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Final

Focused Feasibility Study Report
Area of Concern (AOC) E
Former Naval Ammunition Support Detachment
Vieques, Puerto Rico

Prepared for

Department of the Navy
ATLANTIC

Contract No.
N62470-08-D-1000
CTO-111

1000

November 2012

Prepared by

CH2MHILL®

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Department of the Navy
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Under the

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Virginia Beach, Virginia

Executive Summary

This Focused Feasibility Study (FS) Report presents an evaluation of groundwater remedial alternatives at Area of Concern (AOC) E, located at the former Naval Ammunitions Support Detachment (NASD), Vieques, Puerto Rico (**Figure ES-1**). This FS is focused, because the groundwater pilot study results have demonstrated that In-situ Chemical Oxidation (ISCO) is an applicable technology capable of addressing groundwater contaminants above acceptable levels at AOC E; a technology screening was presented to solely satisfy the requirements of the technology screening process in accordance with the EPA RI/FS Guidance (EPA, 1988). The alternatives evaluated in the FS were developed based on the demonstrated success of ISCO technology.

AOC E is the site of a former 500-gallon underground storage tank (UST). In 1996, UST (along with some contaminated soil) was removed and replaced with a 500-gallon aboveground storage tank (AST) that, in turn, was removed in 2001. AOC E occupies less than about a tenth of an acre. The property that contains AOC E was transferred from the Navy to the Municipality of Vieques (MOV) in April 2001. **Figure ES-2** shows the AOC E site layout map, including monitoring well locations.

Figure ES-3 shows a conceptual model (CSM) of AOC E prior to the UST/soil removal and subsequent pilot studies. As demonstrated in the CSM, the UST that was used to store waste oil from vehicle maintenance operations leaked over time, resulting in petroleum-related contaminant migration through the soil and into groundwater. However, because of the relatively tight characteristics of the water-bearing unit at AOC E, groundwater flows at a low velocity (about 1 foot/year), which resulted in a much localized area of groundwater contamination.

On March 14, 2005, Vieques was placed on the National Priority List (NPL), which required subsequent environmental restoration activities for Navy Installation Restoration (IR) sites on Vieques be conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) unless and until removed from CERCLA authority.

The Final Remedial Investigation (RI) Report for AOC E was issued in July 2008 (CH2M HILL, 2008a). The human health risk assessment (HHRA) contained in the RI Report and additional post RI-sampling in July 2008 identified 6 Chemicals of Concern (COCs) in groundwater: 1,2-dichloroethane (1,2-DCA), benzene, methyl tert butyl ether (MTBE), xylenes, 2-methylnaphthalene and naphthalene. No unacceptable risks were identified for ecological receptors at AOC E. In addition, no unacceptable human health risks were identified for AOC E soil.

The Remedial Action Objective (RAO) for AOC E groundwater is to prevent exposure to COCs in groundwater at concentrations that pose a potentially unacceptable human health risk until the COC concentrations reach the drinking water standard or, in the absence of a drinking water standard, an acceptable risk level (i.e., cumulative risk level for the carcinogenic COCs of 1×10^{-4} to 1×10^{-6}; Hazard Index [HI] of individual non-carcinogenic COCs not greater than 1).

Due to the relatively small footprint of the impacted groundwater, a groundwater pilot study was implemented between January 2010 and December 2011 that treated the entire area of contamination. The pilot study consisted of denitrification-based bioremediation (DBB) for unsaturated soil to address potential soil-to-groundwater leaching, and in situ chemical oxidation (ISCO) for groundwater remediation. Post-DBB injection soil samples collected in November 2011 indicated that soil-to-groundwater leaching is not a concern. The ISCO pilot test, covering the entire impacted area, has shown ISCO to be effective in reducing the concentrations of site COCs in groundwater to acceptable levels. However, the presence of elevated residual persulfate concentrations hinders the ability to monitor for potential rebound of COCs (**Figure ES-4)**. Therefore, the Navy, United States Environmental Protection Agency (USEPA), and Puerto Rico Environmental Quality Board (PREQB) concurred that the pilot study had generally satisfied its objectives and that the site should proceed to an FS to address the residual persulfate and potential for contaminant rebound.

Two rounds of ISCO injections (March and June 2010) using alkaline-activated sodium persulfate during the pilot study decreased COC concentrations in groundwater to below the pilot study preliminary remediation goals (pilot

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study PRGs). Elevated persulfate concentrations (with respect to natural conditions) remain in the groundwater, but the persulfate is likely to naturally attenuate within 2 to 3 years, based on persulfate concentration trends observed during the pilot study.

The primary purpose of the Focused FS is to evaluate performance-based groundwater monitoring of the post-ISCO groundwater conditions to ensure COCs do not rebound to concentrations above cleanup levels as residual persulfate levels decline. The Focused FS also includes evaluating contingency ISCO injections (if necessary) to: (1) accelerate persulfate attenuation, and (2) reduce COC concentrations below the remediation goals (RGs) if rebound is observed.

The following remedial alternatives were developed to meet the RAO:

- Alternative 1—*No Action*
- Alternative 2—*Groundwater Monitoring and Institutional Controls (ICs)*
  - Contingency Plan 1 (CP-1) – *ISCO Injection Using Catalyzed Hydrogen Peroxide Propagations (CHP)*
  - Contingency Plan 2 (CP-2) – *ISCO Injection Using Persulfate*

Each remedial alternative was evaluated against seven feasibility evaluation criteria, as defined in the National Contingency Plan (NCP). The net present value (NPV) costs for Alternatives 1 and 2 and the contingencies for Alternative 2 are presented in the **Table ES-1**.

Alternative 1- *No Action* is neither protective of human health and environment nor compliant with applicable or relevant and appropriate requirements (ARARs). Based on the evaluation against seven NCP criteria, Alternative 2 – *Groundwater Monitoring and ICs*, including contingencies (**Figure ES-5**), is protective of the human health and environment and compliant with ARARs.

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Resumen Ejecutivo

Este Informe del Estudio de Factibilidad Enfocado (FS por sus siglas en inglés) presenta el proceso de evaluación de las alternativas de remediación del agua subterránea en el Área de Preocupación (AOC por sus siglas en inglés) E, que se ubica en el Antiguo Destacamento de Apoyo de Municiones Navales (NASD por sus siglas en inglés), Vieques, Puerto Rico (**Figura ES-1**). Este es un FS enfocado porque los resultados del estudio piloto del agua subterránea han demostrado que la Oxidación Química In-Situ (ISCO por sus siglas en inglés) es una tecnología aplicable capaz de atender los contaminantes del agua subterránea que se encuentran sobre los niveles aceptables en AOC E; se presenta sólo una tecnología ya que por sí sola satisface los requisitos del proceso de evaluación de alternativas de acuerdo con la Guía de la EPA para RI/FS (EPA, 1988). Las alternativas evaluadas en el FS fueron desarrolladas en base al éxito demostrado de la tecnología ISCO.

AOC E es el sitio donde se ubicaba un antiguo tanque soterrado de almacenamiento de 500-galones (UST por sus siglas en inglés). En 1996 el UST (y algo de suelo contaminado) fue removido y reemplazado con un tanque sobre la superficie (AST por sus siglas en inglés) de 500-galones, el cual fue removido en el 2001. AOC E ocupa más o menos una décima parte de un acre. En abril de 2011, la Marina transfirió al Municipio de Vieques (MOV por sus siglas en inglés) la propiedad en la que se encuentra AOC E. La **Figura ES-2** muestra el mapa del sitio AOC E, incluyendo la ubicación de los pozos de monitoreo.

La **Figura ES-3** muestra el modelo conceptual (CSM por sus siglas en inglés) de AOC E antes de la remoción del UST/suelo y de los estudios pilotos subsecuentes. Como se demuestra en el CSM, el UST que fue usado para almacenar aceite usado de las operaciones de manteniendo de vehículos con el tiempo presentó filtraciones, lo que produjo la migración de contaminantes relacionados a petróleo del suelo hacia el agua subterránea. Sin embargo, debido a la formación estrecha de la unidad de agua en AOC E, el agua subterránea fluye a baja velocidad (más o menos 1 pie/año), por lo que la contaminación en el agua subterránea se encuentra en un área bastante localizada.

El 14 de marzo de 2005, Vieques fue añadida a la Lista de Prioridades Nacionales (NPL por sus siglas en inglés), lo cual requiere que las actividades subsecuentes de restauración ambiental para los sitios dentro del Programa de Restauración de la Marina (IR) en Vieques se lleven a cabo siguiendo la Ley de Respuesta Ambiental, Compensación y Responsabilidad Ambiental (CERCLA por sus siglas en inglés) a menos que, y hasta que, Vieques ya no se rija bajo la autoridad de CERCLA.

El Informe Final de la Investigación para la Remediación (RI por sus siglas en inglés) para AOC E fue emitido en julio de 2008 (CH2M HILL, 2008a). La evaluación de riesgos a la salud humana (HHRA por sus siglas en inglés) que se encuentra en el Informe RI y el muestreo adicional que se llevó a cabo en julio de 2008, después de la investigación RI, identificó seis (6) Sustancias Químicas de Preocupación (COCs por sus siglas en inglés) en el agua subterránea: 1,2-dichloroetano (1,2-DCA), benceno, metil tert butil eter (MTBE), xilenos, 2-metilnaftaleno y naftaleno. No se identificaron riesgos para receptores ecológicos en AOC E. Tampoco se identificaron riesgos no aceptables para la salud humana en los suelos de AOC E.

El Objetivo de la Acción de Remediación (RAO por sus siglas en ingles) para AOC E es prevenir la exposición a los COCs que se encuentran en el agua subterránea en concentraciones que presenten un riesgo potencialmente inaceptable a la salud humana hasta que estas concentraciones se reduzcan y alcancen los estándares de agua potable, o de no existir estándares establecidos para agua potable, hasta que las concentraciones de los COCs lleguen a un nivel de riesgo aceptable (es decir, el nivel de riesgo acumulado de los COCs cancerígenos de 1×10^{-4} a 1×10^{-6}; Riesgo de Peligro [HI por sus siglas en inglés) de COCs cancerígenos individuales no mayor que 1).

Debido al espacio relativamente pequeño del agua subterránea afectada, entre enero de 2010 a diciembre de 2011 se implementó un estudio piloto en el agua subterránea que trató toda el área contaminada. El estudio piloto consistió en una bio-remediación basada en una desnitrificación (DBB por sus siglas en inglés) para los suelos no saturados para atender el potencial de lixiviación del suelo hacia el agua subterránea, y una oxidación química (ISCO) para remediar el agua subterránea. Las muestras de suelo que se obtuvieron después de la inyección de DBB en

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noviembre de 2011, indicaron que no existe preocupación de lixiviación del suelo hacia el agua subterránea. La prueba piloto ISCO, que cubrió toda el área afectada, demostró que la tecnología ISCO es efectiva para reducir las concentraciones de los COCs en el agua subterránea del sitio a niveles aceptables. Sin embargo, la presencia de concentraciones elevadas de persulfato residual dificulta la habilidad de monitorear posibles rebotes de los COCs (**Figura ES-4)**. Por lo que, la Marina, la Agencia de Protección Ambiental de los EE.UU. (USEPA por sus siglas en inglés) y la Junta de Calidad Ambiental de Puerto Rico (JCA) acordaron que el estudio piloto en general ha satisfecho sus objetivos y que el sitio deber proceder a un FS para atender el persulfato residual y la posibilidad de rebotes de la contaminación.

Durante el estudio piloto se llevaron a cabo dos rondas de inyecciones de ISCO (marzo y junio 2010) usando persulfato de sodio alcalino activado que disminuyeron las concentraciones de COCs en el agua subterránea por debajo de los objetivos de remediación preliminares del estudio piloto (PRGs por sus siglas en inglés). Concentraciones elevadas de persulfato (en relación a las condiciones naturales) aún permanecen en el agua subterránea, aunque en base a las tendencias de las concentraciones de persulfato que se observaron durante la prueba piloto, se estima que el persulfato probablemente se atenuará naturalmente dentro de 2 a 3 años.

El objetivo principal de FS Enfocado es evaluar las condiciones del agua subterránea posteriores a las inyecciones ISCO para asegurar que los COCs no reboten a concentraciones sobre los niveles de limpieza al mismo tiempo que los niveles de persulfato disminuyan. El FS Enfocado también incluye la evaluación de inyecciones ISCO contingentes (de ser necesario) para: (1) acelerar la atenuación del persulfato, y (2) reducir las concentraciones de COCs por debajo de los objetivos de remediación (RGs por sus siglas en inglés) si es que se observa un rebote.

Se desarrollaron las siguientes alternativas para alcanzar los RAOs:

- Alternativa 1—*No Acción*
- Alternativa 2—*Monitoreo del Agua Subterránea y Controles Institucionales (ICs por sus siglas en inglés)*
  - Plan de Contingencia 1 (CP-1) – *Inyección ISCO Usando Propagaciones de Peróxido de Hidrógeno Catalizado (CHP por sus siglas en inglés)*
  - Plan de Contingencia 2 (CP-2) – *Inyección ISCO Usando Persulfato*

Se evaluó cada alternativa de remediación comparándolas con siete criterios de factibilidad, tal y como se define en el Plan de Contingencia Nacional (NCP por sus siglas en inglés). El valor neto actual (NPV por sus siglas en inglés) de los costos de las Alternativas 1 y 2 y las contingencias de la Alternativa 2 se presentan en la **Tabla ES-1**.

Alternativa 1- La Alternativa de *No Acción* no protege a la salud humana y tampoco cumple con los requisitos aplicables o relevantes (ARARs por sus siglas en inglés). En base a la evaluación contra los siete criterios NCP, la Alternativa 2 – *Monitoreo de Agua Subterránea con ICs,* incluyendo contingencias (**Figura ES-5**), protege a la salud humana y al ambiente, a la vez que cumple con los ARARs.

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TABLE ES-1

Summary of Cost Estimates for Remedial Alternatives

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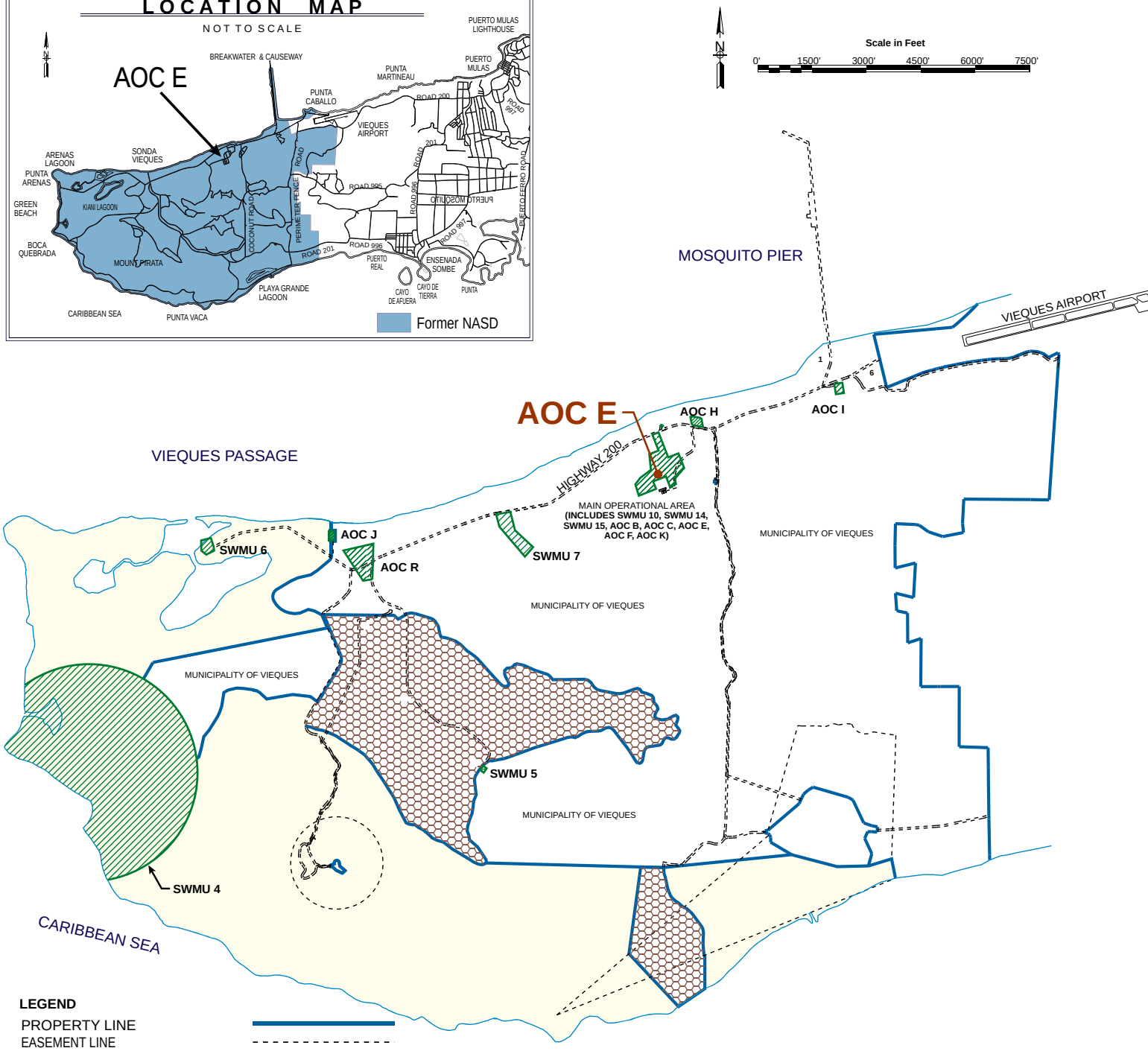
Former NASD, Vieques, Puerto Rico

Alternatives	**Alternative 1**	**Alternative 2**				
Description	**(No Action)** **30 years**	**(Groundwater Monitoring and ICs)** **6 years**	**With Contingency Plan CP-1 (Groundwater Monitoring, ICs, and CHP Injection)** **9 years**		**With Contingency Plan CP-2 (Groundwater Monitoring, ICs, and Persulfate Injection)** **9 years**	
			Groundwater Monitoring	**CHP Injection**	**Groundwater Monitoring**	**Persulfate Injection**
Total Capital Cost	$0	$66,000	$66,000	$126,000	$66,000	$117,000
Total O&M & Periodic Cost (NPV)	$109,000	$194,000	$194,000	$87,000	$194,000	$77,000
Total Project Cost (NPV in 2012$)	$109,000	$260,000	$473,000		$454,000	

Note: NPV is based on discount rate of 4%



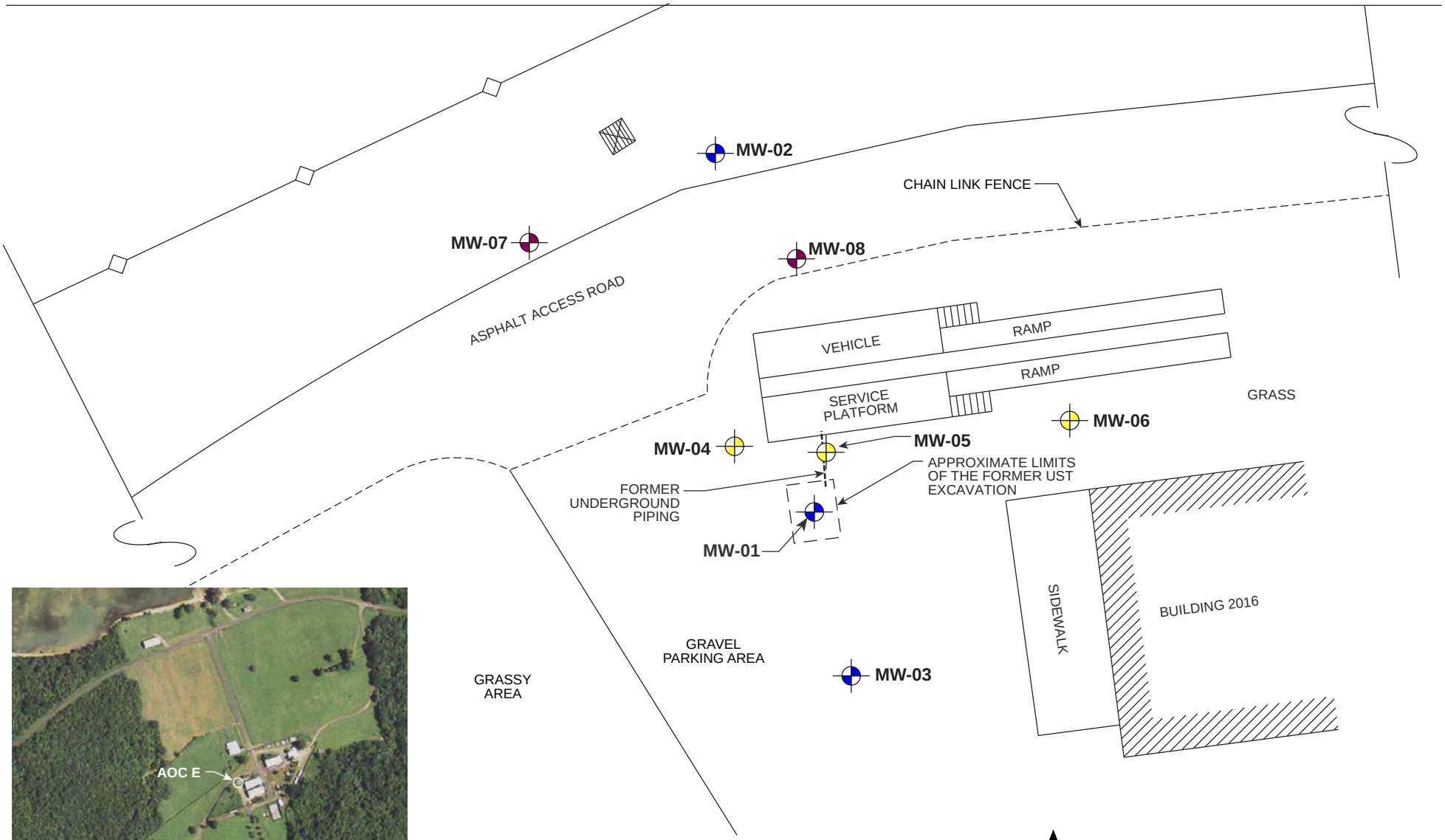
LEGEND

PROPERTY LINE
EASEMENT LINE
APPROXIMATE EDGE OF WATER
UNITED STATES GOVERNMENT\ DEPARTMENT OF THE INTERIOR
PUERTO RICO CONSERVATION TRUST
APPROXIMATE AREAS OF SITES
HIGHWAY OR ROAD

AOC - AREA OF CONCERN
SWMU - SOLID WASTE MANAGEMENT UNIT
NASD - NAVAL AMMUNITION SUPPORT DETACHMENT

SOURCE:
VIEQUES NASD SURVEY LAND TRANSFER & DISPOSAL OVERALL LOCATION SURVEY
PREPARED BY GLENN & SADLER AND LUIS BERRIOS MONTES & ASSOCIATES

FIGURE ES-1
Site Map
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico



2004 Aerial Photograph

LEGEND

- Monitoring Well Installed during the 1998 Site Characterization
- Monitoring Well Installed during the 2000 PA/SI
- Monitoring Well Installed during the 2002 RI

FIGURE ES-2
Site Layout Map
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Vieques, Puerto Rico

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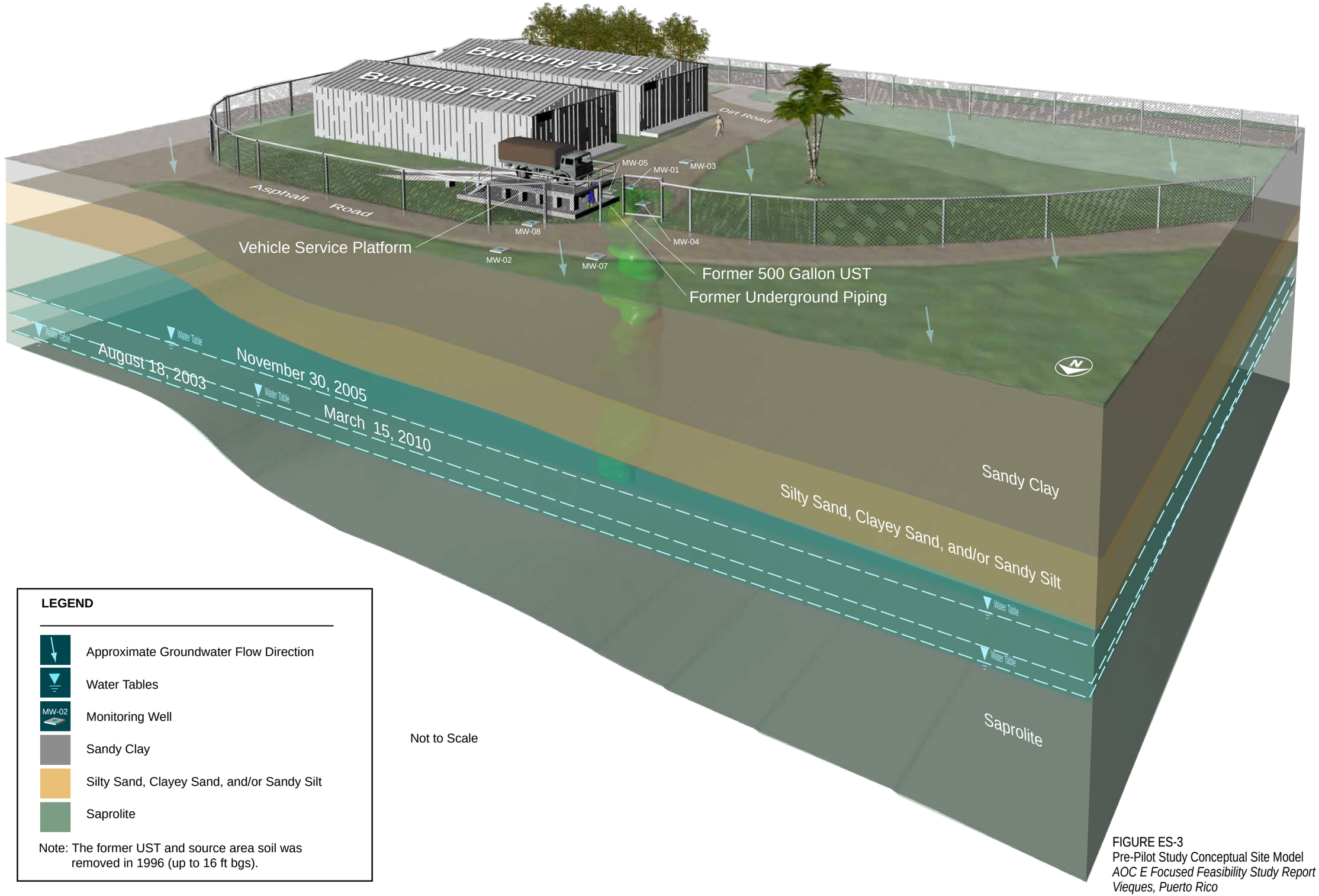

LEGEND

- Approximate Groundwater Flow Direction
- Water Tables
- MW-02 Monitoring Well
- Sandy Clay
- Silty Sand, Clayey Sand, and/or Sandy Silt
- Saprolite

Note: The former UST and source area soil was removed in 1996 (up to 16 ft bgs).

FIGURE ES-3
Pre-Pilot Study Conceptual Site Model
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Vieques, Puerto Rico

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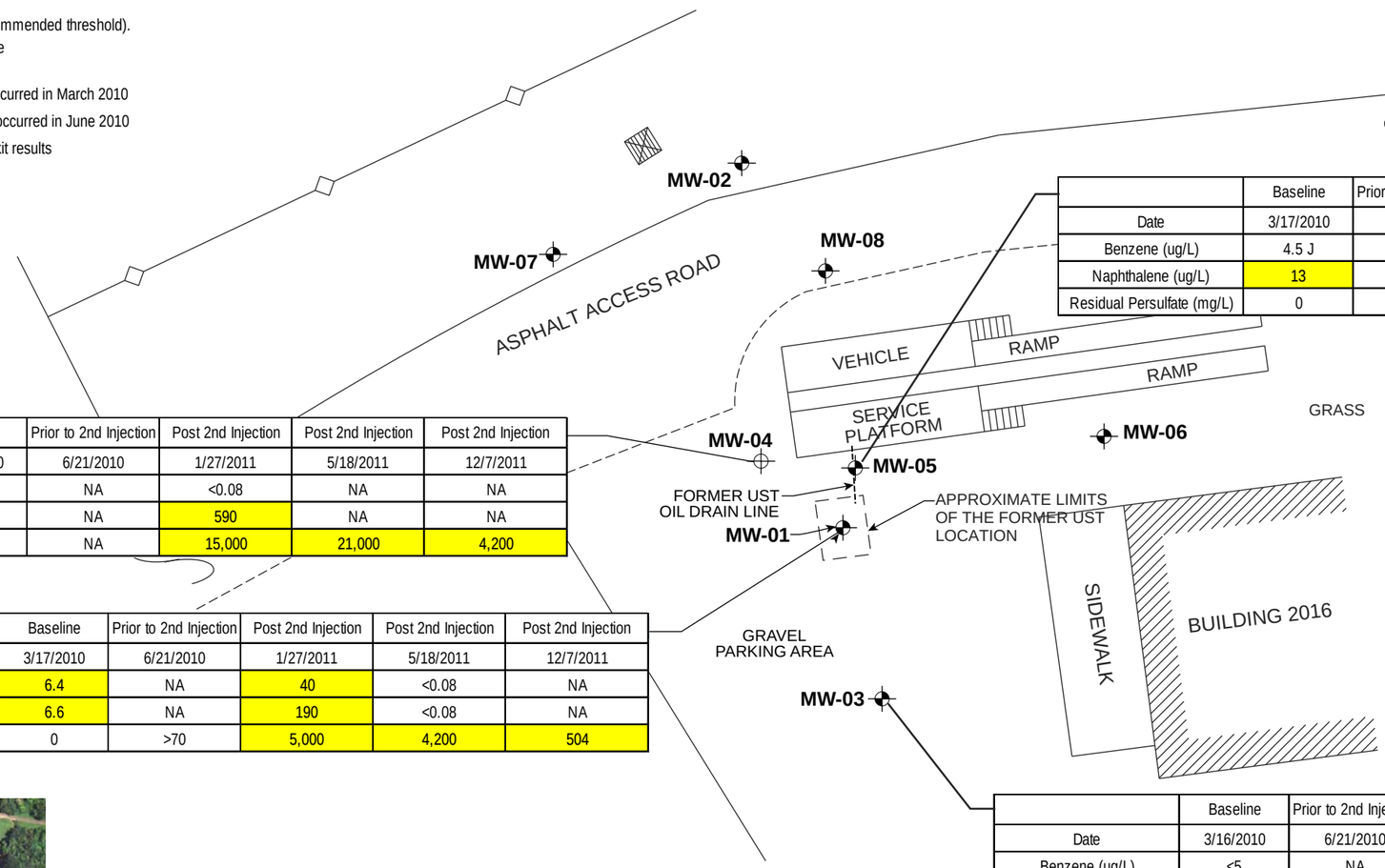
Parameters	Limits	Basis
Benzene (ug/L)	5	PRG
Naphthalene (ug/L)	6.1	PRG
Residual Persulfate (mg/L)	500	Threshold

Notes:

Bolded and highlighted values exceed the limits (PRG or recommended threshold).
Persulfate below 500 mg/L is considered essentially non-reactive
NA= Not Analyzed
1st Pesulfate Injection (200 g/L; approximately 2,000 gallons) occurred in March 2010
2nd Persulfate Injection (180 g/L; approximately 1,000 gallons) occurred in June 2010
Residual concentrations were based on CHEMetrics field test kit results

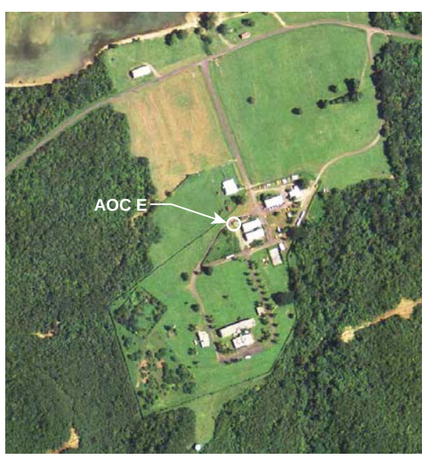


	Baseline	Prior to 2nd Injection	Post 2nd Injection	Post 2nd Injection	Post 2nd Injection
Date	3/17/2010	6/21/2010	1/27/2011	5/18/2011	12/7/2011
Benzene (ug/L)	4.5 J	NA	<0.08	<0.08	NA
Naphthalene (ug/L)	**13**	NA	**14.8**	<0.08	NA
Residual Persulfate (mg/L)	0	>70	**7,000**	**7,000**	**5,040**

	Baseline	Prior to 2nd Injection	Post 2nd Injection	Post 2nd Injection	Post 2nd Injection
Date	3/17/2010	6/21/2010	1/27/2011	5/18/2011	12/7/2011
Benzene (ug/L)	<5	NA	<0.08	NA	NA
Naphthalene (ug/L)	<1	NA	**590**	NA	NA
Residual Persulfate (mg/L)	0.07	NA	**15,000**	**21,000**	**4,200**

	Baseline	Prior to 2nd Injection	Post 2nd Injection	Post 2nd Injection	Post 2nd Injection
Date	3/17/2010	6/21/2010	1/27/2011	5/18/2011	12/7/2011
Benzene (ug/L)	**6.4**	NA	**40**	<0.08	NA
Naphthalene (ug/L)	**6.6**	NA	**190**	<0.08	NA
Residual Persulfate (mg/L)	0	>70	**5,000**	**4,200**	**504**

	Baseline	Prior to 2nd Injection	Post 2nd Injection	Post 2nd Injection	Post 2nd Injection
Date	3/16/2010	6/21/2010	1/27/2011	5/18/2011	12/7/2011
Benzene (ug/L)	<5	NA	NA	NA	NA
Naphthalene (ug/L)	<1	NA	NA	NA	NA
Residual Persulfate (mg/L)	0	>70	**35,000**	**21,000**	**10,750**



2004 Aerial Photograph

North

0 20 40
Scale in Feet

FIGURE ES-4
ISCO Pilot Study - Benzene, Naphthalene, and Residual Persulfate Concentrations
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico

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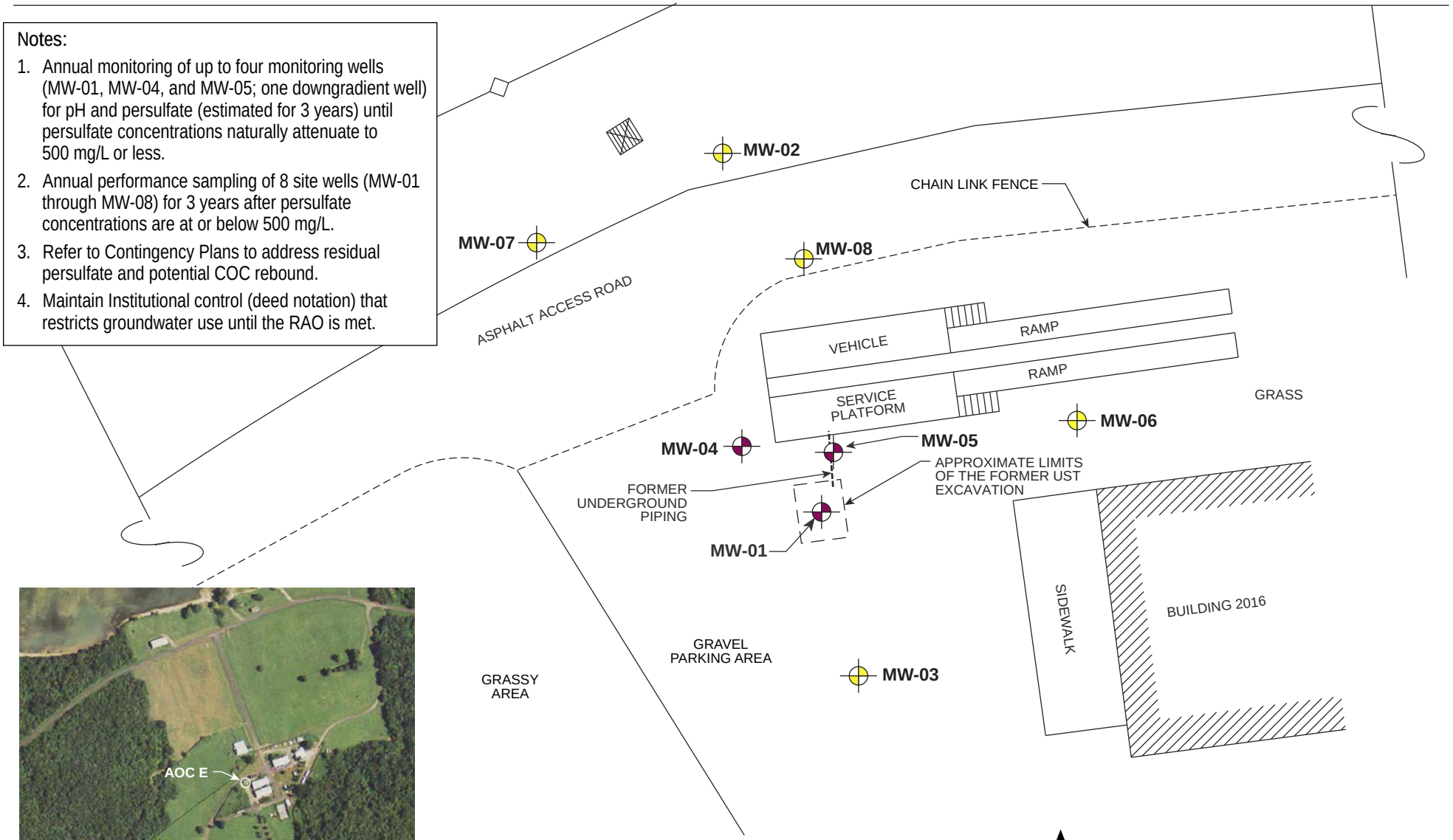
Notes:

1. Annual monitoring of up to four monitoring wells (MW-01, MW-04, and MW-05; one downgradient well) for pH and persulfate (estimated for 3 years) until persulfate concentrations naturally attenuate to 500 mg/L or less.
2. Annual performance sampling of 8 site wells (MW-01 through MW-08) for 3 years after persulfate concentrations are at or below 500 mg/L.
3. Refer to Contingency Plans to address residual persulfate and potential COC rebound.
4. Maintain Institutional control (deed notation) that restricts groundwater use until the RAO is met.



2004 Aerial Photograph

LEGEND

- Proposed Long-tern Monitoring Wells
- Other Monitoring Wells

FIGURE ES-5
Alternative 2 - Groundwater Monitoring and ICs
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G Final Response to USEPA and PREQB Comments

Acronyms and Abbreviations

1,2-DCA	1,2-dichloroethane
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
AOC	Area of Concern
ARARs	applicable or relevant and appropriate requirements
AST	Aboveground Storage Tank
bgs	below ground surface
BTU	British Thermal Unit
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CD-ROM	compact disk read-only memory
CFR	Code of Federal Regulations
CH_4	methane
CHP	Catalyzed Hydrogen Peroxide Propagations
CLEAN	Comprehensive Long-term Environmental Action—Navy
cm/s	centimeter per second
CO_2e	carbon dioxide equivalents
CO_2	carbon dioxide
COC	chemical of concern
CP	Contingency Plan
CSM	conceptual site model
DBB	Denitrification-based bioremediation
DoD	Department of Defense
DOI	Department of the Interior
EISB	Enhanced In-situ Bioremediation
ELCR	excess lifetime cancer risk
ERA	ecological risk assessment
ERP	Environmental Restoration Program
FFA	Federal Facilities Agreement
FS	Feasibility Study
ft bgs	feet below ground surface
GHG	Greenhouse gas
gpm	gallons per minute
HHRA	Human Health Risk Assessment
HI	Hazard Index
H_2O_2	hydrogen peroxide
ICs	institutional controls
IP	injection points
ISCO	in-situ chemical oxidation
IR	Installation Restoration
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MOV	Municipality of Vieques

MPE	multiphase extraction
MW	Monitoring Well
MTBE	methyl tert butyl ether
NAPL	non-aqueous phase liquid
NASD	Naval Ammunitions Support Detachment
NAVFAC	Naval Facilities Engineering Command
Navy	US Department of Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
N_2O	nitrous oxide
NOx	oxides of nitrogen
NPL	National Priorities List
NPV	net present value
O&M	operation and maintenance
ORIN	ORIN Remediation Technologies, LLC
PA	Preliminary Assessment
PA/SI	Preliminary Assessment/Site Inspection
PALs	Project Action Limits
PDF	portable document format
PM	particulate matter
PP	Proposed Plan
PREQB	Puerto Rico Environmental Quality Board
PRWQS	Puerto Rico Water Quality Standards
PRGs	Preliminary Remedial Goals
PVC	polyvinyl chloride
RA	Remedial Action
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
ROD	Record of Decision
RI	Remedial Investigation
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SI	Site Investigation
SOx	sulfur oxides
SPLPs	Synthetic Precipitation Leaching Procedure
SSL	soil screening level
SVOC	semivolatile organic compound
TBC	to be considered
TMV	toxicity, mobility, and volume
TOC	total organic carbon
TPH	total petroleum hydrocarbon
US	United States
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UST	Underground Storage Tank
VOC	volatile organic compound

SECTION 1

Introduction

This Focused Feasibility Study (FS) report presents an evaluation of groundwater remedial alternatives for Area of Concern (AOC) E, located at the former Naval Ammunitions Support Detachment (NASD) in the western portion of Vieques, Puerto Rico (**Figure 1-1).** This FS is focused because the groundwater pilot study results have demonstrated that In-situ Chemical Oxidation (ISCO) is an applicable technology capable of addressing groundwater contaminants above acceptable levels at AOC E. A technology screening was presented to solely satisfy the requirements of the technology screening process in accordance with the EPA RI/FS Guidance (EPA, 1988). The alternatives evaluated in the FS were developed based on the demonstrated ISCO technology.

AOC E is less than a tenth of an acre in size and is located within the main operational area (i.e., Public Works facility) of the former NASD. The primary source of contamination at the site was a former 500-gallon underground storage tank (UST) used between about 1970 and 1996 to store used oil from vehicle maintenance activities on the Building 2016 vehicle service platform (**Figure 1-2**).

This Focused FS was prepared under the United States (U.S.) Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC), Atlantic Division, Comprehensive Long-Term Environmental Action - Navy (CLEAN) Contract N62470-08-D-1000, Contract Task Order (CTO) 111, for submittal to the Navy, United States Environmental Protection Agency (USEPA) Region 2, and the Commonwealth of Puerto Rico Environmental Quality Board (PREQB). The Navy, USEPA, and PREQB work jointly as the former NASD Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Environmental Restoration Program (ERP) Team. The United States Fish and Wildlife Service (USFWS) is also a member of the ERP Team for sites located on former Navy property that is currently administrated by the Department of Interior (DOI). AOC E is not located on DOI property; it is located on property owned by the Municipality of Vieques (MOV).

The Focused FS was developed in accordance with the CERCLA 1980 requirements, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and implemented by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and USEPA's FS guidance (1998). Consistent with the CERCLA process, this Focused FS will support the selection of a preferred remedy. Subsequent to the selection of the remedy, the Proposed Plan (PP), which documents the Navy's and USEPA's preferred remedy, will be prepared and provided for public comment. Following consideration of public comments, the selected remedy will be documented in the Record of Decision (ROD) for AOC E.

1.1 Objectives and Approach

The Remedial Investigation (RI) conducted at AOC E evaluated the nature and extent of contamination and potential risks to human health and the environment (CH2M HILL, 2008a). Although contaminants were present in both soil and groundwater at the site, only localized groundwater contamination was found to pose an unacceptable risk (under the potable use scenario) to hypothetical future residents. The RI identified five groundwater chemicals of concern (COCs) comprising 1,2-dichloroethane (1,2-DCA), 2-methylnaphthalene, methyl-tert-butyl ether (MTBE), naphthalene, and xylenes. Additional groundwater samples collected and analyzed in July 2008 indicated the COC concentrations had generally declined. However, the benzene concentration exceeded its Federal Maximum Contaminant Level (MCL) in July 2008; therefore, benzene was added to the site COC list.

In addition to identifying groundwater COCs, the RI identified a localized area of free-phase product accumulation in groundwater around the former UST. A multi-phase extraction (MPE) pilot study was conducted during the RI to assess the effectiveness of this technology on mitigating the free-phase product. While product removal efforts were largely successful at removing free-phase product from the subsurface, due to the localized occurrence of groundwater COCs above anticipated cleanup levels, a second pilot study was implemented between January 2010 and October 2011 at AOC E. The second pilot study consisted of Denitrification-based Bioremediation (DBB)

for unsaturated soil to address potential soil-to-groundwater COC leaching and In-Situ Chemical Oxidation (ISCO) to address groundwater contamination.

As detailed in Section 3, post-DBB injection soil samples collected in November 2011 indicated that soil to groundwater leaching is not a concern. Additionally, the ISCO pilot test has shown ISCO to be effective in reducing the concentrations of site COCs in groundwater to below cleanup levels. However, the presence of elevated residual persulfate concentrations hinders the ability to monitor for potential rebound of COCs.

Based on the above information, this Focused FS was completed to evaluate performance-based groundwater monitoring of the post-ISCO groundwater conditions to ensure COCs do not rebound to concentrations above cleanup levels as residual persulfate levels decline. In the event that elevated residual persulfate concentrations persist and/or COC rebound above cleanup levels is observed during performance-based monitoring, two contingencies were also evaluated: (1) ISCO Injection Using Catalyzed Hydrogen Peroxide Propagations (CHP) to address persistent residual persulfate and (2) ISCO Injection Using Persulfate to address COC rebound above cleanup levels.

The specific objectives of the Focused FS are:

- Identify applicable or relevant and appropriate requirements (ARARs) and to-be-considered (TBC) criteria that may affect the groundwater remedy selection for AOC E.
- Develop remedial action objectives (RAOs).
- Develop and evaluate groundwater remedial alternatives to ensure unacceptable risks to potential receptors from exposure to groundwater at AOC E are mitigated.

Pursuant to USEPA FS guidance (1988), the remedial alternatives were evaluated according to their ability to meet the following seven NCP criteria:

- Overall protection of human health and the environment
- Compliance with ARARs
- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume
- Short-term effectiveness
- Implementability
- Cost

Two other NCP criteria (State/Commonwealth acceptance and community acceptance) will be evaluated during the preparation of the PP and public comment process. The information presented herein will be used by the ERP Team to propose a remedial alternative that complies with the requirements of CERCLA and the NCP.

1.2 Report Organization

The Focused FS Report is organized as follows:

Section 1 – Introduction, presents the objectives and approach of the Focused FS and organization of the Focused FS Report.

Section 2 – Site Characterization Summary, presents the site background, site history, major findings of the RI, and updated nature and extent of contamination, contaminant fate and transport, and baseline risk assessment.

Section 3 – Soil/Groundwater Pilot Study Summary, presents a summary of the groundwater and soil pilot studies at AOC E.

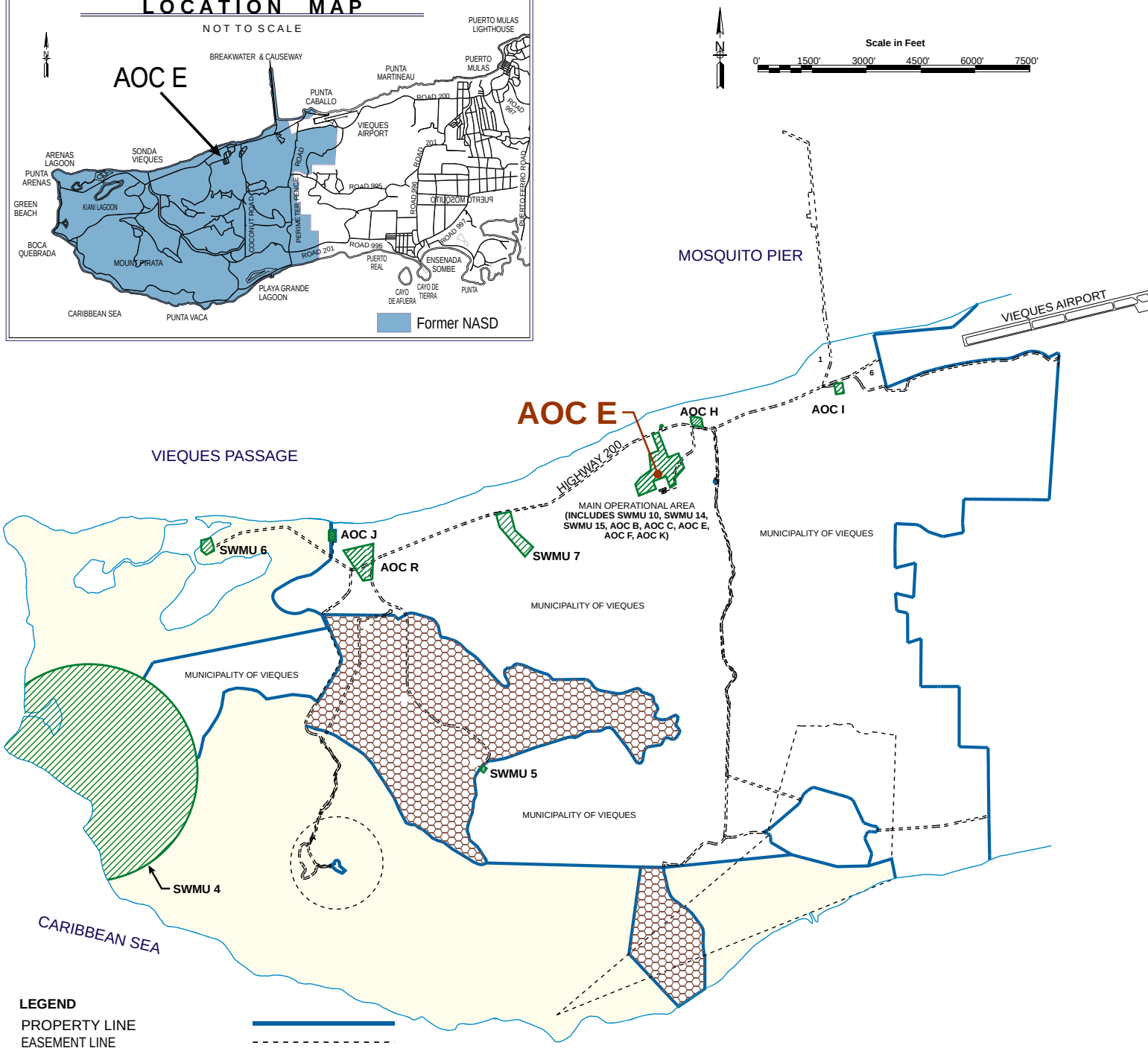
Section 4 – Remedial Action Objectives and Approach, identifies applicable technologies and presents the RAOs, ARARs, preliminary remediation goals (PRGs), and general response actions.

Section 5 – Development of Remedial Alternatives, describes the two remedial alternatives and the two contingencies associated with the second alternative in more detail.

Section 6 – Detailed Analysis of Remedial Alternatives, presents an individual and comparative analysis of two alternatives with the contingencies.

Section 7 – References, cites references used in this Focused FS.

Tables and figures are provided at the end of each respective section. Appendices are provided electronically in portable document format (PDF) on a compact disk read-only memory (CD-ROM).



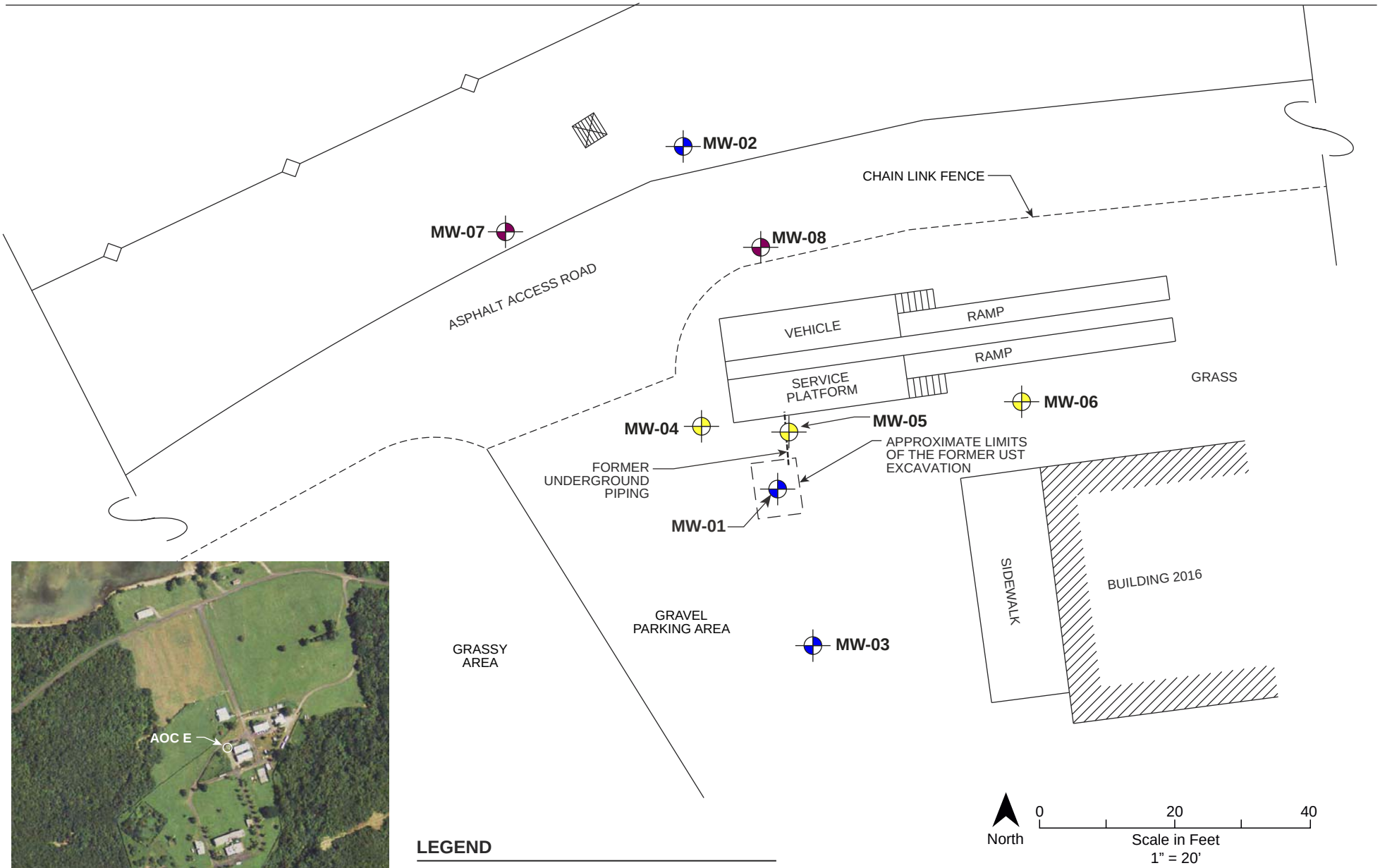
LEGEND

PROPERTY LINE
EASEMENT LINE
APPROXIMATE EDGE OF WATER
UNITED STATES GOVERNMENT\ DEPARTMENT OF THE INTERIOR
PUERTO RICO CONSERVATION TRUST
APPROXIMATE AREAS OF SITES
HIGHWAY OR ROAD

AOC - AREA OF CONCERN
SWMU - SOLID WASTE MANAGEMENT UNIT
NASD - NAVAL AMMUNITION SUPPORT DETACHMENT

SOURCE:
VIEQUES NASD SURVEY LAND TRANSFER & DISPOSAL OVERALL LOCATION SURVEY
PREPARED BY GLENN & SADLER AND LUIS BERRIOS MONTES & ASSOCIATES

FIGURE 1-1
Site Location Map
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico



2004 Aerial Photograph

LEGEND

- Monitoring Well Installed during the 1998 Site Characterization
- Monitoring Well Installed during the 2000 PA/SI
- Monitoring Well Installed during the 2002 RI

FIGURE 1-2
Site Layout Map
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico

CH2MHILL

SECTION 2

Site Characterization Summary

This section presents a general summary of the previous environmental investigations, the site conceptual model, updated nature and extent of contamination, and potential human health and ecological risks at AOC E. More detailed information is provided in the following documents:

- Final Remedial Investigation Report, Area of Concern (AOC) E, Former Naval Ammunition Support Detachment, Vieques, Puerto Rico (CH2M HILL, 2008a; Referred as "RI Report").
- Final In-Situ Remediation Pilot Studies (AOC E and AOC I Sites) Sampling and Analysis Plan, Former Naval Ammunition Support Detachment, Vieques, Puerto Rico. (CH2M HILL, 2010), hereafter referred to as "Pilot Study SAP".

This section does not repeat the detailed information already presented in the RI Report, and Pilot Study SAP, but instead summarizes relevant site background information and updated nature and extent of contamination to support the FS evaluation. Additions and modifications to information presented in the RI Report and Pilot Study SAP are based on data collected during the soil and groundwater pilot study.

Figure 2-1 presents a graphical representation of the pre-UST removal and pre-pilot study (groundwater and soil) conceptual site model for AOC E and supports the discussion in this section.

2.1 Site Background and History

Vieques Island is approximately 7 miles southeast of the eastern tip of the main island of Puerto Rico. Vieques is the largest island in the Commonwealth of Puerto Rico, encompassing 33,088 acres. The Navy purchased large portions of Vieques in the early 1940s to conduct activities related to military training. Site operations within the former NASD consisted mainly of ammunition loading and storage, vehicle and facility maintenance, and some training. The Navy ceased facility-wide operations on the former NASD in April 2001, in accordance with the January 30, 2000, Presidential Directive of the Secretary of Defense associated with transfer of lands of the Navy-owned western portion of Vieques. The land transfer was completed on May 1, 2001, and the Navy has had no military presence at the main operational area since. Currently, the Navy's involvement at the former NASD comprises the environmental restoration program.

The former NASD was placed on the USEPA National Priorities List (NPL) as part of the former Atlantic Fleet Weapons Training Area – Vieques on February 11, 2005. The Navy, USEPA Region 2, PREQB, and the DOI entered into a Federal Facilities Agreement (FFA) for the former NAD in 2007, as a result of the NPL listing and pursuant to CERCLA. The FFA establishes the procedural framework and schedule for implementing the CERCLA response actions for Vieques.

As noted previously, the UST at AOC E was used to store used oil generated from vehicle maintenance activities associated with Building 2016 (**Figure 1-2**). Specifically, oil removed from vehicles on the vehicle service platform was drained to the UST via an underground pipe between the platform and the UST. In 1996, the UST was removed and replaced with a 500-gallon aboveground storage tank (AST) that, in turn, was removed in 2001.

The property that contains AOC E was transferred to the MOV in April 2001. Currently, people are not continuously present nor reside at or near the site, but MOV Public Works personnel may periodically be present for routine grounds maintenance (e.g., mowing).

2.2 Previous Investigations and Pilot Studies

A chronological list of previous investigation and remedial activities as well as milestone dates at AOC E is summarized below:

- **UST Removal Report (1996)** – Removal of the 500-gallon used oil UST; confirmatory soil samples were collected as part of the PREQB UST program as Site 2016. The UST Removal Report indicated contaminated soil was found below the UST (Reliable Mechanical, Inc., 1997).
- **Site Characterization of AOC E (1998)** - Site characterization included the collection of eight subsurface soil samples and the installation and sampling of three monitoring wells (MW-01 through MW-03) (CH2M HILL, 1999).
- **Environmental Baseline Survey (EBS) (2000)** – Documents the environmental conditions of the property in support of former Navy land transfer from the Navy to the MOV, DOI, and the Puerto Rico Conservation Trust (Program Management Company, 2000).
- **Expanded Preliminary Assessment/Site Investigation (Expanded PA/SI) (2000)** –Assessed impacts to site groundwater from releases from the former UST, which included the installation and sampling of three monitoring wells (MW-04, MW-05, and MW-06) and the sampling of two existing monitoring wells (CH2M HILL, 2000).
- **Quitclaim Deed (2001)** – Transferred the former NASD land to the MOV, DOI, and the Puerto Rico Conservation Trust (Department of the Navy, 2001).
- **Initial RI Sampling Event (2002 and 2003)** – Based on the recommendations of the Expanded PA/SI, an initial RI sampling event was conducted in 2002 and 2003. The RI field work consisted of drilling seven borings from which 20 samples were collected to assist in characterizing the horizontal and vertical extent of soil contamination. In addition, two monitoring wells were installed (MW-07 and MW-08) and sampled, additional groundwater samples were collected from four existing monitoring wells, and in-situ hydraulic conductivity tests were performed (CH2M HILL, 2004).
- **Multiphase Extraction (MPE) Pilot Study (2002)** – A MPE pilot study was conducted to provide quantitative performance, cost, and design information to help evaluate the effectiveness of this technology in mitigating the free phase hydrocarbon product accumulation. The MPE system recovered groundwater at an average rate of approximately 0.216 gallons per minute (gpm) over the study period. A total of approximately 11,000 gallons of emulsified free product and groundwater were recovered (CH2M HILL, 2004).
- **Supplemental RI (2004 and 2005)** – Supplemental data were collected including another round of groundwater samples from all eight monitoring wells in 2004 and surface soil samples from seven locations, subsurface soil samples from four locations, and groundwater samples from six existing monitoring wells in 2005 (CH2M HILL, 2008a).
- **Pilot Study (2010 and 2011)** – A groundwater ISCO pilot study was conducted in 2010 and 2011, which included baseline sampling, two rounds of persulfate ISCO injection, three rounds of residual persulfate field measurements, and two rounds of groundwater sampling in January and May 2011 from wells MW-01 and MW-05 (and one sample collected from well MW-04 in May 2011) for benzene and naphthalene analysis. In addition an unsaturated soil DBB pilot study was conducted in 2010 and 2011, which included baseline sampling, injecting calcium nitrate, and collecting post-injection soil samples (CH2M HILL, 2008b; CH2M HILL, 2010; and CH2M HILL, 2011).

2.3 Physical Characteristics

AOC E is relatively flat with the ground elevation approximately 43 feet (ft) above mean sea level (amsl). The vegetative cover is primarily grass, weeds, and scrub brush. Because of the developed and periodically maintained conditions of AOC E, the ecological habitat potential in the area is minimal. The site is fenced to discourage trespassing.

Because of the site's flat nature, stormwater at the site tends to pond rather than run off. To the north of the site, a stormwater ditch channels stormwater runoff toward the north of the Public Works access roads. No surface water bodies are located at or immediately adjacent to AOC E.

The soil at the site is comprised of sandy clay from Quaternary or Holocene alluvium that is interspersed with silty/clayey sand. This extends from ground surface to a depth of approximately 35 feet below ground surface (bgs) in the vicinity of the former UST. Beneath these deposits lies a clay-rich saprolite weathered in place from the underlying granodiorite bedrock. The sandy clay and silty/clayey sand layers are generally above the water table, though the lowest sections are submerged at the site's highest recorded water levels. The top of the saprolite varies in depth from approximately 28 feet bgs to about 50 feet bgs (**Figure 2-2**).

The depth to groundwater typically ranges from approximately 28 to 43 feet bgs, with seasonal (or drought-induced) fluctuations up to approximately 15 feet. Groundwater is usually encountered in the saprolite, but sometimes in the lowest portion of the unconsolidated, sandy deposits directly above the saprolite. Groundwater flows generally to the north-northwest, with an average linear horizontal groundwater velocity estimated at approximately 1 ft/year (CH2M HILL, 2008a). **Figure 2-3** shows the potentiometric surface map based on a representative groundwater level measurement in March 2010.

2.4 Nature and Extent of Contamination

The primary source of the petroleum-related contamination was detected in soil at a depth interval of 12 to 16 feet below ground surface (ft bgs) in the vicinity and underneath the former UST; however, the UST and soil contamination from this depth interval was removed during the UST removal in 1996 (CH2M HILL, 2008a). Residual subsurface soil contamination was detected beneath the former UST primarily at a depth interval from 16 to 38 ft bgs (CH2M HILL, 2008a). Free product had been observed in three monitoring wells (MW-01, MW-04, and MW-05) in the vicinity of the former UST and associated piping. The majority of the recoverable free product was removed during the MPE pilot study in 2002, and subsequent manual bailing in 2005. Free product in-well thickness was 0.48 feet in MW-01 and 0.24 feet in MW-05 in May 2002 prior to the MPE pilot study, and no free product was measured in MW-01 and MW-05 in August 2002. The initial nature and extent of contamination in environmental media were characterized as part of the RI based on the analysis of soil and groundwater data (CH2M HILL, 2008a). During the RI characterization, chemical concentrations were compared to risk-based screening values for human health and ecological receptors and Puerto Rico UST-based screening values.

A complete human health risk assessment (HHRA) and an ecological risk assessment (ERA) were included in the RI Report (CH2M HILL, 2008a). The complete HHRA, contained in the Appendix N of the RI Report (CH2M HILL, 2008a), evaluated the soil data collected during the 2002 RI and the 2005 Supplemental RI. Potential current and future receptors were evaluated in the HHRA. The only current potential receptor type at AOC E is maintenance workers, who may conduct grounds maintenance. As shown in the human health conceptual site model (CSM) for potential human receptors (**Figure 2-5**), future receptors evaluated in the HHRA consisted of future maintenance workers, industrial workers, construction workers, recreational users (adult, youth, and child), and residents (adult and child). EPA's target range for excess lifetime cancer risk (ELCR) associated with CERCLA sites is 1-in-10,000 ($1x10^{-4}$) to 1-in-1,000,000 ($1x10^{-6}$). Similarly, the target non-cancer hazard index (HI) is 1 or less. The potential risks based on the direct contact exposure pathways to contaminants detected in soil were within the USEPA acceptable range and, therefore, no soil COCs requiring remediation from a risk-based perspective were identified. Based on the HHRA estimates, unacceptable risks only exist for future residents (adult and child), associated with ingestion and dermal contact from potable use of groundwater, and inhalation of bathroom air from tap water use. The HHRA identified five site-related groundwater COCs that contributed to the unacceptable HHRA estimates: 1,2 DCA, 2-methylnaphthalene, MTBE, naphthalene, and xylenes. Additional groundwater samples collected and analyzed in 2008 indicated the COC concentrations had generally declined. However, the concentration of benzene was observed above its MCL in monitoring well MW-05; therefore, benzene was added to the site COC list. Table 2-1 summarizes the potential receptors and exposure scenarios evaluated in the HHRA and presents the resulting risk and hazard estimates and site-related COCs identified for site groundwater.

The complete ERA, contained in the Appendix O of the RI Report (CH2M HILL, 2008a), concluded that no unacceptable risks were identified for ecological receptors at AOC E.

The summary of soil and groundwater contamination provided below is based on site conditions just prior to the 2010/2011 pilot study (i.e., conditions that influenced performing the pilot study). Additional details are discussed in Section 3:

- Soil sampling conducted just before and at the end of the pilot study demonstrated the soil concentrations of the groundwater COCs were below levels that likely pose a leaching-to-groundwater concern, which is discussed in more detail in Section 3.
- As of March 2010 and prior to the ISCO pilot study, free product (0.16 ft thick) was detected in only one monitoring well (MW-01). Following the implementation of ISCO pilot study in 2010, no residual free product has been observed in any of the monitoring wells. Additional details regarding the MPE pilot study are provided in Appendix H of the AOC E RI Report (CH2M HILL, 2008a).
- Prior to implementing the groundwater pilot study, groundwater contamination was localized around three monitoring wells (MW-01, MW-04, and MW-05). Due to the small “footprint” of groundwater contamination, the pilot study groundwater remedy could be implemented across the entire COC-impacted area, which is discussed further in Section 3.

Table 2-2 lists the groundwater COCs at AOCE, including the maximum concentrations detected in AOC groundwater prior to the pilot study. **Figure 2-4** presents the distribution of groundwater COCs prior to the ISCO pilot study, including the concentrations measured during the pilot study baseline sampling event in 2010.

TABLE 2-1
Summary of Human Health Risk Assessment (HHRA)
AOC E Focused Feasibility Study Report
Former NASD, Vieques, Puerto Rico

						Carcinogenic Risk			Non-Carcinogenic Hazard Quotient		
Receptor	**Time Frame**	**Age Group**	**Exposure Media**	**Exposure Pathways**	**COCs**	**Ing**	**Inh**	**Derm**	**Ing**	**Inh**	**Derm**
Maintenance Workers	Current/Future	Adult	Surface Soil (0-2 ft)	Ing/Derm/Inh	none	--	--	--	--	--	--
Recreational Users	Future	Adult/Youth/Child	Surface Soil (0-2 ft)	Ing/Derm/Inh	none	--	--	--	--	--	--
Construction Workers	Future	Adult	Total Soil (0-6 ft)	Ing/Derm/Inh	none	--	--	--	--	--	--
Industrial Workers	Future	Adult	Total Soil (0-6 ft)	Ing/Derm/Inh	none	--	--	--	--	--	--
			Groundwater	Ing/Derm	none	--	--	--	--	--	--
Residents	Future	Child	Soil‡	Ing/Derm/Inh	none	--	--	--	--	--	--
			Groundwater†	Ing/Derm/Inh	2-Methylnaphthalene	--	--	--	0.2	NA	0.2
					1,2-DCA	--	--	--	0.008	1.1	0.0004
					MTBE	--	--	--	NA	0.4	NA
					Xylene (total)	--	--	--	0.008	0.5	0.004
					Naphthalene	--	--	--	0.03	7	0.02
		Adult	Soil‡	Ing/Derm/Inh	none	--	--	--	--	--	--
			Groundwater	Ing/Derm/Inh	none	--	--	--	--	--	--
		Adult/Child Aggregate	Surface Soil	Ing/Derm/Inh	none	--	--	--	--	--	--
			Groundwater†	Ing/Derm/Inh	1,2-DCA	4.E-06	3E-07	6.E-08	--	--	--

Notes:
†Additional Groundwater samples collected in 2008 indicated that the concentration of benzene was above its MCL; therefore, benzene was added to the site COC list.
‡ The higher concentration of two depths interval (Surface Soil [0-2 ft] or Total Soil [0-6 ft]) was used.
Ing - Ingestion
Derm - Dermal Contact
Inh - Inhalation
DCA - Dichloroethane
MTBE - tert-Butyl methyl ether
NA - Not Available

TABLE 2-2
Summary of Groundwater Chemicals of Concern (COCs)
AOC E Focused Feasibility Study Report
Former NASD, Vieques, Puerto Rico

COCs	Maximum Detected Site Concentrations (1998 - 2010)	MCL	Tap Water RSL	PRWQS
Benzene	17	5	0.39	5
1,2-Dichloroethane	32	5	0.15	3.8
2-Methylnaphthalene	16	NA	27	NA
MTBE	1220	NA	12	NA
Naphthalene	35	NA	0.14	NA
Total Xylenes	26.2	10,000	190	NA

Notes:

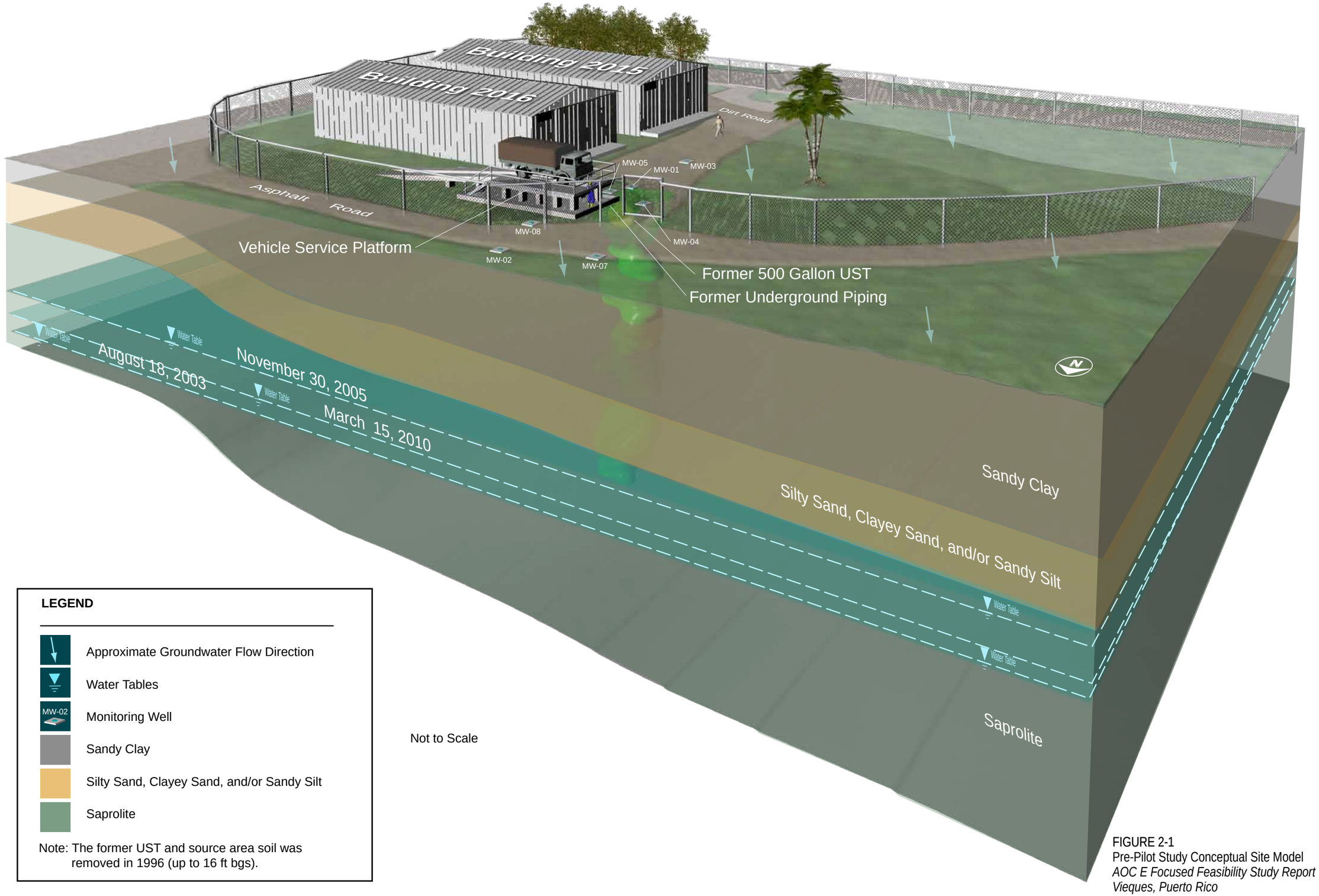
All concentrations are in µg/L.

NA- Not Applicable or Not Available.

MCL- Maximum Contaminant Level

PRWQS – Puerto Rico Water Quality Standards (March, 2010; for groundwater - Class SG)

RSL – EPA Regional Screening Level (May, 2012) for tap water; lowest of the cancer-based and non-cancer based levels (based on excess lifetime cancer risk of $1x10^{-6}$ and hazard index of 1).



LEGEND

- Approximate Groundwater Flow Direction
- Water Tables
- MW-02 Monitoring Well
- Sandy Clay
- Silty Sand, Clayey Sand, and/or Sandy Silt
- Saprolite

Note: The former UST and source area soil was removed in 1996 (up to 16 ft bgs).

FIGURE 2-1
Pre-Pilot Study Conceptual Site Model
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico

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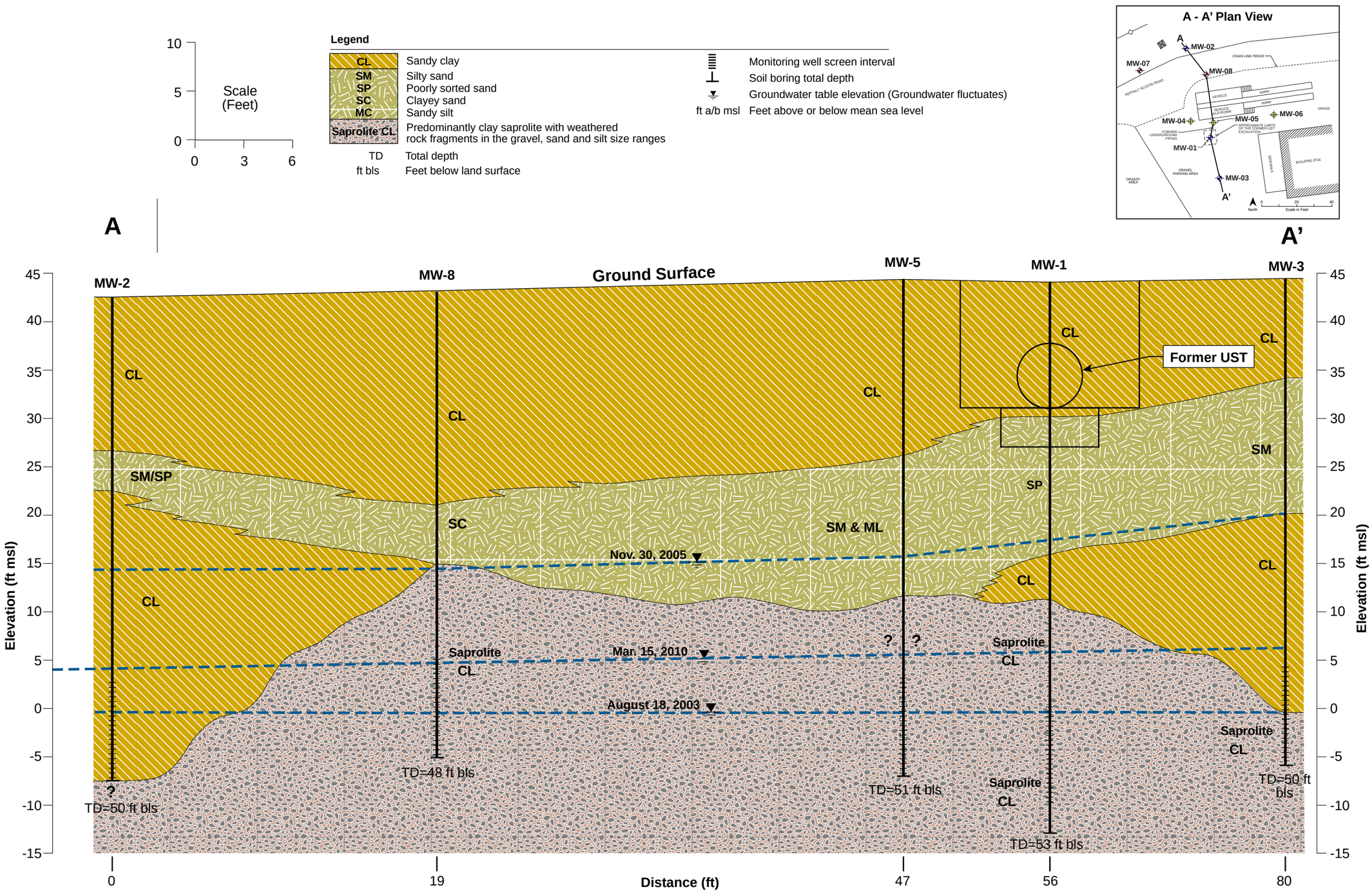

FIGURE 2-2
Geologic Cross Section
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico

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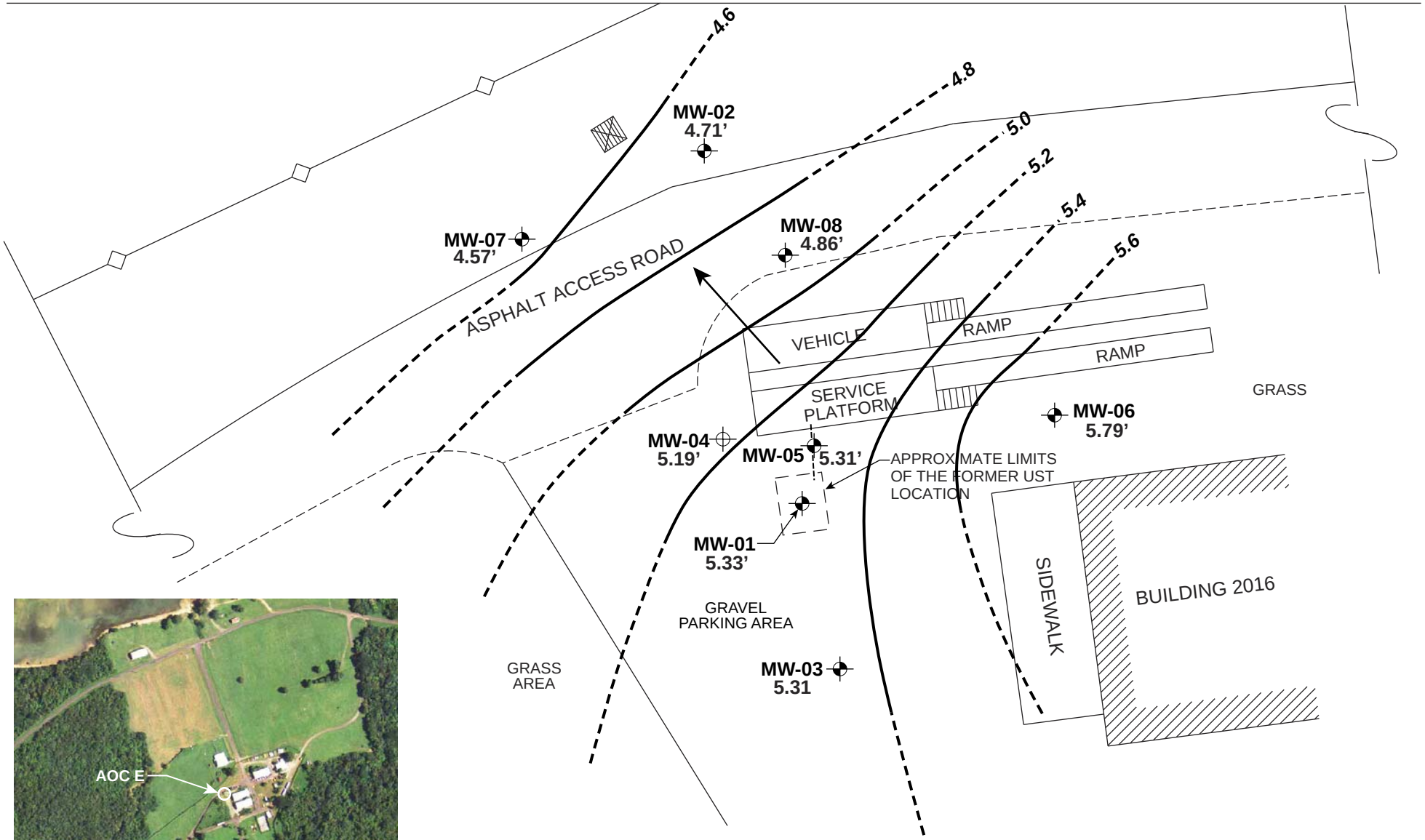

2004 Aerial Photograph

LEGEND

Estimated Direction of Groundwater Flow

5.19' Water Level, feet above mean sea level

Estimated Groundwater Contour
(March 15, 2010)
Dashed where inferred

FIGURE 2-3
Potentiometric Map, March 15, 2010
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico

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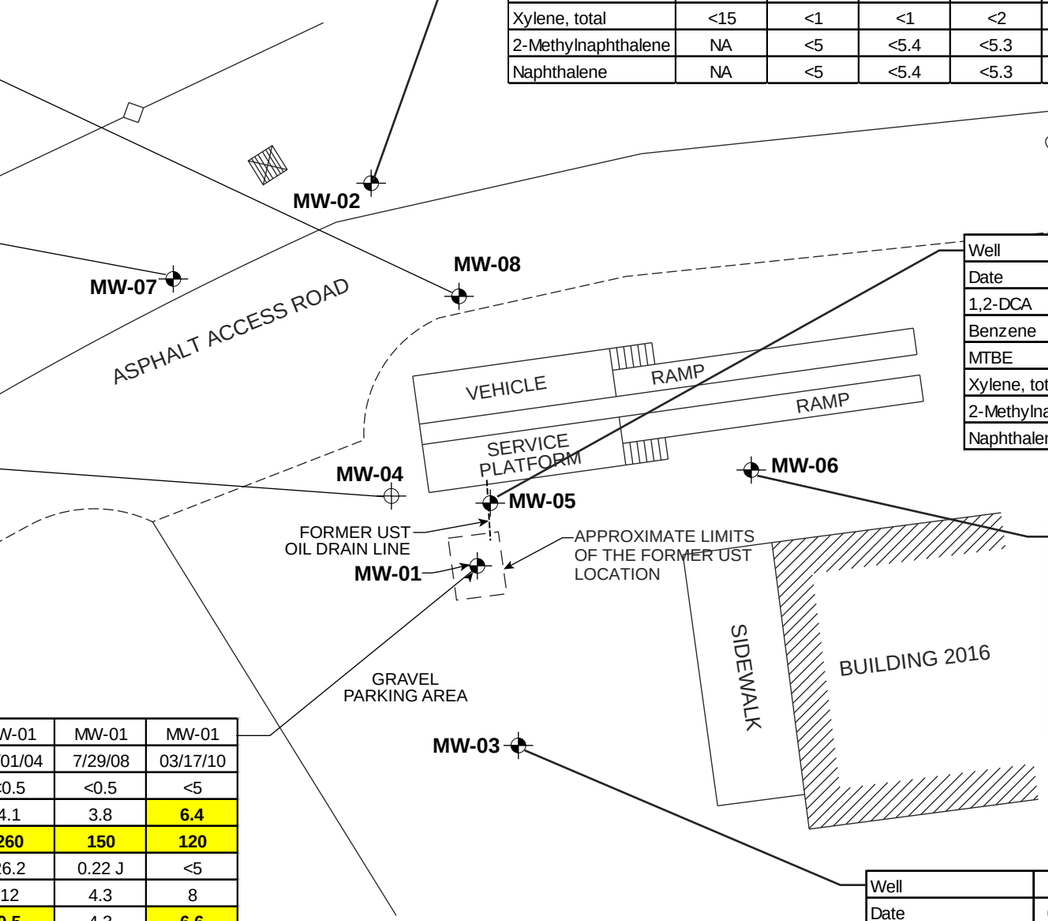
Well	MW-08	MW-08	MW-08
Date	09/08/03	08/26/04	7/27/08
1,2-DCA	<0.5	<0.5	<0.5
Benzene	<0.5	<0.5	<0.5
MTBE	<0.5	<0.5	<0.5
Xylene, total	<2	<2	<0.5
2-Methylnaphthalene	<5.2	<5.2	<0.098
Naphthalene	<5.2	<5.2	<0.098

Well	MW-02	MW-02	MW-02	MW-02	MW-02
Date	09/11/98	04/05/00	05/21/02	08/26/04	7/27/08
1,2-DCA	NA	<1	<1	<0.5	<0.5
Benzene	<5	<1	<1	<0.5	<0.5
MTBE	NA	NA	NA	<0.5	<0.5
Xylene, total	<15	<1	<1	<2	<0.5
2-Methylnaphthalene	NA	<5	<5.4	<5.3	<0.093
Naphthalene	NA	<5	<5.4	<5.3	<0.093

Well	MW-07	MW-07	MW-07
Date	05/24/02	08/26/04	7/27/08
1,2-DCA	<1	<0.5	<0.5
Benzene	<1	<0.5	<0.5
MTBE	NA	<0.5	<0.5
Xylene, total	<1	<2	<0.5
2-Methylnaphthalene	<5.8	<5	<0.11
Naphthalene	<5.8	<5	<0.11

Well	MW-05	MW-05	MW-05	MW-05	MW-05
Date	05/01/00	08/30/04	08/30/04	7/29/08	03/17/10
1,2-DCA	**32**	**7.2**	**6.4**	<0.5	<5
Benzene	**6**	0.81 J	1.2 J	**16**	4.5 J
MTBE	NA	**1,180**	**1,220**	**560**	**520**
Xylene, total	20	1 J	1.8 J	2.5	<5
2-Methylnaphthalene	14	<5.1	<5.2	16 J	5.8
Naphthalene	**15**	<5.1	<5.2	**35 J**	**13**

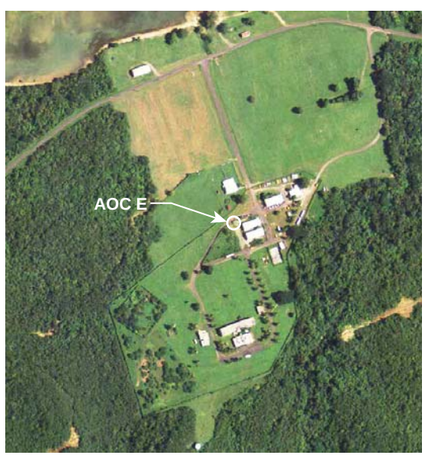
Well	MW-04	MW-04	MW-04	MW-04	MW-04
Date	04/27/00	05/21/02	08/30/04	7/28/08	03/17/10
1,2-DCA	<1	4.6	0.59	<0.5	<5
Benzene	2	0.72 J	0.21 J	<0.5	<5
MTBE	NA	NA	**234**	110	**130**
Xylene, total	0.9 J	<1	<2	<0.5	<5
2-Methylnaphthalene	<5	<5.4	<5.1	0.05 J	<1
Naphthalene	<5	<5.4	<5.1	<0.093	<1



Well	MW-06	MW-06	MW-06	MW-06
Date	04/27/00	05/20/02	08/25/04	7/28/08
1,2-DCA	<1	<1	<0.5	<0.5
Benzene	<1	<1	<0.5	<0.5
MTBE	NA	NA	<0.5	0.11 J
Xylene, total	<1	<1	<2	<0.5
2-Methylnaphthalene	<6	<5.4	<5.3	0.035 J
Naphthalene	<6	<5.4	<5.3	0.1

Well	MW-01	MW-01	MW-01	MW-01
Date	09/11/98	09/01/04	7/29/08	03/17/10
1,2-DCA	NA	<0.5	<0.5	<5
Benzene	**17**	4.1	3.8	**6.4**
MTBE	NA	**260**	**150**	**120**
Xylene, total	<15	26.2	0.22 J	<5
2-Methylnaphthalene	NA	12	4.3	8
Naphthalene	NA	**9.5**	4.3	**6.6**

Well	MW-03	MW-03	MW-03	MW-03	MW-03	MW-03
Date	09/11/98	04/05/00	05/21/02	08/25/04	7/27/08	03/16/10
1,2-DCA	NA	<1	<1	<0.5	<0.5	<5
Benzene	<5	<1	<1	<0.5	<0.5	<5
MTBE	NA	NA	NA	<0.5	<0.5	<5
Xylene, total	<15	<1	<1	<2	<0.5	<5
2-Methylnaphthalene	NA	<5	<5.6	<5.3	<0.095	<1
Naphthalene	NA	<5	<5.6	<5.3	<0.095	<1



2004 Aerial Photograph

COCs	PRG (ug/L)
1,2-DCA	3.8
Benzene	5
MTBE	120
Xylene, total	10,000
2-Methylnaphthalene	27
Naphthalene	6.1

Notes:
NA - Not analyzed
< - Non-detected results (below detection limit)
J - Estimated results
All concentrations in ug/L
Bolded and hihglighted results exceed PRGs
1,2-Dichloroethane - 1,2-DCA
Methyl-tert-butyl ether - MTBE

North

0 20 40
Scale in Feet

FIGURE 2-4
Groundwater COC Concentrations
(Prior to Pilot Study)
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico

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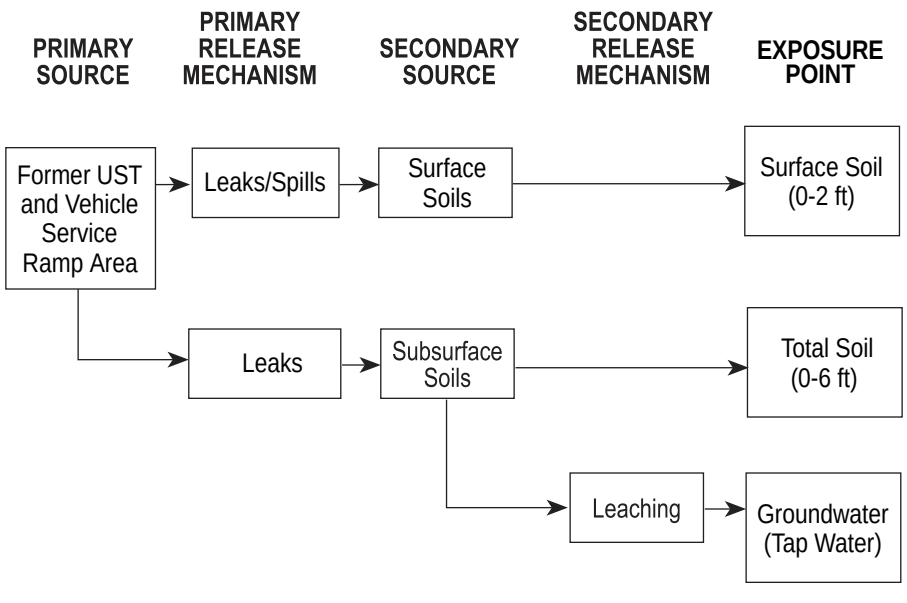


	POTENTIAL HUMAN RECEPTORS				
EXPOSURE ROUTE	Current/Future Maintenance Worker	Future Recreator	Future Industrial Worker	Future Construction Worker	Future Resident
Ingestion	●	●	—	—	●
Dermal Contact	●	●	—	—	●
Inhalation	●	●	—	—	●
Ingestion	—	—	●	●	●
Dermal Contact	—	—	●	●	●
Inhalation	—	—	●	●	●
Ingestion	—	—	●	—	●
Dermal Contact	—	—	●	—	●
Inhalation	—	—	—	—	●

LEGEND

→ Potentially Complete Exposure Pathway

● Exposure Pathways for Quantitative Evaluation

— Incomplete Pathways

FIGURE 2-5
Human Health Conceptual Model
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico

SECTION 3

Soil/Groundwater Pilot Study Summary

The soil/groundwater pilot study was conducted in 2010/2011 at AOC E to evaluate the implementability and effectiveness: (1) of DBB in reducing the potential for contamination in the unsaturated soil to leach into groundwater and result in COC concentrations above potential cleanup levels, and (2) of ISCO in reducing groundwater COC concentrations to anticipated cleanup levels. **Figure 3-1** presents the layout of the pilot study DBB injections and ISCO treatment wells. Implementation of the pilot study was in general accordance with the document titled *Final In-Situ Remediation Pilot Studies (AOC E and AOC I Sites) Sampling and Analysis Plan (SAP), Former Naval Ammunition Support Detachment, Vieques, Puerto Rico* (CH2M HILL, 2010), except as noted below.

The DBB soil pilot study summary is presented in Section 3.1. The Post-RI soil data collected in 2008 were used as the baseline (pre-pilot study) soil data. Soil data collected in November 2011 were used as the post-pilot study data for performance evaluation. A summary of soil data collected pre- and post- pilot study is included in **Appendix A** (**Appendix A-1** for pre-pilot study data, **Appendix A-2** for post-pilot study data, and Appendix A-3 for baseline and post-DBB pilot study soil concentrations).

The ISCO groundwater pilot study summary is presented in Section 3.2. The details of the ISCO groundwater pilot study are summarized in the document titled *Technical Memorandum - Summary of AOC E Pilot Study Status and Rationale for Transitioning to Feasibility Study, Area of Concern (AOC) E, Former Naval Ammunition Support Detachment Vieques, Puerto Rico* (CH2M HILL, 2011), which is included as **Appendix B**.

Data validation reports for soil and groundwater data not included in the RI Report are included in **Appendix C**.

3.1 DBB Soil Pilot Study Summary

The DBB soil pilot study was performed between March 2010 and November 2011. The DBB soil pilot approach consisted of injecting calcium nitrate into seven injection points and evaluating whether the technology could reduce the mass of petroleum hydrocarbons (primarily naphthalene) in the unsaturated zone by enhanced anaerobic biodegradation. It was anticipated that the result would be a lower potential for groundwater COCs to leach from soil to groundwater, even though the pre-pilot study concentrations were below levels likely posing a leaching-to-groundwater concern. Although soil concentrations detected during the RI did not represent unacceptable risk, the intent of treating groundwater COCs in soil was to evaluate mitigation of potential longer-term soil-to-groundwater leaching.

The Post-RI soil sampling results collected in July 2008 were used as baseline data (pre-injection). In July 2008, two continuous soil cores (SB-20 beneath the former UST and SB-21 beneath the former piping) were drilled. A total of 13 soil samples were collected between 8 and 38 ft bgs analyzed for VOCs, SVOCs, total metals, total organic carbon (TOC), total petroleum hydrocarbon (TPH), pH, porosity, grain size, and Synthetic Precipitation Leaching Procedure (SPLPs) for VOCs, SVOCs and metals. The July 2008 data collected from borings SB-20 beneath the former UST and SB-21 beneath the former piping (**Figure 3-2**) indicated that the highest COC concentrations occurred in the unsaturated soil interval from 16 to 20 feet bgs, and in the smear zone from 28 to 30 and 34 to 36 feet bgs. A summary of the baseline soil sample results are included in **Appendix A-1**.

The soil pilot study was initiated in March 2010 by injecting calcium nitrate through seven temporary injection points (IP-1 through IP-7) in the unsaturated zone (16 to 26 feet bgs) in the area of highest contamination identified during the RI and baseline sampling (**Figure 3-1**). A total of approximately 800 gallons of 5 percent calcium nitrate solution was delivered by gravity feed under an average flow of 1.5 gallon per minute (gpm). Following calcium nitrate injection, 20 gallons of chase water was injected into each injection point.

In November 2011, five post-injection soil samples were collected from two soil borings (SB-22 and SB-23; see **Figure 3-2**). SB-22 was collected adjacent to SB-20, and SB-23 was collected adjacent to SB-21. Two soil samples were collected from each soil boring location – one from unsaturated zone soil interval (16-20 feet bgs) and another one from the smear zone of interest (28-32 ft bgs). In addition, one field duplicate sample was collected

from the 28-32 ft bgs interval at location SB-23. The 2008 pre treatment samples were collected and analyzed using EPA CLP SOM01. Because of concentrations too high for the low level analysis, some samples were analyzed using the low concentration procedure (very similar to the 5035 method) and some were analyzed using the medium level procedure (very similar to the 5030 method). The post treatment soil samples were analyzed following method SW-846-5035 unless the concentrations were too high, in which they were analyzed by method 5030. These five soil samples were analyzed for total concentrations of COCs (benzene, 1,2-DCA, MTBE, total xylenes, 2-methylnaphthalene, and naphthalene), SPLPs of COCs, TOC, pH, TPH, and nitrate. A summary of the post-injection soil sample results are included in **Appendix A-2**. The SPLP results are shown in **Figure 3-2**.

The conclusions of the soil pilot study are summarized below:

- Both the pre- and post-pilot study soil data show the SPLP concentrations of COCs in soil are likely significantly below concentrations indicative of a soil-to-groundwater leaching concern (i.e., leaching that may result in groundwater concentrations above likely cleanup levels), especially because the soil samples were collected from areas representing the highest levels of residual soil contamination.

Based on the above information and the risk assessments performed during the RI, no soil remedy is necessary at AOC E; therefore, soil is not included in the Focused FS remedial alternatives evaluation.

3.2 ISCO Groundwater Pilot Study Summary

The purpose of the ISCO pilot study was to evaluate whether the remediation technology could reduce COC concentrations in groundwater below pilot study PRGs and reduce the time required to achieve these levels. The ISCO pilot study for groundwater was performed between January 2010 and December 2011. The pilot study consisted of a baseline sampling event, two ISCO injections events, and three groundwater monitoring events. Due to elevated residual persulfate concentrations in groundwater, only COCs that had exhibited PRG exceedances during baseline sampling were analyzed in groundwater samples collected from select wells during the post-injection sampling events. The elevated residual persulfate and the non-detect results for the COCs during the second post-injection sampling event also obviated the need to implement the planned EISB component of the groundwater pilot study (i.e., installation of ORC socks).

In March 2010, baseline groundwater samples were collected from MW-01, MW-03, MW-04, and MW-05. **Table 3-1** lists the pilot study PRGs for the six groundwater COCs and the criterion on which each was based. It is noted that naphthalene's tap water Regional Screening Level (RSL) of 1.4 µg/L was used as a conservative pilot study PRG to evaluate the ability to reduce groundwater concentrations. For the purposes of the remedial alternatives evaluation in this Focused FS, a risk-based cleanup level is used (See Section 4.4).

As shown in **Figure 2-4**, during the baseline sampling event (2010), 1,2-DCA and xylenes were not detected and only benzene, MTBE, and naphthalene were detected above pilot study PRGs. The only concentration of benzene above the pilot study PRG of 5 µg/L was detected at MW-01 (6.4 µg/L); MTBE was detected above the pilot study PRG of 120 µg/L at MW-01 (120 µg/L), MW-04 (130 µg/L), and MW-05 (520 µg/L). Baseline exceedances of the naphthalene pilot study PRG of 1.4 µg/L were observed at MW-01 (6.6 µg/L) and MW-05 (13 µg/L).

In March and June 2010, ISCO injections were conducted using sodium hydroxide activated persulfate in MW-01, MW-03, MW-04, and MW-05. In March 2010, approximately 3,344 pounds (lbs) of sodium persulfate dissolved in water with 3,200 lbs of sodium hydroxide (a 20 percent by weight, or approximately 200,000 mg/L activated persulfate solution) were injected. In June 2010, approximately 1,672 lbs of sodium persulfate dissolved in water with 1,600 lbs of sodium hydroxide (an 18 percent by weight, or approximately 180,000 mg/L activated persulfate solution) were injected. **Figure 3-3** shows the concentrations of groundwater COCs and residual persulfate concentrations during the pilot study. Additionally**, Figures 3-4**, **3-5**, and **3-6** identify groundwater concentration trends for Naphthalene, Benzene, and Persulfate respectively. The key results of pilot study are discussed below.

The first post-ISCO groundwater sampling event was planned for January 2011; however, field measurement of residual persulfate concentration exhibited up to 35,000 mg/L of residual persulfate in the monitoring wells. Studies by the persulfate vendor, FMC Corporation (FMC), suggest persulfate is no longer reactive at concentrations below about 500 mg/L. However, studies by EPA suggest persulfate may be reactive at

concentrations lower than 500 mg/L. For this reason, and at the request of EPA persulfate researcher Scott Huling, the Navy agreed to add ascorbic acid to all sample containers containing residual persulfate to sequester the persulfate and prevent it from continuing to react with contaminants (if present) in the sample container. However, because residual persulfate concentrations considerably higher than 500 mg/L were persistent at AOC E and because the Pilot Study SAP (CH2M HILL, 2010) indicated groundwater samples would be collected for analysis by the contracted laboratory once residual persulfate was consumed, select groundwater samples were sent to the persulfate manufacturer, FMC, for evaluation. FMC's laboratory analyzed the samples for contaminants using GC/MS with the purge and trap method for extraction. In addition, FMC conducted tests to assess the cause for persulfate's unusual stability. Although FMC's analytical methods were sound, FMC's research analytical laboratory is not a Department of Defense (DoD) certified laboratory. However, the analytical data can be used with confidence for pilot study conditions and interpretations. MW-01 exhibited 190 µg/L of naphthalene and 40 µg/L of benzene while MW-04 contained 590 µg/L of naphthalene. The increase of COC concentrations in groundwater after the first persulfate injection is likely due in part due to the release of adsorbed COCs from the soil matrix into the groundwater as a result of oxidized organic material and in part due to physical agitation in the subsurface during injections.

Supplemental laboratory studies performed by FMC indicated: (1) the residual persulfate was still reactive (i.e., would continue react with COCs, if present in AOC E groundwater) and (2) catalyzed hydrogen peroxide (H_2O_2) was the most feasible (among eight treatments conducted) to facilitate a decrease of the residual persulfate concentrations should that become desirable or necessary.

The second post-ISCO groundwater sampling event was planned for May 2011. Residual persulfate concentrations, however, were similar to those measured in January 2011. Nonetheless, two groundwater samples were collected (from MW-1 and MW-5) and sent to FMC's laboratory for further study. Neither benzene nor naphthalene was detected above the laboratory detection limit of 0.08 µg/L. This suggested that the ISCO treatment technology was successful in oxidizing COCs to concentrations below PRGs.

The third post-ISCO groundwater sampling event was conducted in December 2011 during which only field measurement of residual persulfate concentrations were collected. The results showed persulfate concentrations decreased in all wells, but still remained elevated relative to baseline conditions (see **Figure 3-3**).

The ISCO pilot study results indicate activated persulfate can treat low concentration COCs to below likely cleanup levels. However, the potential rebound of COCs in groundwater from back-diffusion and other processes may not be possible until the residual persulfate has decreased to below 500 mg/L, at which concentration persulfate is not considered reactive by the manufacturer.

TABLE 3-1
Pilot Study Preliminary Remediation Goals
AOC E Focused Feasibility Study Report
Former NASD, Vieques, Puerto Rico

COCs	Pilot Study PRGs	Source
Benzene	5 µg/L	MCL
1,2-Dichloroethane	5 µg/L	MCL
2-Methylnaphthalene	150 µg/L	Based on a Hazard Index (HI) of 1 and the November 2008 EPA Regional Screening Level (RSL)
MTBE	120 µg/L	Based on the cancer risk of 10^{-5} and the November 2008 EPA Regional Screening Level
Naphthalene	1.4* µg/L	Based on the cancer risk of 10^{-5} and the November 2008 EPA Regional Screening Level
Total xylenes	10,000 µg/L	MCL

* Note: A pilot study PRG of 1.4 µg/L was selected solely to represent a conservative screening value to evaluate the technical implementability and effectiveness of the proposed pilot study technology.

Reference: CH2M HILL, 2010. *Final In-Situ Remediation Pilot Studies (AOC E and AOC I Sites) Sampling and Analysis Plan, Former Naval Ammunition Support Detachment, Vieques, Puerto Rico*. January.

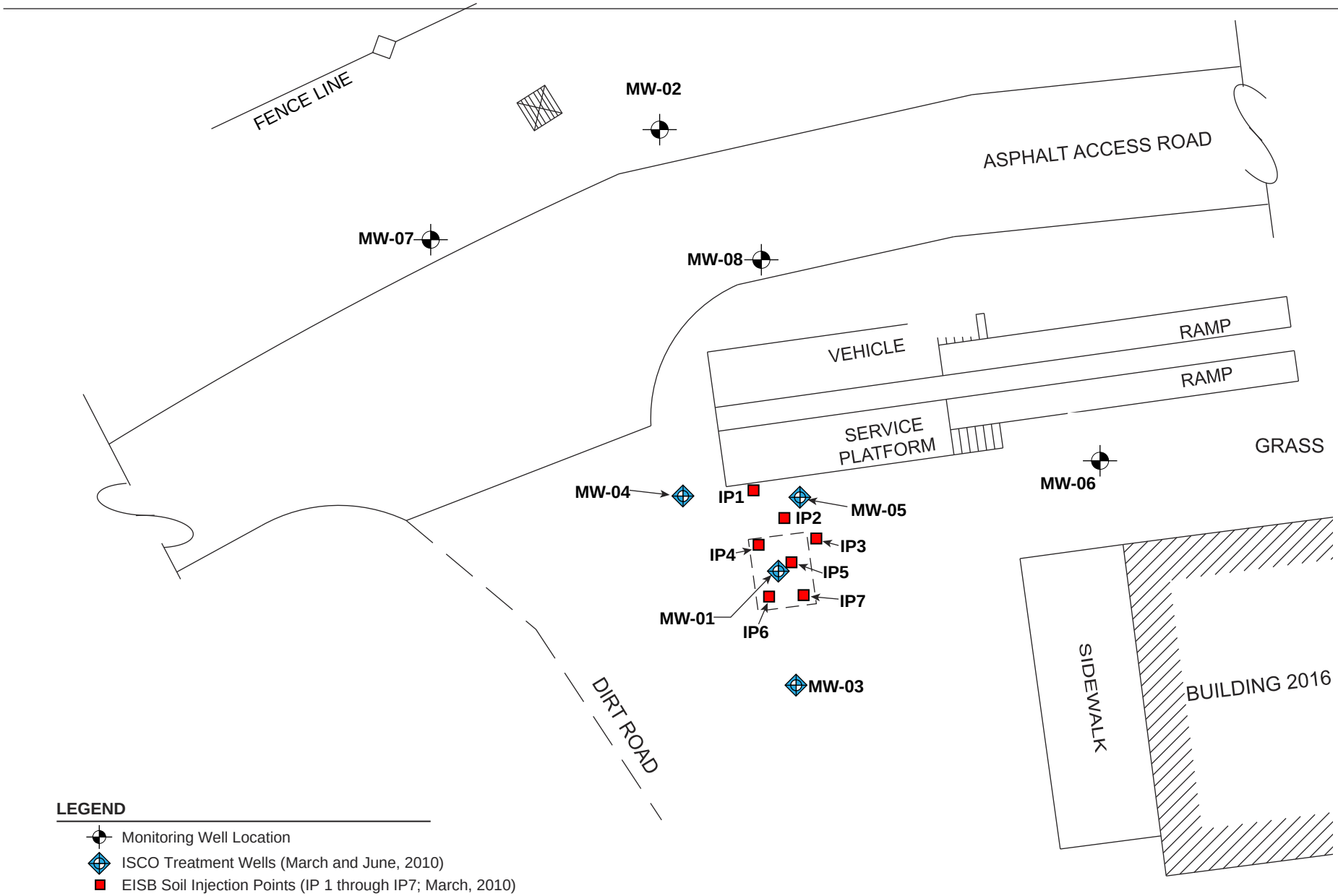


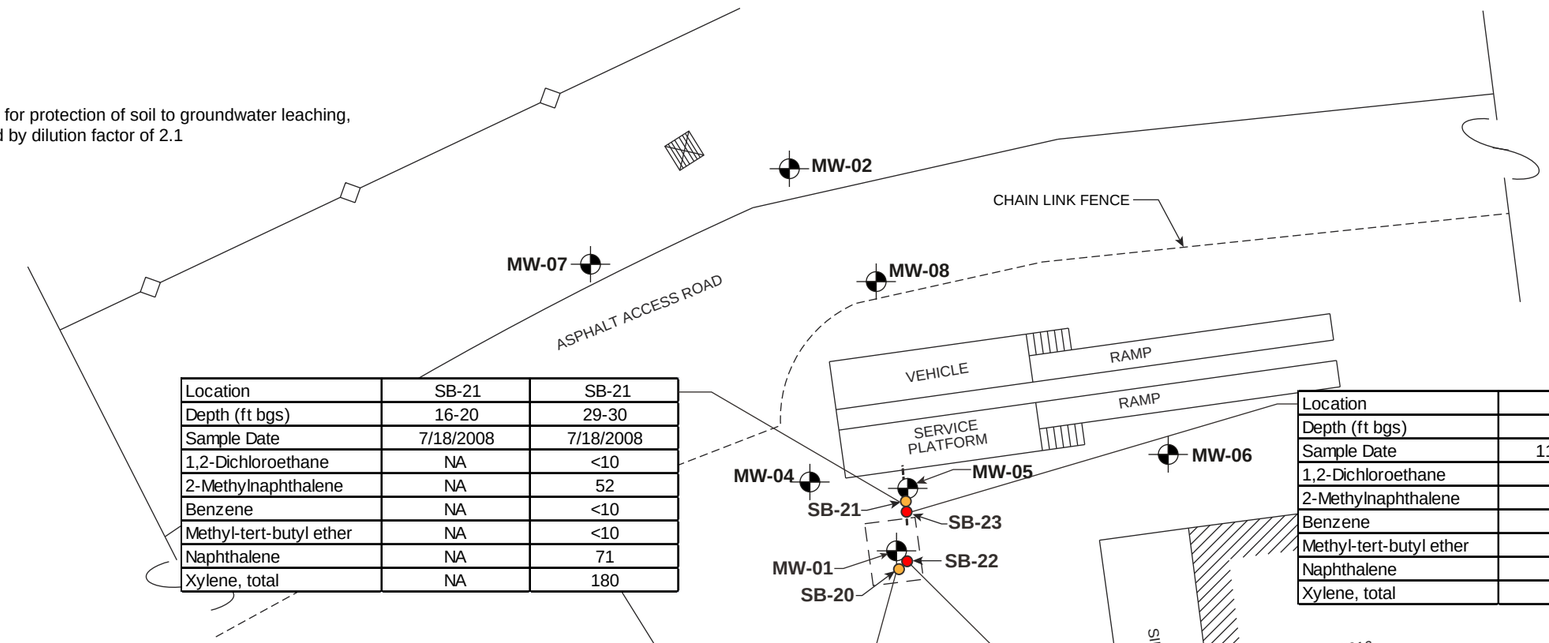
FIGURE 3-1
Pilot Study DBB Injection Points
and ISCO Treatment Wells
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico

CH2MHILL

ES092211083434TPA F3-1 Pilot Study EISB Injection Points-rev1.ai

COCs	Soil PALs (µg/L)
1,2-Dichloroethane	10.5
2-Methylnaphthalene	315
Benzene	10.5
Methyl-tert-butyl ether	252
Naphthalene	210
Xylenes, total	21,000

Notes:
NA - Not Analyzed
All concentrations are SPLP results in µg/L.
Soil Project Action Levels (PALs) were established for protection of soil to groundwater leaching, which were groundwater pilot study PRGs adjusted by dilution factor of 2.1



Location	SB-21	SB-21
Depth (ft bgs)	16-20	29-30
Sample Date	7/18/2008	7/18/2008
1,2-Dichloroethane	NA	<10
2-Methylnaphthalene	NA	52
Benzene	NA	<10
Methyl-tert-butyl ether	NA	<10
Naphthalene	NA	71
Xylene, total	NA	180

Location	SB-23	SB-23
Depth (ft bgs)	16-20	28-32
Sample Date	11/1/2011	11/1/2011
1,2-Dichloroethane	<0.5	<2.5
2-Methylnaphthalene	71	23
Benzene	<0.5	<2.5
Methyl-tert-butyl ether	<0.5	<2.5
Naphthalene	92 J	46
Xylene, total	3.1 J	580

Location	SB-20	SB-20
Depth (ft bgs)	16-18	28-30
Sample Date	7/18/2008	7/18/2008
1,2-Dichloroethane	NA	<10
2-Methylnaphthalene	NA	<50
Benzene	NA	<10
Methyl-tert-butyl ether	NA	<10
Naphthalene	NA	<50
Xylene, total	NA	<10

Location	SB-22	SB-22
Depth (ft bgs)	16-20	28-32
Sample Date	11/1/2011	11/1/2011
1,2-Dichloroethane	<0.5	<0.5
2-Methylnaphthalene	<2	30
Benzene	<0.5	<0.5
Methyl-tert-butyl ether	<0.5	<0.5
Naphthalene	<2	49
Xylene, total	<1	72

2004 Aerial Photograph

LEGEND

- Post RI Subsurface Soil Sample Location - 2008
- Confirmatory Soil Sample Locations (Post-Nitrate Injection)
- Monitoring Well

North

0 20 40
Scale in Feet
1" = 20'

FIGURE 3-2
Soil SPLP Concentrations
(Baseline and Post-DBB Injection)
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico

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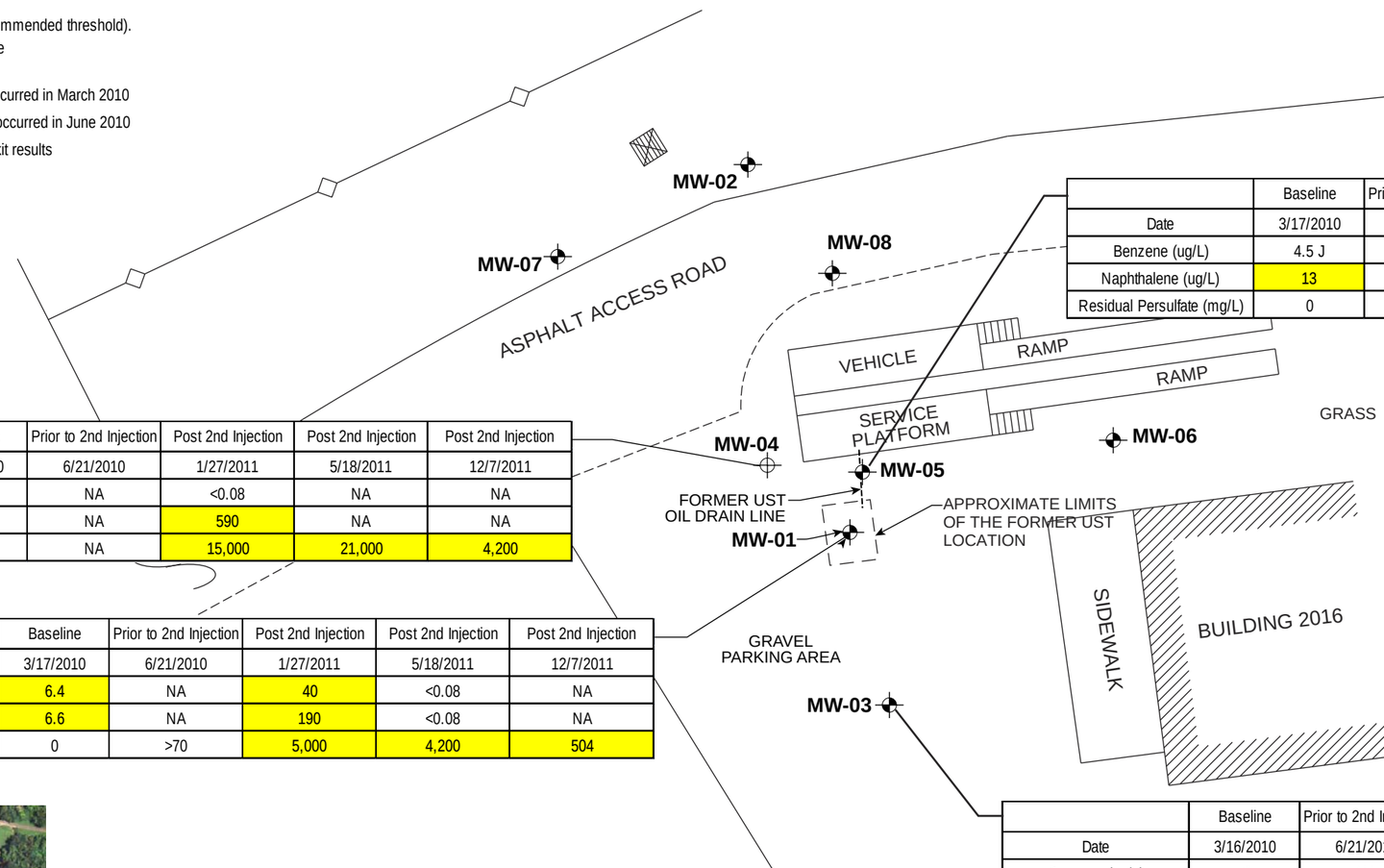
Parameters	Limits	Basis
Benzene (ug/L)	5	PRG
Naphthalene (ug/L)	6.1	PRG
Residual Persulfate (mg/L)	500	Threshold

Notes:

Bolded and highlighted values exceed the limits (PRG or recommended threshold).
Persulfate below 500 mg/L is considered essentially non-reactive
NA= Not Analyzed
1st Pesulfate Injection (200 g/L; approximately 2,000 gallons) occurred in March 2010
2nd Persulfate Injection (180 g/L; approximately 1,000 gallons) occurred in June 2010
Residual concentrations were based on CHEMetrics field test kit results

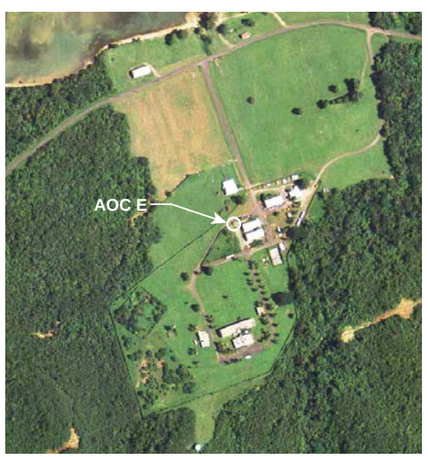


	Baseline	Prior to 2nd Injection	Post 2nd Injection	Post 2nd Injection	Post 2nd Injection
Date	3/17/2010	6/21/2010	1/27/2011	5/18/2011	12/7/2011
Benzene (ug/L)	4.5 J	NA	<0.08	<0.08	NA
Naphthalene (ug/L)	**13**	NA	**14.8**	<0.08	NA
Residual Persulfate (mg/L)	0	>70	**7,000**	**7,000**	**5,040**

	Baseline	Prior to 2nd Injection	Post 2nd Injection	Post 2nd Injection	Post 2nd Injection
Date	3/17/2010	6/21/2010	1/27/2011	5/18/2011	12/7/2011
Benzene (ug/L)	<5	NA	<0.08	NA	NA
Naphthalene (ug/L)	<1	NA	**590**	NA	NA
Residual Persulfate (mg/L)	0.07	NA	**15,000**	**21,000**	**4,200**

	Baseline	Prior to 2nd Injection	Post 2nd Injection	Post 2nd Injection	Post 2nd Injection
Date	3/17/2010	6/21/2010	1/27/2011	5/18/2011	12/7/2011
Benzene (ug/L)	**6.4**	NA	**40**	<0.08	NA
Naphthalene (ug/L)	**6.6**	NA	**190**	<0.08	NA
Residual Persulfate (mg/L)	0	>70	**5,000**	**4,200**	**504**

	Baseline	Prior to 2nd Injection	Post 2nd Injection	Post 2nd Injection	Post 2nd Injection
Date	3/16/2010	6/21/2010	1/27/2011	5/18/2011	12/7/2011
Benzene (ug/L)	<5	NA	NA	NA	NA
Naphthalene (ug/L)	<1	NA	NA	NA	NA
Residual Persulfate (mg/L)	0	>70	**35,000**	**21,000**	**10,750**



2004 Aerial Photograph

North 0 20 40 Scale in Feet

FIGURE 3-3
ISCO Pilot Study - Benzene, Naphthalene, and Residual Persulfate Concentrations
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico

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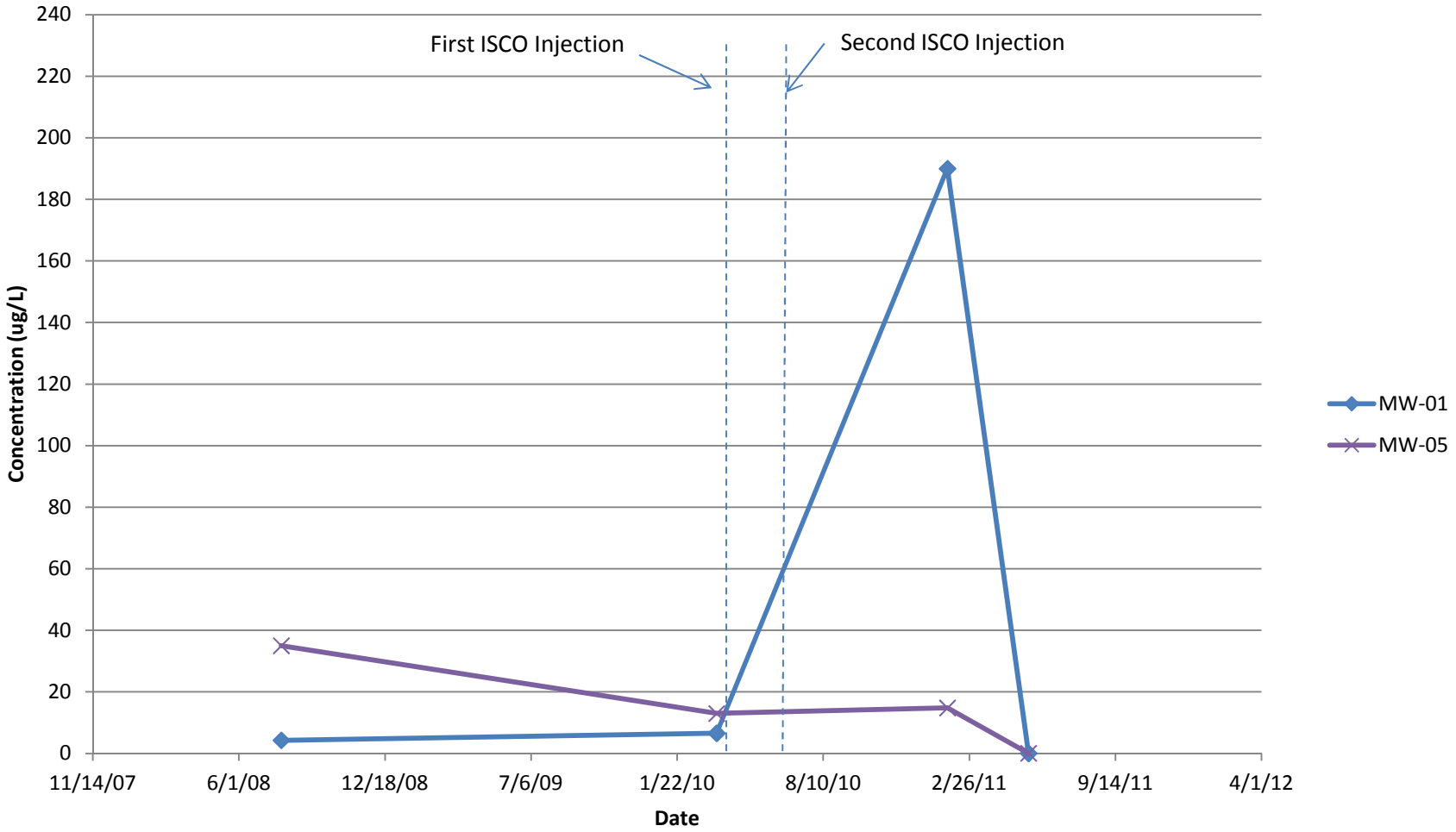

FIGURE 3-4
Groundwater COC Trends: Naphthalene
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico

FIGURE 3-5
Groundwater COC Trends: Benzene
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico

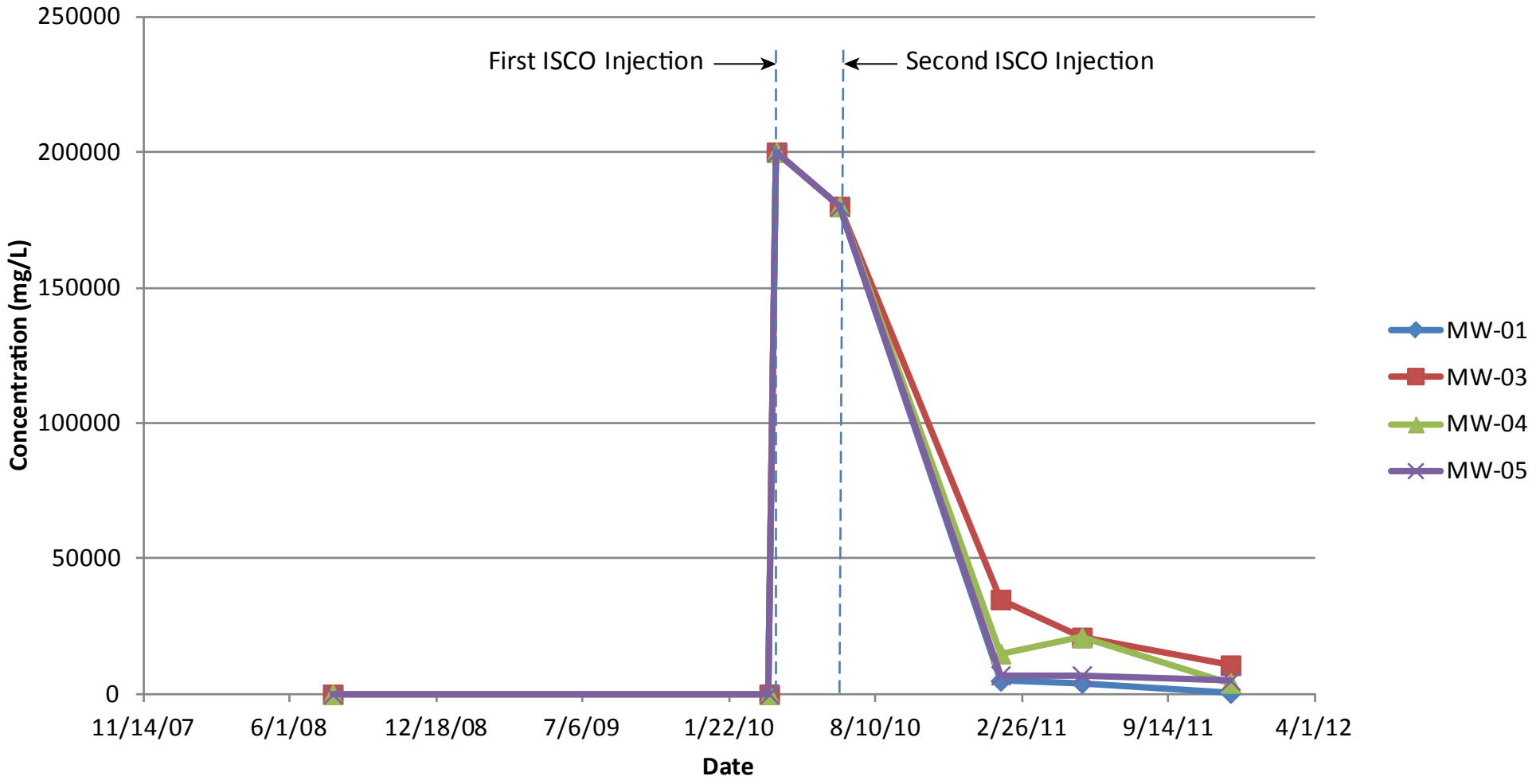

FIGURE 3-6
Persulfate Concentration Trends
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico

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SECTION 4

Remedial Action Objective and Approach

This section discusses the applicable or relevant and appropriate requirements (ARARs), remedial action objective (RAO), performance criteria, and the initial steps to develop remedial alternatives including the identification of general response actions (GRAs) and screening of potential remedial technologies at AOC E. This Focused FS was prepared in general accordance with the following guidance documents:

- *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988)*
- *Presumptive Response Strategy and Ex-Situ Treatment Technologies for Contaminated Ground Water at CERCLA Sites (USEPA, 1996)*
- *Consideration of Green and Sustainable Remediation Practices in the Defense Environmental Restoration Program (DoD, 2009)*
- *National Oil and Hazardous Substances Pollution National Contingency Plan (NCP)*
- *Section 120 of CERCLA as amended by the Superfund Amendments and Reauthorization Act (SARA)*

4.1 Applicable or Relevant and Appropriate Requirements

CERCLA remedial actions must meet ARARs for selected remedies unless a specific ARAR waiver is requested. ARARs are federal and state (commonwealth) public health and environmental requirements used to define the extent of site cleanup, identify sensitive land areas or land uses, develop remedial alternatives, and direct site remediation.

Applicable requirements are cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state (commonwealth) law that address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances at the site.

Relevant and Appropriate requirements are cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state (commonwealth) law that are well suited to the particular site. While not necessarily "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances of the site, relevant and appropriate requirements address problems or situations sufficiently similar to those encountered at the site to justify their use.

Factors To Be Considered (TBC) are non-promulgated advisories or guidance, issued by federal or state (commonwealth) government, that are not legally binding and do not have the status of potential ARARs. However, in many circumstances such factors will be considered along with ARARs in determining the level of cleanup required to protect human health and the environment.

Remedial actions must comply with both federal and state (commonwealth) ARARs. For a state (commonwealth) requirement to be an ARAR, it must meet three criteria:

- It must meet the definition of an ARAR.
- It must be more stringent than federal requirements.
- It must be a promulgated standard, requirement, criterion, or limitation under a state (commonwealth) environmental or facility citing law.

There are three types of ARARs. *Location-specific* ARARs restrict the occurrence of chemicals in certain sensitive environments, such as wetlands (for example, the Endangered Species Act). *Action-specific* ARARs are activity or technology based, which typically control remedial activities that generate hazardous wastes (for example, RCRA). *Chemical-specific* ARARs are health based or risk management based numbers that provide concentration limits for the occurrence of a chemical in the environment (for example, federal MCLs). Remedial actions must comply

with both federal and state (commonwealth) ARARs. The statutes and regulations listed in **Table 4-1** contain requirements deemed to be potential ARARs at AOC E.

4.2 Remedial Action Objective

The RAO consists of specific goals for protecting human health and/or the environment. The RAO for AOC E groundwater is:

> Prevent exposure to COCs in groundwater at concentrations above drinking water standards or, in the absence of a drinking water standard, above USEPA's acceptable risk range (cumulative excess lifetime cancer risk of 1×10^{-4} to 1×10^{-6}) and target Hazard Index of 1.

4.3 Contaminants of Concern

A baseline HHRA in the Final RI Report (CH2M HILL, 2008a) identified several groundwater COCs, based on RI groundwater sampling data collected during May 2002 and August/September 2004 events. Additional post-RI groundwater samples collected and analyzed in July 2008 indicated the COC concentrations had generally declined, but that one additional COC, benzene, was detected above its MCL (CH2M HILL, 2010). Therefore, the following are the groundwater COCs for AOC E:

- 1,2-DCA
- benzene
- MTBE
- total xylenes
- 2-methylnaphthalene
- naphthalene

4.4 Preliminary Remedial Goals

RAOs or aspects of RAOs must be translated into numerical PRGs to evaluate the effectiveness of an alternative in reducing risk or meeting an ARAR and to compare the costs of different alternatives. PRGs are chemical concentrations in environmental media that achieve the levels of protection specified in the RAO. PRGs are developed on the basis of chemical-specific ARARs and/or site-specific, risk-based factors and are designed to facilitate the development and evaluation of the remedial technologies and remedial alternatives. The PRGs for AOC E are included in **Table 4-2**, along with the source of the PRGs.

Persulfate is not a COC. It has no federal or Puerto Rico enforceable standard, such as an MCL, or risk-based screening level. Therefore, persulfate does not have a PRG.

The *2011 Edition of the Drinking Water Standards and Health Advisories* (issued by the USEPA Office of Water) indicates that the cancer classification of naphthalene is "**I - inadequate information to assess carcinogenic potential.**" The Lifetime Health Advisory (HA) Level of 100 μg/L for naphthalene is defined as the concentration of naphthalene in drinking water that is not expected to cause any adverse noncarcinogenic effects for a lifetime of exposure. In the updated *2012 Edition of the Drinking Water Standards and Health Advisories*, the HA Level of 100 μg/L for naphthalene is unchanged.

The Record of Decision (ROD) entries contained in the USEPA CERCLIS Public Access Database were searched for naphthalene cleanup goals in EPA Region 2. For the nine Superfund Sites where quantitative cleanup goals were available for naphthalene, goals ranged from 10 to 300 μg/L (see table below). A PRG of 10 μg/L was selected for three sites in New York, as stipulated in the NYSDEC Groundwater Standards, based on aesthetic impacts on surface waters. A PRG of 300 μg/L was selected for two sites in NJ as a result of the NJ Groundwater Quality Standard, based on a non-carcinogenic endpoint HI of 1 with an uncertainty factor (UF) of 10 for "Group C" carcinogens to provide sufficient protection from possible carcinogenic effects. Additionally, naphthalene does not have a groundwater standard (SG) in the Puerto Rico Water Quality Standards (PRWQS).

EPAID	Site Name	Naphthalene Cleanup Goal in GW (ppb)	Basis
NYD0980535652	APPLIED ENVIRONMENTAL SERVICES	10	NYSDEC Groundwater Standards
NYD010968014	CARROLL & DUBIES SEWAGE DISPOSAL	10	NYSDEC Groundwater Standards
NY4571924451	GRIFFISS AIR FORCE BASE (11 AREAS)	10	NYSDEC Groundwater Standards
NYD980664361	NIAGARA MOHAWK POWER CORP. (SARATOGA SPRINGS PLANT)	13	Cleanup level for groundwater protection (1995 ROD)
NJD001502517	CIBA-GEIGY CORP.	15	NA
NJD002168748	DAYCO CORP./L.E. CARPENTER CO.	30	NJ Groundwater Standard, Interim
NYD002920312	HOOKER CHEMICAL & PLASTICS CORP./RUCO	50	Minimum ARAR based Groundwater Cleanup
NJ0001900281	FEDERAL CREOSOTE	300	NJ Groundwater Quality Standard
NJD063160667	GLOBAL SANITARY LANDFILL	300	NJ Groundwater Quality Standard

The May 2012 USEPA Regional Screening Level (RSL) Table provides carcinogenic inhalation toxicity values for naphthalene, with a tap water RSL of 0.14 μg/L corresponding to $1x10^{-6}$ excess lifetime cancer risk (ELCR) (or 14 μg/L corresponding to $1x10^{-4}$ ELCR). USEPA's target range for ELCR is $1x10^{-4}$ to $1x10^{-6}$. The 2012 RSL table also identifies a tap water RSL of 6.1 μg/L for non-carcinogenic endpoints, based on an HI of 1 (for cumulative exposures via ingestion/dermal/inhalation).

Puerto Rico regulations require groundwater such as that at AOC E be considered potable (i.e., groundwater is classified as Class SG - groundwater intended for use as source of drinking water supply and agricultural uses including irrigation, based on Puerto Rico Water Quality Standards [PRWQS] published in March, 2010). However, it should be noted that it is unlikely that site groundwater would be used as a source of potable water in the future since drinking water is supplied to Vieques from the mainland of Puerto Rico and groundwater investigations and pilot studies conducted at AOC E indicate the water-bearing unit is not productive enough to be used as a potable source. The saturated unconsolidated material at AOC E is clay-rich and has low permeability, as evidenced by the low hydraulic conductivity measured in MW-04 in 2002 (0.2 feet per day, or 7.06×10^{-5} centimeters per second [cm/sec]). The MPE pilot study in 2002 suggested a groundwater yield of about 0.216 gpm, which is not sufficient for normal potable use.

Based on the above information, the HI-based PRG of 6.1 μg/L, especially considering it is within the USEPA's acceptable ELCR range, is used as the PRG for naphthalene.

4.5 General Response Actions

The GRAs describe the broad range of actions that will satisfy the RAO at the site. The GRAs may include no action, institutional controls, monitoring, containment, removal, treatment, disposal or any combination of these. Consideration of the No Action GRA is required by CERCLA.

Based on site-specific conditions following the pilot study, the following response actions were identified for AOC E to satisfy the RAO:

- No Action
- Institutional Controls
- Groundwater Monitoring
- In Situ Groundwater Treatment (using ISCO), as contingency plan

4.6 Screening of Remedial Technologies

The pilot study results have demonstrated that ISCO is an applicable technology capable of meeting the RAO regarding COC concentrations. However, a technology screening was conducted to satisfy the requirements of the technology screening process in accordance with the EPA RI/FS Guidance (EPA, 1988). It is noted that ISCO was identified as a likely appropriate technology for pilot study, and it was ultimately demonstrated to be appropriate.

The alternatives evaluated in the Section 5 of the FFS were developed based on the demonstrated success of the ISCO technology at AOC E. **Table 4-3** summarizes the results of the technology screening process. A narrative description of technologies and summary of technology screening for AOC E is included in Appendix F. Based on the screening of potential technologies and pilot study findings, the following technologies are retained for developing remedial alternatives in Section 5:

- No Action
- Institutional Controls
- Groundwater Monitoring
- ISCO

4.7 Sustainability

Executive Order 13242, *Strengthening Federal Environmental, Energy, and Transportation Management*, requires Federal agencies to implement sustainable practices. Sustainability is a *greening* process focused on energy conservation, reduction of greenhouse gases, waste minimization, and re-use and recycling of materials. These considerations are not NCP requirements for remedial alternatives, but may be considered during the alternative selection process.

Green remediation results in effective cleanups minimizing the environmental and energy footprints of site remediation and revitalization (USEPA, 2008). Sustainable practices emphasize the need to more closely evaluate core elements of a cleanup project, compare the site-specific value of conservation benefits gained by different strategies of green remediation, and weigh the environmental trade-offs of potential strategies.

The sustainability of each alternative is evaluated by the SiteWise™ tool. SiteWise™ is a stand-alone analytical tool to efficiently and systematically conduct a sustainability analysis of remediation technologies, thereby providing a tool for selecting a remediation alternative that is based not only on the first seven NCP evaluation criteria, as detailed in Section 6, but also on the basis of the environmental footprint of the technology. The sustainability analysis evaluates the environmental footprint of each remedial alternative considered in terms of five metrics, comprising:

1. Greenhouse gases (GHGs) reported as carbon dioxide equivalents (CO_2e), consisting of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O);
2. Energy usage (expressed as British Thermal Unit [BTU]);
3. Water consumption (gallons)
4. Air emissions of criteria pollutants consisting of oxides of nitrogen (NOx) and sulfur (SOx), and particulate matter (PM); and
5. Accident risk (risk of injury and risk of fatality).

A low environmental footprint indicates low deleterious impacts to environmental and social metrics, which collectively make up the SiteWise™ sustainability metrics. Conversely, a high environmental footprint indicates high deleterious impacts associated with the SiteWise™ metrics. A summary of the sustainability analysis for AOC E is included in **Appendix E.** The major conclusions of this sustainability analysis are incorporated into the short-term effectiveness criteria evaluation of this Focused FS Report.

Table 4-1(a)
Federal Chemical-Specific ARARs
AOC E Focused Feasibility Study Report
Former Naval Ammunition Support Detachment (NASD)
Vieques, Puerto Rico

Media	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
USEPA RSLs						
Groundwater	Chemical concentrations corresponding to target cancer risk and non-cancer hazard levels for human health.	RSLs are conservative, risk-based criteria for screening CERCLA sites. EPA has developed these risk-based concentrations for many constituents associated with contaminated sites.	USEPA RSL Table (May 2012) for Residential tap water only as they apply to 2-methylnaphthalene, MTBE, naphthalene	2, CP-1, CP-2	TBC	A baseline human health risk assessment has been performed to estimate site-specific risks and was used in the development of the following RGs: 2-Methylnaphthalene: 27 µg/L MTBE: 120 µg/L Naphthalene: 6.1 µg/L
Safe Drinking Water Act						
Groundwater	SDWA standards serve to protect public water systems. Primary drinking water standards consist of federally enforceable MCLs. MCLs are the highest level of a contaminant that is allowed in drinking water.	Groundwater contamination exceeds MCLs. Cleanup to MCLs for the contaminants presenting risks and hazards above EPA acceptable levels is being considered in order to meet the state's expectations for beneficial use.	40 CFR 141.61 (a)(2) and (18)	2, CP-1, CP-2	Relevant and Appropriate	Relevant and appropriate because the aquifer is neither currently, nor reasonably anticipated in the future to be used as a potable water supply. The MCLs were used to set the following RGs: Benzene: 5 µg/L Total xylenes: 10,000 µg/L

Table 4-1(b)
Puerto Rico Chemical-Specific ARARs
AOC E Focused Feasibility Study Report
Former Naval Ammunition Support Detachment (NASD)
Vieques, Puerto Rico

Media	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
Puerto Rico Water Quality Standards						
Groundwater	Establishes water quality standards within the Commonwealth of Puerto Rico.	All groundwater in Puerto Rico must meet the requirements of a class SG water.	Puerto Rico Water Quality Standards apply to all chemicals with class SG standards	2, CP-1, CP-2	Applicable	The RGs set using the PRWQS are: 1,2-Dichloroethane: 3.8 µg/L

Table 4-1(c)
Federal Location-Specific ARARs
AOC E Focused Feasibility Study Report
Former Naval Ammunition Support Detachment (NASD)
Vieques, Puerto Rico

Location	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
Coastal Zone						
Migratory Flyway						
Migratory bird area	Protects almost all species of native birds in the United States from unregulated taking.	Presence of migratory birds.	*Migratory Bird Treaty Act* , 16 USC 703	2, CP-1, CP-2	Applicable	The site is located in the Atlantic Americas Migratory Flyway. If migratory birds, or their nests or eggs, are identified at the site, operations will not destroy the birds, nests, or

Table 4-1(d)
Puerto Rico Location-Specific ARARs
AOC E Focused Feasibility Study Report
Former Naval Ammunition Support Detachment (NASD)
Vieques, Puerto Rico

Location	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
No Puerto Rico Location-Specific ARARs apply.						

Table 4-1(e)
Federal Action-Specific ARARs
AOC E Focused Feasibility Study Report
Former Naval Ammunition Support Detachment (NASD)
Vieques, Puerto Rico

Action	Requirement	Prerequisite	Citation	Alternative	ARAR Determinatior	Comment
Underground Injection Control						
Underground injection of treatment chemicals	Regulates the subsurface emplacement of liquids through the Underground Injection Control program, which governs the design and operation of five classes of injection wells in order to prevent contamination of underground sources of drinking water. The Underground Injection Control program regulates well construction, well operation, and monitoring.	Any dug hole or well that is deeper than its largest surface dimension, where the principal function of the hole is in subsurface placement of fluids.	40 CFR 144.12(a), 144.24(a), 144.82(a)(1) and (b), 144.83(a)(1)(i), 146.8(a)-(e), 146.10(c)	CP-1, CP-2	Applicable	Applicable to to the installation of Class V wells. Permits are not applicable to on-site CERCLA injection wells; however, these remedial actions will comply with the substantive requirements of the regulations.

Table 4-1(f)
Puerto Rico Action-Specific ARARs
AOC E Focused Feasibility Study Report
Former Naval Ammunition Support Detachment (NASD)
Vieques, Puerto Rico

Action	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
Noise Pollution						
Performing construction activities that generate noise	No construction activity may be performed at night or in such a way that vibrations are produced that can be felt beyond the property boundary. If equipment used in construction is not manufactured in accordance with USEPA standards for newly manufactured equipment then it may not produce noise that exceeds 70 dBA.	Construction activity including earthwork	Puerto Rico Regulation 3418.3.1.5(A),(C);3.1.10; 3.1.13; and 4.1	2, CP-1, CP-2	Applicable	The site is considered to be in Zone II (Commercial) for noise production. Noise pollution during onsite activities will be prevented.
Underground injection						
Underground injection	Establishes construction and operation standards for underground injection wells.	Construction of any dug hole or well that is deeper than its largest surface dimension, where the principal function of the hole is the subsurface emplacement of fluids. Fluids include both liquids and gasses.	Puerto Rico Underground Injection Regulations 304.A.2.a, b, d, e; 304.A.4, 304.B.1, C.2.a, b; C.3.c	CP-1, CP-2	Applicable	Applicable to ISCO injections. A permit would not be required; however, substantive requirements of the rule would be met. Injections would be accomplished with Class V type B7 wells. The Commonwealth of Puerto Rico does not have Class V permitting authority; however, they do maintain their own seperate regualtions regarding the operation and maintenance of underground injection systems.
Waste Management						
Management of non-hazardous solid waste onsite in containers and piles	Non-hazardous solid waste staged onsite must not create a hazard or public nuisance.	Generation of non-hazardous solid waste that is managed onsite in containers or in piles.	Puerto Rico Non-Hazardous Solid Waste Regulation 531.H	2, CP-1, CP-2	Applicable	It is anticipated that non-hazardous solid wastes will be generated during the implementation of these alternatives. Wastes will be sampled to confirm characterization prior to disposal.

TABLE 4-2
FS Preliminary Remediation Goals
AOC E Focused Feasibility Study Report
Former NASD, Vieques, Puerto Rico

Chemical of Concern	Preliminary Remediation Goal	Basis
Benzene	5 µg/L	MCL
1,2-Dichloroethane	3.8 µg/L	PRWQS for Groundwater (SG); an ARAR that is lower than the MCL of 5 µg/L
2-Methylnaphthalene	27 µg/L	HI of 1; not a potential carcinogen (EPA, 2012)
MTBE	120 µg/L	ELCR of $1x10^{-5}$ and HI of 0.02 (EPA, 2012)
Naphthalene	6.1 µg/L	HI of 1 and ELCR of $4x10^{-5}$ (EPA, 2012)
Total xylenes	10,000 µg/L	MCL

Notes:

ELCR – excess lifetime cancer risk
HI – hazard index
PRWQS – Puerto Rico Water Quality Standards

Source:
USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites. May (EPA, 2012).

TABLE 4-3
Technology Screening Summary
AOC E Focused Feasibility Study Report
Former NASD, Vieques, Puerto Rico

General Response Actions	Remedial Technology	Process Options	Descriptions	Effectiveness	Implementability	Relative Cost	Retain	Reject
No Action	None	None	No active remedial action. This process option is retained to provide the basis for comparing active process options and technologies.	None	Not Applicable (Required by NCP to include in the FS evaluation)	Not Applicable	x	
Institutional Controls	Administrative Restrictions	Land-Use-Controls (LUCs)/Deed Notices	Access and groundwater use restrictions for the site already transferred to the Municipality of Vieques (MOV) in April 2001. The Navy uses a Web-based management tool, LUC Tracker, as part of the Naval Installation Restoration Information System (NIRIS).	Effective in protecting in human health	Easy to implement	Low	x	
	Access Restrictions	Fences and Signs	Security fences already in place at the site	Effective in limiting site access	Easy to implement. Site currently restricted by perimeter fence and locked gates. Signs easy to install with minimal cost.	Low	x	
Monitoring	Groundwater LTM	Performance Monitoring	Periodic groundwater sampling to monitor residual persulfate and COC concentrations	Effective for determining when residual oxidant persulfate meet 500 mg/L and when COC concentrations meet RGs	Easily implemented with standard sampling tools/procedures.	Low short-term cost, but long-term cost could be moderate to high until RGs are met.	x	
Containment	Vertical Barriers	Slurry Walls, sheet piling, vibrating barrier walls	Physically or chemically or combination of the two to create subsurface barriers to contain/prevent contaminated groundwater flow to downgradient. Isolates and/or contains contamination; therefore, effective for most contaminants.	Containment of the plume can be effective for isolating source areas to prevent plume migration, but not effective for dissolved-phase contaminants with slow groundwater flow velocity.	Can be implemented In fine porous media to depths of 30 to 60 ft bgs using conventional construction, deeper using injection methods.	Moderate to high depending on area and volume requirements		x (Not effective for low concentration COC impacted GW in localized area; no active treatment involved)
Removal	Excavation	Excavation	Excavation of impacted solids and fluids using standard construction equipment (I.e. backhoes, bulldozers, and front-end loaders).	Fugitive emissions such as dust and particulates are often a problem during operations. Communities often oppose the transportation of excavated material through populated areas. Some restrictions or pretreatment of the waste may be necessary.	The source area soil at AOC E has been removed up to 16 ft bgs in 1996 during the UST removal; excavation up to 40 ft bgs or deeper to remove saturated zone soil and groundwater is technically challenging and not cost effective.	Excavation and off-site disposal is a relatively simple process, well proven and readily implementable technology.		x (Not feasible for excavation up to 40 ft bgs or deeper)
In Situ Treatment	Chemical	In-situ Chemical Oxidation (ISCO)	Aqueous injection of oxidizing agents (persulfate, peroxide, permanganate, or ozone) to promote abiotic in situ oxidation of organic compounds.	Effective on most chlorinated solvents, polyaromatic hydrocarbons, and petroleum products. Permanganate is not effective on benzene; ozone not easy to handle and not cost effective.	ISCO using activated persulfate was successfully demonstrated at AOC E via pilot study to treat COCs. Using Catalyzed Hydrogen Peroxide Propagations (CHP) to address persulfate persistence is based on findings of eight treatment studies performed by persulfate manufacturer FMC.	Moderate	x (ISCO using activated persulfate successfully demonstrated by pilot study; persulfate persistence can be addressed by CHP)	
		In-Situ Chemical Reduction (ISCR)	Aqueous injection of reducing agents (zero-valent iron, hydrogen) to promote abiotic in situ reduction of chlorinated organic compounds (CVOC).	Most suitable as permeable treatment barrier for the migration of impacted CVOC groundwater. Not compatible for site COCs.	Considerable uncertainty on fundamental design parameters for field application.	Moderate to high		x (Not compatible for COCs)
	Physical	In-well Air Stripping (Circulating Wells)	Groundwater is aerated and lifted within a well bore, re-infiltrates a different strata of the formation, and creates groundwater circulation.	Target compounds are halogenated VOCs, SVOCs, and fuels. Variations of the technology may allow for its effectiveness against some nonhalogenated VOCs, SVOCs, pesticides, and inorganics. In general, in-well air strippers are more effective at sites containing high concentrations of dissolved contaminants with high Henry's law constants. In addition, tight formation at AOC E would limit or inhibit the effectiveness of this technology.	Extensive system capital investment required. Power not readily available at the site	Moderate to high		x (not suitable for AOC E with low concentration)
		Air Sparging/Air Stripping	Air in injected into saturated matrices to remove COCs through volatilization. May also be used at lower air flow rates to promote biodegradation of petroleum VOCs. Often coupled with SVE for collection/treatment of displaced VOCs.	Target compounds are VOCs, fuels and some SVOCs. Effective with tight well spacing (25' or so) in permeable, homogeneous media; significantly less effective in low permeability soils or stratified soils such at those observed at AOC E.	Installation of additional SVE wells are required. Extensive system capital investment required. Power not readily available at the site	Moderate to high		x (not suitable for AOC E with low concentration)
		Multiphase phase extraction (MPE)	MPE is a technology that uses a high vacuum system to remove liquid (i.e., NAPL, contaminated groundwater) and soil vapor. It removes contaminants from above and below the water table. Once above ground, the extracted vapors, liquid-phase organics, and/or groundwater are separated and treated. Systems may be designed to recover only product, mixed product and water, or separate streams of product and water.	Target compounds are dissolved-phase VOCs and fuels. Use of MPE can shorten the cleanup time at a site, as the capillary fringe is often the most contaminated area, but is not likely to be effective in low permeability conditions with only dissolved-phase constituents.	MPE pilot test performed in 2002 already removed the LNAPL. LNAPL is not currently present in the site wells to warrant the application of MPE. Extensive system capital investment and energy usage required.	Moderate to high		x (LNAPL is not present)
	Biological Treatment	Enhanced Aerobic Bioremediation	The rate of bioremediation of organic compounds by microbes is enhanced by increasing the concentration of electron acceptors and nutrients in ground water, surface water, and leachate. Oxygen is the main electron acceptor for aerobic bioremediation. Nitrate serves as an alternative electron acceptor under anoxic conditions.	Target compounds for enhanced biodegradation processes are nonhalogenated VOCs, nonhalogenated SVOCs, and fuels. Pesticides also should have limited treatability.	May be used as a polishing step (ORC socks) after ISCO treatment, however; There is no need for placement of ORC socks due to the proven success of ISCO by pilot study.	Low to moderate		x (not retained due to the success of ISCO pilot study)
		Anaerobic Bioremediation with Permeable Reactive Barriers/Biowalls or Injection Grid Application	Subsurface delivery of electron donors (hydrogen, acetate, methanol, commercially available substrate etc.) via biobarrier or grid application within the target zone to stimulate anaerobic biodegradation of chlorinated compounds by reductive dechlorination.	Considerable uncertainty on rate and extent of biodegradation that can be achieved. Requires necessary organic substrate to maintain anaerobic conditions. Nitrate enhancement has primarily been used to remediate groundwater source area contaminated by BTEX, but at lower degradation rates than aerobic degradation.	May require site-specific pilot-scale testing. As with any technology relying on advective flow for reagent delivery to treatment zone, significant constraints in low permeability media.	Moderate to high		x (not quite effective for low concentration COCs at AOC E)

TABLE 4-3
Technology Screening Summary
AOC E Focused Feasibility Study Report
Former NASD, Vieques, Puerto Rico

General Response Actions	Remedial Technology	Process Options	Descriptions	Effectiveness	Implementability	Relative Cost	Retain	Reject
In Situ Treatment (continued)	Biological Treatment (continued)	Monitored Natural Attenuation	Short-and/or long-term routine monitoring is implemented to record site conditions, concentration levels, and natural attenuation parameters. Natural subsurface processes such as dilution, volatilization, biodegradation, adsorption, and chemical reactions with subsurface materials reduce concentrations to acceptable levels.	Good, but highly site specific. Less generation or transfer of remediation wastes; less intrusive as few surface structures are required; may be applied to all or part of a given site, depending on site conditions and cleanup objectives; overall cost will likely be lower than active remediation. Longer time frames (> 15 years) may be required to achieve remediation objectives, compared to active remediation.	Good, and increasing regulatory agency acceptance. However, regulatory agencies often require demonstrated biodegradation before acceptance.	Low to moderate. The most significant costs associated with natural attenuation are most often due to monitoring requirements.		x (MNA not retained due to long remediation time and uncertainty to meet PRGS within a reasonable time frame)
Ex Situ Treatment	Chemical	Chemical Oxidation (e.g., UV Oxidation)	Oxidizing agents are used to destroy organic contaminants in an ex situ reactor. Potential oxidizing agents are UV radiation, ozone, and/or hydrogen peroxide/ferrous iron, or permanganate.	Oxidizing agents added to wastewater for oxidation of cyanide, heavy metals, unsaturated organics, sulfides, phenolics, pesticides, aldehydes, and aromatic hydrocarbons to less toxic oxidation states. Does not work well for saturated aliphatics such as 1,2-DCA. Must be able to extract groundwater in cost-effective manner, which would likely hinder any ex situ treatment at AOC E.	Not suitable for 1,2-DCA; extensive system capital investment and energy usage required.	High		x (not suitable for 1,2-DCA; high capital cost)
	Physical Treatment	Ion Exchange	Ion exchange removes ions from the aqueous phase by the exchange of cations or anions between the contaminants and the exchange medium. Ion exchange materials may consist of resins made from synthetic organic materials that contain ionic functional groups to which exchangeable ions are attached. They also may be inorganic and natural polymeric materials. After the resin capacity has been exhausted, resins can be regenerated for re-use.	Does not work well for mixed organic contaminants.	This technology has long been used in industry and is commercially available. High concentrations of anions in groundwater containing high TDS would make selective removal of low concentration (ppb level) of COCs challenging.	High. Key cost factors include: pre-treatment requirements, discharge requirements, resin utilization, regenerant used, exchange efficiency, energy usage.		x (Not cost effective for low concentration COC impacted GW ; brine and waste resin need disposal)
		Separation	Separation processes seek to detach contaminants from their medium by processes: ultrafiltration/microfiltration, reverse osmosis, and electrodialysis.	Target compounds are VOCs, SVOCs, pesticides, suspended particles. Effectiveness of separation processes for site COCs is limited due to high pretreatment requirements, fouling of membranes, unsuitable membrane pore size for COC removal.	Would require power supply. Need for disposal of brine.	High		x (Limited use for groundwater treatment)
		Liquid-Phase Carbon Adsorption	Liquid phase carbon adsorption is a full-scale technology in which groundwater is pumped through one or more vessels containing activated carbon to which dissolved organic contaminants adsorb. When the concentration of contaminants in the effluent from the bed exceeds a certain level, the carbon can be regenerated in place; removed and regenerated at an off-site facility; or removed and disposed. The two most common reactor configurations for carbon adsorption systems are the fixed bed and the pulsed or moving bed.	The technology is well proven, and is frequently part of remedial designs. The duration of GAC is usually short-term; however, if concentrations are low enough, the duration may be long-term. The duration of operation and maintenance is dependent on contaminant type, concentration, and volume; regulatory cleanup requirements; and metal concentrations. Carbon adsorption systems can be deployed rapidly, and	Applicable for large flow low concentrations of water. Require pretreatment to remove suspended solids and silica. Other anions in water like nitrate and sulfate will reduce the ability of GAC to remove COCs. Need for disposal of spent carbon.	High		x (Not cost effective for treatment of low concentration COC impacted GW in localized area)
	Biological Treatment	Biological reactors (fluidized bed, packed bed)	Organics in wastewater oxidized through the use of a mixed culture of organisms in anaerobic conditions. Bioreactor containing contaminants and electron donors to stimulate anaerobic biodegradation of chlorinated compounds by reductive dechlorination.	Need sufficient organic substrate to sustain organisms.	Proven technology for CVOCs and perchlorate with relatively high concentrations (ppm level), not effective for site COCs with low concentrations.	High		x (Not cost effective for treatment of low concentration COC impacted GW in localized area)
Phyto-remediation	Physical/Plant uptake/Phyto-degradation/Rhizo-degradation	Plants	Phytoremediation via (1) uptake and phytodegradation, (2) uptake and phytoaccumulation by some plant species, and (3) rapid rhizodegradation	Generally high public acceptance; no secondary waste production if phytoremediation is engineered to enhance rhizodegradation	Depth to groundwater at AOC E is approximately 40 feet bgs, which would likely inhibit the application of this technology because maximum root depths of tress are typically within 15 feet bgs.	Low to moderate		x (Not suitable for AOC E due to deep groundwater)

Note:
Retained technologies are shaded.
Effectiveness is the ability to perform as part of an overall alternative that can meet the objective under conditions and limitations that exist onsite
Implementability is the likelihood that the process could be implemented as part of the remedial action plan under the physical, regulatory, technical, and schedule constraints.
Relative cost is for comparative purposes only and it is judged relative to the other processes and technologies that perform similar functions.

SECTION 5

Development of Remedial Alternatives

This section presents a description of focused remedial alternatives developed to meet the RAO. Remedial alternatives were developed based on site-specific considerations related to the nature of the COCs and their current (post-pilot study) concentrations, site hydrogeologic conditions, and the apparent successful implementation of the pilot study. Although groundwater data suggest the pilot study resulted in a decline of COC concentrations to below PRGs, residual persulfate has persisted in the groundwater at the site longer than anticipated, which interferes with the assessment of potential COC rebound. Therefore, the following remedial alternatives were developed to meet the RAO:

- Alternative 1—*No Action*
- Alternative 2—*Groundwater Monitoring and Institutional Controls*
  - Contingency Plan 1 (CP-1) – *ISCO Injection Using Catalyzed Hydrogen Peroxide Propagations (CHP)*
  - Contingency Plan 2 (CP-2) – *ISCO Injection Using Persulfate*

The major components of the remedial alternatives are described below.

5.1 Alternative 1 – No Action

Alternative 1 consists of no action. Alternative 1 is retained per requirement by NCP as a baseline for comparison to the other alternative.

The major components of Alternative 1 include the following:

- No groundwater sampling would be performed to monitor concentrations of COCs or residual persulfate from.
- No institutional controls would be implemented.
- Five-year reviews (for an estimated 30 years) would be required.

5.2 Alternative 2 – Groundwater Monitoring and Institutional Controls

Persulfate is likely to naturally attenuate below 500 mg/L within 2 to 3 years based on persulfate concentration trends observed during the pilot study. Therefore, Alternative 2, Groundwater Monitoring and ICs, was developed to monitor both the decrease of persulfate to below 500 mg/L and the subsequent groundwater trends in AOC E COCs to ensure COC rebound above PRGs does not occur, while implementing appropriate ICs that control exposure to groundwater.

Based on persulfate concentration trends observed during the pilot study, the average first-order decay rate constant for persulfate was estimated to be 0.007 day^{-1}. The persulfate first-order decay constants at AOC E were estimated using non-linear exponential regression of persulfate concentrations versus time for groundwater data collected at MW-01, MW-03, MW-04, and MW-05 (**Table 5-1**). This indicates that residual persulfate concentrations would likely naturally attenuate to 500 mg/L or less within 2 to 3 years. Tests performed by persulfate's manufacturer, FMC, have shown that persulfate is no longer reactive below this level. Alternative 2 would include annual groundwater monitoring during an estimated 3 years to monitor residual persulfate concentrations. After persulfate concentrations decrease to 500 mg/L or less, an estimated 1 year of quarterly groundwater monitoring would be performed to verify COC concentrations remain below PRGs. During the groundwater monitoring period, ICs would be implemented to restrict groundwater use until the COCs are verified to remain below the PRGs.

The conceptual layout of Alternative 2 is presented in **Figure 5-1.** The components and assumptions for Alternative 2 include:

- Annual monitoring of up to four monitoring wells (MW-01, MW-04, and MW-05; and one downgradient well) for pH and persulfate until persulfate concentrations naturally attenuate to 500 mg/L or less (the persulfate threshold below which persulfate has been shown to be non-reactive by the manufacturer).
- Annual confirmation sampling of up to eight site monitoring wells (MW-01 through MW-08) for COCs for 3 years after persulfate concentrations are at or below 500 mg/L.
- Implementing ICs to restrict potable groundwater use until the RAO is met.
- Total estimated remedial action timeframe to meet the RAO is assumed to be less than 6 years.
- Five-year reviews for 10 years for evaluating the effectiveness of the selected remedy and contingency plans.

The actual monitoring frequency, duration, numbers of monitoring wells, and parameters will be included in the long-term monitoring (LTM) work plan that will be prepared following signature of the ROD. The frequency, duration, and parameters provided above are for the cost-estimating purposes of this Focused FS.

5.2.1 Contingency Plans

In the event COC rebound above PRGs is identified and/or residual persulfate remains elevated, two contingency plans are included for Alternative 2. A preferred remedy including associated contingency plan(s) can be selected in the PP and ROD to document remedial actions to be taken if triggered by defined trends. The following contingency plans were developed to address potentially persistent residual persulfate and/or COC rebound:

- Contingency Plan 1 (CP-1) – *ISCO Injection Using Catalyzed Hydrogen Peroxide Propagations (CHP)*
- Contingency Plan 1 (CP-2) – *ISCO Injection Using Persulfate*

The contingency plans would need to be implemented if:

- Persulfate concentrations remain above 500 mg/L after 3 years (CP-1).
- COC rebound is observed during the year of quarterly COC sampling (CP-2).

Details of each of the contingency plans are described below. The assumed treatment zone for the contingencies is 25 feet by 25 feet in area (surrounding wells MW-01, MW-04, and MW-05), and the treatment interval is assumed to be 10 feet thick (approximately 43 to 53 feet bgs). This results in a treatment volume of 6,250 cubic feet or 231 cubic yards. With an assumed total porosity of 0.2, approximately 9,350 gallons of groundwater are within the treatment zone.

Contingency Plan 1 (CP-1)

CP-1- *ISCO Injection Using Catalyzed Hydrogen Peroxide Propagations (CHP)* would address potentially persistent residual persulfate. During the ISCO Pilot study, laboratory studies were performed by FMC which indicated that hydrogen peroxide (H_2O_2), that can serve as an activator for persulfate oxidation, was the most feasible among eight treatments options to decrease the concentrations of residual persulfate (CH2M HILL, 2011). The treatments included electrolysis, enzyme catalase, hydrogen peroxide addition, pH adjustment to 6.8 followed by hydrogen peroxide addition, pH adjustment to 3.4 followed by hydrogen peroxide addition, iron EDTA addition, iron EDTA addition followed by UV-irradation, and iron EDTA addition followed by thermal treatment. As documented in the ISCO Groundwater Pilot Study Technical Memorandum (CH2M HILL, 2011), which is included in Appendix B, of the eight treatments conducted to assess how best to decrease the residual persulfate concentrations, using hydrogen peroxide (H_2O_2) as an activator was the most feasible. The components and assumptions for CP-1 include:

- Approximately 2,900 gallons of 8% hydrogen peroxide catalyzed and stabilized by 610 pounds of reagents would be required to treat the targeted treatment zone at AOC E. Given the tight formation at AOC E, a stabilizer would be added to the hydrogen peroxide to increase the half-life of hydroxyl radicals formed, and

thus allow a larger radius of influence to be achieved for the injected oxidant solution. Details of the ISCO application will be provided in the remedial action (RA) work plan.

- The hydrogen peroxide reagent solution would be injected via one injection event into three wells (MW-01, MW-04, and MW-05).
- Annual confirmation sampling of up to eight site monitoring wells (MW-01 through MW-08) for COCs for 3 years after persulfate concentrations are at or below 500 mg/L. If COC rebound above PRGs is observed at or before at the end of 3 years of confirmation sampling, proceed to Contingency Plan CP-2.
- Continue maintaining ICs that restrict groundwater use until the RAO is met.
- Total estimated remediation time is less than 3 years.
- No additional five-year review is necessary beyond the one included in Alternative 2 because the RAO is assumed to be met within 9 years including the contingency plan. However, whether another five-year review would be conducted for AOC E would be dependent on the actual monitoring results.

Contingency Plan 2 (CP-2)

CP-2- *ISCO Injection Using Activated Persulfate* would address potential COC rebound. The ISCO Pilot Study demonstrated that ISCO using activated persulfate is effective in decreasing the COC concentrations (CH2M HILL, 2011). During the pilot study, sodium hydroxide was used as the activator. Based on FMC's laboratory testing, hydrogen peroxide is recommended for the contingency due to its ability to expedite persulfate's consumption In addition, persulfate would be applied at a lower concentration (10 percent by weight) than during the pilot study (20 percent by weight). The components and assumptions for CP-2 include:

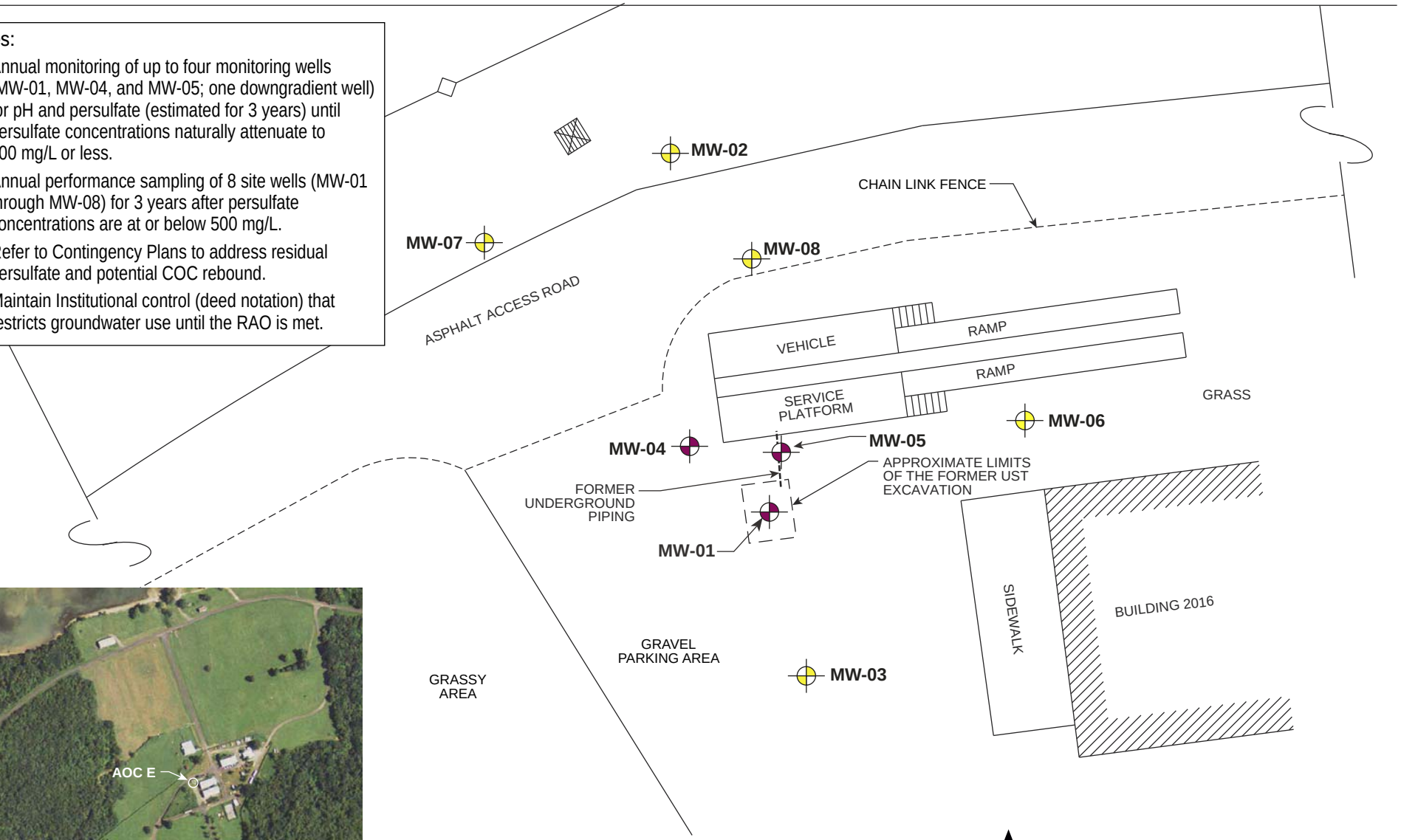
- Approximately 850 pounds of Klozur® sodium persulfate and 550 gallons of 12% hydrogen peroxide would be required to treat the targeted treatment zone at AOC E.
- For the purposes of the Focused FS, it is assumed rebound above PRGs is observed in wells MW-01, MW-04, and/or MW-05. Therefore, it is assumed the injectate would be delivered via one injection event into three wells (MW-01, MW-04, and MW-05). The details of the ISCO application will be provided in the RA work plan.
- Annual sampling of up to eight site wells (MW-01 through MW-08) for site COCs and persulfate would be performed for 3 years.
- Continue maintaining ICs that restrict groundwater use until the RAO is met.
- Total estimated remediation time is less than 3 years.
- No five-year review is necessary beyond the one included in Alternative 2 because the RAO is assumed to be met within 9 years including the contingency plans. However, whether another five-year review would be conducted for AOC E would be dependent on the actual monitoring results.

TABLE 5-1
Persulfate First-Order Decay Rate Constant
AOC E Focused Feasibility Study Report
Former NASD, Vieques, Puerto Rico

Date	**6/21/2010**	**1/27/2011**	**5/18/2011**	**12/7/2011**	**Persulfate First Order Decay Rate Constant K (day^{-1})**
Time (Days)	**0**	**220**	**331**	**534**	
MW-1 (mg/L)	180000	5,000	4200	504	0.011
MW-3 (mg/L)	180000	35,000	21000	10750	0.005
MW-4 (mg/L)	180000	15,000	21000	4200	0.007
MW-5 (mg/L)	180000	7,000	7000	5040	0.006
				Average	**0.007**

Notes:

1. Annual monitoring of up to four monitoring wells (MW-01, MW-04, and MW-05; one downgradient well) for pH and persulfate (estimated for 3 years) until persulfate concentrations naturally attenuate to 500 mg/L or less.
2. Annual performance sampling of 8 site wells (MW-01 through MW-08) for 3 years after persulfate concentrations are at or below 500 mg/L.
3. Refer to Contingency Plans to address residual persulfate and potential COC rebound.
4. Maintain Institutional control (deed notation) that restricts groundwater use until the RAO is met.



2004 Aerial Photograph

LEGEND

- Proposed Long-tern Monitoring Wells
- Other Monitoring Wells

FIGURE 5-1
Alternative 2 - Groundwater Monitoring and ICs
AOC E Focused Feasibility Study Report
Vieques, Puerto Rico

CH2MHILL

ES092211083434TPA F5-1 Alternative 2 GW MW Locations-rev4.ai

SECTION 6

Detailed Analysis of Remedial Alternatives

This section presents a detailed analysis of the remedial alternatives developed in Section 5. Evaluation of alternatives against criteria is structured according to provisions outlined in the NCP. Alternatives are then compared against one another, to highlight differences and preferential characteristics.

6.1 Evaluation Criteria

CERCLA guidance requires evaluation of each alternative against nine criteria listed in 40 CFR 300.430(e)(9). Criteria were published in the March 8, 1990, *Federal Register* (55 FR 8666), as a basis for comparing relative performance, implementability, and advantages and disadvantages of alternatives. This approach is intended to provide sufficient information for comparison of alternatives, and for selection of the most appropriate site-specific remedial action. Evaluation criteria are listed below:

1. Overall protection of human health and the environment
2. Compliance with ARARs
3. Long-term effectiveness and permanence
4. Reduction of toxicity, mobility, and volume (TMV) through treatment
5. Short-term effectiveness
6. Implementability
7. Cost
8. Community acceptance
9. State/Commonwealth acceptance

The first two categories from the above list are mandatory criteria for an alternative's consideration, and are referred to as *threshold criteria*. However, alternatives which do not satisfy ARAR requirements *can* be considered if a specific ARAR waiver is granted. The next five categories are the primary criteria upon which the detailed analysis is based, and are referred to as *balancing criteria*. The remaining two evaluation categories are considered *modifying criteria* that are to be evaluated following the public comment process. The identified remedial alternatives are evaluated in this Focused FS against the first seven criteria, which are defined below.

6.1.1 Threshold Criteria

Threshold criteria are standards that an alternative must meet to be eligible for selection as a remedial action. There is little flexibility in meeting the threshold criteria—the alternative must meet them or it is unacceptable. If ARARs cannot be met, a waiver may be obtained where one or more site exceptions defined in the NCP occur.

- **Overall Protection of Human Health and the Environment.** Protectiveness is the main requirement that remedial actions must meet under CERCLA. It is an assessment of whether each alternative achieves and maintains adequate protection of human health and the environment. A remedy is protective if it eliminates, reduces, or controls all current and potential unacceptable risks posed by the site through each exposure pathway.

- **Compliance with ARARs.** Compliance with ARARs is one of the statutory requirements of remedy selection. This criterion is used to determine whether the alternatives would meet the pertinent applicable federal, state (commonwealth), and local ARARs identified above.

6.1.2 Balancing Criteria

Unlike threshold criteria, the five balancing criteria detailed below weigh trade-offs between alternatives. A low rating on one balancing criterion may be compensated by a high rating on another. Balancing criteria represent principles upon which the detailed evaluation and comparative analysis of alternatives is based.

- **Long-Term Effectiveness and Permanence.** CERCLA emphasizes selection of remedies which ensure both short- and long-term protection of human health and the environment. This criterion evaluates residual risks

that may persist after implementation of a remedial action (or selection of a 'no further action' alternative). Assessment includes evaluation of the adequacy and reliability of controls. Factors considered appropriate include the following:

  - Magnitude of residual risks as a result of untreated waste, byproducts, or following conclusion of remedial activities. Degree of residual hazards, with respect to TMV and propensity to bioaccumulate, are considered.
  - Adequacy and reliability of controls necessary to manage treatment residuals and untreated waste. Evaluation considers long-term protection from residuals, potential technical modifications that may be required, and potential hazards posed by alternative replacement.

- **Reduction of TMV through Treatment.** This criterion addresses the statutory preference for remedies that employ treatment to significantly reduce the toxicity, mobility, or volume of the hazardous substances. That preference is satisfied when treatment is used to reduce the principal threats at a site by destroying toxic chemicals or reducing the total mass or total volume of affected media. This criterion is specific to evaluating only how the treatment reduces toxicity, mobility, and volume. It does not address containment actions such as capping or covering.
- **Short-Term Effectiveness.** This criterion addresses short-term impacts of the remedial alternatives by examining the effectiveness of alternatives in protecting human health and the environment during construction and implementation activities. Short-term impacts include runoff, dust, vapor, access issues, traffic, potential spills, noise and other byproducts of construction and remedy implementation, until response objectives are achieved. In addition, the environmental footprints evaluated by a sustainability analysis are incorporated into the short-term effectiveness criteria evaluation of this Focused FS Report. Short-term effects are evaluated against the following considerations:
  - Short-term risks that might be posed to the community during implementation of an alternative.
  - Potential impacts to workers during remedy implementation, including effectiveness and reliability of protective measures.
  - Potential environmental effects from remedy implementation, including effectiveness and reliability of mitigation measures.
  - Timeframe for implementation and achieved protection.
- **Implementability.** This criterion evaluates technical and administrative feasibility of an alternative, to include availability of materials and services required for implementation. Implementability is evaluated per the following factors:
  - Technical feasibility, including difficulties and unknowns associated with construction, operation, technological reliability, feasibility of modular upgrades, and ability to monitor remedial effectiveness.
  - Administrative feasibility, including coordination activities, ability and time required for necessary approvals, and issuance of required permits.
  - Availability of services and materials, as applicable, including: adequate offsite treatment, storage, and disposal capacity; necessary equipment, specialists, manpower, and provisions; prospective and emerging technologies.
- **Cost.** For the detailed cost analysis of alternatives, the expenditures required to complete each measure are estimated in terms of both capital and annual O&M costs. Given these values, a present-worth calculation for each alternative can be calculated for comparison. The cost estimates in this section provide an accuracy of –30 to +50 percent. Costs are projected for up to a period of 30 years in accordance with *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study* (USEPA, 2000).

Selection of specific technologies utilized in alternative configurations is not intended to limit final design options, but rather provides a baseline for cost estimation. Final cost, and resultant feasibility, depends on actual labor and material costs, competitive market conditions, site conditions, project scope, implementation schedule, contracted design, and other variables. Due to these factors, project feasibility and funding needs must be reviewed carefully before specific financial decisions are made, to help ensure proper evaluation, budget, and adequate funding. Specific details and cost estimates may need to be refined during the RA work plan development, as applicable.

6.1.3 Modifying Criteria

The following criteria modify selection of recommended alternatives:

- **Community Acceptance.** This assessment includes determination of public opinion, support of, and/or opposition to components of remedial options.
- **State (Commonwealth) Acceptance**. State (commonwealth) concerns taken into consideration include the following:
  - The state's (commonwealth's) position and key interests related to alternatives
  - State (commonwealth) comments on ARARs (or proposed waivers)

Modifying criteria are evaluated following public comment, and as result, community and commonwealth acceptance is not addressed in this Focused FS. Commonwealth acceptance and community acceptance criteria will be evaluated by addressing comments received after the USEPA, EQB, and the public have reviewed site documents (e.g., Focused FS Report, Proposed Plan). This evaluation will be presented in the Responsiveness Summary of the ROD.

The following subsections evaluate the remedial alternatives against the first seven criteria described above. Sufficient detail is incorporated into the analysis to understand significant aspects of each alternative, and to identify uncertainties associated with proposed solutions.

6.2 Detailed Evaluation of Remedial Alternatives

The two remedial alternatives described in Section 5 were evaluated in detail using the seven evaluation criteria described in Section 6.1. A summary of the detailed analyses is presented in **Table 6-1**.

Detailed cost estimates of the remedial alternatives are provided in **Table 6-2** and **Appendix D**. The table breaks down the estimated capital, annual O&M, and net present value (NPV), calculated based on a 4 percent discount rate for 30 years for Alternative 1, and 10 years for Alternative 2 including contingency plans. The alternative cost estimates are in 2012 dollars, based on RS Means and engineer's estimates for similar projects.

The cost estimates presented in **Table 6-2** has been developed strictly for comparing the remedial alternatives. The final costs of the project and the resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, the implementation schedule, and other variables. Therefore, final project costs may vary from the cost estimates. Because of these factors, project feasibility and funding needs should be reviewed carefully before specific financial decisions are made or project budgets are established to help ensure proper project evaluation and adequate funding. The cost estimates are order-of-magnitude estimates having an intended accuracy range of +50 to -30 percent. The range applies only to the alternatives as they are defined in Section 5 and does not account for changes in the scope of the alternatives. The specific details in remedial actions and cost estimates would be refined during the RA work plan development.

6.2.1 Assessment of Alternative 1

Alternative 1 – *No Action* serves as the baseline against which the effectiveness of Alternative 2 is compared. This alternative is required under the NCP. Under this alternative no further groundwater monitoring will be conducted to monitor residual persulfate and COC concentrations in impacted groundwater at AOC E. If there was rebound following the persulfate treatment, COC concentrations (and therefore magnitude of risk) would still

likely decrease over time via natural attenuation, but there would be no mechanism to monitor progress and duration. Because contaminated groundwater may be left on the site, a review of site conditions every 5 years would be required by the NCP.

Implementation of this alternative would not protect potential future exposure to potentially impacted groundwater because a groundwater monitoring program and ICs would not be implemented. There is no reduction of risks posed by potentially contaminated groundwater.

This alternative would not meet action-specific ARARs since no action would be undertaken. The aquifers may remain out of compliance with the chemical-specific ARARs for an indefinite time because no groundwater monitoring would be performed to verify the groundwater conditions. The time period for this alternative was estimated to be 30 years due to the need for five-year reviews.

COCs at AOC E are relatively immobile due to slow groundwater flow (about 1 foot/year), and off-site migration of contaminated groundwater has not been observed and is unlikely. Reduction of Toxicity, Mobility, and Volume (TMV) was achieved by the pilot study; however, Alternative 1 would not verify potential COC rebound and achieve further reduction, if necessary, due to a lack of groundwater monitoring and additional treatment.

No construction or monitoring is associated with this alternative; however, site inspections would be required during the periodic five-year reviews. With respect to short-term effectiveness, the timeframe to achieve the RAO is indefinite for Alternative 1 because there would be no groundwater monitoring to verify the progress. For FS cost estimating purpose, the estimated timeframe to achieve RAO is 30 years. Short-term impacts would be primarily associated with minor impacts during the site inspections required by five-year reviews. The environmental footprint is low, based on a sustainability analysis using the SiteWise™ tool (see Appendix E). If five-year reviews indicate more action (groundwater monitoring) is necessary, the site would need to go through the PP/ROD process again. As part of the five-year review process, groundwater monitoring would likely be required in the future.

Taking no action would require no capital costs nor operation and maintenance (O&M) costs. For cost comparison, although five-year reviews are an administrative requirement by the NCP rather than by active remedy, five-year-review costs have been included as a periodic cost and in the present-worth analysis for Alternative 1. The periodic cost estimate for the five-year review is $32,000 and the present worth cost of Alternative 1 is estimated at $109,000 assuming a 30-year operation period and 4 percent discount rate.

6.2.2 Assessment of Alternative 2

Alternative 2 – *Groundwater Monitoring and ICs* consists of implementing ICs for groundwater restrictions and conducting groundwater monitoring. Either or both of the contingency plans may be added to Alternative 2 if needed. Alternative 2 is protective of human health and the environment. Implementation of ICs (e.g., signage and groundwater use restrictions) would provide protection against potential groundwater ingestion and/or uncontrolled exposure during the remedy. Groundwater monitoring for an estimated 3 years would verify that persulfate concentrations have decreased to below 500 mg/L, allowing monitoring of COCs for potential rebound above PRGs. If necessary, contingency plans (CP-1 and CP-2) would be implemented to address potential residual persulfate persistence or COC rebound above PRGs. The subsequent groundwater COC sampling included in each contingency would confirm that the PRGs are achieved. In terms of long-term effectiveness, Alternative 2 would be effective because it utilizes groundwater monitoring to ensure rebound does not occur to levels that above drinking water standards or posing unacceptable risk, as well as contingency ISCO injections should that level of rebound occur.

There are no Puerto-Rico location-specific ARARs for this alternative. This alternative would meet federal location-specific and other action-specific ARARs. Potential exposures can be effectively minimized in the short term by implementing an IC plan to restrict groundwater use. It may take approximately 3 years for persulfate concentrations to naturally attenuate to 500 mg/L or below. This alternative including contingency plans is expected to meet the chemical-specific ARARs within 9 years.

Alternative 2 would meet the RAO within 6 to 9 years depending on whether contingency plans are needed or not. Short-term impacts would be negligible and primarily associated with equipment and personnel transport to the site during groundwater sampling activities, site inspections, and injection activities should implementation of a contingency(ies) be necessary. The environmental footprint is low to moderate (see analysis using the SiteWise™ tool in Appendix E).

No significant technical difficulties are likely associated with the implementation of this alternative. Groundwater monitoring is easily implemented. ICs would likely require administrative resources and local cooperation. The ISCO pilot study was implemented successfully at the site, with competent vendors for injection work and commercial oxidants readily available. This would likely be similar for any necessary contingency.

The capital cost of Alternative 2 consists primarily of implementing ICs, initiating the groundwater monitoring program, and, if necessary, ISCO injection under contingency conditions. The capital cost is estimated to be $66,000. The alternative assumes that no additional monitoring wells or injection wells will be necessary. The annual O&M cost consists primarily of field labor and analytical costs to collect groundwater data, and office labor to analyze trends and prepare annual monitoring reports. The present worth cost of total O&M and periodic cost for Alternative 2 is $194,000). The present worth for Alternative 2 without having to implement a contingency, assuming a 9-year project life, is $260,000. The cost estimate is detailed in **Appendix D**.

If contingency CP-1 is required, the present worth costs for the CHP injection are estimated to be $213,000. When added to the present worth costs for groundwater monitoring, the total present worth costs for contingency CP-1 are $473,000. If contingency CP-2 is required, the present worth costs for the persulfate injection are estimated to be $194,000. When added to the present worth costs for groundwater monitoring, the total present worth costs for contingency CP-2 are $454,000. The cost estimate details for the contingencies are included in **Appendix D**.

6.3 Comparative Analysis of Alternatives

This section provides a comparative analysis of the remedial alternatives described in Section 5. The relative performance of the two alternatives is evaluated in relation to each evaluation criteria. The comparative analysis identifies the advantages and disadvantages of each alternative, relative to each other, so that key tradeoffs can be assessed during the decision–making process.

6.3.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) is not protective, because attainment of the RAO would not ascertained due to lack of ICs and groundwater monitoring. Alternative 2 (Groundwater Monitoring and ICs), including the contingency plans, is protective of human health and the environment because the RAO would be met within 5 years and potential exposure would be prevented by groundwater use restrictions until the RAO was met.

6.3.2 Compliance with ARARs

There are no Puerto Rico location-specific ARARs relevant to the alternatives. Alternative 1 (No Action) does not verify whether the chemical-specific ARARs are met. Alternative 2 meets all ARARs.

6.3.3 Long-Term Effectiveness and Permanence

Since groundwater monitoring would not be performed for Alternative 1 to verify COC concentrations remain below PRGs, long-term effectiveness could not be evaluated for Alternative 1. Five-year reviews would be required for an indefinite time (assumed to be 30 years for cost estimation) for Alternative 1. Because there would be no long-term monitoring, the long-term effectiveness of Alternative 1 would not be known.

Alternative 2 provides adequate and reliable long-term protection. Alternative 2 would be effective because it utilizes groundwater monitoring to ensure rebound does not occur to levels that above drinking water standards or posing unacceptable risk, as well as contingency ISCO injections should that level of rebound.

6.3.4 Reduction of Toxicity, Mobility, and Volume through Treatment

Reduction of TMV was achieved by the pilot study; however, Alternative 1 would not verify potential rebound and achieve further reduction, if necessary, due to lack of groundwater monitoring and additional treatment. For

Alternative 2, natural attenuation that is monitored, and implementation of contingency plans (if necessary), would reduce COC concentrations in groundwater within 9 years for further TMV reduction.

6.3.5 Short-Term Effectiveness

Alternative 1, due to the lack of groundwater monitoring or contingency injections, would result in minimal short-term impact. For FS cost estimating purpose, the time to meet the RAO for Alternative 1 is 30 years, but the actual timeframe would be unknown because there would be no long-term monitoring conducted. Alternative 2 would have a higher short term impact, but they are relatively minor and warranted to ensure exposure to COC-impacted groundwater is restricted while persulfate concentrations and COCs are monitored. The estimated timeframe to meet the RAO for Alternative 2 ranges from 6 to 9 years depending on whether contingency plans are needed or not. The contingencies would also enhance short-term effectiveness by providing a means of addressing adverse groundwater conditions, whether these are persistent elevated persulfate concentrations or COCs rebounding above remediation goals.

A sustainability analysis of the two alternatives was conducted using the SiteWise™ tool (see **Appendix E**). Alternative 1 had the lowest environmental footprint in terms of projected greenhouse gas (GHG) emissions and energy consumptions between the two alternatives considered. However, as noted previously, this alternative does not meet the RAO. The environmental footprints of the alternatives including contingency plans are in the order below (lowest to highest): Alternative 1 < Alternative 2 < Alternative 2 with CP-2 < Alternative 2 with CP-1.

6.3.6 Implementability

Since Alternative 1 is the No Action alternative and does not meet the RAO, it would be difficult to obtain administrative approval for this alternative. Alternative 2 is technically and administratively feasible because previous groundwater monitoring and ISCO injections have been performed at the site.

6.3.7 Cost

The estimated costs for each alternative are summarized in **Table 6-2**.

TABLE 6-1
Detailed Evaluation of Remedial Alternatives
AOC E Focused Feasibility Study Report
Former NASD, Vieques, Puerto Rico

Evaluation Criteria	Alternative 1: No Action	Alternative 2: Groundwater Monitoring and Institutional Controls
Overall Protection to Human Health and the Environment		
Prevent exposure to COCs in groundwater at concentrations that pose a potentially unacceptable human health risk until the COC concentrations reach the drinking water standard or, in the absence of a drinking water standard, an acceptable risk level.	No reduction in risk of exposure over current conditions. This will not protect potential future users of groundwater, since a groundwater monitoring program and ICs would not be established. The longer-term compliance with PRGs would not be verified, nor would the decline of injected oxidant persulfate be monitored or known.	Protective: groundwater monitoring would verify the injected oxidant (persulfate) concentration decreases to non-reactive levels, and would allow an assessment of a potential COC rebound. Contingency plans (CP-1 and CP-2) would address potential residual persulfate persistence and/or COC rebound. The subsequent groundwater COC sampling would confirm that the remedial goals have been achieved. Implementation of ICs (e.g., signage and groundwater use restrictions) would provide protection against risk from groundwater ingestion and/or exposure during the remedy.
Compliance with ARARs		
Location-specific ARARs	Not applicable.	Would meet location-specific ARARs.
Action-specific ARARs	Would not meet any ARARs since there would be no action.	Would meet action-specific ARARs.
Chemical-specific ARARs	Does not comply with the Preliminary Remedial Goals (PRGs).	Would meet PRGs. Based on persulfate concentration trends over a 21-month period post-ISCO, it may take approximately 2 to 3 years for persulfate concentrations to naturally attenuate to 500 mg/L or below (the persulfate threshold below which FMC Corporation determined persulfate to be non-reactive). After persulfate concentrations decrease to 500 mg/L or less, groundwater COC sampling would be conducted to verify COC concentrations remain below PRGs and no rebound occurs. Contingency plans would be performed as necessary, if persulfate persists longer than 3 years, and/or if COCs rebound to above PRGs once residual persulfate is no longer reactive.

TABLE 6-1
Detailed Evaluation of Remedial Alternatives
AOC E Focused Feasibility Study Report
Former NASD, Vieques, Puerto Rico

Evaluation Criteria	Alternative 1: No Action	Alternative 2: Groundwater Monitoring and Institutional Controls
Long-Term Effectiveness and Permanence		
Magnitude of Risks	COCs at AOC E are relatively immobile due to slow groundwater flow (about 1 foot/year), and off-site migration of contaminated groundwater has not been observed and is unlikely. Risk would be reduced over time via natural attenuation, but there will be no mechanism to monitor COC concentrations, nor persulfate concentrations.	This alternative in conjunction with implementation of contingency plans (as necessary) would ensure or reduce COC concentrations to meet PRGs and therefore reduce unacceptable risks within an estimated 5 years.
Adequacy and Reliability of Controls	No controls.	ICs are expected to reliably prevent exposure to groundwater until the RAO is met.
Need for 5-year review	Because groundwater monitoring would not be performed to verify COC concentrations are below PRGs, five-year reviews would be required for an indefinite time (assumed to be 30 years for cost estimating purpose).	Since the remedial action is anticipated to be completed within 5 years, 5-year review s for 10 years is assume to be required to evaluate the effectiveness and protectiveness of the remedy.
Reduction of Toxicity, Mobility, or Volume (TMV) Through Treatment		
Reduction of TMV	Reduction of TMV was achieved by the pilot study, however, Alternative 1 would not verify the potential rebound and achieve further reduction result in no measurable reduction of TMV due to a lack of groundwater monitoring and additional treatment.	Groundwater monitoring would document that COCs remained below PRGs or, if not, a contingency plan would be implemented to reduce COC concentrations in groundwater to achieve the PRGs via TMV reduction within an estimated 6 years.
Short-Term Effectiveness		
Potential impacts to workers during remedial action and the effectiveness and reliability of protective measures	Not applicable.	Impacts to workers would be minor, primarily associated with injection activities if contingency plans are implemented.

TABLE 6-1
Detailed Evaluation of Remedial Alternatives
AOC E Focused Feasibility Study Report
Former NASD, Vieques, Puerto Rico

Evaluation Criteria	Alternative 1: No Action	Alternative 2: Groundwater Monitoring and Institutional Controls
Short-term risk that might be posed to the community during implementation	There would be no short-term risk to the community because no action would be implemented.	No community is located at or immediately adjacent to the site. The only potential interaction with the community is transporting equipment and personnel for implementing and monitoring the remedy to the site. However, the potential impacts are negligible.
Potential environmental impacts of remedial action and effectiveness and reliability of mitigation measures during implementation	Minor impacts associated with site inspections required by five-year reviews.	Negligible impacts associated with groundwater sampling activities, site inspections, and/or injection activities.
Time until protection is achieved	Could not be verified due to lack of groundwater monitoring (Assuming 5-year reviews for 30 years for cost estimating purpose)	Less than approximately 9 years.
Environmental Footprint (In terms of GHG emissions and energy consumption)	Negligible	Higher than Alternative 1 but it is necessary to meet RAOs
Implementability		
Technical feasibility	No groundwater monitoring to verify the effectiveness of the remedy.	Groundwater monitoring is easily implemented. ICs would likely require administrative resources and local cooperation.
Administrative feasibility	If five-year reviews indicate more action is necessary, would need to go through the PP/ROD process again.	Feasible: Similar injection work at the site was approved by the regulatory agencies for the pilot study.
Availability of services, equipment, and materials	Not applicable.	Readily available: Groundwater monitoring uses conventional equipment. Vendors competent in injection design and implementation are readily available. Oxidant commercially available.
Cost		
(See Table 6-2 for Cost Breakdown)	Low	Low to medium

TABLE 6-2

Summary of Cost Estimates for Remedial Alternatives

AOC E Focused Feasibility Study Report

Former NASD, Vieques, Puerto Rico

Alternatives	**Alternative 1**	**Alternative 2**				
Description	**(No Action)** **30 years**	**(Groundwater Monitoring and ICs)** **6 years**	**With Contingency Plan CP-1 (Groundwater Monitoring, ICs, and CHP Injection)** **9 years**		**With Contingency Plan CP-2 (Groundwater Monitoring, ICs, and Persulfate Injection)** **9 years**	
			Groundwater Monitoring	**CHP Injection**	**Groundwater Monitoring**	**Persulfate Injection**
Total Capital Cost	$0	$66,000	$66,000	$126,000	$66,000	$117,000
Total O&M & Periodic Cost (NPV)	$109,000	$194,000	$194,000	$87,000	$194,000	$77,000
Total Project Cost (NPV in 2012$)	$109,000	$260,000	$473,000		$454,000	

Note: NPV is based on discount rate of 4%

SECTION 7

References

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Appendices

Appendix A
Summary of Soil Data for DBB Soil Pilot Study

Appendix A-1
Vieques - West AOC E
Validated Subsurface Soil Raw Analytical Results
July 2008

Sample ID	VWAE-SB20-0810-08C	VWAE-SB20-1618-08C	VWAE-SB20-2022-08C	VWAE-SB20-2830-08C	VWAE-SB20-3234-08C	VWAE-SB20P-1618-08C	VWAE-SB21-0910-08C	VWAE-SB21-1618-08C	VWAE-SB21-1820-08C	VWAE-SB21-2930-08C	VWAE-SB21-3436-08C	VWAE-SB21-3638-08C	VWAE-SB21P-0910-08C
Sample Date	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08	7/16/08	7/16/08	7/16/08	7/16/08	7/17/08	7/17/08	7/16/08
Chemical Name													
Volatile Organic Compounds (UG/KG)													
1,1,1-TRICHLOROETHANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
1,1,2,2-TETRACHLOROETHANE	4.6 U	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
1,1,2-TRICHLOROETHANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
1,1-DICHLOROETHANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
1,1-DICHLOROETHENE	4.6 U	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
1,2,3-TRICHLOROBENZENE	4.6 U	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
1,2,4-TRICHLOROBENZENE	4.6 U	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
1,2-DIBROMO-3-CHLOROPROPANE	4.6 U	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
1,2-DIBROMOETHANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
1,2-DICHLOROBENZENE	4.6 U	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	90 J	270 U	260 U	240 J	900 U	940 U	240 U
1,2-DICHLOROETHANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
1,2-DICHLOROPROPANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
1,3-DICHLOROBENZENE	4.6 U	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
1,4-DICHLOROBENZENE	4.6 U	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
1,4-DIOXANE	91 U	86 U	87 U	89 U	78 U	88 U	4900 U	5300 U	5100 U	5200 U	18000 U	19000 U	4800 U
2-BUTANONE	9.1 U	8.6 U	8.7 U	8.9 U	7.8 U	8.8 U	490 U	110 J	130 J	520 U	1800 U	1900 U	480 U
2-HEXANONE	9.1 U	8.6 U	8.7 U	8.9 U	7.8 U	8.8 U	490 U	530 U	510 U	520 U	1800 U	1900 U	480 U
4-METHYL-2-PENTANONE	9.1 U	8.6 U	8.7 U	8.9 U	7.8 U	8.8 U	490 U	530 U	510 U	520 U	1800 U	1900 U	480 U
ACETONE	9.1 U	8.6 U	8.7 U	10 U	17 U	8.8 U	490 U	530 U	510 U	520 U	1800 U	1900 U	480 U
BENZENE	4.6 UJ	4.3 UJ	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	390	380 J	940 U	240 U
BROMOCHLOROMETHANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
BROMODICHLOROMETHANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
BROMOFORM	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
BROMOMETHANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
CARBON DISULFIDE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
CARBON TETRACHLORIDE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
CHLOROBENZENE	4.6 U	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
CHLOROETHANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
CHLOROFORM	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
CHLOROMETHANE	0.47 J	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
CIS-1,2-DICHLOROETHENE	4.6 U	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
CIS-1,3-DICHLOROPROPENE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
CYCLOHEXANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
DIBROMOCHLOROMETHANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
DICHLORODIFLUOROMETHANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
ETHYLBENZENE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	2,300	1,100	1,400	9,000	7,100	5,200	2,200
ISOPROPYLBENZENE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	970	620	840	3,000	1,700	1,300	830
m- and p-Xylene	4.6 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
M,P-XYLENE	NA	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	150 J	850	1,300	50,000	29,000	27,000	150 J
METHYL ACETATE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
METHYL TERT-BUTYL ETHER	4.6 UJ	4.3 U	4.3 U	1.3 J	0.3 J	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
METHYLCYCLOHEXANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	480	270 U	260 U	720	820 J	640 J	580
METHYLENE CHLORIDE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
O-XYLENE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	240 J	490	22,000	570 J	3,800	240 U
STYRENE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
TETRACHLOROETHENE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
TOLUENE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	6,300	900 U	940 U	240 U
TRANS-1,2-DICHLOROETHENE	4.6 U	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
TRANS-1,3-DICHLOROPROPENE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
TRICHLOROETHENE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
TRICHLOROFLUOROMETHANE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
VINYL CHLORIDE	4.6 UJ	4.3 U	4.3 U	4.5 U	3.9 U	4.4 U	240 U	270 U	260 U	260 U	900 U	940 U	240 U
SPLP Volatile Organic Compounds (UG/L)													
1,1,1-TRICHLOROETHANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
1,1,2,2-TETRACHLOROETHANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
1,1,2-TRICHLOROETHANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
1,1-DICHLOROETHANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
1,1-DICHLOROETHENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
1,2,4-TRICHLOROBENZENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
1,2-DIBROMO-3-CHLOROPROPANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
1,2-DIBROMOETHANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
1,2-DICHLOROBENZENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	3 J	3 J	NA	NA
1,2-DICHLOROETHANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
1,2-DICHLOROPROPANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
1,3-DICHLOROBENZENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
1,4-DICHLOROBENZENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
2-BUTANONE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
2-HEXANONE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
4-METHYL-2-PENTANONE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
ACETONE	10 UJ	NA	NA	10 UJ	NA	NA	NA	NA	NA	10 UJ	10 UJ	NA	NA

Appendix A-1
Vieques - West AOC E
Validated Subsurface Soil Raw Analytical Results
July 2008

Sample ID	VWAE-SB20-0810-08C	VWAE-SB20-1618-08C	VWAE-SB20-2022-08C	VWAE-SB20-2830-08C	VWAE-SB20-3234-08C	VWAE-SB20P-1618-08C	VWAE-SB21-0910-08C	VWAE-SB21-1618-08C	VWAE-SB21-1820-08C	VWAE-SB21-2930-08C	VWAE-SB21-3436-08C	VWAE-SB21-3638-08C	VWAE-SB21P-0910-08C
Sample Date	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08	7/16/08	7/16/08	7/16/08	7/16/08	7/17/08	7/17/08	7/16/08
Chemical Name													
BENZENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
BROMODICHLOROMETHANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
BROMOFORM	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
BROMOMETHANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
CARBON DISULFIDE	10 U	NA	NA	2 J	NA	NA	NA	NA	NA	2 J	3 J	NA	NA
CARBON TETRACHLORIDE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
CHLOROBENZENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
CHLOROETHANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
CHLOROFORM	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
CHLOROMETHANE	7 J	NA	NA	2 J	NA	NA	NA	NA	NA	15	11	NA	NA
CIS-1,2-DICHLOROETHENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
CIS-1,3-DICHLOROPROPENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
CYCLOHEXANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
DIBROMOCHLOROMETHANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
DICHLORODIFLUOROMETHANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
ETHYLBENZENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	27	19	NA	NA
ISOPROPYLBENZENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	5 J	5 J	NA	NA
METHYL ACETATE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	2 J	2 J	NA	NA
METHYL TERT-BUTYL ETHER	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
METHYLCYCLOHEXANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
METHYLENE CHLORIDE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
STYRENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
TETRACHLOROETHENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
TOLUENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	26	10 U	NA	NA
TRANS-1,2-DICHLOROETHENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
TRANS-1,3-DICHLOROPROPENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
TRICHLOROETHENE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
TRICHLOROFLUOROMETHANE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
VINYL ACETATE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
VINYL CHLORIDE	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
XYLENE (TOTAL)	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	180	100	NA	NA
Semivolatile Organic Compounds (UG/KG)													
1,1'-BIPHENYL	190 U	180 U	180 U	190 U	NA	180 U	220	200 U	1400 U	340	190	110 J	380
1,2,4,5 TETRACHLOROBENZENE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
2,2'-OXYBIS(1-CHLOROPROPANE)	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
2,3,4,6-TETRACHLOROPHENOL	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
2,4,5-TRICHLOROPHENOL	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
2,4,6-TRICHLOROPHENOL	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
2,4-DICHLOROPHENOL	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
2,4-DIMETHYLPHENOL	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
2,4-DINITROPHENOL	380 U	350 U	360 U	370 U	NA	350 U	370 U	380 U	2700 U	380 U	360 U	340 U	370 U
2,4-DINITROTOLUENE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
2,6-DINITROTOLUENE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
2-CHLORONAPHTHALENE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
2-CHLOROPHENOL	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
2-METHYLNAPHTHALENE	3.8 U	19 J	8 J	7.4 U	NA	8.7 J	2,900	10,000	14,000	6,600	3,200	2,300	4,300
2-METHYLPHENOL	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
2-NITROANILINE	380 U	350 U	360 U	370 U	NA	350 U	370 U	380 U	2700 U	380 U	360 U	340 U	370 U
2-NITROPHENOL	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
3,3'-DICHLOROBENZIDINE	190 U	180 U	180 U	190 U	NA	180 U	190 R	200 R	1400 U	190 R	180 R	180 R	190 R
3-NITROANILINE	380 U	350 U	360 U	370 U	NA	350 U	370 U	380 U	2700 U	380 U	360 U	340 U	370 U
4,6-DINITRO-2-METHYLPHENOL	380 U	350 U	360 U	370 U	NA	350 U	370 U	380 U	2700 U	380 U	360 U	340 U	370 U
4-BROMOPHENYL PHENYL ETHER	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
4-CHLORO-3-METHYLPHENOL	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
4-CHLOROANILINE	190 U	180 U	180 U	190 U	NA	180 U	190 R	200 R	1400 U	190 R	180 R	180 R	190 R
4-CHLOROPHENYL PHENYL ETHER	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
4-METHYLPHENOL	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
4-NITROANILINE	380 U	350 U	360 U	370 U	NA	350 U	370 U	380 U	2700 U	380 U	360 U	340 U	370 U
4-NITROPHENOL	380 U	350 U	360 U	370 U	NA	350 U	370 U	380 U	2700 U	380 U	360 U	340 U	370 U
ACENAPHTHENE	3.8 UJ	7.1 U	180 U	7.4 U	NA	180 U	23	270	320 J	160 J	100 J	94 J	150 J
ACENAPHTHYLENE	3.8 U	7.1 U	180 U	7.4 U	NA	180 U	22 U	38 U	38 U	7.5 U	22 U	21	22 U
ACETOPHENONE	90 J	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
ANTHRACENE	3.8 U	7.1 U	7.2 U	7.4 U	NA	7.1 U	36	110	85	360	61	77	49
ATRAZINE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
BENZALDEHYDE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
BENZO(A)ANTHRACENE	3.8 U	1.3 J	7.2 U	7.4 U	NA	7.1 U	83	310	260	280	130	100	140
BENZO(A)PYRENE	3.8 U	7.1 U	7.2 U	7.4 U	NA	7.1 U	26	82	92	43 J	36	37	45
BENZO(B)FLUORANTHENE	3.8 U	7.1 U	7.2 U	7.4 U	NA	7.1 U	31	86	91	82 J	43	27	52
BENZO(G,H,I)PERYLENE	3.8 U	7.1 U	7.2 U	7.4 U	NA	7.1 U	40	140	160	72 J	63	54	70
BENZO(K)FLUORANTHENE	3.8 U	7.1 U	7.2 U	7.4 U	NA	7.1 U	18 J	56	72	7.5 U	27	27	30
BIS(2-CHLOROETHOXY)METHANE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
BIS(2-CHLOROETHYL)ETHER	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
BIS(2-ETHYLHEXYL)PHTHALATE	190 U	180 U	180 U	190 U	NA	180 U	530 J	1,600	1,700	1,200	720	670	5,500 J

Appendix A-1
Vieques - West AOC E
Validated Subsurface Soil Raw Analytical Results
July 2008

Sample ID	VWAE-SB20-0810-08C	VWAE-SB20-1618-08C	VWAE-SB20-2022-08C	VWAE-SB20-2830-08C	VWAE-SB20-3234-08C	VWAE-SB20P-1618-08C	VWAE-SB21-0910-08C	VWAE-SB21-1618-08C	VWAE-SB21-1820-08C	VWAE-SB21-2930-08C	VWAE-SB21-3436-08C	VWAE-SB21-3638-08C	VWAE-SB21P-0910-08C
Sample Date	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08	7/16/08	7/16/08	7/16/08	7/16/08	7/17/08	7/17/08	7/16/08
Chemical Name													
BUTYL BENZYL PHTHALATE	190 U	180 U	180 U	190 U	NA	180 U	190	590	900 J	420	170 J	180	440
CAPROLACTAM	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
CARBAZOLE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
CHRYSENE	3.8 U	1.2 J	1.1 J	7.4 U	NA	7.1 U	59	210	240	140 J	100	85	110
DIBENZO(A,H)ANTHRACENE	3.8 U	7.1 U	7.2 U	7.4 U	NA	7.1 U	9.6 J	17 J	15 J	7.5 U	7.8 J	11 J	16 J
DIBENZOFURAN	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
DIETHYL PHTHALATE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
DIMETHYL PHTHALATE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
DI-N-BUTYL PHTHALATE	190 U	180 U	180 U	190 U	NA	180 U	190 U	61 J	1400 U	190 U	180 U	180 U	190 U
DI-N-OCTYL PHTHALATE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
FLUORANTHENE	3.8 U	7.1 U	7.2 U	7.4 U	NA	7.1 U	50	200	290 J	50	100	88	85
FLUORENE	3.8 U	3.4 J	1.7 J	7.4 U	NA	1.7 J	140	460	650 J	320	210	180	220
HEXACHLOROBENZENE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
HEXACHLOROBUTADIENE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
HEXACHLOROCYCLOPENTADIENE	190 U	180 U	180 U	190 U	NA	180 U	190 R	200 R	1400 U	190 R	180 R	180 R	190 R
HEXACHLOROETHANE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
INDENO(1,2,3-CD)PYRENE	3.8 U	7.1 U	7.2 U	7.4 U	NA	7.1 U	18 J	48	54	7.5 U	24	22	29
ISOPHORONE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
NAPHTHALENE	3.8 U	14 J	7 J	7.4 U	NA	7.1 J	1,500	5,500	7,600	3,900	2,100	1,800	2,600
NITROBENZENE	190 UJ	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
N-NITROSO-DI-N-PROPYLAMINE	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
N-NITROSODIPHENYLAMINE(1)	190 U	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
PENTACHLOROPHENOL	380 U	14 UJ	15 UJ	370 U	NA	14 UJ	45 U	78 U	77 U	380 U	44 U	340 U	45 U
PHENANTHRENE	3.8 U	7.1 U	7.2 U	7.4 U	NA	7.1 U	220	900	1,400	410	540	480	600
PHENOLS	39 J	180 U	180 U	190 U	NA	180 U	190 U	200 U	1400 U	190 U	180 U	180 U	190 U
PYRENE	3.8 U	2.6 J	2.2 J	7.4 U	NA	1.9 J	150	810	500 J	380	330	310	360
SPLP Semivolatile Organic Compounds (UG/L)													
1,1'-BIPHENYL	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
2,4,5-TRICHLOROPHENOL	130 U	NA	NA	130 U	NA	NA	NA	NA	NA	130 U	130 U	NA	NA
2,4,6-TRICHLOROPHENOL	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
2,4-DICHLOROPHENOL	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
2,4-DIMETHYLPHENOL	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
2,4-DINITROPHENOL	130 U	NA	NA	130 U	NA	NA	NA	NA	NA	130 U	130 U	NA	NA
2,4-DINITROTOLUENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
2,6-DINITROTOLUENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
2-CHLORONAPHTHALENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
2-CHLOROPHENOL	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
2-METHYLNAPHTHALENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	52	52	NA	NA
2-METHYLPHENOL	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
2-NITROANILINE	130 U	NA	NA	130 U	NA	NA	NA	NA	NA	130 U	130 U	NA	NA
2-NITROPHENOL	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
3,3'-DICHLOROBENZIDINE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
3-NITROANILINE	130 U	NA	NA	130 U	NA	NA	NA	NA	NA	130 U	130 U	NA	NA
4,6-DINITRO-2-METHYLPHENOL	130 U	NA	NA	130 U	NA	NA	NA	NA	NA	130 U	130 U	NA	NA
4-BROMOPHENYL PHENYL ETHER	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
4-CHLORO-3-METHYLPHENOL	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
4-CHLOROANILINE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
4-CHLOROPHENYL PHENYL ETHER	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
4-METHYLPHENOL	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
4-NITROANILINE	130 U	NA	NA	130 U	NA	NA	NA	NA	NA	130 U	130 U	NA	NA
4-NITROPHENOL	130 U	NA	NA	130 U	NA	NA	NA	NA	NA	130 U	130 U	NA	NA
ACENAPHTHENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
ACENAPHTHYLENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
ACETOPHENONE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
ANTHRACENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
ATRAZINE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
BENZALDEHYDE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
BENZO(A)ANTHRACENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
BENZO(A)PYRENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
BENZO(B)FLUORANTHENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
BENZO(G,H,I)PERYLENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
BENZO(K)FLUORANTHENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
BIS(2-CHLOROETHOXY)METHANE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
BIS(2-CHLOROETHYL)ETHER	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	50 U	NA	NA	21 J	NA	NA	NA	NA	NA	38 J	21 J	NA	NA
BUTYL BENZYL PHTHALATE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
CAPROLACTAM	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
CARBAZOLE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
CHRYSENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
DIBENZO(A,H)ANTHRACENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
DIBENZOFURAN	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
DIETHYL PHTHALATE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA

Appendix A-1
Vieques - West AOC E
Validated Subsurface Soil Raw Analytical Results
July 2008

Sample ID	VWAE-SB20-0810-08C	VWAE-SB20-1618-08C	VWAE-SB20-2022-08C	VWAE-SB20-2830-08C	VWAE-SB20-3234-08C	VWAE-SB20P-1618-08C	VWAE-SB21-0910-08C	VWAE-SB21-1618-08C	VWAE-SB21-1820-08C	VWAE-SB21-2930-08C	VWAE-SB21-3436-08C	VWAE-SB21-3638-08C	VWAE-SB21P-0910-08C
Sample Date	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08	7/16/08	7/16/08	7/16/08	7/16/08	7/17/08	7/17/08	7/16/08
Chemical Name													
DIMETHYL PHTHALATE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
DI-N-BUTYL PHTHALATE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
DI-N-OCTYL PHTHALATE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
FLUORANTHENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
FLUORENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
HEXACHLOROBENZENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
HEXACHLOROBUTADIENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
HEXACHLOROCYCLOPENTADIENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
HEXACHLOROETHANE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
INDENO(1,2,3-CD)PYRENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
ISOPHORONE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
NAPHTHALENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	71	80	NA	NA
NITROBENZENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
N-NITROSODIPHENYLAMINE(1)	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
PENTACHLOROPHENOL	130 UJ	NA	NA	130 UJ	NA	NA	NA	NA	NA	130 UJ	130 UJ	NA	NA
PHENANTHRENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
PHENOLS	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
PYRENE	50 U	NA	NA	50 U	NA	NA	NA	NA	NA	50 U	50 U	NA	NA
Total Metals (MG/KG)													
ALUMINUM	19,700	7,290	9,080	30,200	NA	8,500	11,900	8,700	5,460	13,100	11,000	6,690	9,230
AMEN CYANIDE	2.9 U	2.7 U	2.7 U	2.8 U	NA	2.7 U	3 U	2.7 U	2.8 U	2.8 U	2.7 U	3.2 U	2.9 U
ANTIMONY	6.8 UJ	6.3 UJ	6.5 UJ	6.7 UJ	NA	6.4 UJ	7.1 UJ	6.3 UJ	6.6 UJ	6.6 UJ	6.3 UJ	7.5 UJ	7 UJ
ARSENIC	0.84 J	0.31 J	1.1 U	2.2	NA	0.38 J	0.51 J	0.42 J	1.1 U	0.57 J	0.54 J	0.51 J	1.2 U
BARIUM	224 J	65.3	76.6	356 J	NA	78.1	97.4	79.6	49.3	126 J	111 J	66.4	118
BERYLLIUM	0.57 U	0.1 J	0.14 J	0.56 U	NA	0.12 J	0.17 J	0.13 J	0.086 J	0.55 U	0.53 U	0.13 J	0.19 J
CADMIUM	0.57 U	0.52 U	0.54 U	0.56 U	NA	0.53 U	0.59 U	0.52 U	0.55 U	0.55 U	0.53 U	0.63 U	0.58 U
CALCIUM	4,240	2,010	2,200	10,500	NA	2,300	2,590	2,110	1,720	2,290	5,740	5,840	2,340
CHROMIUM	16.1	6.7	7.9	39.3	NA	9.8	9.8	8.8	4.6	10.1	21.7	59.3	10.9
COBALT	18.8 J	5.1 J	6	29.5 J	NA	6	7.3	6.1	3.6 J	15 J	7.3 J	1.1 J	9.5
COPPER	44.5	19.3	22.1	68.2	NA	23.2	33.8	23.3	13.1	25.5	17.3	9.1	34.8
IRON	27,700	14,100	15,600	53,400	NA	16,100	18,900	16,400	10,600	22,800	14,800	12,000	16,500
LEAD	3.8	1.3 R	1.4 R	1.7	NA	1.9 R	12.6 R	6.3 R	5.3 R	7.7	3.6	3.2 R	19.1 R
MAGNESIUM	5,050	2,030	2,350	19,900	NA	2,460	3,170	2,390	1,540	2,080	3,970	2,180	3,250
MANGANESE	1,120 J	367	451	1,250 J	NA	423	551	496	278	480 J	309 J	264	771
MERCURY	0.11 U	0.1 U	0.11 U	0.11 U	NA	0.1 U	0.12 U	0.1 U	0.11 U	0.11 U	0.11 U	0.51	0.11 U
NICKEL	9.2	4.2 U	4.3 U	23.5	NA	4.3 U	5.3	4.2 U	4.4 U	3.6 J	6.3	5 U	5.3
POTASSIUM	2,430 J	976 J	1,080 J	256 J	NA	1,090 J	1,160 J	1,210 J	660 J	596 J	491 J	1,220 J	1,210 J
SELENIUM	4 UJ	3.6 U	3.8 U	3.9 UJ	NA	3.7 U	4.2 U	3.7 U	3.8 U	3.9 UJ	3.7 UJ	4.4 U	4.1 U
SILVER	1.1 U	1 U	1.1 U	1.1 U	NA	1.1 U	1.2 U	1 U	1.1 U	1.1 U	1.1 U	1.3 U	1.2 U
SODIUM	570 U	521 U	543 U	559 U	NA	532 U	594 U	523 U	549 U	554 U	528 U	626 U	581 U
THALLIUM	0.57 U	0.54 U	0.53 U	0.53 U	NA	0.51 U	0.57 U	0.55 U	0.57 U	0.55 U	0.53 U	0.61 U	0.56 U
VANADIUM	71.7	43.5	45.7	176	NA	48.5	61.6	49.9	31.8	76.5	37	10.9	50.8
ZINC	49.2	20.2	28.2	69.1	NA	23.9	86.2	24.7	17.4	26.6	25.9	14.5	109
SPLP Metals (UG/L)													
ALUMINUM	34,900	NA	NA	31,400	NA	NA	NA	NA	NA	29,000	2,980	NA	NA
ANTIMONY	4.2 J	NA	NA	4 J	NA	NA	NA	NA	NA	3.5 UJ	3.5 UJ	NA	NA
ARSENIC	3.2 U	NA	NA	3.2 U	NA	NA	NA	NA	NA	3.2 U	3.2 U	NA	NA
BARIUM	173	NA	NA	209	NA	NA	NA	NA	NA	165	35.2	NA	NA
BERYLLIUM	0.58	NA	NA	0.29	NA	NA	NA	NA	NA	0.77	0.18 U	NA	NA
CADMIUM	0.89 U	NA	NA	0.89 U	NA	NA	NA	NA	NA	0.89 U	0.89 U	NA	NA
CALCIUM	5,780	NA	NA	6,740	NA	NA	NA	NA	NA	8,210	3,690	NA	NA
CHROMIUM	28.6	NA	NA	44.4	NA	NA	NA	NA	NA	23.1	3.6	NA	NA
COBALT	8.7	NA	NA	18.3	NA	NA	NA	NA	NA	16.1	4.1 U	NA	NA
COPPER	74.7	NA	NA	83.3	NA	NA	NA	NA	NA	46.5	7.3	NA	NA
IRON	53,200	NA	NA	61,400	NA	NA	NA	NA	NA	47,500	3,930	NA	NA
LEAD	3.1	NA	NA	2.2	NA	NA	NA	NA	NA	17.5	1.5 U	NA	NA
MAGNESIUM	9,450	NA	NA	11,000	NA	NA	NA	NA	NA	5,920	2,250	NA	NA
MANGANESE	421	NA	NA	950	NA	NA	NA	NA	NA	379	83.1	NA	NA
MERCURY	0.1 U	NA	NA	0.1 U	NA	NA	NA	NA	NA	0.1 U	0.1 U	NA	NA
NICKEL	13.2	NA	NA	20.6	NA	NA	NA	NA	NA	9.6	2	NA	NA
POTASSIUM	4,070 J	NA	NA	581 J	NA	NA	NA	NA	NA	1,260 J	253 J	NA	NA
SELENIUM	4.4 U	NA	NA	4.4 U	NA	NA	NA	NA	NA	4.4 U	4.4 U	NA	NA
SILVER	0.51 U	NA	NA	0.51 U	NA	NA	NA	NA	NA	0.51 U	0.51 U	NA	NA
SODIUM	14,400	NA	NA	13,000	NA	NA	NA	NA	NA	23,900	12,000	NA	NA
THALLIUM	3.8 U	NA	NA	3.8 U	NA	NA	NA	NA	NA	3.8 U	3.8 U	NA	NA
VANADIUM	130	NA	NA	216	NA	NA	NA	NA	NA	168	39.4	NA	NA
ZINC	96.8 J	NA	NA	54.9 J	NA	NA	NA	NA	NA	87.1 J	11.8 J	NA	NA
Wet Chemistry (PH)													
PH	7.97	NA	NA	6.64	NA	NA	NA	NA	NA	7.88	8.26	NA	NA
TOC	903	NA	NA	4,420	NA	NA	NA	NA	NA	11,700	8,870	NA	NA

Appendix A-1
Vieques - West AOC E
Validated Subsurface Soil Raw Analytical Results
July 2008

Sample ID	VWAE-SB20-0810-08C	VWAE-SB20-1618-08C	VWAE-SB20-2022-08C	VWAE-SB20-2830-08C	VWAE-SB20-3234-08C	VWAE-SB20P-1618-08C	VWAE-SB21-0910-08C	VWAE-SB21-1618-08C	VWAE-SB21-1820-08C	VWAE-SB21-2930-08C	VWAE-SB21-3436-08C	VWAE-SB21-3638-08C	VWAE-SB21P-0910-08C
Sample Date	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08	7/18/08	7/16/08	7/16/08	7/16/08	7/16/08	7/17/08	7/17/08	7/16/08
Chemical Name													
Geotechnical (RATIO)													
Liquid Index (LI)	NA	NA	-7.60E-01	NA	NA	NA	NA	NA	-1.32E+00	-3.10E-01	NA	NA	NA
Liquid Limit (LL)	38	NA	23	NA	NA	NA	NA	NA	22	38	NA	NA	NA
Plastic Limit (PL)	20	NA	16	NA	NA	NA	NA	NA	17	18	NA	NA	NA
Plasticity Index (PI)	18	NA	7	NA	NA	NA	NA	NA	5	20	NA	NA	NA
Grain Size (PCT)													
GS01 Sieve 12" (300 mm)	100	NA	100	NA	NA	NA	NA	NA	100	100	NA	NA	NA
GS03 Sieve 3" (75 mm)	100	NA	100	NA	NA	NA	NA	NA	100	100	NA	NA	NA
GS04 Sieve 2.5" (62.5 mm)	100	NA	100	NA	NA	NA	NA	NA	100	100	NA	NA	NA
GS05 Sieve 2" (50 mm)	100	NA	100	NA	NA	NA	NA	NA	100	100	NA	NA	NA
GS06 Sieve 1.5" (37.5 mm)	100	NA	100	NA	NA	NA	NA	NA	100	100	NA	NA	NA
GS07 Sieve 1" (25.0 mm)	100	NA	100	NA	NA	NA	NA	NA	100	100	NA	NA	NA
GS08 Sieve 0.75" (19.0 mm)	100	NA	100	NA	NA	NA	NA	NA	100	100	NA	NA	NA
GS09 Sieve 0.5" (12.5 mm)	100	NA	100	NA	NA	NA	NA	NA	100	100	NA	NA	NA
GS10 Sieve 0.375" (9.5 mm)	98.6	NA	100	NA	NA	NA	NA	NA	100	100	NA	NA	NA
Sieve No. 004 (4.75 mm)	98	NA	98.7	NA	NA	NA	NA	NA	99.4	99	NA	NA	NA
Sieve No. 010 (2.00 mm)	95.5	NA	94.5	NA	NA	NA	NA	NA	91.6	97.6	NA	NA	NA
Sieve No. 020 (850 um)	89.2	NA	82.1	NA	NA	NA	NA	NA	65.4	90.1	NA	NA	NA
Sieve No. 040 (425 um)	81.3	NA	68.3	NA	NA	NA	NA	NA	38.7	75.8	NA	NA	NA
Sieve No. 060 (250 um)	75.2	NA	56.9	NA	NA	NA	NA	NA	25.7	64.9	NA	NA	NA
Sieve No. 100 (150 um)	69.6	NA	45.4	NA	NA	NA	NA	NA	17.7	56.8	NA	NA	NA
Sieve No. 200 (75 um)	62.8	NA	34.5	NA	NA	NA	NA	NA	12.9	49.7	NA	NA	NA
Total Petroleum Hydrocarbons (MG/KG)													
TPH-diesel range	11 U	11 U	11 U	11 U	NA	11 U	670	830	1,600	600	380	370	430
TPH-gas range	0.45 U	0.45 U	0.42 U	0.45 U	0.38 U	0.44 U	1.7	2.7	1.2	5	18	14	1.8
TPH-oil range	13 J	31	21	18	NA	23	2,700	5,100	5,700	3,200	1,900	2,200	2,000
SPLP Total Petroleum Hydrocarbons (MG/L)													
TPH-diesel range	2.5 UJ	NA	NA	2.5 U	NA	NA	NA	NA	NA	0.97 J	0.79 J	NA	NA
TPH-gas range	0.5 U	NA	NA	0.5 U	NA	NA	NA	NA	NA	1.2	1.1	NA	NA
TPH-oil range	5 U	NA	NA	5 U	NA	NA	NA	NA	NA	5 U	5 U	NA	NA

Notes:

J - Analyte present. Value may or may not be accurate or precise
NA - Not analyzed
R - Unreliable Result
U - The material was analyed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
MG/L - Milligrams per liter
PCT - Percent
PH - pH units
RATIO - ratio
UG/KG - Micrograms per kilogram
UG/L - Micrograms per liter

Appendix A-2
Vieques-West AOCE
Subsurface Soil Raw Analytica lResults
November 2011

Station ID		VWAE-SB22		VWAE-SB23		
Sample ID	**Soil PALs**	VWAE-SB22-1620-1111	VWAE-SB22-2832-1111	VWAE-SB23-1620-1111	VWAE-SB23-2832-1111	VWAE-SB23P-2832-1111
Sample Date		11/01/11	11/01/11	11/01/11	11/01/11	11/01/11
Chemical Name						
Volatile Organic Compounds (UG/KG)						
1,2-Dichloroethane		1.3 U	84 U	90 U	110 U	120 U
Benzene		1.3 U	99 J	90 U	1,400	2,200
Methyl-tert-butyl ether (MTBE)		1.3 U	150 J	90 U	290	370
Xylene, total		1.3 UJ	23,000	100 J	110,000	150,000
SPLP Volatile Organic Compounds (UG/L)						
1,2-Dichloroethane, SPLP	10.5	0.5 U	0.5 U	0.5 U	2.5 U	NA
Benzene, SPLP	10.5	0.5 U	0.5 U	0.5 U	2.5 U	NA
Methyl-tert-butyl ether (MTBE), SPLP	252	0.5 U	0.5 U	0.5 U	2.5 U	NA
Xylene, total, SPLP	21,000	1 U	72	3.1 J	580	NA
Semivolatile Organic Compounds (UG/KG)						
2-Methylnaphthalene		3.6 U	3,100	14,000	4,200	4,500
Naphthalene		3.6 U	1,700	7,900	3,000	3,100
SPLP Semivolatile Organic Compounds (UG/L)						
2-Methylnaphthalene, SPLP	315	2 U	30 J	71 J	23 J	NA
Naphthalene, SPLP	210	2 U	49 J	89	46 J	NA
Wet Chemistry						
% Moisture (pct)		10	11	8.9 J	12	11
Nitrate (mg/kg)		3.6	9.8	1.1 U	0.5 U	NA
pH (ph)		7.5	7.6	7.9	7.9	NA
Sulfate (mg/kg)		90 J	55 J	1,700	66 J	NA
Total organic carbon (TOC) (mg/kg)		2,300	7,500	13,000	11,000	NA
Total Petroleum Hydrocarbons (UG/KG)						
TPH-diesel range		16,000	2,100,000	1,600,000	2,800,000 J	1,700,000 J
TPH-gas range		2,900 U	1,800,000	1,500,000	950,000	890,000
TPH-oil range		25,000	2,200,000	1,700,000	2,700,000	2,000,000

Notes:

Soil PALs - Soil Project Action Levels were established for protection of soil to groundwater leaching during the EISB pilot study, which were groundwater pilot study PRGs adjusted by dilution factor of 2.1.

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

NA - Not analyzed

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

MG/KG - Milligrams per kilogram

PCT - Percent

PH - pH units

UG/KG - Micrograms per kilogram

UG/L - Micrograms per liter

Appendix B
ISCO Groundwater Pilot Study Technical Memorandum

Summary of AOC E Pilot Study Status and Rationale for Transitioning to Feasibility Study

PREPARED FOR: Julio Vazquez/USEPA
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PREPARED BY: CH2M HILL on behalf of the Navy

DATE: August 3, 2011

The purpose of this Technical Memorandum (TM) is to provide the rationale for halting the Pilot Study at Area of Concern (AOC) E and moving to a Feasibility Study for the site. As such, this TM summarizes the data and information obtained from the baseline sampling event, two post-injection sampling events, and related activities associated with the In-situ Chemical Oxidation (ISCO) and Enhanced In-situ Bioremediation (EISB) Pilot Study. AOC E is located at the Former Naval Ammunition Support Detachment (NASD), Vieques, Puerto Rico (**Figure 1**). **Figure 2** shows the monitoring well distribution at AOC E, and Figure 3 shows the general groundwater flow directions across the site, which trends west to northwest.

This TM was prepared under the United States (U.S.) Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC), Atlantic Division, Comprehensive Long-term Environmental Action – (CLEAN) Contract N62470-08-D-1000, Contract Task Order 083, for submittal to the United States Environmental Protection Agency (USEPA) Region 2 and the Commonwealth of Puerto Rico Environmental Quality Board (PREQB). The Navy, USEPA, and the EQB, together with the United States Fish and Wildlife Service (USFWS) for land owned by the Department of Interior (DOI), work jointly as the former NASD Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Environmental Restoration Program (ERP) Team.

The planning document that sets the framework for the implementation of the Pilot Study is the Sampling and Analysis Plan (SAP) (CH2M HILL, 2010).

Pilot Test Design

Historical information regarding the contaminant source and release(s) can be found in the Remedial Investigation (RI) Report (CH2M HILL, 2008). Based on the historical information, the AOC E Pilot Study was designed with three objectives:

- To determine if the Pilot Study technologies (for the unsaturated and saturated zones) can reduce the groundwater contaminant concentrations to acceptable levels
- To determine if the Pilot Study technologies can reduce the groundwater cleanup time relative to contaminants degrading on their own (natural attenuation)

- To determine if the pilot study technologies can reduce the groundwater contaminant concentrations in soil to levels that do not pose soil to groundwater leaching concerns.

Preliminary remediation goals from the SAP (CH2M HILL, 2010) are summarized in **Table 1.** The Pilot Study approach consisted of an ISCO application with sodium persulfate (sodium hydroxide alkaline activated Klozur) injections into four existing 2-inch-diameter monitoring wells (MW-01, MW-03, MW-04 and MW-05) in and around the area of groundwater contamination. Immediately following ISCO injections, an enhanced biodegradation technology was implemented by injecting calcium nitrate into the unsaturated zone in the area of highest contamination identified in the unsaturated zone.

A second round of groundwater injections of sodium persulfate activated with sodium hydroxide was conducted in monitoring wells MW-01, MW-03, MW-04, and MW-05 3 months after the initial application.

Pilot Test Activities

Activities conducted to date on the Pilot Test at AOC E are summarized in **Table 2** and described in more detail below.

Baseline Groundwater Monitoring

On January 25, 2010, prior to baseline groundwater monitoring, AOC E monitoring wells were checked for free product. None was detected in any well except MW-01, which contained 0.59 foot of free product. The product was bailed from the well. On March 5, 2010, 0.16 foot of product was detected in MW-01. The product was again bailed from the well.

Baseline groundwater monitoring was conducted on monitoring wells MW-01, MW-03, MW-04, and MW-05 on March 16-17, 2010. Less than an inch of product was detected in MW-01; however, the product was bailed from the well prior to collecting groundwater samples. The samples were analyzed and validated in accordance with the SAP (CH2M HILL, 2010). Analytical results are summarized in **Table 3**. The Pilot Study preliminary remediation goals (PRGs) were exceeded for benzene in MW-01, for MTBE in MW-04 and MW-05, and for naphthalene in MW-01 and MW-05. Field measurements of persulfate were also recorded to provide baseline concentrations for the oxidant.

First ISCO Injection Event

Immediately following the baseline sampling event, the first ISCO injection event was conducted from March 27 to 31, 2010. Approximately 3,344 pounds (lb) of sodium persulfate with 3,200 lb of sodium hydroxide (20 percent by weight or 200,000 milligrams per liter [mg/L] activated persulfate) were injected into MW-01, MW-03, MW-04 and MW-05. The chemicals were evenly distributed among the wells. Twenty gallons of water was injected behind the final oxidant solution injected into each well. Because of the free product detected in MW-01, activated persulfate was first injected into MW-03, MW-04, and MW-05 (the wells surrounding MW-01) while bailing from MW-01 to induce a gradient toward the well. The purpose was to enhance the distribution of persulfate throughout the area of groundwater contamination. When persulfate was detected in groundwater bailed from MW-01, injection of the activated persulfate solution commenced in MW-01.

Second ISCO Injection Event

The second ISCO injection event occurred from June 21 to 23, 2010. Prior to the injections, residual persulfate concentrations were measured in the wells (**Table 4**) with a Chemetrics test kit, as defined in the SAP (CH2M HILL, 2010). Because the maximum detectable persulfate concentration by the particular field test kit was 70 mg/L, and all readings showed the concentrations in the wells were higher, the actual concentrations of residual persulfate were unknown. However, based on the well-documented behavior of persulfate in the environment, the second ISCO injection proceeded as planned.

Approximately 1,672 lb of sodium persulfate with 1,600 lbs of sodium hydroxide (18 percent by weight or 180,000 mg/L activated persulfate) were injected into MW-01, MW-03, MW-04, and MW-05. The chemicals were evenly distributed among the wells, and the injections were followed by 20 gallons of water in each well. As with the first ISCO injection event, the oxidant solution was first injected into the wells surrounding MW-01 (MW-03, MW-04, and MW-05) while MW-01 was bailed to induce a gradient. After injecting 100 gallons (of a total of 256 gallons) in MW-03 and MW-04, and 256 gallons into MW-05, injections into MW-01 commenced.

First Post-ISCO Injection Sampling Event

As part of the scheduled first post-injection groundwater sampling event, residual persulfate concentrations were measured on January 27, 2011 in monitoring wells MW-01, MW-03, MW-04 and MW-05. Although residual persulfate concentrations were measured with the Chemetrics test kit, as was done during the second injection event, the samples were diluted so that the kits could be used to get better estimates of the residual persulfate concentrations, as shown in **Table 4.** Because persulfate concentrations remained high (the highest measured was 35,000 mg/L, which is about 19 percent of the injected concentration [i.e., 180,000 mg/L] during the second injection event [i.e., an 81 percent or more decline in persulfate concentrations]), the decision was made to postpone groundwater sampling (in accordance with the SAP [CH2M HILL, 2010]) until persulfate concentrations declined further.

Because residual persulfate was showing unusual persistence, groundwater samples were collected from the four wells and sent to FMC Corporation's (the persulfate's manufacturer) research analytical laboratory for confirmation of persulfate concentrations by FMC's test kit and auto-titrator tests. In addition to confirming the field-measured persulfate concentrations and pH levels, FMC tested the groundwater to:

- Measure contaminants in monitoring well water via gas chromatography (GC)/mass spectrometer (MS) with purge and trap
- Analyze potential options to break down remaining persulfate
- Spike the groundwater samples from MW-03 and MW-04 with benzene and naphthalene to see if the residual persulfate could oxidize spiked benzene and naphthalene

It is noted that although FMC Corporations' analytical methods were sound, FMC research analytical laboratory is not a Department of Defense (DoD)-certified laboratory, nor is it the

laboratory procured for the Pilot Study in accordance with the SAP (CH2M HILL, 2010). However, the analytical data can be used to make determinations regarding the Pilot Study with confidence. The chromatograms produced by FMC for MW-01 showed naphthalene and benzene concentrations of 190 and 40 micrograms per liter (µg/L), respectively. They also showed MW-04 contained 590 µg/L naphthalene; while MW-05 contained 14.8 µg/L naphthalene and was below the detection limit of 0.08 µg/L for benzene.

Results of analysis of the second bulleted question above show that of the eight treatments conducted to assess how best to decrease the residual persulfate concentrations, using hydrogen peroxide (H_2O_2) as an activator was the most feasible.

In a spike test referenced in bullet three above, samples of groundwater from MW-04 and MW-03 were spiked with approximately 20,000 µg/L naphthalene and 10,000 µg/L benzene. Some samples were kept at 2 degrees Celsius (°C), and others at 25°C. The samples were analyzed by GC/MS with purge and trap after 0 days, 5 days, 10 days, 15 days, and 20 days (**Figure 4**). In the tests conducted at 25°C, groundwater samples from both MW-03 and MW-04 that had been spiked with benzene and naphthalene showed no detections of these contaminants by 20 days (less than the method detection limit [MDL] of 0.08 µg/L). In tests conducted at 2°C, groundwater from MW-03 and MW-04 spiked with benzene and naphthalene showed marked decreases to less than or equal to 5000 µg/L by 20 days. Because laboratory results indicated the persulfate appears to remain able to oxidize residual contaminants in groundwater, the persulfate was left in the groundwater to slowly destroy residual contaminants rather than being actively consumed by delivering appropriate chemicals to the groundwater.

Second Post-ISCO Injection Sampling Event

Persulfate concentrations were measured again on May 18, 2011 to determine if/how much additional residual persulfate consumption had occurred since the January 2011 sampling event, to assess if persulfate concentrations had decreased sufficiently to sample the groundwater for contaminants in accordance with the SAP (CH2M HILL, 2010). As shown in **Table 4,** residual persulfate concentrations were similar to those measured in January 2011. MW-01 and MW-05 groundwater samples were sent to the FMC Corporation research laboratory to be analyzed by purge and trap and GC/MS. Three sets of samples were sent from each well: one unpreserved, one preserved with HCL, and one preserved with ascorbic acid in accordance with an USEPA laboratory protocol to neutralize the oxidation process. Neither benzene nor naphthalene was detected in any of the three sets of samples from both wells (MDL of 0.08 µg/L).

Conclusions

Although the pilot study activities and outcome were not as originally planned, the information collected suggests the ISCO injections were successful at reducing contaminant concentrations. Specifically, the residual persulfate levels are requiring a longer period than anticipated to decline, but contaminant concentrations measured by FMC during two sampling events indicate concentrations of contaminants of interest have declined below goals.

Further, tests by FMC Corporation show that the persulfate is still reactive with contaminants. The pilot test has shown ISCO to be effective on the site constituents of concern (COCs) in groundwater. Therefore, rather than waiting for an unknown period of time for the persulfate levels to return to normal, it is proposed that the feasibility study for AOC E to be initiated. In this case, further groundwater monitoring to ensure persulfate levels return to normal and contaminant concentrations do not rebound can be performed as part of post-ROD monitoring. However, because no post-injection soil samples have been collected, soil sampling in accordance with the SAP (CH2M HILL, 2010) will be conducted during the Feasibility Study so that information can be included in the evaluation of remedial alternatives, as warranted.

References

CH2M HILL. 2008. *Final Remedial Investigation Report, Area of Concern (AOC) E, Former Naval Ammunition Support Detachment, Vieques, Puerto Rico*

CH2M HILL. 2010. *Final In-Situ Remediation Pilot Studies (AOC E and AOC I Sites) Sampling and Analysis Plan, Former Naval Ammunition Support Detachment, Vieques, Puerto Rico.*

Tables

TABLE 1
Preliminary Remediation Goals
AOC E Technical Memorandum
Vieques, Puerto Rico

COCs	Pilot Study PRGs	Source of PRGs
Benzene	5 µg/L	MCL
1,2-Dichloroethane	5 µg/L	MCL
2-Methylnaphthalene	150 µg/L	Hazard Index (HI) of 1 based on the September 2008 EPA Regional Screening Level
MTBE	120 µg/L	Based on the cancer risk of 10-5 and the September 2008 EPA Regional Screening Level
Naphthalene	1.4 µg/L*	Based on the cancer risk of 10-5 and the September 2008 EPA Regional Screening Level
Total xylenes	10,000 µg/L	MCL

* Note: A pilot study PRG of 1.4 µg/L was selected solely to represent a conservative screening value to evaluate the technical implementability and effectiveness of the proposed pilot study technology. The EPA's health-advisory life-time value for naphthalene is 100 µg/L (USEPA, 2006), which would most likely be the final clean-up level in groundwater for naphthalene.

TABLE 2
Field Activity Summary
AOC E Technical Memorandum
Vieques, Puerto Rico

Date	Specific Activity	Comments
January 25, 2010	Product check in AOC E monitoring wells	Detected and bailed 0.59 feet of product from monitoring well MW-01; no product in other wells.
March 5, 2010	Product check in AOC E monitoring wells	Detected and bailed 0.16 feet of product from monitoring well MW-01.
March 16-17, 2010	Baseline Groundwater Sampling Event	Purged and sampled 4 monitoring wells (MW-01, MW-03, MW-04, and MW-05). Samples analyzed by DoD certified lab and results validated by 3rd party validator. Measured 0.07 feet product in MW-01; no product in other wells.
March 27-31, 2010	1st ISCO Injection Event	Injected 3,344 pounds of sodium persulfate with 3,200 lbs of sodium hydroxide (total of approximately 2,009 gallons) across four existing monitoring wells (MW-01, MW-03, MW-04, and MW-05). Started injecting in wells MW-03, -04, and -05 while bailing MW-01 to draw the persulfate in that direction, then when persulfate was detected in purge water from MW-01, started injecting in MW-01.
June 21-23, 2010	2nd ISCO Injection Event	Injected 1,672 pounds of sodium persulfate with 1,600 lbs of sodium hydroxide (total of approximately 1,024 gallons) across four existing monitoring wells (MW-01, MW-03, MW-04, and MW-05). Injected in wells surrounding MW-01 first (MW-03, MW -04, and MW-05) while bailing from MW-01, then started injecting also in MW-01.
January 27, 2011	Field-measured persulfate concentrations in wells prior to scheduled sampling event; sent samples from MW-01, MW-03, MW-04, and MW-05 to FMC Corporation lab for multiple tests	Purged and field-measured persulfate in monitoring wells MW-01, MW-03, MW-04, and MW-05. Decision made to delay formal sampling event until persulfate concentrations declined further. FMC Corporation measured persulfate concentrations in each well sample. Additional tests consisted of: 1) Analyzing options to break down remaining persulfate, 2) Measuring contaminants of interest in monitoring well water via GC/MS with purge and trap, 3) Spiking the groundwater samples with benzene and naphthalene in MW-03 and MW-04 to see if remaining persulfate would oxidize spiked benzene and naphthalene
May 18, 2011	Field-measured persulfate concentrations in wells to determine feasibility of sampling; sent groundwater samples from MW-01 and MW-05 to FMC Corporation lab for testing	Purged and field-measured persulfate in monitoring wells MW-01, MW-03, MW-04, and MW-05. Decision made to delay formal sampling event until persulfate concentrations declined further. FMC Corporation analyzed groundwater samples from MW-01 and MW-05 via GC/MS purge and trap. Benzene and naphthalene in both samples below MDL of 0.08 μ g/L.

Table 3
CTO-83 AOC-E
Groundwater Exceedance Results
AOC E Technical Memorandum
Vieques, Puerto Rico

Station ID	**GW PRGs**	WAE-MW01	WAE-MW03	WAE-MW04		WAE-MW05
Sample ID		VWAE-MW01-0310	VWAE-MW03-0310	VWAE-MW04-0310	VWAE-MW04P-0310 (duplicate)	VWAE-MW05-0310
Sample Date		03/17/10	03/16/10	03/17/10	03/17/10	03/17/10
Chemical Name						
Volatile Organic Compounds (UG/L)						
Benzene	5	**6.4**	5 U	5 U	5 U	4.5 J
Methyl-tert-butyl ether (MTBE)	120	120	5 U	**130**	96	**520**
Semivolatile Organic Compounds (UG/L)						
2-Methylnaphthalene	150	8	1 U	1 U	1 U	5.8
Naphthalene	1.4	**6.6**	1 U	1 U	1 U	**13**
Dissolved Metals (UG/L)						
Iron, Dissolved		5,860	200 U	4,730	NA	4,100
Manganese, Dissolved		2,130	50 UJ	4,350	NA	2,040
Wet Chemistry						
Nitrate (mg/l)		0.34 B	4.9 J	0.07 BJ	NA	0.038 BJ
Sulfate (mg/l)		5.5 B	20 B	8.5 B	NA	7.3 B
Total organic carbon (TOC) (mg/l)		17	10 U	19	NA	9.2 J
Total Petroleum Hydrocarbons (UG/L)						
TPH-diesel range		3,500	350 U	1,600	1,500	1,300
TPH-gas range		150	55 U	65	60	250
TPH-oil range		870	350 U	540	630	350 U
Biomass (CELLS/ML)						
Cells		110,000	NA	NA	NA	NA
Community Structure (Percent)						
Actinomycetes		8.96	NA	NA	NA	NA
Anaerobic metal reducers		2.09	NA	NA	NA	NA
Eukaryotes		0.75	NA	NA	NA	NA
Firmicutes		15.7	NA	NA	NA	NA
General Nsats		25.4	NA	NA	NA	NA
Proteobacteria		47.1	NA	NA	NA	NA
Functioning Genes (CELLS/ML)						
Benzyl Succinante Synthase		40.3	NA	NA	NA	NA
Napthalene Dioxygenase		18,000	NA	NA	NA	NA
Physiological Status						
Decreased Permeability (Tran/Cis)		0.169	NA	NA	NA	NA
Slowed Growth (CY/Cis)		2.00	NA	NA	NA	NA

Notes:
Bold indicates exceeds criteria

B - Analyte not detected above the level reported in blanks

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

NA - Not analyzed

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

CELLS/ML - Cells per milliliter

MG/L - Milligrams per liter

Tran/Cis- The ratio of the number of cells of all trans fatty acids to the number of cells of all cis fatty acids

CY/Cis- The ratio of the number of cells of all cyclopropyl (mid-chain branched fatty acids) to the number of cells of all cis fatty acids

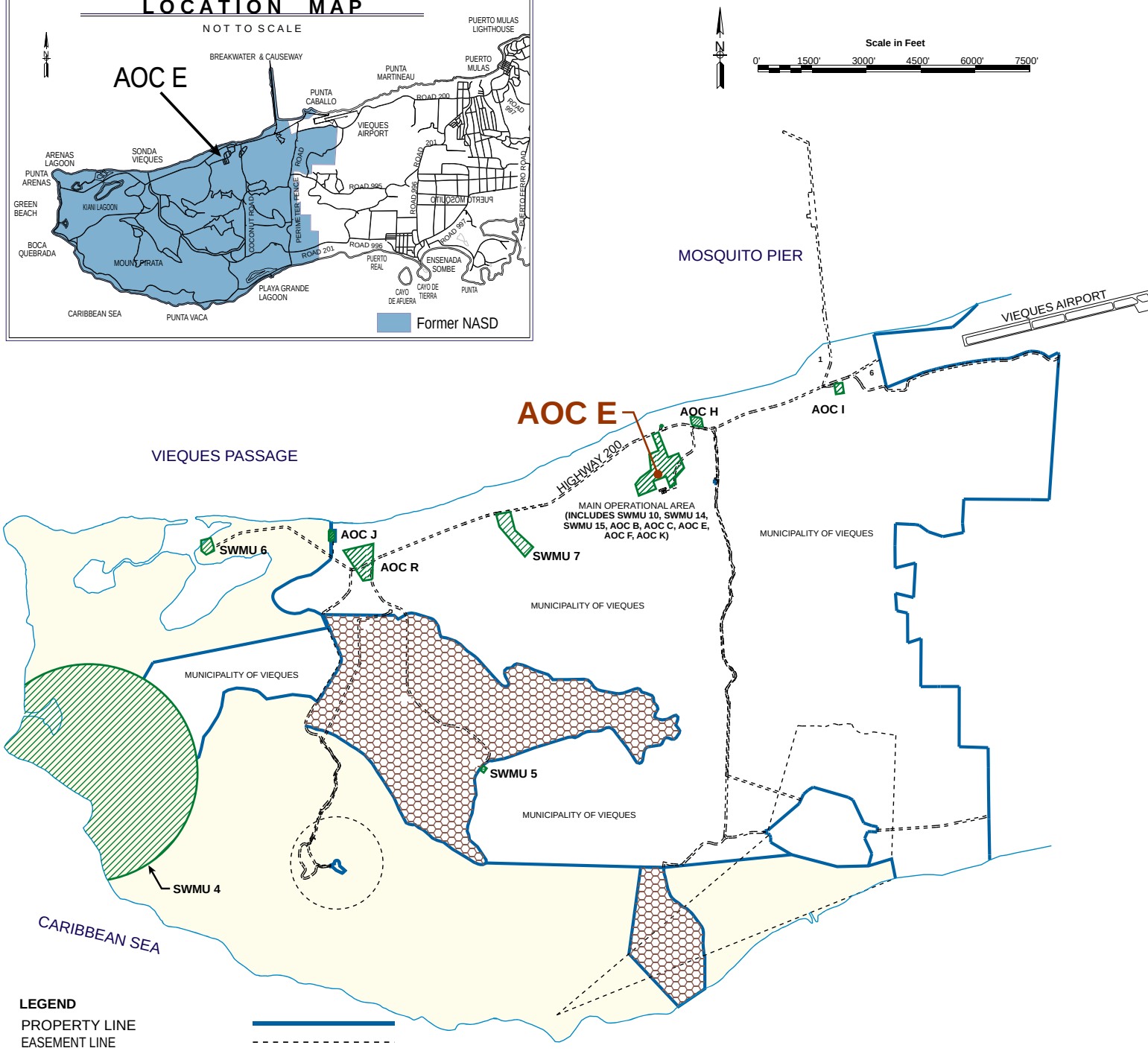
UG/L - Micrograms per liter

Table 4
Measured Persulfate Concentrations
AOC E Technical Memorandum
Vieques, Puerto Rico

AOC E Persulfate Concentrations						
	03/16-03/18/10	6/21/2010	1/27/2011	1/27/2011	1/27/2011	5/18/2011
Well number	Concentration (mg/L)					
MW-1	0	>70	5,000	5,420	5,945	4,200
MW-3	0	>70	35,000	27,580	22,960	21,000
MW-4	0.07	NM	15,000	26,240	21,929	21,000
MW-5	0	>70	7,000	3,940	4,768	7,000
	Baseline monitoring with Chemets test kit prior to injections	Chemets test kit results prior to second injection	Chemets test kit results prior to scheduled sampling event	FMC laboratory test kit results prior to scheduled sampling	FMC laboratory auto-titrator results prior to scheduled sampling	Chemets test kit results during sampling for FMC

NM= Not measured
Injected at 200,000 mg/L starting on 3/22/10
Injected at 180,000 mg/L starting on 6/21/10

Figures



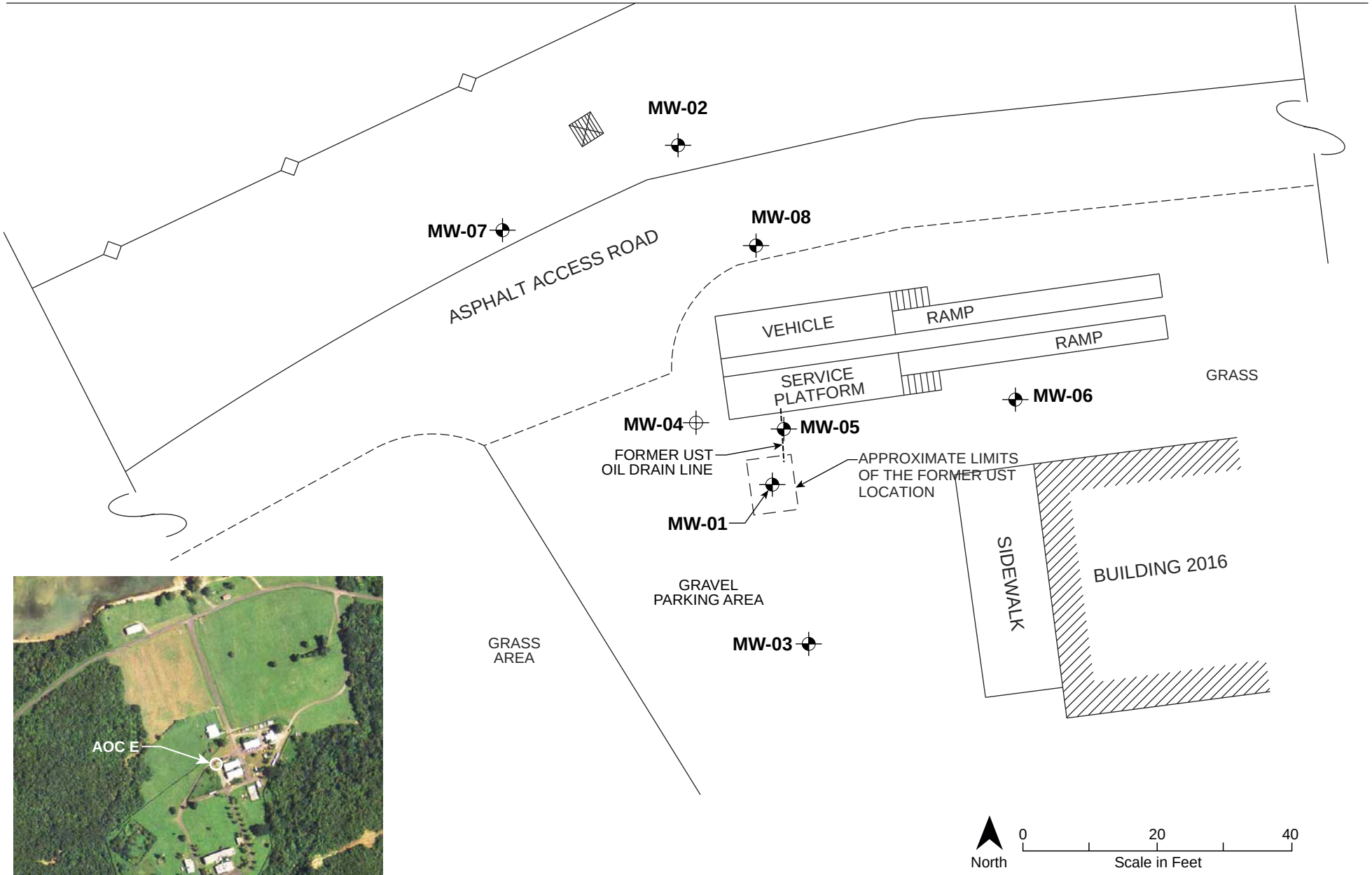
LEGEND

PROPERTY LINE
EASEMENT LINE
APPROXIMATE EDGE OF WATER
UNITED STATES GOVERNMENT\ DEPARTMENT OF THE INTERIOR
PUERTO RICO CONSERVATION TRUST
APPROXIMATE AREAS OF SITES
HIGHWAY OR ROAD

AOC - AREA OF CONCERN
SWMU - SOLID WASTE MANAGEMENT UNIT
NASD - NAVAL AMMUNITION SUPPORT DETACHMENT

SOURCE:
VIEQUES NASD SURVEY LAND TRANSFER & DISPOSAL OVERALL LOCATION SURVEY
PREPARED BY GLENN & SADLER AND LUIS BERRIOS MONTES & ASSOCIATES

FIGURE 1
AOC E Site Location Map
AOC E Technical Memorandum
Vieques, Puerto Rico

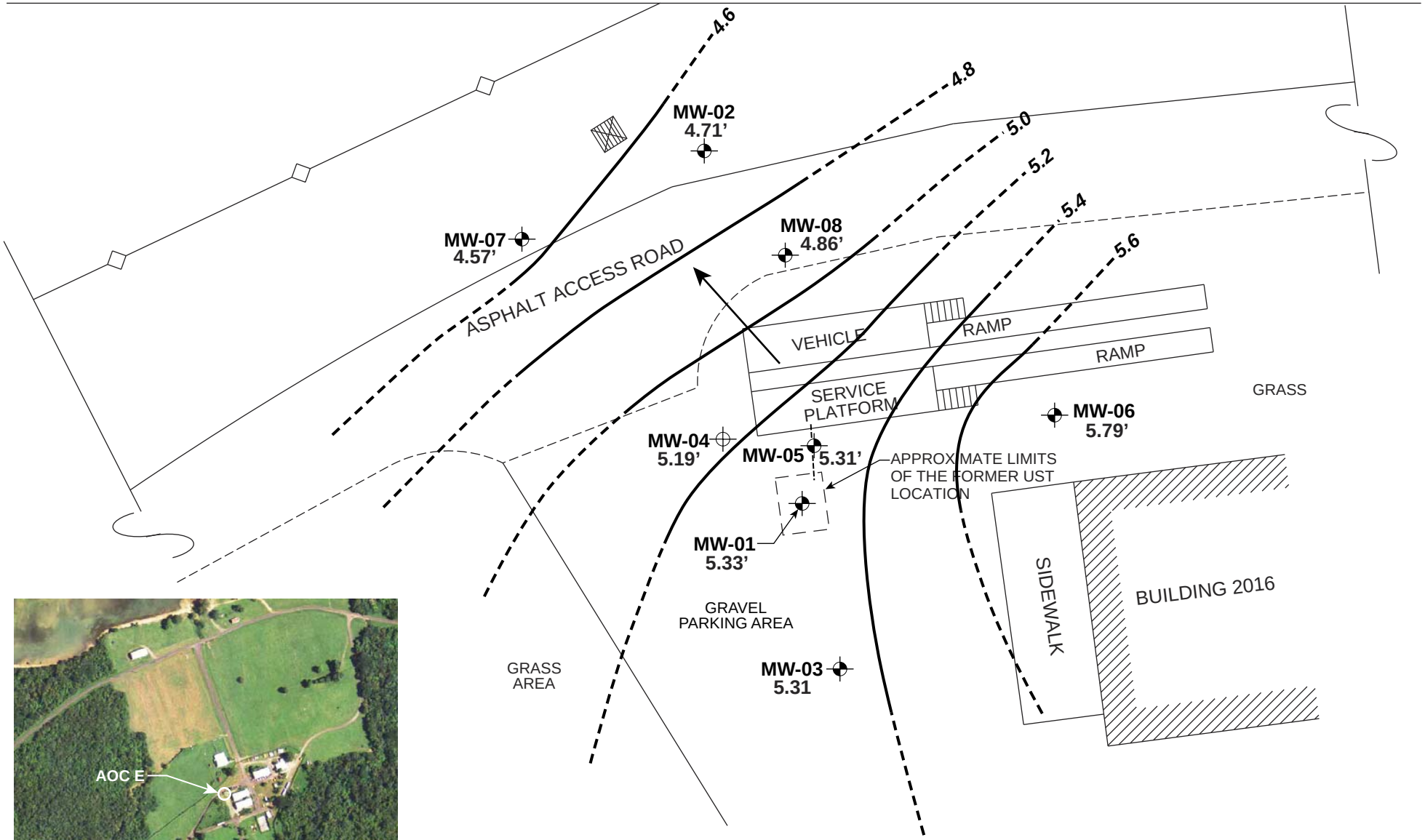


2004 Aerial Photograph

FIGURE 2
AOC E Site Map
AOC E Technical Memorandum
Vieques, Puerto Rico

CH2MHILL

ES063011201833TPA F2-AOC E Site Map.ai



2004 Aerial Photograph

LEGEND

Estimated Direction of Groundwater Flow

5.19' Water Level Elevation, feet above mean sea level

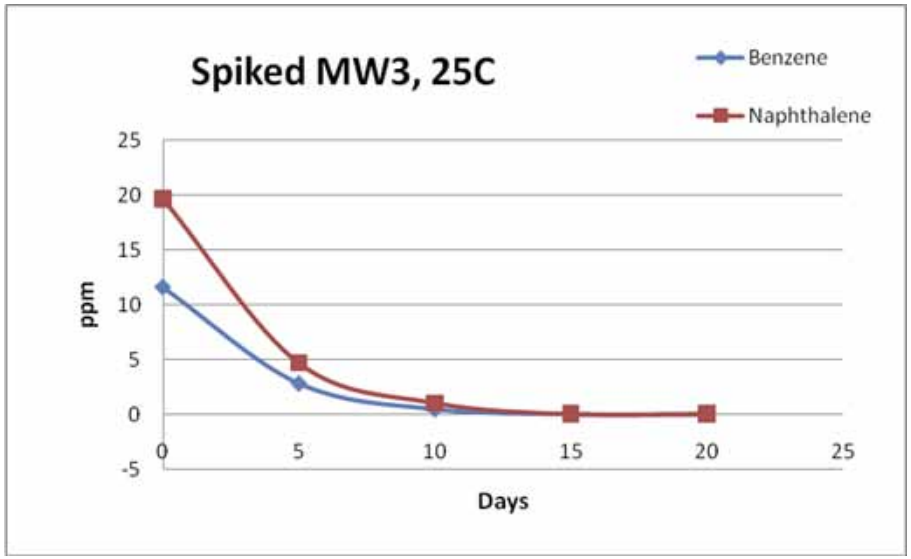
Estimated Groundwater Contour
(March 15, 2010)
Dashed where inferred

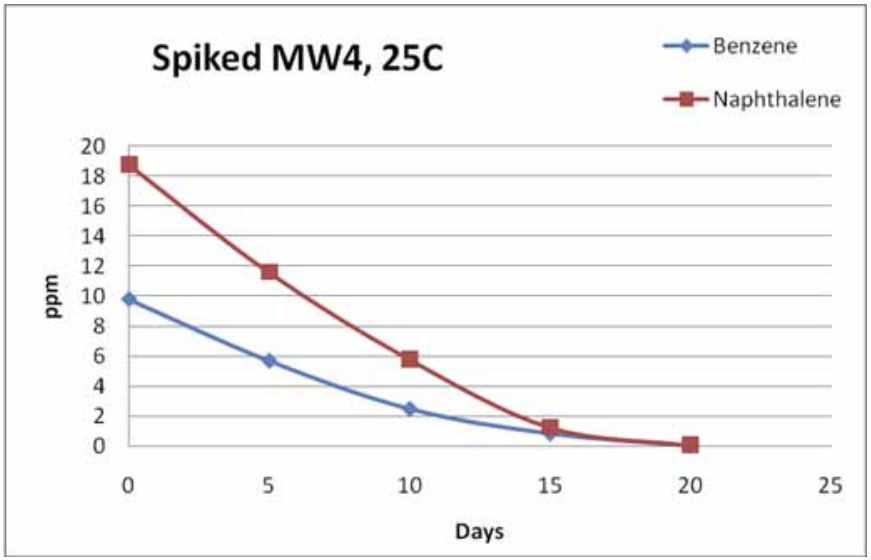
North

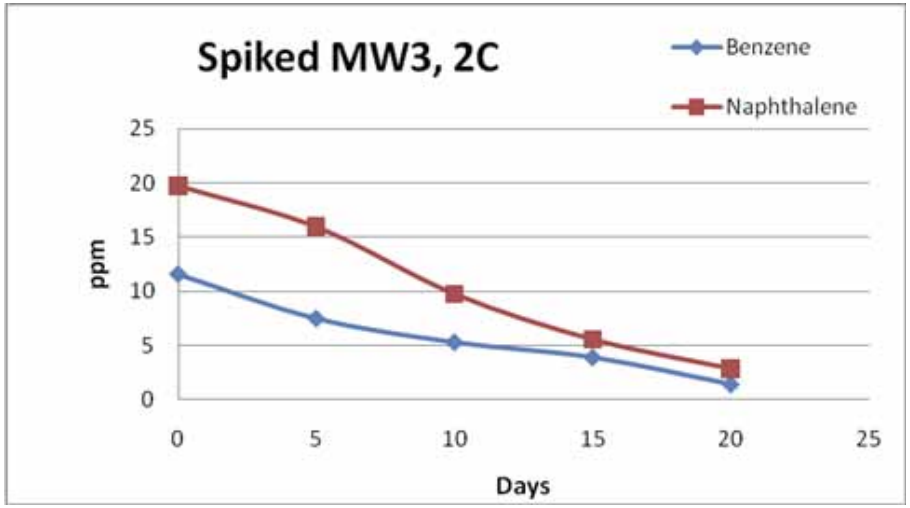
0 20 40
Scale in Feet

FIGURE 3
AOC E Potentiometric Map, March 15, 2010
AOC E Technical Memorandum
Vieques, Puerto Rico

CH2MHILL







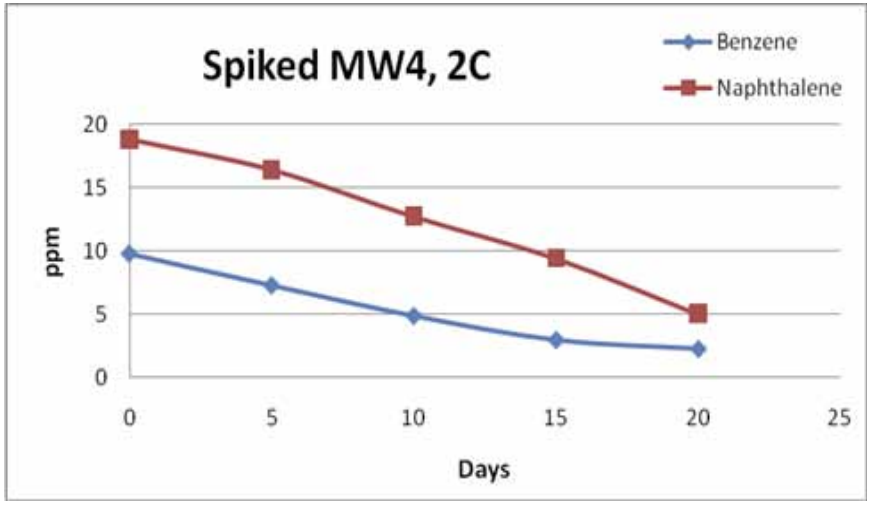


FIGURE 4
FMC Laboratory Degradation Curves
AOC E Technical Memorandum
Vieques, Puerto Rico

Appendix C
Data Validation Reports

Post RI – July 2008

ENVIRONMENTAL
Data Services, Inc.

DIESEL RANGE ORGANICS (DRO/ORO)

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807038

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 25, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SS21-0506	0807038-08	Soil
1MS	VWAE-SS21-0506MS	0807038-08MS	Soil
1MSD	VWAE-SS21-0506MSD	0807038-08MSD	Soil
2	VWAE-SB21-0910	0807038-09	Soil
3	VWAE-SB21P-0910	0807038-10	Soil
4	VWAE-SB21-1618	0807038-11	Soil
5	VWAE-SB21-1820	0807038-12	Soil
6	VWAE-SB21-3436	0807038-13	Soil
7	VWAE-SB21-3638	0807038-14	Soil
8	VWAE-SB21-2930	0807038-15	Soil
9	VWAE-SB20-1618	0807038-17	Soil
10	VWAE-SB20P-1618	0807038-18	Soil
11	VWAE-SB20-2022	0807038-19	Soil
12	VWAE-SS20-0406	0807038-22	Soil
13	VWAE-SS20-2830	0807038-23	Soil

The USEPA "Contract Laboratory Program National Functional Guidelines for Organic Data Review," October 1999, method criteria and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 14 days for soil samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD samples exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blank was free of contamination.

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. mg/L	Qualifier	Affected Samples
VWAE-EB01-071708	None - ND	-	-	-
VWAE-EB01-071808	None - ND	-	-	-
VWAE-EB02-071708	None - ND	-	-	-

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF and/or correlation coefficients values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAE-SB21-0910 mg/kg	VWAE-SB21P-0910 mg/kg	RPD	Qualifier
Diesel	670	430	44%	None
ORO	2700	2000	30%	None

Compound	VWAE-SB20-1618 mg/kg	VWAE-SB20P-1618 mg/kg	RPD	Qualifier
ORO	31	23	30%	None

ANNOTATED FORM Is

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SS21-0506

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-08RE1

Sample wt/vol: 20.0 (g/mL) G Lab File ID: _____

% Moisture: 11 decanted: (Y/N) N Date Received: 07/18/08

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:07/25/08

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-5	Diesel	8.8	J
	ORO	200	

FORM I PEST

lw 10/25/08

2

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-0910

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-09RE1

Sample wt/vol: 20.0 (g/mL) G Lab File ID: _____

% Moisture: 11 decanted: (Y/N) N Date Received: 07/18/08

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 07/25/08

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-5	Diesel	670	
	ORO	2700	

FORM I PEST

hW
10/25/08

3

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21P-0910

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-10RE1

Sample wt/vol: 20.0 (g/mL) G Lab File ID: _____

% Moisture: 10 decanted: (Y/N) N Date Received: 07/18/08

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:07/25/08

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-5	Diesel	430	
	ORO	2000	

FORM I PEST

JW 10/25/08

4

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-1618

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-11RE1

Sample wt/vol: 20.0 (g/mL) G Lab File ID: _____

% Moisture: 14 decanted: (Y/N) N Date Received: 07/18/08

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 07/25/08

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 20.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-5	Diesel	830	
	ORO	5100	

FORM I PEST

LW
10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-1820

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-12RE1

Sample wt/vol: 20.0 (g/mL) G Lab File ID: _____

% Moisture: 13 decanted: (Y/N) N Date Received: 07/18/08

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:07/25/08

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 20.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-5	Diesel	1600	
	ORO	5700	

FORM I PEST

MW 10/25/08

6

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-13RE1

Sample wt/vol: 20.0 (g/mL) G Lab File ID: _____

% Moisture: 8 decanted: (Y/N) N Date Received: 07/18/08

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 07/25/08

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-5	Diesel	380	
	ORO	1900	

FORM I PEST

lw
10/25/08

7

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-3638

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-14RE1

Sample wt/vol: 20.0 (g/mL) G Lab File ID: _____

% Moisture: 3 decanted: (Y/N) N Date Received: 07/18/08

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 07/25/08

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-5	Diesel	370	
	ORO	2200	

FORM I PEST

lw 10/25/08

8

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-15RE1

Sample wt/vol: 20.0 (g/mL) G Lab File ID: _____

% Moisture: 12 decanted: (Y/N) N Date Received: 07/18/08

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:07/25/08

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 20.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-5	Diesel	600	
	ORO	3200	

FORM I PEST

10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. 9

VWAE-SB20-1618

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-17RE1

Sample wt/vol: 20.0 (g/mL) G Lab File ID: _____

% Moisture: 7 decanted: (Y/N) N Date Received: 07/21/08

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 07/25/08

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-5	Diesel	11	U
	ORO	31	

FORM I PEST

MW 10/25/08

10

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20P-1618

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-18RE1

Sample wt/vol: 20.0 (g/mL) G Lab File ID: _____

% Moisture: 7 decanted: (Y/N) N Date Received: 07/21/08

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:07/25/08

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-5	Diesel	11	U
	ORO	23	

FORM I PEST

HW
10/25/08

11

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-2022

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-19RE1

Sample wt/vol: 20.0 (g/mL) G Lab File ID: _____

% Moisture: 8 decanted: (Y/N) N Date Received: 07/21/08

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 07/25/08

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-5	Diesel ORO	11 21	U

FORM I PEST

hW
10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SS20-0406

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-22RE1

Sample wt/vol: 20.0 (g/mL) G Lab File ID: _____

% Moisture: 13 decanted: (Y/N) N Date Received: 07/21/08

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:07/25/08

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-5	Diesel	11	U
	ORO	32	

FORM I PEST

Qw
10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SS20-2830

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-23RE1

Sample wt/vol: 20.0 (g/mL) G Lab File ID: _____

% Moisture: 11 decanted: (Y/N) N Date Received: 07/21/08

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:07/25/08

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/06/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-5	Diesel	11	U
	ORO	18	

FORM I PEST

hw
10/25/08

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

ENVIRONMENTAL
Data Services, Inc.

GASOLINE RANGE ORGANICS (GRO)

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807038

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 25, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SS21-0506	0807038-01	Soil
1MS	VWAE-SS21-0506MS	0807038-01MS	Soil
1MSD	VWAE-SS21-0506MSD	0807038-01MSD	Soil
2	VWAE-SB21-0910	0807038-02	Soil
3	VWAE-SB21P-0910	0807038-03	Soil
4	VWAE-SB21-1618	0807038-04	Soil
5	VWAE-SB21-1820	0807038-05	Soil
6	VWAE-SB21-2930	0807038-06	Soil
7	VWAE-SB21-3436	0807038-13	Soil
8	VWAE-SB21-3638	0807038-14	Soil
9	VWAE-SS20-0406	0807038-16	Soil
10	VWAE-SB20-1618	0807038-17	Soil
11	VWAE-SB20P-1618	0807038-18	Soil
12	VWAE-SB20-2022	0807038-19	Soil
13	VWAE-SB20-2830	0807038-20	Soil
14	VWAE-SB20-3234	0807038-21	Soil

The USEPA "Contract Laboratory Program National Functional Guidelines for Organic Data Review," October 1999, method criteria and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were analyzed within 14 days for soil samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS sample exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. mg/kg	Qualifier	Affected Samples
VBLKBO	GRO	0.057	U	1, 12-14
VBLKBR	GRO	0.053	U	9-11

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. mg/L	Qualifier	Affected Samples
VWAE-TB01-071608	None - ND	-	-	-
VWAE-EB01-071708	None - ND	-	-	-
VWAE-TB01-071708	None - ND	-	-	-
VWAE-TB01-071808	None - ND	-	-	-
VWAE-EB01-071808	None - ND	-	-	-
VWAE-EB02-071708	None - ND	-	-	-

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAE-SB21-0910 mg/kg	VWAE-SB21P-0910 mg/kg	RPD	Qualifier
GRO	1.7	1.8	6%	None

Compound	VWAE-SB20-1618 mg/kg	VWAE-SB20P-1618 mg/kg	RPD	Qualifier
None	ND	ND	-	-

ANNOTATED FORM Is

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SS21-0506

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-01

Sample wt/vol: 6.6 (g/mL) G Lab File ID: 333W0807038-01

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. 11 Date Analyzed: 07/21/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7	Gasoline	0.43 ~~0.048~~	~~JB~~ u BL

FORM I GC VOA

LW 10/25/08

2

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB21-0910

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-02

Sample wt/vol: 6.5 (g/mL) G Lab File ID: 334W0807038-02

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. 11 Date Analyzed: 07/21/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7	Gasoline	1.7	~~B~~

FORM I GC VOA

lcw 10/25/08

3

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB21P-0910

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-03

Sample wt/vol: 6.5 (g/mL) G Lab File ID: 335W0807038-03

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. 10 Date Analyzed: 07/21/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7	Gasoline	1.8	B

FORM I GC VOA

lw 10/25/08

4

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB21-1618

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-04

Sample wt/vol: 6.4 (g/mL) G Lab File ID: 336W0807038-04

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. 14 Date Analyzed: 07/21/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7	Gasoline	2.7	~~B~~

FORM I GC VOA

KW 10/25/08

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB21-1820

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-05

Sample wt/vol: 6.5 (g/mL) G Lab File ID: 337W0807038-05

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. 13 Date Analyzed: 07/21/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7	Gasoline	1.2	~~B~~

FORM I GC VOA

AW
10/25/08

6

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-06

Sample wt/vol: 6.2 (g/mL) G Lab File ID: 338W0807038-06

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. 12 Date Analyzed: 07/21/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7	Gasoline	5	~~B~~

FORM I GC VOA

LW 10/25/08

7

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-13

Sample wt/vol: 6.0 (g/mL) G Lab File ID: 368W0807038-13

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: not dec. 8 Date Analyzed: 07/23/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7	Gasoline	18	~~B~~

FORM I GC VOA

MW 10/25/08

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FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB21-3638

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-14

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 369W0807038-14

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: not dec. 3 Date Analyzed: 07/23/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7	Gasoline	14	~~B~~

FORM I GC VOA

LW
10/25/08

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FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SS20-0406

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-16

Sample wt/vol: 6.6 (g/mL) G Lab File ID: 370W0807038-16

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. 13 Date Analyzed: 07/23/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7	Gasoline	0.44 ~~0.12~~ ~~JB~~	u BL

FORM I GC VOA

MW
10/25/08

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB20-1618

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-17

Sample wt/vol: 6.0 (g/mL) G Lab File ID: 366W0807038-17

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: not dec. 7 Date Analyzed: 07/23/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q	
9999-99-7	Gasoline	0.45 0.047	JB	u BL

FORM I GC VOA

GW 10/25/08

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB20P-1618

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-18

Sample wt/vol: 6.1 (g/mL) G Lab File ID: 367W0807038-18

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: not dec. 7 Date Analyzed: 07/23/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7	Gasoline	0.44 ~~0.04~~	~~JB~~ u BL

FORM I GC VOA

LW 10/25/08

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB20-2022

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-19

Sample wt/vol: 6.5 (g/mL) G Lab File ID: 340W0807038-19

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. 8 Date Analyzed: 07/21/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7	Gasoline	0.42 ~~0.045~~ ~~JB~~	U BL

FORM I GC VOA

AW
10/25/08

13

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB20-2830

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-20

Sample wt/vol: 6.3 (g/mL) G Lab File ID: 341W0807038-20

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. 11 Date Analyzed: 07/21/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7	Gasoline	0.45 ~~0.051~~	~~JB~~ u BL

FORM I GC VOA

MW 10/25/08

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO. 14

VWAE-SB20-3234

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 0807038-21

Sample wt/vol: 6.5 (g/mL) G Lab File ID: 342W0807038-21

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 07/21/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7	Gasoline	0.38 ~~0.044~~	~~JB~~ u BL

FORM I GC VOA

AW 10/25/08

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VBLKBR

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 8072308-BLK1

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 364W8072308-BLK1

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 07/23/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7	-------Gasoline	0.053	J

FORM I GC VOA

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VBLKBO

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807038

Matrix: (soil/water) SOIL Lab Sample ID: 8072111-BLK1

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 331W8072111-BLK1

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 07/21/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7	Gasoline	0.057	J

FORM I GC VOA

ENVIRONMENTAL
Data Services, Inc.

POLYNUCLEAR AROMATIC HYDROCARBONS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807038

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 21, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SS21-0506	0807038-08	Soil
1MS	VWAE-SS21-0506MS	0807038-08MS	Soil
1MSD	VWAE-SS21-0506MSD	0807038-08MSD	Soil
2	VWAE-SB21-0910	0807038-09	Soil
3	VWAE-SB21P-0910	0807038-10	Soil
4	VWAE-SB21-1618	0807038-11	Soil
5	VWAE-SB21-1820	0807038-12	Soil
6	VWAE-SB21-3436	0807038-13	Soil
7	VWAE-SB21-3638	0807038-14	Soil
8	VWAE-SB21-2930	0807038-15	Soil
9	VWAE-SB20-1618	0807038-17	Soil
9DL	VWAE-SB20-1618DL	0807038-17DL	Soil
10	VWAE-SB20P-1618	0807038-18	Soil
10DL	VWAE-SB20P-1618DL	0807038-18DL	Soil
11	VWAE-SB20-2022	0807038-19	Soil
11DL	VWAE-SB20-2022DL	0807038-19DL	Soil
12	VWAE-SB20-0406	0807038-22	Soil
12DL	VWAE-SB20-0406DL	0807038-22DL	Soil
13	VWAE-SS20-2830	0807038-23	Soil

The USEPA Region II SOP HW-35, Revision 1, August 2007: USEPA CLP Statement of Work for Organic Analysis of Low/Medium Concentration of Semivolatile Organic Compounds SOM01.2 Data Validation and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 14 days for soil samples and analyzed within 40 days for all samples.

Surrogates - Many samples had surrogate recoveries which were (OD) diluted out. No further action was required. All other samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD samples exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	MS/MSD %R/RPD	Qualifier
1	Acenaphthene	42%/Ok/Ok	J/UJ
	Pentachlorophenol	0%/0%/999.9	J/R
	Pyrene	-34%/-10%/109	J/R

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blank was free of contamination.

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-EB01-071808	Acenaphthene	0.033	U	1
	Phenanthrene	0.030	U	9, 9DL, 10, 10DL, 11, 11DL, 12DL, 13
	Anthrecene	0.042	U	1, 9, 9DL, 10, 10DL, 11, 11DL
VWAE-EB02-071708	None - ND	-	-	-

GC/MS Instrument Performance Check - All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - Several samples exhibited high concentrations of target compounds and were flagged (E) by the laboratory. The laboratory diluted and reanalyzed these samples. The reviewer replaced the original results with the dilution results. The original Form Is should be used for reporting purposes.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values with the exception of the following.

ICAL Date	Compound	RRF	Qualifier	Affected Samples
08/12/08	Pentachlorophenol	0.040	J/R	7, 8, 9DL, 10DL, 11DL, 12DL, 13

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values with the exception of the following.

CCAL Date	Compound	%D/RRF	Qualifier	Affected Samples
08/08/08	Pentachlorophenol	36.4%	J/UJ	9-12
08/15/08	Pentachlorophenol	0.033	None	Already qualified due to ICAL
08/14/08	Pentachlorophenol	0.031	None	Already qualified due to ICAL

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Sample ID	Internal Standard	Area Count	Qualifier
9	Naphthalene-d8	Low	J/R - Associated compounds
9DL	Naphthalene-d8	Low	J/R - Associated compounds
	Acenaphthene-d10	Low	J/R - Associated compounds
	Phenanthrene-d10	Low	J/R - Associated compounds
10	Naphthalene-d8	Low	J/R - Associated compounds
	Acenaphthene-d10	Low	J/R - Associated compounds
10DL	Naphthalene-d8	Low	J/R - Associated compounds
	Acenaphthene-d10	Low	J/R - Associated compounds
	Phenanthrene-d10	Low	J/R - Associated compounds
	Chrysene-d12	Low	J/R - Associated compounds
11	Naphthalene-d8	Low	J/R - Associated compounds
	Acenaphthene-d10	Low	J/R - Associated compounds
11DL	Naphthalene-d8	Low	J/R - Associated compounds
	Acenaphthene-d10	Low	J/R - Associated compounds
	Phenanthrene-d10	Low	J/R - Associated compounds
	Chrysene-d12	Low	J/R - Associated compounds
12	Naphthalene-d8	Low	J/R - Associated compounds
	Acenaphthene-d10	Low	J/R - Associated compounds
12DL	Naphthalene-d8	Low	J/R - Associated compounds
	Acenaphthene-d10	Low	J/R - Associated compounds
12DL	Phenanthrene-d10	Low	J/R - Associated compounds
	Chrysene-d12	Low	J/R - Associated compounds

Field Duplicates - Field duplicate results are summarized below.

Compound	VWEA-SB21-0910 ug/kg	VWEA-SB21P-0910 ug/kg	RPD	Qualifier
Naphthalene	1200	2500	70%	None
2-Methylnaphthalene	2100	4200	67%	None
Acenaphthene	23	22 U	NC	None
Fluorene	140	230	49%	None

Compound	VWEA-SB21-0910 ug/kg	VWEA-SB21P-0910 ug/kg	RPD	Qualifier
Phenanthrene	220	370	51%	None
Anthracene	36	49	31%	None
Fluoranthene	50	85	52%	None
Pyrene	150	260	54%	None
Benzo (a) anthracene	83	140	51%	None
Chrysene	59	110	60%	None
Benzo (b) fluoranthene	31	52	51%	None
Benzo (k) fluoranthene	18	30	50%	None
Benzo (a) pyrene	26	45	54%	None
Indeno (1,2,3-cd) pyrene	18	29	47%	None
Dibenzo (a,h) anthracene	9.6	16	50%	None
Benzo (g,h,i) perylene	40	70	55%	None

Compound	VWAE-SB20-1618 ug/kg	VWAE-SB20P-1618 ug/kg	RPD	Qualifier
Naphthalene	14	7.1	65%	None
2-Methylnaphthalene	19	8.7	74%	None
Fluorene	3.4	1.7	67%	None
Pyrene	2.6	1.9	31%	None
Benzo (a) anthracene	1.3	7.1 U	NC	None
Chrysene	1.2	7.1 U	NC	None

ANNOTATED FORM Is

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SS21-0506

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-08

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-08DA64_N2.d

Extraction: (Type) SONC

% Moisture: 11.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) Y pH: 8.1 Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
91-20-3	Naphthalene	6.2	J	
91-57-6	2-Methylnaphthalene	6.1	J	
208-96-8	Acenaphthylene	7.4	U	
83-32-9	Acenaphthene	7.4 ~~5.4~~	~~J~~	UJ, MSL, BL
86-73-7	Fluorene	13		
87-86-5	Pentachlorophenol	15	~~U~~	R MSL
85-01-8	Phenanthrene	7.8		
120-12-7	Anthracene	7.4 ~~6.4~~	~~J~~	U BL
206-44-0	Fluoranthene	7.4		
129-00-0	Pyrene	22		J MSL
56-55-3	Benzo (a) anthracene	13		
218-01-9	Chrysene	13		
205-99-2	Benzo (b) fluoranthene	10		
207-08-9	Benzo (k) fluoranthene	8.4		
50-32-8	Benzo (a) pyrene	12		
193-39-5	Indeno (1,2,3-cd) pyrene	11		
53-70-3	Dibenzo (a,h) anthracene	8.5		
191-24-2	Benzo (g,h,i) perylene	12		

MW
10/23/08

2

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-0910

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-09

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-09DA64_N2.d

Extraction: (Type) SONC

% Moisture: 11.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 6.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
91-20-3	Naphthalene	1200	~~E~~
91-57-6	2-Methylnaphthalene	2100	~~E~~
208-96-8	Acenaphthylene	22	U
83-32-9	Acenaphthene	23	
86-73-7	Fluorene	140	
87-86-5	Pentachlorophenol	45	U
85-01-8	Phenanthrene	220	
120-12-7	Anthracene	36	
206-44-0	Fluoranthene	50	
129-00-0	Pyrene	150	
56-55-3	Benzo (a) anthracene	83	
218-01-9	Chrysene	59	
205-99-2	Benzo (b) fluoranthene	31	
207-08-9	Benzo (k) fluoranthene	18	J
50-32-8	Benzo (a) pyrene	26	
193-39-5	Indeno (1,2,3-cd) pyrene	18	J
53-70-3	Dibenzo (a,h) anthracene	9.6	J
191-24-2	Benzo (g,h,i) perylene	40	

(NW) ~~J~~ ~~L~~ R R R
(NW) ~~J~~ ~~L~~ R R

AW 10/23/08

3

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21P-0910

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-10

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-10DA64_N2.d

Extraction: (Type) SONC

% Moisture: 10.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 6.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
91-20-3	Naphthalene	2500	~~E~~	~~J LR~~ R RE
91-57-6	2-Methylnaphthalene	4200	~~E~~	~~J LR~~ R RE
208-96-8	Acenaphthylene	22	U	
83-32-9	Acenaphthene	22	~~U~~	R RE
86-73-7	Fluorene	230	~~E~~	~~J LR~~ RR
87-86-5	Pentachlorophenol	45	U	
85-01-8	Phenanthrene	370	~~E~~	~~J LR~~ RR
120-12-7	Anthracene	49		
206-44-0	Fluoranthene	85		
129-00-0	Pyrene	260	~~E~~	~~J LR~~ RI
56-55-3	Benzo (a) anthracene	140		
218-01-9	Chrysene	110		
205-99-2	Benzo (b) fluoranthene	52		
207-08-9	Benzo (k) fluoranthene	30		
50-32-8	Benzo (a) pyrene	45		
193-39-5	Indeno (1,2,3-cd) pyrene	29		
53-70-3	Dibenzo (a,h) anthracene	16	J	
191-24-2	Benzo (g,h,i) perylene	70		

LW 10/23/08

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1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-11

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-11DA64_N2.d

Extraction: (Type) SONC

% Moisture: 14.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) Y pH: 7.9 Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
91-20-3	Naphthalene	5700	~~E~~	~~J LR~~ RRE
91-57-6	2-Methylnaphthalene	8600	~~E~~	~~J LR~~ RRE
208-96-8	Acenaphthylene	38	U	
83-32-9	Acenaphthene	38	~~U~~	R RE
86-73-7	Fluorene	480	~~E~~	~~J LR~~ R R
87-86-5	Pentachlorophenol	78	U	
85-01-8	Phenanthrene	920	~~E~~	~~J LR~~ R R
120-12-7	Anthracene	110		
206-44-0	Fluoranthene	200		
129-00-0	Pyrene	590	~~E~~	~~J LR~~ R R
56-55-3	Benzo (a) anthracene	190		R RE
218-01-9	Chrysene	210		R RE
205-99-2	Benzo (b) fluoranthene	86		
207-08-9	Benzo (k) fluoranthene	56		
50-32-8	Benzo (a) pyrene	82		
193-39-5	Indeno (1,2,3-cd) pyrene	48		
53-70-3	Dibenzo (a,h) anthracene	17	J	
191-24-2	Benzo (g,h,i) perylene	140		

MW
10/23/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-1820

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-12

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-12DA64_N2.d

Extraction: (Type) SONC

% Moisture: 13.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) Y pH: 8.4 Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
91-20-3	Naphthalene	7000	~~E~~	~~J LRRR~~
91-57-6	2-Methylnaphthalene	10000	~~E~~	~~J LRRR~~
208-96-8	Acenaphthylene	38	U	
83-32-9	Acenaphthene	38	~~U~~	R RE
86-73-7	Fluorene	520	~~E~~	~~J LRRR~~
87-86-5	Pentachlorophenol	77	U	
85-01-8	Phenanthrene	660	~~E~~	~~J LRRR~~
120-12-7	Anthracene	85		
206-44-0	Fluoranthene	110		R RE
129-00-0	Pyrene	500	~~E~~	J LR
56-55-3	Benzo (a) anthracene	260		
218-01-9	Chrysene	240		
205-99-2	Benzo (b) fluoranthene	91		
207-08-9	Benzo (k) fluoranthene	72		
50-32-8	Benzo (a) pyrene	92		
193-39-5	Indeno (1,2,3-cd) pyrene	54		
53-70-3	Dibenzo (a,h) anthracene	15	J	
191-24-2	Benzo (g,h,i) perylene	160		

MW 10/23/08

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1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-13

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-13DA64_N2.d

Extraction: (Type) SONC

% Moisture: 8.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) Y pH: 8.6 Dilution Factor: 6.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
91-20-3	Naphthalene	2100	~~E~~	~~J LR~~ R RE
91-57-6	2-Methylnaphthalene	2900	~~E~~	~~J LR~~ RRE
208-96-8	Acenaphthylene	22	U	
83-32-9	Acenaphthene	22	~~U~~	R RE
86-73-7	Fluorene	210		
87-86-5	Pentachlorophenol	44	U	
85-01-8	Phenanthrene	420	~~E~~	~~J LR~~ R R
120-12-7	Anthracene	61		
206-44-0	Fluoranthene	100		
129-00-0	Pyrene	260	~~E~~	~~J LR~~ RR
56-55-3	Benzo (a) anthracene	130		
218-01-9	Chrysene	100		
205-99-2	Benzo (b) fluoranthene	43		
207-08-9	Benzo (k) fluoranthene	27		
50-32-8	Benzo (a) pyrene	36		
193-39-5	Indeno (1,2,3-cd) pyrene	24		
53-70-3	Dibenzo (a,h) anthracene	7.8	J	
191-24-2	Benzo (g,h,i) perylene	63		

MW
10/23/08

7

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-3638

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-14

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-14D2A64_N.d

Extraction: (Type) SONC

% Moisture: 3.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/14/2008

GPC Cleanup: (Y/N) Y pH: 8.9 Dilution Factor: 4.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
91-20-3	Naphthalene	1400	~~E~~	~~J LR~~ RR
91-57-6	2-Methylnaphthalene	1800	~~E~~	~~J LR~~ RR
208-96-8	Acenaphthylene	21		
83-32-9	Acenaphthene	14	~~U~~	R RE
86-73-7	Fluorene	150	~~E~~	~~J LR~~ RR
87-86-5	Pentachlorophenol	28	~~U~~	R ICB
85-01-8	Phenanthrene	360	~~E~~	~~J LR~~ RR
120-12-7	Anthracene	77		
206-44-0	Fluoranthene	88		
129-00-0	Pyrene	200	~~E~~	~~J LR~~ RR
56-55-3	Benzo (a) anthracene	100		
218-01-9	Chrysene	85		
205-99-2	Benzo (b) fluoranthene	27		
207-08-9	Benzo (k) fluoranthene	27		
50-32-8	Benzo (a) pyrene	37		
193-39-5	Indeno (1,2,3-cd) pyrene	22		
53-70-3	Dibenzo (a,h) anthracene	11	J	
191-24-2	Benzo (g,h,i) perylene	54		

KW
10/23/08

8

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-15

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-15DJ2A64N.d

Extraction: (Type) SONC

% Moisture: 12.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/15/2008

GPC Cleanup: (Y/N) Y pH: 8.4 Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
91-20-3	Naphthalene	3900	~~E~~	~~J LR~~ R RE
91-57-6	2-Methylnaphthalene	4900	~~E~~	~~J LR~~ RRE
208-96-8	Acenaphthylene	7.5	U	
83-32-9	Acenaphthene	77	~~E~~	~~J LR~~ R K
86-73-7	Fluorene	220	~~E~~	~~J LR~~ R
87-86-5	Pentachlorophenol	15	~~U~~	R ICB
85-01-8	Phenanthrene	250	~~E~~	~~J LR~~ RR
120-12-7	Anthracene	43		R RE
206-44-0	Fluoranthene	50		
129-00-0	Pyrene	330	E	~~J LR~~ R
56-55-3	Benzo (a) anthracene	210	E	RR
218-01-9	Chrysene	160	E	RR
205-99-2	Benzo (b) fluoranthene	7.5	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	7.5	~~U~~	
50-32-8	Benzo (a) pyrene	7.5	~~U~~	R RE
193-39-5	Indeno (1,2,3-cd) pyrene	7.5	U	
53-70-3	Dibenzo (a,h) anthracene	7.5	U	
191-24-2	Benzo (g,h,i) perylene	7.5	~~U~~	R RE

MJ
10/23/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-17

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-17DA64_N2.d

Extraction: (Type) SONC

% Moisture: 7.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/08/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
91-20-3	Naphthalene	14		J ISL
91-57-6	2-Methylnaphthalene	19		J ISL
208-96-8	Acenaphthylene	7.1	U	
83-32-9	Acenaphthene	7.1	U	
86-73-7	Fluorene	3.4	J	
87-86-5	Pentachlorophenol	14	~~J~~	UJ CCH
85-01-8	Phenanthrene	7.1 ~~4.2~~	~~J~~	U BL
120-12-7	Anthracene	7.1 ~~1.5~~	~~J~~	U BL
206-44-0	Fluoranthene	7.1	U	
129-00-0	Pyrene	2.6	J	
56-55-3	Benzo (a) anthracene	1.3	J	
218-01-9	Chrysene	1.2	J	
205-99-2	Benzo (b) fluoranthene	7.1	U	
207-08-9	Benzo (k) fluoranthene	7.1	U	
50-32-8	Benzo (a) pyrene	7.1	U	
193-39-5	Indeno (1,2,3-cd) pyrene	7.1	U	
53-70-3	Dibenzo (a,h) anthracene	7.1	U	
191-24-2	Benzo (g,h,i) perylene	7.1	U	

AW
10/23/08

9DL

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-1618RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-17RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-17DJA64_N.d

Extraction: (Type) SONC

% Moisture: 7.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/14/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 2.0

use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
91-20-3	Naphthalene	13		J ISL
91-57-6	2-Methylnaphthalene	13		J ISL
208-96-8	Acenaphthylene	7.1	~~U~~	R ISL
83-32-9	Acenaphthene	7.1	~~U~~	R ISL
86-73-7	Fluorene	2.8	~~J~~	J ISL
87-86-5	Pentachlorophenol	14	~~U~~	R ICB
85-01-8	Phenanthrene	7.1 ~~6.1~~	~~J~~	UJ ISL,B
120-12-7	Anthracene	7.1 ~~2.6~~	~~J~~	UJ ↓ ↓ ,BL
206-44-0	Fluoranthene	3.4	~~J~~	
129-00-0	Pyrene	4.1	~~J~~	
56-55-3	Benzo (a) anthracene	2.8	~~J~~	
218-01-9	Chrysene	2.7	~~J~~	
205-99-2	Benzo (b) fluoranthene	2.2	J	
207-08-9	Benzo (k) fluoranthene	2.2	J	
50-32-8	Benzo (a) pyrene	2.3	J	
193-39-5	Indeno (1,2,3-cd) pyrene	3.3	J	
53-70-3	Dibenzo (a,h) anthracene	3.4	J	
191-24-2	Benzo (g,h,i) perylene	2.4	J	

lw 10/23/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20P-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-18

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-18DA64_N2.d

Extraction: (Type) SONC

% Moisture: 7.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/08/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
91-20-3	Naphthalene	7.1		J ISL
91-57-6	2-Methylnaphthalene	8.7		J ISL
208-96-8	Acenaphthylene	7.1	~~U~~	R ISL
83-32-9	Acenaphthene	7.1	~~U~~	R ISL
86-73-7	Fluorene	1.7	~~J~~	J ISL
87-86-5	Pentachlorophenol	14	~~U~~	UJ CCH
85-01-8	Phenanthrene	7.1 ~~2.9~~	~~J~~	U BL
120-12-7	Anthracene	7.1 ~~1.4~~	~~J~~	U BL
206-44-0	Fluoranthene	7.1	U	
129-00-0	Pyrene	1.9	J	
56-55-3	Benzo (a) anthracene	7.1	U	
218-01-9	Chrysene	7.1	U	
205-99-2	Benzo (b) fluoranthene	7.1	U	
207-08-9	Benzo (k) fluoranthene	7.1	U	
50-32-8	Benzo (a) pyrene	7.1	U	
193-39-5	Indeno (1,2,3-cd) pyrene	7.1	U	
53-70-3	Dibenzo (a,h) anthracene	7.1	U	
191-24-2	Benzo (g,h,i) perylene	7.1	U	

lw 10/23/08

10DL

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20P-1618RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-18RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-18DJA64_N.d

Extraction: (Type) SONC

% Moisture: 7.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/28/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/14/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 2.0

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
91-20-3	Naphthalene	7.1	~~U~~ R ISL
91-57-6	2-Methylnaphthalene	1.4	~~J~~ J ISL
208-96-8	Acenaphthylene	7.1	~~U~~ R
83-32-9	Acenaphthene	7.1	~~U~~
86-73-7	Fluorene	1.6	~~J~~ J
87-86-5	Pentachlorophenol	14	~~U~~ R ICB
85-01-8	Phenanthrene	7.1 ~~3.6~~	~~J~~ U J ISL, BL
120-12-7	Anthracene	7.1 ~~1.1~~	~~J~~ U J , BL
206-44-0	Fluoranthene	7.1	~~U~~ R
129-00-0	Pyrene	2.3	~~J~~ J
56-55-3	Benzo (a) anthracene	1.2	~~J~~
218-01-9	Chrysene	1.3	~~J~~
205-99-2	Benzo (b) fluoranthene	7.1	U
207-08-9	Benzo (k) fluoranthene	7.1	U
50-32-8	Benzo (a) pyrene	7.1	U
193-39-5	Indeno (1,2,3-cd) pyrene	7.1	U
53-70-3	Dibenzo (a,h) anthracene	7.1	U
191-24-2	Benzo (g,h,i) perylene	7.1	U

LCD 10/23/08

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1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-2022

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-19

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-19DA64_N2.d

Extraction: (Type) SONC

% Moisture: 8.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/08/2008

GPC Cleanup: (Y/N) Y pH: 7.6 Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
91-20-3	Naphthalene	7.0	~~J~~	J ISL
91-57-6	2-Methylnaphthalene	8.0		J ISL
208-96-8	Acenaphthylene	7.2	~~U~~	R ISL
83-32-9	Acenaphthene	7.2	~~U~~	R ISL
86-73-7	Fluorene	1.7	~~J~~	J ISL
87-86-5	Pentachlorophenol	15	~~U~~	UJ CCH
85-01-8	Phenanthrene	7.2 ~~2.8~~	~~J~~	U BL
120-12-7	Anthracene	7.2 ~~1.6~~	~~J~~	U BL
206-44-0	Fluoranthene	7.2	U	
129-00-0	Pyrene	2.2	J	
56-55-3	Benzo (a) anthracene	7.2	U	
218-01-9	Chrysene	1.1	J	
205-99-2	Benzo (b) fluoranthene	7.2	U	
207-08-9	Benzo (k) fluoranthene	7.2	U	
50-32-8	Benzo (a) pyrene	7.2	U	
193-39-5	Indeno (1,2,3-cd) pyrene	7.2	U	
53-70-3	Dibenzo (a,h) anthracene	7.2	U	
191-24-2	Benzo (g,h,i) perylene	7.2	U	

lw 10/23/08

11DL

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-2022RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-19RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-19DJA64_N.d

Extraction: (Type) SONC

% Moisture: 8.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/14/2008

GPC Cleanup: (Y/N) Y pH: 7.6 Dilution Factor: 2.0

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
91-20-3	Naphthalene	7.2	~~U~~ R ISL
91-57-6	2-Methylnaphthalene	7.2	U
208-96-8	Acenaphthylene	7.2	U
83-32-9	Acenaphthene	7.2	U
86-73-7	Fluorene	1.8	J J ISL
87-86-5	Pentachlorophenol	15	~~J~~ R ICB
85-01-8	Phenanthrene	7.2 ~~4.0~~	~~J~~ UJ ISL,
120-12-7	Anthracene	7.2 ~~1.3~~	J UJ B
206-44-0	Fluoranthene	1.8	J J
129-00-0	Pyrene	3.1	J
56-55-3	Benzo (a) anthracene	1.7	J
218-01-9	Chrysene	1.8	J
205-99-2	Benzo (b) fluoranthene	7.2	U
207-08-9	Benzo (k) fluoranthene	7.2	U
50-32-8	Benzo (a) pyrene	7.2	U
193-39-5	Indeno (1,2,3-cd) pyrene	7.2	U
53-70-3	Dibenzo (a,h) anthracene	7.2	U
191-24-2	Benzo (g,h,i) perylene	7.2	U

10/23/08

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1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SS20-0406

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-22

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-22DA64_N2.d

Extraction: (Type) SONC

% Moisture: 13.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/08/2008

GPC Cleanup: (Y/N) Y pH: 7.2 Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
91-20-3	Naphthalene	7.0	~~J~~	J ISL
91-57-6	2-Methylnaphthalene	8.2		J ISL
208-96-8	Acenaphthylene	7.6	~~U~~	R ISL
83-32-9	Acenaphthene	7.6	~~U~~	R ISL
86-73-7	Fluorene	1.7	~~J~~	J ISL
87-86-5	Pentachlorophenol	15	~~U~~	UJ CCH
85-01-8	Phenanthrene	2.8	J	
120-12-7	Anthracene	1.6	J	
206-44-0	Fluoranthene	7.6	U	
129-00-0	Pyrene	2.1	J	
56-55-3	Benzo (a) anthracene	7.6	U	
218-01-9	Chrysene	7.6	U	
205-99-2	Benzo (b) fluoranthene	7.6	U	
207-08-9	Benzo (k) fluoranthene	7.6	U	
50-32-8	Benzo (a) pyrene	7.6	U	
193-39-5	Indeno (1,2,3-cd) pyrene	7.6	U	
53-70-3	Dibenzo (a,h) anthracene	7.6	U	
191-24-2	Benzo (g,h,i) perylene	7.6	U	

MW 10/23/08

12DL

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SS20-0406RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-22RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-22DJA64_N.d

Extraction: (Type) SONC

% Moisture: 13.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/14/2008

GPC Cleanup: (Y/N) Y pH: 7.2 Dilution Factor: 2.0

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
91-20-3	Naphthalene	7.6	U	R ISL
91-57-6	2-Methylnaphthalene	7.6	U	
208-96-8	Acenaphthylene	7.6	U	
83-32-9	Acenaphthene	7.6	U	
86-73-7	Fluorene	7.6	U	
87-86-5	Pentachlorophenol	15	~~U~~	R ICB
85-01-8	Phenanthrene	7.6 ~~3.3~~	~~J~~ U	J ISL, E
120-12-7	Anthracene	7.6	U	R ISL
206-44-0	Fluoranthene	7.6	U	R
129-00-0	Pyrene	1.7	J	J
56-55-3	Benzo (a) anthracene	7.6	U	R
218-01-9	Chrysene	7.6	U	R
205-99-2	Benzo (b) fluoranthene	7.6	U	
207-08-9	Benzo (k) fluoranthene	7.6	U	
50-32-8	Benzo (a) pyrene	7.6	U	
193-39-5	Indeno (1,2,3-cd) pyrene	7.6	U	
53-70-3	Dibenzo (a,h) anthracene	7.6	U	
191-24-2	Benzo (g,h,i) perylene	7.6	U	

LW 10/23/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SS20-2830

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-23RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-23DJA64_N.d

Extraction: (Type) SONC

% Moisture: 11.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/14/2008

GPC Cleanup: (Y/N) Y pH: 7.9 Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
91-20-3	Naphthalene	7.4	U
91-57-6	2-Methylnaphthalene	7.4	U
208-96-8	Acenaphthylene	7.4	U
83-32-9	Acenaphthene	7.4	U
86-73-7	Fluorene	7.4	U
87-86-5	Pentachlorophenol	15	~~U~~ R ICB
85-01-8	Phenanthrene	7.4 ~~2.8~~	~~J~~ U BL
120-12-7	Anthracene	7.4	U
206-44-0	Fluoranthene	7.4	U
129-00-0	Pyrene	7.4	U
56-55-3	Benzo (a) anthracene	7.4	U
218-01-9	Chrysene	7.4	U
205-99-2	Benzo (b) fluoranthene	7.4	U
207-08-9	Benzo (k) fluoranthene	7.4	U
50-32-8	Benzo (a) pyrene	7.4	U
193-39-5	Indeno (1,2,3-cd) pyrene	7.4	U
53-70-3	Dibenzo (a,h) anthracene	7.4	U
191-24-2	Benzo (g,h,i) perylene	7.4	U

MW 10/23/08

USEPA REGION II WORKSHEETS

(Please refer to Semivolatile Organic Report for Worksheets)

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

3F - FORM III SV-SIM2
SOIL SEMIVOLATILE SIM MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix Spike - EPA Sample No.: WAE-SS21-0506 (#1)

COMPOUND	SPIKE ADDED (ug/kg)	SAMPLE CONCENTRATION (ug/kg)	MS CONCENTRATION (ug/kg)	MS ~~%REC~~ #	QC LIMITS REC.	
Acenaphthene	15	5.4	6.2	42 *	46-118	J/UJ
Pentachlorophenol	15	0.0	0.0	0 *	9-103	J/R
Pyrene	15	22	16	-34 *	26-127	J/R

COMPOUND	SPIKE ADDED (ug/kg)	MSD CONCENTRATION (ug/kg)	MSD %REC #	%RPD #	QC LIMITS	
					RPD	REC.
Acenaphthene	15	7.3	48	~~15~~	0-31	46-118
Pentachlorophenol	15	0.0	0 *	999.9*	0-50	9-103
Pyrene	15	20	-10 *	109 *	0-31	26-127

Column to be used to flag recovery and RPD values with ~~an asterisk~~
* Values outside of QC limits

RPD: 1 out of 3 outside limits
Spike Recovery: 5 out of 6 outside limits

COMMENTS:

2M - FORM II SV-SIM2
SOIL SEMIVOLATILE SIM DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: _____ SDG No.: 0807038

	EPA SAMPLE NO.	SDMC17 (FLN) #		SDMC18 (2MN) #		TOT OUT
01	SBLKJE	89		59		0
02	VWAE-SB20-1618	45	D	52		0
03	VWAE-SB20-1618RE	84		64		0
04	VWAE-SB20-2022	50		64		0
05	VWAE-SB20-2022RE	92		70		0
06	VWAE-SB20P-1618	43	D	51		0
07	VWAE-SB20P-1618RE	76		52		0
08	VWAE-SB21-0910	86		87		0
09	VWAE-SB21-1618	115		108		0
10	VWAE-SB21-1820	144		117		0
11	VWAE-SB21-2930	36	D	135		0
12	VWAE-SB21-3436	144		97		0
13	VWAE-SB21-3638	139		68		0
14	VWAE-SB21P-0910	121		97		0
15	VWAE-SS20-0406	41	D	51		0
16	VWAE-SS20-0406RE	71		48	D	0
17	VWAE-SS20-2830	66		48	D	0
18	VWAE-SS21-0506	43	D	63		0
19	VWAE-SS21-0506MS	60		31	*	1
20	VWAE-SS21-0506MSD	77		50		0
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

- None for MS/MSD

	QC LIMITS
SDMC17 (FLN) = Fluoranthene-d10	(50-150)
SDMC18 (2MN) = 2-Methylnaphthalene-d10	(50-150)

Column to be used to flag recovery values
* Value outside of contract required QC limits
D DMC diluted out

Several "D" diluted out -

No action required

SOM01.2 (8/2007)

8E - FORM VIII SV-SIM1
SEMIVOLATILE INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: _____ SDG No.: 0807038

GC Column: RTX-5MS ID: 0.32 (mm) Init. Calib. Date(s): 08/07/2008 08/07/2008

EPA Sample No.(SSTD020##): SSTD0.4EK Date Analyzed: 08/08/2008

Lab File ID (Standard): S080808A64.d Time Analyzed: 1010

Instrument ID: 5972hp64

	IS1 (DCB) AREA #	RT #	IS2 (NPT) AREA #	RT #	IS3 (ANT) AREA #	RT #
12 HOUR STD	0	0.00	575847	10.98	243156	15.42
UPPER LIMIT	0	0.50	1151694	11.48	486312	15.92
LOWER LIMIT	0	-0.50	287924	10.48	121578	14.92
EPA SAMPLE NO.						
01 VWAE-SB20-1618			231023 *	10.99	126954	15.42
02 VWAE-SB20P-1618			198797 *	11.00	109272 *	15.42
03 VWAE-SB20-2022			202165 *	11.00	110785 *	15.42
04 VWAE-SS20-0406			202477 *	10.98	108042 *	15.43
05 SSTD0.4EL			166208 *	11.00	73084 *	15.42
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = 200% of internal standard area
AREA LOWER LIMIT = 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk

8E - FORM VIII SV-SIM1
SEMIVOLATILE INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

GC Column: RTX-5MS ID: 0.32 (mm) Init. Calib. Date(s): 08/12/2008 08/12/2008

EPA Sample No.(SSTD020##): SSTD0.4EX Date Analyzed: 08/14/2008

Lab File ID (Standard): B080814A64.d Time Analyzed: 1729

Instrument ID: 5972hp64

		IS1 (DCB) AREA #	RT #	IS2 (NPT) AREA #	RT #	IS3 (ANT) AREA #	RT #
	12 HOUR STD	0	0.00	224493	10.92	120084	15.36
	UPPER LIMIT	0	0.50	448986	11.42	240168	15.86
	LOWER LIMIT	0	-0.50	112247	10.42	60042	14.86
	EPA SAMPLE NO.						
01	VWAE-SB21-3638			149679	10.92	78614	15.33
9 DL ~~02~~	VWAE-SB20-1618RE			112047 *	10.92	52308 *	15.36
10 DL ~~03~~	VWAE-SB20P-1618RE			99301 *	10.92	48790 *	15.33
11 DL ~~04~~	VWAE-SB20-2022RE			88141 *	10.92	42987 *	15.33
12 DL ~~05~~	VWAE-SS20-0406RE			108974 *	10.92	52291 *	15.33
06	VWAE-SS20-2830			122776	10.92	61522	15.33
07	SSTD0.4EY			263535	10.92	139583	15.33
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

all associated (SIR)

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = 200% of internal standard area
AREA LOWER LIMIT = 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk

8F - FORM VIII SV-SIM2
SEMIVOLATILE INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

EPA Sample No.(SSTD020##): SSTD0.4EX Date Analyzed: 08/14/2008

Lab File ID (Standard): B080814A64.d Time Analyzed: 1729

Instrument ID: 5972hp64 GC Column: RTX-5MS ID: 0.32 (mm)

	IS4 (PHN) AREA #	RT #	IS5 (CRY) AREA #	RT #	IS6 (PRY) AREA #	RT #
12 HOUR STD	161087	19.08	133275	25.81	91716	29.95
UPPER LIMIT	322174	19.58	266550	26.31	183432	30.45
LOWER LIMIT	80544	18.58	66638	25.31	45858	29.45
EPA SAMPLE NO.						
01 VWAE-SB21-3638	95284	19.05	74647	25.83	57987	29.98
02 VWAE-SB20-1618RE	74729 *	19.08	71112	25.81	53731	29.95
03 VWAE-SB20P-1618RE	74015 *	19.05	56448 *	25.81	51795	29.95
04 VWAE-SB20-2022RE	66625 *	19.05	49442 *	25.81	52020	29.93
05 VWAE-SS20-0406RE	78225 *	19.05	57113 *	25.81	59248	29.93
06 VWAE-SS20-2830	90938	19.04	71402	25.81	62129	29.93
07 SSTD0.4EY	187183	19.04	149738	25.79	100526	29.93
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						

9DL
10DL
11DL
12DL

(all assoc J/R)

IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = 200% of internal standard area
AREA LOWER LIMIT = 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.

ENVIRONMENTAL
Data Services, Inc.

LOW CONCENTRATION SEMIVOLATILE ORGANIC COMPOUNDS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807038

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 21, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SS21-0506	0807038-08	Soil
1MS	VWAE-SS21-0506MS	0807038-08MS	Soil
1MSD	VWAE-SS21-0506MSD	0807038-08MSD	Soil
2	VWAE-SB21-0910	0807038-09	Soil
3	VWAE-SB21P-0910	0807038-10	Soil
3DL	VWAE-SB21P-0910DL	0807038-10DL	Soil
4	VWAE-SB21-1618	0807038-11	Soil
4DL	VWAE-SB21-1618DL	0807038-11DL	Soil
5	VWAE-SB21-1820	0807038-12	Soil
6	VWAE-SB21-3436	0807038-13	Soil
6DL	VWAE-SB21-3436DL	0807038-13DL	Soil
7	VWAE-SB21-3638	0807038-14	Soil
7DL	VWAE-SB21-3638DL	0807038-14DL	Soil
8	VWAE-SB21-2930	0807038-15	Soil
8DL	VWAE-SB21-2930DL	0807038-15DL	Soil
9	VWAE-SB20-1618	0807038-17	Soil
10	VWAE-SB20P-1618	0807038-18	Soil
11	VWAE-SB20-2022	0807038-19	Soil
12	VWAE-SS20-0406	0807038-22	Soil
13	VWAE-SS20-2830	0807038-23	Soil

The USEPA Region II SOP HW-35, Revision 1, August 2007: USEPA CLP Statement of Work for Organic Analysis of Low/Medium Concentration of Semivolatile Organic Compounds SOM01.2 Data Validation and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 14 days for soil samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries except the following.

Sample ID	Surrogate	%R	Qualifier
2	4-Chloroaniline-d4	0%	J/R - associated compounds
3	4-Chloroaniline-d4	0%	J/R - associated compounds
4	4-Chloroaniline-d4	0%	J/R - associated compounds
6	4-Chloroaniline-d4	0%	J/R - associated compounds
7	4-Chloroaniline-d4	0%	J/R - associated compounds
8	4-Chloroaniline-d4	0%	J/R - associated compounds

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS sample exhibited acceptable %R values.

Method Blank - The method blank was free of contamination.

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-EB01-071708	Acetophenone	1.7	U	13
	Benzaldehyde	1.7	None	All associated samples ND
VWAE-EB02-071708	Benzaldehyde	2.0	None	All associated samples ND
	Acetophenone	1.6	None	All associated samples ND
	bis (2-Ethylhexyl) phthalate	4.1	None	All associated samples ND

GC/MS Instrument Performance Check - All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were correctly reported and qualified by the laboratory.

Compound Quantitation and Reported Detection Limits - Many samples had surrogate recoveries which were (OD) diluted out. No further action was required.

Several samples exhibited high concentrations of target compounds and were flagged (E) by the laboratory. The laboratory diluted and reanalyzed these samples. The reviewer replaced the original results with the dilution results. The original Form Is should be used for reporting purposes.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate results are summarized below.

Compound	VWEA-SB21-0910 ug/kg	VWEA-SB21P-0910 ug/kg	RPD	Qualifier
Naphthalene	1500	2600	54%	None
2-Methylnaphthalene	2900	4300	39%	None
1,1'-Biphenyl	220	380	53%	None
Acenaphthene	97	150	43%	None
Fluorene	150	220	38%	None
Phenanthrene	410	600	38%	None
Anthracene	42	190 U	NC	None
Fluoranthene	93	100	7%	None
Pyrene	240	360	40%	None
Butylbenzylphthalate	190	440	79%	None
Benzo (a) anthracene	110	110	0%	None
Chrysene	84	110	27%	None
bis (2-Ethylhexyl) phthalate	530	5500	165%	J
Benzo (b) fluoranthene	190 U	55	NC	None

Compound	VWAE-SB20-1618 ug/kg	VWAE-SB20P-1618 ug/kg	RPD	Qualifier
None	ND	ND	-	-

ANNOTATED FORM Is

1

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SS21-0506

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-08

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-08A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 11.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 8.1 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
100-52-7	Benzaldehyde	190	U	
108-95-2	Phenol	190	U	
111-44-4	Bis(2-chloroethyl)ether	190	U	
95-57-8	2-Chlorophenol	190	U	
95-48-7	2-Methylphenol	190	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	190	U	
98-86-2	Acetophenone	190	U	
106-44-5	4-Methylphenol	190	U	
621-64-7	N-Nitroso-di-n-propylamine	190	U	
67-72-1	Hexachloroethane	190	U	
98-95-3	Nitrobenzene	190	U	
78-59-1	Isophorone	190	U	
88-75-5	2-Nitrophenol	190	U	
105-67-9	2,4-Dimethylphenol	190	U	
111-91-1	Bis(2-chloroethoxy)methane	190	U	
120-83-2	2,4-Dichlorophenol	190	U	
91-20-3	Naphthalene	190	~~U~~	R RE
106-47-8	4-Chloroaniline	190	U	
87-68-3	Hexachlorobutadiene	190	U	
105-60-2	Caprolactam	190	U	
59-50-7	4-Chloro-3-methylphenol	190	U	
91-57-6	2-Methylnaphthalene	190	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	190	U	
88-06-2	2,4,6-Trichlorophenol	190	U	
95-95-4	2,4,5-Trichlorophenol	190	U	
92-52-4	1,1'-Biphenyl	190	U	
91-58-7	2-Chloronaphthalene	190	U	
88-74-4	2-Nitroaniline	370	U	
131-11-3	Dimethylphthalate	190	U	
606-20-2	2,6-Dinitrotoluene	190	U	
208-96-8	Acenaphthylene	190	~~U~~	R RE
99-09-2	3-Nitroaniline	370	U	
83-32-9	Acenaphthene	190	~~U~~	R RE

lW
10/23/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SS21-0506

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-08

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-08A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 11.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 8.1 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
51-28-5	2,4-Dinitrophenol	370	U	
100-02-7	4-Nitrophenol	370	U	
132-64-9	Dibenzofuran	190	U	
121-14-2	2,4-Dinitrotoluene	190	U	
84-66-2	Diethylphthalate	190	U	
86-73-7	Fluorene	190	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	190	U	
100-01-6	4-Nitroaniline	370	U	
534-52-1	4,6-Dinitro-2-methylphenol	370	U	
86-30-6	N-Nitrosodiphenylamine (1)	190	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	190	U	
101-55-3	4-Bromophenyl-phenylether	190	U	
118-74-1	Hexachlorobenzene	190	U	
1912-24-9	Atrazine	190	U	
87-86-5	Pentachlorophenol	370	U	
85-01-8	Phenanthrene	190	~~U~~	R RE
120-12-7	Anthracene	190	~~U~~	R RE
86-74-8	Carbazole	190	U	
84-74-2	Di-n-butylphthalate	190	U	
206-44-0	Fluoranthene	190	~~U~~	R RE
129-00-0	Pyrene	190	~~U~~	R RE
85-68-7	Butylbenzylphthalate	190	U	
91-94-1	3,3'-Dichlorobenzidine	190	U	
56-55-3	Benzo (a) anthracene	190	~~U~~	R RE
218-01-9	Chrysene	190	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	190	U	
117-84-0	Di-n-octylphthalate	190	U	
205-99-2	Benzo (b) fluoranthene	190	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	190	~~U~~	R
50-32-8	Benzo (a) pyrene	190	~~U~~	R
193-39-5	Indeno (1,2,3-cd) pyrene	190	~~U~~	R
53-70-3	Dibenzo (a,h) anthracene	190	~~U~~	R
191-24-2	Benzo (g,h,i) perylene	190	~~U~~	R
58-90-2	2,3,4,6-Tetrachlorophenol	190	U	

[1] Cannot be separated from Diphenylamine

MW 10/23/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SS21-0506

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-08

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-08A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 11.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 8.1 Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	20.71	94	J
02	57-10-3	n-Hexadecanoic acid $$ Hexadecanoic	29.63	140	JN
03	112-84-5	Erucylamide $$ 13-Docosenamide, (Z)-	36.78	940	JN
04		UNKNOWN	37.09	84	J
05		UNKNOWN	37.19	82	J
06		UNKNOWN	38.57	88	J
07		UNKNOWN	38.97	110	J
08		UNKNOWN	39.53	150	J
09		UNKNOWN	40.02	84	J
10		UNKNOWN	40.09	81	J
11	55255-70-4	Anthracene, 9-cyclohexyltetradecahyc	40.18	180	JN
12		UNKNOWN	40.26	130	J
13					
14					
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19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	1300	

[2]EPA-designated Registry Number.

LW 10/23/08

2

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-0910

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-09

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-09A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 11.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
100-52-7	Benzaldehyde	190	U	
108-95-2	Phenol	190	U	
111-44-4	Bis(2-chloroethyl)ether	190	U	
95-57-8	2-Chlorophenol	190	U	
95-48-7	2-Methylphenol	190	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	190	U	
98-86-2	Acetophenone	190	U	
106-44-5	4-Methylphenol	190	U	
621-64-7	N-Nitroso-di-n-propylamine	190	U	
67-72-1	Hexachloroethane	190	U	
98-95-3	Nitrobenzene	190	U	
78-59-1	Isophorone	190	U	
88-75-5	2-Nitrophenol	190	U	
105-67-9	2,4-Dimethylphenol	190	U	
111-91-1	Bis(2-chloroethoxy)methane	190	U	
120-83-2	2,4-Dichlorophenol	190	U	
91-20-3	Naphthalene	1500		
106-47-8	4-Chloroaniline	190	~~U~~	R SSL
87-68-3	Hexachlorobutadiene	190	U	
105-60-2	Caprolactam	190	U	
59-50-7	4-Chloro-3-methylphenol	190	U	
91-57-6	2-Methylnaphthalene	2900		
77-47-4	Hexachlorocyclopentadiene	190	~~U~~	R SSL
88-06-2	2,4,6-Trichlorophenol	190	U	
95-95-4	2,4,5-Trichlorophenol	190	U	
92-52-4	1,1'-Biphenyl	220		
91-58-7	2-Chloronaphthalene	190	U	
88-74-4	2-Nitroaniline	370	U	
131-11-3	Dimethylphthalate	190	U	
606-20-2	2,6-Dinitrotoluene	190	U	
208-96-8	Acenaphthylene	190	~~U~~	R RE
99-09-2	3-Nitroaniline	370	U	
83-32-9	Acenaphthene	97	~~J~~	R RE

LW 10/23/08

2

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-0910

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-09

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-09A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 11.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
51-28-5	2,4-Dinitrophenol	370	U	
100-02-7	4-Nitrophenol	370	U	
132-64-9	Dibenzofuran	190	U	
121-14-2	2,4-Dinitrotoluene	190	U	
84-66-2	Diethylphthalate	190	U	
86-73-7	Fluorene	150	~~J~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	190	U	
100-01-6	4-Nitroaniline	370	U	
534-52-1	4,6-Dinitro-2-methylphenol	370	U	
86-30-6	N-Nitrosodiphenylamine (1)	190	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	190	U	
101-55-3	4-Bromophenyl-phenylether	190	U	
118-74-1	Hexachlorobenzene	190	U	
1912-24-9	Atrazine	190	U	
87-86-5	Pentachlorophenol	370	~~U~~	R RE
85-01-8	Phenanthrene	410		R
120-12-7	Anthracene	42	~~J~~	R ↓
86-74-8	Carbazole	190	U	
84-74-2	Di-n-butylphthalate	190	U	
206-44-0	Fluoranthene	93	~~J~~	R RE
129-00-0	Pyrene	240		R RE
85-68-7	Butylbenzylphthalate	190		
91-94-1	3,3'-Dichlorobenzidine	190	~~U~~	R SSL
56-55-3	Benzo (a) anthracene	110	~~J~~	R RE
218-01-9	Chrysene	84	~~J~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	530		J FD
117-84-0	Di-n-octylphthalate	190	U	
205-99-2	Benzo (b) fluoranthene	190	U	R RE
207-08-9	Benzo (k) fluoranthene	190	U	↓
50-32-8	Benzo (a) pyrene	190	U	↓
193-39-5	Indeno (1,2,3-cd) pyrene	190	U	↓
53-70-3	Dibenzo (a,h) anthracene	190	U	↓
191-24-2	Benzo (g,h,i) perylene	190	U	↓
58-90-2	2,3,4,6-Tetrachlorophenol	190	U	

[1] Cannot be separated from Diphenylamine

lw 10/23/08

2

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-0910

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-09

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-09A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 11.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	611-14-3	Benzene, 1-ethyl-2-methyl- $$ Toluer	10.24	1500	JN
02	526-73-8	Benzene, 1,2,3-trimethyl- $$ Hemimel	11.38	2200	JN
03	95-93-2	Benzene, 1,2,4,5-tetramethyl-	15.29	1900	JN
04	933-98-2	Benzene, 1-ethyl-2,3-dimethyl-	15.41	1800	JN
05	1680-51-9	Naphthalene, 1,2,3,4-tetrahydro-6-me	19.92	2800	JN
06	90-12-0	Naphthalene, 1-methyl- $$ .alpha.-Me	20.98	1700	JN
07	582-16-1	Naphthalene, 2,7-dimethyl- $$ 2,7-Di	22.70	1500	JN
08	582-16-1	Naphthalene, 2,7-dimethyl-(1)	22.96	1700	JN
09	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	24.89	1100	JN
10	2136-72-3	Ethanol, 2-(octadecyloxy)- $$ 2-Octa	33.06	260	JN
11		UNKNOWN	33.94	240	J
12	6938-66-5	1-Bromodocosane	36.43	490	JN
13		UNKNOWN	37.58	500	J
14		UNKNOWN	38.64	680	J
15		UNKNOWN	39.08	600	J
16		UNKNOWN	39.63	570	J
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	30000	

[2]EPA-designated Registry Number.

lw
10/23/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21P-0910

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-10

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-10A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 10.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
100-52-7	Benzaldehyde	190	U	
108-95-2	Phenol	190	U	
111-44-4	Bis(2-chloroethyl)ether	190	U	
95-57-8	2-Chlorophenol	190	U	
95-48-7	2-Methylphenol	190	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	190	U	
98-86-2	Acetophenone	190	U	
106-44-5	4-Methylphenol	190	U	
621-64-7	N-Nitroso-di-n-propylamine	190	U	
67-72-1	Hexachloroethane	190	U	
98-95-3	Nitrobenzene	190	U	
78-59-1	Isophorone	190	U	
88-75-5	2-Nitrophenol	190	U	
105-67-9	2,4-Dimethylphenol	190	U	
111-91-1	Bis(2-chloroethoxy)methane	190	U	
120-83-2	2,4-Dichlorophenol	190	U	
91-20-3	Naphthalene	2600		
106-47-8	4-Chloroaniline	190	~~U~~	R SSL
87-68-3	Hexachlorobutadiene	190	U	
105-60-2	Caprolactam	190	U	
59-50-7	4-Chloro-3-methylphenol	190	U	
91-57-6	2-Methylnaphthalene	4300 ~~4900~~	~~E~~	R DL
77-47-4	Hexachlorocyclopentadiene	190	~~U~~	R SSL
88-06-2	2,4,6-Trichlorophenol	190	U	
95-95-4	2,4,5-Trichlorophenol	190	U	
92-52-4	1,1'-Biphenyl	380		
91-58-7	2-Chloronaphthalene	190	U	
88-74-4	2-Nitroaniline	370	U	
131-11-3	Dimethylphthalate	190	U	
606-20-2	2,6-Dinitrotoluene	190	U	
208-96-8	Acenaphthylene	190	~~U~~	R RE
99-09-2	3-Nitroaniline	370	U	
83-32-9	Acenaphthene	150	J	

hW
10/23/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21P-0910

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-10

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-10A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 10.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
51-28-5	2,4-Dinitrophenol	370	U	
100-02-7	4-Nitrophenol	370	U	
132-64-9	Dibenzofuran	190	U	
121-14-2	2,4-Dinitrotoluene	190	U	
84-66-2	Diethylphthalate	190	U	
86-73-7	Fluorene	220		
7005-72-3	4-Chlorophenyl-phenylether	190	U	
100-01-6	4-Nitroaniline	370	U	
534-52-1	4,6-Dinitro-2-methylphenol	370	U	
86-30-6	N-Nitrosodiphenylamine (1)	190	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	190	U	
101-55-3	4-Bromophenyl-phenylether	190	U	
118-74-1	Hexachlorobenzene	190	U	
1912-24-9	Atrazine	190	U	
87-86-5	Pentachlorophenol	370	~~U~~	R RE
85-01-8	Phenanthrene	600		
120-12-7	Anthracene	190	~~U~~	R RE
86-74-8	Carbazole	190	U	
84-74-2	Di-n-butylphthalate	190	U	
206-44-0	Fluoranthene	100	~~J~~	R RE
129-00-0	Pyrene	360		
85-68-7	Butylbenzylphthalate	440		
91-94-1	3,3'-Dichlorobenzidine	190	~~U~~	R SSL
56-55-3	Benzo (a) anthracene	110	~~J~~	R RE
218-01-9	Chrysene	110	~~J~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	5500 ~~7200~~ J FD	~~E~~	R DL
117-84-0	Di-n-octylphthalate	190	U	
205-99-2	Benzo (b) fluoranthene	55	~~J~~	R RE
207-08-9	Benzo (k) fluoranthene	190	U	
50-32-8	Benzo (a) pyrene	190	U	
193-39-5	Indeno (1,2,3-cd) pyrene	190	U	
53-70-3	Dibenzo (a,h) anthracene	190	U	
191-24-2	Benzo (g,h,i) perylene	190	U	
58-90-2	2,3,4,6-Tetrachlorophenol	190	U	

[1] Cannot be separated from Diphenylamine

lcw ~~10/23/08~~ 11/12/08

3

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21P-0910

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-10

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-10A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 10.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	611-14-3	Benzene, 1-ethyl-2-methyl-	10.29	2600	JN
02	95-63-6	Benzene, 1,2,4-trimethyl- $$ .psi.-C	10.52	1300	JN
03	95-63-6	Benzene, 1,2,4-trimethyl- $$ .psi.-C	11.42	3900	JN
04	526-73-8	Benzene, 1,2,3-trimethyl- $$ Hemimel	12.38	1900	JN
05	1074-43-7	Benzene, 1-methyl-3-propyl-	13.34	1900	JN
06	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	13.61	1200	JN
07	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-(1)	14.43	3000	JN
08	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-(2)	15.34	1700	JN
09	95-93-2	Benzene, 1,2,4,5-tetramethyl-	15.45	1300	JN
10	2234-20-0	2,4-Dimethylstyrene $$ Benzene, 1-et	15.97	1300	JN
11		UNKNOWN	16.23	1500	J
12	1680-51-9	Naphthalene, 1,2,3,4-tetrahydro-6-me	19.97	6800	JN
13	90-12-0	Naphthalene, 1-methyl- $$ .alpha.-Me	21.02	8900	JN
14	582-16-1	Naphthalene, 2,7-dimethyl-	23.00	9900	JN
15	2245-38-7	Naphthalene, 1,6,7-trimethyl-	24.93	5500	JN
16	1576-67-6	Phenanthrene, 3,6-dimethyl- $$ 3,6-D	30.51	820	JN
17		UNKNOWN	39.14	2800	J
18		UNKNOWN	39.68	1900	J
19	57864-18-3	Hentriacontane, 15-methylene-	39.78	1900	JN
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	100000	

[2]EPA-designated Registry Number.

LW
10/23/08

3D

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21P-0910DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-10RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-10DJA66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 10.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 4.0

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
100-52-7	Benzaldehyde	760	U
108-95-2	Phenol	760	U
111-44-4	Bis(2-chloroethyl)ether	760	U
95-57-8	2-Chlorophenol	760	U
95-48-7	2-Methylphenol	760	U
108-60-1	2,2'-Oxybis(1-chloropropane)	760	U
98-86-2	Acetophenone	760	U
106-44-5	4-Methylphenol	760	U
621-64-7	N-Nitroso-di-n-propylamine	760	U
67-72-1	Hexachloroethane	760	U
98-95-3	Nitrobenzene	760	U
78-59-1	Isophorone	760	U
88-75-5	2-Nitrophenol	760	U
105-67-9	2,4-Dimethylphenol	760	U
111-91-1	Bis(2-chloroethoxy)methane	760	U
120-83-2	2,4-Dichlorophenol	760	U
91-20-3	Naphthalene	2300	D
106-47-8	4-Chloroaniline	760	U
87-68-3	Hexachlorobutadiene	760	U
105-60-2	Caprolactam	760	U
59-50-7	4-Chloro-3-methylphenol	760	U
91-57-6	2-Methylnaphthalene	4300	D
77-47-4	Hexachlorocyclopentadiene	760	U
88-06-2	2,4,6-Trichlorophenol	760	U
95-95-4	2,4,5-Trichlorophenol	760	U
92-52-4	1,1'-Biphenyl	320	JD
91-58-7	2-Chloronaphthalene	760	U
88-74-4	2-Nitroaniline	1500	U
131-11-3	Dimethylphthalate	760	U
606-20-2	2,6-Dinitrotoluene	760	U
208-96-8	Acenaphthylene	760	U
99-09-2	3-Nitroaniline	1500	U
83-32-9	Acenaphthene	760	U

RE

RCW
10/23/08

3D

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21P-0910DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-10RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-10DJA66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 10.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 4.0

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
51-28-5	2,4-Dinitrophenol	1500	U
100-02-7	4-Nitrophenol	1500	U
132-64-9	Dibenzofuran	760	U
121-14-2	2,4-Dinitrotoluene	760	U
84-66-2	Diethylphthalate	760	U
86-73-7	Fluorene	220	JD
7005-72-3	4-Chlorophenyl-phenylether	760	U
100-01-6	4-Nitroaniline	1500	U
534-52-1	4,6-Dinitro-2-methylphenol	1500	U
86-30-6	N-Nitrosodiphenylamine (1)	760	U
95-94-3	1,2,4,5-Tetrachlorobenzene	760	U
101-55-3	4-Bromophenyl-phenylether	760	U
118-74-1	Hexachlorobenzene	760	U
1912-24-9	Atrazine	760	U
87-86-5	Pentachlorophenol	1500	U
85-01-8	Phenanthrene	540	JD
120-12-7	Anthracene	760	U
86-74-8	Carbazole	760	U
84-74-2	Di-n-butylphthalate	760	U
206-44-0	Fluoranthene	760	U
129-00-0	Pyrene	760	U
85-68-7	Butylbenzylphthalate	240	JD
91-94-1	3,3'-Dichlorobenzidine	760	U
56-55-3	Benzo (a) anthracene	140	JD
218-01-9	Chrysene	760	U
117-81-7	Bis(2-ethylhexyl)phthalate	5500	~~D~~ J FD
117-84-0	Di-n-octylphthalate	760	U
205-99-2	Benzo (b) fluoranthene	760	U
207-08-9	Benzo (k) fluoranthene	760	U
50-32-8	Benzo (a) pyrene	760	U
193-39-5	Indeno (1,2,3-cd) pyrene	760	U
53-70-3	Dibenzo (a,h) anthracene	760	U
191-24-2	Benzo (g,h,i) perylene	760	U
58-90-2	2,3,4,6-Tetrachlorophenol	760	U

[1] Cannot be separated from Diphenylamine

3DL

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21P-0910DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-10RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-10DJA66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 10.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 4.0

use original

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	622-96-8	Benzene, 1-ethyl-4-methyl-	10.13	2900	JDN
02	95-63-6	Benzene, 1,2,4-trimethyl- $$ .psi.-C	11.27	4600	JDN
03	526-73-8	Benzene, 1,2,3-trimethyl- $$ Hemimel	12.24	1800	JDN
04	933-98-2	Benzene, 1-ethyl-2,3-dimethyl-	15.20	1800	JDN
05	874-41-9	Benzene, 1-ethyl-2,4-dimethyl-	15.32	1700	JDN
06	1587-04-8	Benzene, 1-methyl-2-(2-propenyl)- $$	15.84	1500	JDN
07	1680-51-9	Naphthalene, 1,2,3,4-tetrahydro-6-me	19.83	2700	JDN
08	4453-90-1	1,4-Methanonaphthalene, 1,4-dihydro-	20.91	2300	JDN
09	571-61-9	Naphthalene, 1,5-dimethyl- $$ 1,5-Di	22.62	1400	JDN
10	571-61-9	Naphthalene, 1,5-dimethyl- $$ 1,5-Di	22.88	1800	JDN
11	581-42-0	Naphthalene, 2,6-dimethyl- $$ 2,6-Di	22.93	1600	JDN
12	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	24.81	1400	JDN
13		UNKNOWN	36.08	590	JD
14		UNKNOWN	36.75	940	JD
15		UNKNOWN	37.21	800	JD
16	55123-81-4	5.alpha.,8.alpha.,14.beta.-Cholestan	37.47	820	JDN
17		UNKNOWN	38.97	840	JD
18		UNKNOWN	39.53	1400	JD
19		UNKNOWN	40.17	740	JD
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	41000	

[2]EPA-designated Registry Number.

lw 10/23/08

4

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-11

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-11A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 14.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 7.9 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
100-52-7	Benzaldehyde	200	U	
108-95-2	Phenol	200	U	
111-44-4	Bis(2-chloroethyl)ether	200	U	
95-57-8	2-Chlorophenol	200	U	
95-48-7	2-Methylphenol	200	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	200	U	
98-86-2	Acetophenone	200	U	
106-44-5	4-Methylphenol	200	U	
621-64-7	N-Nitroso-di-n-propylamine	200	U	
67-72-1	Hexachloroethane	200	U	
98-95-3	Nitrobenzene	200	U	
78-59-1	Isophorone	200	U	
88-75-5	2-Nitrophenol	200	U	
105-67-9	2,4-Dimethylphenol	200	U	
111-91-1	Bis(2-chloroethoxy)methane	200	U	
120-83-2	2,4-Dichlorophenol	200	U	
91-20-3	Naphthalene	5500 ~~5900~~	~~E~~	R DL
106-47-8	4-Chloroaniline	200	~~U~~	R SSL
87-68-3	Hexachlorobutadiene	200	U	
105-60-2	Caprolactam	200	U	
59-50-7	4-Chloro-3-methylphenol	200	U	
91-57-6	2-Methylnaphthalene	10000 ~~10000~~	~~E~~	R DL
77-47-4	Hexachlorocyclopentadiene	200	~~U~~	R SSL
88-06-2	2,4,6-Trichlorophenol	200	U	
95-95-4	2,4,5-Trichlorophenol	200	U	
92-52-4	1,1'-Biphenyl	200	U	
91-58-7	2-Chloronaphthalene	200	U	
88-74-4	2-Nitroaniline	380	U	
131-11-3	Dimethylphthalate	200	U	
606-20-2	2,6-Dinitrotoluene	200	U	
208-96-8	Acenaphthylene	200	~~U~~	R RE
99-09-2	3-Nitroaniline	380	U	
83-32-9	Acenaphthene	270		

GW
10/23/08

4

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-11

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-11A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 14.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 7.9 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
51-28-5	2,4-Dinitrophenol	380	U	
100-02-7	4-Nitrophenol	380	U	
132-64-9	Dibenzofuran	200	U	
121-14-2	2,4-Dinitrotoluene	200	U	
84-66-2	Diethylphthalate	200	U	
86-73-7	Fluorene	460		
7005-72-3	4-Chlorophenyl-phenylether	200	U	
100-01-6	4-Nitroaniline	380	U	
534-52-1	4,6-Dinitro-2-methylphenol	380	U	
86-30-6	N-Nitrosodiphenylamine (1)	200	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	200	U	
101-55-3	4-Bromophenyl-phenylether	200	U	
118-74-1	Hexachlorobenzene	200	U	
1912-24-9	Atrazine	200	U	
87-86-5	Pentachlorophenol	380	~~U~~	R RE
85-01-8	Phenanthrene	900		
120-12-7	Anthracene	76	~~J~~	R RE
86-74-8	Carbazole	200	U	
84-74-2	Di-n-butylphthalate	61	J	
206-44-0	Fluoranthene	200		R RE
129-00-0	Pyrene	810		
85-68-7	Butylbenzylphthalate	590		
91-94-1	3,3'-Dichlorobenzidine	200	~~U~~	R SSL
56-55-3	Benzo (a) anthracene	310		
218-01-9	Chrysene	210		
117-81-7	Bis(2-ethylhexyl)phthalate	1600		
117-84-0	Di-n-octylphthalate	200	U	
205-99-2	Benzo (b) fluoranthene	200	U	R RE
207-08-9	Benzo (k) fluoranthene	200	U	↓ ↓
50-32-8	Benzo (a) pyrene	200	U	
193-39-5	Indeno (1,2,3-cd) pyrene	40	~~J~~	R RE
53-70-3	Dibenzo (a,h) anthracene	200	~~U~~	R RE
191-24-2	Benzo (g,h,i) perylene	140	~~J~~	R RE
58-90-2	2,3,4,6-Tetrachlorophenol	200	U	

[1] Cannot be separated from Diphenylamine

hW 10/23/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-11

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-11A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 14.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 7.9 Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	526-73-8	Benzene, 1,2,3-trimethyl- $$ Hemimel	12.35	2400	JN
02	135-01-3	Benzene, 1,2-diethyl-	13.30	1300	JN
03	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	14.41	4500	JN
04	933-98-2	Benzene, 1-ethyl-2,3-dimethyl-	15.03	1800	JN
05	95-93-2	Benzene, 1,2,4,5-tetramethyl-	15.31	1900	JN
06		UNKNOWN	15.34	1300	J
07	95-93-2	Benzene, 1,2,4,5-tetramethyl-(1)	15.42	1500	JN
08	1587-04-8	Benzene, 1-methyl-2-(2-propenyl)- $$	15.97	2200	JN
09	824-90-8	1-Phenyl-1-butene $$ Benzene, 1-bute	16.33	5700	JN
10		UNKNOWN	16.67	1200	J
11		UNKNOWN	17.53	1400	J
12		UNKNOWN	17.91	4800	J
13	6682-71-9	1H-Indene, 2,3-dihydro-4,7-dimethyl-	19.55	4100	JN
14	2809-64-5	Naphthalene, 1,2,3,4-tetrahydro-5-me	19.97	11000	JN
15	90-12-0	Naphthalene, 1-methyl-	21.04	16000	JN
16		UNKNOWN	21.64	3700	J
17	581-42-0	Naphthalene, 2,6-dimethyl-	22.73	7800	JN
18	581-42-0	Naphthalene, 2,6-dimethyl-(1)	22.76	5200	JN
19	581-40-8	Naphthalene, 2,3-dimethyl-	23.03	18000	JN
20	582-16-1	Naphthalene, 2,7-dimethyl- $$ 2,7-Di	23.08	4700	JN
21	575-41-7	Naphthalene, 1,3-dimethyl-	23.33	4600	JN
22	2027-17-0	Naphthalene, 2-(1-methylethyl)-	24.33	4200	JN
23	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	24.66	5200	JN
24	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	24.95	7100	JN
25	2245-38-7	Naphthalene, 1,6,7-trimethyl-	25.17	4400	JN
26		UNKNOWN	25.64	4600	J
27	66708-24-5	5H-Inden-5-one, 1,2,4,6,7,7a-hexahyc	31.83	370	JN
28		UNKNOWN	32.24	430	J
29					
30					
	E966796[2]	Total Alkanes	N/A	47000	

[2]EPA-designated Registry Number.

fcW
10/23/08

4DL

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-1618DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-11RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-11DJA66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 14.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 7.9 Dilution Factor: 5.0

Use - original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
100-52-7	Benzaldehyde	990	U
108-95-2	Phenol	990	U
111-44-4	Bis(2-chloroethyl)ether	990	U
95-57-8	2-Chlorophenol	990	U
95-48-7	2-Methylphenol	990	U
108-60-1	2,2'-Oxybis(1-chloropropane)	990	U
98-86-2	Acetophenone	990	U
106-44-5	4-Methylphenol	990	U
621-64-7	N-Nitroso-di-n-propylamine	990	U
67-72-1	Hexachloroethane	990	U
98-95-3	Nitrobenzene	990	U
78-59-1	Isophorone	990	U
88-75-5	2-Nitrophenol	990	U
105-67-9	2,4-Dimethylphenol	990	U
111-91-1	Bis(2-chloroethoxy)methane	990	U
120-83-2	2,4-Dichlorophenol	990	U
91-20-3	Naphthalene	5500	D
106-47-8	4-Chloroaniline	990	U
87-68-3	Hexachlorobutadiene	990	U
105-60-2	Caprolactam	990	U
59-50-7	4-Chloro-3-methylphenol	990	U
91-57-6	2-Methylnaphthalene	10000	D
77-47-4	Hexachlorocyclopentadiene	990	U
88-06-2	2,4,6-Trichlorophenol	990	U
95-95-4	2,4,5-Trichlorophenol	990	U
92-52-4	1,1'-Biphenyl	990	U
91-58-7	2-Chloronaphthalene	990	U
88-74-4	2-Nitroaniline	1900	U
131-11-3	Dimethylphthalate	990	U
606-20-2	2,6-Dinitrotoluene	990	U
208-96-8	Acenaphthylene	990	U
99-09-2	3-Nitroaniline	1900	U
83-32-9	Acenaphthene	260	JD

RW 10/23/08

4DL

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-1618DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-11RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-11DJA66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 14.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008 use original

GPC Cleanup: (Y/N) Y pH: 7.9 Dilution Factor: 5.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
51-28-5	2,4-Dinitrophenol	1900	U
100-02-7	4-Nitrophenol	1900	U
132-64-9	Dibenzofuran	990	U
121-14-2	2,4-Dinitrotoluene	990	U
84-66-2	Diethylphthalate	990	U
86-73-7	Fluorene	500	JD
7005-72-3	4-Chlorophenyl-phenylether	990	U
100-01-6	4-Nitroaniline	1900	U
534-52-1	4,6-Dinitro-2-methylphenol	1900	U
86-30-6	N-Nitrosodiphenylamine (1)	990	U
95-94-3	1,2,4,5-Tetrachlorobenzene	990	U
101-55-3	4-Bromophenyl-phenylether	990	U
118-74-1	Hexachlorobenzene	990	U
1912-24-9	Atrazine	990	U
87-86-5	Pentachlorophenol	1900	U
85-01-8	Phenanthrene	1200	D
120-12-7	Anthracene	990	U
86-74-8	Carbazole	990	U
84-74-2	Di-n-butylphthalate	990	U
206-44-0	Fluoranthene	260	JD
129-00-0	Pyrene	990	U
85-68-7	Butylbenzylphthalate	390	JD
91-94-1	3,3'-Dichlorobenzidine	990	U
56-55-3	Benzo (a) anthracene	250	JD
218-01-9	Chrysene	210	JD
117-81-7	Bis(2-ethylhexyl)phthalate	1400	D
117-84-0	Di-n-octylphthalate	990	U
205-99-2	Benzo (b) fluoranthene	990	U
207-08-9	Benzo (k) fluoranthene	990	U
50-32-8	Benzo (a) pyrene	990	U
193-39-5	Indeno (1,2,3-cd) pyrene	990	U
53-70-3	Dibenzo (a,h) anthracene	990	U
191-24-2	Benzo (g,h,i) perylene	990	U
58-90-2	2,3,4,6-Tetrachlorophenol	990	U

[1] Cannot be separated from Diphenylamine

MW 10/23/08

4DL

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-1618DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-11RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-11DJA66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 14.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 7.9 Dilution Factor: 5.0 use original

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	933-98-2	Benzene, 1-ethyl-2,3-dimethyl-	14.30	5600	JDN
02	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	15.20	3400	JDN
03	768-00-3	Benzene, (1-methyl-1-propenyl)-, (E)	16.17	2200	JDN
04	56253-64-6	Benzene, (2-methyl-1-butenyl)- $$ 2-	17.36	2600	JDN
05	53172-84-2	Benzene, (1-methyl-1-butenyl)-	17.74	3100	JDN
06	6682-71-9	1H-Indene, 2,3-dihydro-4,7-dimethyl-	19.41	2300	JDN
07	2809-64-5	Naphthalene, 1,2,3,4-tetrahydro-5-me	19.84	4500	JDN
08		UNKNOWN	20.25	2500	JD
09	4453-90-1	1,4-Methanonaphthalene, 1,4-dihydro-	20.92	5000	JDN
10	573-98-8	Naphthalene, 1,2-dimethyl-	22.44	2600	JDN
11	571-61-9	Naphthalene, 1,5-dimethyl- $$ 1,5-Di	22.64	4100	JDN
12	581-42-0	Naphthalene, 2,6-dimethyl- $$ 2,6-Di	22.89	3800	JDN
13	582-16-1	Naphthalene, 2,7-dimethyl- $$ 2,7-Di	22.94	3200	JDN
14	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	24.83	2700	JDN
15		UNKNOWN	34.73	890	JD
16		UNKNOWN	35.20	730	JD
17		UNKNOWN	35.44	830	JD
18		UNKNOWN	35.56	930	JD
19		UNKNOWN	35.96	1600	JD
20		UNKNOWN	36.00	950	JD
21		UNKNOWN	36.24	1500	JD
22		UNKNOWN	37.23	1800	JD
23		UNKNOWN	37.51	1200	JD
24		UNKNOWN	39.00	2300	JD
25		UNKNOWN	39.57	2300	JD
26		UNKNOWN	40.19	1200	JD
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	49000	

[2]EPA-designated Registry Number.

LW 10/23/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-1820

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-12

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-12DJA66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 13.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.4 Dilution Factor: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
100-52-7	Benzaldehyde	1400	U
108-95-2	Phenol	1400	U
111-44-4	Bis(2-chloroethyl)ether	1400	U
95-57-8	2-Chlorophenol	1400	U
95-48-7	2-Methylphenol	1400	U
108-60-1	2,2'-Oxybis(1-chloropropane)	1400	U
98-86-2	Acetophenone	1400	U
106-44-5	4-Methylphenol	1400	U
621-64-7	N-Nitroso-di-n-propylamine	1400	U
67-72-1	Hexachloroethane	1400	U
98-95-3	Nitrobenzene	1400	U
78-59-1	Isophorone	1400	U
88-75-5	2-Nitrophenol	1400	U
105-67-9	2,4-Dimethylphenol	1400	U
111-91-1	Bis(2-chloroethoxy)methane	1400	U
120-83-2	2,4-Dichlorophenol	1400	U
91-20-3	Naphthalene	7600	
106-47-8	4-Chloroaniline	1400	U
87-68-3	Hexachlorobutadiene	1400	U
105-60-2	Caprolactam	1400	U
59-50-7	4-Chloro-3-methylphenol	1400	U
91-57-6	2-Methylnaphthalene	14000	
77-47-4	Hexachlorocyclopentadiene	1400	U
88-06-2	2,4,6-Trichlorophenol	1400	U
95-95-4	2,4,5-Trichlorophenol	1400	U
92-52-4	1,1'-Biphenyl	1400	U
91-58-7	2-Chloronaphthalene	1400	U
88-74-4	2-Nitroaniline	2700	U
131-11-3	Dimethylphthalate	1400	U
606-20-2	2,6-Dinitrotoluene	1400	U
208-96-8	Acenaphthylene	1400	~~U~~ R RE
99-09-2	3-Nitroaniline	2700	U
83-32-9	Acenaphthene	320	J

hW 10/23/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-1820

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-12

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-12DJA66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 13.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.4 Dilution Factor: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
51-28-5	2,4-Dinitrophenol	2700	U	
100-02-7	4-Nitrophenol	2700	U	
132-64-9	Dibenzofuran	1400	U	
121-14-2	2,4-Dinitrotoluene	1400	U	
84-66-2	Diethylphthalate	1400	U	
86-73-7	Fluorene	650	J	
7005-72-3	4-Chlorophenyl-phenylether	1400	U	
100-01-6	4-Nitroaniline	2700	U	
534-52-1	4,6-Dinitro-2-methylphenol	2700	U	
86-30-6	N-Nitrosodiphenylamine (1)	1400	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	1400	U	
101-55-3	4-Bromophenyl-phenylether	1400	U	
118-74-1	Hexachlorobenzene	1400	U	
1912-24-9	Atrazine	1400	U	
87-86-5	Pentachlorophenol	2700	~~U~~	R RE
85-01-8	Phenanthrene	1400		
120-12-7	Anthracene	1400	~~U~~	R RE
86-74-8	Carbazole	1400	U	
84-74-2	Di-n-butylphthalate	1400	U	
206-44-0	Fluoranthene	290	J	
129-00-0	Pyrene	1400	~~U~~	R RE
85-68-7	Butylbenzylphthalate	900	J	
91-94-1	3,3'-Dichlorobenzidine	1400	U	
56-55-3	Benzo (a) anthracene	350	~~J~~	R RE
218-01-9	Chrysene	280	~~J~~	R RE
117-84-0	Di-n-octylphthalate	1400	U	
205-99-2	Benzo (b) fluoranthene	1400	U	R RE
207-08-9	Benzo (k) fluoranthene	1400	U	
50-32-8	Benzo (a) pyrene	1400	U	
193-39-5	Indeno (1,2,3-cd) pyrene	1400	U	
53-70-3	Dibenzo (a,h) anthracene	1400	U	
191-24-2	Benzo (g,h,i) perylene	1400	U	
58-90-2	2,3,4,6-Tetrachlorophenol	1400	U	

[1] Cannot be separated from Diphenylamine

RW 10/23/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-1820

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-12

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-12DJA66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 13.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.4 Dilution Factor: 7.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	95-63-6	Benzene, 1,2,4-trimethyl- $$ .psi.-C	11.29	10000	JN
02	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	14.31	8300	JN
03	95-93-2	Benzene, 1,2,4,5-tetramethyl-	15.34	7800	JN
04	2809-64-5	Naphthalene, 1,2,3,4-tetrahydro-5-me	19.85	10000	JN
05	90-12-0	Naphthalene, 1-methyl- $$ .alpha.-Me	20.93	6800	JN
06	582-16-1	Naphthalene, 2,7-dimethyl-	22.64	5800	JN
07	571-61-9	Naphthalene, 1,5-dimethyl- $$ 1,5-Di	22.89	5200	JN
08	575-43-9	Naphthalene, 1,6-dimethyl-	22.95	4300	JN
09		UNKNOWN	35.96	1900	J
10		UNKNOWN	37.23	2300	J
11		UNKNOWN	37.32	2800	J
12		UNKNOWN	37.41	1300	J
13		UNKNOWN	37.53	2400	J
14		UNKNOWN	37.81	1500	J
15		UNKNOWN	38.28	1700	J
16		UNKNOWN	38.38	2200	J
17		UNKNOWN	38.44	3200	J
18		UNKNOWN	38.88	4400	J
19	53584-60-4	28-Nor-17.alpha.(H)-hopane	39.01	3500	JN
20		UNKNOWN	39.04	3000	J
21		UNKNOWN	39.13	1800	J
22		UNKNOWN	39.37	1600	J
23		UNKNOWN	39.40	1600	J
24		UNKNOWN	39.48	1600	J
25		UNKNOWN	39.56	4800	J
26		UNKNOWN	39.82	1500	J
27		UNKNOWN	39.84	3200	J
28		UNKNOWN	40.09	1300	J
29		UNKNOWN	40.20	3200	J
30		UNKNOWN	40.27	2600	J
	E966796[2]	Total Alkanes	N/A	62000	

[2]EPA-designated Registry Number.

JW 10/23/08

6

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-13

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-13A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 8.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 8.6 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
100-52-7	Benzaldehyde	180	U	
108-95-2	Phenol	180	U	
111-44-4	Bis(2-chloroethyl)ether	180	U	
95-57-8	2-Chlorophenol	180	U	
95-48-7	2-Methylphenol	180	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	180	U	
98-86-2	Acetophenone	180	U	
106-44-5	4-Methylphenol	180	U	
621-64-7	N-Nitroso-di-n-propylamine	180	U	
67-72-1	Hexachloroethane	180	U	
98-95-3	Nitrobenzene	180	U	
78-59-1	Isophorone	180	U	
88-75-5	2-Nitrophenol	180	U	
105-67-9	2,4-Dimethylphenol	180	U	
111-91-1	Bis(2-chloroethoxy)methane	180	U	
120-83-2	2,4-Dichlorophenol	180	U	
91-20-3	Naphthalene	2100		
106-47-8	4-Chloroaniline	180	~~U~~	R SSL
87-68-3	Hexachlorobutadiene	180	U	
105-60-2	Caprolactam	180	U	
59-50-7	4-Chloro-3-methylphenol	180	U	
91-57-6	2-Methylnaphthalene	3200 ~~3300~~	~~E~~	R DL
77-47-4	Hexachlorocyclopentadiene	180	~~U~~	R SSL
88-06-2	2,4,6-Trichlorophenol	180	U	
95-95-4	2,4,5-Trichlorophenol	180	U	
92-52-4	1,1'-Biphenyl	190		
91-58-7	2-Chloronaphthalene	180	U	
88-74-4	2-Nitroaniline	360	U	
131-11-3	Dimethylphthalate	180	U	
606-20-2	2,6-Dinitrotoluene	180	U	
208-96-8	Acenaphthylene	180	~~U~~	R RE
99-09-2	3-Nitroaniline	360	U	
83-32-9	Acenaphthene	100	J	

lw
10/23/08

6

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-13

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-13A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 8.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 8.6 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
51-28-5	2,4-Dinitrophenol	360	U	
100-02-7	4-Nitrophenol	360	U	
132-64-9	Dibenzofuran	180	U	
121-14-2	2,4-Dinitrotoluene	180	U	
84-66-2	Diethylphthalate	180	U	
86-73-7	Fluorene	180	~~J~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	180	U	
100-01-6	4-Nitroaniline	360	U	
534-52-1	4,6-Dinitro-2-methylphenol	360	U	
86-30-6	N-Nitrosodiphenylamine (1)	180	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	180	U	
101-55-3	4-Bromophenyl-phenylether	180	U	
118-74-1	Hexachlorobenzene	180	U	
1912-24-9	Atrazine	180	U	
87-86-5	Pentachlorophenol	360	~~U~~	R RE
85-01-8	Phenanthrene	540		
120-12-7	Anthracene	60	~~J~~	R RE
86-74-8	Carbazole	180	U	
84-74-2	Di-n-butylphthalate	180	U	
206-44-0	Fluoranthene	120	~~J~~	R RE
129-00-0	Pyrene	330		
85-68-7	Butylbenzylphthalate	170	J	
91-94-1	3,3'-Dichlorobenzidine	180	~~U~~	R SSL
56-55-3	Benzo (a) anthracene	130	~~J~~	R RE
218-01-9	Chrysene	86	~~J~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	720		
117-84-0	Di-n-octylphthalate	180	U	
205-99-2	Benzo (b) fluoranthene	67	~~J~~	R RE
207-08-9	Benzo (k) fluoranthene	180	U	
50-32-8	Benzo (a) pyrene	180	U	
193-39-5	Indeno (1,2,3-cd) pyrene	180	U	
53-70-3	Dibenzo (a,h) anthracene	180	U	
191-24-2	Benzo (g,h,i) perylene	180	U	
58-90-2	2,3,4,6-Tetrachlorophenol	180	U	

[1] Cannot be separated from Diphenylamine

LW
10/23/08

6

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-13

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-13A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 8.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 8.6 Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	611-14-3	Benzene, 1-ethyl-2-methyl-	10.26	2100	JN
02	526-73-8	Benzene, 1,2,3-trimethyl- $$ Hemimel	11.41	3600	JN
03	95-63-6	Benzene, 1,2,4-trimethyl- $$ .psi.-C	12.36	1400	JN
04	1074-43-7	Benzene, 1-methyl-3-propyl-	13.35	1600	JN
05	95-93-2	Benzene, 1,2,4,5-tetramethyl-	15.30	2300	JN
06	874-41-9	Benzene, 1-ethyl-2,4-dimethyl-	15.44	2700	JN
07	1680-51-9	Naphthalene, 1,2,3,4-tetrahydro-6-me	19.95	2400	JN
08	90-12-0	Naphthalene, 1-methyl- $$ .alpha.-Me	21.01	1900	JN
09	582-16-1	Naphthalene, 2,7-dimethyl- $$ 2,7-Di	22.72	1600	JN
10	581-42-0	Naphthalene, 2,6-dimethyl- $$ 2,6-Di	22.99	1700	JN
11	2245-38-7	Naphthalene, 1,6,7-trimethyl-	24.92	1300	JN
12	3674-66-6	Phenanthrene, 2,5-dimethyl-	30.48	1100	JN
13		UNKNOWN	38.70	2000	J
14	66563-30-2	Bacchotricuneatin c	38.84	2000	JN
15		UNKNOWN	38.98	1500	J
16		UNKNOWN	39.12	1600	J
17		UNKNOWN	39.46	1400	J
18		UNKNOWN	39.67	2700	J
19		UNKNOWN	40.30	2300	J
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	38000	

[2]EPA-designated Registry Number.

lw 10/23/08

6DL

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-3436DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-13RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-13DJA66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 8.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.6 Dilution Factor: 2.0

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
100-52-7	Benzaldehyde	370	U
108-95-2	Phenol	370	U
111-44-4	Bis(2-chloroethyl)ether	370	U
95-57-8	2-Chlorophenol	370	U
95-48-7	2-Methylphenol	370	U
108-60-1	2,2'-Oxybis(1-chloropropane)	370	U
98-86-2	Acetophenone	370	U
106-44-5	4-Methylphenol	370	U
621-64-7	N-Nitroso-di-n-propylamine	370	U
67-72-1	Hexachloroethane	370	U
98-95-3	Nitrobenzene	370	U
78-59-1	Isophorone	370	U
88-75-5	2-Nitrophenol	370	U
105-67-9	2,4-Dimethylphenol	370	U
111-91-1	Bis(2-chloroethoxy)methane	370	U
120-83-2	2,4-Dichlorophenol	370	U
91-20-3	Naphthalene	2000	D
106-47-8	4-Chloroaniline	370	U
87-68-3	Hexachlorobutadiene	370	U
105-60-2	Caprolactam	370	U
59-50-7	4-Chloro-3-methylphenol	370	U
91-57-6	2-Methylnaphthalene	3200	D
77-47-4	Hexachlorocyclopentadiene	370	U
88-06-2	2,4,6-Trichlorophenol	370	U
95-95-4	2,4,5-Trichlorophenol	370	U
92-52-4	1,1'-Biphenyl	170	JD
91-58-7	2-Chloronaphthalene	370	U
88-74-4	2-Nitroaniline	720	U
131-11-3	Dimethylphthalate	370	U
606-20-2	2,6-Dinitrotoluene	370	U
208-96-8	Acenaphthylene	370	U
99-09-2	3-Nitroaniline	720	U
83-32-9	Acenaphthene	94	JD

RC

RC

RW
10/23/08

6DL

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-3436DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-13RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-13DJA66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 8.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.6 Dilution Factor: 2.0

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
51-28-5	2,4-Dinitrophenol	720	U
100-02-7	4-Nitrophenol	720	U
132-64-9	Dibenzofuran	370	U
121-14-2	2,4-Dinitrotoluene	370	U
84-66-2	Diethylphthalate	370	U
86-73-7	Fluorene	180	JD
7005-72-3	4-Chlorophenyl-phenylether	370	U
100-01-6	4-Nitroaniline	720	U
534-52-1	4,6-Dinitro-2-methylphenol	720	U
86-30-6	N-Nitrosodiphenylamine (1)	370	U
95-94-3	1,2,4,5-Tetrachlorobenzene	370	U
101-55-3	4-Bromophenyl-phenylether	370	U
118-74-1	Hexachlorobenzene	370	U
1912-24-9	Atrazine	370	U
87-86-5	Pentachlorophenol	720	U
85-01-8	Phenanthrene	490	D
120-12-7	Anthracene	370	U
86-74-8	Carbazole	370	U
84-74-2	Di-n-butylphthalate	370	U
206-44-0	Fluoranthene	120	JD
129-00-0	Pyrene	370	U
85-68-7	Butylbenzylphthalate	130	JD
91-94-1	3,3'-Dichlorobenzidine	370	U
56-55-3	Benzo (a) anthracene	110	JD
218-01-9	Chrysene	77	JD
117-81-7	Bis(2-ethylhexyl)phthalate	630	D
117-84-0	Di-n-octylphthalate	370	U
205-99-2	Benzo (b) fluoranthene	370	U
207-08-9	Benzo (k) fluoranthene	370	U
50-32-8	Benzo (a) pyrene	370	U
193-39-5	Indeno (1,2,3-cd) pyrene	370	U
53-70-3	Dibenzo (a,h) anthracene	370	U
191-24-2	Benzo (g,h,i) perylene	370	U
58-90-2	2,3,4,6-Tetrachlorophenol	370	U

[1] Cannot be separated from Diphenylamine

RE

MW 10/23/08

6DL

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-3436DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-13RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-13DJA66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 8.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.6 Dilution Factor: 2.0

Use original

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	95-63-6	Benzene, 1,2,4-trimethyl- $$ .psi.-C	11.29	4000	JDN
02	526-73-8	Benzene, 1,2,3-trimethyl- $$ Hemimel	12.25	1500	JDN
03	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	15.21	1600	JDN
04	874-41-9	Benzene, 1-ethyl-2,4-dimethyl-	15.34	2000	JDN
05	90-12-0	Naphthalene, 1-methyl- $$ .alpha.-Me	20.93	1600	JDN
06	571-61-9	Naphthalene, 1,5-dimethyl- $$ 1,5-Di	22.89	1400	JDN
07		UNKNOWN	35.24	540	JD
08		UNKNOWN	35.96	550	JD
09		UNKNOWN	36.03	370	JD
10		UNKNOWN	37.24	600	JD
11		UNKNOWN	37.31	940	JD
12	481-21-0	Cholestane	37.52	580	JDN
13		UNKNOWN	39.00	620	JD
14		UNKNOWN	39.56	760	JD
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	32000	

[2]EPA-designated Registry Number.

RE

JW 10/23/08

7

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-3638

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-14

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-14A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 3.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 8.9 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
100-52-7	Benzaldehyde	180	U	
108-95-2	Phenol	180	U	
111-44-4	Bis(2-chloroethyl)ether	180	U	
95-57-8	2-Chlorophenol	180	U	
95-48-7	2-Methylphenol	180	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	180	U	
98-86-2	Acetophenone	180	U	
106-44-5	4-Methylphenol	180	U	
621-64-7	N-Nitroso-di-n-propylamine	180	U	
67-72-1	Hexachloroethane	180	U	
98-95-3	Nitrobenzene	180	U	
78-59-1	Isophorone	180	U	
88-75-5	2-Nitrophenol	180	U	
105-67-9	2,4-Dimethylphenol	180	U	
111-91-1	Bis(2-chloroethoxy)methane	180	U	
120-83-2	2,4-Dichlorophenol	180	U	
91-20-3	Naphthalene	1800		
106-47-8	4-Chloroaniline	180	~~U~~	R SSL
87-68-3	Hexachlorobutadiene	180	U	
105-60-2	Caprolactam	180	U	
59-50-7	4-Chloro-3-methylphenol	180	U	
91-57-6	2-Methylnaphthalene	2300 ~~2900~~	~~E~~	R DL
77-47-4	Hexachlorocyclopentadiene	180	~~U~~	R SSL
88-06-2	2,4,6-Trichlorophenol	180	U	
95-95-4	2,4,5-Trichlorophenol	180	U	
92-52-4	1,1'-Biphenyl	110	J	
91-58-7	2-Chloronaphthalene	180	U	
88-74-4	2-Nitroaniline	340	U	
131-11-3	Dimethylphthalate	180	U	
606-20-2	2,6-Dinitrotoluene	180	U	
208-96-8	Acenaphthylene	180	~~U~~	R RE
99-09-2	3-Nitroaniline	340	U	
83-32-9	Acenaphthene	94	J	

MW
10/23/08

7

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-3638

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-14

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-14A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 3.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 8.9 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
51-28-5	2,4-Dinitrophenol	340	U	
100-02-7	4-Nitrophenol	340	U	
132-64-9	Dibenzofuran	180	U	
121-14-2	2,4-Dinitrotoluene	180	U	
84-66-2	Diethylphthalate	180	U	
86-73-7	Fluorene	180		
7005-72-3	4-Chlorophenyl-phenylether	180	U	
100-01-6	4-Nitroaniline	340	U	
534-52-1	4,6-Dinitro-2-methylphenol	340	U	
86-30-6	N-Nitrosodiphenylamine (1)	180	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	180	U	
101-55-3	4-Bromophenyl-phenylether	180	U	
118-74-1	Hexachlorobenzene	180	U	
1912-24-9	Atrazine	180	U	
87-86-5	Pentachlorophenol	340	U	
85-01-8	Phenanthrene	480		
120-12-7	Anthracene	57	~~J~~	R RE
86-74-8	Carbazole	180	U	
84-74-2	Di-n-butylphthalate	180	U	
206-44-0	Fluoranthene	120	~~J~~	R RE
129-00-0	Pyrene	310		
85-68-7	Butylbenzylphthalate	180		
91-94-1	3,3'-Dichlorobenzidine	180	~~U~~	R SSL
56-55-3	Benzo (a) anthracene	130	~~J~~	R RE
218-01-9	Chrysene	110	~~J~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	670		
117-84-0	Di-n-octylphthalate	180	U	
205-99-2	Benzo (b) fluoranthene	51	~~J~~	R RE
207-08-9	Benzo (k) fluoranthene	180	U	
50-32-8	Benzo (a) pyrene	180	U	
193-39-5	Indeno (1,2,3-cd) pyrene	180	U	
53-70-3	Dibenzo (a,h) anthracene	180	U	
191-24-2	Benzo (g,h,i) perylene	180	U	
58-90-2	2,3,4,6-Tetrachlorophenol	180	U	

[1] Cannot be separated from Diphenylamine

lw 10/23/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-3638

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-14

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-14A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 3.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) Y pH: 8.9 Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	611-14-3	Benzene, 1-ethyl-2-methyl-	10.24	1600	JN
02	526-73-8	Benzene, 1,2,3-trimethyl- $$ Hemimel	11.38	2600	JN
03	526-73-8	Benzene, 1,2,3-trimethyl- $$ Hemimel	12.34	1200	JN
04	1074-43-7	Benzene, 1-methyl-3-propyl-	13.33	1400	JN
05	99-87-6	Benzene, 1-methyl-4-(1-methylethyl)-	13.58	1100	JN
06	933-98-2	Benzene, 1-ethyl-2,3-dimethyl-	15.30	1600	JN
07	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	15.42	2200	JN
08	934-74-7	Benzene, 1-ethyl-3,5-dimethyl- $$ m-	16.34	1500	JN
09	1680-51-9	Naphthalene, 1,2,3,4-tetrahydro-6-me	19.93	1900	JN
10	4453-90-1	1,4-Methanonaphthalene, 1,4-dihydro-	20.99	1700	JN
11		UNKNOWN	22.52	980	J
12	582-16-1	Naphthalene, 2,7-dimethyl-	22.71	1500	JN
13	575-41-7	Naphthalene, 1,3-dimethyl- $$ 1,3-Di	22.97	1500	JN
14	582-16-1	Naphthalene, 2,7-dimethyl- $$ 2,7-Di	23.02	1100	JN
15	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	24.90	1200	JN
16	3674-66-6	Phenanthrene, 2,5-dimethyl-	30.48	1000	JN
17		UNKNOWN	32.02	250	J
18		UNKNOWN	32.16	230	J
19	52078-56-5	11-Tricosene	33.09	250	JN
20		UNKNOWN	37.63	610	J
21		UNKNOWN	37.91	570	J
22		UNKNOWN	39.65	600	J
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	19000	

[2]EPA-designated Registry Number.

lw 10/23/08

7DL

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-3638DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-14RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-14DJA66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 3.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.9 Dilution Factor: 2.0

use orig. NJ

RE

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
100-52-7	Benzaldehyde	350	U
108-95-2	Phenol	350	U
111-44-4	Bis(2-chloroethyl)ether	350	U
95-57-8	2-Chlorophenol	350	U
95-48-7	2-Methylphenol	350	U
108-60-1	2,2'-Oxybis(1-chloropropane)	350	U
98-86-2	Acetophenone	350	U
106-44-5	4-Methylphenol	350	U
621-64-7	N-Nitroso-di-n-propylamine	350	U
67-72-1	Hexachloroethane	350	U
98-95-3	Nitrobenzene	350	U
78-59-1	Isophorone	350	U
88-75-5	2-Nitrophenol	350	U
105-67-9	2,4-Dimethylphenol	350	U
111-91-1	Bis(2-chloroethoxy)methane	350	U
120-83-2	2,4-Dichlorophenol	350	U
91-20-3	Naphthalene	1300	D
106-47-8	4-Chloroaniline	350	U
87-68-3	Hexachlorobutadiene	350	U
105-60-2	Caprolactam	350	U
59-50-7	4-Chloro-3-methylphenol	350	U
91-57-6	2-Methylnaphthalene	2300	D
77-47-4	Hexachlorocyclopentadiene	350	U
88-06-2	2,4,6-Trichlorophenol	350	U
95-95-4	2,4,5-Trichlorophenol	350	U
92-52-4	1,1'-Biphenyl	79	JD
91-58-7	2-Chloronaphthalene	350	U
88-74-4	2-Nitroaniline	680	U
131-11-3	Dimethylphthalate	350	U
606-20-2	2,6-Dinitrotoluene	350	U
208-96-8	Acenaphthylene	350	U
99-09-2	3-Nitroaniline	680	U
83-32-9	Acenaphthene	69	JD

RW 10/23/08

7DL

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-3638DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-14RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-14DJA66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 3.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.9 Dilution Factor: 2.0

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
51-28-5	2,4-Dinitrophenol	680	U
100-02-7	4-Nitrophenol	680	U
132-64-9	Dibenzofuran	350	U
121-14-2	2,4-Dinitrotoluene	350	U
84-66-2	Diethylphthalate	350	U
86-73-7	Fluorene	140	JD
7005-72-3	4-Chlorophenyl-phenylether	350	U
100-01-6	4-Nitroaniline	680	U
534-52-1	4,6-Dinitro-2-methylphenol	680	U
86-30-6	N-Nitrosodiphenylamine (1)	350	U
95-94-3	1,2,4,5-Tetrachlorobenzene	350	U
101-55-3	4-Bromophenyl-phenylether	350	U
118-74-1	Hexachlorobenzene	350	U
1912-24-9	Atrazine	350	U
87-86-5	Pentachlorophenol	680	U
85-01-8	Phenanthrene	370	D
120-12-7	Anthracene	350	U
86-74-8	Carbazole	350	U
84-74-2	Di-n-butylphthalate	350	U
206-44-0	Fluoranthene	91	JD
129-00-0	Pyrene	350	U
85-68-7	Butylbenzylphthalate	120	JD
91-94-1	3,3'-Dichlorobenzidine	350	U
56-55-3	Benzo (a) anthracene	90	JD
218-01-9	Chrysene	75	JD
117-81-7	Bis(2-ethylhexyl)phthalate	480	D
117-84-0	Di-n-octylphthalate	350	U
205-99-2	Benzo (b) fluoranthene	350	U
207-08-9	Benzo (k) fluoranthene	350	U
50-32-8	Benzo (a) pyrene	350	U
193-39-5	Indeno (1,2,3-cd) pyrene	350	U
53-70-3	Dibenzo (a,h) anthracene	350	U
191-24-2	Benzo (g,h,i) perylene	350	U
58-90-2	2,3,4,6-Tetrachlorophenol	350	U

[1] Cannot be separated from Diphenylamine

lw 10/23/08

7DL

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-3638DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-14RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-14DJA66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 3.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.9 Dilution Factor: 2.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

Use - orig. NAL

RE

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	95-63-6	Benzene, 1,2,4-trimethyl- $$ .psi.-(	11.28	2100	JDN
02	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	14.31	1700	JDN
03	4453-90-1	1,4-Methanonaphthalene, 1,4-dihydro-	20.92	1200	JDN
04		UNKNOWN	36.77	470	JD
05		UNKNOWN	37.11	580	JD
06		UNKNOWN	37.23	960	JD
07		UNKNOWN	37.31	890	JD
08		UNKNOWN	37.40	470	JD
09		UNKNOWN	37.52	840	JD
10		UNKNOWN	37.57	430	JD
11		UNKNOWN	37.80	590	JD
12		UNKNOWN	38.09	690	JD
13		UNKNOWN	38.26	520	JD
14		UNKNOWN	38.33	330	JD
15		UNKNOWN	38.58	1400	JD
16		UNKNOWN	38.88	860	JD
17		UNKNOWN	39.00	700	JD
18		UNKNOWN	39.34	430	JD
19		UNKNOWN	39.39	450	JD
20		UNKNOWN	39.48	380	JD
21		UNKNOWN	39.55	1000	JD
22		UNKNOWN	39.81	480	JD
23		UNKNOWN	40.19	570	JD
24		UNKNOWN	40.27	510	JD
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	15000	

[2]EPA-designated Registry Number.

LW 10/23/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-15

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-15A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 12.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.4 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
100-52-7	Benzaldehyde	190	U	
111-44-4	Bis(2-chloroethyl)ether	190	U	
95-57-8	2-Chlorophenol	190	U	
95-48-7	2-Methylphenol	190	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	190	U	
98-86-2	Acetophenone	190	U	
106-44-5	4-Methylphenol	190	U	
621-64-7	N-Nitroso-di-n-propylamine	190	U	
67-72-1	Hexachloroethane	190	U	
98-95-3	Nitrobenzene	190	U	
78-59-1	Isophorone	190	U	
88-75-5	2-Nitrophenol	190	U	
105-67-9	2,4-Dimethylphenol	190	U	
111-91-1	Bis(2-chloroethoxy)methane	190	U	
120-83-2	2,4-Dichlorophenol	190	U	
91-20-3	Naphthalene	3900 ~~3400~~	~~E~~	R DL
106-47-8	4-Chloroaniline	190	~~U~~	R SSL
87-68-3	Hexachlorobutadiene	190	U	
105-60-2	Caprolactam	190	U	
59-50-7	4-Chloro-3-methylphenol	190	U	
91-57-6	2-Methylnaphthalene	6600 ~~5900~~	~~E~~	R DL
77-47-4	Hexachlorocyclopentadiene	190	~~U~~	R SSL
88-06-2	2,4,6-Trichlorophenol	190	U	
95-95-4	2,4,5-Trichlorophenol	190	U	
92-52-4	1,1'-Biphenyl	340		
91-58-7	2-Chloronaphthalene	190	U	
88-74-4	2-Nitroaniline	380	U	
131-11-3	Dimethylphthalate	190	U	
606-20-2	2,6-Dinitrotoluene	190	U	
208-96-8	Acenaphthylene	190	~~U~~	R RE
99-09-2	3-Nitroaniline	380	U	
83-32-9	Acenaphthene	160	J	
51-28-5	2,4-Dinitrophenol	380	U	

RW 10/23/08

8

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-15

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-15A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 12.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.4 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
100-02-7	4-Nitrophenol	380	U	
132-64-9	Dibenzofuran	190	U	
121-14-2	2,4-Dinitrotoluene	190	U	
84-66-2	Diethylphthalate	190	U	
86-73-7	Fluorene	320		
7005-72-3	4-Chlorophenyl-phenylether	190	U	
100-01-6	4-Nitroaniline	380	U	
534-52-1	4,6-Dinitro-2-methylphenol	380	U	
86-30-6	N-Nitrosodiphenylamine (1)	190	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	190	U	
101-55-3	4-Bromophenyl-phenylether	190	U	
118-74-1	Hexachlorobenzene	190	U	
1912-24-9	Atrazine	190	U	
87-86-5	Pentachlorophenol	380	U	
85-01-8	Phenanthrene	410		
120-12-7	Anthracene	360		
86-74-8	Carbazole	190	U	
84-74-2	Di-n-butylphthalate	190	U	
206-44-0	Fluoranthene	92	~~J~~	R RE
129-00-0	Pyrene	380		
85-68-7	Butylbenzylphthalate	420		
91-94-1	3,3'-Dichlorobenzidine	190	~~U~~	R SSL
56-55-3	Benzo (a) anthracene	280		
218-01-9	Chrysene	140	J	
117-81-7	Bis(2-ethylhexyl)phthalate	1200		
117-84-0	Di-n-octylphthalate	190	U	
205-99-2	Benzo (b) fluoranthene	82	J	
207-08-9	Benzo (k) fluoranthene	190	~~U~~	R RE
50-32-8	Benzo (a) pyrene	43	J	
193-39-5	Indeno (1,2,3-cd) pyrene	190	~~U~~	R RE
53-70-3	Dibenzo (a,h) anthracene	190	~~U~~	R RE
191-24-2	Benzo (g,h,i) perylene	72	J	
58-90-2	2,3,4,6-Tetrachlorophenol	190	U	

[1] Cannot be separated from Diphenylamine

lw 10/23/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-15

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-15A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 12.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.4 Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	611-14-3	Benzene, 1-ethyl-2-methyl-	10.17	3300	JN
02	95-63-6	Benzene, 1,2,4-trimethyl- $$ .psi.-C	10.41	1500	JN
03	95-63-6	Benzene, 1,2,4-trimethyl- $$ .psi.-C	11.33	6000	JN
04	526-73-8	Benzene, 1,2,3-trimethyl- $$ Hemimel	12.27	2000	JN
05	1074-43-7	Benzene, 1-methyl-3-propyl-	13.27	2200	JN
06	527-84-4	Benzene, 1-methyl-2-(1-methylethyl)-	13.52	1900	JN
07	2870-04-4	Benzene, 2-ethyl-1,3-dimethyl-	14.13	2500	JN
08	933-98-2	Benzene, 1-ethyl-2,3-dimethyl-	14.95	1300	JN
09	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	15.23	1800	JN
10	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-(1)	15.37	2900	JN
11	1587-04-8	Benzene, 1-methyl-2-(2-propenyl)- $$	15.88	1400	JN
12		UNKNOWN	16.12	1200	J
13	934-74-7	Benzene, 1-ethyl-3,5-dimethyl- $$ m-	16.28	1400	JN
14	2809-64-5	Naphthalene, 1,2,3,4-tetrahydro-5-me	19.87	2500	JN
15	4453-90-1	1,4-Methanonaphthalene, 1,4-dihydro-	20.95	3700	JN
16	581-42-0	Naphthalene, 2,6-dimethyl-	22.66	3200	JN
17	575-43-9	Naphthalene, 1,6-dimethyl- $$ 1,6-Di	22.97	5400	JN
18	134261-85-1	3-(2-Methyl-propenyl)-1H-indene	24.22	1700	JN
19	2245-38-7	Naphthalene, 1,6,7-trimethyl-	24.85	2700	JN
20	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	25.08	1700	JN
21		UNKNOWN	39.13	2100	J
22		UNKNOWN	39.66	2300	J
23		UNKNOWN	40.28	2100	J
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	46000	

[2]EPA-designated Registry Number.

MW
10/23/08

8DL

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-2930DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-15RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-15DA66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 12.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/05/2008

GPC Cleanup: (Y/N) Y pH: 8.4 Dilution Factor: 3.0

use orig. RL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
100-52-7	Benzaldehyde	580	U
108-95-2	Phenol	580	U
111-44-4	Bis(2-chloroethyl)ether	580	U
95-57-8	2-Chlorophenol	580	U
95-48-7	2-Methylphenol	580	U
108-60-1	2,2'-Oxybis(1-chloropropane)	580	U
98-86-2	Acetophenone	580	U
106-44-5	4-Methylphenol	580	U
621-64-7	N-Nitroso-di-n-propylamine	580	U
67-72-1	Hexachloroethane	580	U
98-95-3	Nitrobenzene	580	U
78-59-1	Isophorone	580	U
88-75-5	2-Nitrophenol	580	U
105-67-9	2,4-Dimethylphenol	580	U
111-91-1	Bis(2-chloroethoxy)methane	580	U
120-83-2	2,4-Dichlorophenol	580	U
91-20-3	Naphthalene	3900	D
106-47-8	4-Chloroaniline	580	U
87-68-3	Hexachlorobutadiene	580	U
105-60-2	Caprolactam	580	U
59-50-7	4-Chloro-3-methylphenol	580	U
91-57-6	2-Methylnaphthalene	6600	D
77-47-4	Hexachlorocyclopentadiene	580	U
88-06-2	2,4,6-Trichlorophenol	580	U
95-95-4	2,4,5-Trichlorophenol	580	U
92-52-4	1,1'-Biphenyl	400	JD
91-58-7	2-Chloronaphthalene	580	U
88-74-4	2-Nitroaniline	1100	U
131-11-3	Dimethylphthalate	580	U
606-20-2	2,6-Dinitrotoluene	580	U
208-96-8	Acenaphthylene	580	U
99-09-2	3-Nitroaniline	1100	U
83-32-9	Acenaphthene	180	JD

LW 10/23/08

8DL

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-2930DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-15RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-15DA66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 12.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/05/2008

GPC Cleanup: (Y/N) Y pH: 8.4 Dilution Factor: 3.0

use original

RE

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
51-28-5	2,4-Dinitrophenol	1100	U
100-02-7	4-Nitrophenol	1100	U
132-64-9	Dibenzofuran	580	U
121-14-2	2,4-Dinitrotoluene	580	U
84-66-2	Diethylphthalate	580	U
86-73-7	Fluorene	350	JD
7005-72-3	4-Chlorophenyl-phenylether	580	U
100-01-6	4-Nitroaniline	1100	U
534-52-1	4,6-Dinitro-2-methylphenol	1100	U
86-30-6	N-Nitrosodiphenylamine (1)	580	U
95-94-3	1,2,4,5-Tetrachlorobenzene	580	U
101-55-3	4-Bromophenyl-phenylether	580	U
118-74-1	Hexachlorobenzene	580	U
1912-24-9	Atrazine	580	U
87-86-5	Pentachlorophenol	1100	U
85-01-8	Phenanthrene	850	D
120-12-7	Anthracene	580	U
86-74-8	Carbazole	580	U
84-74-2	Di-n-butylphthalate	580	U
206-44-0	Fluoranthene	200	JD
129-00-0	Pyrene	580	U
85-68-7	Butylbenzylphthalate	350	JD
91-94-1	3,3'-Dichlorobenzidine	580	U
56-55-3	Benzo (a) anthracene	190	JD
218-01-9	Chrysene	150	JD
117-81-7	Bis(2-ethylhexyl)phthalate	910	D
117-84-0	Di-n-octylphthalate	580	U
205-99-2	Benzo (b) fluoranthene	580	U
207-08-9	Benzo (k) fluoranthene	580	U
50-32-8	Benzo (a) pyrene	580	U
193-39-5	Indeno (1,2,3-cd) pyrene	580	U
53-70-3	Dibenzo (a,h) anthracene	580	U
191-24-2	Benzo (g,h,i) perylene	580	U
58-90-2	2,3,4,6-Tetrachlorophenol	580	U

[1] Cannot be separated from Diphenylamine

LW
10/23/08

8DL

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-2930DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-15RE1

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-15DA66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 12.0 Decanted: (Y/N) N Date Received: 07/18/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/05/2008

GPC Cleanup: (Y/N) Y pH: 8.4 Dilution Factor: 3.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

Use ORIGINAL

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	611-14-3	Benzene, 1-ethyl-2-methyl-	10.06	4700	JDN
02	95-63-6	Benzene, 1,2,4-trimethyl- $$ .psi.-C	10.81	2600	JDN
03	95-63-6	Benzene, 1,2,4-trimethyl- $$ .psi.-C	11.21	8700	JDN
04	526-73-8	Benzene, 1,2,3-trimethyl- $$ Hemimel	12.17	3000	JDN
05	1074-43-7	Benzene, 1-methyl-3-propyl-	13.17	3400	JDN
06	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	14.24	4900	JDN
07	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-(1)	15.14	3000	JDN
08	95-93-2	Benzene, 1,2,4,5-tetramethyl-	15.26	4000	JDN
09	1680-51-9	Naphthalene, 1,2,3,4-tetrahydro-6-me	19.77	3900	JDN
10	4453-90-1	1,4-Methanonaphthalene, 1,4-dihydro-	20.85	3500	JDN
11	581-42-0	Naphthalene, 2,6-dimethyl- $$ 2,6-Di	22.84	2800	JDN
12	582-16-1	Naphthalene, 2,7-dimethyl- $$ 2,7-Di	22.89	2300	JDN
13	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	24.78	2200	JDN
14		UNKNOWN	35.89	950	JD
15		UNKNOWN	37.17	1500	JD
16		UNKNOWN	37.23	1900	JD
17		UNKNOWN	37.44	1400	JD
18	111-01-3	Squalane	37.97	2500	JDN
19	53584-60-4	28-Nor-17.alpha.(H)-hopane	38.92	1000	JDN
20		UNKNOWN	39.48	1200	JD
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	49000	

[2]EPA-designated Registry Number.

MW 10/23/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-17

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-17A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 7.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
100-52-7	Benzaldehyde	180	U	
108-95-2	Phenol	180	U	
111-44-4	Bis(2-chloroethyl)ether	180	U	
95-57-8	2-Chlorophenol	180	U	
95-48-7	2-Methylphenol	180	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	180	U	
98-86-2	Acetophenone	180	U	
106-44-5	4-Methylphenol	180	U	
621-64-7	N-Nitroso-di-n-propylamine	180	U	
67-72-1	Hexachloroethane	180	U	
98-95-3	Nitrobenzene	180	U	
78-59-1	Isophorone	180	U	
88-75-5	2-Nitrophenol	180	U	
105-67-9	2,4-Dimethylphenol	180	U	
111-91-1	Bis(2-chloroethoxy)methane	180	U	
120-83-2	2,4-Dichlorophenol	180	U	
91-20-3	Naphthalene	180	~~U~~	R RE
106-47-8	4-Chloroaniline	180	U	
87-68-3	Hexachlorobutadiene	180	U	
105-60-2	Caprolactam	180	U	
59-50-7	4-Chloro-3-methylphenol	180	U	
91-57-6	2-Methylnaphthalene	180	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	180	U	
88-06-2	2,4,6-Trichlorophenol	180	U	
95-95-4	2,4,5-Trichlorophenol	180	U	
92-52-4	1,1'-Biphenyl	180	U	
91-58-7	2-Chloronaphthalene	180	U	
88-74-4	2-Nitroaniline	350	U	
131-11-3	Dimethylphthalate	180	U	
606-20-2	2,6-Dinitrotoluene	180	U	
208-96-8	Acenaphthylene	180	~~U~~	R RE
99-09-2	3-Nitroaniline	350	U	
83-32-9	Acenaphthene	180	~~U~~	R RE

QW 10/23/08

9

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-17

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-17A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 7.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
51-28-5	2,4-Dinitrophenol	350	U	
100-02-7	4-Nitrophenol	350	U	
132-64-9	Dibenzofuran	180	U	
121-14-2	2,4-Dinitrotoluene	180	U	
84-66-2	Diethylphthalate	180	U	
86-73-7	Fluorene	180	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	180	U	
100-01-6	4-Nitroaniline	350	U	
534-52-1	4,6-Dinitro-2-methylphenol	350	U	
86-30-6	N-Nitrosodiphenylamine (1)	180	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	180	U	
101-55-3	4-Bromophenyl-phenylether	180	U	
118-74-1	Hexachlorobenzene	180	U	
1912-24-9	Atrazine	180	U	
87-86-5	Pentachlorophenol	350	~~U~~	R RE
85-01-8	Phenanthrene	180	~~U~~	R RE
120-12-7	Anthracene	180	~~U~~	R RE
86-74-8	Carbazole	180	U	
84-74-2	Di-n-butylphthalate	180	U	
206-44-0	Fluoranthene	180	~~U~~	R RE
129-00-0	Pyrene	180	~~U~~	R RE
85-68-7	Butylbenzylphthalate	180	U	
91-94-1	3,3'-Dichlorobenzidine	180	U	
56-55-3	Benzo (a) anthracene	180	~~U~~	R RE
218-01-9	Chrysene	180	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	180	U	
117-84-0	Di-n-octylphthalate	180	U	
205-99-2	Benzo (b) fluoranthene	180	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	180	~~U~~	
50-32-8	Benzo (a) pyrene	180	~~U~~	
193-39-5	Indeno (1,2,3-cd) pyrene	180	~~U~~	
53-70-3	Dibenzo (a,h) anthracene	180	~~U~~	
191-24-2	Benzo (g,h,i) perylene	180	~~U~~	
58-90-2	2,3,4,6-Tetrachlorophenol	180	U	

[1]Cannot be separated from Diphenylamine

LW 10/23/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB20-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-17

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-17A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 7.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	36.73	610	J
02		UNKNOWN	40.20	120	J
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	460	

[2]EPA-designated Registry Number.

MW
10/23/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20P-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-18

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-18A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 7.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
100-52-7	Benzaldehyde	180	U	
108-95-2	Phenol	180	U	
111-44-4	Bis(2-chloroethyl)ether	180	U	
95-57-8	2-Chlorophenol	180	U	
95-48-7	2-Methylphenol	180	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	180	U	
98-86-2	Acetophenone	180	U	
106-44-5	4-Methylphenol	180	U	
621-64-7	N-Nitroso-di-n-propylamine	180	U	
67-72-1	Hexachloroethane	180	U	
98-95-3	Nitrobenzene	180	U	
78-59-1	Isophorone	180	U	
88-75-5	2-Nitrophenol	180	U	
105-67-9	2,4-Dimethylphenol	180	U	
111-91-1	Bis(2-chloroethoxy)methane	180	U	
120-83-2	2,4-Dichlorophenol	180	U	
91-20-3	Naphthalene	180	~~U~~	R RE
106-47-8	4-Chloroaniline	180	U	
87-68-3	Hexachlorobutadiene	180	U	
105-60-2	Caprolactam	180	U	
59-50-7	4-Chloro-3-methylphenol	180	U	
91-57-6	2-Methylnaphthalene	180	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	180	U	
88-06-2	2,4,6-Trichlorophenol	180	U	
95-95-4	2,4,5-Trichlorophenol	180	U	
92-52-4	1,1'-Biphenyl	180	U	
91-58-7	2-Chloronaphthalene	180	U	
88-74-4	2-Nitroaniline	350	U	
131-11-3	Dimethylphthalate	180	U	
606-20-2	2,6-Dinitrotoluene	180	U	
208-96-8	Acenaphthylene	180	U	
99-09-2	3-Nitroaniline	350	U	
83-32-9	Acenaphthene	180	U	

MW 10/23/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20P-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-18

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-18A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 7.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
51-28-5	2,4-Dinitrophenol	350	U	
100-02-7	4-Nitrophenol	350	U	
132-64-9	Dibenzofuran	180	U	
121-14-2	2,4-Dinitrotoluene	180	U	
84-66-2	Diethylphthalate	180	U	
86-73-7	Fluorene	180	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	180	U	
100-01-6	4-Nitroaniline	350	U	
534-52-1	4,6-Dinitro-2-methylphenol	350	U	
86-30-6	N-Nitrosodiphenylamine (1)	180	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	180	U	
101-55-3	4-Bromophenyl-phenylether	180	U	
118-74-1	Hexachlorobenzene	180	U	
1912-24-9	Atrazine	180	U	
87-86-5	Pentachlorophenol	350	~~U~~	R RE
85-01-8	Phenanthrene	180	~~U~~	R RE
120-12-7	Anthracene	180	~~U~~	R RE
86-74-8	Carbazole	180	U	
84-74-2	Di-n-butylphthalate	180	U	
206-44-0	Fluoranthene	180	~~U~~	R RE
129-00-0	Pyrene	180	~~U~~	R RE
85-68-7	Butylbenzylphthalate	180	U	
91-94-1	3,3'-Dichlorobenzidine	180	U	
56-55-3	Benzo (a) anthracene	180	~~U~~	R RE
218-01-9	Chrysene	180	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	180	U	
117-84-0	Di-n-octylphthalate	180	U	
205-99-2	Benzo (b) fluoranthene	180	U	R RE
207-08-9	Benzo (k) fluoranthene	180	U	
50-32-8	Benzo (a) pyrene	180	U	
193-39-5	Indeno (1,2,3-cd) pyrene	180	U	
53-70-3	Dibenzo (a,h) anthracene	180	U	
191-24-2	Benzo (g,h,i) perylene	180	U	
58-90-2	2,3,4,6-Tetrachlorophenol	180	U	

[1] Cannot be separated from Diphenylamine

RW 10/23/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB20P-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-18

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-18A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 7.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 8.0 Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	57-10-3	n-Hexadecanoic acid	29.59	80	JN
02		UNKNOWN	36.71	530	J
03		UNKNOWN	39.91	77	J
04		UNKNOWN	40.12	86	J
05		UNKNOWN	40.22	120	J
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	1000	

[2]EPA-designated Registry Number.

lcw
10/23/08

11

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-2022

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-19

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-19A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 8.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 7.6 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
100-52-7	Benzaldehyde	180	U
108-95-2	Phenol	180	U
111-44-4	Bis(2-chloroethyl)ether	180	U
95-57-8	2-Chlorophenol	180	U
95-48-7	2-Methylphenol	180	U
108-60-1	2,2'-Oxybis(1-chloropropane)	180	U
98-86-2	Acetophenone	180	U
106-44-5	4-Methylphenol	180	U
621-64-7	N-Nitroso-di-n-propylamine	180	U
67-72-1	Hexachloroethane	180	U
98-95-3	Nitrobenzene	180	U
78-59-1	Isophorone	180	U
88-75-5	2-Nitrophenol	180	U
105-67-9	2,4-Dimethylphenol	180	U
111-91-1	Bis(2-chloroethoxy)methane	180	U
120-83-2	2,4-Dichlorophenol	180	U
91-20-3	Naphthalene	180	~~U~~ R RE
106-47-8	4-Chloroaniline	180	U
87-68-3	Hexachlorobutadiene	180	U
105-60-2	Caprolactam	180	U
59-50-7	4-Chloro-3-methylphenol	180	U
91-57-6	2-Methylnaphthalene	180	~~U~~ R RE
77-47-4	Hexachlorocyclopentadiene	180	U
88-06-2	2,4,6-Trichlorophenol	180	U
95-95-4	2,4,5-Trichlorophenol	180	U
92-52-4	1,1'-Biphenyl	180	U
91-58-7	2-Chloronaphthalene	180	U
88-74-4	2-Nitroaniline	360	U
131-11-3	Dimethylphthalate	180	U
606-20-2	2,6-Dinitrotoluene	180	U
208-96-8	Acenaphthylene	180	U
99-09-2	3-Nitroaniline	360	U
83-32-9	Acenaphthene	180	U

LW
10/23/08

11

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-2022

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-19

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-19A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 8.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 7.6 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
51-28-5	2,4-Dinitrophenol	360	U	
100-02-7	4-Nitrophenol	360	U	
132-64-9	Dibenzofuran	180	U	
121-14-2	2,4-Dinitrotoluene	180	U	
84-66-2	Diethylphthalate	180	U	
86-73-7	Fluorene	180	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	180	U	
100-01-6	4-Nitroaniline	360	U	
534-52-1	4,6-Dinitro-2-methylphenol	360	U	
86-30-6	N-Nitrosodiphenylamine (1)	180	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	180	U	
118-74-1	Hexachlorobenzene	180	U	
1912-24-9	Atrazine	180	U	
87-86-5	Pentachlorophenol	360	~~U~~	R RE
85-01-8	Phenanthrene	180	~~U~~	↓ ↓
120-12-7	Anthracene	180	~~U~~	
86-74-8	Carbazole	180	U	
84-74-2	Di-n-butylphthalate	180	U	
206-44-0	Fluoranthene	180	~~U~~	R RE
129-00-0	Pyrene	180	~~U~~	R RE
85-68-7	Butylbenzylphthalate	180	U	
91-94-1	3,3'-Dichlorobenzidine	180	U	
56-55-3	Benzo (a) anthracene	180	~~U~~	R RE
218-01-9	Chrysene	180	~~U~~	RRE
117-81-7	Bis(2-ethylhexyl)phthalate	180	U	
117-84-0	Di-n-octylphthalate	180	U	
205-99-2	Benzo (b) fluoranthene	180	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	180	~~U~~	
50-32-8	Benzo (a) pyrene	180	~~U~~	↓ ↓
193-39-5	Indeno (1,2,3-cd) pyrene	180	~~U~~	
53-70-3	Dibenzo (a,h) anthracene	180	~~U~~	
191-24-2	Benzo (g,h,i) perylene	180	~~U~~	
58-90-2	2,3,4,6-Tetrachlorophenol	180	U	

[1] Cannot be separated from Diphenylamine

LW
10/23/08

11

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB20-2022

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-19

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-19A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 8.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 7.6 Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	36.70	140	J
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	420	

[2]EPA-designated Registry Number.

lw
10/23/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SS20-0406

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-22

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-22A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 13.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 7.2 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
100-52-7	Benzaldehyde	200	U	
108-95-2	Phenol	200	U	
111-44-4	Bis(2-chloroethyl)ether	200	U	
95-57-8	2-Chlorophenol	200	U	
95-48-7	2-Methylphenol	200	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	200	U	
98-86-2	Acetophenone	200	U	
106-44-5	4-Methylphenol	200	U	
621-64-7	N-Nitroso-di-n-propylamine	200	U	
67-72-1	Hexachloroethane	200	U	
98-95-3	Nitrobenzene	200	U	
78-59-1	Isophorone	200	U	
88-75-5	2-Nitrophenol	200	U	
105-67-9	2,4-Dimethylphenol	200	U	
111-91-1	Bis(2-chloroethoxy)methane	200	U	
120-83-2	2,4-Dichlorophenol	200	U	
91-20-3	Naphthalene	200	~~U~~	R RE
106-47-8	4-Chloroaniline	200	U	
87-68-3	Hexachlorobutadiene	200	U	
105-60-2	Caprolactam	200	U	
59-50-7	4-Chloro-3-methylphenol	200	U	
91-57-6	2-Methylnaphthalene	200	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	200	U	
88-06-2	2,4,6-Trichlorophenol	200	U	
95-95-4	2,4,5-Trichlorophenol	200	U	
92-52-4	1,1'-Biphenyl	200	U	
91-58-7	2-Chloronaphthalene	200	U	
88-74-4	2-Nitroaniline	380	U	
131-11-3	Dimethylphthalate	200	U	
606-20-2	2,6-Dinitrotoluene	200	U	
208-96-8	Acenaphthylene	200	U	
99-09-2	3-Nitroaniline	380	U	
83-32-9	Acenaphthene	200	U	

MW 10/23/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SS20-0406

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-22

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-22A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 13.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 7.2 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
51-28-5	2,4-Dinitrophenol	380	U	
100-02-7	4-Nitrophenol	380	U	
132-64-9	Dibenzofuran	200	U	
121-14-2	2,4-Dinitrotoluene	200	U	
84-66-2	Diethylphthalate	200	U	
86-73-7	Fluorene	200	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	200	U	
100-01-6	4-Nitroaniline	380	U	
534-52-1	4,6-Dinitro-2-methylphenol	380	U	
86-30-6	N-Nitrosodiphenylamine (1)	200	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	200	U	
101-55-3	4-Bromophenyl-phenylether	200	U	
118-74-1	Hexachlorobenzene	200	U	
1912-24-9	Atrazine	200	U	
87-86-5	Pentachlorophenol	380	~~U~~	R RE
85-01-8	Phenanthrene	200	~~U~~	↓ ↓
120-12-7	Anthracene	200	~~U~~	
86-74-8	Carbazole	200	U	
84-74-2	Di-n-butylphthalate	200	U	
206-44-0	Fluoranthene	200	~~U~~	R RE
129-00-0	Pyrene	200	~~U~~	↓ ↓
85-68-7	Butylbenzylphthalate	200	U	
91-94-1	3,3'-Dichlorobenzidine	200	U	
56-55-3	Benzo (a) anthracene	200	~~U~~	R RE
218-01-9	Chrysene	200	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	200	U	
117-84-0	Di-n-octylphthalate	200	U	
205-99-2	Benzo (b) fluoranthene	200	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	200	~~U~~	↓ ↓
50-32-8	Benzo (a) pyrene	200	~~U~~	
193-39-5	Indeno (1,2,3-cd) pyrene	200	~~U~~	
53-70-3	Dibenzo (a,h) anthracene	200	~~U~~	
191-24-2	Benzo (g,h,i) perylene	200	~~U~~	
58-90-2	2,3,4,6-Tetrachlorophenol	200	U	

[1] Cannot be separated from Diphenylamine

MW
10/23/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SS20-0406

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-22

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-22A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 13.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 7.2 Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	57-10-3	n-Hexadecanoic acid	29.59	130	JN
02		UNKNOWN	36.70	100	J
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	410	

[2]EPA-designated Registry Number.

MW
10/23/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SS20-2830

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-23

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-23A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 11.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/02/2008

GPC Cleanup: (Y/N) Y pH: 7.9 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
100-52-7	Benzaldehyde	190	U	
108-95-2	Phenol	190	U	
111-44-4	Bis(2-chloroethyl)ether	190	U	
95-57-8	2-Chlorophenol	190	U	
95-48-7	2-Methylphenol	190	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	190	U	
98-86-2	Acetophenone	190 ~~59~~	~~J~~	U BL
106-44-5	4-Methylphenol	190	U	
621-64-7	N-Nitroso-di-n-propylamine	190	U	
67-72-1	Hexachloroethane	190	U	
98-95-3	Nitrobenzene	190	U	
78-59-1	Isophorone	190	U	
88-75-5	2-Nitrophenol	190	U	
105-67-9	2,4-Dimethylphenol	190	U	
111-91-1	Bis(2-chloroethoxy)methane	190	U	
120-83-2	2,4-Dichlorophenol	190	U	
91-20-3	Naphthalene	190	~~U~~	R RE
106-47-8	4-Chloroaniline	190	U	
87-68-3	Hexachlorobutadiene	190	U	
105-60-2	Caprolactam	190	U	
59-50-7	4-Chloro-3-methylphenol	190	U	
91-57-6	2-Methylnaphthalene	190	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	190	U	
88-06-2	2,4,6-Trichlorophenol	190	U	
95-95-4	2,4,5-Trichlorophenol	190	U	
92-52-4	1,1'-Biphenyl	190	U	
91-58-7	2-Chloronaphthalene	190	U	
88-74-4	2-Nitroaniline	370	U	
131-11-3	Dimethylphthalate	190	U	
606-20-2	2,6-Dinitrotoluene	190	U	
208-96-8	Acenaphthylene	190	~~U~~	R RE
99-09-2	3-Nitroaniline	370	U	
83-32-9	Acenaphthene	190	~~U~~	R RE

lw 10/23/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SS20-2830

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-23

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-23A66.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 11.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/02/2008

GPC Cleanup: (Y/N) Y pH: 7.9 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
51-28-5	2,4-Dinitrophenol	370	U	
100-02-7	4-Nitrophenol	370	U	
132-64-9	Dibenzofuran	190	U	
121-14-2	2,4-Dinitrotoluene	190	U	
84-66-2	Diethylphthalate	190	U	
86-73-7	Fluorene	190	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	190	U	
100-01-6	4-Nitroaniline	370	U	
534-52-1	4,6-Dinitro-2-methylphenol	370	U	
86-30-6	N-Nitrosodiphenylamine (1)	190	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	190	U	
101-55-3	4-Bromophenyl-phenylether	190	U	
118-74-1	Hexachlorobenzene	190	U	
1912-24-9	Atrazine	190	U	
87-86-5	Pentachlorophenol	370	U	
85-01-8	Phenanthrene	190	~~U~~	R RE
120-12-7	Anthracene	190	~~U~~	R RE
86-74-8	Carbazole	190	U	
84-74-2	Di-n-butylphthalate	190	U	
206-44-0	Fluoranthene	190	~~U~~	R RE
129-00-0	Pyrene	190	~~U~~	R RE
85-68-7	Butylbenzylphthalate	190	U	
91-94-1	3,3'-Dichlorobenzidine	190	U	
56-55-3	Benzo (a) anthracene	190	~~U~~	R RE
218-01-9	Chrysene	190	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	190	U	
117-84-0	Di-n-octylphthalate	190	U	
205-99-2	Benzo (b) fluoranthene	190	U	R RE
207-08-9	Benzo (k) fluoranthene	190	U	
50-32-8	Benzo (a) pyrene	190	U	
193-39-5	Indeno (1,2,3-cd) pyrene	190	U	
53-70-3	Dibenzo (a,h) anthracene	190	U	
191-24-2	Benzo (g,h,i) perylene	190	U	
58-90-2	2,3,4,6-Tetrachlorophenol	190	U	

[1] Cannot be separated from Diphenylamine

MW 1-12-2008

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SS20-2830

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-23

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807038-23A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 11.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/23/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/02/2008

GPC Cleanup: (Y/N) Y pH: 7.9 Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	36.71	360	J
02		UNKNOWN	40.31	80	J
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	320	

[2]EPA-designated Registry Number.

fw
10/23/08

USEPA REGION II WORKSHEETS

SOP NO. HW-35/SVOA Data Validation
USEPA Contract Laboratory Program
Statement of Work for Organic Analysis of Low/Medium Concentration of Semivolatile Organic Compounds SOM01.2

Prepared by: George Karras Date: 8/13/07
George Karras, Chemist
Hazardous Waste Support Section

Peer Reviewed by: Russell Arnone Date: 10/3/07
Russell Arnone, Chemist
Hazardous Waste Support Section

Concurred by: Linda Mauel Date: 10/7/07
Linda Mauel, Chief
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Approved by: Robert Runyon Date: 10/10/07
Robert Runyon, Chief
Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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INTRODUCTION

Scope and Applicability

This SOP offers detailed guidance in evaluating laboratory data generated according to the method in the "USEPA Contract Laboratory Program Statement of Work for Organics Analysis Multi-Media, Multi-Concentration, SOM01.1, May 2005". The validation procedures and actions discussed in this document are based on the requirements set forth in the "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, January 2005". This document attempts to cover technical problems specific to low/Medium concentration of semivolatile compounds. Situations may arise where data limitations must be assessed based on the reviewer's own professional judgement.

In addition to technical requirements, contractual requirements may also be covered in this document. While it is important that instances of contract non-compliance be addressed in the Data Assessment, the technical criteria are always used to qualify the analytical data.

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 as follows:

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.

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

P - Pesticide/Aroclor target analytes when the % Difference between the analyte concentrations obtained from the two dissimilar GC columns is greater than 25%.

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 the USEPA Statement of Work SOM01.2 and National Functional Guidelines mentioned above.

YES NO N/A

. . . . . .

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: N/A **LAB:** Compuchem, Cary NC

SITE NAME: Vieques Island, PR **SDG No(s).:** 0807038

1.0 Chain of Custody and Sampling Trip Reports

1.1 Are the Traffic Reports/Chain-of-Custody Records present for all samples? [✓] ___ ___

ACTION: If no, contact RSCC, or the TOPO to obtain replacement of missing or illegible copies from the lab.

1.2 Is the Sampling Trip Report present for all samples? [✓] ___ ___

ACTION: If no, contact either RSCC or ask the TOPO to obtain the necessary information from the prime contractor.

2.0 Data Completeness and Deliverables

2.1 Have any missing deliverables been received and added to the data package? ___ [✓] ___

ACTION: Contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the lab. If lab cannot provide them, note the effect on the review of the data package in the Contract Problems/Non-compliance section of the Data Assessment.

2.2 Was CLASS CCS checklist included with the package? [✓] ___ ___

	YES	NO	N/A
. . . . .			
2.3 Are there any discrepancies between the Traffic Reports/Chain-of-Custody Records, Sampling Trip Report and Sample Tags?	___	[√]	___

ACTION: If yes, contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the laboratory.

3.0 <u>Cover Letter SDG Narrative</u>

3.1 Is the SDG Narrative or Cover Letter Present?	[√]	___	___
3.2 Are case number, SDG number and contract number contained in the SDG Narrative or cover letter (see SOW, Exhibit B, section 2.5.1)? EPA sample numbers in the SDG, detailed documentation of any quality control, sample, shipment, and/or analytical problems encountered in processing the samples? Corrective action taken?	[√]	___	___
3.3 Does the Narrative contain the following information SOM01.1, page B-12, section 2.5.1)? column used, storage of samples, case#, SDG#, analytical problems, and discrepancies between field and lab weights.	[√]	___	___
3.5 Did the contractor record the temperature of the cooler on the Form DC-1, Item 9 - Cooler Temperature, and in the SDG Narrative?	[√]	___	___
3.6 Does the Case Narrative contain the "verbatim" statement (page B-12, section 2.5.1 of the SOM)?	[√]	___	___

ACTION: If "No", to any question in this section, contact the TOPO to obtain necessary resubmittals. If unavailable, document under the Contract Problems/ Non-Compliance section of the Data Assessment.

. . . . . .

	YES	NO	N/A

4.0 Data Validation Checklist

4.1 Check the package for the following (see SOM reporting requirements, section 2.1, page B-10):

	YES	NO	N/A
a. Is the package paginated in ascending order starting from the SDG narrative?	[✓]	___	___
b. Are all forms and copies legible?	[✓]	___	___
c. Assembled in the order set forth in the SOW?	[✓]	___	___
d. Semivolatiles Data present?	[✓]	___	

PART A: Low/Medium Semivolatile Analyses

1.0 Sample Conditions/Problems

	YES	NO	N/A
1.1 Do the Traffic Reports/Chain-of-Custody Records, Sampling Trip Report or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	___	[✓]	___

ACTION: If samples were not iced or the ice was melted upon arrival at the laboratory and the temperature of the cooler was > 10° C, then flag all positive results with a "J" and all non-detects "UJ".

2.0 Holding Times

	YES	NO	N/A
2.1 Have any SVOA technical holding times, determined from date of collection to date of analysis, been exceeded?	___	[✓]	___

2.2 Preservation: Aqueous and Non-aqueous samples must be cooled at 4°C ± 2°C.

YES NO N/A

. . . . . .

Action: Qualify sample results according to the following table.

Holding Time Actions for Low/Medium Semivolatile Analyses

Matrix	Preserved	Criteria	Action	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤ 7 days (extraction) < 40 days (analysis)	J*	UJ*
	No	> 7 days (extraction) > 40 days (analysis)	J	UJ
	Yes	≤ 7 days (extraction) ≤ 40 days (analysis)	No qualification	
	Yes	> 7 days (extraction) > 40 days (analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	R
Non-aqueous	No	≤ 14 days (extraction) ≤ 40 days (analysis)	J*	UJ*
	No	> 14 days (extraction) > 40 days (analysis)	J	UJ
	Yes	≤ 14 days (extraction) ≤ 40 days (analysis)	No qualification	
	Yes	> 14 days (extraction) > 40 days (analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	R

* Only if cooler temperature exceeds 10° C (see ACTION in Section 1.1 above). No action required if temperature < 10° C.

3.0 Deuterated Monitoring Compound (DMC) Recovery (Form II)

3.1 Are the Semivolatile DMC Recovery Summaries (Form II) present? [✓] ___ ___

	YES	NO	N/A
. . . . .			
ACTION: Contact the TOPO to obtain an explanation/resubmittal from the lab. If missing deliverables are unavailable, document the effect in the Data Assessment.			
3.2 Were outliers marked correctly with an asterisk?	[√]	___	___
ACTION: Circle all outliers in red.			
3.3 Were more than four of the sixteen (16) Deuterated Monitoring Compounds (DMC's) recoveries outside their corresponding limits?	___	[√]	___
If yes, were samples re-analyzed?	[ ]	___	√
Were method blanks re-analyzed?	[ ]	___	√

Note: Up to four (4) DMCs per sample may fail % recovery but all % recoveries must be > zero.

ACTION: If any DMC is outside the required limits, qualify their associated target compounds (See Table below) as follows:

SEMIVOLATILE DMC AND THEIR ASSOCIATED TARGET COMPOUNDS

Phenol-d5 Benzaldehyde Phenol	**2-Chlorophenol-d4** 2-Chlorophenol	**2-Nitrophenol-d4** Isophorone 2-nitrophenol
Bis(2-Chloroethyl)ether-d8 bis(2-Chloroethyl)ether 2,2'oxybis(1-Chloropropane bis(2-Chloroethoxy)methane	**4-Methylphenol-d8** 2-Methylphenol 4-Methylphenol 2,4 Dimethylphenol	**4-Chloroaniline-d4** 4-Chloroaniline Hexachloro cyclopentadiene 3,3'Dichlorobenzidine

Nitrobenzene-d8 Acetophenone N-Nitro-di-n-propylamine Hexachloroethane Nitrobenzene 2,6-Dinitrotoluene 2,4-Dinitrotoluene N-Nitrodiphenylamine	**2,4-Dichlorophenol-d3** 2,4-Dichlorophenol Hexaclorobutadiene 4-Chloro-3-methylphenol 2,4,6-Trichlorophenol 2,4,5-Trichlorophenol 1,2,4,5-Tetrachloro-benzene Pentachlorophenol 2,3,4,6-Tetrachloro-phenol	**Dimethylphthalate-d6** Caprolactam 1,1'-Biphenyl Dimethylphthalate Diethylphthalate Di-n-butylphthalate Butylbenzylphthalate bis(2-Ethylhexyl)-phthalate Di-n-octylphthalate
Fluorene-d10 Dibenzofuran Fluorene 4-Chlorophenyl-phenylether 4-Bromophenyl-phenylether Carbazole	**Anthracene-d10** Hexachlorobenzene Atrazine Phenanthrene Anthracene	**Pyrene-d10** Fluoranthene Pyrene Benzo(a)anthracene Chrysene
Acenaphthylene-d8 Naphthalene 2-Methylphthalene 2-Chlorophthalene Acenapthylene Acenaphthene	**4-Nitrophenol-d4** 2-Nitroaniline 3-Nitroaniline 2,4-Dinitrophenol 4-Nitrophenol 4-Nitroaniline	**Benzo(a)pyrene-d12** Benzo(b)flur0anthene Benzo(k)fluroanthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)pertlene
4,6-Dinitro-2-methylphenol-d2 4,6-Dinitro-2-methylphenol		

Semivolatile Deuterated Monitoring Compound Recovery Limits for Selective Ion Monitoring (SIM) and the Associated Target Compounds

Fluoranthene-d10 (DMC)	**2-Methylnaphthalene-d10 (DMC)**
Fluoranthene	Naphthalene

Pyrene	2-Methylnaphthalene
Benzo(a)anthracene	Acenaphthylene
Chrysene	Acenaphthene
Benzo(b)fluoranthene	Fluorene
Benzo(k)fluoranthene	Pentachlorophenol
Benzo(a)pyrene	Phenanthrene
Indeno(1,2,3-cd)pyrene	Anthracene
Bibenzo(a,h)anthracene	
Benzo(g,h,i)perylene	

SEMIVOLATILE DEUTERATED MONITORING COMPOUND RECOVERY LIMITS

DMC	Recovery Limits (%) for Water Samples	Recovery Limits (%) for Soil samples
Phenol-d5	39 - 106	17 - 103
Bis-(2-chloroethyl) ether-d8	40 - 105	12 - 9
2-Chlorophenol-d4	41 - 106	13 - 101
4-Methylphenol-d8	25 - 111	8 - 100
Nitrobenzene-d5	43 - 108	16 - 103
2-Nitrophenol-d4	40 - 108	16 - 104
2,4-Dichlorophenol-d3	37 - 105	23 - 104
4-Chloroaniline-d4	1 - 145	1 - 145
Dimethylphthalate-d6	47 - 114	43 - 111
Acenaphthalate-d8	41 - 107	20 - 97
4-Nitrophenol-d4	33 - 116	16 - 166
Fluorene-d10	42 - 111	40 - 108
4,6-Dintro-2-methylphenol-d2	22 - 104	1 - 121

Anthracene-d10	44 - 110	22 - 98
Pyrene-d10	52 - 119	51 - 120
Benzo(a)pyrene-d12	32 - 121	43 - 111
Fluoranthene-d10 (SIM)	5- - 150	50 - 150
2-Methylnaphthalene-d10 (SIM)	50 - 150	50 - 150

Deuterated Monitoring Compound Recovery Action for Semivolatiles

Criteria	Action	
	Detected Associated Compounds	**Non-Detected Associated Compounds**
%R > Upper Acceptance Limit	J	No qualification
%R < Lower acceptance Limit	J	UJ
Lower Acceptance ≤ %R ≤ Upper Acceptance Limit	No qualification	

NOTE: Use the above table to qualify SVOA data including SIM analysis.

NOTE: As per SOM, any sample which has more than 4 DMC's outside the limits, it must be reanalyzed (SOM sec. 11.4.3.1 pg. D-49/Low Medium SVOA).

Blank analysis have DMCs out of specification: 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. For example, if one or more samples in the batch show acceptable DMC recoveries, the reviewer may choose to consider the blank problem to be an isolated occurrence.

ACTION: Note in the Data Assessment under Contract Problems/ Non-Compliance if the Lab did not perform reanalysis and reviewer's judgment regarding blank problem.

	YES	NO	N/A
3.4 Are there any transcription/calculation errors between raw data and form II?	___	[✓]	___

ACTION: If large errors exist, ask the TOPO to obtain an explanation/resubmittal from the lab, make any necessary corrections and note errors in the data assessment.

Note: DMC recovery limits criteria and qualification apply to samples diluted 5X and less. For samples diluted greater than 5X, recovery criteria does not apply Because it is assumed DMC is diluted below the quantitation range.

4.0 Matrix Spike/Matrix Spike Duplicate Recovery (Form III)

Note: Data for MS/MSD will not be present unless requested.

	YES	NO	N/A
4.1 Are the MS/MSD Recovery Forms (Form III BNA) present?	[✓]	___	___
4.2 Was the MS/MSD analyzed at the required frequency (once per SDG, or every 20 samples, whichever is more frequent)?	[✓]	___	___

ACTION: If any MS/MSD data are missing, take action as specified in section 3.1 above.

ACTION: No action is taken on MS/MSD data alone. However, using professional judgement, the validator may use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. If Any MS/MSD % recovery or RPD is out of specification, qualify data to include the consideration of the existence of interference in the raw data. Consideration include, but not limited to the following "Action":

Matrix Spike/Matrix Spike Duplicate Action for Semivolatiles

Criteria	Action	
	Detected Spike Compounds	Non-detected Spike Compounds

YES NO N/A

. . . . . .

%R or RPD > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	Use Professional Judgment
Lower Acceptance Limit ≤ %R; RPD ≤ Upper Acceptance Limit	No qualification required	

Note: If it can be determined that the results of the MS/MSD affects only the sample spiked, limit qualification to only this sample. However, use professional judgment when it is determined through the MS/MSD results that the laboratory is having systematic problem in the analysis of one or more analytes that affect all associated samples.

5.0 Method Blanks (Form IV)

5.1 Is the Semivolatile Method Blank Summary (Form IV BNA) present for aqueous and soil samples? [✓] ___ ___

5.2 Frequency of Analysis: For the analysis of SVOA TCL compounds, has a method blank been analyzed for each SDG or every 20 samples, whichever is more frequent? [✓] ___ ___

5.3 Has a SVOA method blank been analyzed after the calibration standards. [✓] ___ ___

5.4 No target compound concentration may exceed the upper limit of the initial calibration. Did the laboratory perform dilution on compounds exceeding the initial calibration upper limit. [✓] ___ ___

ACTION: If any method blank data is missing or dilution was not done, notify the TOPO to obtain resubmittals or an explanation from the lab. If method blank data are unavailable, the reviewer may use professional judgement, or substitute field blank or trip blank data for missing method blank data.

5.5 Chromatography: Review the blank raw data chromatogram (RICs), quant. Reports or data system printout and spectra. Is the

	YES	NO	N/A
. . . . .			
chromatographic performance (baseline stability) acceptable for each instrument?	[√]	___	___

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

5.6 The validator should verify that the correct identification scheme for EPA blanks was used. (See SOM page B-39, section 3.3.7.3 for more information.)

Was the correct identification scheme used for all SVOA blanks?	[√]	___	___

ACTION: Contact the TOPO to obtain corrections from the lab, or make the necessary corrections. Document in the "Contract Problems/Non-Compliance section of the Data Assessment all corrections made by the validator.

5.8 Are all detected hits for target compounds in method, and field blanks less than the CRQL?	[√]	___	___

Exception: Bis(2-ethylhexyl)phthalate must be less than 5X times their respective CRQLs listed in the method.

ACTION: If no, an explanation and laboratory's corrective actions must be addressed in the case narrative. If the narrative contains no explanation, then make a note in the Contract Problems/Non-Compliance section of the Data Assessment.

6.0 Contamination

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

Note: These limits are not advisory.

6.1 Do any method blanks contain positive SVOA results (TCL and/or TICs)?	___	[√]	___

. . . . . .

	YES	NO	N/A
6.2 Do any field/rinse blanks have positive SVOA results (including TICs)?	✓	[ ]	

NOTE: All field blank results associated with 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 system monitoring compound, instrument performance criteria, spectral or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks. If any blanks are grossly contaminated (i.e.,saturated peaks by GC/MS) all associated sample data should be qualified unusable (R).

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
	Gross contamination	Detects	Qualify results as unusable R
	TIC: aqueous	< 5x blank value	R

YES NO N/A

. . . . . .

	TIC: non-aqueous	< 5x blank value	R

* 5x the CRQL for bis(2-ethylhexyl)Phthalate

NOTE: Analytes qualified "U" for blank contamination are treated as "hits" when qualifying for calibration criteria.
Note: When applied as described in the table above, the contaminant concentration in the blank are multiplied by the sample dilution factor.

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

ACTION: 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.

7.0 GC/MS Instrument Performance Check (Form V)

7.1 Are the GC/MS Instrument Performance Check Forms (Form V) present for decafluorotriphenylphosphine (DFTPP)? [√] ___ ___

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

7.3 Did the 12-hour clock begin with either the injection of DFTPP, or in cases where a closing continuing calibration (CCV) was used as an opening CCV? [√] ___ ___

Listed below are some, but not necessarily all, examples of acceptable analytical sequences incorporating the use of the opening/closing CCV. Use these examples as a guide for possible analytical sequences that can be expected.

Conditions for When Example Sequence is Appropriate:	Acceptable Criteria That Must be Met:	Notes:
If time remains on the 12 hour clock after initial calibration sequence	• DFTPP tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets both opening and closing CCV criteria • CCV B meets closing CCV criteria.	The requirement of starting the new 12-hr clock for Analytical Sequence 2 with a new DFTPP tune is waived if CCV A meets opening CCV criteria. If CCV B meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.
If time remains on the 12 hour clock after initial calibration sequence	• DFTPP tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets closing CCV criteria (but does not meet opening CCV criteria). • CCV B meets opening CCV criteria. • CCV C meets closing CCV Criteria.	CCV A does not meet opening criteria, therefore a new DFTPP tune must be performed, immediately followed by CCV B before a method blank and any sample may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new DFTPP tune.
If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV. OR If the most recent closing CCV was not or could not be used as an opening CCV.	• DFTPP tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets both opening and closing CCV criteria. • CCV C meets both opening and closing CCV criteria.	The requirement of starting the new 12 hour clock for Analytical Sequence 2 with a new DFTPP tune is waived if CCV B meets opening CCV criteria. If CCV C meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.

YES NO N/A

. . . . . .

If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV OR If the most recent closing CCV was not or could not be used as an opening CCV	• DFTPP tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets closing CCV criteria (but does not meet opening CCV criteria). • CCV C meets opening CCV Criteria. • CCV D meets both opening and closing CCV criteria.	CCV B does not meet opening CCV criteria, therefore a new DFTPP tune must be performed, immediately followed by CCV B before a method blank and any samples may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new DFTPP tune. The requirement of starting the new 12 hr clock for Analytical Sequence 3 with a new DFTPP tune is waived if CCV D meets opening CCV criteria. If CCV D meets opening criteria, a method blank and subsequent samples may be analyzed after CCV B.

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

NOTE: All ion abundance ratios must be normalized to m/z 198, the nominal base peak, even though the ion abundance of m/z 442 may be up to 100% that of m/z 198.

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

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

ACTION: If ion abundance criteria are not met, professional Judgement to determine to what extent the data may be utilized.

NOTE: Guidelines to aid in the application of professional judgment in evaluating ion abundance criteria are discussed below:

a. Some of the most critical factors in the DFTPP criteria are the non-instrument specific requirements that are also not unduly affected by the location of the spectrum on the chromatographic profile. The m/z ratios for 198/199 and 442/443 are critical. These ratios are based on the natural abundance of carbon 12 and carbon 13 and should always be met. Similarly, the relative abundance of m/z 68, 70, 197, and 441 indicate the condition of the instrument and the suitability of the resolution adjustment. Note that all of the foregoing abundance relate to adjacent ions; they are relatively insensitive to differences in instrument design and position of the spectrum on the chromatographic profile.

	YES	NO	N/A
. . . . .			

b. For the ions at m/z 51, 127, and 275, the actual relative abundance is not as critical. For instance, if m/z 275 has 80.0% relative abundance (criteria 10.0-60.0%) and other criteria are met, the deficiency is minor.

c. The relative abundance of m/z 365 is an indicator of suitable instrument zero adjustment. If relative abundance for m/z 365 is zero, minimum detection limits may be affected. On the other hand, if m/z 365 is present, but < 0.75% minimum abundance criteria, the deficiency is not as serious.

		YES	NO	N/A
7.6	Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.)	___	[✓]	___
7.7	Is the number of significant figures for the reported relative abundances consistent with the number given in the ion abundance criteria column on Form V ?	[✓]	___	___

ACTION: If large errors exist, take action as specified in section 3.1 above.

		YES	NO	N/A
7.8	Is the spectrum of the mass calibration compound acceptable?	[✓]	___	___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

Note: The requirement to analyze the instrument performance check solution is optional when analysis of Polynuclear Hydrocarbon (PAHs)/pentachlorophenol is to be performed by the Selected Ion Monitoring (SIM) technique.

8.0 Target Compound List (TCL) Analytes (Form I)

		YES	NO	N/A
8.1	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. Regional Control/MS/MSD samples?	[✓]	___	___
	c. Blanks (method, field, etc)?	[✓]	___	___
8.2	Are the SVOA Reconstructed Ion Chromatograms, the 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. Regional Control/MS/MSD samples?	[✓]	___	___

	YES	NO	N/A
c. Blanks (method, field, etc)?	[✓]	___	___

ACTION: If any data are missing, take action specified in 3.1 above.

8.3 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.

8.4 Are lab-generated standard mass spectra of the identified SVOA compounds present for each sample?	[✓]	___	___

ACTION: If any mass spectra are missing, take action as specified in 3.1 above. If lab does not generate their own standard spectra, make note under the "Contract Problems/Non-Compliance" section of the Data Assessment. If spectra are unavailable reject "R" the reported results.

8.5 Is the RRT of each reported compound within ± 0.06 RRT units of the standard RRT in the continuing calibration verification or initial calibration mid-point standard?	[✓]	___	___
8.6 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
8.7 Do sample and standard relative ion intensities agree to within ± 20% between standard and sample spectra?	[✓]	___	___

ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be 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 sections 8.4-8.7 above.

YES NO N/A

. . . . . .

ACTION: When sample carry-over is suspected, use professional judgment to determine if instrument cross-contamination has affected positive compound identifications.

9.0 Tentatively Identified Compounds (TIC)

9.1 Are all Tentatively Identified Compound Forms (Form I SVOA-TIC) present? Do listed TICs include scan number or retention time, as well as the estimated "J" and/or "JN" qualifier? [✓] ___ ___

9.2 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 3.1 above.

ACTION: Verify "JN" qualifier is present for all chemically named TICs having a percent match of greater than or equal 85%. TICs labeled "unknown" are qualified with a "J" qualifier.

9.3 Are any target compounds (from any fraction) listed as TICs? (Example: 1,2-dimethylbenzene is xylene - a VOA target analyte - and should not be reported as a TIC.) ___ [✓] ___

ACTION: Flag with "R" only target compound detected in another fraction. (except blank contamination - see blank table in sec 6.3 above)

9.4 Are major ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample spectrum? [✓] ___ ___

9.5 Do TICs and "best match" reference spectra relative ion intensities agree within ± 20%? [✓] ___ ___

ACTION: Use professional judgement to determine the acceptability of TIC identifications. If it is determined that an incorrect identification was made, change its identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.

Action: When a compound is not found in any blank, but is detected in a sample and is a suspected artifact of a common laboratory contaminant, solvent preservatives or Aldo condensation, the result should be qualified as

YES NO N/A

. . . . . .

unusable (R). (i.e., common lab contaminants such as CO_2(m/e 44), Siloxanes (m/e 73), diethyl ether, hexane, certain freons and phthalates at < 100 ug/L. Aldol condensation products: 4-hydroxy-4-methyl-2-pentanone, 4-methyl-2-penten-2-one, and 5,5-dimethyl-2(H)-furanone. Solvent preservatives cyclohexene, and related by-products: cyclohexanone, cyclohexenone, cyclohexanol, cyclohexenol, chlorocyclohexene, and chlorocyclohexanol.).

10.0 Compound Quantitation and Reported Detection Limits

10.1 Are there any transcription/calculation errors in Form I results? (Check at least two positive values. Verify that the correct internal standards, quantitation ions, and RRFs were used to calculate Form I results.) ___ [✓] ___

10.2 Are the CRQLs adjusted to reflect sample dilutions? [✓] ___ ___

ACTION: If errors are large, take action as specified in section 3.1 above.

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQLs data from the diluted sample). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original Form I and substituting the data from 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 not to be used, including any in the data summary package.

10.3 For non-aqueous samples, were the percent moisture < 70%? [✓] ___ ___

Action: If the % moisture ≥ 70.0% and < 90.0%, qualify detects as "J" and non-detects as approximated "UJ" If the % Moisture ≥ 90%, qualify detects as "J" and non-detects as "R"

11.0 Standards Data (GC/MS)

11.1 Are the reconstructed ion chromatograms, and data system printouts (quant. reports) present for each initial and continuing calibration? [✓] ___ ___

ACTION: If any calibration standard data are missing, take action specified in section 3.1 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI SVOA) present and complete for the semivolatile target compounds (except seven listed below) at concentrations of 5, 10, 20, 40,

YES NO N/A

. . . . . .

and 80 µg/ℓ and 4-point calibration at 10, 20, 40, and 80 ug/L for 2,4-dinitrophenol, pentachlorophenol, 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, 4-nitrophenol and 4,6-dinitro-2-methylphenol? [✓] ___ ___

Note: If analysis by Selected Ion Monitoring (SIM) technique is requested for PAHs/pentachlorophenols, calibration standards are analyzed at 0.10, 0.20, 0.40, 0.80 and 1.0 ng/uL for each target compound of interest and the associated DMCs. Pentachlorophenol will require only a four-point initial calibration at 0.20, 0.40, 0.80 and 1.0 ng/uL.

ACTION: If any Initial Calibration forms are missing, take action as specified in section 3.1 above.

12.2 Are the relative standard deviation (RSD) stable for SVOA's over the concentration range of the calibration (i.e., %RSD ≤ 20%, and ≤ 40% for poor performers (see table below)? (SVOC) (PAH) [✓] [✓] ___

ACTION: Circle all outliers in red.

NOTE: The twenty two (25) poor performers compounds and associated DMCs are listed below. The relative response factor (RRF) for these compounds must be greater than or equal to 0.010. The RRF for all other BNA target compounds must be ≥ 0.050.

Semivolatile Compounds Exhibiting Poor Response

Semivolatile Compounds	
2,2'-Oxybis(1-chloropropane)	Benzaldehyde
4-Chloroaniline	4-Nitroaniline
Hexachlorobutadiene	4,6-Dinitro-2-methylphenol
Hexachlorocyclopentadiene	N-Nitrosodiphenylamine
2-Nitroaniline	3,3'Dichlorobenzidine
3-Nitroaniline	1,1'Biphenyl
2,4-Dinitrophenol	Dimethylphthalate
4-Nitrophenol	Diethylphthalate
Acetophenone	1,2,4,5-Tetrachlorobenzene
Caprolactam	Carbazole

YES NO N/A

Atrazine	Butylbenzylphthalate
Di-n-butylphthalate	Di-n-octylphthalate
Bis-2(ethylhexyl)phthalate	

NOTE: Analytes previously qualified "U" for blank contamination are still treated as "hits" when qualifying for initial calibration criteria. (PAH) (SVOA)

12.3 Are any $\overline{RRF}$s < 0.050 (< 0.010 for poor performers)? ✓ ✓

ACTION: Circle all outliers in red.

ACTION: Use the following table to qualify for detects and non-detect compounds.

Initial Calibration Actions for Semivolatile Analyses

Criteria for Semivolatile Analysis	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RRF < 0.010 (compounds exhibiting poor response) RRF < 0.050 (all other target compounds)	J	R
RRF ≥ 0.010 (compounds exhibiting poor response) RRF ≥ 0.050 (all other target compounds)	No qualification	
%RSD ≤ 40.0% (compounds exhibiting poor response) %RSD ≤ 20.0% (all other target compounds)	No qualification	
%RSD > 40.0% (compounds exhibiting poor response) %RSD > 20.0% (all other target compounds)	J	No qualification

ACTION: Document in the Data Assessment Report the analytes that fail %RSD and/or RRF criteria.

12.4 Are there any transcription/calculation errors in the reporting of RRFs, $\overline{RRF}$s or %RSD values? (Check at least 2 values, but if errors are found, check more.) ___ ✓ ___

ACTION: Circle errors in red.

ACTION: If errors are large, contact the TOPO to obtain an explanation/resubmittal from the lab, document in the Data Assessment under Contract Problems/Non-Compliance.

. . . . . YES NO N/A

13.0 GC/MS Continuing Calibration Verification (CCV) (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII SVOA) present and complete for the semivolatile fraction? [✓] ___ ___

13.2 Did the 12 hour clock begin with either the injection of DFTPP or in cases where a closing CCV can be used as an opening CCV for each instrument? [✓] ___ ___

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, ask the TOPO to obtain explanation/resubmittal from the laboratory. If continuing calibration data are unavailable, flag all associated sample data as unusable (R).

13.3 Do any semivolatile compounds have a % Difference (% D) between the initial RRF and CCV RRF exceeding ± 40% for the poor performers (see table/page 22) or ± 25% for the remaining compounds? (PAH) ✓ (SVOC) [✓] ___

ACTION: Circle all outliers in red.

13.4 Do any semivolatile compounds have a RRF < 0.05 or < 0.01 for the poor performers? ___ [✓] ___

ACTION: Circle all outliers in red.

Note: Verify that the CCV was run at the required frequency (an opening and closing CCV must be run within 12-hour period) and the CCV was compared to the correct initial calibration. If the mid-point standard from the initial calibration is used as an opening CCV, verify that the result (RRF) of the mid-point standard was compared to the average RRF from the correct initial calibration.

Note: The closing CCV used to bracket the end of a 12-hour analytical sequence may be used as the opening CCV for the new 12-hour analyical sequence, provided that all the technical acceptance criteria are met for an opening CCV (see table below). If the closing CCV does not meet the technical acceptance criteria for an opening CCV, then a DFTPP tune followed by an opening CCV is required and the next 12-hour time period begins with the DFTPP tune.

Action: Use the following table to qualify data based on the technical acceptance criteria for the opening CCV and closing CCV.

Continuing Calibration Verification (CCV) Actions for Low/Medium Semivolatiles Analyses

Criteria for Opening CCV	Criteria for Closing CCV	Action	
		Detected Associated Compounds	Non-Detected Associated Compounds

YES NO N/A

. . . . . .

RRF < 0.010 (poor responders) RRF < 0.050 (for all other compounds)	RRF < 0.010 (for all target compounds)	J	R
RRF ≥ 0.010 (poor responders) RRF ≥ 0.050 (all other target compounds)	RRF ≥ 0.010 (for all target compounds)	No Action	
%D > 40.0 or < -40.0 (poor responders) %D > 25.0 or < -25.0 (all other volatile target compounds)	%D > 50.0 or < -50.0 (for all target compounds)	J	UJ
%D ≤ 40.0 or ≥ -40.0 (poor responders) %D ≤ 25.0 or ≥ -25.0 (all other target compounds)	%D ≤ 50.0 or ≥ -50.0 (for all target compounds)	No Action	
Opening CCV not performed at required frequency *	Closing CCV not performed at required frequency *	R	

* The 12-hour clock begins with either the injection of DFTPP or in cases where a closing CCV can be used as an opening CCV, the 12-hour clock begins with the injection of the opening CCV.

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance if more than two of the required analytes failed the above acceptance criteria.

13.5 Are there any transcription/calculation errors for the reporting of RRFs, or %D between initial RRFs and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors with red pencil.

ACTION: If errors are large, notify the TOPO to obtain explanation/resubmittals from the lab. Document errors in the Contract Problems/Non-Compliance section of the Data Assessment.

Note: All DMCs must meet RRF ≥ 0.010. No qualification of the data is necessary on the DMCs RRF and %RSD/%Diff data alone. However, use professional judgment to evaluate the DMC and %RSD/% Diff data in conjunction with the DMC recoveries to determine the need of qualification of the data.

14.0 Internal Standard (Form VIII)

14.1 Were the internal standard area counts for every sample and blank within the range of 50.0% and 200.0% of its response from the associated 12-hour calibration (opening CCV or mid-point initial calibration standard? (SVOA) [✓] (PAH) ✓

If no, were affected samples reanalyzed? [✓] (Pah) ___ ✓ (SVOA)

ACTION: 1. Circle all outliers with red pencil.

14.2 Are the retention times of the internal standards in sample or blanks within ± 30 seconds from the RT of the

	YES	NO	N/A
internal standard in the 12-hour associated calibration standard (opening CCV or mid-point standard from initial calibration)?	[√]	___	___

Action: Use the following table to qualify the data

INTERNAL STANDARDS ACTIONS FOR LOW/MEDIUM SEMIVOLATILES

Criteria	ACTION	
	Detected Associated Compounds *	**Non-detected Associated Compounds ***
Area counts ≥ 50% and ≤ 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	No Action required	
Area counts < 50% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J	R
Area counts > 200% of 12-hour standard (Opening CCV or mid-point standard from initial calibration)	J	No Action
RT difference > 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	R	
RT difference ≤ 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	No Action required	

* For semivolatile compounds associated to each internal standard, see Table 2-Semivolatile standards corresponding Target and Deuterated Monitoring Compounds for Quantitation in SOM01.1, Exhibit D, available at:

Http://www.epa.gov/superfund/programs/clp/som1.htm

Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable "R" if the mass spectral are met.

NOTE: Contract Requirements: The SOM (section 11.4.4 page D-50/SVOA Low/Medium states that any sample which fails the acceptance criteria for internal standard response must be reanalyzed.

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance any sample(s) which failed the above IS acceptance criteria.

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15.0 Field Duplicates

15.1 Were any field duplicates submitted for Low Concentration SVOA analysis? [✓] ___ ___

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

ACTION: Any gross variation between duplicate results must be addressed in the reviewer narrative. If large differences exist, contact the TOPO to confirm identification of field duplicates with the sampler.

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Definitions

CCS - contract compliance screening
CLASS - Contract Laboratory Analytical Services Support
CLP - Contract Laboratory Program
CRQL - Contract Required Quantitation Limit
DFTPP - decafluorotriphenylphosphine
GC/MS - gas chromatography/mass spectroscopy
kg - kilogram
µg - microgram
ℓ - liter
mℓ - milliliter
QC - quality control
RAS - Routine Analytical Services
RIC - reconstructed ion chromatogram
RPD - relative percent difference
RRF - relative response factor
$\overline{RRF}$ - 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
SOP - standard operating procedure
SOW - Statement of Work
SVOA - semivolatile organic acid
TCL - Target Compound List
TCLP - Toxicity Characteristics Leachate Procedure
TIC - tentatively identified compound
TPO - technical project officer
VTSR - validated time of sample receipt
TOPO - Task Order Project Officer

. . . . . .

References

1. USEPA Contract Laboratory Program of Work for Organic Analysis Multi-Media, Multi-Concentration, SOW/CLPSOM01.1, October 2004
2. National Functional Guidelines for Superfund Organic Methods Data Review January 2005

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

2J - FORM II SV-3
SOIL SEMIVOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: _____ SDG No.: 0807038

Level: (LOW/MED) LOW

	EPA SAMPLE NO.	SDMC1 (PHL) #	SDMC2 (BCE) #	SDMC3 (2CP) #	SDMC4 (4MP) #	SDMC5 (NBZ) #	SDMC6 (2NP) #	SDMC7 (DCP) #	SDMC8 (4CA) #	
01	SBLKJA	61	74	59	50	53	51	48	27	
02	VWAE-SB20-16	62	71	66	44	63	61	58	30	
03	VWAE-SB20-20	61	71	65	43	63	61	56	31	
04	VWAE-SB20P-1	53	55	56	36	52	53	50	21	
#2 05	VWAE-SB21-09	10 62	73	60	41	63	60	55	0 *	(J/R)
#4 06	VWAE-SB21-16	18 59	64	52	24	72	56	48	0 *	(J/R)
07	VWAE-SB21-16	46	59	47	18	66	47	40	0 D	
08	VWAE-SB21-18	46	52	46	27	74	49	49	248 D	
#8 09	VWAE-SB21-29	30 47	48	47	20	61	50	44	0 *	(J/R)
10	VWAE-SB21-29	55	49	56	29	65	61	54	0 D	
#6 11	VWAE-SB21-34	36 54	61	55	41	60	57	52	0 *	(J/R)
12	VWAE-SB21-34	48	51	50	35	56	50	47	0 D	
#7 13	VWAE-SB21-36	38 55	62	56	44	60	57	54	0 *	(J/R)
14	VWAE-SB21-36	38	41	39	30	44	41	39	0 D	
#3 15	VWAE-SB21P-0	9 10 59	75	58	25	68	60	49	0 *	(J/R)
16	VWAE-SB21P-0	48	59	50	21	59	46	42	0 D	
17	VWAE-SS20-04	59	67	63	49	61	60	56	28	
18	VWAE-SS20-28	63	75	68	40	67	68	58	26	
19	VWAE-SS21-05	61	71	57	47	57	55	53	17	
20	VWAE-SS21-05	61	66	55	54	53	52	52	25	
21	VWAE-SS21-05	62	73	60	56	58	57	57	31	
22										
23										
24										
25										
26										
27										
28										
29										
30										

Associated cmpds.

		QC LIMITS
SDMC1	(PHL) = Phenol-d5	(17-103)
SDMC2	(BCE) = Bis(2-chloroethyl)ether-d8	(12-98)
SDMC3	(2CP) = 2-Chlorophenol-d4	(13-101)
SDMC4	(4MP) = 4-Methylphenol-d8	(8-100)
SDMC5	(NBZ) = Nitrobenzene-d5	(16-103)
SDMC6	(2NP) = 2-Nitrophenol-d4	(16-104)
SDMC7	(DCP) = 2,4-Dichlorophenol-d3	(23-104)
SDMC8	(4CA) = 4-Chloroaniline-d4	(1-145)

\# Column to be used to flag recovery values
* Value outside of contract required QC limits
D DMC diluted out

many "0 D" diluted out - No action required

SOM01.2 (8/2007)

2K - FORM II SV-4
SOIL SEMIVOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case 0807038 Mod. Ref No.: _____ SDG No.: 0807038

Level: (LOW/MED) LOW

	EPA SAMPLE NO.	SDMC9 (DMP) #	SDMC10 (ACY) #	SDMC11 (4NP) #	SDMC12 (FLR) #	SDMC13 (NMP) #	SDMC14 (ANC) #	SDMC15 (PYR) #	SDMC16 (BAP) #	TOT OUT
01	SBLKJA	62	57	63	61	62	65	79	67	0
02	VWAE-SB20-16	71	64	68	67	64	70	77	77	0
03	VWAE-SB20-20	71	65	67	67	66	70	77	76	0
04	VWAE-SB20P-1	62	55	57	58	59	59	67	66	0
05	VWAE-SB21-09	68	62	67	71	58	65	74	74	1
06	VWAE-SB21-16	62	56	41	58	52	43	79	75	1
07	VWAE-SB21-16	57	53	36	58	39	66	54	58	0
08	VWAE-SB21-18	61	62	84	64	49	80	61	69	0
09	VWAE-SB21-29	59	55	69	58	45	52	68	67	1
10	VWAE-SB21-29	62	59	58	66	56	62	62	59	0
11	VWAE-SB21-34	65	61	64	66	58	65	77	72	1
12	VWAE-SB21-34	58	55	43	60	48	63	58	64	0
13	VWAE-SB21-36	66	60	69	68	61	67	76	75	1
14	VWAE-SB21-36	47	42	41	48	38	52	49 D	51	0
15	VWAE-SB21P-0	65	61	67	66	61	60	76	59	1
16	VWAE-SB21P-0	55	53	0 D	59	39	61	56	58	0
17	VWAE-SS20-04	69	61	65	65	62	69	75	74	0
18	VWAE-SS20-28	73	68	65	69	65	67	78	78	0
19	VWAE-SS21-05	65	56	62	65	58	62	73	68	0
20	VWAE-SS21-05	65	59	68	66	62	67	80	76	0
21	VWAE-SS21-05	69	63	71	69	66	70	80	79	0
22										
23										
24										
25										
26										
27										
28										
29										
30										

	QC LIMITS
SDMC9 (DMP) = Dimethylphthalate-d6	(43-111)
SDMC10 (ACY) = Acenaphthylene-d8	(20-97)
SDMC11 (4NP) = 4-Nitrophenol-d4	(16-166)
SDMC12 (FLR) = Fluorene-d10	(40-108)
SDMC13 (NMP) = 4,6-Dinitro-2-methylphenol-d2	(1-121)
SDMC14 (ANC) = Anthracene-d10	(22-98)
SDMC15 (PYR) = Pyrene-d10	(51-120)
SDMC16 (BAP) = Benzo(a)pyrene-d12	(43-111)

\# Column to be used to flag recovery values
* Value outside of contract required QC limits
D DMC diluted out

Several "0 D" diluted out
No action required

SOM01.2 (8/2007)

ENVIRONMENTAL
Data Services, Inc.

LOW/MEDIUM CONCENTRATION VOLATILE ORGANIC COMPOUNDS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807038

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 21, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SS21-0506	0807038-01	Soil
1MS	VWAE-SS21-0506MS	0807038-01MS	Soil
1MSD	VWAE-SS21-0506MSD	0807038-01MSD	Soil
2	VWAE-SB21-0910	0807038-02	Soil
3	VWAE-SB21P-0910	0807038-03	Soil
4	VWAE-SB21-1618	0807038-04	Soil
5	VWAE-SB21-1820	0807038-05	Soil
6	VWAE-SB21-2930	0807038-06	Soil
6RE	VWAE-SB21-2930RE	0807038-06RE	Soil
7	VWAE-SB21-3436	0807038-13	Soil
8	VWAE-SB21-3638	0807038-14	Soil
9	VWAE-SS20-0406	0807038-16	Soil
10	VWAE-SB20-1618	0807038-17	Soil
11	VWAE-SB20P-1618	0807038-18	Soil
12	VWAE-SB20-2022	0807038-19	Soil
13	VWAE-SB20-2830	0807038-20	Soil
14	VWAE-SB20-3234	0807038-21	Soil

The USEPA Region II SOP HW-33, Revision 1, August 2007: USEPA CLP Statement of Work for Organic Analysis of Low/Medium Concentration of Volatile Organic Compounds SOM01.2 Data Validation and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were analyzed within 14 days for soil samples.

Surrogates - All samples exhibited acceptable surrogate recoveries except the following.

Sample ID	Surrogate	%R	Qualifier
9	1,2-Dichloroethane-d4	76%	J/UJ - All associated compounds
10	Benzene-d6	79%	J/UJ - All associated compounds

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ug/kg	Qualifier	Affected Samples
VBLKLA	Methylene chloride	2.1	U	1, 9
	Cyclohexane	0.38	None	All ND
VBLKEO	Methylene chloride	0.82	U	10-14
	1,3-Dichlorobenzene	0.36	None	All ND
	1,4-Dichlorobenzene	0.45	None	All ND
	1,2,4-Trichlorobenzene	0.72	U	10
VBLKOF	Methylene chloride	100	None	All associated ND
	1,2,4-Trichlorobenzene	19	None	All associated ND
	1,2,3-Trichlorobenzene	23	None	All associated ND
VBLKOE	Methylene chloride	160	None	All associated ND
	1,2,4-Trichlorobenzene	33	None	All associated ND
	1,2,3-Trichlorobenzene	38	None	All associated ND
HOLDING BLANK	Methylene chloride	0.94	None	All ND or already qualified

Trip, Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-TB01-071608	None - ND	-	-	-
VWAE-EB01-071708	Acetone	58	U	1-6
	Methylene chloride	14	None	All ND or already qualified
	Chloroform	41	None	All ND or <CRDL
	4-Methyl-2-pentanone	3.1	None	All ND or <CRDL
	Toluene	0.71	None	All ND or <CRDL
VWAE-TB01-071708	None - ND	-	-	-
VWAE-TB01-071808	None - ND	-	-	-
VWAE-EB01-071808	Acetone	49	U	13, 14
	4-Methyl-2-pentanone	2.8	None	All ND
VWAE-EB02-071708	Acetone	50	U	7
	Methylene chloride	12	None	All ND
	4-Methyl-2-pentanone	2.5	None	All ND
	Toluene	0.54	None	All ND

GC/MS Instrument Performance Check - All of the BFB tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - All TICs were correctly qualified on the Form Is by the laboratory.

Compound Quantitation and Reported Detection Limits - Several samples exhibited high concentrations of target compounds and were flagged (E) by the laboratory. The laboratory diluted and reanalyzed these samples. The reviewer replaced the original results with the dilution results. The original Form Is should be used for reporting purposes.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAE-SB21-0910 ug/kg	VWAE-SB21P-0910 ug/kg	RPD	Qualifier
Methylcyclohexane	480	580	19%	None
Ethylbenzene	2300	2200	4%	None
m,p-Xylene	150	150	0%	None
Isopropylbenzene	970	830	16%	None
1,2-Dichlorobenzene	90	240 U	NC	None

Compound	VWAE-SB20-1618 ug/kg	VWAE-SB20P-1618 ug/kg	RPD	Qualifier
None	ND	ND	-	-

ANNOTATED FORM Is

1

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SS21-0506

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-01

Sample wt/vol: 6.14 (g/mL) g Lab File ID: 0807038-01R73.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/17/2008

% Moisture: not dec. 11.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
75-71-8	Dichlorodifluoromethane	4.6	U	
74-87-3	Chloromethane	4.6	U	
75-01-4	Vinyl chloride	4.6	U	
74-83-9	Bromomethane	4.6	U	
75-00-3	Chloroethane	4.6	U	
75-69-4	Trichlorofluoromethane	4.6	U	
75-35-4	1,1-Dichloroethene	4.6	U	
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	4.6	U	
67-64-1	Acetone	10		U BL
75-15-0	Carbon disulfide	4.6	U	
79-20-9	Methyl acetate	4.6	U	
75-09-2	Methylene chloride	4.6 ~~1.6~~	~~JB~~	U BL
156-60-5	trans-1,2-Dichloroethene	4.6	U	
1634-04-4	Methyl tert-butyl ether	4.6	U	
75-34-3	1,1-Dichloroethane	4.6	U	
156-59-2	cis-1,2-Dichloroethene	4.6	U	
78-93-3	2-Butanone	9.1	U	
74-97-5	Bromochloromethane	4.6	U	
67-66-3	Chloroform	4.6	U	
71-55-6	1,1,1-Trichloroethane	4.6	U	
110-82-7	Cyclohexane	4.6	U	
56-23-5	Carbon tetrachloride	4.6	U	
71-43-2	Benzene	4.6	U	
107-06-2	1,2-Dichloroethane	4.6	U	
123-91-1	1,4-Dioxane	91	U	

Report 1,4-Dioxane for Low-Medium VOA analysis only

RW 10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SS21-0506

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-01

Sample wt/vol: 6.14 (g/mL) g Lab File ID: 0807038-01R73.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/17/2008

% Moisture: not dec. 11.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	4.6	U
108-87-2	Methylcyclohexane	16	
78-87-5	1,2-Dichloropropane	4.6	U
75-27-4	Bromodichloromethane	4.6	U
10061-01-5	cis-1,3-Dichloropropene	4.6	U
108-10-1	4-Methyl-2-pentanone	9.1	U
108-88-3	Toluene	4.6	U
10061-02-6	trans-1,3-Dichloropropene	4.6	U
79-00-5	1,1,2-Trichloroethane	4.6	U
127-18-4	Tetrachloroethene	4.6	U
591-78-6	2-Hexanone	9.1	U
124-48-1	Dibromochloromethane	4.6	U
106-93-4	1,2-Dibromoethane	4.6	U
108-90-7	Chlorobenzene	4.6	U
100-41-4	Ethylbenzene	4.6	U
95-47-6	o-Xylene	4.6	U
179601-23-1	m,p-Xylene	4.6	U
100-42-5	Styrene	4.6	U
75-25-2	Bromoform	4.6	U
98-82-8	Isopropylbenzene	4.6	U
79-34-5	1,1,2,2-Tetrachloroethane	4.6	U
541-73-1	1,3-Dichlorobenzene	4.6	U
106-46-7	1,4-Dichlorobenzene	4.6	U
95-50-1	1,2-Dichlorobenzene	4.6	U
96-12-8	1,2-Dibromo-3-chloropropane	4.6	U
120-82-1	1,2,4-Trichlorobenzene	4.6	U
87-61-6	1,2,3-Trichlorobenzene	4.6	U

10/21/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SS21-0506

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-01

Sample wt/vol: 6.14 (g/mL) g Lab File ID: 0807038-01R73.d

Level: (TRACE or LOW/MED) LOW Date Received: 07/17/2008

% Moisture: not dec. 11.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 10.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	10.02	68	J
02		UNKNOWN	10.97	43	J
03		UNKNOWN	11.06	83	J
04		UNKNOWN	11.34	73	J
05		UNKNOWN	11.44	61	J
06		UNKNOWN	11.55	36	J
07		UNKNOWN	12.14	81	J
08		UNKNOWN	12.33	38	J
09		UNKNOWN	12.61	49	J
10		UNKNOWN	12.66	54	J
11		UNKNOWN	12.92	86	J
12		UNKNOWN	13.15	55	J
13		UNKNOWN	13.20	48	J
14		UNKNOWN	13.48	62	J
15	141-93-5	Benzene, 1,3-diethyl-	13.93	47	JN
16		UNKNOWN	14.70	80	J
17		UNKNOWN	14.77	37	J
18		UNKNOWN	14.93	68	J
19		UNKNOWN	15.26	39	J
20		UNKNOWN	15.54	59	J
21		UNKNOWN	15.61	36	J
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

MW
10/21/08

2

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-0910

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-02

Sample wt/vol: 6.58 (g/mL) g Lab File ID: 0807038-0291.d

Level: (TRACE/LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 11.0 Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	240	U
74-87-3	Chloromethane	240	U
75-01-4	Vinyl chloride	240	U
74-83-9	Bromomethane	240	U
75-00-3	Chloroethane	240	U
75-69-4	Trichlorofluoromethane	240	U
75-35-4	1,1-Dichloroethene	240	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	240	U
67-64-1	Acetone	490 ~~310~~	~~J~~ U BL
75-15-0	Carbon disulfide	240	U
79-20-9	Methyl acetate	240	U
75-09-2	Methylene chloride	240	U
156-60-5	trans-1,2-Dichloroethene	240	U
1634-04-4	Methyl tert-butyl ether	240	U
75-34-3	1,1-Dichloroethane	240	U
156-59-2	cis-1,2-Dichloroethene	240	U
78-93-3	2-Butanone	490	U
74-97-5	Bromochloromethane	240	U
67-66-3	Chloroform	240	U
71-55-6	1,1,1-Trichloroethane	240	U
110-82-7	Cyclohexane	240	U
56-23-5	Carbon tetrachloride	240	U
71-43-2	Benzene	240	U
107-06-2	1,2-Dichloroethane	240	U
123-91-1	1,4-Dioxane	4900	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

lw 10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-0910

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-02

Sample wt/vol: 6.58 (g/mL) g Lab File ID: 0807038-0291.d

Level: (TRACE/LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 11.0 Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	240	U
108-87-2	Methylcyclohexane	480	
78-87-5	1,2-Dichloropropane	240	U
75-27-4	Bromodichloromethane	240	U
10061-01-5	cis-1,3-Dichloropropene	240	U
108-10-1	4-Methyl-2-pentanone	490	U
108-88-3	Toluene	240	U
10061-02-6	trans-1,3-Dichloropropene	240	U
79-00-5	1,1,2-Trichloroethane	240	U
127-18-4	Tetrachloroethene	240	U
591-78-6	2-Hexanone	490	U
124-48-1	Dibromochloromethane	240	U
106-93-4	1,2-Dibromoethane	240	U
108-90-7	Chlorobenzene	240	U
100-41-4	Ethylbenzene	2300	
179601-23-1	m,p-Xylene	150	J
95-47-6	o-Xylene	240	U
100-42-5	Styrene	240	U
75-25-2	Bromoform	240	U
98-82-8	Isopropylbenzene	970	
79-34-5	1,1,2,2-Tetrachloroethane	240	U
541-73-1	1,3-Dichlorobenzene	240	U
106-46-7	1,4-Dichlorobenzene	240	U
95-50-1	1,2-Dichlorobenzene	90	J
96-12-8	1,2-Dibromo-3-chloropropane	240	U
120-82-1	1,2,4-Trichlorobenzene	240	U
87-61-6	1,2,3-Trichlorobenzene	240	U

LW 10/21/08

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-0910

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-02

Sample wt/vol: 6.58 (g/mL) g Lab File ID: 0807038-0291.d

Level: (TRACE or LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 11.0 Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:(ug/L or ug/kg) ug/kg Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	98-82-8	Benzene, (1-methylethyl)-	12.86	2900	JN
02	103-65-1	Benzene, propyl-	13.13	5600	JN
03	611-14-3	Benzene, 1-ethyl-2-methyl-	13.21	2900	JN
04	95-63-6	Benzene, 1,2,4-trimethyl-	13.52	1900	JN
05	135-98-8	Benzene, (1-methylpropyl)-	13.65	2500	JN
06	526-73-8	Benzene, 1,2,3-trimethyl- $$ Hemime	13.85	7500	JN
07	141-93-5	Benzene, 1,3-diethyl-	13.94	4100	JN
08	1074-55-1	Benzene, 1-methyl-4-propyl- $$ Tolu	14.18	3600	JN
09		UNKNOWN	14.23	3000	J
10	527-84-4	Benzene, 1-methyl-2-(1-methylethyl)	14.31	10000	JN
11		UNKNOWN	14.41	3500	J
12	768-49-0	Benzene, (2-methyl-1-propenyl)-	14.48	4100	JN
13	99-87-6	Benzene, 1-methyl-4-(1-methylethyl)	14.59	2900	JN
14	488-23-3	Benzene, 1,2,3,4-tetramethyl-	14.65	6900	JN
15	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	14.71	6100	JN
16		UNKNOWN	14.82	1700	J
17		UNKNOWN	14.87	2300	J
18		UNKNOWN	14.93	2300	J
19		UNKNOWN	14.99	5800	J
20		UNKNOWN	15.05	2300	J
21	934-74-7	Benzene, 1-ethyl-3,5-dimethyl-	15.11	5500	JN
22		UNKNOWN	15.14	1900	J
23	874-35-1	1H-Indene, 2,3-dihydro-5-methyl- $$	15.16	6800	JN
24	2050-24-0	Benzene, 1,3-diethyl-5-methyl- $$ T	15.42	11000	JN
25		UNKNOWN	15.50	5400	J
26	17059-48-2	1H-Indene, 2,3-dihydro-1,6-dimethyl	15.60	4300	JN
27		UNKNOWN	15.74	3400	J
28	91-20-3	Naphthalene	15.87	4700	JN
29		UNKNOWN	15.94	4600	J
30		UNKNOWN	16.04	3100	J
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lw 10/21/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21P-0910

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-03

Sample wt/vol: 6.53 (g/mL) g Lab File ID: 0807038-0391.d

Level: (TRACE/LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 10.0 Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	240	U
74-87-3	Chloromethane	240	U
75-01-4	Vinyl chloride	240	U
74-83-9	Bromomethane	240	U
75-00-3	Chloroethane	240	U
75-69-4	Trichlorofluoromethane	240	U
75-35-4	1,1-Dichloroethene	240	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	240	U
67-64-1	Acetone	480 ~~240~~	~~J~~ U BL
75-15-0	Carbon disulfide	240	U
79-20-9	Methyl acetate	240	U
75-09-2	Methylene chloride	240	U
156-60-5	trans-1,2-Dichloroethene	240	U
1634-04-4	Methyl tert-butyl ether	240	U
75-34-3	1,1-Dichloroethane	240	U
156-59-2	cis-1,2-Dichloroethene	240	U
78-93-3	2-Butanone	480	U
74-97-5	Bromochloromethane	240	U
67-66-3	Chloroform	240	U
71-55-6	1,1,1-Trichloroethane	240	U
110-82-7	Cyclohexane	240	U
56-23-5	Carbon tetrachloride	240	U
71-43-2	Benzene	240	U
107-06-2	1,2-Dichloroethane	240	U
123-91-1	1,4-Dioxane	4800	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

RW 10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21P-0910

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-03

Sample wt/vol: 6.53 (g/mL) g Lab File ID: 0807038-0391.d

Level: (TRACE/LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 10.0 Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	240	U
108-87-2	Methylcyclohexane	580	
78-87-5	1,2-Dichloropropane	240	U
75-27-4	Bromodichloromethane	240	U
10061-01-5	cis-1,3-Dichloropropene	240	U
108-10-1	4-Methyl-2-pentanone	480	U
108-88-3	Toluene	240	U
10061-02-6	trans-1,3-Dichloropropene	240	U
79-00-5	1,1,2-Trichloroethane	240	U
127-18-4	Tetrachloroethene	240	U
591-78-6	2-Hexanone	480	U
124-48-1	Dibromochloromethane	240	U
106-93-4	1,2-Dibromoethane	240	U
108-90-7	Chlorobenzene	240	U
100-41-4	Ethylbenzene	2200	
179601-23-1	m,p-Xylene	150	J
95-47-6	o-Xylene	240	U
100-42-5	Styrene	240	U
75-25-2	Bromoform	240	U
98-82-8	Isopropylbenzene	830	
79-34-5	1,1,2,2-Tetrachloroethane	240	U
541-73-1	1,3-Dichlorobenzene	240	U
106-46-7	1,4-Dichlorobenzene	240	U
95-50-1	1,2-Dichlorobenzene	240	U
96-12-8	1,2-Dibromo-3-chloropropane	240	U
120-82-1	1,2,4-Trichlorobenzene	240	U
87-61-6	1,2,3-Trichlorobenzene	240	U

RW 10/21/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21P-0910

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-03

Sample wt/vol: 6.53 (g/mL) g Lab File ID: 0807038-0391.d

Level: (TRACE or LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 10.0 Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	103-65-1	Benzene, propyl-	13.13	1600	JN
02	611-14-3	Benzene, 1-ethyl-2-methyl-	13.21	530	JN
03	622-96-8	Benzene, 1-ethyl-4-methyl- $$ Tolue	13.41	850	JN
04	95-63-6	Benzene, 1,2,4-trimethyl-	13.52	370	JN
05	135-98-8	Benzene, (1-methylpropyl)-	13.65	570	JN
06	141-93-5	Benzene, 1,3-diethyl-	13.94	1100	JN
07	1074-55-1	Benzene, 1-methyl-4-propyl- $$ Tolu	14.18	1000	JN
08	527-84-4	Benzene, 1-methyl-2-(1-methylethyl)	14.23	700	JN
09	99-87-6	Benzene, 1-methyl-4-(1-methylethyl)	14.31	2900	JN
10	768-49-0	Benzene, (2-methyl-1-propenyl)-	14.41	790	JN
11	934-10-1	3-Phenylbut-1-ene $$ 1-Methyl-2-pro	14.48	1200	JN
12		UNKNOWN	14.59	770	J
13	488-23-3	Benzene, 1,2,3,4-tetramethyl-	14.65	1800	JN
14		UNKNOWN	14.71	1500	J
15		UNKNOWN	14.82	320	J
16		UNKNOWN	14.87	520	J
17		UNKNOWN	14.93	460	J
18		UNKNOWN	14.99	1600	J
19		UNKNOWN	15.05	520	J
20		UNKNOWN	15.11	1400	J
21	824-90-8	1-Phenyl-1-butene $$ Benzene, 1-but	15.16	1900	JN
22		UNKNOWN	15.22	270	J
23	2050-24-0	Benzene, 1,3-diethyl-5-methyl- $$ T	15.42	2600	JN
24		UNKNOWN	15.50	1300	J
25	4489-84-3	Benzene, (3-methyl-2-butenyl)-	15.60	910	JN
26		UNKNOWN	15.74	460	J
27	91-20-3	Naphthalene	15.87	1100	JN
28		UNKNOWN	15.94	950	J
29		UNKNOWN	16.04	620	J
30	6682-71-9	1H-Indene, 2,3-dihydro-4,7-dimethyl	16.19	730	JN
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lw
1/21/08

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1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-04

Sample wt/vol: 6.48 (g/mL) g Lab File ID: 0807038-0491.d

Level: (TRACE/LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 14.0 Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	270	U
74-87-3	Chloromethane	270	U
75-01-4	Vinyl chloride	270	U
74-83-9	Bromomethane	270	U
75-00-3	Chloroethane	270	U
75-69-4	Trichlorofluoromethane	270	U
75-35-4	1,1-Dichloroethene	270	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	270	U
67-64-1	Acetone	530 ~~220~~	~~J~~ U BL
75-15-0	Carbon disulfide	270	U
79-20-9	Methyl acetate	270	U
75-09-2	Methylene chloride	270	U
156-60-5	trans-1,2-Dichloroethene	270	U
1634-04-4	Methyl tert-butyl ether	270	U
75-34-3	1,1-Dichloroethane	270	U
156-59-2	cis-1,2-Dichloroethene	270	U
78-93-3	2-Butanone	110	J
74-97-5	Bromochloromethane	270	U
67-66-3	Chloroform	270	U
71-55-6	1,1,1-Trichloroethane	270	U
110-82-7	Cyclohexane	270	U
56-23-5	Carbon tetrachloride	270	U
71-43-2	Benzene	270	U
107-06-2	1,2-Dichloroethane	270	U
123-91-1	1,4-Dioxane	5300	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

hW
10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-04

Sample wt/vol: 6.48 (g/mL) g Lab File ID: 0807038-0491.d

Level: (TRACE/LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 14.0 Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	270	U
108-87-2	Methylcyclohexane	270	U
78-87-5	1,2-Dichloropropane	270	U
75-27-4	Bromodichloromethane	270	U
10061-01-5	cis-1,3-Dichloropropene	270	U
108-10-1	4-Methyl-2-pentanone	530	U
108-88-3	Toluene	270	U
10061-02-6	trans-1,3-Dichloropropene	270	U
79-00-5	1,1,2-Trichloroethane	270	U
127-18-4	Tetrachloroethene	270	U
591-78-6	2-Hexanone	530	U
124-48-1	Dibromochloromethane	270	U
106-93-4	1,2-Dibromoethane	270	U
108-90-7	Chlorobenzene	270	U
100-41-4	Ethylbenzene	1100	
179601-23-1	m,p-Xylene	850	
95-47-6	o-Xylene	240	J
100-42-5	Styrene	270	U
75-25-2	Bromoform	270	U
98-82-8	Isopropylbenzene	620	
79-34-5	1,1,2,2-Tetrachloroethane	270	U
541-73-1	1,3-Dichlorobenzene	270	U
106-46-7	1,4-Dichlorobenzene	270	U
95-50-1	1,2-Dichlorobenzene	270	U
96-12-8	1,2-Dibromo-3-chloropropane	270	U
120-82-1	1,2,4-Trichlorobenzene	270	U
87-61-6	1,2,3-Trichlorobenzene	270	U

LW
10/21/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-04

Sample wt/vol: 6.48 (g/mL) g Lab File ID: 0807038-0491.d

Level: (TRACE or LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 14.0 Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	103-65-1	Benzene, propyl-	13.13	930	JN
02	611-14-3	Benzene, 1-ethyl-2-methyl-	13.41	1200	JN
03	108-67-8	Benzene, 1,3,5-trimethyl-	13.52	430	JN
04	1074-17-5	Benzene, 1-methyl-2-propyl-	13.65	570	JN
05	99-87-6	Benzene, 1-methyl-4-(1-methylethyl)	13.72	580	JN
06	141-93-5	Benzene, 1,3-diethyl-	13.94	1200	JN
07	135-01-3	Benzene, 1,2-diethyl-	14.01	1700	JN
08		UNKNOWN	14.04	1700	J
09	1074-55-1	Benzene, 1-methyl-4-propyl- $$ Tolu	14.18	1200	JN
10		UNKNOWN	14.23	740	J
11	527-84-4	Benzene, 1-methyl-2-(1-methylethyl)	14.31	3400	JN
12	1560-06-1	Benzene, 2-butenyl-	14.41	930	JN
13	768-49-0	Benzene, (2-methyl-1-propenyl)-	14.48	1400	JN
14	874-41-9	Benzene, 1-ethyl-2,4-dimethyl-	14.59	1100	JN
15	488-23-3	Benzene, 1,2,3,4-tetramethyl-	14.65	2300	JN
16		UNKNOWN	14.71	2700	J
17		UNKNOWN	14.99	2000	J
18	1758-85-6	Benzene, 2,4-diethyl-1-methyl- $$ 1	15.05	700	JN
19	934-74-7	Benzene, 1-ethyl-3,5-dimethyl-	15.11	2100	JN
20	934-10-1	3-Phenylbut-1-ene $$ 1-Methyl-2-pro	15.16	2700	JN
21		UNKNOWN	15.41	1200	J
22		UNKNOWN	15.42	1800	J
23		UNKNOWN	15.50	1900	J
24	97664-18-1	Benzene, 1-methyl-4-(1-methyl-2-pro	15.60	1300	JN
25		UNKNOWN	15.74	1100	J
26	91-20-3	Naphthalene	15.87	2100	JN
27		UNKNOWN	15.94	1400	J
28		UNKNOWN	16.04	910	J
29	6682-71-9	1H-Indene, 2,3-dihydro-4,7-dimethyl	16.19	1100	JN
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

MW 10/21/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-1820

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-05

Sample wt/vol: 6.57 (g/mL) g Lab File ID: 0807038-0591.d

Level: (TRACE/LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 13.0 Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	260	U
74-87-3	Chloromethane	260	U
75-01-4	Vinyl chloride	260	U
74-83-9	Bromomethane	260	U
75-00-3	Chloroethane	260	U
75-69-4	Trichlorofluoromethane	260	U
75-35-4	1,1-Dichloroethene	260	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	260	U
67-64-1	Acetone	510 ~~300~~	~~J~~ U BL
75-15-0	Carbon disulfide	260	U
79-20-9	Methyl acetate	260	U
75-09-2	Methylene chloride	260	U
156-60-5	trans-1,2-Dichloroethene	260	U
1634-04-4	Methyl tert-butyl ether	260	U
75-34-3	1,1-Dichloroethane	260	U
156-59-2	cis-1,2-Dichloroethene	260	U
78-93-3	2-Butanone	130	J
74-97-5	Bromochloromethane	260	U
67-66-3	Chloroform	260	U
71-55-6	1,1,1-Trichloroethane	260	U
110-82-7	Cyclohexane	260	U
56-23-5	Carbon tetrachloride	260	U
71-43-2	Benzene	260	U
107-06-2	1,2-Dichloroethane	260	U
123-91-1	1,4-Dioxane	5100	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW 10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-1820

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-05

Sample wt/vol: 6.57 (g/mL) g Lab File ID: 0807038-0591.d

Level: (TRACE/LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 13.0 Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	260	U
108-87-2	Methylcyclohexane	260	U
78-87-5	1,2-Dichloropropane	260	U
75-27-4	Bromodichloromethane	260	U
10061-01-5	cis-1,3-Dichloropropene	260	U
108-10-1	4-Methyl-2-pentanone	510	U
108-88-3	Toluene	260	U
10061-02-6	trans-1,3-Dichloropropene	260	U
79-00-5	1,1,2-Trichloroethane	260	U
127-18-4	Tetrachloroethene	260	U
591-78-6	2-Hexanone	510	U
124-48-1	Dibromochloromethane	260	U
106-93-4	1,2-Dibromoethane	260	U
108-90-7	Chlorobenzene	260	U
100-41-4	Ethylbenzene	1400	
179601-23-1	m,p-Xylene	1300	
95-47-6	o-Xylene	490	
100-42-5	Styrene	260	U
75-25-2	Bromoform	260	U
98-82-8	Isopropylbenzene	840	
79-34-5	1,1,2,2-Tetrachloroethane	260	U
541-73-1	1,3-Dichlorobenzene	260	U
106-46-7	1,4-Dichlorobenzene	260	U
95-50-1	1,2-Dichlorobenzene	260	U
96-12-8	1,2-Dibromo-3-chloropropane	260	U
120-82-1	1,2,4-Trichlorobenzene	260	U
87-61-6	1,2,3-Trichlorobenzene	260	U

lw
8/21/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-1820

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-05

Sample wt/vol: 6.57 (g/mL) g Lab File ID: 0807038-0591.d

Level: (TRACE or LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 13.0 Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:(ug/L or ug/kg) ug/kg Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	103-65-1	Benzene, propyl-	13.13	840	JN
02	108-67-8	Benzene, 1,3,5-trimethyl-	13.21	800	JN
03	526-73-8	Benzene, 1,2,3-trimethyl-	13.24	880	JN
04	622-96-8	Benzene, 1-ethyl-4-methyl- $$ Tolue	13.41	1200	JN
05	108-67-8	Benzene, 1,3,5-trimethyl-(1)	13.52	600	JN
06	135-98-8	Benzene, (1-methylpropyl)-	13.65	490	JN
07	535-77-3	Benzene, 1-methyl-3-(1-methylethyl)	13.68	350	JN
08	527-84-4	Benzene, 1-methyl-2-(1-methylethyl)	13.73	380	JN
09	135-01-3	Benzene, 1,2-diethyl-	13.94	1300	JN
10	105-05-5	Benzene, 1,4-diethyl-	14.00	2300	JN
11		UNKNOWN	14.04	1800	J
12	1074-55-1	Benzene, 1-methyl-4-propyl- $$ Tolu	14.18	1300	JN
13	2870-04-4	Benzene, 2-ethyl-1,3-dimethyl- $$ n	14.23	1100	JN
14	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	14.31	3600	JN
15		UNKNOWN	14.41	1300	J
16		UNKNOWN	14.48	1300	J
17	874-41-9	Benzene, 1-ethyl-2,4-dimethyl-	14.59	1200	JN
18	95-93-2	Benzene, 1,2,4,5-tetramethyl-	14.65	2500	JN
19	99-87-6	Benzene, 1-methyl-4-(1-methylethyl)	14.71	3500	JN
20		UNKNOWN	14.99	2300	J
21	25550-13-4	Benzene, diethylmethyl- $$ Toluene,	15.05	840	JN
22	767-58-8	Indan, 1-methyl-	15.16	4800	JN
23	119-64-2	Naphthalene, 1,2,3,4-tetrahydro-	15.35	1400	JN
24	2050-24-0	Benzene, 1,3-diethyl-5-methyl- $$ T	15.43	3200	JN
25		UNKNOWN	15.50	2200	J
26	20836-11-7	2,2-Dimethylindene, 2,3-dihydro- $$	15.60	1500	JN
27	25419-33-4	Naphthalene, 1,2,3,4-tetrahydro-1,8	15.69	450	JN
28	700-12-9	Benzene, pentamethyl-	15.74	850	JN
29	91-20-3	Naphthalene(2)	15.87	2600	JN
30		UNKNOWN	15.94	1700	J
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

AW
10/21/08

6

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-06

Sample wt/vol: 6.28 (g/mL) g Lab File ID: 0807038-0691.d

Level: (TRACE/LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 12.0 Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	260	U
74-87-3	Chloromethane	260	U
75-01-4	Vinyl chloride	260	U
74-83-9	Bromomethane	260	U
75-00-3	Chloroethane	260	U
75-69-4	Trichlorofluoromethane	260	U
75-35-4	1,1-Dichloroethene	260	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	260	U
67-64-1	Acetone	520 ~~310~~	~~J~~ u BL
75-15-0	Carbon disulfide	260	U
79-20-9	Methyl acetate	260	U
75-09-2	Methylene chloride	260	U
156-60-5	trans-1,2-Dichloroethene	260	U
1634-04-4	Methyl tert-butyl ether	260	U
75-34-3	1,1-Dichloroethane	260	U
156-59-2	cis-1,2-Dichloroethene	260	U
78-93-3	2-Butanone	520	U
74-97-5	Bromochloromethane	260	U
67-66-3	Chloroform	260	U
71-55-6	1,1,1-Trichloroethane	260	U
110-82-7	Cyclohexane	260	U
56-23-5	Carbon tetrachloride	260	U
71-43-2	Benzene	390	
107-06-2	1,2-Dichloroethane	260	U
123-91-1	1,4-Dioxane	5200	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW 10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-06

Sample wt/vol: 6.28 (g/mL) g Lab File ID: 0807038-0691.d

Level: (TRACE/LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 12.0 Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	260	U
108-87-2	Methylcyclohexane	720	
78-87-5	1,2-Dichloropropane	260	U
75-27-4	Bromodichloromethane	260	U
10061-01-5	cis-1,3-Dichloropropene	260	U
108-10-1	4-Methyl-2-pentanone	520	U
108-88-3	Toluene	6300	
10061-02-6	trans-1,3-Dichloropropene	260	U
79-00-5	1,1,2-Trichloroethane	260	U
127-18-4	Tetrachloroethene	260	U
591-78-6	2-Hexanone	520	U
124-48-1	Dibromochloromethane	260	U
106-93-4	1,2-Dibromoethane	260	U
108-90-7	Chlorobenzene	260	U
100-41-4	Ethylbenzene	9000	
179601-23-1	m,p-Xylene	50000 ~~35000~~	~~E~~ R DL
95-47-6	o-Xylene	22000 ~~19000~~	~~E~~ R DL
100-42-5	Styrene	260	U
75-25-2	Bromoform	260	U
98-82-8	Isopropylbenzene	3000	
79-34-5	1,1,2,2-Tetrachloroethane	260	U
541-73-1	1,3-Dichlorobenzene	260	U
106-46-7	1,4-Dichlorobenzene	260	U
95-50-1	1,2-Dichlorobenzene	240	J
96-12-8	1,2-Dibromo-3-chloropropane	260	U
120-82-1	1,2,4-Trichlorobenzene	260	U
87-61-6	1,2,3-Trichlorobenzene	260	U

lw 10/21/08

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-06

Sample wt/vol: 6.28 (g/mL) g Lab File ID: 0807038-0691.d

Level: (TRACE or LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 12.0 Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	10.72	1200	J
02		UNKNOWN	10.83	4000	J
03		UNKNOWN	11.50	1800	J
04		UNKNOWN	11.81	1200	J
05		UNKNOWN	12.15	1300	J
06		UNKNOWN	12.79	1900	J
07	103-65-1	Benzene, propyl-	13.14	1500	JN
08	611-14-3	Benzene, 1-ethyl-2-methyl-	13.18	6200	JN
09	620-14-4	Benzene, 1-ethyl-3-methyl-	13.41	2200	JN
10		UNKNOWN	13.52	6200	J
11	93-53-8	Benzeneacetaldehyde, .alpha.-methyl	13.65	580	JN
12	535-77-3	Benzene, 1-methyl-3-(1-methylethyl)	13.68	830	JN
13	527-84-4	Benzene, 1-methyl-2-(1-methylethyl)	13.73	370	JN
14	526-73-8	Benzene, 1,2,3-trimethyl- $$ Hemime	13.85	2600	JN
15	1758-88-9	Benzene, 2-ethyl-1,4-dimethyl-	13.96	2900	JN
16		UNKNOWN	14.18	1200	J
17	535-77-3	Benzene, 1-methyl-3-(1-methylethyl)	14.23	1500	JN
18	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	14.31	2600	JN
19		UNKNOWN	14.41	1200	J
20	767-58-8	Indan, 1-methyl-	14.48	1000	JN
21	874-41-9	Benzene, 1-ethyl-2,4-dimethyl-	14.59	830	JN
22	488-23-3	Benzene, 1,2,3,4-tetramethyl-	14.65	1800	JN
23	76089-59-3	1,3-Cyclopentadiene, 1,2,3,4-tetran	14.70	3200	JN
24	768-00-3	Benzene, (1-methyl-1-propenyl)-, (E	14.99	1500	JN
25	934-74-7	Benzene, 1-ethyl-3,5-dimethyl-	15.11	1300	JN
26	934-10-1	3-Phenylbut-1-ene $$ 1-Methyl-2-pro	15.16	1800	JN
27		UNKNOWN	15.43	1800	J
28		UNKNOWN	15.50	1200	J
29	20836-11-7	2,2-Dimethylindene, 2,3-dihydro- $$	15.60	800	JN
30	275-51-4	Azulene	15.87	1600	JN
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

MW

6RE

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-2930DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-06RE1

Sample wt/vol: 6.28 (g/mL) g Lab File ID: 0807038-06D91.d

Level: (TRACE/LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 12.0 Date Analyzed: 07/25/2008 use original

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 15 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	1700	U
74-87-3	Chloromethane	1700	U
75-01-4	Vinyl chloride	1700	U
74-83-9	Bromomethane	1700	U
75-00-3	Chloroethane	1700	U
75-69-4	Trichlorofluoromethane	1700	U
75-35-4	1,1-Dichloroethene	1700	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1700	U
67-64-1	Acetone	3500 ~~2000~~	~~JB~~ U BL
75-15-0	Carbon disulfide	1700	U
79-20-9	Methyl acetate	1700	U
75-09-2	Methylene chloride	1700	U
156-60-5	trans-1,2-Dichloroethene	1700	U
1634-04-4	Methyl tert-butyl ether	1700	U
75-34-3	1,1-Dichloroethane	1700	U
156-59-2	cis-1,2-Dichloroethene	1700	U
78-93-3	2-Butanone	3500	U
74-97-5	Bromochloromethane	1700	U
67-66-3	Chloroform	1700	U
71-55-6	1,1,1-Trichloroethane	1700	U
110-82-7	Cyclohexane	1700	U
56-23-5	Carbon tetrachloride	1700	U
71-43-2	Benzene	1700	U
107-06-2	1,2-Dichloroethane	1700	U
123-91-1	1,4-Dioxane	35000	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

DL

SOM01.2 (8/2007)

10/21/08

6RE

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-2930DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-06RE1

Sample wt/vol: 6.28 (g/mL) g Lab File ID: 0807038-06D91.d

Level: (TRACE/LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 12.0 Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 15 (uL)

Purge Volume: 5.0 (mL)

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	1700	U
108-87-2	Methylcyclohexane	1700	U
78-87-5	1,2-Dichloropropane	1700	U
75-27-4	Bromodichloromethane	1700	U
10061-01-5	cis-1,3-Dichloropropene	1700	U
108-10-1	4-Methyl-2-pentanone	3500	U
108-88-3	Toluene	5700	D
10061-02-6	trans-1,3-Dichloropropene	1700	U
79-00-5	1,1,2-Trichloroethane	1700	U
127-18-4	Tetrachloroethene	1700	U
591-78-6	2-Hexanone	3500	U
124-48-1	Dibromochloromethane	1700	U
106-93-4	1,2-Dibromoethane	1700	U
108-90-7	Chlorobenzene	1700	U
100-41-4	Ethylbenzene	9100	D
179601-23-1	m,p-Xylene	50000	D
95-47-6	o-Xylene	22000	D
100-42-5	Styrene	1700	U
75-25-2	Bromoform	1700	U
98-82-8	Isopropylbenzene	2800	D
79-34-5	1,1,2,2-Tetrachloroethane	1700	U
541-73-1	1,3-Dichlorobenzene	1700	U
106-46-7	1,4-Dichlorobenzene	1700	U
95-50-1	1,2-Dichlorobenzene	1700	U
96-12-8	1,2-Dibromo-3-chloropropane	1700	U
120-82-1	1,2,4-Trichlorobenzene	1700	U
87-61-6	1,2,3-Trichlorobenzene	1700	U

DL

lw 1/12/08

6RE

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-2930DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-06RE1

Sample wt/vol: 6.28 (g/mL) g Lab File ID: 0807038-06D91.d

Level: (TRACE or LOW/MED) MED Date Received: 07/17/2008

% Moisture: not dec. 12.0 Date Analyzed: 07/25/2008

Use original

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 15 (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	103-65-1	Benzene, propyl-	13.14	6700	JDN
02	620-14-4	Benzene, 1-ethyl-3-methyl-	13.18	40000	JDN
03	526-73-8	Benzene, 1,2,3-trimethyl-	13.24	16000	JDN
04	611-14-3	Benzene, 1-ethyl-2-methyl-	13.41	10000	JDN
05	526-73-8	Benzene, 1,2,3-trimethyl-(1)	13.52	47000	JDN
06	135-98-8	Benzene, (1-methylpropyl)-	13.65	2000	JDN
07	527-84-4	Benzene, 1-methyl-2-(1-methylethyl)	13.68	5000	JDN
08	1074-43-7	Benzene, 1-methyl-3-propyl- $$ Tolu	13.96	15000	JDN
09	874-41-9	Benzene, 1-ethyl-2,4-dimethyl-	13.99	15000	JDN
10		UNKNOWN	14.04	9100	JD
11		UNKNOWN	14.18	5000	JD
12	2870-04-4	Benzene, 2-ethyl-1,3-dimethyl- $$ n	14.23	5600	JDN
13	95-93-2	Benzene, 1,2,4,5-tetramethyl-	14.26	9900	JDN
14	99-87-6	Benzene, 1-methyl-4-(1-methylethyl)	14.31	13000	JDN
15	1560-06-1	Benzene, 2-butenyl- $$ 2-Butene, 1-	14.41	4100	JDN
16	3333-13-9	Benzene, 1-methyl-4-(2-propenyl)- $	14.48	4900	JDN
17		UNKNOWN	14.59	3500	JD
18	95-93-2	Benzene, 1,2,4,5-tetramethyl-(1)	14.65	8100	JDN
19	76089-59-3	1,3-Cyclopentadiene, 1,2,3,4-tetran	14.70	15000	JDN
20		UNKNOWN	14.87	3700	JD
21		UNKNOWN	14.94	2400	JD
22		UNKNOWN	14.99	7200	JD
23		UNKNOWN	15.05	2700	JD
24		UNKNOWN	15.11	5800	JD
25	934-10-1	3-Phenylbut-1-ene $$ 1-Methyl-2-pro	15.16	9400	JDN
26	119-64-2	Naphthalene, 1,2,3,4-tetrahydro-	15.35	3100	JDN
27		UNKNOWN	15.43	8100	JD
28		UNKNOWN	15.50	5200	JD
29	17059-48-2	1H-Indene, 2,3-dihydro-1,6-dimethyl	15.60	3700	JDN
30		UNKNOWN	15.74	2700	JD
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lw 1/21/08

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1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-13

Sample wt/vol: 6.71 (g/mL) g Lab File ID: 0807038-13D91.d

Level: (TRACE/LOW/MED) MED Date Received: 07/18/2008

% Moisture: not dec. 8.0 Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 25 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	900	U
74-87-3	Chloromethane	900	U
75-01-4	Vinyl chloride	900	U
74-83-9	Bromomethane	900	U
75-00-3	Chloroethane	900	U
75-69-4	Trichlorofluoromethane	900	U
75-35-4	1,1-Dichloroethene	900	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	900	U
67-64-1	Acetone	1800 ~~1200~~	~~J~~ 4 BL
75-15-0	Carbon disulfide	900	U
79-20-9	Methyl acetate	900	U
75-09-2	Methylene chloride	900	U
156-60-5	trans-1,2-Dichloroethene	900	U
1634-04-4	Methyl tert-butyl ether	900	U
75-34-3	1,1-Dichloroethane	900	U
156-59-2	cis-1,2-Dichloroethene	900	U
78-93-3	2-Butanone	1800	U
74-97-5	Bromochloromethane	900	U
67-66-3	Chloroform	900	U
71-55-6	1,1,1-Trichloroethane	900	U
110-82-7	Cyclohexane	900	U
56-23-5	Carbon tetrachloride	900	U
71-43-2	Benzene	380	J
107-06-2	1,2-Dichloroethane	900	U
123-91-1	1,4-Dioxane	18000	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

lw 10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-13

Sample wt/vol: 6.71 (g/mL) g Lab File ID: 0807038-13D91.d

Level: (TRACE/LOW/MED) MED Date Received: 07/18/2008

% Moisture: not dec. 8.0 Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 25 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	900	U
108-87-2	Methylcyclohexane	820	J
78-87-5	1,2-Dichloropropane	900	U
75-27-4	Bromodichloromethane	900	U
10061-01-5	cis-1,3-Dichloropropene	900	U
108-10-1	4-Methyl-2-pentanone	1800	U
108-88-3	Toluene	900	U
10061-02-6	trans-1,3-Dichloropropene	900	U
79-00-5	1,1,2-Trichloroethane	900	U
127-18-4	Tetrachloroethene	900	U
591-78-6	2-Hexanone	1800	U
124-48-1	Dibromochloromethane	900	U
106-93-4	1,2-Dibromoethane	900	U
108-90-7	Chlorobenzene	900	U
100-41-4	Ethylbenzene	7100	
179601-23-1	m,p-Xylene	29000	
95-47-6	o-Xylene	570	J
100-42-5	Styrene	900	U
75-25-2	Bromoform	900	U
98-82-8	Isopropylbenzene	1700	
79-34-5	1,1,2,2-Tetrachloroethane	900	U
541-73-1	1,3-Dichlorobenzene	900	U
106-46-7	1,4-Dichlorobenzene	900	U
95-50-1	1,2-Dichlorobenzene	900	U
96-12-8	1,2-Dibromo-3-chloropropane	900	U
120-82-1	1,2,4-Trichlorobenzene	900	U
87-61-6	1,2,3-Trichlorobenzene	900	U

lw
10/21/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-13

Sample wt/vol: 6.71 (g/mL) g Lab File ID: 0807038-13D91.d

Level: (TRACE or LOW/MED) MED Date Received: 07/18/2008

% Moisture: not dec. 8.0 Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 25 (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	108-67-8	Benzene, 1,3,5-trimethyl-	13.52	23000	JN
02		UNKNOWN	13.18	20000	J
03		UNKNOWN	13.99	9600	J
04	526-73-8	Benzene, 1,2,3-trimethyl-	13.24	8800	JN
05	95-93-2	Benzene, 1,2,4,5-tetramethyl-	14.70	7500	JN
06	933-98-2	Benzene, 1-ethyl-2,3-dimethyl-	14.31	6700	JN
07	1074-43-7	Benzene, 1-methyl-3-propyl- $$ Tolu	13.96	5900	JN
08		UNKNOWN	10.84	5400	J
09	767-58-8	Indan, 1-methyl- $$ 1H-Indene, 2,3-	15.16	4400	JN
10	611-14-3	Benzene, 1-ethyl-2-methyl-	13.41	4300	JN
11	103-65-1	Benzene, propyl-	13.14	4100	JN
12	488-23-3	Benzene, 1,2,3,4-tetramethyl-	14.65	4000	JN
13		UNKNOWN	14.04	4000	J
14	99-87-6	Benzene, 1-methyl-4-(1-methylethyl)	14.25	3800	JN
15	535-77-3	Benzene, 1-methyl-3-(1-methylethyl)	13.68	3800	JN
16		UNKNOWN	15.43	3600	J
17		UNKNOWN	14.99	3500	J
18	527-84-4	Benzene, 1-methyl-2-(1-methylethyl)	14.23	3500	JN
19	275-51-4	Azulene	15.87	3200	JN
20		UNKNOWN	15.11	2900	J
21	934-10-1	3-Phenylbut-1-ene $$ 1-Methyl-2-pro	14.48	2400	JN
22		UNKNOWN	15.50	2300	J
23		UNKNOWN	14.18	2100	J
24	1560-06-1	Benzene, 2-butenyl-	14.41	2000	JN
25		UNKNOWN	11.50	1800	J
26		UNKNOWN	14.87	1700	J
27		UNKNOWN	14.59	1700	J
28	17059-48-2	1H-Indene, 2,3-dihydro-1,6-dimethyl	15.60	1600	JN
29		UNKNOWN	10.73	1400	J
30		UNKNOWN	15.05	1200	J
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

RW
10/21/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-3638

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-14

Sample wt/vol: 5.69 (g/mL) g Lab File ID: 0807038-14D91.d

Level: (TRACE/LOW/MED) MED Date Received: 07/18/2008

% Moisture: not dec. 3.0 Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 25 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	940	U
74-87-3	Chloromethane	940	U
75-01-4	Vinyl chloride	940	U
74-83-9	Bromomethane	940	U
75-00-3	Chloroethane	940	U
75-69-4	Trichlorofluoromethane	940	U
75-35-4	1,1-Dichloroethene	940	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	940	U
67-64-1	Acetone	1900	U
75-15-0	Carbon disulfide	940	U
79-20-9	Methyl acetate	940	U
75-09-2	Methylene chloride	940	U
156-60-5	trans-1,2-Dichloroethene	940	U
1634-04-4	Methyl tert-butyl ether	940	U
75-34-3	1,1-Dichloroethane	940	U
156-59-2	cis-1,2-Dichloroethene	940	U
78-93-3	2-Butanone	1900	U
74-97-5	Bromochloromethane	940	U
67-66-3	Chloroform	940	U
71-55-6	1,1,1-Trichloroethane	940	U
110-82-7	Cyclohexane	940	U
56-23-5	Carbon tetrachloride	940	U
71-43-2	Benzene	940	U
107-06-2	1,2-Dichloroethane	940	U
123-91-1	1,4-Dioxane	19000	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

RW 10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB21-3638

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-14

Sample wt/vol: 5.69 (g/mL) g Lab File ID: 0807038-14D91.d

Level: (TRACE/LOW/MED) MED Date Received: 07/18/2008

% Moisture: not dec. 3.0 Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 25 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	940	U
108-87-2	Methylcyclohexane	640	J
78-87-5	1,2-Dichloropropane	940	U
75-27-4	Bromodichloromethane	940	U
10061-01-5	cis-1,3-Dichloropropene	940	U
108-10-1	4-Methyl-2-pentanone	1900	U
108-88-3	Toluene	940	U
10061-02-6	trans-1,3-Dichloropropene	940	U
79-00-5	1,1,2-Trichloroethane	940	U
127-18-4	Tetrachloroethene	940	U
591-78-6	2-Hexanone	1900	U
124-48-1	Dibromochloromethane	940	U
106-93-4	1,2-Dibromoethane	940	U
108-90-7	Chlorobenzene	940	U
100-41-4	Ethylbenzene	5200	
179601-23-1	m,p-Xylene	27000	
95-47-6	o-Xylene	3800	
100-42-5	Styrene	940	U
75-25-2	Bromoform	940	U
98-82-8	Isopropylbenzene	1300	
79-34-5	1,1,2,2-Tetrachloroethane	940	U
541-73-1	1,3-Dichlorobenzene	940	U
106-46-7	1,4-Dichlorobenzene	940	U
95-50-1	1,2-Dichlorobenzene	940	U
96-12-8	1,2-Dibromo-3-chloropropane	940	U
120-82-1	1,2,4-Trichlorobenzene	940	U
87-61-6	1,2,3-Trichlorobenzene	940	U

lw
1.12.08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB21-3638

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-14

Sample wt/vol: 5.69 (g/mL) g Lab File ID: 0807038-14D91.d

Level: (TRACE or LOW/MED) MED Date Received: 07/18/2008

% Moisture: not dec. 3.0 Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 25 (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	764-13-6	2,4-Hexadiene, 2,5-dimethyl-	11.50	1200	JN
02		UNKNOWN	11.93	970	J
03	103-65-1	Benzene, propyl-	13.14	4000	JN
04	108-67-8	Benzene, 1,3,5-trimethyl-	13.18	21000	JN
05	526-73-8	Benzene, 1,2,3-trimethyl-	13.24	8800	JN
06	611-14-3	Benzene, 1-ethyl-2-methyl-	13.41	5200	JN
07		UNKNOWN	13.52	24000	J
08	99-87-6	Benzene, 1-methyl-4-(1-methylethyl)	13.68	4200	JN
09	1074-55-1	Benzene, 1-methyl-4-propyl- $$ Tolu	13.96	6500	JN
10		UNKNOWN	13.99	8400	J
11		UNKNOWN	14.04	3800	J
12		UNKNOWN	14.23	2700	J
13		UNKNOWN	14.26	4800	J
14	874-41-9	Benzene, 1-ethyl-2,4-dimethyl-	14.31	6000	JN
15	1560-06-1	Benzene, 2-butenyl- $$ 2-Butene, 1-	14.41	2100	JN
16	934-10-1	3-Phenylbut-1-ene $$ 1-Methyl-2-pro	14.48	2600	JN
17	527-84-4	Benzene, 1-methyl-2-(1-methylethyl)	14.59	1700	JN
18	488-23-3	Benzene, 1,2,3,4-tetramethyl-	14.65	3900	JN
19	95-93-2	Benzene, 1,2,4,5-tetramethyl-	14.70	7300	JN
20		UNKNOWN	14.87	2000	J
21		UNKNOWN	14.94	1200	J
22		UNKNOWN	14.99	3500	J
23		UNKNOWN	15.05	1300	J
24	934-74-7	Benzene, 1-ethyl-3,5-dimethyl-	15.11	2700	JN
25		UNKNOWN	15.16	4500	J
26		UNKNOWN	15.43	5100	J
27		UNKNOWN	15.50	2400	J
28	4175-53-5	1H-Indene, 2,3-dihydro-1,3-dimethyl	15.60	1800	JN
29		UNKNOWN	15.73	1400	J
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

hw 12/1/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SS20-0406

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-16

Sample wt/vol: 6.30 (g/mL) g Lab File ID: 0807038-16R273.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/18/2008

% Moisture: not dec. 13.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
75-71-8	Dichlorodifluoromethane	4.6	U	
74-87-3	Chloromethane	4.6	U	
75-01-4	Vinyl chloride	4.6	U	
74-83-9	Bromomethane	4.6	U	
75-00-3	Chloroethane	4.6	U	
75-69-4	Trichlorofluoromethane	4.6	~~U~~	UJ SSL
75-35-4	1,1-Dichloroethene	4.6	U	
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	4.6	~~U~~	UJ SSL
67-64-1	Acetone	9.1	U	
75-15-0	Carbon disulfide	4.6	U	
79-20-9	Methyl acetate	4.6	~~U~~	UJ SSL
75-09-2	Methylene chloride	4.6 ~~1.7~~	~~JB~~	UJ BL,S
156-60-5	trans-1,2-Dichloroethene	4.6	U	
1634-04-4	Methyl tert-butyl ether	4.6	~~U~~	UJ SSL
75-34-3	1,1-Dichloroethane	4.6	U	
156-59-2	cis-1,2-Dichloroethene	4.6	U	
78-93-3	2-Butanone	9.1	U	
74-97-5	Bromochloromethane	4.6	U	
67-66-3	Chloroform	4.6	U	
71-55-6	1,1,1-Trichloroethane	4.6	~~U~~	UJ SSL
110-82-7	Cyclohexane	4.6	U	
56-23-5	Carbon tetrachloride	4.6	~~U~~	UJ SSL
71-43-2	Benzene	4.6	U	
107-06-2	1,2-Dichloroethane	4.6	~~U~~	UJ SSL
123-91-1	1,4-Dioxane	91	U	

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW
10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SS20-0406

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-16

Sample wt/vol: 6.30 (g/mL) g Lab File ID: 0807038-16R273.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/18/2008

% Moisture: not dec. 13.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	4.6	U
108-87-2	Methylcyclohexane	4.6	U
78-87-5	1,2-Dichloropropane	4.6	U
75-27-4	Bromodichloromethane	4.6	U
10061-01-5	cis-1,3-Dichloropropene	4.6	U
108-10-1	4-Methyl-2-pentanone	9.1	U
108-88-3	Toluene	4.6	U
10061-02-6	trans-1,3-Dichloropropene	4.6	U
79-00-5	1,1,2-Trichloroethane	4.6	U
127-18-4	Tetrachloroethene	4.6	U
591-78-6	2-Hexanone	9.1	U
124-48-1	Dibromochloromethane	4.6	U
106-93-4	1,2-Dibromoethane	4.6	~~U~~ UJ SSL
108-90-7	Chlorobenzene	4.6	U
100-41-4	Ethylbenzene	4.6	U
95-47-6	o-Xylene	4.6	U
179601-23-1	m,p-Xylene	4.6	U
100-42-5	Styrene	4.6	U
75-25-2	Bromoform	4.6	U
98-82-8	Isopropylbenzene	4.6	U
79-34-5	1,1,2,2-Tetrachloroethane	4.6	U
541-73-1	1,3-Dichlorobenzene	4.6	U
106-46-7	1,4-Dichlorobenzene	4.6	U
95-50-1	1,2-Dichlorobenzene	4.6	U
96-12-8	1,2-Dibromo-3-chloropropane	4.6	U
120-82-1	1,2,4-Trichlorobenzene	4.6	U
87-61-6	1,2,3-Trichlorobenzene	4.6	U

MW 10/21/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SS20-0406

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-16

Sample wt/vol: 6.30 (g/mL) g Lab File ID: 0807038-16R273.d

Level: (TRACE or LOW/MED) LOW Date Received: 07/18/2008

% Moisture: not dec. 13.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 10.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

MW
10/21/08

10

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-17

Sample wt/vol: 6.28 (g/mL) g Lab File ID: 0807038-1791.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 7.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	4.3	U
74-87-3	Chloromethane	4.3	U
75-01-4	Vinyl chloride	4.3	U
74-83-9	Bromomethane	4.3	U
75-00-3	Chloroethane	4.3	U
75-69-4	Trichlorofluoromethane	4.3	U
75-35-4	1,1-Dichloroethene	4.3	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	4.3	U
67-64-1	Acetone	8.6	U
75-15-0	Carbon disulfide	4.3	U
79-20-9	Methyl acetate	4.3	U
75-09-2	Methylene chloride	4.3 ~~0.82~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	4.3	U
1634-04-4	Methyl tert-butyl ether	4.3	U
75-34-3	1,1-Dichloroethane	4.3	U
156-59-2	cis-1,2-Dichloroethene	4.3	U
78-93-3	2-Butanone	8.6	U
74-97-5	Bromochloromethane	4.3	U
67-66-3	Chloroform	4.3	U
71-55-6	1,1,1-Trichloroethane	4.3	U
110-82-7	Cyclohexane	4.3	U
56-23-5	Carbon tetrachloride	4.3	U
71-43-2	Benzene	4.3	~~U~~ UJ SSL
107-06-2	1,2-Dichloroethane	4.3	U
123-91-1	1,4-Dioxane	86	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

LEW
10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-17

Sample wt/vol: 6.28 (g/mL) g Lab File ID: 0807038-1791.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 7.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	4.3	U
108-87-2	Methylcyclohexane	4.3	U
78-87-5	1,2-Dichloropropane	4.3	U
75-27-4	Bromodichloromethane	4.3	U
10061-01-5	cis-1,3-Dichloropropene	4.3	U
108-10-1	4-Methyl-2-pentanone	8.6	U
108-88-3	Toluene	4.3	U
10061-02-6	trans-1,3-Dichloropropene	4.3	U
79-00-5	1,1,2-Trichloroethane	4.3	U
127-18-4	Tetrachloroethene	4.3	U
591-78-6	2-Hexanone	8.6	U
124-48-1	Dibromochloromethane	4.3	U
106-93-4	1,2-Dibromoethane	4.3	U
108-90-7	Chlorobenzene	4.3	U
100-41-4	Ethylbenzene	4.3	U
95-47-6	o-Xylene	4.3	U
179601-23-1	m,p-Xylene	4.3	U
100-42-5	Styrene	4.3	U
75-25-2	Bromoform	4.3	U
98-82-8	Isopropylbenzene	4.3	U
79-34-5	1,1,2,2-Tetrachloroethane	4.3	U
541-73-1	1,3-Dichlorobenzene	4.3	U
106-46-7	1,4-Dichlorobenzene	4.3	U
95-50-1	1,2-Dichlorobenzene	4.3	U
96-12-8	1,2-Dibromo-3-chloropropane	4.3	U
120-82-1	1,2,4-Trichlorobenzene	4.3 ~~0.32~~	~~JB~~ U BL
87-61-6	1,2,3-Trichlorobenzene	4.3	U

LLW 10/21/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB20-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-17

Sample wt/vol: 6.28 (g/mL) g Lab File ID: 0807038-1791.d

Level: (TRACE or LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 7.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 10.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

LW 10/21/08

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1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20P-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-18

Sample wt/vol: 6.10 (g/mL) g Lab File ID: 0807038-1891.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 7.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	4.4	U
74-87-3	Chloromethane	4.4	U
75-01-4	Vinyl chloride	4.4	U
74-83-9	Bromomethane	4.4	U
75-00-3	Chloroethane	4.4	U
75-69-4	Trichlorofluoromethane	4.4	U
75-35-4	1,1-Dichloroethene	4.4	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	4.4	U
67-64-1	Acetone	8.8	U
75-15-0	Carbon disulfide	4.4	U
79-20-9	Methyl acetate	4.4	U
75-09-2	Methylene chloride	4.4 ~~1.4~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	4.4	U
1634-04-4	Methyl tert-butyl ether	4.4	U
75-34-3	1,1-Dichloroethane	4.4	U
156-59-2	cis-1,2-Dichloroethene	4.4	U
78-93-3	2-Butanone	8.8	U
74-97-5	Bromochloromethane	4.4	U
67-66-3	Chloroform	4.4	U
71-55-6	1,1,1-Trichloroethane	4.4	U
110-82-7	Cyclohexane	4.4	U
56-23-5	Carbon tetrachloride	4.4	U
71-43-2	Benzene	4.4	U
107-06-2	1,2-Dichloroethane	4.4	U
123-91-1	1,4-Dioxane	88	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW 10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20P-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-18

Sample wt/vol: 6.10 (g/mL) g Lab File ID: 0807038-1891.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 7.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	4.4	U
108-87-2	Methylcyclohexane	4.4	U
78-87-5	1,2-Dichloropropane	4.4	U
75-27-4	Bromodichloromethane	4.4	U
10061-01-5	cis-1,3-Dichloropropene	4.4	U
108-10-1	4-Methyl-2-pentanone	8.8	U
108-88-3	Toluene	4.4	U
10061-02-6	trans-1,3-Dichloropropene	4.4	U
79-00-5	1,1,2-Trichloroethane	4.4	U
127-18-4	Tetrachloroethene	4.4	U
591-78-6	2-Hexanone	8.8	U
124-48-1	Dibromochloromethane	4.4	U
106-93-4	1,2-Dibromoethane	4.4	U
108-90-7	Chlorobenzene	4.4	U
100-41-4	Ethylbenzene	4.4	U
95-47-6	o-Xylene	4.4	U
179601-23-1	m,p-Xylene	4.4	U
100-42-5	Styrene	4.4	U
75-25-2	Bromoform	4.4	U
98-82-8	Isopropylbenzene	4.4	U
79-34-5	1,1,2,2-Tetrachloroethane	4.4	U
541-73-1	1,3-Dichlorobenzene	4.4	U
106-46-7	1,4-Dichlorobenzene	4.4	U
95-50-1	1,2-Dichlorobenzene	4.4	U
96-12-8	1,2-Dibromo-3-chloropropane	4.4	U
120-82-1	1,2,4-Trichlorobenzene	4.4	U
87-61-6	1,2,3-Trichlorobenzene	4.4	U

AW 10/21/08

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB20P-1618

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: _____ SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-18

Sample wt/vol: 6.10 (g/mL) g Lab File ID: 0807038-1891.d

Level: (TRACE or LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 7.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 10.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

LW
10/21/08

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1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-2022

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-19

Sample wt/vol: 6.26 (g/mL) g Lab File ID: 0807038-1991.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 8.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	4.3	U
74-87-3	Chloromethane	4.3	U
75-01-4	Vinyl chloride	4.3	U
74-83-9	Bromomethane	4.3	U
75-00-3	Chloroethane	4.3	U
75-69-4	Trichlorofluoromethane	4.3	U
75-35-4	1,1-Dichloroethene	4.3	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	4.3	U
67-64-1	Acetone	8.7	U
75-15-0	Carbon disulfide	4.3	U
79-20-9	Methyl acetate	4.3	U
75-09-2	Methylene chloride	4.3 ~~0.96~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	4.3	U
1634-04-4	Methyl tert-butyl ether	4.3	U
75-34-3	1,1-Dichloroethane	4.3	U
156-59-2	cis-1,2-Dichloroethene	4.3	U
78-93-3	2-Butanone	8.7	U
74-97-5	Bromochloromethane	4.3	U
67-66-3	Chloroform	4.3	U
71-55-6	1,1,1-Trichloroethane	4.3	U
110-82-7	Cyclohexane	4.3	U
56-23-5	Carbon tetrachloride	4.3	U
71-43-2	Benzene	4.3	U
107-06-2	1,2-Dichloroethane	4.3	U
123-91-1	1,4-Dioxane	87	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW
10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-2022

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-19

Sample wt/vol: 6.26 (g/mL) g Lab File ID: 0807038-1991.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 8.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	4.3	U
108-87-2	Methylcyclohexane	4.3	U
78-87-5	1,2-Dichloropropane	4.3	U
75-27-4	Bromodichloromethane	4.3	U
10061-01-5	cis-1,3-Dichloropropene	4.3	U
108-10-1	4-Methyl-2-pentanone	8.7	U
108-88-3	Toluene	4.3	U
10061-02-6	trans-1,3-Dichloropropene	4.3	U
79-00-5	1,1,2-Trichloroethane	4.3	U
127-18-4	Tetrachloroethene	4.3	U
591-78-6	2-Hexanone	8.7	U
124-48-1	Dibromochloromethane	4.3	U
106-93-4	1,2-Dibromoethane	4.3	U
108-90-7	Chlorobenzene	4.3	U
100-41-4	Ethylbenzene	4.3	U
95-47-6	o-Xylene	4.3	U
179601-23-1	m,p-Xylene	4.3	U
100-42-5	Styrene	4.3	U
75-25-2	Bromoform	4.3	U
98-82-8	Isopropylbenzene	4.3	U
79-34-5	1,1,2,2-Tetrachloroethane	4.3	U
541-73-1	1,3-Dichlorobenzene	4.3	U
106-46-7	1,4-Dichlorobenzene	4.3	U
95-50-1	1,2-Dichlorobenzene	4.3	U
96-12-8	1,2-Dibromo-3-chloropropane	4.3	U
120-82-1	1,2,4-Trichlorobenzene	4.3	U
87-61-6	1,2,3-Trichlorobenzene	4.3	U

LW 10/2/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB20-2022

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-19

Sample wt/vol: 6.26 (g/mL) g Lab File ID: 0807038-1991.d

Level: (TRACE or LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 8.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 10.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

MW
10/21/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-2830

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-20

Sample wt/vol: 6.29 (g/mL) g Lab File ID: 0807038-2091.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 11.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	4.5	U
74-87-3	Chloromethane	4.5	U
75-01-4	Vinyl chloride	4.5	U
74-83-9	Bromomethane	4.5	U
75-00-3	Chloroethane	4.5	U
75-69-4	Trichlorofluoromethane	4.5	U
75-35-4	1,1-Dichloroethene	4.5	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	4.5	U
67-64-1	Acetone	10	U BL
75-15-0	Carbon disulfide	4.5	U
79-20-9	Methyl acetate	4.5	U
75-09-2	Methylene chloride	4.5 ~~1.0~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	4.5	U
1634-04-4	Methyl tert-butyl ether	1.3	J
75-34-3	1,1-Dichloroethane	4.5	U
156-59-2	cis-1,2-Dichloroethene	4.5	U
78-93-3	2-Butanone	8.9	U
74-97-5	Bromochloromethane	4.5	U
67-66-3	Chloroform	4.5	U
71-55-6	1,1,1-Trichloroethane	4.5	U
110-82-7	Cyclohexane	4.5	U
56-23-5	Carbon tetrachloride	4.5	U
71-43-2	Benzene	4.5	U
107-06-2	1,2-Dichloroethane	4.5	U
123-91-1	1,4-Dioxane	89	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

MW
10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-2830

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-20

Sample wt/vol: 6.29 (g/mL) g Lab File ID: 0807038-2091.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 11.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	4.5	U
108-87-2	Methylcyclohexane	4.5	U
78-87-5	1,2-Dichloropropane	4.5	U
75-27-4	Bromodichloromethane	4.5	U
10061-01-5	cis-1,3-Dichloropropene	4.5	U
108-10-1	4-Methyl-2-pentanone	8.9	U
108-88-3	Toluene	4.5	U
10061-02-6	trans-1,3-Dichloropropene	4.5	U
79-00-5	1,1,2-Trichloroethane	4.5	U
127-18-4	Tetrachloroethene	4.5	U
591-78-6	2-Hexanone	8.9	U
124-48-1	Dibromochloromethane	4.5	U
106-93-4	1,2-Dibromoethane	4.5	U
108-90-7	Chlorobenzene	4.5	U
100-41-4	Ethylbenzene	4.5	U
95-47-6	o-Xylene	4.5	U
179601-23-1	m,p-Xylene	4.5	U
100-42-5	Styrene	4.5	U
75-25-2	Bromoform	4.5	U
98-82-8	Isopropylbenzene	4.5	U
79-34-5	1,1,2,2-Tetrachloroethane	4.5	U
541-73-1	1,3-Dichlorobenzene	4.5	U
106-46-7	1,4-Dichlorobenzene	4.5	U
95-50-1	1,2-Dichlorobenzene	4.5	U
96-12-8	1,2-Dibromo-3-chloropropane	4.5	U
120-82-1	1,2,4-Trichlorobenzene	4.5	U
87-61-6	1,2,3-Trichlorobenzene	4.5	U

MW 10/21/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB20-2830

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-20

Sample wt/vol: 6.29 (g/mL) g Lab File ID: 0807038-2091.d

Level: (TRACE or LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 11.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 10.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lcw
10/21/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-3234

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-21

Sample wt/vol: 6.38 (g/mL) g Lab File ID: 0807038-2191.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
75-71-8	Dichlorodifluoromethane	3.9	U	
74-87-3	Chloromethane	3.9	U	
75-01-4	Vinyl chloride	3.9	U	
74-83-9	Bromomethane	3.9	U	
75-00-3	Chloroethane	3.9	U	
75-69-4	Trichlorofluoromethane	3.9	U	
75-35-4	1,1-Dichloroethene	3.9	U	
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	3.9	U	
67-64-1	Acetone	17		U BL
75-15-0	Carbon disulfide	3.9	U	
79-20-9	Methyl acetate	3.9	U	
75-09-2	Methylene chloride	3.9 ~~0.91~~	~~JB~~	U BL
156-60-5	trans-1,2-Dichloroethene	3.9	U	
1634-04-4	Methyl tert-butyl ether	0.30	J	
75-34-3	1,1-Dichloroethane	3.9	U	
156-59-2	cis-1,2-Dichloroethene	3.9	U	
78-93-3	2-Butanone	7.8	U	
74-97-5	Bromochloromethane	3.9	U	
67-66-3	Chloroform	3.9	U	
71-55-6	1,1,1-Trichloroethane	3.9	U	
110-82-7	Cyclohexane	3.9	U	
56-23-5	Carbon tetrachloride	3.9	U	
71-43-2	Benzene	3.9	U	
107-06-2	1,2-Dichloroethane	3.9	U	
123-91-1	1,4-Dioxane	78	U	

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW
10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-3234

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-21

Sample wt/vol: 6.38 (g/mL) g Lab File ID: 0807038-2191.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	3.9	U
108-87-2	Methylcyclohexane	3.9	U
78-87-5	1,2-Dichloropropane	3.9	U
75-27-4	Bromodichloromethane	3.9	U
10061-01-5	cis-1,3-Dichloropropene	3.9	U
108-10-1	4-Methyl-2-pentanone	7.8	U
108-88-3	Toluene	3.9	U
10061-02-6	trans-1,3-Dichloropropene	3.9	U
79-00-5	1,1,2-Trichloroethane	3.9	U
127-18-4	Tetrachloroethene	3.9	U
591-78-6	2-Hexanone	7.8	U
124-48-1	Dibromochloromethane	3.9	U
106-93-4	1,2-Dibromoethane	3.9	U
108-90-7	Chlorobenzene	3.9	U
100-41-4	Ethylbenzene	3.9	U
95-47-6	o-Xylene	3.9	U
179601-23-1	m,p-Xylene	3.9	U
100-42-5	Styrene	3.9	U
75-25-2	Bromoform	3.9	U
98-82-8	Isopropylbenzene	3.9	U
79-34-5	1,1,2,2-Tetrachloroethane	3.9	U
541-73-1	1,3-Dichlorobenzene	3.9	U
106-46-7	1,4-Dichlorobenzene	3.9	U
95-50-1	1,2-Dichlorobenzene	3.9	U
96-12-8	1,2-Dibromo-3-chloropropane	3.9	U
120-82-1	1,2,4-Trichlorobenzene	3.9	U
87-61-6	1,2,3-Trichlorobenzene	3.9	U

LW 10/21/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB20-3234

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807038-21

Sample wt/vol: 6.38 (g/mL) g Lab File ID: 0807038-2191.d

Level: (TRACE or LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 10.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	6.39	6.9	J
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

MW 10/21/08

USEPA REGION II WORKSHEETS

SOP HW-33/VOA
Revision 1
August 2007

USEPA Contract Laboratory Program
Statement of Work for Organic Analysis of Low/Medium Concentration of VolatileOrganic Compounds SOM01.2
Data Validation

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Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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INTRODUCTION

Scope and Applicability

This SOP offers detailed guidance in evaluating laboratory data generated according to the method in the "USEPA Contract Laboratory Program Statement of Work for Organics Analysis Multi-Media, Multi-Concentration, SOM01.1, May 2005". The validation procedures and actions discussed in this document are based on the requirements set forth in the "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, January 2005". This document attempts to cover technical problems specific to low/Medium concentration of volatile compounds. Situations may arise where data limitations must be assessed based on the reviewer's own professional judgement.

In addition to technical requirements, contractual requirements may also be covered in this document. While it is important that instances of contract non-compliance be addressed in the Data Assessment, the technical criteria are always used to qualify the analytical data.

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 as follows:

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.

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

P - Pesticide/Aroclor target analytes when the % Difference between the analyte concentrations obtained from the two dissimilar GC columns is greater than 25%.

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 the USEPA Statement of Work SOM01.2 and National Functional Guidelines mentioned above.

YES NO N/A

. . . . . .

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: N/A **LAB:** Compuchem, Cary, NC

SITE NAME: Vieques Island, PR **SDG No(s).:** 0807038

1.0 Chain of Custody and Sampling Trip Reports

1.1 Are the Traffic Reports/Chain-of-Custody Records present for all samples? [✓] ___ ___

ACTION: If no, contact RSCC, or the TOPO to obtain replacement of missing or illegible copies from the lab.

1.2 Is the Sampling Trip Report present for all samples? [✓] ___ ___

ACTION: If no, contact either RSCC or ask the TOPO to obtain the necessary information from the prime contractor.

2.0 Data Completeness and Deliverables

2.1 Have any missing deliverables been received and added to the data package? ___ [✓] ___

ACTION: Contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the lab. If lab cannot provide them, note the effect on the review of the data package in the Contract Problems/Non-compliance section of the Data Assessment.

2.2 Was CLASS CCS checklist included with the package? [✓] ___ ___

	YES	NO	N/A
. . . . .			
2.3 Are there any discrepancies between the Traffic Reports/Chain-of-Custody Records, and Sampling Trip Report?	___	[✓]	___

ACTION: If yes, contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the laboratory.

3.0 <u>Cover Letter SDG Narrative</u>

3.1 Is the SDG Narrative or Cover Letter Present?	[✓]	___	___
3.2 Are case number, SDG number and contract number contained in the SDG Narrative or cover letter (see SOW, Exhibit B, section 2.5.1)? EPA sample numbers in the SDG, detailed documentation of any quality control, sample, shipment, and/or analytical problems encountered in processing the samples? Corrective action taken?	[✓]	___	___
3.3 Does the Narrative contain the following information SOM01.1, page B-12, section 2.5.1)? Description of trap, column used, storage of samples, case#, SDG#, analytical problems, and discrepancies between field and lab weights.	[✓]	___	___
3.4 Does the narrative, VOA section, contain a list of all TICs identified as alkanes and their estimated concentrations?	[✓]	___	___
3.5 Did the contractor record the temperature of the cooler on the Form DC-1, Item 9 - Cooler Temperature, and in the SDG Narrative?	[✓]	___	___
3.6 Does the narrative contain a list of the pH values determined for each water sample submitted for volatiles analysis (SOW, page B-13, section 2.5.1.2)?	[ ]	___	✓

	YES	NO	N/A
. . . . .			
3.7 Does the Case Narrative contain the "verbatim" statement (page B-12, section 2.5.1 of the SOM)?	[✓]	___	___

ACTION: If "No", to any question in this section, contact the TOPO to obtain necessary resubmittals. If unavailable, document under the Contract Problems/ Non-Compliance section of the Data Assessment.

4.0 Data Validation Checklist

4.1 Check the package for the following (see SOM reporting requirements, section 2.1, page B-10):

a. Is the package paginated in ascending order starting from the SDG narrative?	[✓]	___	___
b. Are all forms and copies legible?	[✓]	___	___
c. Assembled in the order set forth in the SOW?	[✓]	___	___
d. Low/Med Concentration Volatiles Data present?	[✓]	___	___

Action: Take action as specified in section 3.7 above.

PART A: Low/Medium Volatile ANALYSES

1.0 Sample Conditions/Problems

1.1 Do the Traffic Reports/Chain-of-Custody Records, Sampling Trip Report or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	___	[✓]	___

ACTION: If samples were not iced or the ice was melted upon arrival at the laboratory and the temperature of the

YES NO N/A

. . . . . .

cooler was > 10° C, then flag all positive results with a "J" and all non-detects "UJ".

ACTION: If both 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".

2.0 Holding Times

2.1 Have any VOA technical holding times, determined from date of collection to date of analysis, been exceeded? ___ [✓] ___

2.2 Preservation: Aqueous samples must be preserved with HCL to pH of 2 or below and cooled at 4°C ± 2°C. Non-aqueous samples: frozen (less than -7°C) or properly cooled (4°C ± 2°C) and preserved with $NaHSO_4$.

Action: Qualify sample results according to the following table.

Holding Time Actions for Low/Medium Volatile Analyses

Matrix	Preserved	Criteria	ACTION	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤ 7 Days	NO Action	
	No	> 7 Days	J	R
	Yes	≤ 14 Days	No Action	
	Yes	> 14 Days	J	R
Non-Aqueous	No	≤ 14 Days	J	R
	Yes	≤ 14 Days	No Action	
	Yes/No	> 14 Days	J	R

3.0 Deuterated Monitoring Compound (DMC) Recovery (Form II)

. . . . . .

	YES	NO	N/A
3.1 Are the Volatile SMC Recovery Summaries (Form II present?	[✓]	___	___

ACTION: Contact the TOPO to obtain an explanation/resubmittal from the lab. If missing deliverables are unavailable, document the effect in the Data Assessment.

3.2 Were outliers marked correctly with an asterisk?	[✓]	___	___

ACTION: Circle all outliers in red.

3.3 Were more than three of the fourteen (14) Deuterated Monitoring Compounds (DMC's) recoveries outside their corresponding limits?	___	[✓]	___
If yes, were samples re-analyzed?	[ ]	___	✓
Were method blanks re-analyzed?	[ ]	___	✓

ACTION: If any DMC is outside the required limits (see Table below), qualify their associated target compounds (See Table below) as follows:

VOLATILE DMC AND THEIR ASSOCIATED TARGET COMPOUNDS

Chloroethane-d5	**1,2-Dichloropropane-d6**	**1,2-Dichlorobenzene-d4**
Dichlorodifluoromethane	Cyclohexane	Chlorobenzene
Chloromethane	Methylcyclohexane	1,3-Dichlorobenzene
Bromomethane	1,2-Dichloropropane	1,4-Dichlorobenzene
Chloroethane	Bromodichloromethane	1,2-Dichlorobenzene
Carbon Disulfide		1,2,4-Trichlorobenzene
		1,2,3-Trichlorobenzene

YES NO N/A

. . . . . .

1,4-Dioxane-d8 1,4-Dioxane	**trans-1,3-Dichloropropene-d4** cis-1,3-Dichloropropene trans-1,3-Dichloropropene 1,1,2-Trichloroethane	**Chloroform-d** 1,1-Dichloroethane Bromochloromethane Chloroform Dibromochloromethane Bromoform
2-Butanone-d5 Acetone 2-butanone	**1,1-dichloroethene-d2** 1,1-dichloroethene trans-1,2-Dichloroethene cis-1,2-Dichloroethene	**2-Hexanone-d5** 4-Methyl-2-pentanone 2-Hexanone
Vinyl Chloride-d3 Vinyl Chloride	**Benzene-d6** Benzene	**1,1,2,2-Tetrachloroethane-d2** 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane
1,2-Dichloroethane-d4 Trichlorofluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Methyl Acetate Methylene Chloride Methyl tert-Butyl Ether Carbon Tetrachloride 1,2-Dichloroethane 1,1,1-Trichloroethane 1,2-Dibromoethane	**Toluene-d8** Trichloroethene Toluene Tetrachloroethene Ethylbenzene o-Xylenes m,p-Xylene Styrene Isopropylbenzene	

VOLATILE DEUTERATED MONITORING COMPOUND RECOVERY LIMITS

DMC	Recovery Limits (%) for Water Samples	Recovery Limits (%) for Soil samples
Vinyl Chloride-d3	65 - 131	68 - 122
Chloroethane-d5	71 - 131	61 - 130
1,1-Dichloroethene-d2	55 - 104	45 - 132
2-Butanone-d5	49 - 155	20 - 182
Chloroform-d	78 - 121	72 - 123
1,2-Dichloroethane-d4	78 - 129	79 - 122
Benzene-d6	77 - 124	80 - 121
1,2-Dichloropropane-d6	79 - 124	74 - 124
Toluene-d8	77 - 121	78 - 121
trans-1,3-Dichloropropene-d4	73 - 121	72 - 130
2-Hexanone-d5	28 - 135	17 - 184
1,4-Dioxane-d8	50 - 150	50 - 150
1,1,2,2-Tetrachloroethane-d2	73 - 125	56 - 161
1,2-Dichlorobenzene-d4	80 - 131	70 - 131

1. For any recovery greater than the upper limit:

   a. Qualify "J" all positive associated target compounds.
   b. Do not qualify associated non-detects.

2. For any recovery greater than or equal to 20%, but less than the lower limit:

   a. Qualify "J" all positive associated target compounds.
   b. Qualify "UJ" associated non-detects.

3. For any recovery less than 20%:

YES NO N/A

. . . . . .

a. Qualify "J" all positive associated target compounds.
b. Qualify "R" all associated non-detects.

NOTE: Up to three (3) DMC's per sample, excluding 1,4-Dioxane-d8, may fail to meet the recovery limits. (SOM, sec. 11.3.4, pg. D-45/Low Medium VOA). Recovery limits for 1,4-Dioxane-d8 are advisory.
As per SOM, any sample which has more than 3 DMC's outside the limits, it must be reanalyzed (SOM sec. 11.4.3.1 pg. D-46/Low Medium VOA).

ACTION: Note in the Data Assessment under Contract Problems/ Non-Compliance if the Lab did not perform reanalysis.

3.4 Are there any transcription/calculation errors between raw data and form II? ___ [✓] ___

ACTION: If large errors exist, ask the TOPO to obtain an explanation/resubmittal from the lab, make any necessary corrections and note errors in the data assessment.

Note: DMC recovery limits criteria and qualifications apply to samples diluted 5X and less. For samples diluted greater than 5X, recovery criteria does not apply because it is assumed DMC is diluted below the quantitation range.

4.0 Matrix Spike/Matrix Spike Duplicate Recovery (Form III)

Note: Data for MS/MSD will not be present unless requested.

4.1 Are the MS/MSD Recovery Forms (Form III Low/Med VOA) present? [✓] ___ ___

4.2 Was the MS/MSD analyzed at the required frequency (once per SDG, or every 20 samples, whichever is more frequent)? [✓] ___ ___

ACTION: If any MS/MSD data are missing, take action as specified in section 3.1 above.

ACTION: No action is taken on MS/MSD data alone. However, using professional judgement, the validator may

YES NO N/A

. . . . . .

use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. If any MS/MSD % recovery or RPD is out of specification, qualify data to include the consideration of the existence of interference in the raw data. Consideration include, but not limited to the following "Action":

Criteria	Action	
	Detected Spiked Compounds	**Non-detected Spiked Compounds**
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use Professional Judgement
Lower Acceptance Limit ≤ %R; RPD ≤ Upper Acceptance Limits	No qualification	

5.0 Method Blanks (Form IV)

5.1 Is the Volatile Method Blank Summary (Form IV VOA) present for aqueous and soil samples? [✓] ___ ___

5.2 Frequency of Analysis: For the analysis of Low/Med Concentration VOA TCL compounds, has a method blank been analyzed for each SDG or every 20 samples, whichever is more frequent? [✓] ___ ___

5.3 Has a VOA method blank been analyzed after the calibration standards and once every 12 hours time period for each GC/MS instrument used? [✓] ___ ___

5.4 Was a VOA instrument blank analyzed after each sample/dilution that contains a target compound exceeding the initial calibration range (see SOM, page D-48/Low/Medium VOA, section 12.1.1.3)? [ ] ___ ✓

YES NO N/A

. . . . . .

ACTION: If any method/instrument blank data are missing, notify the TOPO to obtain resubmittals or an explanation from the lab. If method blank data are unavailable, the reviewer may use professional judgement, or substitute field blank or trip blank data for missing method blank data.

If an instrument blank was not analyzed after a sample containing a target analyte exceeding the initial calibration standards, inspect the sample chromatogram acquired immediately after this sample for possible carryover. The system is considered uncontaminated if the target analyte is below CRQL. Use professional judgement to determine if carryover occurred and qualify analyte(s) accordingly.

5.5 Was a storage blank analyzed once per SDG after all the samples were analyzed? [✓] ___ ___

ACTION: If storage blank data is missing, contact the TOPO to obtain any missing deliverables from the laboratory. If unavailable, note in the Contract Problems/Non-Compliance section of the Data Assessment.

5.6 The validator should verify that the correct identification scheme for EPA blanks was used. (See SOM page B-39, section 3.3.7.3 for more information.)

Was the correct identification scheme used for all Low/Med VOA blanks? [✓] ___ ___

ACTION: Contact the TOPO to obtain corrections from the lab, or make the necessary corrections. Document in the "Contract Problems/Non-Compliance section of the Data Assessment all corrections made by the validator.

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

Also compare the storage blank raw data with the method blank. Determine if contamination in the storage blank is also present in the method blank.

	YES	NO	N/A
. . . . .			
Is the chromatographic performance (baseline stability) for each instrument acceptable for Low/Medium VOAs?	[✓]	___	___

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

5.8 Are all detected hits for target compounds in method, and storage blanks less than the CRQL?	[✓]	___	___

Exception: Methylene Chloride, Acetone and 2-butanone must be less than 2X times their respective CRQLs.

ACTION: If no, an explanation and laboratory's corrective actions must be addressed in the case narrative. If the narrative contains no explanation, then make a note in the Contract Problems/Non-Compliance section of the Data Assessment.

6.0 Contamination

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

6.1 Does the storage blank contain positive results (TCL and/or TICs) for Low/Med Concentration VOAs?	✓	[ ]	___
6.2 Do any method/reagent/instrument blanks contain positive results (including TICs) for Low/Med Concentration VOAs?	✓	[ ]	___

NOTE: Contaminated instrument blanks are unacceptable under this SOW (see page D-50/VOA, section 12.1.5.2).

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance if a contaminated instrument blank was submitted.

YES NO N/A

. . . . . .

ACTION: Sample analysis results after the high concentration sample must be evaluated for carryover. Sample must meet the maximum carryover criteria as listed in SOM sec. 11.3.8 p. D-46/VOA.("the sample must not contain a concentration above the CRQL for the target compounds that exceeded the limit in the contaminated sample.")

6.3 Do any field/trip/rinse blanks have positive hits for Low/Med VOA results (including TICs)? ___ [ ] ✓

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

NOTE: All field blank results associated with a particular group of samples (may exceed one per case) must be used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Field blanks & trip blanks must be qualified for system monitoring compound, instrument performance criteria, spectral or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks. If any blanks are grossly contaminated (i.e., saturated by GC/MS), all associated sample data should be qualified unusable (R).

Blank Type	Blank Result	Sample Result	Action for Samples
	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
Method, Field,		≥ CRQL*	No qualification required

YES NO N/A

. . . . . .

Trip, Storage, Instrument **	> 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
	Gross contamination	Detects	Qualify results as unusable R
	TIC > 2ug/L	Detects	See "Action" below

* 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: Analytes qualified "U" for blank contamination are treated as "hits" when qualifying for calibration criteria.

Note: When applied as described in the table above, the contaminant concentration in the blank are multiplied by the sample dilution factor.

ACTION : For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

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

ACTION: 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.

7.0 GC/MS Instrument Performance Check (Form V)

. . . . . .

		YES	NO	N/A
7.1	Are the GC/MS Instrument Performance Check Forms (Form V) present for Bromofluorobenzene (BFB)?	[✓]	___	___
7.2	Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the BFB provided for each twelve hour shift?	[✓]	___	___
7.3	Did the 12-hour clock begin with either the injection of BFB, or in cases where a closing continuing calibration (CCV) was used as an opening CCV?	[✓]	___	___

Listed below are some, but not necessarily all, examples of acceptable analytical sequences incorporating the use of the opening/closing CCV. Use these examples as a guide for possible analytical sequences that can be expected.

Conditions for When Example Sequence is Appropriate:	**Acceptable Criteria That Must be Met:**	**Notes:**
If time remains on the 12 hour clock after initial calibration sequence	• BFB tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets both opening and closing CCV criteria • CCV B meets closing CCV criteria.	The requirement of starting the new 12-hr clock for Analytical Sequence 2 with a new BFB tune is waived if CCV A meets opening CCV criteria. If CCV B meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.
If time remains on the 12 hour clock after initial calibration sequence	• BFB tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets closing CCV criteria (but does not meet opening CCV criteria). • CCV B meets opening CCV criteria. • CCV C meets closing CCV Criteria.	CCV A does not meet opening criteria, therefore a new BFB tune must be performed, immediately followed by CCV B before a method blank and any samples may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new BFB tune.

YES NO N/A

. . . . . .

If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV. OR If the most recent closing CCV was not or could not be used as an opening CCV.	• BFB tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets both opening and closing CCV criteria. • CCV C meets both opening and closing CCV criteria.	The requirement of starting the new 12 hour clock for Analytical Sequence 2 with a new BFB tune is waived if CCV B meets opening CCV criteria. If CCV C meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.
If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV OR If the most recent closing CCV was not or could not be used as an opening CCV	• BFB tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets closing CCV criteria (but does not meet opening CCV criteria). • CCV C meets opening CCV Criteria. • CCV D meets both opening and closing CCV criteria.	CCV B does not meet opening CCV criteria, therefore a new BFB tune must be performed, immediately followed by CCV B before a method blank and any samples may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new BFB tune. The requirement of starting the new 12 hr clock for Analytical Sequence 3 with a new BFB tune is waived if CCV D meets opening CCV criteria. If CCV D meets opening criteria, a method blank and subsequent samples may be analyzed after CCV B.

7.4 Have the ion abundances been normalized to m/z 95 [✓] ___ ___

NOTE: All ion abundance ratios must be normalized to m/z 95, the nominal base peak, even though the ion abundance of m/z 174 may be up to 120% that of m/z 95.

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

7.5 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, professional Judgement may be applied to determine to what extent the data may be utilized.

	YES	NO	N/A
. . . . .			
7.6 Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.)	___	[✓]	___
7.7 Is the number of significant figures for the reported relative abundances consistent with the number given in the ion abundance criteria column on Form V ?	[✓]	___	___
ACTION: If large errors exist, take action as specified in section 3.1 above.			
7.8 Is the spectrum of the mass calibration compound acceptable?	[✓]	___	___
ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.			
8.0 Target Compound List (TCL) Analytes (Form I)			
8.1 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. Regional Control/MS/MSD samples?	[✓]	___	___
c. Blanks (method, trip, etc)?	[✓]	___	___
8.2 Are the VOA Reconstructed Ion Chromatograms, the 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. Regional Control/MS/MSD samples?	[✓]	___	___
c. Blanks (method, trip, etc)?	[✓]	___	___
ACTION: If any data are missing, take action specified in 3.1 above.			
8.3 Is chromatographic performance acceptable with respect to:			
Baseline stability?	[✓]	___	___
Resolution?	[✓]	___	___
Peak shape?	[✓]	___	___
Full-scale graph (attenuation)?	[✓]	___	___

	YES	NO	N/A
. . . . .			
Other: _____?	[ ]	___	✓

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

8.4	Are lab-generated standard mass spectra of the identified VOA compounds present for each sample?	[✓]	___	___

ACTION: If any mass spectra are missing, take action as specified in 3.1 above. If lab does not generate their own standard spectra, make note under the "Contract Problems/Non-Compliance" section of the Data Assessment. If spectra are unavailable reject "R" the reported results.

8.5	Is the RRT of each reported compound within ± 0.06 RRT units of the standard RRT in the continuing calibration?	[✓]	___	___
8.6	Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
8.7	Do sample and standard relative ion intensities agree to within ± 20%?	[✓]	___	___

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 sections 8.4-8.7 above.

ACTION: When sample carry-over is suspected, review section 6.2/Action #2 above before determining if instrument cross-contamination has affected positive compound identifications.

9.0 Tentatively Identified Compounds (TIC)

9.1	Are all Tentatively Identified Compound Forms (Form I VOA-TIC) present? Do listed TICs include scan number or retention time, as well as the estimated "J" and/or "JN" qualifier?	[✓]	___	___
9.2	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?	[✓]	___	___

	YES	NO	N/A
. . . . .			
b. Blanks?	[✓]	___	___
b. Are Alkanes listed in/or part of the Case Narrative?	[✓]	___	___

ACTION: If any TIC data are missing, take action specified in 3.1 above.

ACTION: Verify "JN" qualifier is present for all chemically named TICs having a percent match of greater than or equal 85%. TICs labeled "unknown" are qualified with a "J" qualifier.

9.3 Are any target compounds (from any fraction) listed as TICs? (Example: 1,2-dimethylbenzene is xylene - a VOA target analyte - and should not be reported as a TIC.)	___	[✓]	___
9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
9.5 Do TICs and "best match" reference spectra relative ion intensities agree within ± 20%?	[✓]	___	___

ACTION: Use professional judgement to determine the acceptability of TIC identifications. If it is determined that an incorrect identification was made, change its identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.

Action: When a compound is not found in any blank, but is detected in a sample and is a suspected artifact of a common laboratory contaminant, solvent preservatives or Aldo condensation, the result should be qualified as unusable (R). (i.e., common lab contaminants such as CO_2(m/e 44), Siloxanes (m/e 73), diethyl ether, hexane, certain freons. Aldol condensation products: 4-hydroxy-4-methyl-2-pentanone, 4-methyl-2-penten-2-one, and 5,5-dimethyl-2(H)-furanone. Solvent preservatives cyclohexene, and related by-products: cyclohexanone, cyclohexenone, cyclohexanol, cyclohexenone, chlorocyclohexene, and chlorocyclohexanol.).

10.0 Compound Quantitation and Reported Detection Limits

10.1 Are there any transcription/calculation errors in Form I results? (Check at least two positive values. Verify that the correct internal standards, quantitation ions, and RRFs were used to calculate Form I results.)	___	[✓]	___
10.2 Are the CRQLs adjusted to reflect sample dilutions and per cent moisture?	[✓]	___	___

YES NO N/A

. . . . . .

ACTION: If errors are large, take action as specified in section 3.1 above.

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQLs data from the diluted sample). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original Form I and substituting the data from 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 not to be used, including any in the data summary package.

!0.3 For non-aqueous samples, were the percent moisture < 70%? [✓] ___ ___

Action: If the % moisture ≥ 70.0% and < 90.0%, qualify detects as "J" and non-detects as approximated "UJ" If the % Moisture ≥ 90%, qualify detects as "J" and non-detects as "R"

11.0 Standards Data (GC/MS)

11.1 Are the reconstructed ion chromatograms, and data system printouts (quant. reports) present for each initial and continuing calibration? [✓] ___ ___

ACTION: If any calibration standard data are missing, take action specified in section 3.1 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI LCV) present and complete for the volatile fraction at concentrations of 5, 10, 50, 100, and 200 µg/ℓ for non-ketones, 10, 20, 100, 200 and 400 ug/L for ketones and 100, 200, 1000, 2000, and 4000 ug/L for 1,4-dioxane. [✓] ___ ___

ACTION: If any Initial Calibration forms are missing, take action as specified in section 3.1 above.

12.2 Are the relative standard deviation (RSD) stable for VOA's over the concentration range of the calibration (i.e., %RSD ≤ 20.%, ≤ 40% for poor performers (see table below), ≤ 50% for 1,4-dioxane)? [✓] ___ ___

ACTION: Circle all outliers in red.

NOTE: The twenty two (22) poor performers compounds and associated DMCs are listed below. The relative response factor (RRF) for these compounds must be greater than or equal to 0.010.

YES NO N/A

. . . . . .

Volatile Compounds Exhibiting Poor Response

Volatile Compounds	
Acetone	1,2-Dibromo-3-chloropropane
2-Butanone	Isopropylbenzene
Carbon disulfide	Methyl acetate
Chloroethane	Methylene chloride
Chloromethane	Methylcyclohexane
Cyclohexane	Methyl tert-butyl ether
1,4-Dioxane	trans-1,2-Dichloroethene
1,2-Dibromoethane	4-Methyl-2-pentanone
Dichlorodifluoromethane	2-Hexanone
cis-1,2-dichloroethene	Trichlorofluoromethane
1,2-Dichloropropane	1,1,2-Trichloro-1,2,2-trifluoroethane

ACTION: If %RSD > 20.0%, (> 40.0% for the poor performers, and > 50% for 1,4-dioxane), qualify associated positive results for that analyte "J" (estimated). If %RSD is > 90, flag all non-detects for that analyte "R" (unusable) and positive results "J".

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

12.3 Are any $\overline{RRF}$s < 0.050 (< 0.010 for poor performers)? ___ [✓] ___

ACTION: Circle all outliers in red.

ACTION: If any $\overline{RRF}$ values are < 0.05 or < 0.01 for poor performers, qualify associated non-detects unusable (R) and associated positive results estimated (J).

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance the analytes that fail %RSD and/or RRF criteria.

12.4 Are there any transcription /calculation errors in the reporting of RRFs, $\overline{RRF}$s or %RSD values? (Check at least 2 values, but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

	YES	NO	N/A
. . . . .			

ACTION: If errors are large, contact the TOPO to obtain an explanation/resubmittal from the lab, document in the Data Assessment under Contract Problems/Non-Compliance.

13.0 GC/MS Continuing Calibration Verification (CCV) (Form VII)

		YES	NO	N/A
13.1	Are the Continuing Calibration Forms (Form VII) present and complete for the volatile fraction?	✓		
13.2	Did the 12 hour clock begin with either the injection of BFB or in cases where a closing CCV can be used as an opening CCV for each instrument?	✓		

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, ask the TOPO to obtain explanation/resubmittal from the laboratory. If continuing calibration data are unavailable, flag all associated sample data as unusable (R).

		YES	NO	N/A
13.3	Do any volatile compounds have a % Difference (% D) between the initial RRF and CCV RRF exceeding ± 50% for 1,4-Dioxane, ± 40% for the poor performers or ± 25% for the remaining compounds?		✓	

ACTION: Circle all outliers in red.

		YES	NO	N/A
13.4	Do any volatile compounds have a RRF < 0.05 or < 0.01 for the poor performers?		✓	

ACTION: Circle all outliers in red.

Note: Verify that the CCV was run at the required frequency (an opening and closing CCV must be run within 12-hour period) and the CCV was compared to the correct initial calibration. If the mid-point standard from the initial calibration is used as an opening CCV, verify that the result (RRF) of the mid-point standard was compared to the average RRF from the correct initial calibration.

Note: The closing CCV used to bracket the end of a 12-hour analytical sequence may be used as the opening CCV for the new 12-hour analyical sequence, provided that all the technical acceptance criteria are met for an opening CCV (see table below). If the closing CCV does not meet the technical acceptance criteria for an opening CCV, then a BFB tune followed by an opening CCV is required and the next 12-hour time period begins with the BFB tune.

Action: Use the following table to qualify data based on the technical acceptance criteria for the opening CCV and closing CCV.

Continuing Calibration Verification (CCV) Actions for Low/Medium Volatiles Analyses

Criteria for	Criteria for	Action

YES NO N/A

. . . . . .

Opening CCV	Closing CCV	Detected Associated Compounds	Non-Detected Associated Compounds
RRF < 0.010 (poor responders) RRF < 0.050 (all other volatile target compounds)	RRF < 0.010 (for all volatile target compounds)	J	R
RRF ≥ 0.010 (poor responders) RRF ≥ 0.050 (for all other compounds)	RRF ≥ 0.010 (for all target volatile compounds)	No Action	
%D > 50.0 or < -50.0 (1,4-Dioxane) %D > 40.0 or < -40.0 (poor responders) %D > 25.0 or < -25.0 (all other volatile target compounds)	%D > 50.0 or < -50.0 (for all volatile target compounds)	J	UJ
%D ≤ 50.0 or ≥ -50.0 (1,4-Dioxane) %D ≤ 40.0 or ≥ -40.0 (poor responders) %D ≤ 25.0 or ≥ -25.0 (all other volatile target compounds)	%D ≤ 50.0 or ≥ -50.0 (for all volatile target compounds)	No Action	
Opening CCV not performed at required frequency *	Closing CCV not performed at required frequency *	R	

* See section 13.2 above

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance if more than two of the required analytes failed the above acceptance criteria.

13.5 Are there any transcription/calculation errors for the reporting of RRFs, or %D between initial RRFs and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors with red pencil.

ACTION: If errors are large, notify the TOPO to obtain explanation/resubmittals from the lab. Document errors in the Contract Problems/Non-Compliance section of the Data Assessment.

Note: All DMCs must meet RRF ≥ 0.010. No qualification of the data is necessary on the DMCs RRF and %RSD/%Diff data alone. However, use professional judgment to evaluate the DMC and %RSD/% Diff data in conjunction with the DMC recoveries to determine the need of qualification of the data.

14.0 Internal Standard (Form VIII)

14.1 Were the internal standard area counts for every sample and blank within the range of 50.0% and 200.0% of its response in the most recent opening CCV standard calibration? [✓] ___ ___

	YES	NO	N/A
. . . . .			
If no, were affected sample reanalyzed?	[ ]	___	✓

ACTION: 1. Circle all outliers with red pencil.

14.2 Are the retention times of the internal standards in sample or blanks within ±30 seconds from the RT of the internal standard in the 12-hour associated calibration standard (opening CCV or mid-point standard from initial calibration)?	✓	___	___

Action: Use the following table to qualify the data:

INTERNAL STANDARDS ACTIONS FOR LOW/MEDIUM VOLATILES

Criteria	ACTION	
	Detected Associated Compounds *	Non-detected Associated Compounds *
Area counts ≥ 50% and ≤ 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	No Action	
Area counts < 50% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J	R
Area counts > 200% of 12-hour standard (Opening CCV or mid-point standard from initial calibration)	J	No Action
RT difference > 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	R**	R
RT difference ≤ 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	No Action	

* For volatile compounds associated to each internal standard, see Table 3-Low/Medium Volatile Target Compounds and Deuterated Monitoring Compounds with Corresponding Internal Standards for Quantitation in SOM01.1, Exhibit D, available at:

Http://www.epa.gov/superfund/programs/clp/som1.htm

** Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable "R" if the mass spectral are met.

NOTE: Contract Requirements: The SOM (section 11.4.1 page D-46/VOA Low/Medium states that any sample which fails the acceptance criteria for IS response must be reanalyzed.

. . . . . .

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance any sample(s) which failed the above IS acceptance criteria.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Low/Medium Concentration VOA analysis? ✓ ___ ___

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

ACTION: Any gross variation between duplicate results must be addressed in the reviewer narrative. If large differences exist, contact the TOPO to confirm identification of field duplicates with the sampler.

. . . . . .

Definitions

BFB - bromofluorobenzene
CCS - contract compliance screening
CLASS - Contract Laboratory Analytical Services Support
CLP - Contract Laboratory Program
CRQL - Contract Required Quantitation Limit
GC/MS - gas chromatography/mass spectroscopy
kg - kilogram
µg - microgram
ℓ - liter
mℓ - milliliter
QC - quality control
RAS - Routine Analytical Services
RIC - reconstructed ion chromatogram
RPD - relative percent difference
RRF - relative response factor
$\overline{RRF}$ - 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
SOP - standard operating procedure
SOW - Statement of Work
TCL - Target Compound List
TCLP - Toxicity Characteristics Leachate Procedure
TIC - tentatively identified compound
TPO - technical project officer
VOA - volatile organic acid
VTSR - validated time of sample receipt
TOPO - Task Order Project Officer

References

. . . . . .

1. USEPA Contract Laboratory Program of Work for Organic Analysis Multi-Media, Multi-Concentration, SOW/CLPSOM01.1, October 2004
2. National Functional Guidelines for Superfund Organic Methods Data Review January 2005

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

Page 1 of 1

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757-671-6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores) 3 encores ms/msd - 4	SVOCs, SVOC SIM, DRO, ORO 2 encores ms/msd - 6	TPH-GRO	Total Metals, TI, CN	Grain Size, Atterberg Limits	VOCs 3-40ml vials (liquid)	TPH-GRO 2-40ml vials	SVOC, SVOC SIM	Total Metals, TI	Cyanide	TPH DRO & ORO	TOC	pH / Sample Info (Lab Use)
0807038-01	VWAE-SS21-0506-08C	7/16/08	0803	SO	15							X		X										
0807038-02	VWAE-SB21-0910-08C	↓	0910	SO	5							X		X										
0807038-03	VWAE-SB21P-0910-08C	↓	0910	SO	5							X		X										
0807038-04	VWAE-SB21-1618-08C	↓	0940	SO	5							X		X										
0807038-05	VWAE-SB21-1820-08C	↓	1020	SO	5							X		X										
0807038-06	VWAE-SB21-2430-08C	✓	1127	SO	5							X		X										
0807042-01	VWAE-TB01-071608	7/16/08	—	QC	5	5											X	X						

Lab Use Only

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

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

Comments

VWAE-SS21-0506-08C has MS/MSD
VHBLKXA → 0807038-07
VHBLKXB → 0807042-02

Sample Custody

Relinquished by: [signature]	Date/Time: 7/16/08 1145	Received by: [signature]	Date/Time: 7-17-08 850
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 0.4 °C

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

White & Yellow copy to lab • Pink copy for customer

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Page 1 of 1

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Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Courier:
Airbill No.:
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Chelsea Bennet / CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Stephen Brand
Phone #: 757.671.6211
Sampler's Name: K. Butler / J. Acaron

Project Information

Project Name: Vieques CTO ~~[illegible]~~-10
Sampling Location: W-AOC-E
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores) 8021	SVOCs, SVOC SIM, DRO, ORO	SPLP SVOC, Metals, TPH-GRO, ORO, DRO	Total Metals, Tl, CN 7470	Grain Size, Atterberg Limits 8.02	VOCs (liquid)	SVOC, SVOC SIM	Total Metals, Tl	Cyanide	TPH-GRO	TPH-DRO & ORO (2AL)	TOC	pH / Sample Info (Lab Use) SUB
~~CPB 7/16/08~~	~~WVAE-EB01-071708~~	~~7/17/08~~	~~0640~~	~~QC~~																				
0807038-08 1584201	WVAE-SS21-0506-08C	7/16/08	0803	SO	6								X (3)		X (3)									
0807038-12 1584202	WVAE-SB21-1820-08C	7/16/08	1020	SO	3								X		X	X								
0807038-03 1584203	WVAE-SB21-0910-08C	↓	0910	SO	2								X		X									
0807038-10 1584204	WVAE-SB21P-0910-08C		0910	SO	2								X		X									
0807038-11 1584205	WVAE-SB21-1618-08C	↓	0940	SO	3								X	X	X									
0807042-03	WVAE-EB01-071708	7/17/08	0640	QC	2														NO →	X	H			

sample IDs should all start w/ "WVAE" [illegible] 7/21/08

Lab Use Only

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

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

Comments

WVAE-SS21-0506-08C is MS/MSD
(*) Bottle not in COC (mistake)

Sample Custody

Relinquished by: [signature]	Date/Time: 7/17/08 1330	Received by: Jennifer Dove	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontract? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 2.4 °C

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

White & Yellow copy to lab • Pink copy for customer

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Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores) 3-encores	VOCs (Liquid) 3-40 ml	SVOCs, SVOC SIM, DRO, GRO (soil) 2-encores	TPH-GRO (soil)	Total Metals, Tl, CN	Grain Size, Atterberg Limits (2 KG)	SVOC, SVOC SIM (Liquid) (2)	Total Metals, Tl (Liquid) (250)	CN (Liquid)	TPH-GRO (Liquid) 2-40 ml	TPH-DRO & ORO (Liquid) 2-40 ml	TOC (Liquid) 2-40 ml	pH / Sample Info (Lab Use) Metals	Cyanide
0807042-03 1584401	VWAE-EB01-071708	7/17/08	0810	QC	11	5	1	1	2				X					X	X	X	X	X		0	<2
0807038-13	VWAE-SB21-3436-08C		0905	SO	5							X			X										
0807038-14	VWAE-SB21-3438-08C		1156	SO	5							X			X										
0807042-04	VWAE-TB01-071708		—	QC	5	5							X								X				
0807098-16	VWAE-SS20-0406-08C		1300	SO	5							X			X										

Lab Use Only

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

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

Comments

VWAE-SS20-0406-08C has a jar for % Moisture included
~~SB21-3436 have: pH 2oz, 4oz, 40z Tl, CN, TOC 4oz Sr, SVSIM, DRO/ORO 8oz, SPLP 4oz, 8oz VOA, SO, Tl~~

Sample Custody

Relinquished by:	Date/Time: 7/17/08 1330	Received by: Jennifer Dove	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 2.6 °C

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

White & Yellow copy to lab • Pink copy for customer

18341

Page 1 of 1

CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757-671-6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Vieques
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores)	SVOCs, SVOC SIM, DRO, GRO	SPLP Metals, SVOC, TPH (GRO, DRO, GRO)	Total Metals, Tl, CN	Grain Size, Atterberg Limits	SPLP VOCs (liquid)	SVOC, SVOC SIM liquid	Total Metals, Tl	~~Cyanide~~ PH	TPH-GRO	TPH-DRO & ORO	TOC*	pH / Sample Info (Lab Use) SVB
0807038-15 1584503*	VWAE-SB21-2930-08C	7-16-08	1127	SO	7			SPLP = 1584501				X	X	X	X	X			X			X		
0807038-14 1584206	VWAE-SB21-3628-08C	7-17-08	1156	SO	2							X		X										
0807038-13 ~~1584207~~ 1584502	VWAE-SB21-3436-08C	7-17-08	0905	SO				SPLP = 1584502				X	X	X			X		X			X		
	~~VWAE-SB21~~																							

*only rec'd SVOC, SIM, DRO, GRO & T. Metals, Tl, CN 4 a for VWAE-SB21-2930-08C JD 7/18/08

Lab Use Only

Sample Unpacked By: Jennifer Dover
Sample Order Entry By:
Samples Received in Good Condition? Y or N
If no, explain:
Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

Mistake

Sample Custody

Relinquished by:	Date/Time: 7/17/08 1330	Received by: Jennifer Dover	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 1.8 °C

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

White & Yellow copy to lab • Pink copy for customer

18363

CHAIN OF CUSTODY

Page 1 of 1

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: W-AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (Include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Liquid) 3-40mL	~~VOCs~~ TPH-GRO (Liquid) 2-40mL	VOCs (Encores) 3-encores	TPH-GRO (Soil) 2-encores	SVOC, SVOC-SIM, DRO, ORO 8270 (50)	Total Metals, TI, CN	TOC 4oz	SPLP-VOA 4oz	SPLP SVOA-Metals-TPH 8oz	RH 2oz	Grain Size, Atterberg Limits 8oz	pH / Sample Info (Lab Use)
0807042-05	VWAE-TB01-071808	7/18/08	—	QC	5	5						X	X										
0807042-06	VWAE-EB01-071808	↓	0700	QC	5	5						X	X										
0807042-07	VWAE-EB02-071708	7/17/08	1810	QC	5	5						X	X										
0807064-01 1584301	VWAE-SB20-0810-08C	7/18/08	0745	SO	20			SPLP = 1584503						X (9)	X (6)	⊗	⊗	X	X	X	X	X *	ad not receive (rec lab)
0807038-17	VWAE-SB20-1618-08C	↓	0818	SO	5									X	X								
0807038-18	VWAE-SB20P-1618-08C	↓	0818	SO	5									X	X								
0807038-19	VWAE-SB20-2022-08C	↓	0825	SO	6									X	X							X	
0807038-20 1584304	VWAE-SB20-2830-08C	↓	0940	SO	9			SPLP = 1584504						X	X			X	X	X	X		SUB =
0807038-21	VWAE-SB20-3234-08C	↓	1145	SO	5									X	X								

Lab Use Only

Sample Unpacked By: Jennifer Dover
Sample Order Entry By:
Samples Received in Good Condition? Y or N (50)
If no, explain:

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

Comments

MS/MSD on VWAE-SB20-0810-08C (20 Bottles)
⊗ Mistake

Sample Custody

Relinquished by:	Date/Time: 7/18/08	Received by: Jennifer Dover	Date/Time: 7/21/08 7:45
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where? Grubbie/Atterberg limits to	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 3.6 °C

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

White & Yellow copy to lab • Pink copy for customer

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CHAIN OF CUSTODY

CompuChem
a division of Liberty Analytical Corp.

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

Page 1 of 1

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: W-AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N: where indicated
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	SVOC-SVOC SIM (2-AL liquid)	Total Metals-TI (1 PL 1:2)	Cyanide	TPH-DRO+ORO (2-AL)	TOC (2-40ml)	SVOC-SVOC SIM-DRO-ORO (1-8 oz 1-4 oz)	Total Metals-TI-CN	TOC (4 oz)	SPLP-VOA (4 oz)	SPLP-SVOC-Metals-TPH (8 oz)	pH	Grain Size, Atterberg Limits (2 oz)	pH/Sample Info (Lab Use): Total metal	Cyanide	TOC	
080704E-01 1584413	VIWAE-EB02-071708	7/17/08	1810	QC	7		1	1	2			X	X	X	X	X								<2	>12	<2	SUB
1584303	VIWAE-SB21-2930-08C	7/16/08	1127	SO	5								SPLP=						X	X	X	X	X				
080708E-22 1584210	VIWAE-SS20-0400-08C	7/17/08	1300	SO	2												X	X									
080708E-23	VIWAE-SB20-2830-08C	7/18/08	0940	SO	2												X	X									

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: [signature]	Date/Time: 7/18/08	Received by: Diane Byrd	Date/Time: 7/21/08 745
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 5.9 °C

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

White & Yellow copy to lab • Pink copy for customer

SUPPORT DOCUMENTATION

2C - FORM II VOA-3
SOIL VOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: _____ SDG No.: 0807038

Level: (LOW/MED) LOW

	EPA SAMPLE NO.	VDMC1 (VCL) #	VDMC2 (CLA) #	VDMC3 (DCE) #	VDMC4 (BUT) #	VDMC5 (CLF) #	VDMC6 (DCA) #	VDMC7 (BEN) #
01	VBLKEO	91	90	74	86	94	96	97
02	VBLKLA	81	84	81	140	80	85	90
03	VHBLKXA	85	92	75	64	91	94	84
HID 04	VWAE-SB20-1618	72	76	60	101	79	84	79 *
05	VWAE-SB20-2022	84	89	72	106	92	98	90
06	VWAE-SB20-2830	78	81	67	94	83	84	80
07	VWAE-SB20-3234	79	84	68	99	84	86	82
08	VWAE-SB20P-1618	80	86	70	109	90	95	90
HI 09	VWAE-SS20-0406	68	75	74	90	77	76 *	81
10	VWAE-SS21-0506	84	86	76	145	80	86	90
11	VWAE-SS21-0506MS	54 *	64	87	136	73	80	78 *
12	VWAE-SS21-0506MSD	57 *	68	82	111	72	79	69 *
13								
14								
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16								
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28								
29								
30								

ASSOC CMPDS (J/UJ)

(J/UJ)

		QC LIMITS
VDMC1	(VCL) = Vinyl chloride-d3	(68-122)
VDMC2	(CLA) = Chloroethane-d5	(61-130)
VDMC3	(DCE) = 1,1-Dichloroethene-d2	(45-132)
VDMC4	(BUT) = 2-Butanone-d5	(20-182)
VDMC5	(CLF) = Chloroform-d	(72-123)
VDMC6	(DCA) = 1,2-Dichloroethane-d4	(79-122)
VDMC7	(BEN) = Benzene-d6	(80-121)

Column to be used to flag recovery values
* Value outside of contract required QC limits

Page 1 of 1

SOM01.2 (8/2007)

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKLA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8073006-BLK1

Sample wt/vol: 5.00 (g/mL) g Lab File ID: 8073006-BLK1R73.d

Level: (TRACE/LOW/MED) LOW Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U
67-64-1	Acetone	10	U
75-15-0	Carbon disulfide	5.0	U
79-20-9	Methyl acetate	5.0	U
75-09-2	Methylene chloride	2.1	J
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-Butanone	10	U
74-97-5	Bromochloromethane	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
110-82-7	Cyclohexane	0.38	J
56-23-5	Carbon tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
123-91-1	1,4-Dioxane	100	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKLA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8073006-BLK1

Sample wt/vol: 5.00 (g/mL) g Lab File ID: 8073006-BLK1R73.d

Level: (TRACE/LOW/MED) LOW Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	5.0	U
108-87-2	Methylcyclohexane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	10	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
95-47-6	o-Xylene	5.0	U
179601-23-1	m,p-Xylene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VBLKLA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8073006-BLK1

Sample wt/vol: 5.00 (g/mL) g Lab File ID: 8073006-BLK1R73.d

Level: (TRACE or LOW/MED) LOW Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 10.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
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16					
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18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKEO

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8073016-BLK1

Sample wt/vol: 5.00 (g/mL) g Lab File ID: 8073016-BLK191.d

Level: (TRACE/LOW/MED) LOW Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U
67-64-1	Acetone	10	U
75-15-0	Carbon disulfide	5.0	U
79-20-9	Methyl acetate	5.0	U
75-09-2	Methylene chloride	0.82	J
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-Butanone	10	U
74-97-5	Bromochloromethane	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
110-82-7	Cyclohexane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
123-91-1	1,4-Dioxane	100	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKEO

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8073016-BLK1

Sample wt/vol: 5.00 (g/mL) g Lab File ID: 8073016-BLK191.d

Level: (TRACE/LOW/MED) LOW Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	5.0	U
108-87-2	Methylcyclohexane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	10	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
95-47-6	o-Xylene	5.0	U
179601-23-1	m,p-Xylene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	0.36	J
106-46-7	1,4-Dichlorobenzene	0.45	J
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	0.72	J
87-61-6	1,2,3-Trichlorobenzene	0.90	J

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VBLKEO

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8073016-BLK1

Sample wt/vol: 5.00 (g/mL) g Lab File ID: 8073016-BLK191.d

Level: (TRACE or LOW/MED) LOW Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 10.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKOF

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8072508-BLK1

Sample wt/vol: 5.00 (g/mL) g Lab File ID: 8072508-BLK191.d

Level: (TRACE/LOW/MED) MED Date Received:

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	250	U
74-87-3	Chloromethane	250	U
75-01-4	Vinyl chloride	250	U
74-83-9	Bromomethane	250	U
75-00-3	Chloroethane	250	U
75-69-4	Trichlorofluoromethane	250	U
75-35-4	1,1-Dichloroethene	250	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	250	U
67-64-1	Acetone	500	U
75-15-0	Carbon disulfide	250	U
79-20-9	Methyl acetate	250	U
75-09-2	Methylene chloride	100	J
156-60-5	trans-1,2-Dichloroethene	250	U
1634-04-4	Methyl tert-butyl ether	250	U
75-34-3	1,1-Dichloroethane	250	U
156-59-2	cis-1,2-Dichloroethene	250	U
78-93-3	2-Butanone	500	U
74-97-5	Bromochloromethane	250	U
67-66-3	Chloroform	250	U
71-55-6	1,1,1-Trichloroethane	250	U
110-82-7	Cyclohexane	250	U
56-23-5	Carbon tetrachloride	250	U
71-43-2	Benzene	250	U
107-06-2	1,2-Dichloroethane	250	U
123-91-1	1,4-Dioxane	5000	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKOF

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8072508-BLK1

Sample wt/vol: 5.00 (g/mL) g Lab File ID: 8072508-BLK191.d

Level: (TRACE/LOW/MED) MED Date Received:

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	250	U
108-87-2	Methylcyclohexane	250	U
78-87-5	1,2-Dichloropropane	250	U
75-27-4	Bromodichloromethane	250	U
10061-01-5	cis-1,3-Dichloropropene	250	U
108-10-1	4-Methyl-2-pentanone	500	U
108-88-3	Toluene	250	U
10061-02-6	trans-1,3-Dichloropropene	250	U
79-00-5	1,1,2-Trichloroethane	250	U
127-18-4	Tetrachloroethene	250	U
591-78-6	2-Hexanone	500	U
124-48-1	Dibromochloromethane	250	U
106-93-4	1,2-Dibromoethane	250	U
108-90-7	Chlorobenzene	250	U
100-41-4	Ethylbenzene	250	U
179601-23-1	m,p-Xylene	250	U
95-47-6	o-Xylene	250	U
100-42-5	Styrene	250	U
75-25-2	Bromoform	250	U
98-82-8	Isopropylbenzene	250	U
79-34-5	1,1,2,2-Tetrachloroethane	250	U
541-73-1	1,3-Dichlorobenzene	250	U
106-46-7	1,4-Dichlorobenzene	250	U
95-50-1	1,2-Dichlorobenzene	250	U
96-12-8	1,2-Dibromo-3-chloropropane	250	U
120-82-1	1,2,4-Trichlorobenzene	19	J
87-61-6	1,2,3-Trichlorobenzene	23	J

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VBLKOF

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8072508-BLK1

Sample wt/vol: 5.00 (g/mL) g Lab File ID: 8072508-BLK191.d

Level: (TRACE or LOW/MED) MED Date Received:

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKOE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8072509-BLK1

Sample wt/vol: 5.00 (g/mL) g Lab File ID: 8072509-BLK191.d

Level: (TRACE/LOW/MED) MED Date Received:

% Moisture: not dec. Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	250	U
74-87-3	Chloromethane	250	U
75-01-4	Vinyl chloride	250	U
74-83-9	Bromomethane	250	U
75-00-3	Chloroethane	250	U
75-69-4	Trichlorofluoromethane	250	U
75-35-4	1,1-Dichloroethene	250	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	250	U
67-64-1	Acetone	500	U
75-15-0	Carbon disulfide	250	U
79-20-9	Methyl acetate	250	U
75-09-2	Methylene chloride	160	J
156-60-5	trans-1,2-Dichloroethene	250	U
1634-04-4	Methyl tert-butyl ether	250	U
75-34-3	1,1-Dichloroethane	250	U
156-59-2	cis-1,2-Dichloroethene	250	U
78-93-3	2-Butanone	500	U
74-97-5	Bromochloromethane	250	U
67-66-3	Chloroform	250	U
71-55-6	1,1,1-Trichloroethane	250	U
110-82-7	Cyclohexane	250	U
56-23-5	Carbon tetrachloride	250	U
71-43-2	Benzene	250	U
107-06-2	1,2-Dichloroethane	250	U
123-91-1	1,4-Dioxane	5000	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKOE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8072509-BLK1

Sample wt/vol: 5.00 (g/mL) g Lab File ID: 8072509-BLK191.d

Level: (TRACE/LOW/MED) MED Date Received:

% Moisture: not dec. Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	250	U
108-87-2	Methylcyclohexane	250	U
78-87-5	1,2-Dichloropropane	250	U
75-27-4	Bromodichloromethane	250	U
10061-01-5	cis-1,3-Dichloropropene	250	U
108-10-1	4-Methyl-2-pentanone	500	U
108-88-3	Toluene	250	U
10061-02-6	trans-1,3-Dichloropropene	250	U
79-00-5	1,1,2-Trichloroethane	250	U
127-18-4	Tetrachloroethene	250	U
591-78-6	2-Hexanone	500	U
124-48-1	Dibromochloromethane	250	U
106-93-4	1,2-Dibromoethane	250	U
108-90-7	Chlorobenzene	250	U
100-41-4	Ethylbenzene	250	U
179601-23-1	m,p-Xylene	250	U
95-47-6	o-Xylene	250	U
100-42-5	Styrene	250	U
75-25-2	Bromoform	250	U
98-82-8	Isopropylbenzene	250	U
79-34-5	1,1,2,2-Tetrachloroethane	250	U
541-73-1	1,3-Dichlorobenzene	250	U
106-46-7	1,4-Dichlorobenzene	250	U
95-50-1	1,2-Dichlorobenzene	250	U
96-12-8	1,2-Dibromo-3-chloropropane	250	U
120-82-1	1,2,4-Trichlorobenzene	33	J
87-61-6	1,2,3-Trichlorobenzene	38	J

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VBLKOE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807038 Mod. Ref No.: SDG No.: 0807038

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8072509-BLK1

Sample wt/vol: 5.00 (g/mL) g Lab File ID: 8072509-BLK191.d

Level: (TRACE or LOW/MED) MED Date Received:

% Moisture: not dec. Date Analyzed: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

ENVIRONMENTAL
Data Services, Inc.

DIESEL RANGE ORGANICS (DRO/ORO)

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807042

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 25, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-EB01-071708	0807042-003	Water
2	VWAE-EB01-071808	0807042-006	Water
3	VWAE-EB02-071708	0807042-007	Water

The USEPA "Contract Laboratory Program National Functional Guidelines for Organic Data Review," October 1999, method criteria and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - A MS/MSD sample was not analyzed.

Laboratory Control Sample - The LCS sample exhibited acceptable %R values.

Method Blank - The method blank was free of contamination.

Field, Equipment Blank - These are field QC samples and will be applied to other packages. The results are summarized below.

Blank ID	Compound	Conc. mg/L	Qualifier	Affected Samples
VWAE-EB01-071708	None - ND	-	-	-
VWAE-EB01-071808	None - ND	-	-	-
VWAE-EB02-071708	None - ND	-	-	-

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and/or correlation coefficients and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Field Duplicates - Field duplicate samples were not included in this data package.

ANNOTATED FORM Is

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB0
1-071708

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807042

Matrix: (soil/water) WATER Lab Sample ID: 807042-03

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/18/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/24/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 07/25/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
	ORO	1.0	U

FORM I PEST

lw
10/25/08

2

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB0
1-071808

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807042

Matrix: (soil/water) WATER Lab Sample ID: 807042-06

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/21/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/24/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 07/25/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
----------	ORO	1.0	U

FORM I PEST

RW
10/25/08

3

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB0
2-071708

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807042

Matrix: (soil/water) WATER Lab Sample ID: 807042-07

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/21/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/24/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 07/25/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
----------	ORO	1.0	U

FORM I PEST

MW
10/25/08

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

ENVIRONMENTAL
Data Services, Inc.

GASOLINE RANGE ORGANICS (GRO)

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807042

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 25, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-TB01-071608	0807042-001	Water
2	VWAE-EB01-071708	0807042-003	Water
3	VWAE-TB01-071708	0807042-004	Water
4	VWAE-TB01-071808	0807042-005	Water
5	VWAE-EB01-071808	0807042-006	Water
6	VWAE-EB02-071708	0807042-007	Water

The USEPA "Contract Laboratory Program National Functional Guidelines for Organic Data Review," October 1999, method criteria and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were analyzed within 14 days for water samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - A MS/MSD sample was not analyzed.

Laboratory Control Sample - The LCS sample exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. mg/L	Qualifier	Affected Samples
VBLKAE	Gasoline	0.04	U	All samples

Field, Equipment Blank - These are field QC samples and will be applied to other packages. The results are summarized below.

Blank ID	Compound	Conc. mg/L	Qualifier	Affected Samples
VWAE-TB01-071608	None - ND	-	-	-
VWAE-EB01-071708	None - ND	-	-	-
VWAE-TB01-071708	None - ND	-	-	-
VWAE-TB01-071808	None - ND	-	-	-
VWAE-EB01-071808	None - ND	-	-	-
VWAE-EB02-071708	None - ND	-	-	-

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Field Duplicates - Field duplicate samples were not included in this data package.

ANNOTATED FORM Is

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-TB0
1-071608

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807042

Matrix: (soil/water) WATER Lab Sample ID: 0807042-01

Sample wt/vol: 5 (g/ml) ML Lab File ID: 041X0807042-01

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 07/30/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.037~~	~~J~~ U BL

FORM I GC VOA

MW 10/25/08

2

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-EB0
1-071708

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807042

Matrix: (soil/water) WATER Lab Sample ID: 0807042-03

Sample wt/vol: 1000 (g/ml) ML Lab File ID: 042X0807042-03

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: not dec. _____ Date Analyzed: 07/30/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.0002~~ ~~U~~	U BL

FORM I GC VOA

RW
10/25/08

3

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-TB0
1-071708

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807042

Matrix: (soil/water) WATER Lab Sample ID: 0807042-04

Sample wt/vol: 5 (g/ml) ML Lab File ID: 043X0807042-04

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 07/30/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q	
9999-99-7	Gasoline	0.500 ~~0.041~~	~~J~~	U BL

FORM I GC VOA

LW
10/25/08

4

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-TB0
1-071808

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807042

Matrix: (soil/water) WATER Lab Sample ID: 0807042-05

Sample wt/vol: 5 (g/ml) ML Lab File ID: 044X0807042-05

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 07/30/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q	
9999-99-7	Gasoline	0.500 ~~0.043~~	J	U BL

FORM I GC VOA

LW 10/23/08

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
VWAE-EB0
1-071808

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807042

Matrix: (soil/water) WATER Lab Sample ID: 0807042-06

Sample wt/vol: 1000 (g/ml) ML Lab File ID: 045X0807042-06

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: not dec. _____ Date Analyzed: 07/30/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q	
9999-99-7	Gasoline	0.500 0.00021	J	u BL

FORM I GC VOA

LW
10/25/08

6

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-EB0
2-071708

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807042

Matrix: (soil/water) WATER Lab Sample ID: 0807042-07

Sample wt/vol: 1000 (g/ml) ML Lab File ID: 046X0807042-07

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: not dec. _____ Date Analyzed: 07/30/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.00022~~	J

U BL

FORM I GC VOA

WW
10/25/08

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VBLKAE

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807042

Matrix: (soil/water) WATER Lab Sample ID: 8073005-BLK1

Sample wt/vol: 5 (g/ml) ML Lab File ID: 038X8073005-BLK1

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 07/30/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7------	Gasoline	0.04	J

FORM I GC VOA

ENVIRONMENTAL
Data Services, Inc.

POLYNUCLEAR AROMATIC HYDROCARBONS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807042

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 22, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-EB01-071708	0807042-003	Water
2	VWAE-EB01-071808	0807042-006	Water
3	VWAE-EB02-071708	0807042-007	Water

The USEPA Region II SOP HW-35, Revision 1, August 2007: USEPA CLP Statement of Work for Organic Analysis of Low/Medium Concentration of Semivolatile Organic Compounds SOM01.2 Data Validation and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - A MS/MSD sample was not analyzed.

Laboratory Control Sample - The LCS sample exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
SBLKKV	2-Methylnaphthalene	0.052	U	1
	Acenaphthylene	0.093	U	1
	Acenaphthene	0.082	U	1
	Phenanthrene	0.093	U	1
	Fluoranthene	0.091	U	1
	Benzo (a) anthracene	0.087	U	1
SBLKJW	Naphthalene	0.046	U	2, 3

Field, Equipment Blank - These are field QC samples to be applied to other samples. The results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-EB01-071708	Naphthalene	0.11	-	To be applied to other packages
	Anthracene	0.053	-	To be applied to other packages
	Pyrene	0.086	-	To be applied to other packages
VWAE-EB01-071808	Acenaphthene	0.033	-	To be applied to other packages
	Phenanthrene	0.030	-	To be applied to other packages
	Anthracene	0.042	-	To be applied to other packages
VWAE-EB02-071708	None - ND	-	-	-

GC/MS Instrument Performance Check - All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values with the exception of the following.

ICAL Date	Compound	RRF	Qualifier	Affected Samples
07/08/08	Pentachlorophenol	0.043	J/R	All samples

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values with the exception of the following.

CCAL Date	Compound	%D/RRF	Qualifier	Affected Samples
07/24/08	Pentachlorophenol	0.033	None	Already qualified due to ICAL

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate samples were not included in this data package.

ANNOTATED FORM Is

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-03

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807042-03A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/18/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/22/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/24/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
91-20-3	Naphthalene	0.11	~~B~~	
91-57-6	2-Methylnaphthalene	0.093 ~~0.027~~	~~JB~~	U BL
208-96-8	Acenaphthylene	0.093 ~~0.044~~	~~JB~~	U BL
83-32-9	Acenaphthene	0.093 ~~0.054~~	~~JB~~	U BL
86-73-7	Fluorene	0.093	U	
87-86-5	Pentachlorophenol	0.19	~~U~~	R ICB
85-01-8	Phenanthrene	0.093 ~~0.043~~	~~JB~~	U BL
120-12-7	Anthracene	0.053	J	
206-44-0	Fluoranthene	0.093 ~~0.039~~	~~JB~~	U BL
129-00-0	Pyrene	0.086	J	
56-55-3	Benzo (a) anthracene	0.093 ~~0.042~~	~~JB~~	U BL
218-01-9	Chrysene	0.093	U	
205-99-2	Benzo (b) fluoranthene	0.093	U	
207-08-9	Benzo (k) fluoranthene	0.093	U	
50-32-8	Benzo (a) pyrene	0.093	U	
193-39-5	Indeno (1,2,3-cd) pyrene	0.093	U	
53-70-3	Dibenzo (a,h) anthracene	0.093	U	
191-24-2	Benzo (g,h,i) perylene	0.093	U	

LW 10/23/08

2

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-071808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-06

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807042-06A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/21/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/29/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.10 ~~0.070~~	~~JB~~ U BL
91-57-6	2-Methylnaphthalene	0.10	U
208-96-8	Acenaphthylene	0.10	U
83-32-9	Acenaphthene	0.033	J
86-73-7	Fluorene	0.10	U
87-86-5	Pentachlorophenol	0.20	~~U~~ R ICB
85-01-8	Phenanthrene	0.030	J
120-12-7	Anthracene	0.042	J
206-44-0	Fluoranthene	0.10	U
129-00-0	Pyrene	0.10	U
56-55-3	Benzo (a) anthracene	0.10	U
218-01-9	Chrysene	0.10	U
205-99-2	Benzo (b) fluoranthene	0.10	U
207-08-9	Benzo (k) fluoranthene	0.10	U
50-32-8	Benzo (a) pyrene	0.10	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.10	U
53-70-3	Dibenzo (a,h) anthracene	0.10	U
191-24-2	Benzo (g,h,i) perylene	0.10	U

MW 10/23/08

3

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB02-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-07

Sample wt/vol: 1050 (g/mL) mL Lab File ID: 0807042-07A64.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/21/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/29/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.095 ~~0.066~~	~~JB~~ U BL
91-57-6	2-Methylnaphthalene	0.095	U
208-96-8	Acenaphthylene	0.095	U
83-32-9	Acenaphthene	0.095	U
86-73-7	Fluorene	0.095	U
87-86-5	Pentachlorophenol	0.19	~~U~~ R IeB
85-01-8	Phenanthrene	0.095	U
120-12-7	Anthracene	0.095	U
206-44-0	Fluoranthene	0.095	U
129-00-0	Pyrene	0.095	U
56-55-3	Benzo (a) anthracene	0.095	U
218-01-9	Chrysene	0.095	U
205-99-2	Benzo (b) fluoranthene	0.095	U
207-08-9	Benzo (k) fluoranthene	0.095	U
50-32-8	Benzo (a) pyrene	0.095	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.095	U
53-70-3	Dibenzo (a,h) anthracene	0.095	U
191-24-2	Benzo (g,h,i) perylene	0.095	U

lW 10/23/08

USEPA REGION II WORKSHEETS

(Please refer to Semivolatile Organic Report for Worksheets)

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
SBLKKV

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8072116-BLK2

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 8072116-BLKA64.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received:

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/22/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/24/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.091	J
91-57-6	2-Methylnaphthalene	0.052	J
208-96-8	Acenaphthylene	0.093	J
83-32-9	Acenaphthene	0.082	J
86-73-7	Fluorene	0.093	J
87-86-5	Pentachlorophenol	0.20	U
85-01-8	Phenanthrene	0.093	J
120-12-7	Anthracene	0.10	U
206-44-0	Fluoranthene	0.091	J
129-00-0	Pyrene	0.10	U
56-55-3	Benzo (a) anthracene	0.087	J
218-01-9	Chrysene	0.078	J
205-99-2	Benzo (b) fluoranthene	0.051	J
207-08-9	Benzo (k) fluoranthene	0.054	J
50-32-8	Benzo (a) pyrene	0.069	J
193-39-5	Indeno (1,2,3-cd) pyrene	0.055	J
53-70-3	Dibenzo (a,h) anthracene	0.10	U
191-24-2	Benzo (g,h,i) perylene	0.049	J

SBLK JW

ext 7/24

Anal 7/30

naphthalene 0.046 ug/L (2,3)

6H - FORM VI SV-SIM
SEMIVOLATILE ORGANICS SIM INITIAL CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: _____ SDG No.: 0807042

Instrument ID: 5972hp64 Calibration Date(s): 07/08/2008 07/08/2008

Calibration Time(s): 1200 1510

LAB FILE ID: RRF0.1= U080708A64.d RRF0.2= W080708A64.d

RRF0.4= S080708A64.d RRF0.8= V080708A64.d RRF001= T080708A64.d

COMPOUND	RRF0.1	RRF0.2	RRF0.4	RRF0.8	RRF001	$\overline{RRF}$	% RSD
Naphthalene	0.960	1.000	1.011	0.913	1.044	0.985	5.1
2-Methylnaphthalene	0.668	0.697	0.721	0.648	0.757	0.698	6.2
Acenaphthylene	1.448	1.560	1.631	1.480	1.792	1.582	8.7
Acenaphthene	1.222	1.095	1.271	1.016	1.196	1.160	8.9
Fluorene	1.160	1.155	1.182	1.083	1.257	1.167	5.4
Pentachlorophenol		0.039	0.038	0.042	0.052	0.043	15.7
Phenanthrene	1.234	1.166	1.222	1.091	1.261	1.195	5.7
Anthracene	0.905	0.897	1.067	0.884	1.062	0.963	9.6
Fluoranthene	0.947	0.992	1.089	0.953	1.130	1.022	8.1
Pyrene	1.333	1.394	1.474	1.291	1.454	1.389	5.6
Benzo (a) anthracene	0.995	1.041	1.133	1.006	1.165	1.068	7.2
Chrysene	1.165	1.271	1.261	1.155	1.276	1.226	4.9
Benzo (b) fluoranthene	1.708	2.216	2.054	2.170	2.559	2.141	14.3
Benzo (k) fluoranthene	2.234	2.066	2.489	1.978	2.207	2.195	8.9
Benzo (a) pyrene	1.316	1.465	1.679	1.538	1.774	1.554	11.5
Indeno (1,2,3-cd) pyrene	1.287	1.517	1.564	1.389	1.618	1.475	9.2
Dibenzo (a,h) anthracene	1.439	1.573	1.644	1.555	1.777	1.598	7.8
Benzo (g,h,i) perylene	1.585	1.735	1.765	1.637	1.854	1.715	6.2
Fluoranthene-d10	0.764	0.833	0.881	0.786	0.932	0.839	8.2
2-Methylnapthalene-d10	0.435	0.470	0.484	0.433	0.499	0.464	6.3

7H - FORM VII SV-SIM
SEMIVOLATILE SIM CONTINUING CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: _____ SDG No.: 0807042

Instrument ID: 5972hp64 Calibration Date: 07/24/2008 Time: 1123

Lab File ID: S080724A64.d Init. Calib. Date(s): 07/08/2008 07/08/2008

EPA Sample No.(SSTD0.4##): SSTD0.4DS Init. Calib. Time(s): 1200 1510

GC Column: RTX-5MS ID: 0.32 (mm)

COMPOUND	$\overline{RRF}$	RRF0.4	MIN RRF	%D	MAX %D
Naphthalene	0.985	1.072	0.700	8.7	25.0
2-Methylnaphthalene	0.698	0.758	0.400	8.5	25.0
Acenaphthylene	1.582	1.785	0.900	12.8	25.0
Acenaphthene	1.160	1.400	0.900	20.7	25.0
Fluorene	1.167	1.289	0.900	10.4	25.0
Pentachlorophenol	0.043	0.033	0.050	-22.2	25.0
Phenanthrene	1.195	1.298	0.700	8.6	25.0
Anthracene	0.963	1.285	0.700	33.5	25.0
Fluoranthene	1.022	1.201	0.600	17.5	25.0
Pyrene	1.389	1.618	0.600	16.5	25.0
Benzo (a) anthracene	1.068	1.280	0.800	19.9	25.0
Chrysene	1.226	1.319	0.700	7.6	25.0
Benzo (b) fluoranthene	2.141	2.137	0.700	-0.2	25.0
Benzo (k) fluoranthene	2.195	2.224	0.700	1.3	25.0
Benzo (a) pyrene	1.554	1.702	0.700	9.5	25.0
Indeno (1,2,3-cd) pyrene	1.475	1.360	0.500	-7.8	25.0
Dibenzo (a,h) anthracene	1.598	1.336	0.400	-16.4	25.0
Benzo (g,h,i) perylene	1.715	1.552	0.500	-9.5	25.0
Fluoranthene-d10	0.839	0.871	0.010	3.8	25.0
2-Methylnapthalene-d10	0.464	0.440	0.010	-5.3	25.0

ENVIRONMENTAL
Data Services, Inc.

LOW CONCENTRATION SEMIVOLATILE ORGANIC COMPOUNDS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807042

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 22, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-EB01-071708	0807042-003	Water
2	VWAE-EB01-071808	0807042-006	Water
3	VWAE-EB02-071708	0807042-007	Water

The USEPA Region II SOP HW-35, Revision 1, August 2007: USEPA CLP Statement of Work for Organic Analysis of Low/Medium Concentration of Semivolatile Organic Compounds SOM01.2 Data Validation and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - A MS/MSD sample was not analyzed.

Laboratory Control Sample - The LCS sample exhibited acceptable %R values.

Method Blank - The method blank was free of contamination.

Field, Equipment Blank - These are field QC blanks that will be applied to other packages. The results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-EB01-071708	Benzaldehyde	1.9	-	To be applied to other packages
	Acetophenone	1.6	-	To be applied to other packages
VWAE-EB01-071808	Benzaldehyde	1.7	-	To be applied to other packages
	Acetophenone	1.5	-	To be applied to other packages
VWAE-EB02-071708	Benzaldehyde	2.0	-	To be applied to other packages
	Acetophenone	1.6	-	To be applied to other packages
	bis (2-Ethylhexyl) phthalate	4.1	-	To be applied to other packages

GC/MS Instrument Performance Check - All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were correctly reported and qualified by the laboratory.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate samples were not included in this data package.

ANNOTATED FORM Is

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-03

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807042-03A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/18/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/22/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/24/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	1.9	J	
108-95-2	Phenol	4.7	U	
111-44-4	Bis(2-chloroethyl)ether	4.7	U	
95-57-8	2-Chlorophenol	4.7	U	
95-48-7	2-Methylphenol	4.7	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	4.7	U	
98-86-2	Acetophenone	1.6	J	
106-44-5	4-Methylphenol	4.7	U	
621-64-7	N-Nitroso-di-n-propylamine	4.7	U	
67-72-1	Hexachloroethane	4.7	U	
98-95-3	Nitrobenzene	4.7	U	
78-59-1	Isophorone	4.7	U	
88-75-5	2-Nitrophenol	4.7	U	
105-67-9	2,4-Dimethylphenol	4.7	U	
111-91-1	Bis(2-chloroethoxy)methane	4.7	U	
120-83-2	2,4-Dichlorophenol	4.7	U	
91-20-3	Naphthalene	4.7	~~U~~	R RE
106-47-8	4-Chloroaniline	4.7	U	
87-68-3	Hexachlorobutadiene	4.7	U	
105-60-2	Caprolactam	4.7	U	
59-50-7	4-Chloro-3-methylphenol	4.7	U	
91-57-6	2-Methylnaphthalene	4.7	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	4.7	U	
88-06-2	2,4,6-Trichlorophenol	4.7	U	
95-95-4	2,4,5-Trichlorophenol	4.7	U	
92-52-4	1,1'-Biphenyl	4.7	U	
91-58-7	2-Chloronaphthalene	4.7	U	
88-74-4	2-Nitroaniline	9.3	U	
131-11-3	Dimethylphthalate	4.7	U	
606-20-2	2,6-Dinitrotoluene	4.7	U	
208-96-8	Acenaphthylene	4.7	~~U~~	R RE
99-09-2	3-Nitroaniline	9.3	U	
83-32-9	Acenaphthene	4.7	~~U~~	R RE

MW 10/23/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-03

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807042-03A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/18/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/22/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/24/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	9.3	U	
100-02-7	4-Nitrophenol	9.3	U	
132-64-9	Dibenzofuran	4.7	U	
121-14-2	2,4-Dinitrotoluene	4.7	U	
84-66-2	Diethylphthalate	4.7	U	
86-73-7	Fluorene	4.7	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	4.7	U	
100-01-6	4-Nitroaniline	9.3	U	
534-52-1	4,6-Dinitro-2-methylphenol	9.3	U	
86-30-6	N-Nitrosodiphenylamine (1)	4.7	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	4.7	U	
101-55-3	4-Bromophenyl-phenylether	4.7	U	
118-74-1	Hexachlorobenzene	4.7	U	
1912-24-9	Atrazine	4.7	U	
87-86-5	Pentachlorophenol	9.3	U	
85-01-8	Phenanthrene	4.7	~~U~~	R RE
120-12-7	Anthracene	4.7	~~U~~	R RE
86-74-8	Carbazole	4.7	U	
84-74-2	Di-n-butylphthalate	4.7	U	
206-44-0	Fluoranthene	4.7	~~U~~	R RE
129-00-0	Pyrene	4.7	~~U~~	R RE
85-68-7	Butylbenzylphthalate	4.7	U	
91-94-1	3,3'-Dichlorobenzidine	4.7	U	
56-55-3	Benzo (a) anthracene	4.7	~~U~~	R RE
218-01-9	Chrysene	4.7	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	4.7	U	
117-84-0	Di-n-octylphthalate	4.7	U	
205-99-2	Benzo (b) fluoranthene	4.7	U	R RE
207-08-9	Benzo (k) fluoranthene	4.7	U	
50-32-8	Benzo (a) pyrene	4.7	U	
193-39-5	Indeno (1,2,3-cd) pyrene	4.7	U	
53-70-3	Dibenzo (a,h) anthracene	4.7	U	
191-24-2	Benzo (g,h,i) perylene	4.7	U	
58-90-2	2,3,4,6-Tetrachlorophenol	4.7	U	

[1] Cannot be separated from Diphenylamine

LW 10/23/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-EB01-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-03

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807042-03A60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/18/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/22/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/24/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	0-00-0	N-Cbz-glycyl-glycine-p-nitrophenyl e	14.12	2.9	JN
02	621-59-0	Benzaldehyde, 3-hydroxy-4-methoxy- $	27.05	1.9	JN
03		UNKNOWN	29.92	2.2	J
04	0-00-0	7,9-Di-tert-butyl-1-oxaspiro(4,5)dec	34.24	5.3	JN
05		UNKNOWN	38.59	3.0	J
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	25	

[2]EPA-designated Registry Number.

JW 10/23/08

2

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-071808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-06

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807042-06A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/21/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	1.7	J	
108-95-2	Phenol	5.0	U	
111-44-4	Bis(2-chloroethyl)ether	5.0	U	
95-57-8	2-Chlorophenol	5.0	U	
95-48-7	2-Methylphenol	5.0	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	5.0	U	
98-86-2	Acetophenone	1.5	J	
106-44-5	4-Methylphenol	5.0	U	
621-64-7	N-Nitroso-di-n-propylamine	5.0	U	
67-72-1	Hexachloroethane	5.0	U	
98-95-3	Nitrobenzene	5.0	U	
78-59-1	Isophorone	5.0	U	
88-75-5	2-Nitrophenol	5.0	U	
105-67-9	2,4-Dimethylphenol	5.0	U	
111-91-1	Bis(2-chloroethoxy)methane	5.0	U	
120-83-2	2,4-Dichlorophenol	5.0	U	
91-20-3	Naphthalene	5.0	~~U~~	R RE
106-47-8	4-Chloroaniline	5.0	U	
87-68-3	Hexachlorobutadiene	5.0	U	
105-60-2	Caprolactam	5.0	U	
59-50-7	4-Chloro-3-methylphenol	5.0	U	
91-57-6	2-Methylnaphthalene	5.0	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	5.0	U	
88-06-2	2,4,6-Trichlorophenol	5.0	U	
95-95-4	2,4,5-Trichlorophenol	5.0	U	
92-52-4	1,1'-Biphenyl	5.0	U	
91-58-7	2-Chloronaphthalene	5.0	U	
88-74-4	2-Nitroaniline	10	U	
131-11-3	Dimethylphthalate	5.0	U	
606-20-2	2,6-Dinitrotoluene	5.0	U	
208-96-8	Acenaphthylene	5.0	~~U~~	R RE
99-09-2	3-Nitroaniline	10	U	
83-32-9	Acenaphthene	5.0	~~U~~	R RE

hw 10/23/08

2

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-071808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-06

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807042-06A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/21/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	10	U	
100-02-7	4-Nitrophenol	10	U	
132-64-9	Dibenzofuran	5.0	U	
121-14-2	2,4-Dinitrotoluene	5.0	U	
84-66-2	Diethylphthalate	5.0	U	
86-73-7	Fluorene	5.0	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	5.0	U	
100-01-6	4-Nitroaniline	10	U	
534-52-1	4,6-Dinitro-2-methylphenol	10	U	
86-30-6	N-Nitrosodiphenylamine (1)	5.0	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	5.0	U	
101-55-3	4-Bromophenyl-phenylether	5.0	U	
118-74-1	Hexachlorobenzene	5.0	U	
1912-24-9	Atrazine	5.0	U	
87-86-5	Pentachlorophenol	10	U	
85-01-8	Phenanthrene	5.0	U	
120-12-7	Anthracene	5.0	~~U~~	R RE
86-74-8	Carbazole	5.0	U	
84-74-2	Di-n-butylphthalate	5.0	U	
206-44-0	Fluoranthene	5.0	~~U~~	R RE
129-00-0	Pyrene	5.0	~~U~~	R RE
85-68-7	Butylbenzylphthalate	5.0	U	
91-94-1	3,3'-Dichlorobenzidine	5.0	U	
56-55-3	Benzo (a) anthracene	5.0	~~U~~	R RE
218-01-9	Chrysene	5.0	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	5.0	U	
117-84-0	Di-n-octylphthalate	5.0	U	
205-99-2	Benzo (b) fluoranthene	5.0	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	5.0	~~U~~	
50-32-8	Benzo (a) pyrene	5.0	~~U~~	
193-39-5	Indeno (1,2,3-cd) pyrene	5.0	~~U~~	
53-70-3	Dibenzo (a,h) anthracene	5.0	~~U~~	
191-24-2	Benzo (g,h,i) perylene	5.0	~~U~~	
58-90-2	2,3,4,6-Tetrachlorophenol	5.0	U	

[1] Cannot be separated from Diphenylamine

LW 10/23/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-EB01-071808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-06

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807042-06A60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/21/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	29.92	2.1	J
02	0-00-0	7,9-Di-tert-butyl-1-oxaspiro(4,5)dec	34.24	5.5	JN
03					
04					
05					
06					
07					
08					
09					
10					
11					
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23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	6.9	

[2]EPA-designated Registry Number.

lw 10/23/08

3

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB02-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-07

Sample wt/vol: 1050 (g/mL) mL Lab File ID: 0807042-07A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/21/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	2.0	J	
108-95-2	Phenol	4.8	U	
111-44-4	Bis(2-chloroethyl)ether	4.8	U	
95-57-8	2-Chlorophenol	4.8	U	
95-48-7	2-Methylphenol	4.8	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	4.8	U	
98-86-2	Acetophenone	1.6	J	
106-44-5	4-Methylphenol	4.8	U	
621-64-7	N-Nitroso-di-n-propylamine	4.8	U	
67-72-1	Hexachloroethane	4.8	U	
98-95-3	Nitrobenzene	4.8	U	
78-59-1	Isophorone	4.8	U	
88-75-5	2-Nitrophenol	4.8	U	
105-67-9	2,4-Dimethylphenol	4.8	U	
111-91-1	Bis(2-chloroethoxy)methane	4.8	U	
120-83-2	2,4-Dichlorophenol	4.8	U	
91-20-3	Naphthalene	4.8	~~U~~	R RE
106-47-8	4-Chloroaniline	4.8	U	
87-68-3	Hexachlorobutadiene	4.8	U	
105-60-2	Caprolactam	4.8	U	
59-50-7	4-Chloro-3-methylphenol	4.8	U	
91-57-6	2-Methylnaphthalene	4.8	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	4.8	U	
88-06-2	2,4,6-Trichlorophenol	4.8	U	
95-95-4	2,4,5-Trichlorophenol	4.8	U	
92-52-4	1,1'-Biphenyl	4.8	U	
91-58-7	2-Chloronaphthalene	4.8	U	
88-74-4	2-Nitroaniline	9.5	U	
131-11-3	Dimethylphthalate	4.8	U	
606-20-2	2,6-Dinitrotoluene	4.8	U	
208-96-8	Acenaphthylene	4.8	~~U~~	R RE
99-09-2	3-Nitroaniline	9.5	U	
83-32-9	Acenaphthene	4.8	~~U~~	R RE

AW 10/23/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB02-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-07

Sample wt/vol: 1050 (g/mL) mL Lab File ID: 0807042-07A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/21/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	9.5	U	
100-02-7	4-Nitrophenol	9.5	U	
132-64-9	Dibenzofuran	4.8	U	
121-14-2	2,4-Dinitrotoluene	4.8	U	
84-66-2	Diethylphthalate	4.8	U	
86-73-7	Fluorene	4.8	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	4.8	U	
100-01-6	4-Nitroaniline	9.5	U	
534-52-1	4,6-Dinitro-2-methylphenol	9.5	U	
86-30-6	N-Nitrosodiphenylamine (1)	4.8	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	4.8	U	
101-55-3	4-Bromophenyl-phenylether	4.8	U	
118-74-1	Hexachlorobenzene	4.8	U	
1912-24-9	Atrazine	4.8	U	
87-86-5	Pentachlorophenol	9.5	U	
85-01-8	Phenanthrene	4.8	~~U~~	R RE
120-12-7	Anthracene	4.8	~~U~~	R RE
86-74-8	Carbazole	4.8	U	
84-74-2	Di-n-butylphthalate	4.8	U	
206-44-0	Fluoranthene	4.8	~~U~~	R RE
129-00-0	Pyrene	4.8	~~U~~	R RE
85-68-7	Butylbenzylphthalate	4.8	U	
91-94-1	3,3'-Dichlorobenzidine	4.8	U	
56-55-3	Benzo (a) anthracene	4.8	~~U~~	R RE
218-01-9	Chrysene	4.8	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	4.1	J	
117-84-0	Di-n-octylphthalate	4.8	U	
205-99-2	Benzo (b) fluoranthene	4.8	U	R RE
207-08-9	Benzo (k) fluoranthene	4.8	U	
50-32-8	Benzo (a) pyrene	4.8	U	
193-39-5	Indeno (1,2,3-cd) pyrene	4.8	U	
53-70-3	Dibenzo (a,h) anthracene	4.8	U	
191-24-2	Benzo (g,h,i) perylene	4.8	U	
58-90-2	2,3,4,6-Tetrachlorophenol	4.8	U	

[1] Cannot be separated from Diphenylamine

3

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-EB02-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-07

Sample wt/vol: 1050 (g/mL) mL Lab File ID: 0807042-07A60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/21/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl alcohol	14.11	4.2	JN
02	621-59-0	Benzaldehyde, 3-hydroxy-4-methoxy-	27.04	2.0	JN
03		UNKNOWN	29.91	2.2	J
04	0-00-0	7,9-Di-tert-butyl-1-oxaspiro(4,5)dec	34.25	6.0	JN
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
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16					
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18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

PW 10/23/08

USEPA REGION II WORKSHEETS

SOP HW-35
Revision 1
August 2007

SOP NO. HW-35/SVOA Data Validation
USEPA Contract Laboratory Program
Statement of Work for Organic Analysis of Low/Medium Concentration of Semivolatile Organic Compounds SOM01.2

Prepared by: George Karras Date: 8/13/07
George Karras, Chemist
Hazardous Waste Support Section

Peer Reviewed by: Russell Arnone Date: 10/3/07
Russell Arnone, Chemist
Hazardous Waste Support Section

Concurred by: Linda Mauel Date: 10/8/07
Linda Mauel, Chief
Hazardous Waste Support Section

Approved by: Robert A. Runyon Date: 10/10/07
Robert Runyon, Chief
Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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INTRODUCTION

Scope and Applicability

This SOP offers detailed guidance in evaluating laboratory data generated according to the method in the "USEPA Contract Laboratory Program Statement of Work for Organics Analysis Multi-Media, Multi-Concentration, SOM01.1, May 2005". The validation procedures and actions discussed in this document are based on the requirements set forth in the "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, January 2005". This document attempts to cover technical problems specific to low/Medium concentration of semivolatile compounds. Situations may arise where data limitations must be assessed based on the reviewer's own professional judgement.

In addition to technical requirements, contractual requirements may also be covered in this document. While it is important that instances of contract non-compliance be addressed in the Data Assessment, the technical criteria are always used to qualify the analytical data.

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 as follows:

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.

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

P - Pesticide/Aroclor target analytes when the % Difference between the analyte concentrations obtained from the two dissimilar GC columns is greater than 25%.

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 the USEPA Statement of Work SOM01.2 and National Functional Guidelines mentioned above.

YES NO N/A

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PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: N/A **LAB:** Compuchem, Cary, NC

SITE NAME: Vieques Island, PR. **SDG No(s).:** 0807042

1.0 Chain of Custody and Sampling Trip Reports

1.1 Are the Traffic Reports/Chain-of-Custody Records present for all samples? [✓] ___ ___

ACTION: If no, contact RSCC, or the TOPO to obtain replacement of missing or illegible copies from the lab.

1.2 Is the Sampling Trip Report present for all samples? [✓] ___ ___

ACTION: If no, contact either RSCC or ask the TOPO to obtain the necessary information from the prime contractor.

2.0 Data Completeness and Deliverables

2.1 Have any missing deliverables been received and added to the data package? ___ [✓] ___

ACTION: Contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the lab. If lab cannot provide them, note the effect on the review of the data package in the Contract Problems/Non-compliance section of the Data Assessment.

2.2 Was CLASS CCS checklist included with the package? [✓] ___ ___

	YES	NO	N/A
2.3 Are there any discrepancies between the Traffic Reports/Chain-of-Custody Records, Sampling Trip Report and Sample Tags?		[✓]	

ACTION: If yes, contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the laboratory.

3.0 Cover Letter SDG Narrative

3.1 Is the SDG Narrative or Cover Letter Present?	[✓]		
3.2 Are case number, SDG number and contract number contained in the SDG Narrative or cover letter (see SOW, Exhibit B, section 2.5.1)? EPA sample numbers in the SDG, detailed documentation of any quality control, sample, shipment, and/or analytical problems encountered in processing the samples? Corrective action taken?	[✓]		
3.3 Does the Narrative contain the following information SOM01.1, page B-12, section 2.5.1)? column used, storage of samples, case#, SDG#, analytical problems, and discrepancies between field and lab weights.	[✓]		
3.5 Did the contractor record the temperature of the cooler on the Form DC-1, Item 9 - Cooler Temperature, and in the SDG Narrative?	[✓]		
3.6 Does the Case Narrative contain the "verbatim" statement (page B-12, section 2.5.1 of the SOM)?	[✓]		

ACTION: If "No", to any question in this section, contact the TOPO to obtain necessary resubmittals. If unavailable, document under the Contract Problems/ Non-Compliance section of the Data Assessment.

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	YES	NO	N/A

4.0 Data Validation Checklist

4.1 Check the package for the following (see SOM reporting requirements, section 2.1, page B-10):

	YES	NO	N/A
a. Is the package paginated in ascending order starting from the SDG narrative?	[✓]	___	___
b. Are all forms and copies legible?	[✓]	___	___
c. Assembled in the order set forth in the SOW?	[✓]	___	___
d. Semivolatiles Data present?	[✓]	___	

PART A: Low/Medium Semivolatile Analyses

1.0 Sample Conditions/Problems

	YES	NO	N/A
1.1 Do the Traffic Reports/Chain-of-Custody Records, Sampling Trip Report or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	___	[✓]	___

ACTION: If samples were not iced or the ice was melted upon arrival at the laboratory and the temperature of the cooler was > 10° C, then flag all positive results with a "J" and all non-detects "UJ".

2.0 Holding Times

	YES	NO	N/A
2.1 Have any SVOA technical holding times, determined from date of collection to date of analysis, been exceeded?	___	[✓]	___

2.2 Preservation: Aqueous and Non-aqueous samples must be cooled at 4°C ± 2°C.

YES NO N/A

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Action: Qualify sample results according to the following table.

Holding Time Actions for Low/Medium Semivolatile Analyses

Matrix	Preserved	Criteria	Action	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤ 7 days (extraction) < 40 days (analysis)	J*	UJ*
	No	> 7 days (extraction) > 40 days (analysis)	J	UJ
	Yes	≤ 7 days (extraction) ≤ 40 days (analysis)	No qualification	
	Yes	> 7 days (extraction) > 40 days (analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	R
Non-aqueous	No	≤ 14 days (extraction) ≤ 40 days (analysis)	J*	UJ*
	No	> 14 days (extraction) > 40 days (analysis)	J	UJ
	Yes	≤ 14 days (extraction) ≤ 40 days (analysis)	No qualification	
	Yes	> 14 days (extraction) > 40 days (analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	R

* Only if cooler temperature exceeds 10° C (see ACTION in Section 1.1 above). No action required if temperature < 10° C.

3.0 Deuterated Monitoring Compound (DMC) Recovery (Form II)

3.1 Are the Semivolatile DMC Recovery Summaries (Form II) present? [✓] ___ ___

	YES	NO	N/A
ACTION: Contact the TOPO to obtain an explanation/resubmittal from the lab. If missing deliverables are unavailable, document the effect in the Data Assessment.			
3.2 Were outliers marked correctly with an asterisk?	[✓]	___	___
ACTION: Circle all outliers in red.			
3.3 Were more than four of the sixteen (16) Deuterated Monitoring Compounds (DMC's) recoveries outside their corresponding limits?	___	[✓]	___
If yes, were samples re-analyzed?	[ ]	___	✓
Were method blanks re-analyzed?	[ ]	___	✓

Note: Up to four (4) DMCs per sample may fail % recovery but all % recoveries must be > zero.

ACTION: If any DMC is outside the required limits, qualify their associated target compounds (See Table below) as follows:

SEMIVOLATILE DMC AND THEIR ASSOCIATED TARGET COMPOUNDS

Phenol-d5 Benzaldehyde Phenol	**2-Chlorophenol-d4** 2-Chlorophenol	**2-Nitrophenol-d4** Isophorone 2-nitrophenol
Bis(2-Chloroethyl)ether-d8 bis(2-Chloroethyl)ether 2,2'oxybis(1-Chloropropane bis(2-Chloroethoxy)methane	**4-Methylphenol-d8** 2-Methylphenol 4-Methylphenol 2,4 Dimethylphenol	**4-Chloroaniline-d4** 4-Chloroaniline Hexachloro cyclopentadiene 3,3'Dichlorobenzidine

YES NO N/A

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Nitrobenzene-d8 Acetophenone N-Nitro-di-n-propylamine Hexachloroethane Nitrobenzene 2,6-Dinitrotoluene 2,4-Dinitrotoluene N-Nitrodiphenylamine	**2,4-Dichlorophenol-d3** 2,4-Dichlorophenol Hexaclorobutadiene 4-Chloro-3-methylphenol 2,4,6-Trichlorophenol 2,4,5-Trichlorophenol 1,2,4,5-Tetrachloro-benzene Pentachlorophenol 2,3,4,6-Tetrachloro-phenol	**Dimethylphthalate-d6** Caprolactam 1,1'-Biphenyl Dimethylphthalate Diethylphthalate Di-n-butylphthalate Butylbenzylphthalate bis(2-Ethylhexyl)-phthalate Di-n-octylphthalate
Fluorene-d10 Dibenzofuran Fluorene 4-Chlorophenyl-phenylether 4-Bromophenyl-phenylether Carbazole	**Anthracene-d10** Hexachlorobenzene Atrazine Phenanthrene Anthracene	**Pyrene-d10** Fluoranthene Pyrene Benzo(a)anthracene Chrysene
Acenaphthylene-d8 Naphthalene 2-Methylphthalene 2-Chlorophthalene Acenapthylene Acenaphthene	**4-Nitrophenol-d4** 2-Nitroaniline 3-Nitroaniline 2,4-Dinitrophenol 4-Nitrophenol 4-Nitroaniline	**Benzo(a)pyrene-d12** Benzo(b)flur0anthene Benzo(k)fluroanthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)pertlene
4,6-Dinitro-2-methylphenol-d2 4,6-Dinitro-2-methylphenol		

Semivolatile Deuterated Monitoring Compound Recovery Limits for Selective Ion Monitoring (SIM) and the Associated Target Compounds

Fluoranthene-d10 (DMC)	**2-Methylnaphthalene-d10 (DMC)**
Fluoranthene	Naphthalene

Pyrene	2-Methylnaphthalene
Benzo(a)anthracene	Acenaphthylene
Chrysene	Acenaphthene
Benzo(b)fluoranthene	Fluorene
Benzo(k)fluoranthene	Pentachlorophenol
Benzo(a)pyrene	Phenanthrene
Indeno(1,2,3-cd)pyrene	Anthracene
Bibenzo(a,h)anthracene	
Benzo(g,h,i)perylene	

SEMIVOLATILE DEUTERATED MONITORING COMPOUND RECOVERY LIMITS

DMC	Recovery Limits (%) for Water Samples	Recovery Limits (%) for Soil samples
Phenol-d5	39 - 106	17 - 103
Bis-(2-chloroethyl) ether-d8	40 - 105	12 - 9
2-Chlorophenol-d4	41 - 106	13 - 101
4-Methylphenol-d8	25 - 111	8 - 100
Nitrobenzene-d5	43 - 108	16 - 103
2-Nitrophenol-d4	40 - 108	16 - 104
2,4-Dichlorophenol-d3	37 - 105	23 - 104
4-Chloroaniline-d4	1 - 145	1 - 145
Dimethylphthalate-d6	47 - 114	43 - 111
Acenaphthalate-d8	41 - 107	20 - 97
4-Nitrophenol-d4	33 - 116	16 - 166
Fluorene-d10	42 - 111	40 - 108
4,6-Dintro-2-methylphenol-d2	22 - 104	1 - 121

Anthracene-d10	44 - 110	22 - 98
Pyrene-d10	52 - 119	51 - 120
Benzo(a)pyrene-d12	32 - 121	43 - 111
Fluoranthene-d10 (SIM)	5- - 150	50 - 150
2-Methylnaphthalene-d10 (SIM)	50 - 150	50 - 150

Deuterated Monitoring Compound Recovery Action for Semivolatiles

Criteria	Action	
	Detected Associated Compounds	**Non-Detected Associated Compounds**
%R > Upper Acceptance Limit	J	No qualification
%R < Lower acceptance Limit	J	UJ
Lower Acceptance ≤ %R ≤ Upper Acceptance Limit	No qualification	

NOTE: Use the above table to qualify SVOA data including SIM analysis.

NOTE: As per SOM, any sample which has more than 4 DMC's outside the limits, it must be reanalyzed (SOM sec. 11.4.3.1 pg. D-49/Low Medium SVOA).

Blank analysis have DMCs out of specification: 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. For example, if one or more samples in the batch show acceptable DMC recoveries, the reviewer may choose to consider the blank problem to be an isolated occurrence.

ACTION: Note in the Data Assessment under Contract Problems/ Non-Compliance if the Lab did not perform reanalysis and reviewer's judgment regarding blank problem.

	YES	NO	N/A
3.4 Are there any transcription/calculation errors between raw data and form II?	___	[✓]	___

ACTION: If large errors exist, ask the TOPO to obtain an explanation/resubmittal from the lab, make any necessary corrections and note errors in the data assessment.

Note: DMC recovery limits criteria and qualification apply to samples diluted 5X and less. For samples diluted greater than 5X, recovery criteria does not apply Because it is assumed DMC is diluted below the quantitation range.

4.0 Matrix Spike/Matrix Spike Duplicate Recovery (Form III)

Note: Data for MS/MSD will not be present unless requested.

4.1 Are the MS/MSD Recovery Forms (Form III BNA) present?	[ ]	___	✓
4.2 Was the MS/MSD analyzed at the required frequency (once per SDG, or every 20 samples, whichever is more frequent)?	[ ]	___	✓

ACTION: If any MS/MSD data are missing, take action as specified in section 3.1 above.

ACTION: No action is taken on MS/MSD data alone. However, using professional judgement, the validator may use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. If Any MS/MSD % recovery or RPD is out of specification, qualify data to include the consideration of the existence of interference in the raw data. Consideration include, but not limited to the following "Action":

Matrix Spike/Matrix Spike Duplicate Action for Semivolatiles

Criteria	Action	
	Detected Spike Compounds	Non-detected Spike Compounds

YES NO N/A

. . . . . .

%R or RPD > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	Use Professional Judgment
Lower Acceptance Limit ≤ %R; RPD ≤ Upper Acceptance Limit	No qualification required	

Note: If it can be determined that the results of the MS/MSD affects only the sample spiked, limit qualification to only this sample. However, use professional judgment when it is determined through the MS/MSD results that the laboratory is having systematic problem in the analysis of one or more analytes that affect all associated samples.

5.0 Method Blanks (Form IV)

5.1 Is the Semivolatile Method Blank Summary (Form IV BNA) present for aqueous and soil samples? [✓] ___ ___

5.2 Frequency of Analysis: For the analysis of SVOA TCL compounds, has a method blank been analyzed for each SDG or every 20 samples, whichever is more frequent? [✓] ___ ___

5.3 Has a SVOA method blank been analyzed after the calibration standards. [✓] ___ ___

5.4 No target compound concentration may exceed the upper limit of the initial calibration. Did the laboratory perform dilution on compounds exceeding the initial calibration upper limit. [✓] ___ ___

ACTION: If any method blank data is missing or dilution was not done, notify the TOPO to obtain resubmittals or an explanation from the lab. If method blank data are unavailable, the reviewer may use professional judgement, or substitute field blank or trip blank data for missing method blank data.

5.5 Chromatography: Review the blank raw data chromatogram (RICs), quant. Reports or data system printout and spectra. Is the

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

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

5.6 The validator should verify that the correct identification scheme for EPA blanks was used. (See SOM page B-39, section 3.3.7.3 for more information.)

	YES	NO	N/A
Was the correct identification scheme used for all SVOA blanks?	[✓]	___	___

ACTION: Contact the TOPO to obtain corrections from the lab, or make the necessary corrections. Document in the "Contract Problems/Non-Compliance section of the Data Assessment all corrections made by the validator.

	YES	NO	N/A
5.8 Are all detected hits for target compounds in method, and field blanks less than the CRQL?	[✓]	___	___

Exception: Bis(2-ethylhexyl)phthalate must be less than 5X times their respective CRQLs listed in the method.

ACTION: If no, an explanation and laboratory's corrective actions must be addressed in the case narrative. If the narrative contains no explanation, then make a note in the Contract Problems/Non-Compliance section of the Data Assessment.

6.0 Contamination

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

Note: These limits are not advisory.

	YES	NO	N/A
6.1 Do any method blanks contain positive SVOA results (TCL and/or TICs)?	✓	[ ]	___

	YES	NO	N/A
6.2 Do any field/rinse blanks have positive SVOA results (including TICs)?	✓	[ ]	

NOTE: All field blank results associated with 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 system monitoring compound, instrument performance criteria, spectral or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks. If any blanks are grossly contaminated (i.e.,saturated peaks by GC/MS) all associated sample data should be qualified unusable (R).

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
	Gross contamination	Detects	Qualify results as unusable R
	TIC: aqueous	< 5x blank value	R

YES NO N/A

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	TIC: non-aqueous	< 5x blank value	R

* 5x the CRQL for bis(2-ethylhexyl)Phthalate

NOTE: Analytes qualified "U" for blank contamination are treated as "hits" when qualifying for calibration criteria.
Note: When applied as described in the table above, the contaminant concentration in the blank are multiplied by the sample dilution factor.

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

ACTION: 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.

7.0 GC/MS Instrument Performance Check (Form V)

7.1 Are the GC/MS Instrument Performance Check Forms (Form V) present for decafluorotriphenylphosphine (DFTPP)? [✓] ___ ___

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

7.3 Did the 12-hour clock begin with either the injection of DFTPP, or in cases where a closing continuing calibration (CCV) was used as an opening CCV? [✓] ___ ___

Listed below are some, but not necessarily all, examples of acceptable analytical sequences incorporating the use of the opening/closing CCV. Use these examples as a guide for possible analytical sequences that can be expected.

YES NO N/A

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Conditions for When Example Sequence is Appropriate:	Acceptable Criteria That Must be Met:	Notes:
If time remains on the 12 hour clock after initial calibration sequence	• DFTPP tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets both opening and closing CCV criteria • CCV B meets closing CCV criteria.	The requirement of starting the new 12-hr clock for Analytical Sequence 2 with a new DFTPP tune is waived if CCV A meets opening CCV criteria. If CCV B meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.
If time remains on the 12 hour clock after initial calibration sequence	• DFTPP tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets closing CCV criteria (but does not meet opening CCV criteria). • CCV B meets opening CCV criteria. • CCV C meets closing CCV Criteria.	CCV A does not meet opening criteria, therefore a new DFTPP tune must be performed, immediately followed by CCV B before a method blank and any sample may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new DFTPP tune.
If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV. OR If the most recent closing CCV was not or could not be used as an opening CCV.	• DFTPP tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets both opening and closing CCV criteria. • CCV C meets both opening and closing CCV criteria.	The requirement of starting the new 12 hour clock for Analytical Sequence 2 with a new DFTPP tune is waived if CCV B meets opening CCV criteria. If CCV C meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.

YES NO N/A

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If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV OR If the most recent closing CCV was not or could not be used as an opening CCV	• DFTPP tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets closing CCV criteria (but does not meet opening CCV criteria). • CCV C meets opening CCV Criteria. • CCV D meets both opening and closing CCV criteria.	CCV B does not meet opening CCV criteria, therefore a new DFTPP tune must be performed, immediately followed by CCV B before a method blank and any samples may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new DFTPP tune. The requirement of starting the new 12 hr clock for Analytical Sequence 3 with a new DFTPP tune is waived if CCV D meets opening CCV criteria. If CCV D meets opening criteria, a method blank and subsequent samples may be analyzed after CCV B.

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

NOTE: All ion abundance ratios must be normalized to m/z 198, the nominal base peak, even though the ion abundance of m/z 442 may be up to 100% that of m/z 198.

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

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

ACTION: If ion abundance criteria are not met, professional Judgement to determine to what extent the data may be utilized.

NOTE: Guidelines to aid in the application of professional judgment in evaluating ion abundance criteria are discussed below:

a. Some of the most critical factors in the DFTPP criteria are the non-instrument specific requirements that are also not unduly affected by the location of the spectrum on the chromatographic profile. The m/z ratios for 198/199 and 442/443 are critical. These ratios are based on the natural abundance of carbon 12 and carbon 13 and should always be met. Similarly, the relative abundance of m/z 68, 70, 197, and 441 indicate the condition of the instrument and the suitability of the resolution adjustment. Note that all of the foregoing abundance relate to adjacent ions; they are relatively insensitive to differences in instrument design and position of the spectrum on the chromatographic profile.

YES NO N/A

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b. For the ions at m/z 51, 127, and 275, the actual relative abundance is not as critical. For instance, if m/z 275 has 80.0% relative abundance (criteria 10.0-60.0%) and other criteria are met, the deficiency is minor.

c. The relative abundance of m/z 365 is an indicator of suitable instrument zero adjustment. If relative abundance for m/z 365 is zero, minimum detection limits may be affected. On the other hand, if m/z 365 is present, but < 0.75% minimum abundance criteria, the deficiency is not as serious.

7.6 Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

7.7 Is the number of significant figures for the reported relative abundances consistent with the number given in the ion abundance criteria column on Form V ? [✓] ___ ___

ACTION: If large errors exist, take action as specified in section 3.1 above.

7.8 Is the spectrum of the mass calibration compound acceptable? [✓] ___ ___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

Note: The requirement to analyze the instrument performance check solution is optional when analysis of Polynuclear Hydrocarbon (PAHs)/pentachlorophenol is to be performed by the Selected Ion Monitoring (SIM) technique.

8.0 <u>Target Compound List (TCL) Analytes (Form I)</u>

8.1 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. Regional Control/MS/MSD samples? [✓] ___ ___

c. Blanks (method, field, etc)? [✓] ___ ___

8.2 Are the SVOA Reconstructed Ion Chromatograms, the 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. Regional Control/MS/MSD samples? [✓] ___ ___

	YES	NO	N/A
c. Blanks (method, field, etc)?	[✓]	___	___

ACTION: If any data are missing, take action specified in 3.1 above.

8.3 Is chromatographic performance acceptable with respect to:

	YES	NO	N/A
Baseline stability?	[✓]	___	___
Resolution?	[✓]	___	___
Peak shape?	[✓]	___	___
Full-scale graph (attenuation)?	[✓]	___	___
Other: _____?	[ ]	___	✓

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

	YES	NO	N/A
8.4 Are lab-generated standard mass spectra of the identified SVOA compounds present for each sample?	[✓]	___	___

ACTION: If any mass spectra are missing, take action as specified in 3.1 above. If lab does not generate their own standard spectra, make note under the "Contract Problems/Non-Compliance" section of the Data Assessment. If spectra are unavailable reject "R" the reported results.

	YES	NO	N/A
8.5 Is the RRT of each reported compound within ± 0.06 RRT units of the standard RRT in the continuing calibration verification or initial calibration mid-point standard?	[✓]	___	___
8.6 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
8.7 Do sample and standard relative ion intensities agree to within ± 20% between standard and sample spectra?	[✓]	___	___

ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be 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 sections 8.4-8.7 above.

	YES	NO	N/A
. . . . .			

ACTION: When sample carry-over is suspected, use professional judgment to determine if instrument cross-contamination has affected positive compound identifications.

9.0 Tentatively Identified Compounds (TIC)

		YES	NO	N/A
9.1	Are all Tentatively Identified Compound Forms (Form I SVOA-TIC) present? Do listed TICs include scan number or retention time, as well as the estimated "J" and/or "JN" qualifier?	[✓]	___	___
9.2	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 3.1 above.

ACTION: Verify "JN" qualifier is present for all chemically named TICs having a percent match of greater than or equal 85%. TICs labeled "unknown" are qualified with a "J" qualifier.

		YES	NO	N/A
9.3	Are any target compounds (from any fraction) listed as TICs? (Example: 1,2-dimethylbenzene is xylene - a VOA target analyte - and should not be reported as a TIC.)	___	[✓]	___

ACTION: Flag with "R" only target compound detected in another fraction. (except blank contamination - see blank table in sec 6.3 above)

		YES	NO	N/A
9.4	Are major ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample spectrum?	[✓]	___	___
9.5	Do TICs and "best match" reference spectra relative ion intensities agree within ± 20%?	[✓]	___	___

ACTION: Use professional judgement to determine the acceptability of TIC identifications. If it is determined that an incorrect identification was made, change its identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.

Action: When a compound is not found in any blank, but is detected in a sample and is a suspected artifact of a common laboratory contaminant, solvent preservatives or Aldo condensation, the result should be qualified as

YES NO N/A

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unusable (R). (i.e., common lab contaminants such as CO_2(m/e 44), Siloxanes (m/e 73), diethyl ether, hexane, certain freons and phthalates at < 100 ug/L. Aldol condensation products: 4-hydroxy-4-methyl-2-pentanone, 4-methyl-2-penten-2-one, and 5,5-dimethyl-2(H)-furanone. Solvent preservatives cyclohexene, and related by-products: cyclohexanone, cyclohexenone, cyclohexanol, cyclohexenol, chlorocyclohexene, and chlorocyclohexanol.).

10.0 Compound Quantitation and Reported Detection Limits

10.1 Are there any transcription/calculation errors in Form I results? (Check at least two positive values. Verify that the correct internal standards, quantitation ions, and RRFs were used to calculate Form I results.) ___ [✓] ___

10.2 Are the CRQLs adjusted to reflect sample dilutions? [✓] ___ ___

ACTION: If errors are large, take action as specified in section 3.1 above.

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQLs data from the diluted sample). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original Form I and substituting the data from 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 not to be used, including any in the data summary package.

10.3 For non-aqueous samples, were the percent moisture < 70%? [ ] ___ ✓

Action: If the % moisture ≥ 70.0% and < 90.0%, qualify detects as "J" and non-detects as approximated "UJ" If the % Moisture ≥ 90%, qualify detects as "J" and non-detects as "R"

11.0 Standards Data (GC/MS)

11.1 Are the reconstructed ion chromatograms, and data system printouts (quant. reports) present for each initial and continuing calibration? [✓] ___ ___

ACTION: If any calibration standard data are missing, take action specified in section 3.1 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI SVOA) present and complete for the semivolatile target compounds (except seven listed below) at concentrations of 5, 10, 20, 40,

YES NO N/A

. . . . . .

and 80 µg/ℓ and 4-point calibration at 10, 20, 40, and 80 ug/L for 2,4-dinitrophenol, pentachlorophenol, 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, 4-nitrophenol and 4,6-dinitro-2-methylphenol? [✓] ___ ___

Note: If analysis by Selected Ion Monitoring (SIM) technique is requested for PAHs/pentachlorophenols, calibration standards are analyzed at 0.10, 0.20, 0.40, 0.80 and 1.0 ng/uL for each target compound of interest and the associated DMCs. Pentachlorophenol will require only a four-point initial calibration at 0.20, 0.40, 0.80 and 1.0 ng/uL.

ACTION: If any Initial Calibration forms are missing, take action as specified in section 3.1 above.

12.2 Are the relative standard deviation (RSD) stable for SVOA's over the concentration range of the calibration (i.e., %RSD ≤ 20%, and ≤ 40% for poor performers (see table below)? [✓] ___ ___

ACTION: Circle all outliers in red.

NOTE: The twenty two (25) poor performers compounds and associated DMCs are listed below. The relative response factor (RRF) for these compounds must be greater than or equal to 0.010. The RRF for all other BNA target compounds must be ≥ 0.050.

Semivolatile Compounds Exhibiting Poor Response

Semivolatile Compounds	
2,2'-Oxybis(1-chloropropane)	Benzaldehyde
4-Chloroaniline	4-Nitroaniline
Hexachlorobutadiene	4,6-Dinitro-2-methylphenol
Hexachlorocyclopentadiene	N-Nitrosodiphenylamine
2-Nitroaniline	3,3'Dichlorobenzidine
3-Nitroaniline	1,1'Biphenyl
2,4-Dinitrophenol	Dimethylphthalate
4-Nitrophenol	Diethylphthalate
Acetophenone	1,2,4,5-Tetrachlorobenzene
Caprolactam	Carbazole

YES NO N/A

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Atrazine	Butylbenzylphthalate
Di-n-butylphthalate	Di-n-octylphthalate
Bis-2(ethylhexyl)phthalate	

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

12.3 Are any $\overline{RRF}$s < 0.050 (< 0.010 for poor performers)? ___ [✓] ___

ACTION: Circle all outliers in red.

ACTION: Use the following table to qualify for detects and non-detect compounds.

Initial Calibration Actions for Semivolatile Analyses

Criteria for Semivolatile Analysis	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RRF < 0.010 (compounds exhibiting poor response) RRF < 0.050 (all other target compounds)	J	R
RRF ≥ 0.010 (compounds exhibiting poor response) RRF ≥ 0.050 (all other target compounds)	No qualification	
%RSD ≤ 40.0% (compounds exhibiting poor response) %RSD ≤ 20.0% (all other target compounds)	No qualification	
%RSD > 40.0% (compounds exhibiting poor response) %RSD > 20.0% (all other target compounds)	J	No qualification

ACTION: Document in the Data Assessment Report the analytes that fail %RSD and/or RRF criteria.

12.4 Are there any transcription/calculation errors in the reporting of RRFs, RRFs or %RSD values? (Check at least 2 values, but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

ACTION: If errors are large, contact the TOPO to obtain an explanation/resubmittal from the lab, document in the Data Assessment under Contract Problems/Non-Compliance.

	YES	NO	N/A
. . . . .			

13.0 GC/MS Continuing Calibration Verification (CCV) (Form VII)

		YES	NO	N/A
13.1	Are the Continuing Calibration Forms (Form VII SVOA) present and complete for the semivolatile fraction?	[✓]	___	___
13.2	Did the 12 hour clock begin with either the injection of DFTPP or in cases where a closing CCV can be used as an opening CCV for each instrument?	[✓]	___	___

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, ask the TOPO to obtain explanation/resubmittal from the laboratory. If continuing calibration data are unavailable, flag all associated sample data as unusable (R).

		YES	NO	N/A
13.3	Do any semivolatile compounds have a % Difference (% D) between the initial RRF and CCV RRF exceeding ± 40% for the poor performers (see table/page 22) or ± 25% for the remaining compounds?	___	[✓]	___

ACTION: Circle all outliers in red.

		YES	NO	N/A
13.4	Do any semivolatile compounds have a RRF < 0.05 or < 0.01 for the poor performers?	___	[✓]	___

ACTION: Circle all outliers in red.

Note: Verify that the CCV was run at the required frequency (an opening and closing CCV must be run within 12-hour period) and the CCV was compared to the correct initial calibration. If the mid-point standard from the initial calibration is used as an opening CCV, verify that the result (RRF) of the mid-point standard was compared to the average RRF from the correct initial calibration.

Note: The closing CCV used to bracket the end of a 12-hour analytical sequence may be used as the opening CCV for the new 12-hour analyical sequence, provided that all the technical acceptance criteria are met for an opening CCV (see table below). If the closing CCV does not meet the technical acceptance criteria for an opening CCV, then a DFTPP tune followed by an opening CCV is required and the next 12-hour time period begins with the DFTPP tune.

Action: Use the following table to qualify data based on the technical acceptance criteria for the opening CCV and closing CCV.

Continuing Calibration Verification (CCV) Actions for Low/Medium Semivolatiles Analyses

Criteria for Opening CCV	Criteria for Closing CCV	Action	
		Detected Associated Compounds	Non-Detected Associated Compounds

YES NO N/A

. . . . . .

RRF < 0.010 (poor responders) RRF < 0.050 (for all other compounds)	RRF < 0.010 (for all target compounds)	J	R
RRF ≥ 0.010 (poor responders) RRF ≥ 0.050 (all other target compounds)	RRF ≥ 0.010 (for all target compounds)	No Action	
%D > 40.0 or < -40.0 (poor responders) %D > 25.0 or < -25.0 (all other volatile target compounds)	%D > 50.0 or < -50.0 (for all target compounds)	J	UJ
%D ≤ 40.0 or ≥ -40.0 (poor responders) %D ≤ 25.0 or ≥ -25.0 (all other target compounds)	%D ≤ 50.0 or ≥ -50.0 (for all target compounds)	No Action	
Opening CCV not performed at required frequency *	Closing CCV not performed at required frequency *	R	

* The 12-hour clock begins with either the injection of DFTPP or in cases where a closing CCV can be used as an opening CCV, the 12-hour clock begins with the injection of the opening CCV.

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance if more than two of the required analytes failed the above acceptance criteria.

13.5 Are there any transcription/calculation errors for the reporting of RRFs, or %D between initial RRFs and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [√] ___

ACTION: Circle errors with red pencil.

ACTION: If errors are large, notify the TOPO to obtain explanation/resubmittals from the lab. Document errors in the Contract Problems/Non-Compliance section of the Data Assessment.

Note: All DMCs must meet RRF ≥ 0.010. No qualification of the data is necessary on the DMCs RRF and %RSD/%Diff data alone. However, use professional judgment to evaluate the DMC and %RSD/% Diff data in conjunction with the DMC recoveries to determine the need of qualification of the data.

14.0 Internal Standard (Form VIII)

14.1 Were the internal standard area counts for every sample and blank within the range of 50.0% and 200.0% of its response from the associated 12-hour calibration (opening CCV or mid-point initial calibration standard? [√] ___ ___

If no, were affected samples reanalyzed? [√] ___ ___

ACTION: 1. Circle all outliers with red pencil.

14.2 Are the retention times of the internal standards in sample or blanks within ± 30 seconds from the RT of the

	YES	NO	N/A
internal standard in the 12-hour associated calibration standard (opening CCV or mid-point standard from initial calibration)?	✓		

Action: Use the following table to qualify the data

INTERNAL STANDARDS ACTIONS FOR LOW/MEDIUM SEMIVOLATILES

Criteria	ACTION	
	Detected Associated Compounds *	Non-detected Associated Compounds *
Area counts ≥ 50% and ≤ 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	No Action required	
Area counts < 50% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J	R
Area counts > 200% of 12-hour standard (Opening CCV or mid-point standard from initial calibration)	J	No Action
RT difference > 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	R	
RT difference ≤ 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	No Action required	

* For semivolatile compounds associated to each internal standard, see Table 2-Semivolatile standards corresponding Target and Deuterated Monitoring Compounds for Quantitation in SOM01.1, Exhibit D, available at:

Http://www.epa.gov/superfund/programs/clp/som1.htm

Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable "R" if the mass spectral are met.

NOTE: Contract Requirements: The SOM (section 11.4.4 page D-50/SVOA Low/Medium states that any sample which fails the acceptance criteria for internal standard response must be reanalyzed.

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance any sample(s) which failed the above IS acceptance criteria.

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15.0 Field Duplicates

15.1 Were any field duplicates submitted for Low Concentration SVOA analysis? [ ] ___ ✓

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

ACTION: Any gross variation between duplicate results must be addressed in the reviewer narrative. If large differences exist, contact the TOPO to confirm identification of field duplicates with the sampler.

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Definitions

CCS - contract compliance screening
CLASS - Contract Laboratory Analytical Services Support
CLP - Contract Laboratory Program
CRQL - Contract Required Quantitation Limit
DFTPP - decafluorotriphenylphosphine
GC/MS - gas chromatography/mass spectroscopy
kg - kilogram
µg - microgram
ℓ - liter
mℓ - milliliter
QC - quality control
RAS - Routine Analytical Services
RIC - reconstructed ion chromatogram
RPD - relative percent difference
RRF - relative response factor
$\overline{RRF}$ - 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
SOP - standard operating procedure
SOW - Statement of Work
SVOA - semivolatile organic acid
TCL - Target Compound List
TCLP - Toxicity Characteristics Leachate Procedure
TIC - tentatively identified compound
TPO - technical project officer
VTSR - validated time of sample receipt
TOPO - Task Order Project Officer

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References

1. USEPA Contract Laboratory Program of Work for Organic Analysis Multi-Media, Multi-Concentration, SOW/CLPSOM01.1, October 2004
2. National Functional Guidelines for Superfund Organic Methods Data Review January 2005

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

ENVIRONMENTAL
Data Services, Inc.

LOW CONCENTRATION VOLATILE ORGANIC COMPOUNDS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807042

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 22, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-TB01-071608	0807042-001	Water
2	VWAE-EB01-071708	0807042-003	Water
3	VWAE-TB01-071708	0807042-004	Water
4	VWAE-TB01-071808	0807042-005	Water
5	VWAE-EB01-071808	0807042-006	Water
6	VWAE-EB02-071708	0807042-007	Water

The USEPA Region II SOP HW-33, Revision 1, August 2007: USEPA CLP Statement of Work for Organic Analysis of Low/Medium Concentration of Volatile Organic Compounds SOM01.2 Data Validation and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were analyzed within 14 days for preserved water samples.

Surrogates - All samples exhibited acceptable surrogate recoveries except the following.

Sample ID	Surrogate	%R	Qualifier
3	1,4-Dioxane-d8	44%	UJ
4	1,4-Dioxane-d8	44%	UJ
5	1,4-Dioxane-d8	49%	UJ
6	1,4-Dioxane-d8	46%	UJ

MS/MSD - A MS/MSD samples was not analyzed.

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VBLKDF	Methylene Chloride	2.1	U	1, 3, 4, 5
	1,2,4-Trichlorobenzene	0.39	None	All ND
	1,2,3-Trichlorobenzene	0.46	None	All ND

Trip, Field, Equipment Blank - These are field QC samples and will be applied to other packages. The results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-TB01-071608	None - ND	-	-	-
VWAE-EB01-071708	Acetone	58	-	-
	Methylene	14	-	-
	Chlorofrom	41	-	-
	4-Methyl-2-pentanone	3.1	-	-
	Toluene	0.71	-	-
VWAE-TB01-071708	None - ND	-	-	-
VWAE-TB01-071808	None - ND	-	-	-
VWAE-EB01-071808	Acetone	49	-	-
	4-Methyl-2-pentanone	2.8	-	-
VWAE-EB02-071708	Acetone	50	-	-
	Methylene chloride	12	-	-
	4-Methyl-2-pentanone	2.5	-	-
	Toluene	0.54	-	-

GC/MS Instrument Performance Check - All of the BFB tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were not reported for the samples in this data package.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate samples were not included in this data package.

ANNOTATED FORM Is

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1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-TB01-071608

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-01

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0191.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/17/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U
67-64-1	Acetone	10	U
75-15-0	Carbon disulfide	5.0	U
79-20-9	Methyl acetate	5.0	U
75-09-2	Methylene chloride	5.0 ~~0.63~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-Butanone	10	U
74-97-5	Bromochloromethane	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
110-82-7	Cyclohexane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
123-91-1	1,4-Dioxane	100	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

hrl 10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-TB01-071608

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-01

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0191.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/17/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-01-6	Trichloroethene	5.0	U
108-87-2	Methylcyclohexane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	10	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
95-47-6	o-Xylene	5.0	U
179601-23-1	m,p-Xylene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	U

hW
10/21/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-TB01-071608

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-01

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0191.d

Level: (TRACE or LOW/MED) LOW Date Received: 07/17/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
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20					
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22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

hW 10/21/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-03

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0391.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/18/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U
67-64-1	Acetone	58	
75-15-0	Carbon disulfide	5.0	U
79-20-9	Methyl acetate	5.0	U
75-09-2	Methylene chloride	14	~~B~~
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-Butanone	10	U
74-97-5	Bromochloromethane	5.0	U
67-66-3	Chloroform	41	
71-55-6	1,1,1-Trichloroethane	5.0	U
110-82-7	Cyclohexane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
123-91-1	1,4-Dioxane	100	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW
10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-03

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0391.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/18/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-01-6	Trichloroethene	5.0	U
108-87-2	Methylcyclohexane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	3.1	J
108-88-3	Toluene	0.71	J
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
95-47-6	o-Xylene	5.0	U
179601-23-1	m,p-Xylene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	U

LW 10/21/08

2

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-EB01-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-03

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0391.d

Level: (TRACE or LOW/MED) LOW Date Received: 07/18/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lcw 10/21/08

3

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-TB01-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-04

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0491.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/18/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U
67-64-1	Acetone	10	U
75-15-0	Carbon disulfide	5.0	U
79-20-9	Methyl acetate	5.0	U
75-09-2	Methylene chloride	5.0 ~~0.80~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-Butanone	10	U
74-97-5	Bromochloromethane	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
110-82-7	Cyclohexane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
123-91-1	1,4-Dioxane	100	~~U~~ UJ SSL

Report 1,4-Dioxane for Low-Medium VOA analysis only

hW 10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-TB01-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-04

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0491.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/18/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-01-6	Trichloroethene	5.0	U
108-87-2	Methylcyclohexane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	10	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
95-47-6	o-Xylene	5.0	U
179601-23-1	m,p-Xylene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	U

lcw 10/21/08

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-TB01-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-04

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0491.d

Level: (TRACE or LOW/MED) LOW Date Received: 07/18/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
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11					
12					
13					
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22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lw 10/21/08

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1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-TB01-071808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-05

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0591.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U
67-64-1	Acetone	10	U
75-15-0	Carbon disulfide	5.0	U
79-20-9	Methyl acetate	5.0	U
75-09-2	Methylene chloride	5.0 ~~0.79~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-Butanone	10	U
74-97-5	Bromochloromethane	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
110-82-7	Cyclohexane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
123-91-1	1,4-Dioxane	100	~~U~~ UJ SSL

Report 1,4-Dioxane for Low-Medium VOA analysis only

lw 10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-TB01-071808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-05

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0591.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-01-6	Trichloroethene	5.0	U
108-87-2	Methylcyclohexane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	10	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
95-47-6	o-Xylene	5.0	U
179601-23-1	m,p-Xylene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	U

RW 10/21/08

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-TB01-071808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-05

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0591.d

Level: (TRACE or LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
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18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

MW 10/21/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-071808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-06

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0691.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U
67-64-1	Acetone	49	
75-15-0	Carbon disulfide	5.0	U
79-20-9	Methyl acetate	5.0	U
75-09-2	Methylene chloride	9.5	~~B~~ U BL
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-Butanone	10	U
74-97-5	Bromochloromethane	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
110-82-7	Cyclohexane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
123-91-1	1,4-Dioxane	100	~~U~~ UJ SSL

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW 10/21/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-071808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-06

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0691.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-01-6	Trichloroethene	5.0	U
108-87-2	Methylcyclohexane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	2.8	J
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
95-47-6	o-Xylene	5.0	U
179601-23-1	m,p-Xylene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	U

LW 10/21/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-EB01-071808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-06

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0691.d

Level: (TRACE or LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
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16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

KW 10/21/08

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1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB02-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-07

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0791.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U
67-64-1	Acetone	50	
75-15-0	Carbon disulfide	5.0	U
79-20-9	Methyl acetate	5.0	U
75-09-2	Methylene chloride	12	~~B~~
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-Butanone	10	U
74-97-5	Bromochloromethane	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
110-82-7	Cyclohexane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
123-91-1	1,4-Dioxane	100	~~U~~ UJ SSC

Report 1,4-Dioxane for Low-Medium VOA analysis only

hW
10/21/08

6

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB02-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-07

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0791.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-01-6	Trichloroethene	5.0	U
108-87-2	Methylcyclohexane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	2.5	J
108-88-3	Toluene	0.54	J
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
95-47-6	o-Xylene	5.0	U
179601-23-1	m,p-Xylene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	U

MW 10/21/08

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-EB02-071708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807042-07

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 0807042-0791.d

Level: (TRACE or LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

CW
10/21/08

USEPA REGION II WORKSHEETS

SOP HW-33/VOA
Revision 1
August 2007

USEPA Contract Laboratory Program
Statement of Work for Organic Analysis of Low/Medium Concentration of VolatileOrganic Compounds SOM01.2
Data Validation

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Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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INTRODUCTION

Scope and Applicability

This SOP offers detailed guidance in evaluating laboratory data generated according to the method in the "USEPA Contract Laboratory Program Statement of Work for Organics Analysis Multi-Media, Multi-Concentration, SOM01.1, May 2005". The validation procedures and actions discussed in this document are based on the requirements set forth in the "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, January 2005". This document attempts to cover technical problems specific to low/Medium concentration of volatile compounds. Situations may arise where data limitations must be assessed based on the reviewer's own professional judgement.

In addition to technical requirements, contractual requirements may also be covered in this document. While it is important that instances of contract non-compliance be addressed in the Data Assessment, the technical criteria are always used to qualify the analytical data.

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 as follows:

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.

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

P - Pesticide/Aroclor target analytes when the % Difference between the analyte concentrations obtained from the two dissimilar GC columns is greater than 25%.

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 the USEPA Statement of Work SOM01.2 and National Functional Guidelines mentioned above.

YES NO N/A

. . . . . .

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: N/A **LAB:** Compuchem, Cary, NC

SITE NAME: Vieques Island, PR **SDG No(s).:** 0807042

1.0 Chain of Custody and Sampling Trip Reports

1.1 Are the Traffic Reports/Chain-of-Custody Records present for all samples? [✓] ___ ___

ACTION: If no, contact RSCC, or the TOPO to obtain replacement of missing or illegible copies from the lab.

1.2 Is the Sampling Trip Report present for all samples? [✓] ___ ___

ACTION: If no, contact either RSCC or ask the TOPO to obtain the necessary information from the prime contractor.

2.0 Data Completeness and Deliverables

2.1 Have any missing deliverables been received and added to the data package? ___ [✓] ___

ACTION: Contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the lab. If lab cannot provide them, note the effect on the review of the data package in the Contract Problems/Non-compliance section of the Data Assessment.

2.2 Was CLASS CCS checklist included with the package? [✓] ___ ___

	YES	NO	N/A
. . . . .			
2.3 Are there any discrepancies between the Traffic Reports/Chain-of-Custody Records, and Sampling Trip Report?		[✓]	

ACTION: If yes, contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the laboratory.

3.0 <u>Cover Letter SDG Narrative</u>

3.1 Is the SDG Narrative or Cover Letter Present?	[✓]		
3.2 Are case number, SDG number and contract number contained in the SDG Narrative or cover letter (see SOW, Exhibit B, section 2.5.1)? EPA sample numbers in the SDG, detailed documentation of any quality control, sample, shipment, and/or analytical problems encountered in processing the samples? Corrective action taken?	[✓]		
3.3 Does the Narrative contain the following information SOM01.1, page B-12, section 2.5.1)? Description of trap, column used, storage of samples, case#, SDG#, analytical problems, and discrepancies between field and lab weights.	[✓]		
3.4 Does the narrative, VOA section, contain a list of all TICs identified as alkanes and their estimated concentrations?	[✓]		
3.5 Did the contractor record the temperature of the cooler on the Form DC-1, Item 9 - Cooler Temperature, and in the SDG Narrative?	[✓]		
3.6 Does the narrative contain a list of the pH values determined for each water sample submitted for volatiles analysis (SOW, page B-13, section 2.5.1.2)?	[✓]		

	YES	NO	N/A
. . . . .			
3.7 Does the Case Narrative contain the "verbatim" statement (page B-12, section 2.5.1 of the SOM)?	[✓]	___	___

ACTION: If "No", to any question in this section, contact the TOPO to obtain necessary resubmittals. If unavailable, document under the Contract Problems/ Non-Compliance section of the Data Assessment.

4.0 Data Validation Checklist

4.1 Check the package for the following (see SOM reporting requirements, section 2.1, page B-10):

a. Is the package paginated in ascending order starting from the SDG narrative?	[✓]	___	___
b. Are all forms and copies legible?	[✓]	___	___
c. Assembled in the order set forth in the SOW?	[✓]	___	___
d. Low/Med Concentration Volatiles Data present?	[✓]	___	___

Action: Take action as specified in section 3.7 above.

PART A: Low/Medium Volatile ANALYSES

1.0 Sample Conditions/Problems

1.1 Do the Traffic Reports/Chain-of-Custody Records, Sampling Trip Report or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	___	[✓]	___

ACTION: If samples were not iced or the ice was melted upon arrival at the laboratory and the temperature of the

YES NO N/A

. . . . . .

cooler was > 10° C, then flag all positive results with a "J" and all non-detects "UJ".

ACTION: If both 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".

2.0 Holding Times

2.1 Have any VOA technical holding times, determined from date of collection to date of analysis, been exceeded? ___ [✓] ___

2.2 Preservation: Aqueous samples must be preserved with HCL to pH of 2 or below and cooled at 4°C ± 2°C. Non-aqueous samples: frozen (less than -7°C) or properly cooled (4°C ± 2°C) and preserved with $NaHSO_4$.

Action: Qualify sample results according to the following table.

Holding Time Actions for Low/Medium Volatile Analyses

Matrix	Preserved	Criteria	ACTION	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤ 7 Days	NO Action	
	No	> 7 Days	J	R
	Yes	≤ 14 Days	No Action	
	Yes	> 14 Days	J	R
Non-Aqueous	No	≤ 14 Days	J	R
	Yes	≤ 14 Days	No Action	
	Yes/No	> 14 Days	J	R

3.0 Deuterated Monitoring Compound (DMC) Recovery (Form II)

	YES	NO	N/A
. . . . .			
3.1 Are the Volatile SMC Recovery Summaries (Form II present?	[✓]	___	___

ACTION: Contact the TOPO to obtain an explanation/resubmittal from the lab. If missing deliverables are unavailable, document the effect in the Data Assessment.

3.2 Were outliers marked correctly with an asterisk?	[✓]	___	___

ACTION: Circle all outliers in red.

3.3 Were more than three of the fourteen (14) Deuterated Monitoring Compounds (DMC's) recoveries outside their corresponding limits?	___	[✓]	___
If yes, were samples re-analyzed?	[ ]	___	✓
Were method blanks re-analyzed?	[ ]	___	✓

ACTION: If any DMC is outside the required limits (see Table below), qualify their associated target compounds (See Table below) as follows:

VOLATILE DMC AND THEIR ASSOCIATED TARGET COMPOUNDS

Chloroethane-d5	**1,2-Dichloropropane-d6**	**1,2-Dichlorobenzene-d4**
Dichlorodifluoromethane Chloromethane Bromomethane Chloroethane Carbon Disulfide	Cyclohexane Methylcyclohexane 1,2-Dichloropropane Bromodichloromethane	Chlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene 1,2,3-Trichlorobenzene

YES NO N/A

. . . . . .

1,4-Dioxane-d8 1,4-Dioxane	**trans-1,3-Dichloropropene-d4** cis-1,3-Dichloropropene trans-1,3-Dichloropropene 1,1,2-Trichloroethane	**Chloroform-d** 1,1-Dichloroethane Bromochloromethane Chloroform Dibromochloromethane Bromoform
2-Butanone-d5 Acetone 2-butanone	**1,1-dichloroethene-d2** 1,1-dichloroethene trans-1,2-Dichloroethene cis-1,2-Dichloroethene	**2-Hexanone-d5** 4-Methyl-2-pentanone 2-Hexanone
Vinyl Chloride-d3 Vinyl Chloride	**Benzene-d6** Benzene	**1,1,2,2-Tetrachloroethane-d2** 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane
1,2-Dichloroethane-d4 Trichlorofluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Methyl Acetate Methylene Chloride Methyl tert-Butyl Ether Carbon Tetrachloride 1,2-Dichloroethane 1,1,1-Trichloroethane 1,2-Dibromoethane	**Toluene-d8** Trichloroethene Toluene Tetrachloroethene Ethylbenzene o-Xylenes m,p-Xylene Styrene Isopropylbenzene	

VOLATILE DEUTERATED MONITORING COMPOUND RECOVERY LIMITS

DMC	Recovery Limits (%) for Water Samples	Recovery Limits (%) for Soil samples
Vinyl Chloride-d3	65 - 131	68 - 122
Chloroethane-d5	71 - 131	61 - 130
1,1-Dichloroethene-d2	55 - 104	45 - 132
2-Butanone-d5	49 - 155	20 - 182
Chloroform-d	78 - 121	72 - 123
1,2-Dichloroethane-d4	78 - 129	79 - 122
Benzene-d6	77 - 124	80 - 121
1,2-Dichloropropane-d6	79 - 124	74 - 124
Toluene-d8	77 - 121	78 - 121
trans-1,3-Dichloropropene-d4	73 - 121	72 - 130
2-Hexanone-d5	28 - 135	17 - 184
1,4-Dioxane-d8	50 - 150	50 - 150
1,1,2,2-Tetrachloroethane-d2	73 - 125	56 - 161
1,2-Dichlorobenzene-d4	80 - 131	70 - 131

1. For any recovery greater than the upper limit:

   a. Qualify "J" all positive associated target compounds.
   b. Do not qualify associated non-detects.

2. For any recovery greater than or equal to 20%, but less than the lower limit:

   a. Qualify "J" all positive associated target compounds.
   b. Qualify "UJ" associated non-detects.

3. For any recovery less than 20%:

YES NO N/A

. . . . . .

a. Qualify "J" all positive associated target compounds.
b. Qualify "R" all associated non-detects.

NOTE: Up to three (3) DMC's per sample, excluding 1,4-Dioxane-d8, may fail to meet the recovery limits. (SOM, sec. 11.3.4, pg. D-45/Low Medium VOA). Recovery limits for 1,4-Dioxane-d8 are advisory.
As per SOM, any sample which has more than 3 DMC's outside the limits, it must be reanalyzed (SOM sec. 11.4.3.1 pg. D-46/Low Medium VOA).

ACTION: Note in the Data Assessment under Contract Problems/ Non-Compliance if the Lab did not perform reanalysis.

3.4 Are there any transcription/calculation errors between raw data and form II? ___ [✓] ___

ACTION: If large errors exist, ask the TOPO to obtain an explanation/resubmittal from the lab, make any necessary corrections and note errors in the data assessment.

Note: DMC recovery limits criteria and qualifications apply to samples diluted 5X and less. For samples diluted greater than 5X, recovery criteria does not apply because it is assumed DMC is diluted below the quantitation range.

4.0 Matrix Spike/Matrix Spike Duplicate Recovery (Form III)

Note: Data for MS/MSD will not be present unless requested.

4.1 Are the MS/MSD Recovery Forms (Form III Low/Med VOA) present? [ ] ___ ✓

4.2 Was the MS/MSD analyzed at the required frequency (once per SDG, or every 20 samples, whichever is more frequent)? [ ] ___ ✓

ACTION: If any MS/MSD data are missing, take action as specified in section 3.1 above.

ACTION: No action is taken on MS/MSD data alone. However, using professional judgement, the validator may

YES NO N/A

. . . . . .

use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. If any MS/MSD % recovery or RPD is out of specification, qualify data to include the consideration of the existence of interference in the raw data. Consideration include, but not limited to the following "Action":

Criteria	Action	
	Detected Spiked Compounds	**Non-detected Spiked Compounds**
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use Professional Judgement
Lower Acceptance Limit ≤ %R; RPD ≤ Upper Acceptance Limits	No qualification	

5.0 <u>Method Blanks (Form IV)</u>

5.1 Is the Volatile Method Blank Summary (Form IV VOA) present for aqueous and soil samples? [✓] ___ ___

5.2 <u>Frequency of Analysis</u>: For the analysis of Low/ Med Concentration VOA TCL compounds, has a method blank been analyzed for each SDG or every 20 samples, whichever is more frequent? [✓] ___ ___

5.3 Has a VOA method blank been analyzed after the calibration standards and once every 12 hours time period for each GC/MS instrument used? [✓] ___ ___

5.4 Was a VOA instrument blank analyzed after each sample/dilution that contains a target compound exceeding the initial calibration range (see SOM, page D-48/Low/Medium VOA, section 12.1.1.3)? [✓] ___ ___

YES NO N/A

. . . . . .

ACTION: If any method/instrument blank data are missing, notify the TOPO to obtain resubmittals or an explanation from the lab. If method blank data are unavailable, the reviewer may use professional judgement, or substitute field blank or trip blank data for missing method blank data.

If an instrument blank was not analyzed after a sample containing a target analyte exceeding the initial calibration standards, inspect the sample chromatogram acquired immediately after this sample for possible carryover. The system is considered uncontaminated if the target analyte is below CRQL. Use professional judgement to determine if carryover occurred and qualify analyte(s) accordingly.

5.5 Was a storage blank analyzed once per SDG after all the samples were analyzed? [√] ___ ___

ACTION: If storage blank data is missing, contact the TOPO to obtain any missing deliverables from the laboratory. If unavailable, note in the Contract Problems/Non-Compliance section of the Data Assessment.

5.6 The validator should verify that the correct identification scheme for EPA blanks was used. (See SOM page B-39, section 3.3.7.3 for more information.)

Was the correct identification scheme used for all Low/Med VOA blanks? [√] ___ ___

ACTION: Contact the TOPO to obtain corrections from the lab, or make the necessary corrections. Document in the "Contract Problems/Non-Compliance section of the Data Assessment all corrections made by the validator.

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

Also compare the storage blank raw data with the method blank. Determine if contamination in the storage blank is also present in the method blank.

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

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

5.8	Are all detected hits for target compounds in method, and storage blanks less than the CRQL?	[✓]	___	___

Exception: Methylene Chloride, Acetone and 2-butanone must be less than 2X times their respective CRQLs.

ACTION: If no, an explanation and laboratory's corrective actions must be addressed in the case narrative. If the narrative contains no explanation, then make a note in the Contract Problems/Non-Compliance section of the Data Assessment.

6.0 Contamination

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

6.1	Does the storage blank contain positive results (TCL and/or TICs) for Low/Med Concentration VOAs?	✓	[ ]	___
6.2	Do any method/reagent/instrument blanks contain positive results (including TICs) for Low/Med Concentration VOAs?	✓	[ ]	___

NOTE: Contaminated instrument blanks are unacceptable under this SOW (see page D-50/VOA, section 12.1.5.2).

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance if a contaminated instrument blank was submitted.

YES NO N/A

. . . . . .

ACTION: Sample analysis results after the high concentration sample must be evaluated for carryover. Sample must meet the maximum carryover criteria as listed in SOM sec. 11.3.8 p. D-46/VOA.("the sample must not contain a concentration above the CRQL for the target compounds that exceeded the limit in the contaminated sample.")

6.3 Do any field/trip/rinse blanks have positive hits for Low/Med VOA results (including TICs)? ✓ [ ] ___

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

NOTE: All field blank results associated with a particular group of samples (may exceed one per case) must be used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Field blanks & trip blanks must be qualified for system monitoring compound, instrument performance criteria, spectral or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks. If any blanks are grossly contaminated (i.e., saturated by GC/MS), all associated sample data should be qualified unusable (R).

Blank Type	Blank Result	Sample Result	Action for Samples
	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
Method, Field,		≥ CRQL*	No qualification required

YES NO N/A

. . . . . .

Trip, Storage, Instrument **	> 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
	Gross contamination	Detects	Qualify results as unusable R
	TIC > 2ug/L	Detects	See "Action" below

* 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: Analytes qualified "U" for blank contamination are treated as "hits" when qualifying for calibration criteria.

Note: When applied as described in the table above, the contaminant concentration in the blank are multiplied by the sample dilution factor.

ACTION : For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.4 Are there field/rinse/equipment blanks associated with every sample? √ ___ ___

ACTION: Note in data assessment that there is no associated field/rinse/equipment blank.

<u>Exception</u>: samples taken from a drinking water tap do not have associated field blanks.

7.0 <u>GC/MS Instrument Performance Check (Form V)</u>

. . . . . .

		YES	NO	N/A
7.1	Are the GC/MS Instrument Performance Check Forms (Form V) present for Bromofluorobenzene (BFB)?	[✓]	___	___
7.2	Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the BFB provided for each twelve hour shift?	[✓]	___	___
7.3	Did the 12-hour clock begin with either the injection of BFB, or in cases where a closing continuing calibration (CCV) was used as an opening CCV?	[✓]	___	___

Listed below are some, but not necessarily all, examples of acceptable analytical sequences incorporating the use of the opening/closing CCV. Use these examples as a guide for possible analytical sequences that can be expected.

Conditions for When Example Sequence is Appropriate:	**Acceptable Criteria That Must be Met:**	**Notes:**
If time remains on the 12 hour clock after initial calibration sequence	• BFB tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets both opening and closing CCV criteria • CCV B meets closing CCV criteria.	The requirement of starting the new 12-hr clock for Analytical Sequence 2 with a new BFB tune is waived if CCV A meets opening CCV criteria. If CCV B meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.
If time remains on the 12 hour clock after initial calibration sequence	• BFB tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets closing CCV criteria (but does not meet opening CCV criteria). • CCV B meets opening CCV criteria. • CCV C meets closing CCV Criteria.	CCV A does not meet opening criteria, therefore a new BFB tune must be performed, immediately followed by CCV B before a method blank and any samples may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new BFB tune.

YES NO N/A

. . . . . .

If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV. OR If the most recent closing CCV was not or could not be used as an opening CCV.	• BFB tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets both opening and closing CCV criteria. • CCV C meets both opening and closing CCV criteria.	The requirement of starting the new 12 hour clock for Analytical Sequence 2 with a new BFB tune is waived if CCV B meets opening CCV criteria. If CCV C meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.
If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV OR If the most recent closing CCV was not or could not be used as an opening CCV	• BFB tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets closing CCV criteria (but does not meet opening CCV criteria). • CCV C meets opening CCV Criteria. • CCV D meets both opening and closing CCV criteria.	CCV B does not meet opening CCV criteria, therefore a new BFB tune must be performed, immediately followed by CCV B before a method blank and any samples may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new BFB tune. The requirement of starting the new 12 hr clock for Analytical Sequence 3 with a new BFB tune is waived if CCV D meets opening CCV criteria. If CCV D meets opening criteria, a method blank and subsequent samples may be analyzed after CCV B.

7.4 Have the ion abundances been normalized to m/z 95 [✓] ___ ___

NOTE: All ion abundance ratios must be normalized to m/z 95, the nominal base peak, even though the ion abundance of m/z 174 may be up to 120% that of m/z 95.

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

7.5 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, professional Judgement may be applied to determine to what extent the data may be utilized.

	YES	NO	N/A
7.6 Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.)		✓	
7.7 Is the number of significant figures for the reported relative abundances consistent with the number given in the ion abundance criteria column on Form V ?	✓		

ACTION: If large errors exist, take action as specified in section 3.1 above.

7.8 Is the spectrum of the mass calibration compound acceptable?	✓		

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

8.0 Target Compound List (TCL) Analytes (Form I)

8.1 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. Regional Control/MS/MSD samples?	✓		
c. Blanks (method, trip, etc)?	✓		

8.2 Are the VOA Reconstructed Ion Chromatograms, the 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. Regional Control/MS/MSD samples?	✓		
c. Blanks (method, trip, etc)?	✓		

ACTION: If any data are missing, take action specified in 3.1 above.

8.3 Is chromatographic performance acceptable with respect to:

Baseline stability?	✓		
Resolution?	✓		
Peak shape?	✓		
Full-scale graph (attenuation)?	✓		

	YES	NO	N/A
. . . . .			
Other: _____?	[ ]	___	✓

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

8.4	Are lab-generated standard mass spectra of the identified VOA compounds present for each sample?	[✓]	___	___

ACTION: If any mass spectra are missing, take action as specified in 3.1 above. If lab does not generate their own standard spectra, make note under the "Contract Problems/Non-Compliance" section of the Data Assessment. If spectra are unavailable reject "R" the reported results.

8.5	Is the RRT of each reported compound within ± 0.06 RRT units of the standard RRT in the continuing calibration?	[✓]	___	___
8.6	Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
8.7	Do sample and standard relative ion intensities agree to within ± 20%?	[✓]	___	___

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 sections 8.4-8.7 above.

ACTION: When sample carry-over is suspected, review section 6.2/Action #2 above before determining if instrument cross-contamination has affected positive compound identifications.

9.0 Tentatively Identified Compounds (TIC)

9.1	Are all Tentatively Identified Compound Forms (Form I VOA-TIC) present? Do listed TICs include scan number or retention time, as well as the estimated "J" and/or "JN" qualifier?	[✓]	___	___
9.2	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?	[✓]	___	___

	YES	NO	N/A
. . . . .			
b. Blanks?	[√]	___	___
b. Are Alkanes listed in/or part of the Case Narrative?	[√]	___	___

ACTION: If any TIC data are missing, take action specified in 3.1 above.

ACTION: Verify "JN" qualifier is present for all chemically named TICs having a percent match of greater than or equal 85%. TICs labeled "unknown" are qualified with a "J" qualifier.

9.3 Are any target compounds (from any fraction) listed as TICs? (Example: 1,2-dimethylbenzene is xylene - a VOA target analyte - and should not be reported as a TIC.)	___	[√]	___

ACTION: Flag with "R" only target compound detected in another fraction (except blank contamination).

9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	[√]	___	___
9.5 Do TICs and "best match" reference spectra relative ion intensities agree within ± 20%?	[√]	___	___

ACTION: Use professional judgement to determine the acceptability of TIC identifications. If it is determined that an incorrect identification was made, change its identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.

Action: When a compound is not found in any blank, but is detected in a sample and is a suspected artifact of a common laboratory contaminant, solvent preservatives or Aldo condensation, the result should be qualified as unusable (R). (i.e., common lab contaminants such as CO_2(m/e 44), Siloxanes (m/e 73), diethyl ether, hexane, certain freons. Aldol condensation products: 4-hydroxy-4-methyl-2-pentanone, 4-methyl-2-penten-2-one, and 5,5-dimethyl-2(H)-furanone. Solvent preservatives cyclohexene, and related by-products: cyclohexanone, cyclohexenone, cyclohexanol, cyclohexenone, chlorocyclohexene, and chlorocyclohexanol.).

10.0 Compound Quantitation and Reported Detection Limits

10.1 Are there any transcription/calculation errors in Form I results? (Check at least two positive values. Verify that the correct internal standards, quantitation ions, and RRFs were used to calculate Form I results.)	___	[√]	___
10.2 Are the CRQLs adjusted to reflect sample dilutions and per cent moisture?	[√]	___	___

YES NO N/A

. . . . . .

ACTION: If errors are large, take action as specified in section 3.1 above.

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQLs data from the diluted sample). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original Form I and substituting the data from 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 not to be used, including any in the data summary package.

!0.3 For non-aqueous samples, were the percent moisture < 70%? [ ] ___ [✓]

Action: If the % moisture ≥ 70.0% and < 90.0%, qualify detects as "J" and non-detects as approximated "UJ" If the % Moisture ≥ 90%, qualify detects as "J" and non-detects as "R"

11.0 Standards Data (GC/MS)

11.1 Are the reconstructed ion chromatograms, and data system printouts (quant. reports) present for each initial and continuing calibration? [✓] ___ ___

ACTION: If any calibration standard data are missing, take action specified in section 3.1 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI LCV) present and complete for the volatile fraction at concentrations of 5, 10, 50, 100, and 200 µg/ℓ for non-ketones, 10, 20, 100, 200 and 400 ug/L for ketones and 100, 200, 1000, 2000, and 4000 ug/L for 1,4-dioxane. [✓] ___ ___

ACTION: If any Initial Calibration forms are missing, take action as specified in section 3.1 above.

12.2 Are the relative standard deviation (RSD) stable for VOA's over the concentration range of the calibration (i.e., %RSD ≤ 20.%, ≤ 40% for poor performers (see table below), ≤ 50% for 1,4-dioxane)? [✓] ___ ___

ACTION: Circle all outliers in red.

NOTE: The twenty two (22) poor performers compounds and associated DMCs are listed below. The relative response factor (RRF) for these compounds must be greater than or equal to 0.010.

YES NO N/A

. . . . . .

Volatile Compounds Exhibiting Poor Response

Volatile Compounds	
Acetone	1,2-Dibromo-3-chloropropane
2-Butanone	Isopropylbenzene
Carbon disulfide	Methyl acetate
Chloroethane	Methylene chloride
Chloromethane	Methylcyclohexane
Cyclohexane	Methyl tert-butyl ether
1,4-Dioxane	trans-1,2-Dichloroethene
1,2-Dibromoethane	4-Methyl-2-pentanone
Dichlorodifluoromethane	2-Hexanone
cis-1,2-dichloroethene	Trichlorofluoromethane
1,2-Dichloropropane	1,1,2-Trichloro-1,2,2-trifluoroethane

ACTION: If %RSD > 20.0%, (> 40.0% for the poor performers, and > 50% for 1,4-dioxane), qualify associated positive results for that analyte "J" (estimated). If %RSD is > 90, flag all non-detects for that analyte "R" (unusable) and positive results "J".

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

12.3 Are any $\overline{RRF}$s < 0.050 (< 0.010 for poor performers)? ___ [✓] ___

ACTION: Circle all outliers in red.

ACTION: If any $\overline{RRF}$ values are < 0.05 or < 0.01 for poor performers, qualify associated non-detects unusable (R) and associated positive results estimated (J).

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance the analytes that fail %RSD and/or RRF criteria.

12.4 Are there any transcription /calculation errors in the reporting of RRFs, $\overline{RRF}$s or %RSD values? (Check at least 2 values, but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

	YES	NO	N/A
. . . . .			

ACTION: If errors are large, contact the TOPO to obtain an explanation/resubmittal from the lab, document in the Data Assessment under Contract Problems/Non-Compliance.

13.0 GC/MS Continuing Calibration Verification (CCV) (Form VII)

		YES	NO	N/A
13.1	Are the Continuing Calibration Forms (Form VII) present and complete for the volatile fraction?	[✓]	___	___
13.2	Did the 12 hour clock begin with either the injection of BFB or in cases where a closing CCV can be used as an opening CCV for each instrument?	[✓]	___	___

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, ask the TOPO to obtain explanation/resubmittal from the laboratory. If continuing calibration data are unavailable, flag all associated sample data as unusable (R).

		YES	NO	N/A
13.3	Do any volatile compounds have a % Difference (% D) between the initial RRF and CCV RRF exceeding ± 50% for 1,4-Dioxane, ± 40% for the poor performers or ± 25% for the remaining compounds?	___	[✓]	___

ACTION: Circle all outliers in red.

		YES	NO	N/A
13.4	Do any volatile compounds have a RRF < 0.05 or < 0.01 for the poor performers?	___	[✓]	___

ACTION: Circle all outliers in red.

Note: Verify that the CCV was run at the required frequency (an opening and closing CCV must be run within 12-hour period) and the CCV was compared to the correct initial calibration. If the mid-point standard from the initial calibration is used as an opening CCV, verify that the result (RRF) of the mid-point standard was compared to the average RRF from the correct initial calibration.

Note: The closing CCV used to bracket the end of a 12-hour analytical sequence may be used as the opening CCV for the new 12-hour analyical sequence, provided that all the technical acceptance criteria are met for an opening CCV (see table below). If the closing CCV does not meet the technical acceptance criteria for an opening CCV, then a BFB tune followed by an opening CCV is required and the next 12-hour time period begins with the BFB tune.

Action: Use the following table to qualify data based on the technical acceptance criteria for the opening CCV and closing CCV.

Continuing Calibration Verification (CCV) Actions for Low/Medium Volatiles Analyses

Criteria for	Criteria for	Action

YES NO N/A

. . . . . .

Opening CCV	Closing CCV	Detected Associated Compounds	Non-Detected Associated Compounds
RRF < 0.010 (poor responders) RRF < 0.050 (all other volatile target compounds)	RRF < 0.010 (for all volatile target compounds)	J	R
RRF ≥ 0.010 (poor responders) RRF ≥ 0.050 (for all other compounds)	RRF ≥ 0.010 (for all target volatile compounds)	No Action	
%D > 50.0 or < -50.0 (1,4-Dioxane) %D > 40.0 or < -40.0 (poor responders) %D > 25.0 or < -25.0 (all other volatile target compounds)	%D > 50.0 or < -50.0 (for all volatile target compounds)	J	UJ
%D ≤ 50.0 or ≥ -50.0 (1,4-Dioxane) %D ≤ 40.0 or ≥ -40.0 (poor responders) %D ≤ 25.0 or ≥ -25.0 (all other volatile target compounds)	%D ≤ 50.0 or ≥ -50.0 (for all volatile target compounds)	No Action	
Opening CCV not performed at required frequency *	Closing CCV not performed at required frequency *	R	

* See section 13.2 above

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance if more than two of the required analytes failed the above acceptance criteria.

13.5 Are there any transcription/calculation errors for the reporting of RRFs, or %D between initial RRFs and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors with red pencil.

ACTION: If errors are large, notify the TOPO to obtain explanation/resubmittals from the lab. Document errors in the Contract Problems/Non-Compliance section of the Data Assessment.

Note: All DMCs must meet RRF ≥ 0.010. No qualification of the data is necessary on the DMCs RRF and %RSD/%Diff data alone. However, use professional judgment to evaluate the DMC and %RSD/% Diff data in conjunction with the DMC recoveries to determine the need of qualification of the data.

14.0 Internal Standard (Form VIII)

14.1 Were the internal standard area counts for every sample and blank within the range of 50.0% and 200.0% of its response in the most recent opening CCV standard calibration? [✓] ___ ___

	YES	NO	N/A
. . . . .			
If no, were affected sample reanalyzed?	[ ]	___	✓

ACTION: 1. Circle all outliers with red pencil.

14.2 Are the retention times of the internal standards in sample or blanks within ±30 seconds from the RT of the internal standard in the 12-hour associated calibration standard (opening CCV or mid-point standard from initial calibration)?	[✓]	___	___

Action: Use the following table to qualify the data:

INTERNAL STANDARDS ACTIONS FOR LOW/MEDIUM VOLATILES

Criteria	ACTION	
	Detected Associated Compounds *	Non-detected Associated Compounds *
Area counts ≥ 50% and ≤ 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	No Action	
Area counts < 50% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J	R
Area counts > 200% of 12-hour standard (Opening CCV or mid-point standard from initial calibration)	J	No Action
RT difference > 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	R**	R
RT difference ≤ 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	No Action	

* For volatile compounds associated to each internal standard, see Table 3-Low/Medium Volatile Target Compounds and Deuterated Monitoring Compounds with Corresponding Internal Standards for Quantitation in SOM01.1, Exhibit D, available at:

Http://www.epa.gov/superfund/programs/clp/som1.htm

** Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable "R" if the mass spectral are met.

NOTE: Contract Requirements: The SOM (section 11.4.1 page D-46/VOA Low/Medium states that any sample which fails the acceptance criteria for IS response must be reanalyzed.

. . . . . .

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance any sample(s) which failed the above IS acceptance criteria.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Low/Medium Concentration VOA analysis? [ ] ___ √

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

ACTION: Any gross variation between duplicate results must be addressed in the reviewer narrative. If large differences exist, contact the TOPO to confirm identification of field duplicates with the sampler.

. . . . . .

Definitions

BFB - bromofluorobenzene
CCS - contract compliance screening
CLASS - Contract Laboratory Analytical Services Support
CLP - Contract Laboratory Program
CRQL - Contract Required Quantitation Limit
GC/MS - gas chromatography/mass spectroscopy
kg - kilogram
µg - microgram
ℓ - liter
mℓ - milliliter
QC - quality control
RAS - Routine Analytical Services
RIC - reconstructed ion chromatogram
RPD - relative percent difference
RRF - relative response factor
$\overline{\text{RRF}}$ - 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
SOP - standard operating procedure
SOW - Statement of Work
TCL - Target Compound List
TCLP - Toxicity Characteristics Leachate Procedure
TIC - tentatively identified compound
TPO - technical project officer
VOA - volatile organic acid
VTSR - validated time of sample receipt
TOPO - Task Order Project Officer

References

. . . . . .

1. USEPA Contract Laboratory Program of Work for Organic Analysis Multi-Media, Multi-Concentration, SOW/CLPSOM01.1, October 2004
2. National Functional Guidelines for Superfund Organic Methods Data Review January 2005

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

Page 1 of 1

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	
Company Name	CH2M Hill
Address	5700 Cleveland St. Ste 101
City / State / Zip	Virginia Beach VA 23462
Project Contact	Chelsea Bennet
Phone #	757-671-6208
Sampler's Name	Kenji Butler / Juan Acaron

Project Information	
Project Name	Vieques CTO-10
Sampling Location	AOC E & I
Turnaround time	28-Day
Batch QC or Project Specific? If Specific, which Sample ID?	
Are aqueous samples field filtered for metals? Y or N	
Are high concentrations expected? Y or N? If yes, which ID(s)?	

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores) 3 encores ms/msd = 4	SVOCs, SVOC SIM, DRO, ORO	TPH-GRO 2 encores ms/msd = 6	Total Metals, TI, CN	Grain Size, Atterberg Limits	VOCs 3-40ml vials (liquid)	TPH-GRO 2-40ml vials	SVOC, SVOC SIM	Total Metals, TI	Cyanide	TPH DRO/ORO	TOC	pH / Sample Info (Lab Use)
0807038-01	VWAE-SS21-0506-08C	7/16/08	0803	SO	15							X		X										
0807038-02	VWAE-SB21-0910-08C		0910	SO	5							X		X										
0807038-03	VWAE-SB21P-0910-08C		0910	SO	5							X		X										
0807038-04	VWAE-SB21-1618-08C		0940	SO	5							X		X										
0807038-05	VWAE-SB21-1820-08C		1020	SO	5							X		X										
0807038-06	VWAE-SB21-2930-08C	✓	1127	SO	5							X		X										
0807042-01	VWAE-TB01-071608	7/16/08	—	QC	5	5											X	X						

Lab Use Only

Sample Unpacked By: [signature]
Sample Order Entry By: [signature] 7/17/08
Samples Received in Good Condition? Y or N
If no, explain:

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

Comments

VWAE-SS21-0506-08C has MS/MSD
VHBLKXA → 0807038-07
VHBLKXB → 0807042-02

Sample Custody

Relinquished by: [signature]	Date/Time: 7/16/08 1145	Received by: [signature]	Date/Time: 7-17-08 850
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontract? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 0.8 °C

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

White & Yellow copy to lab • Pink copy for customer

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Cary, NC 27513
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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Chelsea Bennet / CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Stephen Brand
Phone #: 757.671.6211
Sampler's Name: K. Butler / J. Acaron

Project Information

Project Name: Vieques CTO ~~[illegible]~~-10
Sampling Location: W-AOC-E
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores)	SVOCs, SVOC Sim, DRO, ORO (8270)	SPLP SVOC, Metals, TPH-GRO, ORO, DRO	Total Metals, Tl, CN (4.07)	Grain Size, Atterberg Limits (8.37)	VOCs (liquid)	SVOC, SVOC Sim	Total Metals, Tl	Cyanide	TPH-GRO	TPH-DRO & ORO (2AD)	TOC	pH / Sample Info (Lab Use)
CAB 7/17/08	~~WVAE-EB01-071708~~	~~7/17/08~~	~~0640~~	~~QC~~																				
0807038-03 1584201	WVAE-SS21-0506-08C	7/16/08	0803	SO	6								X (3)		X (3)									
0807038-02 1584202	WVAE-SB21-1820-08C	7/16/08	1020	SO	3								X		X	X								
0807038-07 1584203	WVAE-SB21-0910-08C	↓	0910	SO	2								X		X									
0807038-10 1584204	WVAE-SB21P-0910-08C		0910	SO	2								X		X									
0807038-11 1584205	WVAE-SB21-1618-08C	↓	0940	SO	3								X	⊗	X									
0807042-03	WVAE-EB01-071708	7/17/08	0640	QC	2														NO →		⊗			

sample IDs should all start w/ "WVAE" [illegible] 7/21/08

Lab Use Only

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

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

Comments

WVAE-SS21-0506-08C is MS/MSD
⊗ Bottle not in COC (mistake)

Sample Custody

Relinquished by: [signature]	Date/Time: 7/17/08 1330	Received by: Jennifer Dove	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 2.4 °C

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

White & Yellow copy to lab • Pink copy for customer

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Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores) 3-encore	VOCs (Liquid) 3-40 mL	SVOCs, SVOC SIM, DRO, ORO 2-encore	TPH-GRO (soil)	Total Metals, Tl, CN	Grain Size, Atterberg Limits	SVOC, SVOC SIM (Liquid)	Total Metals, Tl (Liquid)	CN (Liquid)	TPH-GRO (Liquid)	TPH-DRO & ORO (Liquid)	TOC (Liquid)	pH / Sample Info (Lab Use) Metals, Cyanide
0807042-03 1584401	VWAE-EB01-071708	7/17/08	0840	QC	11	5	1	1	2				X					X	X	X	X			<2
0807038-13	VWAE-SB21-3436-08C	↓	0905	SO	5							X			X									
0807038-14	VWAE-SB81-3638-08C		1156	SO	5							X			X									
0807042-04	VWAE-TB01-071708		—	QC	5	5							X								X			
0807038-16	VWAE-SS20-0406-08C	↓	1300	SO	5							X			X									

Lab Use Only

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

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

Comments

VWAE-SS20-0406-08C has a jar for % Moisture included
~~SB21-3436 have: pH 2a, 4oz HDPE Tl, CN, TOC 4oz SV, SV SIM, DRO/ORO 8oz; SPLP 4oz, 8oz VOC, 8oz Tl~~

Sample Custody

Relinquished by:	Date/Time: 7/17/08 1330	Received by: Jennifer Dove	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 2.6 °C

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

White & Yellow copy to lab • Pink copy for customer

18341

17

CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

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

Page 1 of 1

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757-671-6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Vieques
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores)	SVOCs, SVOC SIM, DRO, ORO	SPLP Metals, SVOC, TPH (GRO, DRO, ORO)	Total Metals, Tl, CN	Grain Size, Atterberg Limits	SPLP VOCs (liquid)	SVOC, SVOC SIM liquid	Total Metals, Tl	~~Cyanide~~ PH	TPH-GRO	TPH-DRO & ORO	TOC*	pH / Sample Info (Lab Use)
0807038-15 ~~1584338~~	VWAE-SB21-2930-08C	7-16-08	1127	SO	7			SPLP = 1584501				X	X	X	X		X		X			X		
0807038-14 ~~1584206~~	VWAE-SB21-3428-08C	7-17-08	1156	SO	2							X			X									
0807038-13 ~~1584207~~ ~~1584302~~	VWAE-SB21-3436-08C	7-17-08	0905	SO				SPLP = 1584502				X	X		X		X		X			X		
	~~VWAE-SB21~~																							

*only rec'd SVOC, SIM, DRO, ORO & T. Metals, Tl, CN 4 oz for VWAE-SB21-2930-08C JD 7/18/08

Lab Use Only

Sample Unpacked By: Jennifer Dover
Sample Order Entry By:
Samples Received in Good Condition? Y or N
If no, explain:
Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

~~*~~ Mistake

Sample Custody

Relinquished by:	Date/Time: 7/17/08 1330	Received by: Jennifer Dover	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 1.8 °C

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

White & Yellow copy to lab • Pink copy for customer

SUPPORT DOCUMENTATION

2B - FORM II VOA-2
WATER VOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: _____ SDG No.: 0807042

Level: (TRACE or LOW) LOW

	EPA SAMPLE NO.	VDMC8 (DPA) #	VDMC9 (TOL) #	VDMC10 (TDP) #	VDMC11 (HEX) #	VDMC12 (DXE) #	VDMC13 (TCA) #	VDMC14 (DCZ) #	TOT OUT	
01	VBLKOF	95	101	96	106	58	94	106	0	
02	VHBLKXB	100	103	94	93	45 *	86	102	1	
03	VWAE-EB01-07170	103	111	102	106	56	92	109	0	
#5 ~~04~~	VWAE-EB01-07180	101	105	97	96	49 *	88	105	1	UJ
#6 ~~05~~	VWAE-EB02-07170	102	106	96	95	46 *	87	104	1	UJ
06	VWAE-TB01-07160	100	105	98	100	52	88	106	0	
#3 07	VWAE-TB01-07170	98	103	97	93	44 *	86	102	1	UJ
#4 ~~08~~	VWAE-TB01-07180	101	104	98	95	44 *	87	105	1	UJ
09										
10										
11										
12										
13										
14										
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30										

	QC LIMITS
VDMC8 (DPA) = 1,2-Dichloropropane-d6	(79-124)
VDMC9 (TOL) = Toluene-d8	(77-121)
VDMC10 (TDP) = trans-1,3-Dichloropropene-d4	(73-121)
VDMC11 (HEX) = 2-Hexanone-d5	(28-135)
VDMC12 (DXE) = 1,4-Dioxane-d8	(50-150)
VDMC13 (TCA) = 1,1,2,2-Tetrachloroethane-d2	(73-125)
VDMC14 (DCZ) = 1,2-Dichlorobenzene-d4	(80-131)

Column to be used to flag recovery values
* Values outside of contract required QC limits
Report 1,4-Dioxane-d8 for Low-Medium VOA analysis only

Page 1 of 1

SOM01.2 (8/2007)

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKOF

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8072502-BLK1

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 8072502-BLK191.d

Level: (TRACE/LOW/MED) LOW Date Received:

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg)ug/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U
67-64-1	Acetone	10	U
75-15-0	Carbon disulfide	5.0	U
79-20-9	Methyl acetate	5.0	U
75-09-2	Methylene chloride	2.1	J
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-Butanone	10	U
74-97-5	Bromochloromethane	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
110-82-7	Cyclohexane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
123-91-1	1,4-Dioxane	100	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VBLKOF

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8072502-BLK1

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 8072502-BLK191.d

Level: (TRACE/LOW/MED) LOW Date Received:

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-01-6	Trichloroethene	5.0	U
108-87-2	Methylcyclohexane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	10	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
95-47-6	o-Xylene	5.0	U
179601-23-1	m,p-Xylene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	0.39	J
87-61-6	1,2,3-Trichlorobenzene	0.46	J

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VBLKOF

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807042 Mod. Ref No.: SDG No.: 0807042

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8072502-BLK1

Sample wt/vol: 5.00 (g/mL) mL Lab File ID: 8072502-BLK191.d

Level: (TRACE or LOW/MED) LOW Date Received:

% Moisture: not dec. Date Analyzed: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 5.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

ENVIRONMENTAL
Data Services, Inc.

DIESEL RANGE ORGANICS (DRO/ORO)

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807064

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 23, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SB20-0810	0807064-01	Soil
1MS	VWAE-SB20-0810MS	0807064-01MS	Soil
1MSD	VWAE-SB20-0810MSD	0807064-01MSD	Soil

The USEPA "Contract Laboratory Program National Functional Guidelines for Organic Data Review," October 1999, method criteria and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 14 days for soil samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	MS/MSD %R/RPD	Qualifier
1	ORO	40%/Ok/Ok	J/UJ

Laboratory Control Sample - The LCS sample exhibited acceptable %R values.

Method Blank - The method blank was free of contamination.

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-EB01-071808	None - ND	-	-	-

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values and/or correlation coefficients.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Field Duplicates - Field duplicate samples were not included in this data package.

ANNOTATED FORM Is

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807064

Matrix: (soil/water) SOIL Lab Sample ID: 0807064-01

Sample wt/vol: 20.0 (g/mL) G Lab File ID: _____

% Moisture: 12 decanted: (Y/N) N Date Received: 07/21/08

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 07/29/08

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/01/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q	
9999-99-5	Diesel	11	U	J MSL
----------	ORO	13		

FORM I PEST

ewl 10/23/08

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

3F

SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807064

Matrix Spike - EPA Sample No.: VWAE-SB20-08

COMPOUND	SPIKE ADDED (mg/Kg	SAMPLE CONCENTRATION (mg/Kg)	MS CONCENTRATION (mg/Kg)	MS % REC #	QC. LIMITS REC.
Diesel	140	0.0	74	53	50-150
ORO	140	13	69	40*	50-150

COMPOUND	SPIKE ADDED (mg/Kg	MSD CONCENTRATION (mg/Kg	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
Diesel	140	85	61	14	40	50-150
ORO	140	85	51	21	40	50-150

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 2 outside limits
Spike Recovery: 1 out of 4 outside limits

COMMENTS: _____

FORM III PEST-2

ENVIRONMENTAL
Data Services, Inc.

GASOLINE RANGE ORGANICS (GRO)

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807064

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 23, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SB20-0810	0807064-01	Soil
1MS	VWAE-SB20-0810MS	0807064-01MS	Soil
1MSD	VWAE-SB20-0810MSD	0807064-01MSD	Soil

The USEPA "Contract Laboratory Program National Functional Guidelines for Organic Data Review," October 1999, method criteria and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were analyzed within 14 days for soil samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS sample exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. mg/kg	Qualifier	Affected Samples
VBLKBO	GRO	0.057	U	1

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. mg/L	Qualifier	Affected Samples
VWAE-TB01-071808	None - ND	-	-	-
VWAE-EB01-071808	None - ND	-	-	-

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Field Duplicates - Field duplicate samples were not included in this data package.

ANNOTATED FORM Is

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807064

Matrix: (soil/water) SOIL Lab Sample ID: 0807064-01

Sample wt/vol: 6.3 (g/mL) G Lab File ID: 339W0807064-01

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. 12 Date Analyzed: 07/21/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q	
9999-99-7	Gasoline	0.45 ~~0.097~~	J	u BL

FORM I GC VOA

LW
10/23/08

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VBLKBO

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807064

Matrix: (soil/water) SOIL Lab Sample ID: 8072111-BLK1

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 331W8072111-BLK1

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 07/21/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/KG	Q
9999-99-7-------	Gasoline	0.057	J

FORM I GC VOA

ENVIRONMENTAL
Data Services, Inc.

POLYNUCLEAR AROMATIC HYDROCARBONS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807064

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 22, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SB20-0810	0807064-01	Soil
1MS	VWAE-SB20-0810MS	0807064-01MS	Soil
1MSD	VWAE-SB20-0810MSD	0807064-01MSD	Soil

The USEPA Region II SOP HW-35, Revision 1, August 2007: USEPA CLP Statement of Work for Organic Analysis of Low/Medium Concentration of Semivolatile Organic Compounds SOM01.2 Data Validation and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 14 days for soil samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	MS/MSD %R/RPD	Qualifier
1	Acenaphthene	45%/39%/Ok	J/UJ
	Pentachlorophenol	0%/0%/999.9	J/R

Laboratory Control Sample - The LCS sample exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ug/kg	Qualifier	Affected Samples
SBLKKS	Naphthalene	1.2	U	1

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-EB01-071808	Acenaphthene	0.033	None	Sample ND
	Phenanthrene	0.050	None	Sample ND
	Anthracene	0.042	None	Sample ND

GC/MS Instrument Performance Check - All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate samples were not included in this data package.

ANNOTATED FORM Is

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: SDG No.: 0807064

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807064-01

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807064-01J2A64.d

Extraction: (Type) SONC

% Moisture: 12.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/29/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) Y pH: 7.6 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
91-20-3	Naphthalene	3.8 ~~1.4~~	~~JB~~	U BL
91-57-6	2-Methylnaphthalene	3.8	U	
208-96-8	Acenaphthylene	3.8	U	
83-32-9	Acenaphthene	3.8	~~U~~	UJ MSL
86-73-7	Fluorene	3.8	U	
87-86-5	Pentachlorophenol	7.6	~~U~~	R MSL
85-01-8	Phenanthrene	3.8	U	
120-12-7	Anthracene	3.8	U	
206-44-0	Fluoranthene	3.8	U	
129-00-0	Pyrene	3.8	U	
56-55-3	Benzo (a) anthracene	3.8	U	
218-01-9	Chrysene	3.8	U	
205-99-2	Benzo (b) fluoranthene	3.8	U	
207-08-9	Benzo (k) fluoranthene	3.8	U	
50-32-8	Benzo (a) pyrene	3.8	U	
193-39-5	Indeno (1,2,3-cd) pyrene	3.8	U	
53-70-3	Dibenzo (a,h) anthracene	3.8	U	
191-24-2	Benzo (g,h,i) perylene	3.8	U	

MW
10/23/08

USEPA REGION II WORKSHEETS

(Please refer to Semivolatile Organic Report for Worksheets)

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

3F - FORM III SV-SIM2
SOIL SEMIVOLATILE SIM MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: SDG No.: 0807064

Matrix Spike - EPA Sample No.: WAE-SB20-081

COMPOUND	SPIKE ADDED (ug/kg)	SAMPLE CONCENTRATION (ug/kg)	MS CONCENTRATION (ug/kg)	MS %REC #	QC LIMITS REC.	
Acenaphthene	15	0.0	6.9	45 *	46-118	J/UJ
Pentachlorophenol	15	0.0	0.0	0 *	9-103	J/R
Pyrene	15	0.0	8.0	52	26-127	

COMPOUND	SPIKE ADDED (ug/kg)	MSD CONCENTRATION (ug/kg)	MSD %REC #	%RPD #	QC LIMITS		
					RPD	REC.	
Acenaphthene	15	5.8	39 *	16	0-31	46-118	J/UJ
Pentachlorophenol	15	0.0	0 *	999.9*	0-50	9-103	J/R
Pyrene	15	6.5	43	20	0-31	26-127	

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 3 outside limits
Spike Recovery: 4 out of 6 outside limits

COMMENTS:

AMENDED DATA

SOM01.2 (8/2007)

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
SBLKKS

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: SDG No.: 0807064

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8072807-BLK2

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 8072807-BLKA64.d

Extraction: (Type) SONC

% Moisture: Decanted: (Y/N) Date Received:

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/29/2008

Injection Volume: 1.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/04/2008

GPC Cleanup: (Y/N) Y pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ~~ug/kg~~) ug/kg	Q
91-20-3	Naphthalene	1.2	J
91-57-6	2-Methylnaphthalene	3.3	U
208-96-8	Acenaphthylene	3.3	U
83-32-9	Acenaphthene	3.3	U
86-73-7	Fluorene	3.3	U
87-86-5	Pentachlorophenol	6.7	U
85-01-8	Phenanthrene	3.3	U
120-12-7	Anthracene	3.3	U
206-44-0	Fluoranthene	3.3	U
129-00-0	Pyrene	3.3	U
56-55-3	Benzo (a) anthracene	3.3	U
218-01-9	Chrysene	3.3	U
205-99-2	Benzo (b) fluoranthene	3.3	U
207-08-9	Benzo (k) fluoranthene	3.3	U
50-32-8	Benzo (a) pyrene	3.3	U
193-39-5	Indeno (1,2,3-cd) pyrene	3.3	U
53-70-3	Dibenzo (a,h) anthracene	3.3	U
191-24-2	Benzo (g,h,i) perylene	3.3	U

ENVIRONMENTAL
Data Services, Inc.

LOW CONCENTRATION SEMIVOLATILE ORGANIC COMPOUNDS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807064

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 22, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SB20-0810	0807064-01	Soil
1MS	VWAE-SB20-0810MS	0807064-01MS	Soil
1MSD	VWAE-SB20-0810MSD	0807064-01MSD	Soil

The USEPA Region II SOP HW-35, Revision 1, August 2007: USEPA CLP Statement of Work for Organic Analysis of Low/Medium Concentration of Semivolatile Organic Compounds SOM01.2 Data Validation and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 14 days for soil samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS sample exhibited acceptable %R values.

Method Blank - The method blank was free of contamination.

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-EB01-071808	Benzaldehyde	1.7	None	Sample ND
	Acetophenone	1.5	None	Sample ND

GC/MS Instrument Performance Check - All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were correctly reported and qualified by the laboratory.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values with the exception of the following.

CCAL Date	Compound	%D/RRF	Qualifier	Affected Samples
08/01/08	Nitrobenzene	31.4%	J/UJ	1

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate samples were not included in this data package.

ANNOTATED FORM Is

1

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: SDG No.: 0807064

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807064-01

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807064-01A60.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 12.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 7.6 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
100-52-7	Benzaldehyde	190	U	
108-95-2	Phenol	39	J	
111-44-4	Bis(2-chloroethyl)ether	190	U	
95-57-8	2-Chlorophenol	190	U	
95-48-7	2-Methylphenol	190	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	190	U	
98-86-2	Acetophenone	90	J	
106-44-5	4-Methylphenol	190	U	
621-64-7	N-Nitroso-di-n-propylamine	190	U	
67-72-1	Hexachloroethane	190	U	
98-95-3	Nitrobenzene	190	~~U~~	UJ CCH
78-59-1	Isophorone	190	U	
88-75-5	2-Nitrophenol	190	U	
105-67-9	2,4-Dimethylphenol	190	U	
111-91-1	Bis(2-chloroethoxy)methane	190	U	
120-83-2	2,4-Dichlorophenol	190	U	
91-20-3	Naphthalene	190	~~U~~	R RE
106-47-8	4-Chloroaniline	190	U	
87-68-3	Hexachlorobutadiene	190	U	
105-60-2	Caprolactam	190	U	
59-50-7	4-Chloro-3-methylphenol	190	U	
91-57-6	2-Methylnaphthalene	190	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	190	U	
88-06-2	2,4,6-Trichlorophenol	190	U	
95-95-4	2,4,5-Trichlorophenol	190	U	
92-52-4	1,1'-Biphenyl	190	U	
91-58-7	2-Chloronaphthalene	190	U	
88-74-4	2-Nitroaniline	380	U	
131-11-3	Dimethylphthalate	190	U	
606-20-2	2,6-Dinitrotoluene	190	U	
208-96-8	Acenaphthylene	190	~~U~~	R RE
99-09-2	3-Nitroaniline	380	U	
83-32-9	Acenaphthene	190	~~U~~	R RE

RW 10/23/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: SDG No.: 0807064

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807064-01

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807064-01A60.d

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 12.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 7.6 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
51-28-5	2,4-Dinitrophenol	380	U	
100-02-7	4-Nitrophenol	380	U	
132-64-9	Dibenzofuran	190	U	
121-14-2	2,4-Dinitrotoluene	190	U	
84-66-2	Diethylphthalate	190	U	
86-73-7	Fluorene	190	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	190	U	
100-01-6	4-Nitroaniline	380	U	
534-52-1	4,6-Dinitro-2-methylphenol	380	U	
86-30-6	N-Nitrosodiphenylamine (1)	190	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	190	U	
101-55-3	4-Bromophenyl-phenylether	190	U	
118-74-1	Hexachlorobenzene	190	U	
1912-24-9	Atrazine	190	U	
87-86-5	Pentachlorophenol	380	U	
85-01-8	Phenanthrene	190	~~U~~	R RE
120-12-7	Anthracene	190	~~U~~	R RE
86-74-8	Carbazole	190	U	
84-74-2	Di-n-butylphthalate	190	U	
206-44-0	Fluoranthene	190	~~U~~	R RE
129-00-0	Pyrene	190	~~U~~	R RE
85-68-7	Butylbenzylphthalate	190	U	
91-94-1	3,3'-Dichlorobenzidine	190	U	
56-55-3	Benzo (a) anthracene	190	~~U~~	R RE
218-01-9	Chrysene	190	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	190	U	
117-84-0	Di-n-octylphthalate	190	U	
205-99-2	Benzo (b) fluoranthene	190	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	190	~~U~~	R RE
50-32-8	Benzo (a) pyrene	190	~~U~~	R RE
193-39-5	Indeno (1,2,3-cd) pyrene	190	~~U~~	R RE
53-70-3	Dibenzo (a,h) anthracene	190	~~U~~	R RE
191-24-2	Benzo (g,h,i) perylene	190	~~U~~	R RE
58-90-2	2,3,4,6-Tetrachlorophenol	190	U	

[1] Cannot be separated from Diphenylamine

LW
10/23/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: SDG No.: 0807064

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807064-01

Sample wt/vol: 30.0 (g/mL) g Lab File ID: 0807064-01A60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 12.0 Decanted: (Y/N) N Date Received: 07/21/2008

Concentrated Extract Volume: 500 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 2.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) Y pH: 7.6 Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	38.50	97	J
02		UNKNOWN	41.46	330	J
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	970	

[2]EPA-designated Registry Number.

LW
10/23/08

USEPA REGION II WORKSHEETS

SOP HW-35
Revision 1
August 2007

SOP NO. HW-35/SVOA Data Validation
USEPA Contract Laboratory Program
Statement of Work for Organic Analysis of Low/Medium Concentration of Semivolatile Organic Compounds SOM01.2

Prepared by: George Karras Date: 8/13/07
George Karras, Chemist
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Concurred by: Linda Mauel Date: 10/8/07
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Robert Runyon, Chief
Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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INTRODUCTION

Scope and Applicability

This SOP offers detailed guidance in evaluating laboratory data generated according to the method in the "USEPA Contract Laboratory Program Statement of Work for Organics Analysis Multi-Media, Multi-Concentration, SOM01.1, May 2005". The validation procedures and actions discussed in this document are based on the requirements set forth in the "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, January 2005". This document attempts to cover technical problems specific to low/Medium concentration of semivolatile compounds. Situations may arise where data limitations must be assessed based on the reviewer's own professional judgement.

In addition to technical requirements, contractual requirements may also be covered in this document. While it is important that instances of contract non-compliance be addressed in the Data Assessment, the technical criteria are always used to qualify the analytical data.

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 as follows:

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.

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

P - Pesticide/Aroclor target analytes when the % Difference between the analyte concentrations obtained from the two dissimilar GC columns is greater than 25%.

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 the USEPA Statement of Work SOM01.2 and National Functional Guidelines mentioned above.

YES NO N/A

. . . . . .

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: N/A **LAB:** CompuChem, Cary NC

SITE NAME: Vieques Island, PR **SDG No(s).:** 0807064

1.0 Chain of Custody and Sampling Trip Reports

1.1 Are the Traffic Reports/Chain-of-Custody Records present for all samples? [✓] ___ ___

ACTION: If no, contact RSCC, or the TOPO to obtain replacement of missing or illegible copies from the lab.

1.2 Is the Sampling Trip Report present for all samples? [✓] ___ ___

ACTION: If no, contact either RSCC or ask the TOPO to obtain the necessary information from the prime contractor.

2.0 Data Completeness and Deliverables

2.1 Have any missing deliverables been received and added to the data package? ___ [✓] ___

ACTION: Contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the lab. If lab cannot provide them, note the effect on the review of the data package in the Contract Problems/Non-compliance section of the Data Assessment.

2.2 Was CLASS CCS checklist included with the package? [✓] ___ ___

	YES	NO	N/A
2.3 Are there any discrepancies between the Traffic Reports/Chain-of-Custody Records, Sampling Trip Report and Sample Tags?	___	[✓]	___

ACTION: If yes, contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the laboratory.

3.0 <u>Cover Letter SDG Narrative</u>

3.1 Is the SDG Narrative or Cover Letter Present?	[✓]	___	___
3.2 Are case number, SDG number and contract number contained in the SDG Narrative or cover letter (see SOW, Exhibit B, section 2.5.1)? EPA sample numbers in the SDG, detailed documentation of any quality control, sample, shipment, and/or analytical problems encountered in processing the samples? Corrective action taken?	[✓]	___	___
3.3 Does the Narrative contain the following information SOM01.1, page B-12, section 2.5.1)? column used, storage of samples, case#, SDG#, analytical problems, and discrepancies between field and lab weights.	[✓]	___	___
3.5 Did the contractor record the temperature of the cooler on the Form DC-1, Item 9 - Cooler Temperature, and in the SDG Narrative?	[✓]	___	___
3.6 Does the Case Narrative contain the "verbatim" statement (page B-12, section 2.5.1 of the SOM)?	[✓]	___	___

ACTION: If "No", to any question in this section, contact the TOPO to obtain necessary resubmittals. If unavailable, document under the Contract Problems/ Non-Compliance section of the Data Assessment.

. . . . . .

	YES	NO	N/A
4.0 Data Validation Checklist			
4.1 Check the package for the following (see SOM reporting requirements, section 2.1, page B-10):			
a. Is the package paginated in ascending order starting from the SDG narrative?	[✓]	___	___
b. Are all forms and copies legible?	[✓]	___	___
c. Assembled in the order set forth in the SOW?	[✓]	___	___
d. Semivolatiles Data present?	[✓]	___	

PART A: Low/Medium Semivolatile Analyses

	YES	NO	N/A
1.0 Sample Conditions/Problems			
1.1 Do the Traffic Reports/Chain-of-Custody Records, Sampling Trip Report or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	___	[✓]	___

ACTION: If samples were not iced or the ice was melted upon arrival at the laboratory and the temperature of the cooler was > 10° C, then flag all positive results with a "J" and all non-detects "UJ".

	YES	NO	N/A
2.0 Holding Times			
2.1 Have any SVOA technical holding times, determined from date of collection to date of analysis, been exceeded?	___	[✓]	___

2.2 Preservation: Aqueous and Non-aqueous samples must be cooled at 4°C ± 2°C.

YES NO N/A

. . . . . .

Action: Qualify sample results according to the following table.

Holding Time Actions for Low/Medium Semivolatile Analyses

Matrix	Preserved	Criteria	Action	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤ 7 days (extraction) < 40 days (analysis)	J*	UJ*
	No	> 7 days (extraction) > 40 days (analysis)	J	UJ
	Yes	≤ 7 days (extraction) ≤ 40 days (analysis)	No qualification	
	Yes	> 7 days (extraction) > 40 days (analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	R
Non-aqueous	No	≤ 14 days (extraction) ≤ 40 days (analysis)	J*	UJ*
	No	> 14 days (extraction) > 40 days (analysis)	J	UJ
	Yes	≤ 14 days (extraction) ≤ 40 days (analysis)	No qualification	
	Yes	> 14 days (extraction) > 40 days (analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	R

* Only if cooler temperature exceeds 10° C (see ACTION in Section 1.1 above). No action required if temperature < 10° C.

3.0 Deuterated Monitoring Compound (DMC) Recovery (Form II)

3.1 Are the Semivolatile DMC Recovery Summaries (Form II) present? [✓] ___ ___

	YES	NO	N/A
. . . . .			
ACTION: Contact the TOPO to obtain an explanation/resubmittal from the lab. If missing deliverables are unavailable, document the effect in the Data Assessment.			
3.2 Were outliers marked correctly with an asterisk?	[✓]	___	___
ACTION: Circle all outliers in red.			
3.3 Were more than four of the sixteen (16) Deuterated Monitoring Compounds (DMC's) recoveries outside their corresponding limits?	___	[✓]	___
If yes, were samples re-analyzed?	[ ]	___	✓
Were method blanks re-analyzed?	[ ]	___	✓

Note: Up to four (4) DMCs per sample may fail % recovery but all % recoveries must be > zero.

ACTION: If any DMC is outside the required limits, qualify their associated target compounds (See Table below) as follows:

SEMIVOLATILE DMC AND THEIR ASSOCIATED TARGET COMPOUNDS

Phenol-d5 Benzaldehyde Phenol	**2-Chlorophenol-d4** 2-Chlorophenol	**2-Nitrophenol-d4** Isophorone 2-nitrophenol
Bis(2-Chloroethyl)ether-d8 bis(2-Chloroethyl)ether 2,2'oxybis(1-Chloropropane bis(2-Chloroethoxy)methane	**4-Methylphenol-d8** 2-Methylphenol 4-Methylphenol 2,4 Dimethylphenol	**4-Chloroaniline-d4** 4-Chloroaniline Hexachloro cyclopentadiene 3,3'Dichlorobenzidine

Nitrobenzene-d8 Acetophenone N-Nitro-di-n-propylamine Hexachloroethane Nitrobenzene 2,6-Dinitrotoluene 2,4-Dinitrotoluene N-Nitrodiphenylamine	**2,4-Dichlorophenol-d3** 2,4-Dichlorophenol Hexaclorobutadiene 4-Chloro-3-methylphenol 2,4,6-Trichlorophenol 2,4,5-Trichlorophenol 1,2,4,5-Tetrachloro-benzene Pentachlorophenol 2,3,4,6-Tetrachloro-phenol	**Dimethylphthalate-d6** Caprolactam 1,1'-Biphenyl Dimethylphthalate Diethylphthalate Di-n-butylphthalate Butylbenzylphthalate bis(2-Ethylhexyl)-phthalate Di-n-octylphthalate
Fluorene-d10 Dibenzofuran Fluorene 4-Chlorophenyl-phenylether 4-Bromophenyl-phenylether Carbazole	**Anthracene-d10** Hexachlorobenzene Atrazine Phenanthrene Anthracene	**Pyrene-d10** Fluoranthene Pyrene Benzo(a)anthracene Chrysene
Acenaphthylene-d8 Naphthalene 2-Methylphthalene 2-Chlorophthalene Acenapthylene Acenaphthene	**4-Nitrophenol-d4** 2-Nitroaniline 3-Nitroaniline 2,4-Dinitrophenol 4-Nitrophenol 4-Nitroaniline	**Benzo(a)pyrene-d12** Benzo(b)flur0anthene Benzo(k)fluroanthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)pertlene
4,6-Dinitro-2-methylphenol-d2 4,6-Dinitro-2-methylphenol		

Semivolatile Deuterated Monitoring Compound Recovery Limits for Selective Ion Monitoring (SIM) and the Associated Target Compounds

Fluoranthene-d10 (DMC)	**2-Methylnaphthalene-d10 (DMC)**
Fluoranthene	Naphthalene

Pyrene	2-Methylnaphthalene
Benzo(a)anthracene	Acenaphthylene
Chrysene	Acenaphthene
Benzo(b)fluoranthene	Fluorene
Benzo(k)fluoranthene	Pentachlorophenol
Benzo(a)pyrene	Phenanthrene
Indeno(1,2,3-cd)pyrene	Anthracene
Bibenzo(a,h)anthracene	
Benzo(g,h,i)perylene	

SEMIVOLATILE DEUTERATED MONITORING COMPOUND RECOVERY LIMITS

DMC	Recovery Limits (%) for Water Samples	Recovery Limits (%) for Soil samples
Phenol-d5	39 - 106	17 - 103
Bis-(2-chloroethyl) ether-d8	40 - 105	12 - 9
2-Chlorophenol-d4	41 - 106	13 - 101
4-Methylphenol-d8	25 - 111	8 - 100
Nitrobenzene-d5	43 - 108	16 - 103
2-Nitrophenol-d4	40 - 108	16 - 104
2,4-Dichlorophenol-d3	37 - 105	23 - 104
4-Chloroaniline-d4	1 - 145	1 - 145
Dimethylphthalate-d6	47 - 114	43 - 111
Acenaphthalate-d8	41 - 107	20 - 97
4-Nitrophenol-d4	33 - 116	16 - 166
Fluorene-d10	42 - 111	40 - 108
4,6-Dintro-2-methylphenol-d2	22 - 104	1 - 121

Anthracene-d10	44 - 110	22 - 98
Pyrene-d10	52 - 119	51 - 120
Benzo(a)pyrene-d12	32 - 121	43 - 111
Fluoranthene-d10 (SIM)	5- - 150	50 - 150
2-Methylnaphthalene-d10 (SIM)	50 - 150	50 - 150

Deuterated Monitoring Compound Recovery Action for Semivolatiles

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
%R > Upper Acceptance Limit	J	No qualification
%R < Lower acceptance Limit	J	UJ
Lower Acceptance ≤ %R ≤ Upper Acceptance Limit	No qualification	

NOTE: Use the above table to qualify SVOA data including SIM analysis.

NOTE: As per SOM, any sample which has more than 4 DMC's outside the limits, it must be reanalyzed (SOM sec. 11.4.3.1 pg. D-49/Low Medium SVOA).

Blank analysis have DMCs out of specification: 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. For example, if one or more samples in the batch show acceptable DMC recoveries, the reviewer may choose to consider the blank problem to be an isolated occurrence.

ACTION: Note in the Data Assessment under Contract Problems/ Non-Compliance if the Lab did not perform reanalysis and reviewer's judgment regarding blank problem.

	YES	NO	N/A
3.4 Are there any transcription/calculation errors between raw data and form II?	___	[✓]	___

ACTION: If large errors exist, ask the TOPO to obtain an explanation/resubmittal from the lab, make any necessary corrections and note errors in the data assessment.

Note: DMC recovery limits criteria and qualification apply to samples diluted 5X and less. For samples diluted greater than 5X, recovery criteria does not apply Because it is assumed DMC is diluted below the quantitation range.

4.0 Matrix Spike/Matrix Spike Duplicate Recovery (Form III)

Note: Data for MS/MSD will not be present unless requested.

4.1 Are the MS/MSD Recovery Forms (Form III BNA) present?	[✓]	___	___
4.2 Was the MS/MSD analyzed at the required frequency (once per SDG, or every 20 samples, whichever is more frequent)?	[✓]	___	___

ACTION: If any MS/MSD data are missing, take action as specified in section 3.1 above.

ACTION: No action is taken on MS/MSD data alone. However, using professional judgement, the validator may use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. If Any MS/MSD % recovery or RPD is out of specification, qualify data to include the consideration of the existence of interference in the raw data. Consideration include, but not limited to the following "Action":

Matrix Spike/Matrix Spike Duplicate Action for Semivolatiles

Criteria	Action	
	Detected Spike Compounds	Non-detected Spike Compounds

YES NO N/A

. . . . . .

%R or RPD > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	Use Professional Judgment
Lower Acceptance Limit ≤ %R; RPD ≤ Upper Acceptance Limit	No qualification required	

Note: If it can be determined that the results of the MS/MSD affects only the sample spiked, limit qualification to only this sample. However, use professional judgment when it is determined through the MS/MSD results that the laboratory is having systematic problem in the analysis of one or more analytes that affect all associated samples.

5.0 Method Blanks (Form IV)

5.1 Is the Semivolatile Method Blank Summary (Form IV BNA) present for aqueous and soil samples? [✓] ___ ___

5.2 Frequency of Analysis: For the analysis of SVOA TCL compounds, has a method blank been analyzed for each SDG or every 20 samples, whichever is more frequent? [✓] ___ ___

5.3 Has a SVOA method blank been analyzed after the calibration standards. [✓] ___ ___

5.4 No target compound concentration may exceed the upper limit of the initial calibration. Did the laboratory perform dilution on compounds exceeding the initial calibration upper limit. [✓] ___ ___

ACTION: If any method blank data is missing or dilution was not done, notify the TOPO to obtain resubmittals or an explanation from the lab. If method blank data are unavailable, the reviewer may use professional judgement, or substitute field blank or trip blank data for missing method blank data.

5.5 Chromatography: Review the blank raw data chromatogram (RICs), quant. Reports or data system printout and spectra. Is the

	YES	NO	N/A
chromatographic performance (baseline stability) acceptable for each instrument?	✓		

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

5.6 The validator should verify that the correct identification scheme for EPA blanks was used. (See SOM page B-39, section 3.3.7.3 for more information.)

	YES	NO	N/A
Was the correct identification scheme used for all SVOA blanks?	✓		

ACTION: Contact the TOPO to obtain corrections from the lab, or make the necessary corrections. Document in the "Contract Problems/Non-Compliance section of the Data Assessment all corrections made by the validator.

	YES	NO	N/A
5.8 Are all detected hits for target compounds in method, and field blanks less than the CRQL?	✓		

Exception: Bis(2-ethylhexyl)phthalate must be less than 5X times their respective CRQLs listed in the method.

ACTION: If no, an explanation and laboratory's corrective actions must be addressed in the case narrative. If the narrative contains no explanation, then make a note in the Contract Problems/Non-Compliance section of the Data Assessment.

6.0 Contamination

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

Note: These limits are not advisory.

	STM	SVOC	
6.1 Do any method blanks contain positive SVOA results (TCL and/or TICs)?	✓	✓	

. . . . .	YES	NO	N/A
	Both		
6.2 Do any field/rinse blanks have positive SVOA results (including TICs)?	√	[ ]	___

NOTE: All field blank results associated with 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 system monitoring compound, instrument performance criteria, spectral or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks. If any blanks are grossly contaminated (i.e.,saturated peaks by GC/MS) all associated sample data should be qualified unusable (R).

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
	Gross contamination	Detects	Qualify results as unusable R
	TIC: aqueous	< 5x blank value	R

YES NO N/A

	TIC: non-aqueous	< 5x blank value	R

* 5x the CRQL for bis(2-ethylhexyl)Phthalate

NOTE: Analytes qualified "U" for blank contamination are treated as "hits" when qualifying for calibration criteria.
Note: When applied as described in the table above, the contaminant concentration in the blank are multiplied by the sample dilution factor.

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

ACTION: 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.

7.0 GC/MS Instrument Performance Check (Form V)

7.1 Are the GC/MS Instrument Performance Check Forms (Form V) present for decafluorotriphenylphosphine (DFTPP)? [✓] ___ ___

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

7.3 Did the 12-hour clock begin with either the injection of DFTPP, or in cases where a closing continuing calibration (CCV) was used as an opening CCV? [✓] ___ ___

Listed below are some, but not necessarily all, examples of acceptable analytical sequences incorporating the use of the opening/closing CCV. Use these examples as a guide for possible analytical sequences that can be expected.

YES NO N/A

. . . . . .

Conditions for When Example Sequence is Appropriate:	Acceptable Criteria That Must be Met:	Notes:
If time remains on the 12 hour clock after initial calibration sequence	• DFTPP tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets both opening and closing CCV criteria • CCV B meets closing CCV criteria.	The requirement of starting the new 12-hr clock for Analytical Sequence 2 with a new DFTPP tune is waived if CCV A meets opening CCV criteria. If CCV B meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.
If time remains on the 12 hour clock after initial calibration sequence	• DFTPP tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets closing CCV criteria (but does not meet opening CCV criteria). • CCV B meets opening CCV criteria. • CCV C meets closing CCV Criteria.	CCV A does not meet opening criteria, therefore a new DFTPP tune must be performed, immediately followed by CCV B before a method blank and any sample may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new DFTPP tune.
If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV. OR If the most recent closing CCV was not or could not be used as an opening CCV.	• DFTPP tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets both opening and closing CCV criteria. • CCV C meets both opening and closing CCV criteria.	The requirement of starting the new 12 hour clock for Analytical Sequence 2 with a new DFTPP tune is waived if CCV B meets opening CCV criteria. If CCV C meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.

YES NO N/A

. . . . . .

If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV OR If the most recent closing CCV was not or could not be used as an opening CCV	• DFTPP tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets closing CCV criteria (but does not meet opening CCV criteria). • CCV C meets opening CCV Criteria. • CCV D meets both opening and closing CCV criteria.	CCV B does not meet opening CCV criteria, therefore a new DFTPP tune must be performed, immediately followed by CCV B before a method blank and any samples may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new DFTPP tune. The requirement of starting the new 12 hr clock for Analytical Sequence 3 with a new DFTPP tune is waived if CCV D meets opening CCV criteria. If CCV D meets opening criteria, a method blank and subsequent samples may be analyzed after CCV B.

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

NOTE: All ion abundance ratios must be normalized to m/z 198, the nominal base peak, even though the ion abundance of m/z 442 may be up to 100% that of m/z 198.

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

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

ACTION: If ion abundance criteria are not met, professional Judgement to determine to what extent the data may be utilized.

NOTE: Guidelines to aid in the application of professional judgment in evaluating ion abundance criteria are discussed below:

a. Some of the most critical factors in the DFTPP criteria are the non-instrument specific requirements that are also not unduly affected by the location of the spectrum on the chromatographic profile. The m/z ratios for 198/199 and 442/443 are critical. These ratios are based on the natural abundance of carbon 12 and carbon 13 and should always be met. Similarly, the relative abundance of m/z 68, 70, 197, and 441 indicate the condition of the instrument and the suitability of the resolution adjustment. Note that all of the foregoing abundance relate to adjacent ions; they are relatively insensitive to differences in instrument design and position of the spectrum on the chromatographic profile.

YES NO N/A

. . . . . .

b. For the ions at m/z 51, 127, and 275, the actual relative abundance is not as critical. For instance, if m/z 275 has 80.0% relative abundance (criteria 10.0-60.0%) and other criteria are met, the deficiency is minor.

c. The relative abundance of m/z 365 is an indicator of suitable instrument zero adjustment. If relative abundance for m/z 365 is zero, minimum detection limits may be affected. On the other hand, if m/z 365 is present, but < 0.75% minimum abundance criteria, the deficiency is not as serious.

7.6 Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

7.7 Is the number of significant figures for the reported relative abundances consistent with the number given in the ion abundance criteria column on Form V ? [✓] ___ ___

ACTION: If large errors exist, take action as specified in section 3.1 above.

7.8 Is the spectrum of the mass calibration compound acceptable? [✓] ___ ___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

Note: The requirement to analyze the instrument performance check solution is optional when analysis of Polynuclear Hydrocarbon (PAHs)/pentachlorophenol is to be performed by the Selected Ion Monitoring (SIM) technique.

8.0 Target Compound List (TCL) Analytes (Form I)

8.1 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. Regional Control/MS/MSD samples? [✓] ___ ___

c. Blanks (method, field, etc)? [✓] ___ ___

8.2 Are the SVOA Reconstructed Ion Chromatograms, the 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. Regional Control/MS/MSD samples? [✓] ___ ___

	YES	NO	N/A
c. Blanks (method, field, etc)?	[✓]	___	___

ACTION: If any data are missing, take action specified in 3.1 above.

8.3 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.

8.4 Are lab-generated standard mass spectra of the identified SVOA compounds present for each sample?	[✓]	___	___

ACTION: If any mass spectra are missing, take action as specified in 3.1 above. If lab does not generate their own standard spectra, make note under the "Contract Problems/Non-Compliance" section of the Data Assessment. If spectra are unavailable reject "R" the reported results.

8.5 Is the RRT of each reported compound within ± 0.06 RRT units of the standard RRT in the continuing calibration verification or initial calibration mid-point standard?	[✓]	___	___
8.6 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
8.7 Do sample and standard relative ion intensities agree to within ± 20% between standard and sample spectra?	[✓]	___	___

ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be 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 sections 8.4-8.7 above.

YES NO N/A

. . . . . .

ACTION: When sample carry-over is suspected, use professional judgment to determine if instrument cross-contamination has affected positive compound identifications.

9.0 Tentatively Identified Compounds (TIC)

9.1 Are all Tentatively Identified Compound Forms (Form I SVOA-TIC) present? Do listed TICs include scan number or retention time, as well as the estimated "J" and/or "JN" qualifier? [✓] ___ ___

9.2 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 3.1 above.

ACTION: Verify "JN" qualifier is present for all chemically named TICs having a percent match of greater than or equal 85%. TICs labeled "unknown" are qualified with a "J" qualifier.

9.3 Are any target compounds (from any fraction) listed as TICs? (Example: 1,2-dimethylbenzene is xylene - a VOA target analyte - and should not be reported as a TIC.) ___ [✓] ___

ACTION: Flag with "R" only target compound detected in another fraction. (except blank contamination - see blank table in sec 6.3 above)

9.4 Are major ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample spectrum? [✓] ___ ___

9.5 Do TICs and "best match" reference spectra relative ion intensities agree within ± 20%? [✓] ___ ___

ACTION: Use professional judgement to determine the acceptability of TIC identifications. If it is determined that an incorrect identification was made, change its identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.

Action: When a compound is not found in any blank, but is detected in a sample and is a suspected artifact of a common laboratory contaminant, solvent preservatives or Aldo condensation, the result should be qualified as

YES NO N/A

. . . . . .

unusable (R). (i.e., common lab contaminants such as CO_2(m/e 44), Siloxanes (m/e 73), diethyl ether, hexane, certain freons and phthalates at < 100 ug/L. Aldol condensation products: 4-hydroxy-4-methyl-2-pentanone, 4-methyl-2-penten-2-one, and 5,5-dimethyl-2(H)-furanone. Solvent preservatives cyclohexene, and related by-products: cyclohexanone, cyclohexenone, cyclohexanol, cyclohexenol, chlorocyclohexene, and chlorocyclohexanol.).

10.0 Compound Quantitation and Reported Detection Limits

10.1 Are there any transcription/calculation errors in Form I results? (Check at least two positive values. Verify that the correct internal standards, quantitation ions, and RRFs were used to calculate Form I results.) ___ [✓] ___

10.2 Are the CRQLs adjusted to reflect sample dilutions? [✓] ___ ___

ACTION: If errors are large, take action as specified in section 3.1 above.

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQLs data from the diluted sample). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original Form I and substituting the data from 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 not to be used, including any in the data summary package.

10.3 For non-aqueous samples, were the percent moisture < 70%? [✓] ___ ___

Action: If the % moisture ≥ 70.0% and < 90.0%, qualify detects as "J" and non-detects as approximated "UJ" If the % Moisture ≥ 90%, qualify detects as "J" and non-detects as "R"

11.0 Standards Data (GC/MS)

11.1 Are the reconstructed ion chromatograms, and data system printouts (quant. reports) present for each initial and continuing calibration? [✓] ___ ___

ACTION: If any calibration standard data are missing, take action specified in section 3.1 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI SVOA) present and complete for the semivolatile target compounds (except seven listed below) at concentrations of 5, 10, 20, 40,

YES NO N/A

. . . . . .

and 80 µg/ℓ and 4-point calibration at 10, 20, 40, and 80 ug/L for 2,4-dinitrophenol, pentachlorophenol, 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, 4-nitrophenol and 4,6-dinitro-2-methylphenol? [✓] ___ ___

Note: If analysis by Selected Ion Monitoring (SIM) technique is requested for PAHs/pentachlorophenols, calibration standards are analyzed at 0.10, 0.20, 0.40, 0.80 and 1.0 ng/uL for each target compound of interest and the associated DMCs. Pentachlorophenol will require only a four-point initial calibration at 0.20, 0.40, 0.80 and 1.0 ng/uL.

ACTION: If any Initial Calibration forms are missing, take action as specified in section 3.1 above.

12.2 Are the relative standard deviation (RSD) stable for SVOA's over the concentration range of the calibration (i.e., %RSD ≤ 20%, and ≤ 40% for poor performers (see table below)? [✓] ___ ___

ACTION: Circle all outliers in red.

NOTE: The twenty two (25) poor performers compounds and associated DMCs are listed below. The relative response factor (RRF) for these compounds must be greater than or equal to 0.010. The RRF for all other BNA target compounds must be ≥ 0.050.

Semivolatile Compounds Exhibiting Poor Response

Semivolatile Compounds	
2,2'-Oxybis(1-chloropropane)	Benzaldehyde
4-Chloroaniline	4-Nitroaniline
Hexachlorobutadiene	4,6-Dinitro-2-methylphenol
Hexachlorocyclopentadiene	N-Nitrosodiphenylamine
2-Nitroaniline	3,3'Dichlorobenzidine
3-Nitroaniline	1,1'Biphenyl
2,4-Dinitrophenol	Dimethylphthalate
4-Nitrophenol	Diethylphthalate
Acetophenone	1,2,4,5-Tetrachlorobenzene
Caprolactam	Carbazole

YES NO N/A

Atrazine	Butylbenzylphthalate
Di-n-butylphthalate	Di-n-octylphthalate
Bis-2(ethylhexyl)phthalate	

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

12.3 Are any $\overline{RRF}$s < 0.050 (< 0.010 for poor performers)? ___ [✓] ___

ACTION: Circle all outliers in red.

ACTION: Use the following table to qualify for detects and non-detect compounds.

Initial Calibration Actions for Semivolatile Analyses

Criteria for Semivolatile Analysis	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RRF < 0.010 (compounds exhibiting poor response) RRF < 0.050 (all other target compounds)	J	R
RRF ≥ 0.010 (compounds exhibiting poor response) RRF ≥ 0.050 (all other target compounds)	No qualification	
%RSD ≤ 40.0% (compounds exhibiting poor response) %RSD ≤ 20.0% (all other target compounds)	No qualification	
%RSD > 40.0% (compounds exhibiting poor response) %RSD > 20.0% (all other target compounds)	J	No qualification

ACTION: Document in the Data Assessment Report the analytes that fail %RSD and/or RRF criteria.

12.4 Are there any transcription/calculation errors in the reporting of RRFs, $\overline{RRF}$s or %RSD values? (Check at least 2 values, but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

ACTION: If errors are large, contact the TOPO to obtain an explanation/resubmittal from the lab, document in the Data Assessment under Contract Problems/Non-Compliance.

	YES	NO	N/A
13.0 GC/MS Continuing Calibration Verification (CCV) (Form VII)			
13.1 Are the Continuing Calibration Forms (Form VII SVOA) present and complete for the semivolatile fraction?	✓		
13.2 Did the 12 hour clock begin with either the injection of DFTPP or in cases where a closing CCV can be used as an opening CCV for each instrument?	✓		
ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, ask the TOPO to obtain explanation/resubmittal from the laboratory. If continuing calibration data are unavailable, flag all associated sample data as unusable (R).			
13.3 Do any semivolatile compounds have a % Difference (% D) between the initial RRF and CCV RRF exceeding ± 40% for the poor performers (see table/page 22) or ± 25% for the remaining compounds?		✓	
ACTION: Circle all outliers in red.			
13.4 Do any semivolatile compounds have a RRF < 0.05 or < 0.01 for the poor performers?		✓	
ACTION: Circle all outliers in red.			

Note: Verify that the CCV was run at the required frequency (an opening and closing CCV must be run within 12-hour period) and the CCV was compared to the correct initial calibration. If the mid-point standard from the initial calibration is used as an opening CCV, verify that the result (RRF) of the mid-point standard was compared to the average RRF from the correct initial calibration.

Note: The closing CCV used to bracket the end of a 12-hour analytical sequence may be used as the opening CCV for the new 12-hour analyical sequence, provided that all the technical acceptance criteria are met for an opening CCV (see table below). If the closing CCV does not meet the technical acceptance criteria for an opening CCV, then a DFTPP tune followed by an opening CCV is required and the next 12-hour time period begins with the DFTPP tune.

Action: Use the following table to qualify data based on the technical acceptance criteria for the opening CCV and closing CCV.

Continuing Calibration Verification (CCV) Actions for Low/Medium Semivolatiles Analyses

Criteria for Opening CCV	Criteria for Closing CCV	Action	
		Detected Associated Compounds	Non-Detected Associated Compounds

YES NO N/A

. . . . . .

RRF < 0.010 (poor responders) RRF < 0.050 (for all other compounds)	RRF < 0.010 (for all target compounds)	J	R
RRF ≥ 0.010 (poor responders) RRF ≥ 0.050 (all other target compounds)	RRF ≥ 0.010 (for all target compounds)	No Action	
%D > 40.0 or < -40.0 (poor responders) %D > 25.0 or < -25.0 (all other volatile target compounds)	%D > 50.0 or < -50.0 (for all target compounds)	J	UJ
%D ≤ 40.0 or ≥ -40.0 (poor responders) %D ≤ 25.0 or ≥ -25.0 (all other target compounds)	%D ≤ 50.0 or ≥ -50.0 (for all target compounds)	No Action	
Opening CCV not performed at required frequency *	Closing CCV not performed at required frequency *	R	

* The 12-hour clock begins with either the injection of DFTPP or in cases where a closing CCV can be used as an opening CCV, the 12-hour clock begins with the injection of the opening CCV.

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance if more than two of the required analytes failed the above acceptance criteria.

13.5 Are there any transcription/calculation errors for the reporting of RRFs, or %D between initial RRFs and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors with red pencil.

ACTION: If errors are large, notify the TOPO to obtain explanation/resubmittals from the lab. Document errors in the Contract Problems/Non-Compliance section of the Data Assessment.

Note: All DMCs must meet RRF ≥ 0.010. No qualification of the data is necessary on the DMCs RRF and %RSD/%Diff data alone. However, use professional judgment to evaluate the DMC and %RSD/% Diff data in conjunction with the DMC recoveries to determine the need of qualification of the data.

14.0 Internal Standard (Form VIII)

14.1 Were the internal standard area counts for every sample and blank within the range of 50.0% and 200.0% of its response from the associated 12-hour calibration (opening CCV or mid-point initial calibration standard? [✓] ___ ___

If no, were affected samples reanalyzed? [✓] ___ ___

ACTION: 1. Circle all outliers with red pencil.

14.2 Are the retention times of the internal standards in sample or blanks within ± 30 seconds from the RT of the

	YES	NO	N/A
internal standard in the 12-hour associated calibration standard (opening CCV or mid-point standard from initial calibration)?	✓		

Action: Use the following table to qualify the data

INTERNAL STANDARDS ACTIONS FOR LOW/MEDIUM SEMIVOLATILES

Criteria	ACTION	
	Detected Associated Compounds *	Non-detected Associated Compounds *
Area counts ≥ 50% and ≤ 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	No Action required	
Area counts < 50% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J	R
Area counts > 200% of 12-hour standard (Opening CCV or mid-point standard from initial calibration)	J	No Action
RT difference > 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	R	
RT difference ≤ 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	No Action required	

* For semivolatile compounds associated to each internal standard, see Table 2-Semivolatile standards corresponding Target and Deuterated Monitoring Compounds for Quantitation in SOM01.1, Exhibit D, available at:

Http://www.epa.gov/superfund/programs/clp/som1.htm

Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable "R" if the mass spectral are met.

NOTE: Contract Requirements: The SOM (section 11.4.4 page D-50/SVOA Low/Medium states that any sample which fails the acceptance criteria for internal standard response must be reanalyzed.

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance any sample(s) which failed the above IS acceptance criteria.

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15.0 Field Duplicates

15.1 Were any field duplicates submitted for Low Concentration SVOA analysis? [✓] ___ ___

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

ACTION: Any gross variation between duplicate results must be addressed in the reviewer narrative. If large differences exist, contact the TOPO to confirm identification of field duplicates with the sampler.

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Definitions

CCS - contract compliance screening
CLASS - Contract Laboratory Analytical Services Support
CLP - Contract Laboratory Program
CRQL - Contract Required Quantitation Limit
DFTPP - decafluorotriphenylphosphine
GC/MS - gas chromatography/mass spectroscopy
kg - kilogram
µg - microgram
ℓ - liter
mℓ - milliliter
QC - quality control
RAS - Routine Analytical Services
RIC - reconstructed ion chromatogram
RPD - relative percent difference
RRF - relative response factor
$\overline{\text{RRF}}$ - 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
SOP - standard operating procedure
SOW - Statement of Work
SVOA - semivolatile organic acid
TCL - Target Compound List
TCLP - Toxicity Characteristics Leachate Procedure
TIC - tentatively identified compound
TPO - technical project officer
VTSR - validated time of sample receipt
TOPO - Task Order Project Officer

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References

1. USEPA Contract Laboratory Program of Work for Organic Analysis Multi-Media, Multi-Concentration, SOW/CLPSOM01.1, October 2004
2. National Functional Guidelines for Superfund Organic Methods Data Review January 2005

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

7E - FORM VII SV-1
SEMIVOLATILE CONTINUING CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: _____ SDG No.: 0807064

Instrument ID: 5972hp60 Calibration Date: 08/01/2008 Time: 1306

Lab File ID: HH080801A60.d Init. Calib. Date(s): 07/19/2008 07/19/2008

EPA Sample No.(SSTD020##): SSTD020CV Init. Calib. Time(s): 1602 2001

GC Column: RTX-5MS ID: 0.32 (mm)

COMPOUND	$\overline{RRF}$	RRF020	MIN RRF	%D	MAX %D
Benzaldehyde	1.203	1.404	0.010	16.7	40.0
Phenol	1.948	2.209	0.800	13.4	25.0
Bis(2-chloroethyl)ether	1.551	1.659	0.700	7.0	25.0
2-Chlorophenol	1.436	1.595	0.800	11.0	25.0
2-Methylphenol	1.318	1.463	0.700	11.0	25.0
2,2'-Oxybis(1-chloropropane)	3.284	3.933	0.010	19.8	40.0
Acetophenone	2.037	2.253	0.010	10.6	40.0
4-Methylphenol	1.428	1.555	0.600	8.9	25.0
N-Nitroso-di-n-propylamine	0.968	1.188	0.500	22.8	25.0
Hexachloroethane	0.741	0.836	0.300	12.8	25.0
Nitrobenzene	0.491	0.645	0.200	31.4	25.0
Isophorone	0.776	0.845	0.400	8.9	25.0
2-Nitrophenol	0.228	0.252	0.100	10.3	25.0
2,4-Dimethylphenol	0.327	0.363	0.200	10.9	25.0
Bis(2-chloroethoxy)methane	0.517	0.575	0.300	11.3	25.0
2,4-Dichlorophenol	0.301	0.320	0.200	6.0	25.0
Naphthalene	1.048	1.135	0.700	8.2	25.0
4-Chloroaniline	0.320	0.292	0.010	-8.7	40.0
Hexachlorobutadiene	0.158	0.165	0.010	4.3	40.0
Caprolactam	0.063	0.069	0.010	9.6	40.0
4-Chloro-3-methylphenol	0.278	0.306	0.200	10.0	25.0
2-Methylnaphthalene	0.524	0.565	0.400	7.6	25.0
Hexachlorocyclopentadiene	0.450	0.462	0.010	2.6	40.0
2,4,6-Trichlorophenol	0.405	0.412	0.200	1.6	25.0
2,4,5-Trichlorophenol	0.449	0.439	0.200	-2.2	25.0
1,1'-Biphenyl	1.532	1.637	0.010	6.8	40.0
2-Chloronaphthalene	1.169	1.224	0.800	4.7	25.0
2-Nitroaniline	0.522	0.580	0.010	11.2	40.0
Dimethylphthalate	1.504	1.518	0.010	0.9	40.0
2,6-Dinitrotoluene	0.382	0.401	0.200	4.8	25.0
Acenaphthylene	2.001	2.117	0.900	5.8	25.0
3-Nitroaniline	0.343	0.234	0.010	-31.7	40.0
Acenaphthene	1.323	1.365	0.900	3.2	25.0
2,4-Dinitrophenol	0.233	0.216	0.010	-7.3	40.0
4-Nitrophenol	0.197	0.183	0.010	-7.1	40.0
Dibenzofuran	1.687	1.771	0.800	5.0	25.0

ENVIRONMENTAL
Data Services, Inc.

LOW CONCENTRATION VOLATILE ORGANIC COMPOUNDS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807064

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 22, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SB20-0810	0807064-01	Soil
1MS	VWAE-SB20-0810MS	0807064-01MS	Soil
1MSD	VWAE-SB20-0810MSD	0807064-01MSD	Soil
1RE	VWAE-SB20-0810RE	0807064-01RE	Soil

The USEPA Region II SOP HW-33, Revision 1, August 2007: USEPA CLP Statement of Work for Organic Analysis of Low/Medium Concentration of Volatile Organic Compounds SOM01.2 Data Validation and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were analyzed within 14 days for soil samples.

Surrogates - All samples exhibited acceptable surrogate recoveries except the following.

Sample ID	Surrogate	%R	Qualifier
1	Vinyl chloride-d3	56%	J/UJ - All associated compounds
	Chloroethane-d5	57%	J/UJ - All associated compounds
	Chloroform-d	55%	J/UJ - All associated compounds
	1,2-Dichloroethane-d4	54%	J/UJ - All associated compounds
	Benzene-d6	64%	J/UJ - All associated compounds
	1,2-Dichloropropane-d6	58%	J/UJ - All associated compounds
	Toluene-d8	65%	J/UJ - All associated compounds
	trans-1,3-Dichloropropene-d4	60%	J/UJ - All associated compounds
	1,4-Dioxane-d8	44%	J/UJ - All associated compounds
	1,1,2,2-Tetrachloroethane-d2	55%	J/UJ - All associated compounds
	1,2-Dichlorobenzene-d4	56%	J/UJ - All associated compounds
1RE	Vinyl chloride-d3	55%	J/UJ - All associated compounds

Sample ID	Surrogate	%R	Qualifier
1RE	Chloroethane	59%	J/UJ - All associated compounds
	Chloroform-d	60%	J/UJ - All associated compounds
	1,2-Dichloroethane-d4	62%	J/UJ - All associated compounds
	Benzene-d6	60%	J/UJ - All associated compounds
	1,2-Dichloropropane-d6	59%	J/UJ - All associated compounds
	Toluene-d8	72%	J/UJ - All associated compounds
	trans-1,3-Dichloropropene-d4	66%	J/UJ - All associated compounds

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS sample exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VBLKLA	Methylene chloride	2.1	U	All samples
	Cyclohexane	0.38	U	All samples

Trip, Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-TB01-071808	None - ND	-	-	-
VWAE-EB01-071808	Acetone	40	None	None - All ND
	4-Methyl-2-pentanone	2.8	None	None - All ND

GC/MS Instrument Performance Check - All of the BFB tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were not reported for the samples in this data package.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate samples were not included in this data package.

ANNOTATED FORM Is

1

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: SDG No.: 0807064

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807064-01

Sample wt/vol: 6.11 (g/mL) g Lab File ID: 0807064-0173.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 12.0 Date Analyzed: 07/30/2008 use reanalysis

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ~~ug/L~~ ug/kg	Q	
75-71-8	Dichlorodifluoromethane	4.6	~~U~~	UJ SSL
74-87-3	Chloromethane	4.6	~~U~~	UJ
75-01-4	Vinyl chloride	4.6	~~U~~	UJ
74-83-9	Bromomethane	4.6	~~U~~	UJ
75-00-3	Chloroethane	4.6	~~U~~	UJ
75-69-4	Trichlorofluoromethane	4.6	~~U~~	UJ
75-35-4	1,1-Dichloroethene	4.6	U	
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	4.6	~~U~~	UJ SSL
67-64-1	Acetone	9.3	U	
75-15-0	Carbon disulfide	4.6	~~U~~	UJ SSL
79-20-9	Methyl acetate	4.6	~~U~~	UJ
75-09-2	Methylene chloride	4.6 ~~1.4~~	~~JB~~	UJ ~~BL~~,S
156-60-5	trans-1,2-Dichloroethene	4.6	U	
1634-04-4	Methyl tert-butyl ether	4.6	~~U~~	UJ SSL
75-34-3	1,1-Dichloroethane	4.6	~~U~~	UJ
156-59-2	cis-1,2-Dichloroethene	4.6	U	
78-93-3	2-Butanone	9.3	U	
74-97-5	Bromochloromethane	4.6	~~U~~	UJ SSL
67-66-3	Chloroform	4.6	~~U~~	UJ
71-55-6	1,1,1-Trichloroethane	4.6	~~U~~	UJ
110-82-7	Cyclohexane	4.6 ~~0.31~~	~~JB~~	UJ ~~BL~~,SS
56-23-5	Carbon tetrachloride	4.6	~~U~~	UJ SSL
71-43-2	Benzene	4.6	~~U~~	UJ
107-06-2	1,2-Dichloroethane	4.6	~~U~~	UJ
123-91-1	1,4-Dioxane	93	~~U~~	UJ

Report 1,4-Dioxane for Low-Medium VOA analysis only

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1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: SDG No.: 0807064

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807064-01

Sample wt/vol: 6.11 (g/mL) g Lab File ID: 0807064-0173.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 12.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL) Use reanalysis

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ~~ug/kg~~	Q	
79-01-6	Trichloroethene	4.6	~~U~~	UJ SSL
108-87-2	Methylcyclohexane	4.6	~~U~~	UJ
78-87-5	1,2-Dichloropropane	4.6	~~U~~	UJ
75-27-4	Bromodichloromethane	4.6	~~U~~	UJ
10061-01-5	cis-1,3-Dichloropropene	4.6	~~U~~	UJ
108-10-1	4-Methyl-2-pentanone	9.3	U	
108-88-3	Toluene	4.6	~~U~~	UJ SSL
10061-02-6	trans-1,3-Dichloropropene	4.6	~~U~~	UJ
79-00-5	1,1,2-Trichloroethane	4.6	~~U~~	UJ
127-18-4	Tetrachloroethene	4.6	~~U~~	UJ
591-78-6	2-Hexanone	9.3	U	
124-48-1	Dibromochloromethane	4.6	~~U~~	UJ SSL
106-93-4	1,2-Dibromoethane	4.6	~~U~~	UJ
108-90-7	Chlorobenzene	4.6	~~U~~	UJ
100-41-4	Ethylbenzene	4.6	~~U~~	UJ
95-47-6	o-Xylene	4.6	~~U~~	
179601-23-1	m,p-Xylene	4.6	~~U~~	
100-42-5	Styrene	4.6	~~U~~	UJ
75-25-2	Bromoform	4.6	~~U~~	UJ
98-82-8	Isopropylbenzene	4.6	~~U~~	UJ
79-34-5	1,1,2,2-Tetrachloroethane	4.6	~~U~~	UJ
541-73-1	1,3-Dichlorobenzene	4.6	~~U~~	
106-46-7	1,4-Dichlorobenzene	4.6	~~U~~	
95-50-1	1,2-Dichlorobenzene	4.6	~~U~~	
96-12-8	1,2-Dibromo-3-chloropropane	4.6	~~U~~	UJ
120-82-1	1,2,4-Trichlorobenzene	4.6	~~U~~	
87-61-6	1,2,3-Trichlorobenzene	4.6	~~U~~	

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LW 10/22/08

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: SDG No.: 0807064

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807064-01

Sample wt/vol: 6.11 (g/mL) g Lab File ID: 0807064-0173.d

Level: (TRACE or LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 12.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0 Use reanalys

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 10.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	6.00	10	J
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

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[1]EPA-designated Registry Number.

LW 10/22/08

1RE

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-0810RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: SDG No.: 0807064

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807064-01RE1

Sample wt/vol: 6.23 (g/mL) g Lab File ID: 0807064-01R273.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 12.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q	
75-71-8	Dichlorodifluoromethane	4.6	~~U~~	UJ SSL
74-87-3	Chloromethane	0.47	~~U~~	J
75-01-4	Vinyl chloride	4.6	~~U~~	UJ
74-83-9	Bromomethane	4.6	~~U~~	UJ
75-00-3	Chloroethane	4.6	~~U~~	UJ
75-69-4	Trichlorofluoromethane	4.6	~~U~~	UJ
75-35-4	1,1-Dichloroethene	4.6	U	
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	4.6	~~U~~	UJ SSL
67-64-1	Acetone	9.1	U	
75-15-0	Carbon disulfide	4.6	~~U~~	UJ SSL
79-20-9	Methyl acetate	4.6	~~U~~	UJ
75-09-2	Methylene chloride	4.6 ~~1.1~~	~~JB~~	UJ ~~BL~~,S
156-60-5	trans-1,2-Dichloroethene	4.6	U	
1634-04-4	Methyl tert-butyl ether	4.6	~~U~~	UJ SSL
75-34-3	1,1-Dichloroethane	4.6	~~U~~	UJ
156-59-2	cis-1,2-Dichloroethene	4.6	U	
78-93-3	2-Butanone	9.1	U	
74-97-5	Bromochloromethane	4.6	~~U~~	UJ SSL
67-66-3	Chloroform	4.6	~~U~~	UJ
71-55-6	1,1,1-Trichloroethane	4.6	~~U~~	UJ
110-82-7	Cyclohexane	4.6 ~~0.38~~	~~JB~~	UJ ~~BL~~,S
56-23-5	Carbon tetrachloride	4.6	~~U~~	UJ SSL
71-43-2	Benzene	4.6	~~U~~	UJ
107-06-2	1,2-Dichloroethane	4.6	~~U~~	UJ
123-91-1	1,4-Dioxane	91	U	

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW 10/22/08

1RE

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-SB20-0810RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: SDG No.: 0807064

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807064-01RE1

Sample wt/vol: 6.23 (g/mL) g Lab File ID: 0807064-01R273.d

Level: (TRACE/LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 12.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q		
79-01-6	Trichloroethene	4.6	~~U~~	UJ	SSL
108-87-2	Methylcyclohexane	4.6	~~U~~	UJ	
78-87-5	1,2-Dichloropropane	4.6	~~U~~		
75-27-4	Bromodichloromethane	4.6	~~U~~		
10061-01-5	cis-1,3-Dichloropropene	4.6	~~U~~	UJ	
108-10-1	4-Methyl-2-pentanone	9.1	~~U~~		
108-88-3	Toluene	4.6	~~U~~	UJ	SSL
10061-02-6	trans-1,3-Dichloropropene	4.6	~~U~~	UJ	
79-00-5	1,1,2-Trichloroethane	4.6	~~U~~	UJ	
127-18-4	Tetrachloroethene	4.6	~~U~~	UJ	
591-78-6	2-Hexanone	9.1	U		
124-48-1	Dibromochloromethane	4.6	~~U~~	UJ	SSL
106-93-4	1,2-Dibromoethane	4.6	~~U~~	UJ	
108-90-7	Chlorobenzene	4.6	U		
100-41-4	Ethylbenzene	4.6	~~U~~	UJ	SSL
95-47-6	o-Xylene	4.6	U		
179601-23-1	m,p-Xylene	4.6	U		
100-42-5	Styrene	4.6	U		
75-25-2	Bromoform	4.6	~~U~~	UJ	
98-82-8	Isopropylbenzene	4.6	~~U~~	UJ	
79-34-5	1,1,2,2-Tetrachloroethane	4.6	U		
541-73-1	1,3-Dichlorobenzene	4.6	U		
106-46-7	1,4-Dichlorobenzene	4.6	U		
95-50-1	1,2-Dichlorobenzene	4.6	U		
96-12-8	1,2-Dibromo-3-chloropropane	4.6	U		
120-82-1	1,2,4-Trichlorobenzene	4.6	U		
87-61-6	1,2,3-Trichlorobenzene	4.6	U		

MW 10/22/08

1RE

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-SB20-0810RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: SDG No.: 0807064

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 0807064-01RE1

Sample wt/vol: 6.23 (g/mL) g Lab File ID: 0807064-01R273.d

Level: (TRACE or LOW/MED) LOW Date Received: 07/21/2008

% Moisture: not dec. 12.0 Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 10.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

LW 12/22/08

USEPA REGION II WORKSHEETS

SOP HW-33/VOA
Revision 1
August 2007

USEPA Contract Laboratory Program
Statement of Work for Organic Analysis of Low/Medium Concentration of VolatileOrganic Compounds SOM01.2
Data Validation

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Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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INTRODUCTION

Scope and Applicability

This SOP offers detailed guidance in evaluating laboratory data generated according to the method in the "USEPA Contract Laboratory Program Statement of Work for Organics Analysis Multi-Media, Multi-Concentration, SOM01.1, May 2005". The validation procedures and actions discussed in this document are based on the requirements set forth in the "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, January 2005". This document attempts to cover technical problems specific to low/Medium concentration of volatile compounds. Situations may arise where data limitations must be assessed based on the reviewer's own professional judgement.

In addition to technical requirements, contractual requirements may also be covered in this document. While it is important that instances of contract non-compliance be addressed in the Data Assessment, the technical criteria are always used to qualify the analytical data.

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 as follows:

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.

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

P - Pesticide/Aroclor target analytes when the % Difference between the analyte concentrations obtained from the two dissimilar GC columns is greater than 25%.

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 the USEPA Statement of Work SOM01.2 and National Functional Guidelines mentioned above.

YES NO N/A

. . . . . .

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: N/A **LAB:** Compuchem, Cary, NC

SITE NAME: Vieques Island, PR **SDG No(s).:** 0807064

1.0 Chain of Custody and Sampling Trip Reports

1.1 Are the Traffic Reports/Chain-of-Custody Records present for all samples? [✓] ___ ___

ACTION: If no, contact RSCC, or the TOPO to obtain replacement of missing or illegible copies from the lab.

1.2 Is the Sampling Trip Report present for all samples? [✓] ___ ___

ACTION: If no, contact either RSCC or ask the TOPO to obtain the necessary information from the prime contractor.

2.0 Data Completeness and Deliverables

2.1 Have any missing deliverables been received and added to the data package? ___ [✓] ___

ACTION: Contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the lab. If lab cannot provide them, note the effect on the review of the data package in the Contract Problems/Non-compliance section of the Data Assessment.

2.2 Was CLASS CCS checklist included with the package? [✓] ___ ___

	YES	NO	N/A
. . . . .			
2.3 Are there any discrepancies between the Traffic Reports/Chain-of-Custody Records, and Sampling Trip Report?	___	[✓]	___

ACTION: If yes, contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the laboratory.

3.0 <u>Cover Letter SDG Narrative</u>

3.1 Is the SDG Narrative or Cover Letter Present?	[✓]	___	___
3.2 Are case number, SDG number and contract number contained in the SDG Narrative or cover letter (see SOW, Exhibit B, section 2.5.1)? EPA sample numbers in the SDG, detailed documentation of any quality control, sample, shipment, and/or analytical problems encountered in processing the samples? Corrective action taken?	[✓]	___	___
3.3 Does the Narrative contain the following information SOM01.1, page B-12, section 2.5.1)? Description of trap, column used, storage of samples, case#, SDG#, analytical problems, and discrepancies between field and lab weights.	[✓]	___	___
3.4 Does the narrative, VOA section, contain a list of all TICs identified as alkanes and their estimated concentrations?	[✓]	___	___
3.5 Did the contractor record the temperature of the cooler on the Form DC-1, Item 9 - Cooler Temperature, and in the SDG Narrative?	[✓]	___	___
3.6 Does the narrative contain a list of the pH values determined for each water sample submitted for volatiles analysis (SOW, page B-13, section 2.5.1.2)?	[✓]	___	___

	YES	NO	N/A
. . . . .			
3.7 Does the Case Narrative contain the "verbatim" statement (page B-12, section 2.5.1 of the SOM)?	[✓]	___	___

ACTION: If "No", to any question in this section, contact the TOPO to obtain necessary resubmittals. If unavailable, document under the Contract Problems/ Non-Compliance section of the Data Assessment.

4.0 Data Validation Checklist

4.1 Check the package for the following (see SOM reporting requirements, section 2.1, page B-10):

a. Is the package paginated in ascending order starting from the SDG narrative?	[✓]	___	___
b. Are all forms and copies legible?	[✓]	___	___
c. Assembled in the order set forth in the SOW?	[✓]	___	___
d. Low/Med Concentration Volatiles Data present?	[✓]	___	___

Action: Take action as specified in section 3.7 above.

PART A: Low/Medium Volatile ANALYSES

1.0 Sample Conditions/Problems

1.1 Do the Traffic Reports/Chain-of-Custody Records, Sampling Trip Report or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	___	[✓]	___

ACTION: If samples were not iced or the ice was melted upon arrival at the laboratory and the temperature of the

YES NO N/A

. . . . . .

cooler was > 10° C, then flag all positive results with a "J" and all non-detects "UJ".

ACTION: If both 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".

2.0 Holding Times

2.1 Have any VOA technical holding times, determined from date of collection to date of analysis, been exceeded? ___ [✓] ___

2.2 Preservation: Aqueous samples must be preserved with HCL to pH of 2 or below and cooled at 4°C ± 2°C. Non-aqueous samples: frozen (less than -7°C) or properly cooled (4°C ± 2°C) and preserved with $NaHSO_4$.

Action: Qualify sample results according to the following table.

Holding Time Actions for Low/Medium Volatile Analyses

Matrix	Preserved	Criteria	ACTION	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤ 7 Days	NO Action	
	No	> 7 Days	J	R
	Yes	≤ 14 Days	No Action	
	Yes	> 14 Days	J	R
Non-Aqueous	No	≤ 14 Days	J	R
	Yes	≤ 14 Days	No Action	
	Yes/No	> 14 Days	J	R

3.0 Deuterated Monitoring Compound (DMC) Recovery (Form II)

	YES	NO	N/A
. . . . .			
3.1 Are the Volatile SMC Recovery Summaries (Form II present?	[✓]	___	___

ACTION: Contact the TOPO to obtain an explanation/resubmittal from the lab. If missing deliverables are unavailable, document the effect in the Data Assessment.

3.2 Were outliers marked correctly with an asterisk?	[✓]	___	___

ACTION: Circle all outliers in red.

3.3 Were more than three of the fourteen (14) Deuterated Monitoring Compounds (DMC's) recoveries outside their corresponding limits?	✓	[ ]	___
If yes, were samples re-analyzed?	[✓]	___	___
Were method blanks re-analyzed?	[ ]	___	✓

ACTION: If any DMC is outside the required limits (see Table below), qualify their associated target compounds (See Table below) as follows:

VOLATILE DMC AND THEIR ASSOCIATED TARGET COMPOUNDS

Chloroethane-d5	**1,2-Dichloropropane-d6**	**1,2-Dichlorobenzene-d4**
Dichlorodifluoromethane Chloromethane Bromomethane Chloroethane Carbon Disulfide	Cyclohexane Methylcyclohexane 1,2-Dichloropropane Bromodichloromethane	Chlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene 1,2,3-Trichlorobenzene

YES NO N/A

. . . . . .

1,4-Dioxane-d8 1,4-Dioxane	**trans-1,3-Dichloropropene-d4** cis-1,3-Dichloropropene trans-1,3-Dichloropropene 1,1,2-Trichloroethane	**Chloroform-d** 1,1-Dichloroethane Bromochloromethane Chloroform Dibromochloromethane Bromoform
2-Butanone-d5 Acetone 2-butanone	**1,1-dichloroethene-d2** 1,1-dichloroethene trans-1,2-Dichloroethene cis-1,2-Dichloroethene	**2-Hexanone-d5** 4-Methyl-2-pentanone 2-Hexanone
Vinyl Chloride-d3 Vinyl Chloride	**Benzene-d6** Benzene	**1,1,2,2-Tetrachloroethane-d2** 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane
1,2-Dichloroethane-d4 Trichlorofluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Methyl Acetate Methylene Chloride Methyl tert-Butyl Ether Carbon Tetrachloride 1,2-Dichloroethane 1,1,1-Trichloroethane 1,2-Dibromoethane	**Toluene-d8** Trichloroethene Toluene Tetrachloroethene Ethylbenzene o-Xylenes m,p-Xylene Styrene Isopropylbenzene	

YES NO N/A

. . . . . .

VOLATILE DEUTERATED MONITORING COMPOUND RECOVERY LIMITS

DMC	Recovery Limits (%) for Water Samples	Recovery Limits (%) for Soil samples
Vinyl Chloride-d3	65 - 131	68 - 122
Chloroethane-d5	71 - 131	61 - 130
1,1-Dichloroethene-d2	55 - 104	45 - 132
2-Butanone-d5	49 - 155	20 - 182
Chloroform-d	78 - 121	72 - 123
1,2-Dichloroethane-d4	78 - 129	79 - 122
Benzene-d6	77 - 124	80 - 121
1,2-Dichloropropane-d6	79 - 124	74 - 124
Toluene-d8	77 - 121	78 - 121
trans-1,3-Dichloropropene-d4	73 - 121	72 - 130
2-Hexanone-d5	28 - 135	17 - 184
1,4-Dioxane-d8	50 - 150	50 - 150
1,1,2,2-Tetrachloroethane-d2	73 - 125	56 - 161
1,2-Dichlorobenzene-d4	80 - 131	70 - 131

1. For any recovery greater than the upper limit:

   a. Qualify "J" all positive associated target compounds.
   b. Do not qualify associated non-detects.

2. For any recovery greater than or equal to 20%, but less than the lower limit:

   a. Qualify "J" all positive associated target compounds.
   b. Qualify "UJ" associated non-detects.

3. For any recovery less than 20%:

YES NO N/A

. . . . . .

a. Qualify "J" all positive associated target compounds.
b. Qualify "R" all associated non-detects.

NOTE: Up to three (3) DMC's per sample, excluding 1,4-Dioxane-d8, may fail to meet the recovery limits. (SOM, sec. 11.3.4, pg. D-45/Low Medium VOA). Recovery limits for 1,4-Dioxane-d8 are advisory.
As per SOM, any sample which has more than 3 DMC's outside the limits, it must be reanalyzed (SOM sec. 11.4.3.1 pg. D-46/Low Medium VOA).

ACTION: Note in the Data Assessment under Contract Problems/ Non-Compliance if the Lab did not perform reanalysis.

3.4 Are there any transcription/calculation errors between raw data and form II? ___ [✓] ___

ACTION: If large errors exist, ask the TOPO to obtain an explanation/resubmittal from the lab, make any necessary corrections and note errors in the data assessment.

Note: DMC recovery limits criteria and qualifications apply to samples diluted 5X and less. For samples diluted greater than 5X, recovery criteria does not apply because it is assumed DMC is diluted below the quantitation range.

4.0 Matrix Spike/Matrix Spike Duplicate Recovery (Form III)

Note: Data for MS/MSD will not be present unless requested.

4.1 Are the MS/MSD Recovery Forms (Form III Low/Med VOA) present? [✓] ___ ___

4.2 Was the MS/MSD analyzed at the required frequency (once per SDG, or every 20 samples, whichever is more frequent)? [✓] ___ ___

ACTION: If any MS/MSD data are missing, take action as specified in section 3.1 above.

ACTION: No action is taken on MS/MSD data alone. However, using professional judgement, the validator may

YES NO N/A

. . . . . .

use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. If any MS/MSD % recovery or RPD is out of specification, qualify data to include the consideration of the existence of interference in the raw data. Consideration include, but not limited to the following "Action":

Criteria	Action	
	Detected Spiked Compounds	**Non-detected Spiked Compounds**
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use Professional Judgement
Lower Acceptance Limit ≤ %R; RPD ≤ Upper Acceptance Limits	No qualification	

5.0 <u>Method Blanks (Form IV)</u>

5.1 Is the Volatile Method Blank Summary (Form IV VOA) present for aqueous and soil samples? [✓] ___ ___

5.2 <u>Frequency of Analysis</u>: For the analysis of Low/ Med Concentration VOA TCL compounds, has a method blank been analyzed for each SDG or every 20 samples, whichever is more frequent? [✓] ___ ___

5.3 Has a VOA method blank been analyzed after the calibration standards and once every 12 hours time period for each GC/MS instrument used? [✓] ___ ___

5.4 Was a VOA instrument blank analyzed after each sample/dilution that contains a target compound exceeding the initial calibration range (see SOM, page D-48/Low/Medium VOA, section 12.1.1.3)? [✓] ___ ___

YES NO N/A

. . . . . .

ACTION: If any method/instrument blank data are missing, notify the TOPO to obtain resubmittals or an explanation from the lab. If method blank data are unavailable, the reviewer may use professional judgement, or substitute field blank or trip blank data for missing method blank data.

If an instrument blank was not analyzed after a sample containing a target analyte exceeding the initial calibration standards, inspect the sample chromatogram acquired immediately after this sample for possible carryover. The system is considered uncontaminated if the target analyte is below CRQL. Use professional judgement to determine if carryover occurred and qualify analyte(s) accordingly.

5.5 Was a storage blank analyzed once per SDG after all the samples were analyzed? [✓] ___ ___

ACTION: If storage blank data is missing, contact the TOPO to obtain any missing deliverables from the laboratory. If unavailable, note in the Contract Problems/Non-Compliance section of the Data Assessment.

5.6 The validator should verify that the correct identification scheme for EPA blanks was used. (See SOM page B-39, section 3.3.7.3 for more information.)

Was the correct identification scheme used for all Low/Med VOA blanks? [✓] ___ ___

ACTION: Contact the TOPO to obtain corrections from the lab, or make the necessary corrections. Document in the "Contract Problems/Non-Compliance section of the Data Assessment all corrections made by the validator.

5.7 <u>Chromatography</u>: review the blank raw data - chromatograms (RICs), quant. reports, data system printouts and spectra.

Also compare the storage blank raw data with the method blank. Determine if contamination in the storage blank is also present in the method blank.

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

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

5.8	Are all detected hits for target compounds in method, and storage blanks less than the CRQL?	[✓]	___	___

Exception: Methylene Chloride, Acetone and 2-butanone must be less than 2X times their respective CRQLs.

ACTION: If no, an explanation and laboratory's corrective actions must be addressed in the case narrative. If the narrative contains no explanation, then make a note in the Contract Problems/Non-Compliance section of the Data Assessment.

6.0 Contamination

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

6.1	Does the storage blank contain positive results (TCL and/or TICs) for Low/Med Concentration VOAs?	✓	[ ]	___
6.2	Do any method/reagent/instrument blanks contain positive results (including TICs) for Low/Med Concentration VOAs?	✓	[ ]	___

NOTE: Contaminated instrument blanks are unacceptable under this SOW (see page D-50/VOA, section 12.1.5.2).

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance if a contaminated instrument blank was submitted.

YES NO N/A

. . . . . .

ACTION: Sample analysis results after the high concentration sample must be evaluated for carryover. Sample must meet the maximum carryover criteria as listed in SOM sec. 11.3.8 p. D-46/VOA.("the sample must not contain a concentration above the CRQL for the target compounds that exceeded the limit in the contaminated sample.")

6.3 Do any field/trip/rinse blanks have positive hits for Low/Med VOA results (including TICs)? ✓ [ ] ___

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

NOTE: All field blank results associated with a particular group of samples (may exceed one per case) must be used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Field blanks & trip blanks must be qualified for system monitoring compound, instrument performance criteria, spectral or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks. If any blanks are grossly contaminated (i.e., saturated by GC/MS), all associated sample data should be qualified unusable (R).

Blank Type	Blank Result	Sample Result	Action for Samples
	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
Method, Field,		≥ CRQL*	No qualification required

YES NO N/A

. . . . . .

Trip, Storage, Instrument **	> 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
	Gross contamination	Detects	Qualify results as unusable R
	TIC > 2ug/L	Detects	See "Action" below

* 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: Analytes qualified "U" for blank contamination are treated as "hits" when qualifying for calibration criteria.

Note: When applied as described in the table above, the contaminant concentration in the blank are multiplied by the sample dilution factor.

ACTION : For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

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

ACTION: Note in data assessment that there is no associated field/rinse/equipment blank.

<u>Exception</u>: samples taken from a drinking water tap do not have associated field blanks.

7.0 <u>GC/MS Instrument Performance Check (Form V)</u>

	YES	NO	N/A
. . . . .			
7.1 Are the GC/MS Instrument Performance Check Forms (Form V) present for Bromofluorobenzene (BFB)?	[✓]	___	___
7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the BFB provided for each twelve hour shift?	[✓]	___	___
7.3 Did the 12-hour clock begin with either the injection of BFB, or in cases where a closing continuing calibration (CCV) was used as an opening CCV?	[✓]	___	___

Listed below are some, but not necessarily all, examples of acceptable analytical sequences incorporating the use of the opening/closing CCV. Use these examples as a guide for possible analytical sequences that can be expected.

Conditions for When Example Sequence is Appropriate:	**Acceptable Criteria That Must be Met:**	**Notes:**
If time remains on the 12 hour clock after initial calibration sequence	• BFB tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets both opening and closing CCV criteria • CCV B meets closing CCV criteria.	The requirement of starting the new 12-hr clock for Analytical Sequence 2 with a new BFB tune is waived if CCV A meets opening CCV criteria. If CCV B meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.
If time remains on the 12 hour clock after initial calibration sequence	• BFB tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets closing CCV criteria (but does not meet opening CCV criteria). • CCV B meets opening CCV criteria. • CCV C meets closing CCV Criteria.	CCV A does not meet opening criteria, therefore a new BFB tune must be performed, immediately followed by CCV B before a method blank and any samples may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new BFB tune.

YES NO N/A

. . . . . .

If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV. OR If the most recent closing CCV was not or could not be used as an opening CCV.	• BFB tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets both opening and closing CCV criteria. • CCV C meets both opening and closing CCV criteria.	The requirement of starting the new 12 hour clock for Analytical Sequence 2 with a new BFB tune is waived if CCV B meets opening CCV criteria. If CCV C meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.
If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV OR If the most recent closing CCV was not or could not be used as an opening CCV	• BFB tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets closing CCV criteria (but does not meet opening CCV criteria). • CCV C meets opening CCV Criteria. • CCV D meets both opening and closing CCV criteria.	CCV B does not meet opening CCV criteria, therefore a new BFB tune must be performed, immediately followed by CCV B before a method blank and any samples may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new BFB tune. The requirement of starting the new 12 hr clock for Analytical Sequence 3 with a new BFB tune is waived if CCV D meets opening CCV criteria. If CCV D meets opening criteria, a method blank and subsequent samples may be analyzed after CCV B.

7.4 Have the ion abundances been normalized to m/z 95 [✓] ___ ___

NOTE: All ion abundance ratios must be normalized to m/z 95, the nominal base peak, even though the ion abundance of m/z 174 may be up to 120% that of m/z 95.

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

7.5 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, professional Judgement may be applied to determine to what extent the data may be utilized.

	YES	NO	N/A
. . . . .			
7.6 Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.)	___	[✓]	___
7.7 Is the number of significant figures for the reported relative abundances consistent with the number given in the ion abundance criteria column on Form V ?	[✓]	___	___

ACTION: If large errors exist, take action as specified in section 3.1 above.

7.8 Is the spectrum of the mass calibration compound acceptable?	[✓]	___	___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

8.0 <u>Target Compound List (TCL) Analytes (Form I)</u>

8.1 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. Regional Control/MS/MSD samples?	[✓]	___	___
c. Blanks (method, trip, etc)?	[✓]	___	___

8.2 Are the VOA Reconstructed Ion Chromatograms, the 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. Regional Control/MS/MSD samples?	[✓]	___	___
c. Blanks (method, trip, etc)?	[✓]	___	___

ACTION: If any data are missing, take action specified in 3.1 above.

8.3 Is chromatographic performance acceptable with respect to:

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

	YES	NO	N/A
. . . . .			
Other: _____?	[ ]	___	✓

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

8.4	Are lab-generated standard mass spectra of the identified VOA compounds present for each sample?	[✓]	___	___

ACTION: If any mass spectra are missing, take action as specified in 3.1 above. If lab does not generate their own standard spectra, make note under the "Contract Problems/Non-Compliance" section of the Data Assessment. If spectra are unavailable reject "R" the reported results.

8.5	Is the RRT of each reported compound within ± 0.06 RRT units of the standard RRT in the continuing calibration?	[✓]	___	___
8.6	Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
8.7	Do sample and standard relative ion intensities agree to within ± 20%?	[✓]	___	___

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 sections 8.4-8.7 above.

ACTION: When sample carry-over is suspected, review section 6.2/Action #2 above before determining if instrument cross-contamination has affected positive compound identifications.

9.0 Tentatively Identified Compounds (TIC)

9.1	Are all Tentatively Identified Compound Forms (Form I VOA-TIC) present? Do listed TICs include scan number or retention time, as well as the estimated "J" and/or "JN" qualifier?	[✓]	___	___
9.2	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?	[✓]	___	___

	YES	NO	N/A
. . . . .			
b. Blanks?	[✓]	___	___
b. Are Alkanes listed in/or part of the Case Narrative?	[✓]	___	___

ACTION: If any TIC data are missing, take action specified in 3.1 above.

ACTION: Verify "JN" qualifier is present for all chemically named TICs having a percent match of greater than or equal 85%. TICs labeled "unknown" are qualified with a "J" qualifier.

9.3 Are any target compounds (from any fraction) listed as TICs? (Example: 1,2-dimethylbenzene is xylene - a VOA target analyte - and should not be reported as a TIC.)	___	[✓]	___

ACTION: Flag with "R" only target compound detected in another fraction (except blank contamination).

9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
9.5 Do TICs and "best match" reference spectra relative ion intensities agree within ± 20%?	[✓]	___	___

ACTION: Use professional judgement to determine the acceptability of TIC identifications. If it is determined that an incorrect identification was made, change its identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.

Action: When a compound is not found in any blank, but is detected in a sample and is a suspected artifact of a common laboratory contaminant, solvent preservatives or Aldo condensation, the result should be qualified as unusable (R). (i.e., common lab contaminants such as CO_2(m/e 44), Siloxanes (m/e 73), diethyl ether, hexane, certain freons. Aldol condensation products: 4-hydroxy-4-methyl-2-pentanone, 4-methyl-2-penten-2-one, and 5,5-dimethyl-2(H)-furanone. Solvent preservatives cyclohexene, and related by-products: cyclohexanone, cyclohexenone, cyclohexanol, cyclohexenone, chlorocyclohexene, and chlorocyclohexanol.).

10.0 Compound Quantitation and Reported Detection Limits

10.1 Are there any transcription/calculation errors in Form I results? (Check at least two positive values. Verify that the correct internal standards, quantitation ions, and RRFs were used to calculate Form I results.)	___	[✓]	___
10.2 Are the CRQLs adjusted to reflect sample dilutions and per cent moisture?	[✓]	___	___

YES NO N/A

. . . . . .

ACTION: If errors are large, take action as specified in section 3.1 above.

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQLs data from the diluted sample). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original Form I and substituting the data from 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 not to be used, including any in the data summary package.

!0.3 For non-aqueous samples, were the percent moisture < 70%? [✓] ___ ___

Action: If the % moisture ≥ 70.0% and < 90.0%, qualify detects as "J" and non-detects as approximated "UJ" If the % Moisture ≥ 90%, qualify detects as "J" and non-detects as "R"

11.0 Standards Data (GC/MS)

11.1 Are the reconstructed ion chromatograms, and data system printouts (quant. reports) present for each initial and continuing calibration? [✓] ___ ___

ACTION: If any calibration standard data are missing, take action specified in section 3.1 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI LCV) present and complete for the volatile fraction at concentrations of 5, 10, 50, 100, and 200 µg/ℓ for non-ketones, 10, 20, 100, 200 and 400 ug/L for ketones and 100, 200, 1000, 2000, and 4000 ug/L for 1,4-dioxane. [✓] ___ ___

ACTION: If any Initial Calibration forms are missing, take action as specified in section 3.1 above.

12.2 Are the relative standard deviation (RSD) stable for VOA's over the concentration range of the calibration (i.e., %RSD ≤ 20.%, ≤ 40% for poor performers (see table below), ≤ 50% for 1,4-dioxane)? [✓] ___ ___

ACTION: Circle all outliers in red.

NOTE: The twenty two (22) poor performers compounds and associated DMCs are listed below. The relative response factor (RRF) for these compounds must be greater than or equal to 0.010.

YES NO N/A

. . . . . .

Volatile Compounds Exhibiting Poor Response

Volatile Compounds	
Acetone	1,2-Dibromo-3-chloropropane
2-Butanone	Isopropylbenzene
Carbon disulfide	Methyl acetate
Chloroethane	Methylene chloride
Chloromethane	Methylcyclohexane
Cyclohexane	Methyl tert-butyl ether
1,4-Dioxane	trans-1,2-Dichloroethene
1,2-Dibromoethane	4-Methyl-2-pentanone
Dichlorodifluoromethane	2-Hexanone
cis-1,2-dichloroethene	Trichlorofluoromethane
1,2-Dichloropropane	1,1,2-Trichloro-1,2,2-trifluoroethane

ACTION: If %RSD > 20.0%, (> 40.0% for the poor performers, and > 50% for 1,4-dioxane), qualify associated positive results for that analyte "J" (estimated). If %RSD is > 90, flag all non-detects for that analyte "R" (unusable) and positive results "J".

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

12.3 Are any $\overline{RRF}$s < 0.050 (< 0.010 for poor performers)? ___ [✓] ___

ACTION: Circle all outliers in red.

ACTION: If any $\overline{RRF}$ values are < 0.05 or < 0.01 for poor performers, qualify associated non-detects unusable (R) and associated positive results estimated (J).

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance the analytes that fail %RSD and/or RRF criteria.

12.4 Are there any transcription /calculation errors in the reporting of RRFs, $\overline{RRF}$s or %RSD values? (Check at least 2 values, but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

	YES	NO	N/A
. . . . .			

ACTION: If errors are large, contact the TOPO to obtain an explanation/resubmittal from the lab, document in the Data Assessment under Contract Problems/Non-Compliance.

13.0 GC/MS Continuing Calibration Verification (CCV) (Form VII)

		YES	NO	N/A
13.1	Are the Continuing Calibration Forms (Form VII) present and complete for the volatile fraction?	✓		
13.2	Did the 12 hour clock begin with either the injection of BFB or in cases where a closing CCV can be used as an opening CCV for each instrument?	✓		

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, ask the TOPO to obtain explanation/resubmittal from the laboratory. If continuing calibration data are unavailable, flag all associated sample data as unusable (R).

		YES	NO	N/A
13.3	Do any volatile compounds have a % Difference (% D) between the initial RRF and CCV RRF exceeding ± 50% for 1,4-Dioxane, ± 40% for the poor performers or ± 25% for the remaining compounds?		✓	

ACTION: Circle all outliers in red.

		YES	NO	N/A
13.4	Do any volatile compounds have a RRF < 0.05 or < 0.01 for the poor performers?		✓	

ACTION: Circle all outliers in red.

Note: Verify that the CCV was run at the required frequency (an opening and closing CCV must be run within 12-hour period) and the CCV was compared to the correct initial calibration. If the mid-point standard from the initial calibration is used as an opening CCV, verify that the result (RRF) of the mid-point standard was compared to the average RRF from the correct initial calibration.

Note: The closing CCV used to bracket the end of a 12-hour analytical sequence may be used as the opening CCV for the new 12-hour analyical sequence, provided that all the technical acceptance criteria are met for an opening CCV (see table below). If the closing CCV does not meet the technical acceptance criteria for an opening CCV, then a BFB tune followed by an opening CCV is required and the next 12-hour time period begins with the BFB tune.

Action: Use the following table to qualify data based on the technical acceptance criteria for the opening CCV and closing CCV.

Continuing Calibration Verification (CCV) Actions for Low/Medium Volatiles Analyses

Criteria for	Criteria for	Action

YES NO N/A

. . . . . .

Opening CCV	Closing CCV	Detected Associated Compounds	Non-Detected Associated Compounds
RRF < 0.010 (poor responders) RRF < 0.050 (all other volatile target compounds)	RRF < 0.010 (for all volatile target compounds)	J	R
RRF ≥ 0.010 (poor responders) RRF ≥ 0.050 (for all other compounds)	RRF ≥ 0.010 (for all target volatile compounds)	No Action	
%D > 50.0 or < -50.0 (1,4-Dioxane) %D > 40.0 or < -40.0 (poor responders) %D > 25.0 or < -25.0 (all other volatile target compounds)	%D > 50.0 or < -50.0 (for all volatile target compounds)	J	UJ
%D ≤ 50.0 or ≥ -50.0 (1,4-Dioxane) %D ≤ 40.0 or ≥ -40.0 (poor responders) %D ≤ 25.0 or ≥ -25.0 (all other volatile target compounds)	%D ≤ 50.0 or ≥ -50.0 (for all volatile target compounds)	No Action	
Opening CCV not performed at required frequency *	Closing CCV not performed at required frequency *	R	

* See section 13.2 above

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance if more than two of the required analytes failed the above acceptance criteria.

13.5 Are there any transcription/calculation errors for the reporting of RRFs, or %D between initial RRFs and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors with red pencil.

ACTION: If errors are large, notify the TOPO to obtain explanation/resubmittals from the lab. Document errors in the Contract Problems/Non-Compliance section of the Data Assessment.

Note: All DMCs must meet RRF ≥ 0.010. No qualification of the data is necessary on the DMCs RRF and %RSD/%Diff data alone. However, use professional judgment to evaluate the DMC and %RSD/% Diff data in conjunction with the DMC recoveries to determine the need of qualification of the data.

14.0 Internal Standard (Form VIII)

14.1 Were the internal standard area counts for every sample and blank within the range of 50.0% and 200.0% of its response in the most recent opening CCV standard calibration? [✓] ___ ___

	YES	NO	N/A
. . . . .			
If no, were affected sample reanalyzed?	[ ]	___	✓

ACTION: 1. Circle all outliers with red pencil.

14.2 Are the retention times of the internal standards in sample or blanks within ±30 seconds from the RT of the internal standard in the 12-hour associated calibration standard (opening CCV or mid-point standard from initial calibration)?	✓ [ ]	___	___

Action: Use the following table to qualify the data:

INTERNAL STANDARDS ACTIONS FOR LOW/MEDIUM VOLATILES

Criteria	ACTION	
	Detected Associated Compounds *	Non-detected Associated Compounds *
Area counts ≥ 50% and ≤ 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	No Action	
Area counts < 50% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J	R
Area counts > 200% of 12-hour standard (Opening CCV or mid-point standard from initial calibration)	J	No Action
RT difference > 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	R**	R
RT difference ≤ 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	No Action	

* For volatile compounds associated to each internal standard, see Table 3-Low/Medium Volatile Target Compounds and Deuterated Monitoring Compounds with Corresponding Internal Standards for Quantitation in SOM01.1, Exhibit D, available at:

Http://www.epa.gov/superfund/programs/clp/som1.htm

** Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable "R" if the mass spectral are met.

NOTE: Contract Requirements: The SOM (section 11.4.1 page D-46/VOA Low/Medium states that any sample which fails the acceptance criteria for IS response must be reanalyzed.

. . . . . .

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance any sample(s) which failed the above IS acceptance criteria.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Low/Medium Concentration VOA analysis? [ ] ___ √

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

ACTION: Any gross variation between duplicate results must be addressed in the reviewer narrative. If large differences exist, contact the TOPO to confirm identification of field duplicates with the sampler.

. . . . . .

Definitions

BFB - bromofluorobenzene
CCS - contract compliance screening
CLASS - Contract Laboratory Analytical Services Support
CLP - Contract Laboratory Program
CRQL - Contract Required Quantitation Limit
GC/MS - gas chromatography/mass spectroscopy
kg - kilogram
µg - microgram
ℓ - liter
mℓ - milliliter
QC - quality control
RAS - Routine Analytical Services
RIC - reconstructed ion chromatogram
RPD - relative percent difference
RRF - relative response factor
$\overline{\text{RRF}}$ - 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
SOP - standard operating procedure
SOW - Statement of Work
TCL - Target Compound List
TCLP - Toxicity Characteristics Leachate Procedure
TIC - tentatively identified compound
TPO - technical project officer
VOA - volatile organic acid
VTSR - validated time of sample receipt
TOPO - Task Order Project Officer

References

. . . . . .

1. USEPA Contract Laboratory Program of Work for Organic Analysis Multi-Media, Multi-Concentration, SOW/CLPSOM01.1, October 2004
2. National Functional Guidelines for Superfund Organic Methods Data Review January 2005

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CompuChem
a division of Liberty Analytical Corp.

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Cham Hill
Address: 5700 Cleveland St, Ste. 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: W-AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (Include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (liquid) 3-40mL	VOCs (liquid) 2-40mL	VOCs (Encores) 3-encores	TPH-GRO (soil) 2-encores	SVOC, SVOC-SIM, DRO, ORO 8270 8015	Total Metals, TI, CN	TOC 4oz	SPLP-VOA 4oz	SPLP SVOA-metals-TPH 8oz	pH 2oz	Grain Size Atterberg Limits 8oz	pH / Sample Info (Lab Use)
0807042-05	VWAE-TB01-071808	7/18/08	—	QC	5	5						X	X										
0807042-06	VWAE-EB01-071808	↓	0700	QC	5	5						X	X										
0807042-07	VWAE-EB02-071708	7/17/08	1810	QC	5	5						X	X										
0807038-01 1584301	VWAE-SB20-0810-08C	7/18/08	0745	SO	20			SPLP=	1584503					X (9)	X (6)	⊗	⊗	X	X	X	X	X *	did not receive (rec'd 608)
0807038-17	VWAE-SB20-1618-08C	↓	0818	SO	5									X	X								
0807038-18	VWAE-SB20P-1618-08C	↓	0818	SO	5									X	X								
0807038-19	VWAE-SB20-2022-08C	↓	0825	SO	6									X	X							X	
0807038-20 1584304	VWAE-SB20-2830-08C	↓	0940	SO	9			SPLP=	1584504					X	X			X	X	X	X		SUB =
0807038-21	VWAE-SB20-3234-08C	↓	1145	SO	5									X	X								

Lab Use Only

Sample Unpacked By: Jennifer Dover
Sample Order Entry By:
Samples Received in Good Condition? Y or N
If no, explain:
Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

MS/MSD on VWAE-SB20-0810-08C (20 Bottles)
⊗ Mistake

Sample Custody

Relinquished by: Date/Time: 7/18/08 Received by: Jennifer Dover Date/Time: 7/21/08 7:45
Relinquished by: Date/Time: Received by: Date/Time:
Subcontact? Y or N If yes, where? Grain Size/Atterberg limits to Custody Seal(s) intact? Y or N On Ice? Y or N Cooler Temp: 3.6 °C

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

White & Yellow copy to lab • Pink copy for customer

18343

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland Street, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Renji Butler / Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N: where indicated
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (encores)	SVOCs, SVOC SIM, DRO, ORO (8 oz)	TPH-GRO	Total Metals, TI, CN (4 oz)	Grain Size, Atterberg Limits	VOCs	SVOCs, SVOC SIM (AL)	Total Metals, TI (1-PL)	Cyanide (250 ml)	TPH-GRO	TPH-DRO & ORO (2-AL)	TOC (2-40 ml)	pH / Sample Info (Lab Use) Total Metals	TOC	Cyanide		
080704-16 158402	* VWAE-EB01-071808	7/18/08	0700	QC	8		1	1	2								⊗	X (1)	X	X		X	X	<2	<2	>12		
080704-01 155430	VWAE-SB20-0810-08C	7/18/08	0745	SO	6								X		X													
080708-14 158407	VWAE-SB20-1618-08C	↓	0818	SO	2								X		X													
080708-15 158408	VWAE-SB20P-1618-08C		0818	SO	2								X		X													
080708-19 158409	VWAE-SB20-2022-08C		0825	SO	2								X		X													

Lab Use Only

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

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

Comments

⊗ - Mistake.
MS/MSD on VWAE-SB20-0810-08C
* 1 of 2 SVOC Amber Liters broken - VWAE-EB01 7-18-08

Sample Custody

Relinquished by:	Date/Time: 7/18/08 1330	Received by: Diane Byrd	Date/Time: 7-21-08 745
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 3.8°C

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

White & Yellow copy to lab • Pink copy for customer

SUPPORT DOCUMENTATION

2C - FORM II VOA-3
SOIL VOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: _____ SDG No.: 0807064

Level: (LOW/MED) LOW

	EPA SAMPLE NO.	VDMC1 (VCL) #	VDMC2 (CLA) #	VDMC3 (DCE) #	VDMC4 (BUT) #	VDMC5 (CLF) #	VDMC6 (DCA) #	VDMC7 (BEN) #
01	VBLKEO	91	90	74	86	94	96	97
02	VBLKLA	81	84	81	140	80	85	90
03	VHBLKXD	85	92	75	64	91	94	84
04	VWAE-SB20-0810	56 *	57 *	55	60	55 *	54 *	64 *
05	VWAE-SB20-0810MS	65 *	68	89	87	71 *	72 *	83
06	VWAE-SB20-0810MSD	56 *	59 *	80	66	62 *	62 *	66 *
07	VWAE-SB20-0810RE	55 *	59 *	52	58	60 *	62 *	60 *
08								
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
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21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

all assoc. J/UJ

		QC LIMITS
VDMC1	(VCL) = Vinyl chloride-d3	(68-122)
VDMC2	(CLA) = Chloroethane-d5	(61-130)
VDMC3	(DCE) = 1,1-Dichloroethene-d2	(45-132)
VDMC4	(BUT) = 2-Butanone-d5	(20-182)
VDMC5	(CLF) = Chloroform-d	(72-123)
VDMC6	(DCA) = 1,2-Dichloroethane-d4	(79-122)
VDMC7	(BEN) = Benzene-d6	(80-121)

Column to be used to flag recovery values
* Value outside of contract required QC limits

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SOM01.2 (8/2007)

2D - FORM II VOA-4
SOIL VOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: _____ SDG No.: 0807064

Level: (LOW/MED) LOW

	EPA SAMPLE NO.	VDMC8 (DPA) #	VDMC9 (TOL) #	VDMC10 (TDP) #	VDMC11 (HEX) #	VDMC12 (DXE) #	VDMC13 (TCA) #	VDMC14 (DCZ) #	TOT OUT
01	VBLKEO	95	96	95	87	82	90	95	0
02	VBLKLA	88	93	90	105	69	81	90	0
03	VHBLKXD	86	85	84	64	63	80	87	0
04	VWAE-SB20-0810	58 *	65 *	60 *	62	44 *	55 *	56 *	11
05	VWAE-SB20-0810MS	80	84	83	88	61	77	79	3
06	VWAE-SB20-0810MSD	63 *	66 *	65 *	60	46 *	59	65 *	10
07	VWAE-SB20-0810RE	59 *	72 *	66 *	80	56	61	71	8
08									
09									
10									
11									
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26									
27									
28									
29									
30									

all assoc (J/UJ)

	QC LIMITS
VDMC8 (DPA) = 1,2-Dichloropropane-d6	(74-124)
VDMC9 (TOL) = Toluene-d8	(78-121)
VDMC10 (TDP) = trans-1,3-Dichloropropene-d4	(72-130)
VDMC11 (HEX) = 2-Hexanone-d5	(17-184)
VDMC12 (DXE) = 1,4-Dioxane-d8	(50-150)
VDMC13 (TCA) = 1,1,2,2-Tetrachloroethane-d2	(56-161)
VDMC14 (DCZ) = 1,2-Dichlorobenzene-d4	(70-131)

Column to be used to flag recovery values
* Values outside of contract required QC limits

Page 1 of 1

SOM01.2 (8/2007)

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKLA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: SDG No.: 0807064

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8073006-BLK1

Sample wt/vol: 5.00 (g/mL) g Lab File ID: 8073006-BLK1R73.d

Level: (TRACE/LOW/MED) LOW Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U
67-64-1	Acetone	10	U
75-15-0	Carbon disulfide	5.0	U
79-20-9	Methyl acetate	5.0	U
75-09-2	Methylene chloride	2.1	J
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-Butanone	10	U
74-97-5	Bromochloromethane	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
110-82-7	Cyclohexane	0.38	J
56-23-5	Carbon tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
123-91-1	1,4-Dioxane	100	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKLA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: SDG No.: 0807064

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8073006-BLK1

Sample wt/vol: 5.00 (g/mL) g Lab File ID: 8073006-BLK1R73.d

Level: (TRACE/LOW/MED) LOW Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
79-01-6	Trichloroethene	5.0	U
108-87-2	Methylcyclohexane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	10	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
95-47-6	o-Xylene	5.0	U
179601-23-1	m,p-Xylene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VBLKLA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807064 Mod. Ref No.: SDG No.: 0807064

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: 8073006-BLK1

Sample wt/vol: 5.00 (g/mL) g Lab File ID: 8073006-BLK1R73.d

Level: (TRACE or LOW/MED) LOW Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg Purge Volume: 10.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

ENVIRONMENTAL
Data Services, Inc.

DIESEL RANGE ORGANICS (DRO/ORO)

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807072

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 22, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAI-MW05P	0807072-01	Water
2	VWAI-MW07	0807072-02	Water
3	VWAI-EB01-072108	0807072-03	Water
4	VWAI-EB01-072008	0807072-04	Water
5	VWAI-MW05	0807072-05	Water
6	VWAI-MW08	0807072-06	Water
7	VWAI-EB01-072208	0807072-09	Water
8	VWAI-MW09	0807072-10	Water
9	VWAI-MW01	0807072-11	Water
10	VWAI-MW04	0807072-14	Water
10MS	VWAI-MW04MS	0807072-14MS	Water
10MSD	VWAI-MW04MSD	0807072-14MSD	Water
11	VWAI-MW02	0807072-15	Water
12	VWAI-MW03	0807072-16	Water
13	VWAI-EB01-072308	0807072-17	Water
14	VWAI-EB01-072408	0807072-18	Water
15	VWAE-MW03	0807072-20	Water
16	VWAE-MW08	0807072-21	Water
17	VWAE-MW07	0807072-22	Water
18	VWAE-EB01-072708	0807072-23	Water
19	VWAE-MW02	0807072-24	Water

The USEPA "Contract Laboratory Program National Functional Guidelines for Organic Data Review," October 1999, method criteria and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries except the following.

Sample ID	Surrogate	%R	Qualifier
12	o-Terphenyl	110%	None - Sample ND

MS/MSD - The MS/MSD samples exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blank was free of contamination.

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. mg/L	Qualifier	Affected Samples
VWAI-EB01-072008	ORO	0.76	None	All associated ND
VWAI-EB01-072108	None - ND	-	-	-
VWAI-EB01-072208	ORO	0.67	None	All associated ND
VWAI-EB01-072308	None - ND	-	-	-
VWAI-EB01-072408	None - ND	-	-	-
VWAE-EB01-072708	None - ND	-	-	-

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and/or correlation coefficients and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAI-MW05 mg/L	VWAI-MW05P mg/L	RPD	Qualifier
Diesel	0.57	0.59	3%	None

ANNOTATED FORM Is

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW05P

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-01

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/22/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/25/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/06/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.59	
----------	ORO	1.0	U

FORM I PEST

lw
10/25/08

2

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW07

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-02

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/23/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 07/25/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/06/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	1.2	
	ORO	1.0	U

FORM I PEST

lw
10/25/08

3

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB0
1-072108

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-03

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/23/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 07/25/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/06/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
	ORO	1.0	U

FORM I PEST

LW
10/25/08

4

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB0
1-072008

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-04

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/23/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/25/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/06/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
	ORO	0.76	J

FORM I PEST

lw
10/25/08

5

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW05

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-05

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/23/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/25/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/06/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.57	
	ORO	1.0	U

FORM I PEST

lw
10/25/08

6

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW08

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-06

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/23/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/25/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/06/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
	ORO	1.0	U

FORM I PEST

lw 10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB0
1-072208

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-09

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/24/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/25/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/06/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
----------	ORO	0.67	J

FORM I PEST

GW
10/25/08

8

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW09

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-10

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/24/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/25/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/06/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
	ORO	1.0	U

FORM I PEST

lw 10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW01

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-11

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/24/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/25/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/06/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
	ORO	1.0	U

FORM I PEST

fw
10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW04

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-14

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/25/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/25/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
----------	ORO	1.0	U

FORM I PEST

lw 10/25/08

11

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW02

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-15

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/25/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/25/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
	ORO	1.0	U

FORM I PEST

MW 10/28/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW03

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-16

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/25/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/25/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
	ORO	1.0	U

FORM I PEST

LW 10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB0
1-072308

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-17

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/25/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/25/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
----------	ORO	1.0	U

FORM I PEST

LW
10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB0
1-072408

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-18

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/25/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/25/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/05/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
	ORO	1.0	U

FORM I PEST

lw 10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW03

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-20

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/29/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/03/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
	ORO	1.0	U

FORM I PEST

LG
10/25/08

16

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW08

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-21

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/29/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/03/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
	ORO	1.0	U

FORM I PEST

hw
10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW07

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-22

Sample wt/vol: 950.0 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/29/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/03/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.53	U
	ORO	1.1	U

FORM I PEST

LW 10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB0
1-072708

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-23

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/29/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/03/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
	ORO	1.0	U

FORM I PEST

MW 10/25/08

19

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW02

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-24

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/29/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/03/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
	ORO	1.0	U

FORM I PEST

GW
10/25/08

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

2E
WATER PESTICIDE SURROGATE RECOVERY

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: . SDG No.: 0807072

GC Column(1): RTX-5 ID: 0.53 (mm)

	EPA SAMPLE NO.	S1 %REC #	S2 %REC #	S3 %REC #	S4 %REC #	S5 %REC #	S6 %REC #	TOT OUT
01	PBLKJJ	110						0
02	PJJLCS	95						0
03	VWAE-MW03	100						0
04	VWAE-MW08	95						0
05	VWAE-MW07	100						0
06	VWAE-EB01-07	100						0
07	VWAE-MW02	100						0
08	PBLKKL	100						0
09	PKLLCS	100						0
10	VWAI-MW04MS	98						0
11	VWAI-MW04MSD	97						0
12	VWAI-MW04	100						0
13	VWAI-MW02	110						0
14	VWAI-MW03	110 *						1
15	VWAI-EB01-07	100						0
16	VWAI-EB01-07	100						0
17	PJXLCS	100						0
18	PJXLCSD	110						0
19	VWAI-MW07	100						0
20	VWAI-EB01-07	100						0
21	VWAI-EB01-07	110						0
22	VWAI-MW08	110						0
23	VWAI-EB01-07	99						0
24	VWAI-MW09	110						0
25	VWAI-MW01	110						0
26	PBLKJX	100						0
27	VWAI-MW05P	95						0
28	VWAI-MW05	96						0
29								
30								

ADVISORY
QC LIMITS

S1 = o-terphenyl (47-112)

Column to be used to flag recovery values
* Values outside of QC limits
D Surrogate diluted out

ENVIRONMENTAL
Data Services, Inc.

GASOLINE RANGE ORGANICS (GRO)

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807072

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 22, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAI-MW07	0807072-02	Water
2	VWAI-EB01-072108	0807072-03	Water
3	VWAI-EB01-072008	0807072-04	Water
4	VWAI-MW05	0807072-05	Water
5	VWAI-MW08	0807072-06	Water
6	VWAI-MW05P	0807072-07	Water
7	VWAI-TB01-072108	0807072-08	Water
8	VWAI-EB01-072208	0807072-09	Water
9	VWAI-MW09	0807072-10	Water
10	VWAI-MW01	0807072-11	Water
11	VWAI-MW04	0807072-12	Water
11MS	VWAI-MW04MS	0807072-12MS	Water
11MSD	VWAI-MW04MSD	0807072-12MSD	Water
12	VWAI-TB01-072308	0807072-13	Water
13	VWAI-MW02	0807072-15	Water
14	VWAI-MW03	0807072-16	Water
15	VWAI-EB01-072308	0807072-17	Water
16	VWAI-EB01-072408	0807072-18	Water
17	VWAI-TB01-072408	0807072-19	Water
18	VWAE-MW03	0807072-20	Water
19	VWAE-MW08	0807072-21	Water
20	VWAE-MW07	0807072-22	Water
21	VWAE-EB01-072708	0807072-23	Water
22	VWAE-MW02	0807072-24	Water

The USEPA "Contract Laboratory Program National Functional Guidelines for Organic Data Review," October 1999, method criteria and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were analyzed within 14 days for water samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD samples exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. mg/L	Qualifier	Affected Samples
BLKAI	GRO	0.042	U	2-10
BLKAL	GRO	0.041	U	12-22

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAI-EB01-072108	None - ND	-	-	-
VWAI-EB01-072008	None - ND	-	-	-
VWAI-TB01-072108	None - ND	-	-	-
VWAI-EB01-072208	None - ND	-	-	-
VWAI-TB01-072308	None - ND	-	-	-
VWAI-EB01-072308	None - ND	-	-	-
VWAI-EB01-072408	None - ND	-	-	-
VWAE-TB01-072408	None - ND	-	-	-
VWAE-EB01-072708	None - ND	-	-	-

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAI-MW05 mg/L	VWAI-MW05P mg/L	RPD	Qualifier
None	ND	ND	-	-

ANNOTATED FORM Is

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAI-MW07

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-02

Sample wt/vol: 5 (g/ml) ML Lab File ID: 067X0807072-02

Level: (low/med) LOW Date Received: 07/23/08

% Moisture: not dec. _____ Date Analyzed: 08/01/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.84	

FORM I GC VOA

lw 10/25/08

2

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAI-EB0
1-072108

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-03

Sample wt/vol: 5 (g/ml) ML Lab File ID: 078X0807072-03

Level: (low/med) LOW Date Received: 07/23/08

% Moisture: not dec. _____ Date Analyzed: 08/01/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.054~~	~~J~~ U BC

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lw 10/25/08

3

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
VWAI-EB0
1-072008

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-04

Sample wt/vol: 5 (g/ml) ML Lab File ID: 079X0807072-04

Level: (low/med) LOW Date Received: 07/23/08

% Moisture: not dec. _____ Date Analyzed: 08/01/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.039~~	~~J~~ U BL

FORM I GC VOA

MW 10/25/08

4

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAI-MW05

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-05

Sample wt/vol: 5 (g/ml) ML Lab File ID: 070X0807072-05

Level: (low/med) LOW Date Received: 07/23/08

% Moisture: not dec. _____ Date Analyzed: 08/01/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.045~~	~~J~~ U BL

FORM I GC VOA

lw 10/25/08

5

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAI-MW08

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-06

Sample wt/vol: 5 (g/ml) ML Lab File ID: 080X0807072-06

Level: (low/med) LOW Date Received: 07/23/08

% Moisture: not dec. _____ Date Analyzed: 08/01/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.04~~	~~J~~ U BL

FORM I GC VOA

LW
10/25/08

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FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAI-MW05P

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-07

Sample wt/vol: 5 (g/ml) ML Lab File ID: 072X0807072-07

Level: (low/med) LOW Date Received: 07/23/08

% Moisture: not dec. _____ Date Analyzed: 08/01/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.045~~	J

u BL

FORM I GC VOA

lw
10/25/08

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FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
VWAI-TB0
1-072108

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-08

Sample wt/vol: 5 (g/ml) ML Lab File ID: 073X0807072-08

Level: (low/med) LOW Date Received: 07/23/08

% Moisture: not dec. _____ Date Analyzed: 08/01/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.04~~	J

u BL

FORM I GC VOA

LW 10/25/08

8

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
VWAI-EB0
1-072208

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-09

Sample wt/vol: 5 (g/ml) ML Lab File ID: 081X0807072-09

Level: (low/med) LOW Date Received: 07/24/08

% Moisture: not dec. _____ Date Analyzed: 08/01/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 0.~~041~~ ~~J~~	u BL

FORM I GC VOA

lw 10/25/08

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FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAI-MW09

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-10

Sample wt/vol: 5 (g/ml) ML Lab File ID: 082X0807072-10

Level: (low/med) LOW Date Received: 07/24/08

% Moisture: not dec. _____ Date Analyzed: 08/01/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q	
9999-99-7	Gasoline	0.500 ~~0.045~~	~~J~~	U BL

FORM I GC VOA

AW
10/25/08

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAI-MW01

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-11

Sample wt/vol: 5 (g/ml) ML Lab File ID: 083X0807072-11

Level: (low/med) LOW Date Received: 07/24/08

% Moisture: not dec. _____ Date Analyzed: 08/01/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L		Q	
9999-99-7	Gasoline	0.500	~~0.042~~	~~J~~	U BL

FORM I GC VOA

LW
10/25/08

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAI-MW04

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-12

Sample wt/vol: 1 (g/ml) ML Lab File ID: 092X0807072-12

Level: (low/med) LOW Date Received: 07/24/08

% Moisture: not dec. _____ Date Analyzed: 08/04/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.67	

FORM I GC VOA

lw 10/25/08

12

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAI-TB0
1-072308

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-13

Sample wt/vol: 1 (g/ml) ML Lab File ID: 093X0807072-13

Level: (low/med) LOW Date Received: 07/24/08

% Moisture: not dec. _____ Date Analyzed: 08/04/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.2~~	~~J~~ U BL

FORM I GC VOA

lcl
10/25/08

13

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAI-MW02

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-15

Sample wt/vol: 1000 (g/ml) ML Lab File ID: 094X0807072-15

Level: (low/med) LOW Date Received: 07/25/08

% Moisture: not dec. _____ Date Analyzed: 08/04/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.00019~~ ~~J~~	u BL

FORM I GC VOA

LW
10/25/08

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FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAI-MW03

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-16

Sample wt/vol: 1000 (g/ml) ML Lab File ID: 095X0807072-16

Level: (low/med) LOW Date Received: 07/25/08

% Moisture: not dec. _____ Date Analyzed: 08/04/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.00033~~	~~J~~ U BL

FORM I GC VOA

RW
10/25/08

15

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAI-EB0
1-072308

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-17

Sample wt/vol: 1000 (g/ml) ML Lab File ID: 096X0807072-17

Level: (low/med) LOW Date Received: 07/25/08

% Moisture: not dec. _____ Date Analyzed: 08/04/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.00019~~	~~J~~ u BL

FORM I GC VOA

JW 10/25/08

16

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAI-EB0
1-072408

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-18

Sample wt/vol: 1000 (g/ml) ML Lab File ID: 097X0807072-18

Level: (low/med) LOW Date Received: 07/25/08

% Moisture: not dec. _____ Date Analyzed: 08/04/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q	
9999-99-7	Gasoline	0.500 ~~0.0002~~	~~J~~	U BL

FORM I GC VOA

lw
10/25/08

17

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.
VWAE-TB0
1-072408

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-19

Sample wt/vol: 5 (g/ml) ML Lab File ID: 098X0807072-19

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 08/04/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.039~~	~~J~~

U BL

FORM I GC VOA

MW 10/25/08

18

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-MW03

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-20

Sample wt/vol: 1000 (g/ml) ML Lab File ID: 100X0807072-20

Level: (low/med) LOW Date Received: 07/29/08

% Moisture: not dec. _____ Date Analyzed: 08/04/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q	
9999-99-7	Gasoline	0.500 ~~0.00022~~	J	u BL

FORM I GC VOA

LW 10/25/08

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FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-MW08

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-21

Sample wt/vol: 1000 (g/ml) ML Lab File ID: 101X0807072-21

Level: (low/med) LOW Date Received: 07/29/08

% Moisture: not dec. _____ Date Analyzed: 08/04/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 0.~~00021~~	J

u BL

FORM I GC VOA

LW 10/25/08

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FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-MW07

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-22

Sample wt/vol: 950 (g/ml) ML Lab File ID: 102X0807072-22

Level: (low/med) LOW Date Received: 07/29/08

% Moisture: not dec. _____ Date Analyzed: 08/04/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.00021~~	~~J~~ U BL

FORM I GC VOA

JW 10/25/08

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FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-EB0
1-072708

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-23

Sample wt/vol: 1000 (g/ml) ML Lab File ID: 103X0807072-23

Level: (low/med) LOW Date Received: 07/29/08

% Moisture: not dec. _____ Date Analyzed: 08/04/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.0002~~	~~J~~

U BL

FORM I GC VOA

LW 10/25/08

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FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-MW02

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 0807072-24

Sample wt/vol: 1000 (g/ml) ML Lab File ID: 104X0807072-24

Level: (low/med) LOW Date Received: 07/29/08

% Moisture: not dec. _____ Date Analyzed: 08/04/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q	
9999-99-7	Gasoline	0.500 ~~0.0002~~	J	4 BL

FORM I GC VOA

RW 10/25/08

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VBLKAI

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 8080103-BLK1

Sample wt/vol: 5 (g/ml) ML Lab File ID: 065X8080103-BLK1

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 08/01/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.042	J

FORM I GC VOA

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VBLKAL

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807072

Matrix: (soil/water) WATER Lab Sample ID: 8080407-BLK1

Sample wt/vol: 5 (g/ml) ML Lab File ID: 090X8080407-BLK1

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 08/04/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.041	J

FORM I GC VOA

ENVIRONMENTAL
Data Services, Inc.

POLYNUCLEAR AROMATIC HYDROCARBONS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807072

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 22, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAI-MW05P	0807072-01	Water
1DL	VWAI-MW05PDL	0807072-01DL	Water
2	VWAI-MW07	0807072-02	Water
2DL	VWAI-MW07DL	0807072-02DL	Water
3	VWAI-EB01-072108	0807072-03	Water
4	VWAI-EB01-072008	0807072-04	Water
5	VWAI-MW05	0807072-05	Water
5DL	VWAI-MW05DL	0807072-05DL	Water
6	VWAI-MW08	0807072-06	Water
7	VWAI-EB01-072208	0807072-09	Water
8	VWAI-MW09	0807072-10	Water
9	VWAI-MW01	0807072-11	Water
10	VWAI-MW04	0807072-12	Water
10MS	VWAI-MW04MS	0807072-12MS	Water
10MSD	VWAI-MW04MSD	0807072-12MSD	Water
10DL	VWAI-MW04DL	0807072-12DL	Water
11	VWAI-MW02	0807072-15	Water
12	VWAI-MW03	0807072-16	Water
12DL	VWAI-MW03DL	0807072-16DL	Water
13	VWAI-EB01-072308	0807072-17	Water
14	VWAI-EB01-072408	0807072-18	Water
15	VWAE-MW03	0807072-20	Water
16	VWAE-MW08	0807072-21	Water
17	VWAE-MW07	0807072-22	Water
18	VWAE-EB01-072708	0807072-23	Water
19	VWAE-MW02	0807072-24	Water

The USEPA Region II SOP HW-35, Revision 1, August 2007: USEPA CLP Statement of Work for Organic Analysis of Low/Medium Concentration of Semivolatile Organic Compounds SOM01.2 Data Validation and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries except the following.

Sample ID	Surrogate	%R	Qualifier
1	Fluoranthene-d10	40%	J/UJ
2	2-Methylnaphthalene-d10	26%	J/UJ
5	Fluoranthene-d10	39%	J/UJ
6	Fluoranthene-d10	47%	J/UJ
	2-Methylnaphthalene-d10	43%	J/UJ
7	2-Methylnaphthalene-d10	33%	J/UJ
12	2-Methylnaphthalene-d10	49%	J/UJ

MS/MSD - The MS/MSD samples exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	MS/MSD %R/RPD	Qualifier
10	Acenaphthene	135%/Ok/74	J
	Pentachlorophenol	167%/147%/Ok	None - All ND

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
SBLKJW	Naphthalene	0.046	U	1DL, 3, 4, 5DL, 6-9,
SBLKKK	Naphthalene	0.089	U	11, 13, 14
	2-Methylnaphthalene	0.035	U	11, 13
	Phenanthrene	0.049	U	10, 10DL
	Anthracene	0.064	U	10DL, 12DL
	Fluoranthene	0.049	U	10, 10DL, 12
SBLKJA	Naphthalene	0.037	U	15-19

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAI-EB01-072008	None - ND	-	-	-
VWAI-EB01-072108	2-Methylnaphthalene	0.020	None	All >CRDL
VWAI-EB01-072208	None - ND	-	-	-
VWAI-EB01-072308	None - ND	-	-	-
VWAI-EB01-072408	None - ND	-	-	-
VWAE-EB01-072708	None - ND	-	-	-

GC/MS Instrument Performance Check - All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values with the exception of the following.

ICAL Date	Compound	RRF	Qualifier	Affected Samples
07/29/08	Pentachlorophenol	0.038	J/R	All except 2DL, 10DL, 12DL, 14
08/12/08	Pentachlorophenol	0.040	J/R	2DL, 10DL, 12Dl, 14

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values with the exception of the following.

CCAL Date	Compound	%D/RRF	Qualifier	Affected Samples
07/29/08	Pentachlorophenol	0.035	None	Already qualified due to ICAL
07/30/08	Pentachlorophenol	0.032	None	Already qualified due to ICAL
	Pentachlorophenol	0.033	None	Already qualified due to ICAL
	Pentachlorophenol	32.1%/0.026	None	Already qualified due to ICAL
07/31/08	Pentachlorophenol	0.029	None	Already qualified due to ICAL

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Sample ID	Internal Standard	Area Count	Qualifier
1DL	Perylene-d12	Low	None - All ND
2	Acenaphthene-d10	Low	J/R - Associated compounds
5DL	Perylene-d12	Low	None - All ND

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAI-MW05 ug/L	VWAI-MW05P ug/L	RPD	Qualifier
Naphthalene	0.33	0.26	24%	None
2-Methylnaphthalene	3.4	2.4	34%	None
Acenaphthene	1.1	0.76	37%	None
Fluorene	1.6	1.2	29%	None
Pentachlorophenol	0.20	0.20	0%	None
Phenanthrene	2.5	1.9	27%	None
Anthracene	0.12	0.092	26%	None

ANNOTATED FORM Is

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-01

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-01A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/22/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/30/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
91-20-3	Naphthalene	0.26	~~B~~	J SSL
91-57-6	2-Methylnaphthalene	2.4 ~~3.6~~	~~E~~	R RE
208-96-8	Acenaphthylene	0.10	~~U~~	UJ SSL
83-32-9	Acenaphthene	0.76 ~~1.1~~	~~E~~	R DL
86-73-7	Fluorene	1.2 ~~1.7~~	~~E~~	R RE
87-86-5	Pentachlorophenol	0.20	~~U~~	R ICB
85-01-8	Phenanthrene	1.9 ~~1.4~~	~~E~~	R DE
120-12-7	Anthracene	0.092	~~U~~	J SSL
206-44-0	Fluoranthene	0.10	U	UJ
129-00-0	Pyrene	0.10	U	
56-55-3	Benzo (a) anthracene	0.10	U	
218-01-9	Chrysene	0.10	U	
205-99-2	Benzo (b) fluoranthene	0.10	U	
207-08-9	Benzo (k) fluoranthene	0.10	U	
50-32-8	Benzo (a) pyrene	0.10	U	
193-39-5	Indeno (1,2,3-cd) pyrene	0.10	U	
53-70-3	Dibenzo (a,h) anthracene	0.10	U	
191-24-2	Benzo (g,h,i) perylene	0.10	U	

QW ~~10/24/08~~ 11/12/08

1 DL

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05PDL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-01RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-01DA64.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/22/2008

Use original

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/30/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 3.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.30 ~~0.19~~	~~JBD~~ U BL
91-57-6	2-Methylnaphthalene	2.4	D
208-96-8	Acenaphthylene	0.30	U
83-32-9	Acenaphthene	0.76	D
86-73-7	Fluorene	1.2	D
87-86-5	Pentachlorophenol	0.60	~~U~~ R ICB
85-01-8	Phenanthrene	1.9	D
120-12-7	Anthracene	0.11	JD
206-44-0	Fluoranthene	0.30	U
129-00-0	Pyrene	0.30	U
56-55-3	Benzo (a) anthracene	0.30	U
218-01-9	Chrysene	0.30	U
205-99-2	Benzo (b) fluoranthene	0.30	U
207-08-9	Benzo (k) fluoranthene	0.30	U
50-32-8	Benzo (a) pyrene	0.30	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.30	U
53-70-3	Dibenzo (a,h) anthracene	0.30	U
191-24-2	Benzo (g,h,i) perylene	0.30	U

RE

LW 10/24/08

2

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-02

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-02A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/30/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
91-20-3	Naphthalene	34 J ~~23~~ LR	~~E~~	R RE
91-57-6	2-Methylnaphthalene	22 J ~~19~~ LR	~~E~~	R RE
208-96-8	Acenaphthylene	0.10	U	R ISL
83-32-9	Acenaphthene	0.10	U	
86-73-7	Fluorene	0.10	U	
87-86-5	Pentachlorophenol	0.20	U	R ICB
85-01-8	Phenanthrene	3.5 ~~2.1~~	~~E~~	R RE
120-12-7	Anthracene	0.21		J SSL
206-44-0	Fluoranthene	0.077	~~J~~	
129-00-0	Pyrene	0.085	~~J~~	
56-55-3	Benzo (a) anthracene	0.10	U	UJ
218-01-9	Chrysene	0.10	U	
205-99-2	Benzo (b) fluoranthene	0.10	U	
207-08-9	Benzo (k) fluoranthene	0.10	U	
50-32-8	Benzo (a) pyrene	0.10	U	
193-39-5	Indeno (1,2,3-cd) pyrene	0.10	U	
53-70-3	Dibenzo (a,h) anthracene	0.10	U	
191-24-2	Benzo (g,h,i) perylene	0.10	U	

lw 10/24/08

2DL

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW07DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-02RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-02D2JA64N.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008 use original

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/14/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ~~ug/kg~~) ug/L	Q	
91-20-3	Naphthalene	34	~~DDE~~	J LR
91-57-6	2-Methylnaphthalene	22	~~DE~~	J LR
208-96-8	Acenaphthylene	1.0	U	
83-32-9	Acenaphthene	1.7	D	
86-73-7	Fluorene	5.5	D	
87-86-5	Pentachlorophenol	2.0	~~U~~	R ICB
85-01-8	Phenanthrene	3.5	D	
120-12-7	Anthracene	0.40	JD	
206-44-0	Fluoranthene	1.0	U	
129-00-0	Pyrene	1.0	U	
56-55-3	Benzo (a) anthracene	1.0	U	
218-01-9	Chrysene	1.0	U	
205-99-2	Benzo (b) fluoranthene	1.0	U	
207-08-9	Benzo (k) fluoranthene	1.0	U	
50-32-8	Benzo (a) pyrene	1.0	U	
193-39-5	Indeno (1,2,3-cd) pyrene	1.0	U	
53-70-3	Dibenzo (a,h) anthracene	1.0	U	
191-24-2	Benzo (g,h,i) perylene	1.0	U	

RE

lw 10/24/08

3

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072108

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-03

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807072-03A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/30/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.098 ~~0.073~~	~~JB~~ u BL
91-57-6	2-Methylnaphthalene	0.020	J
208-96-8	Acenaphthylene	0.098	U
83-32-9	Acenaphthene	0.098	U
86-73-7	Fluorene	0.098	U
87-86-5	Pentachlorophenol	0.20	~~U~~ R ICB
85-01-8	Phenanthrene	0.098	U
120-12-7	Anthracene	0.098	U
206-44-0	Fluoranthene	0.098	U
129-00-0	Pyrene	0.098	U
56-55-3	Benzo (a) anthracene	0.098	U
218-01-9	Chrysene	0.098	U
205-99-2	Benzo (b) fluoranthene	0.098	U
207-08-9	Benzo (k) fluoranthene	0.098	U
50-32-8	Benzo (a) pyrene	0.098	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.098	U
53-70-3	Dibenzo (a,h) anthracene	0.098	U
191-24-2	Benzo (g,h,i) perylene	0.098	U

10/24/08

4

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072008

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-04

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-04A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/30/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.10 ~~0.056~~	~~JB~~ U BL
91-57-6	2-Methylnaphthalene	0.10	U
208-96-8	Acenaphthylene	0.10	U
83-32-9	Acenaphthene	0.10	U
86-73-7	Fluorene	0.10	U
87-86-5	Pentachlorophenol	0.20	~~U~~ R ICB
85-01-8	Phenanthrene	0.10	U
120-12-7	Anthracene	0.10	U
206-44-0	Fluoranthene	0.10	U
129-00-0	Pyrene	0.10	U
56-55-3	Benzo (a) anthracene	0.10	U
218-01-9	Chrysene	0.10	U
205-99-2	Benzo (b) fluoranthene	0.10	U
207-08-9	Benzo (k) fluoranthene	0.10	U
50-32-8	Benzo (a) pyrene	0.10	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.10	U
53-70-3	Dibenzo (a,h) anthracene	0.10	U
191-24-2	Benzo (g,h,i) perylene	0.10	U

DLW 10/24/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-05

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-05A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/30/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg)ug/L	Q	
91-20-3	Naphthalene	0.33	~~E~~	J SSL
91-57-6	2-Methylnaphthalene	3.4 ~~5.4~~	~~E~~	R DL
208-96-8	Acenaphthylene	0.10	~~U~~	UJ SSL
83-32-9	Acenaphthene	1.1 ~~1.7~~	~~E~~	R DL
86-73-7	Fluorene	1.6 ~~2.7~~	~~E~~	R DL
87-86-5	Pentachlorophenol	0.20	~~U~~	R ~~JCB~~
85-01-8	Phenanthrene	2.5 ~~1.6~~	~~E~~	R DL
120-12-7	Anthracene	0.12		J SSL
206-44-0	Fluoranthene	0.10	U	UJ SSL
129-00-0	Pyrene	0.10	U	
56-55-3	Benzo (a) anthracene	0.10	U	
218-01-9	Chrysene	0.10	U	
205-99-2	Benzo (b) fluoranthene	0.10	U	
207-08-9	Benzo (k) fluoranthene	0.10	U	
50-32-8	Benzo (a) pyrene	0.10	U	
193-39-5	Indeno (1,2,3-cd) pyrene	0.10	U	
53-70-3	Dibenzo (a,h) anthracene	0.10	U	
191-24-2	Benzo (g,h,i) perylene	0.10	U	

LW ~~10/24/08~~ 11/12/08

5DL

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-05RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-05DA64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Use original

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/31/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 4.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.40 ~~0.23~~	~~JBD~~ U BL
91-57-6	2-Methylnaphthalene	3.4	D
208-96-8	Acenaphthylene	0.40	U
83-32-9	Acenaphthene	1.1	D
86-73-7	Fluorene	1.6	D
87-86-5	Pentachlorophenol	0.80	~~U~~ R ICB
85-01-8	Phenanthrene	2.5	D
120-12-7	Anthracene	0.17	JD
206-44-0	Fluoranthene	0.40	U
129-00-0	Pyrene	0.40	U
56-55-3	Benzo (a) anthracene	0.40	U
218-01-9	Chrysene	0.40	U
205-99-2	Benzo (b) fluoranthene	0.40	U
207-08-9	Benzo (k) fluoranthene	0.40	U
50-32-8	Benzo (a) pyrene	0.40	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.40	U
53-70-3	Dibenzo (a,h) anthracene	0.40	U
191-24-2	Benzo (g,h,i) perylene	0.40	U

RE

MW 10/24/08

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1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MWO8

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-06

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-06JA64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/31/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
91-20-3	Naphthalene	0.110 ~~0.051~~	~~JB~~	UJ BL, SSL
91-57-6	2-Methylnaphthalene	0.10	U	UJ SSL
208-96-8	Acenaphthylene	0.10	U	
83-32-9	Acenaphthene	0.10	U	
86-73-7	Fluorene	0.10	U	
87-86-5	Pentachlorophenol	0.20	U	R IcB
85-01-8	Phenanthrene	0.075	J	J SSL
120-12-7	Anthracene	0.10	U	UJ
206-44-0	Fluoranthene	0.10	U	
129-00-0	Pyrene	0.10	U	
56-55-3	Benzo (a) anthracene	0.10	U	
218-01-9	Chrysene	0.10	U	
205-99-2	Benzo (b) fluoranthene	0.10	U	
207-08-9	Benzo (k) fluoranthene	0.10	U	
50-32-8	Benzo (a) pyrene	0.10	U	
193-39-5	Indeno (1,2,3-cd) pyrene	0.10	U	
53-70-3	Dibenzo (a,h) anthracene	0.10	U	
191-24-2	Benzo (g,h,i) perylene	0.10	U	

lw 10/24/08

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1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072208

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-09

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-09A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/30/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.093 ~~0.065~~	~~JB~~ UJ BL, SSL
91-57-6	2-Methylnaphthalene	0.093	U UJ SSL
208-96-8	Acenaphthylene	0.093	U
83-32-9	Acenaphthene	0.093	U
86-73-7	Fluorene	0.093	U
87-86-5	Pentachlorophenol	0.19	U R IcB
85-01-8	Phenanthrene	0.093	U UJ SSL
120-12-7	Anthracene	0.093	U
206-44-0	Fluoranthene	0.093	U
129-00-0	Pyrene	0.093	U
56-55-3	Benzo (a) anthracene	0.093	U
218-01-9	Chrysene	0.093	U
205-99-2	Benzo (b) fluoranthene	0.093	U
207-08-9	Benzo (k) fluoranthene	0.093	U
50-32-8	Benzo (a) pyrene	0.093	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.093	U
53-70-3	Dibenzo (a,h) anthracene	0.093	U
191-24-2	Benzo (g,h,i) perylene	0.093	U

lw 10/24/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW09

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-10

Sample wt/vol: 1050 (g/mL) mL Lab File ID: 0807072-10A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/30/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
91-20-3	Naphthalene	0.095 ~~0.041~~	~~JB~~	U BL
91-57-6	2-Methylnaphthalene	0.095	U	
208-96-8	Acenaphthylene	0.095	U	
83-32-9	Acenaphthene	0.095	U	
86-73-7	Fluorene	0.095	U	
87-86-5	Pentachlorophenol	0.19	~~U~~	R ICB
85-01-8	Phenanthrene	0.095	U	
120-12-7	Anthracene	0.095	U	
206-44-0	Fluoranthene	0.095	U	
129-00-0	Pyrene	0.095	U	
56-55-3	Benzo (a) anthracene	0.095	U	
218-01-9	Chrysene	0.095	U	
205-99-2	Benzo (b) fluoranthene	0.095	U	
207-08-9	Benzo (k) fluoranthene	0.095	U	
50-32-8	Benzo (a) pyrene	0.095	U	
193-39-5	Indeno (1,2,3-cd) pyrene	0.095	U	
53-70-3	Dibenzo (a,h) anthracene	0.095	U	
191-24-2	Benzo (g,h,i) perylene	0.095	U	

lw 10/24/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-11

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-11A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/30/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
91-20-3	Naphthalene	0.093 ~~0.040~~	~~JB~~	u BL
91-57-6	2-Methylnaphthalene	0.093	U	
208-96-8	Acenaphthylene	0.093	U	
83-32-9	Acenaphthene	0.093	U	
86-73-7	Fluorene	0.093	U	
87-86-5	Pentachlorophenol	0.19	~~U~~	R ICB
85-01-8	Phenanthrene	0.093	U	
120-12-7	Anthracene	0.093	U	
206-44-0	Fluoranthene	0.093	U	
129-00-0	Pyrene	0.093	U	
56-55-3	Benzo (a) anthracene	0.093	U	
218-01-9	Chrysene	0.093	U	
205-99-2	Benzo (b) fluoranthene	0.093	U	
207-08-9	Benzo (k) fluoranthene	0.093	U	
50-32-8	Benzo (a) pyrene	0.093	U	
193-39-5	Indeno (1,2,3-cd) pyrene	0.093	U	
53-70-3	Dibenzo (a,h) anthracene	0.093	U	
191-24-2	Benzo (g,h,i) perylene	0.093	U	

MW 10/24/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW04

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-14

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-14A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/08/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
91-20-3	Naphthalene	1.1 ~~1.3~~	~~BE~~	R RE
91-57-6	2-Methylnaphthalene	0.47	~~B~~	
208-96-8	Acenaphthylene	0.10	U	
83-32-9	Acenaphthene	0.77	~~B~~	J MSH
86-73-7	Fluorene	1.8 ~~2.2~~	~~E~~	R RE
87-86-5	Pentachlorophenol	0.20	~~U~~	R ICB
85-01-8	Phenanthrene	0.10 ~~0.066~~	~~JB~~	U BL
120-12-7	Anthracene	0.14	~~B~~	
206-44-0	Fluoranthene	0.10 ~~0.075~~	~~JB~~	U BL
129-00-0	Pyrene	0.18		
56-55-3	Benzo (a) anthracene	0.10	U	
218-01-9	Chrysene	0.10	U	
205-99-2	Benzo (b) fluoranthene	0.10	U	
207-08-9	Benzo (k) fluoranthene	0.10	U	
50-32-8	Benzo (a) pyrene	0.10	U	
193-39-5	Indeno (1,2,3-cd) pyrene	0.10	U	
53-70-3	Dibenzo (a,h) anthracene	0.10	U	
191-24-2	Benzo (g,h,i) perylene	0.10	U	

MW 10/24/08

10DL

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW04DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-14RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-14DB64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008 Use original

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/12/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ~~ug/kg~~) ug/L	Q
91-20-3	Naphthalene	1.1	~~BD~~
91-57-6	2-Methylnaphthalene	0.33	~~BD~~
208-96-8	Acenaphthylene	0.20	U
83-32-9	Acenaphthene	0.65	~~BD~~
86-73-7	Fluorene	1.8	~~D~~
87-86-5	Pentachlorophenol	0.40	~~U~~
85-01-8	Phenanthrene	0.20 ~~0.10~~	~~JBD~~
120-12-7	Anthracene	0.20 ~~0.13~~	~~JBD~~
206-44-0	Fluoranthene	0.20 ~~0.068~~	~~JBD~~
129-00-0	Pyrene	0.16	JD
56-55-3	Benzo (a) anthracene	0.20	U
218-01-9	Chrysene	0.20	U
205-99-2	Benzo (b) fluoranthene	0.20	U
207-08-9	Benzo (k) fluoranthene	0.20	U
50-32-8	Benzo (a) pyrene	0.20	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.20	U
53-70-3	Dibenzo (a,h) anthracene	0.20	U
191-24-2	Benzo (g,h,i) perylene	0.20	U

R ICB
U BL

10/24/08

11

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-15

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-15A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/08/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.10 ~~0.072~~	~~JB~~ u BL
91-57-6	2-Methylnaphthalene	0.10 ~~0.021~~	~~JB~~ u BL
208-96-8	Acenaphthylene	0.10	U
83-32-9	Acenaphthene	0.10	U
86-73-7	Fluorene	0.10	U
87-86-5	Pentachlorophenol	0.20	~~U~~ R IcB
85-01-8	Phenanthrene	0.10	U
120-12-7	Anthracene	0.10	U
206-44-0	Fluoranthene	0.10	U
129-00-0	Pyrene	0.10	U
56-55-3	Benzo (a) anthracene	0.10	U
218-01-9	Chrysene	0.10	U
205-99-2	Benzo (b) fluoranthene	0.10	U
207-08-9	Benzo (k) fluoranthene	0.10	U
50-32-8	Benzo (a) pyrene	0.10	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.10	U
53-70-3	Dibenzo (a,h) anthracene	0.10	U
191-24-2	Benzo (g,h,i) perylene	0.10	U

lw 10/24/08

12

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-16

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-16A64_N2.d

Extraction: (Type) CONT

% Moisture: _____ Decanted: (Y/N) _____ Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/08/2008

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
91-20-3	Naphthalene	0.71	~~B~~	J SSL
91-57-6	2-Methylnaphthalene	1.3 ~~1.6~~	~~BE~~	R RE
208-96-8	Acenaphthylene	0.10	~~U~~	UJ SSL
83-32-9	Acenaphthene	0.56	~~B~~	J SSL
86-73-7	Fluorene	1.5 ~~1.6~~	~~E~~	R RE
87-86-5	Pentachlorophenol	0.20	~~U~~	R ICB
85-01-8	Phenanthrene	0.31	~~B~~	J SSL
120-12-7	Anthracene	0.14	~~B~~	↓ ↓
206-44-0	Fluoranthene	0.10 ~~0.040~~	~~JB~~	UJ ~~BK~~, SSL
129-00-0	Pyrene	0.10		J SSL
56-55-3	Benzo (a) anthracene	0.10	U	UJ
218-01-9	Chrysene	0.10	U	
205-99-2	Benzo (b) fluoranthene	0.10	U	
207-08-9	Benzo (k) fluoranthene	0.10	U	
50-32-8	Benzo (a) pyrene	0.10	U	
193-39-5	Indeno (1,2,3-cd) pyrene	0.10	U	
53-70-3	Dibenzo (a,h) anthracene	0.10	U	
191-24-2	Benzo (g,h,i) perylene	0.10	U	

MW 10/24/08

12DL

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW03DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-16RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-16DB64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/12/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 2.0

Use orig. NAL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.71	~~BD~~
91-57-6	2-Methylnaphthalene	1.3	~~BD~~
208-96-8	Acenaphthylene	0.20	U
83-32-9	Acenaphthene	0.54	~~BD~~
86-73-7	Fluorene	1.5	~~D~~
87-86-5	Pentachlorophenol	0.40	~~U~~ R ICB
85-01-8	Phenanthrene	0.36	~~BD~~
120-12-7	Anthracene	0.20 ~~0.15~~	~~JBD~~ U BL
206-44-0	Fluoranthene	0.20	U
129-00-0	Pyrene	0.11	~~JD~~
56-55-3	Benzo (a) anthracene	0.20	U
218-01-9	Chrysene	0.20	U
205-99-2	Benzo (b) fluoranthene	0.20	U
207-08-9	Benzo (k) fluoranthene	0.20	U
50-32-8	Benzo (a) pyrene	0.20	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.20	U
53-70-3	Dibenzo (a,h) anthracene	0.20	U
191-24-2	Benzo (g,h,i) perylene	0.20	U

10/24/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072308

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-17

Sample wt/vol: 975 (g/mL) mL Lab File ID: 0807072-17A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/08/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
91-20-3	Naphthalene	0.10 ~~0.080~~	~~JB~~	U BL
91-57-6	2-Methylnaphthalene	0.10 ~~0.021~~	~~JB~~	U BL
208-96-8	Acenaphthylene	0.10	U	
83-32-9	Acenaphthene	0.10	U	
86-73-7	Fluorene	0.10	U	
87-86-5	Pentachlorophenol	0.21	~~U~~	R ICB
85-01-8	Phenanthrene	0.10	U	
120-12-7	Anthracene	0.10	U	
206-44-0	Fluoranthene	0.10	U	
129-00-0	Pyrene	0.10	U	
56-55-3	Benzo (a) anthracene	0.10	U	
218-01-9	Chrysene	0.10	U	
205-99-2	Benzo (b) fluoranthene	0.10	U	
207-08-9	Benzo (k) fluoranthene	0.10	U	
50-32-8	Benzo (a) pyrene	0.10	U	
193-39-5	Indeno (1,2,3-cd) pyrene	0.10	U	
53-70-3	Dibenzo (a,h) anthracene	0.10	U	
191-24-2	Benzo (g,h,i) perylene	0.10	U	

Ben
10/29/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072408

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-18

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-18JB64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/12/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
91-20-3	Naphthalene	0.093 ~~0.057~~	~~JB~~	u BL
91-57-6	2-Methylnaphthalene	0.093	U	
208-96-8	Acenaphthylene	0.093	U	
83-32-9	Acenaphthene	0.093	U	
86-73-7	Fluorene	0.093	U	
87-86-5	Pentachlorophenol	0.19	~~U~~	R ICB
85-01-8	Phenanthrene	0.093	U	
120-12-7	Anthracene	0.093	U	
206-44-0	Fluoranthene	0.093	U	
129-00-0	Pyrene	0.093	U	
56-55-3	Benzo (a) anthracene	0.093	U	
218-01-9	Chrysene	0.093	U	
205-99-2	Benzo (b) fluoranthene	0.093	U	
207-08-9	Benzo (k) fluoranthene	0.093	U	
50-32-8	Benzo (a) pyrene	0.093	U	
193-39-5	Indeno (1,2,3-cd) pyrene	0.093	U	
53-70-3	Dibenzo (a,h) anthracene	0.093	U	
191-24-2	Benzo (g,h,i) perylene	0.093	U	

lw 10/29/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-20

Sample wt/vol: 1050 (g/mL) mL Lab File ID: 0807072-20JA64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.095 ~~0.040~~	~~JB~~ U BL
91-57-6	2-Methylnaphthalene	0.095	U
208-96-8	Acenaphthylene	0.095	U
83-32-9	Acenaphthene	0.095	U
86-73-7	Fluorene	0.095	U
87-86-5	Pentachlorophenol	0.12	~~J~~ J ICB
85-01-8	Phenanthrene	0.095	U
120-12-7	Anthracene	0.095	U
206-44-0	Fluoranthene	0.095	U
129-00-0	Pyrene	0.095	U
56-55-3	Benzo (a) anthracene	0.095	U
218-01-9	Chrysene	0.095	U
205-99-2	Benzo (b) fluoranthene	0.095	U
207-08-9	Benzo (k) fluoranthene	0.095	U
50-32-8	Benzo (a) pyrene	0.095	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.095	U
53-70-3	Dibenzo (a,h) anthracene	0.095	U
191-24-2	Benzo (g,h,i) perylene	0.095	U

RCW 10/29/08

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1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-21

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807072-21JA64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.098 ~~0.025~~	~~JB~~ U BL
91-57-6	2-Methylnaphthalene	0.098	U
208-96-8	Acenaphthylene	0.098	U
83-32-9	Acenaphthene	0.098	U
86-73-7	Fluorene	0.098	U
87-86-5	Pentachlorophenol	0.20	~~U~~ R ICB
85-01-8	Phenanthrene	0.098	U
120-12-7	Anthracene	0.098	U
206-44-0	Fluoranthene	0.098	U
129-00-0	Pyrene	0.098	U
56-55-3	Benzo (a) anthracene	0.098	U
218-01-9	Chrysene	0.098	U
205-99-2	Benzo (b) fluoranthene	0.098	U
207-08-9	Benzo (k) fluoranthene	0.098	U
50-32-8	Benzo (a) pyrene	0.098	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.098	U
53-70-3	Dibenzo (a,h) anthracene	0.098	U
191-24-2	Benzo (g,h,i) perylene	0.098	U

LW
10/24/08

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1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-22

Sample wt/vol: 950 (g/mL) mL Lab File ID: 0807072-22JA64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.11 ~~0.022~~	~~JB~~ U BL
91-57-6	2-Methylnaphthalene	0.11	U
208-96-8	Acenaphthylene	0.11	U
83-32-9	Acenaphthene	0.11	U
86-73-7	Fluorene	0.11	U
87-86-5	Pentachlorophenol	0.21	~~U~~ R ICB
85-01-8	Phenanthrene	0.11	U
120-12-7	Anthracene	0.11	U
206-44-0	Fluoranthene	0.11	U
129-00-0	Pyrene	0.11	U
56-55-3	Benzo (a) anthracene	0.11	U
218-01-9	Chrysene	0.11	U
205-99-2	Benzo (b) fluoranthene	0.11	U
207-08-9	Benzo (k) fluoranthene	0.11	U
50-32-8	Benzo (a) pyrene	0.11	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.11	U
53-70-3	Dibenzo (a,h) anthracene	0.11	U
191-24-2	Benzo (g,h,i) perylene	0.11	U

lew 10/24/08

18

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. (RW)

VWAE-EB01-072~~2~~08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-23

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807072-23JA64_N2.d

Extraction: (Type) CONT

% Moisture: _____ Decanted: (Y/N) _____ Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.098 ~~0.022~~	~~JB~~ U BL
91-57-6	2-Methylnaphthalene	0.098	U
208-96-8	Acenaphthylene	0.098	U
83-32-9	Acenaphthene	0.098	U
86-73-7	Fluorene	0.098	U
87-86-5	Pentachlorophenol	0.20	~~U~~ R ICB
85-01-8	Phenanthrene	0.098	U
120-12-7	Anthracene	0.098	U
206-44-0	Fluoranthene	0.098	U
129-00-0	Pyrene	0.098	U
56-55-3	Benzo (a) anthracene	0.098	U
218-01-9	Chrysene	0.098	U
205-99-2	Benzo (b) fluoranthene	0.098	U
207-08-9	Benzo (k) fluoranthene	0.098	U
50-32-8	Benzo (a) pyrene	0.098	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.098	U
53-70-3	Dibenzo (a,h) anthracene	0.098	U
191-24-2	Benzo (g,h,i) perylene	0.098	U

RW 10/24/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-24

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-24JA64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
91-20-3	Naphthalene	0.093 ~~0.050~~	~~JB~~	U BL
91-57-6	2-Methylnaphthalene	0.093	U	
208-96-8	Acenaphthylene	0.093	U	
83-32-9	Acenaphthene	0.093	U	
86-73-7	Fluorene	0.093	U	
87-86-5	Pentachlorophenol	0.19	~~U~~	R ICB
85-01-8	Phenanthrene	0.077	J	
120-12-7	Anthracene	0.12		
206-44-0	Fluoranthene	0.11		
129-00-0	Pyrene	0.15		
56-55-3	Benzo (a) anthracene	0.11		
218-01-9	Chrysene	0.12		
205-99-2	Benzo (b) fluoranthene	0.086	J	
207-08-9	Benzo (k) fluoranthene	0.097		
50-32-8	Benzo (a) pyrene	0.17		
193-39-5	Indeno (1,2,3-cd) pyrene	0.11		
53-70-3	Dibenzo (a,h) anthracene	0.094		
191-24-2	Benzo (g,h,i) perylene	0.092	J	

JW 10/24/08

USEPA REGION II WORKSHEETS

(Please refer to Semivolatile Organic Report for Worksheets)

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

2L - FORM II SV-SIM1
WATER SEMIVOLATILE SIM DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

	EPA SAMPLE NO.	SDMC17 (FLN) #	SDMC18 (2MN) #	TOT OUT	
01	SBLKJA	66	61	0	
02	SBLKJW	77	74	0	
03	SBLKKK	85	87	0	
04	VWAE-EB01-072208 #7	51	33 *	1	(J/UJ)
05	VWAE-MW02	81	80	0	
06	VWAE-MW03 #12	57	49 *	1	(J/UJ)
07	VWAE-MW07 #2	50	26 *	1	
08	VWAE-MW08 #6	47 *	43 *	2	
09	VWAI-EB01-072008	78	55	0	
10	VWAI-EB01-072108	80	74	0	
11	VWAI-EB01-072208	76	65	0	
12	VWAI-EB01-072308	86	74	0	
13	VWAI-EB01-072408	68	53	0	
14	VWAI-MW01	76	69	0	
15	VWAI-MW02	89	80	0	
16	VWAI-MW03	92	84	0	
17	VWAI-MW03DL	99	69	0	
18	VWAI-MW04	99	98	0	
19	VWAI-MW04DL	92	68	0	
20	VWAI-MW04MS	113	99	0	
21	VWAI-MW04MSD	97	83	0	
22	VWAI-MW05 #5	39 *	74	1	(J/UJ)
23	VWAI-MW05DL	53	46 D	0	- None
24	VWAI-MW05P #1	40 *	63	1	(J/UJ)
25	VWAI-MW05PDL	51	42 D	0	- None
26	VWAI-MW07	75	71	0	
27	VWAI-MW07DL	103	70	0	
28	VWAI-MW09	70	67	0	
29	VWAI-MW08	95	75	0	
30					

	QC LIMITS
SDMC17 (FLN) = Fluoranthene-d10	(50-150)
SDMC18 (2MN) = 2-Methylnaphthalene-d10	(50-150)

Column to be used to flag recovery values
* Value outside of contract required QC limits
D DMC diluted out

3E - FORM III SV-SIM1
WATER SEMIVOLATILE SIM MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

Matrix Spike - EPA Sample No.: VWAI-MW04 #10

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS %REC #	QC LIMITS REC.
Acenaphthene	0.41	0.77	1.3	135 *	46-118
Pentachlorophenol	0.41	0.0	0.68	167 *	9-103
Pyrene	0.41	0.18	0.53	84	26-127

J ✓
J — None ND

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD %REC #	%RPD #	QC LIMITS RPD	QC LIMITS REC.
Acenaphthene	0.40	1.0	62	74 *	0-31	46-118
Pentachlorophenol	0.40	0.59	147 *	12	0-50	9-103
Pyrene	0.40	0.50	79	5	0-31	26-127

— None For RPD
J — None ND

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 1 out of 3 outside limits
Spike Recovery: 3 out of 6 outside limits

COMMENTS: _____

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
SBLKJW

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8072409-BLK2

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 8072409-BJ3A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received:

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/30/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ~~ug/kg~~) ug/L	Q
91-20-3	Naphthalene	0.046	J
91-57-6	2-Methylnaphthalene	~~0.10~~	U
208-96-8	Acenaphthylene	0.10	U
83-32-9	Acenaphthene	0.10	U
86-73-7	Fluorene	0.10	U
87-86-5	Pentachlorophenol	0.20	U
85-01-8	Phenanthrene	0.10	U
120-12-7	Anthracene	0.10	U
206-44-0	Fluoranthene	0.10	U
129-00-0	Pyrene	0.10	U
56-55-3	Benzo (a) anthracene	0.10	U
218-01-9	Chrysene	0.10	U
205-99-2	Benzo (b) fluoranthene	0.10	U
207-08-9	Benzo (k) fluoranthene	0.10	U
50-32-8	Benzo (a) pyrene	0.10	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.10	U
53-70-3	Dibenzo (a,h) anthracene	0.10	U
191-24-2	Benzo (g,h,i) perylene	0.10	U

U

3,4,6,7,8,9
1DL, 5DL

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
SBLKKK

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8072517-BLK2

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 8072517-BLKA64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received:

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/08/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ~~ug/kg~~) ug/L	Q
91-20-3	Naphthalene	0.089	J
91-57-6	2-Methylnaphthalene	0.035	J
208-96-8	Acenaphthylene	0.050	J
83-32-9	Acenaphthene	0.051	J
86-73-7	Fluorene	0.10	U
87-86-5	Pentachlorophenol	0.20	U
85-01-8	Phenanthrene	0.049	J
120-12-7	Anthracene	0.064	J
206-44-0	Fluoranthene	0.049	J
129-00-0	Pyrene	0.10	U
56-55-3	Benzo (a) anthracene	0.055	J
218-01-9	Chrysene	0.053	J
205-99-2	Benzo (b) fluoranthene	0.10	U
207-08-9	Benzo (k) fluoranthene	0.10	U
50-32-8	Benzo (a) pyrene	0.10	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.050	J
53-70-3	Dibenzo (a,h) anthracene	0.042	J
191-24-2	Benzo (g,h,i) perylene	0.10	U

11,13,14
11,13
u
10,10DL
10 DL,12DL
10,10DL,12

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLKJA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8072908-BLK2

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 8072908-BLKA64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received:

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.037	J
91-57-6	2-Methylnaphthalene	0.10	U
208-96-8	Acenaphthylene	0.10	U
83-32-9	Acenaphthene	0.10	U
86-73-7	Fluorene	0.10	U
87-86-5	Pentachlorophenol	0.20	U
85-01-8	Phenanthrene	0.10	U
120-12-7	Anthracene	0.10	U
206-44-0	Fluoranthene	0.10	U
129-00-0	Pyrene	0.10	U
56-55-3	Benzo (a) anthracene	0.10	U
218-01-9	Chrysene	0.10	U
205-99-2	Benzo (b) fluoranthene	0.10	U
207-08-9	Benzo (k) fluoranthene	0.10	U
50-32-8	Benzo (a) pyrene	0.10	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.10	U
53-70-3	Dibenzo (a,h) anthracene	0.10	U
191-24-2	Benzo (g,h,i) perylene	0.10	U

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15, 16, 17, 18, 1

6H - FORM VI SV-SIM
SEMIVOLATILE ORGANICS SIM INITIAL CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

Instrument ID: 5972hp64 Calibration Date(s): 07/29/2008 07/29/2008

Calibration Time(s): 1334 1644

LAB FILE ID: RRF0.1= U080729A64.d RRF0.2= W080729A64.d

RRF0.4= S080729A64.d RRF0.8= V080729A64.d RRF001= T080729A64.d

COMPOUND	RRF0.1	RRF0.2	RRF0.4	RRF0.8	RRF001	$\overline{RRF}$	% RSD
Naphthalene	1.272	1.048	1.116	0.947	1.124	1.101	10.8
2-Methylnaphthalene	0.863	0.734	0.823	0.690	0.834	0.789	9.3
Acenaphthylene	2.035	1.721	1.831	1.637	1.772	1.799	8.3
Acenaphthene	1.310	1.115	1.380	1.047	1.180	1.206	11.4
Fluorene	1.494	1.265	1.450	1.224	1.347	1.356	8.5
Pentachlorophenol		0.034	0.035	0.039	0.045	0.038	13.5 (J/R)
Phenanthrene	1.404	1.308	1.323	1.140	1.241	1.283	7.7
Anthracene	1.252	1.160	1.215	0.908	1.059	1.119	12.4
Fluoranthene	1.209	1.115	1.176	1.010	1.138	1.130	6.7
Pyrene	1.892	1.635	1.662	1.464	1.545	1.639	9.8
Benzo (a) anthracene	1.224	1.089	1.189	1.010	1.111	1.125	7.5
Chrysene	1.454	1.290	1.201	1.072	1.139	1.231	12.0
Benzo (b) fluoranthene	2.177	1.902	2.204	1.728	1.938	1.990	10.0
Benzo (k) fluoranthene	2.464	2.283	1.949	1.855	1.900	2.090	12.9
Benzo (a) pyrene	1.513	1.392	1.494	1.299	1.450	1.430	6.1
Indeno (1,2,3-cd) pyrene	1.347	1.246	1.203	1.143	1.173	1.222	6.5
Dibenzo (a,h) anthracene	1.253	1.171	1.151	1.055	1.153	1.157	6.1
Benzo (g,h,i) perylene	1.668	1.493	1.451	1.282	1.361	1.451	10.1
Fluoranthene-d10	0.994	0.931	0.980	0.835	0.956	0.939	6.7
2-Methylnapthalene-d10	0.585	0.496	0.553	0.465	0.565	0.533	9.4

6H - FORM VI SV-SIM
SEMIVOLATILE ORGANICS SIM INITIAL CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

Instrument ID: 5972hp64 Calibration Date(s): 08/12/2008 08/12/2008

Calibration Time(s): 1345 1655

LAB FILE ID: RRF0.1= U080812B64.d RRF0.2= W080812B64.d

RRF0.4= S080812B64.d RRF0.8= V080812B64.d RRF001= T080812B64.d

COMPOUND	RRF0.1	RRF0.2	RRF0.4	RRF0.8	RRF001	$\overline{RRF}$	% RSD
Naphthalene	1.245	1.054	0.915	0.874	0.879	0.993	16.0
2-Methylnaphthalene	1.042	0.859	0.832	0.731	0.741	0.841	14.9
Acenaphthylene	2.076	1.824	1.913	1.622	1.671	1.821	10.1
Acenaphthene	1.447	1.301	1.193	1.096	1.024	1.212	13.8
Fluorene	1.452	1.343	1.270	1.115	1.071	1.250	12.7
Pentachlorophenol		0.047	0.039	0.040	0.035	0.040	12.7 (J/R)
Phenanthrene	1.495	1.306	1.336	1.104	1.118	1.272	12.9
Anthracene	1.359	1.122	1.129	0.967	0.946	1.105	15.0
Fluoranthene	1.285	1.146	1.193	1.003	0.996	1.125	11.1
Pyrene	1.763	1.595	1.657	1.323	1.323	1.532	13.1
Benzo (a) anthracene	1.386	1.264	1.331	1.058	1.066	1.221	12.4
Chrysene	1.488	1.288	1.273	1.064	1.041	1.231	14.9
Benzo (b) fluoranthene	3.080	2.662	2.739	2.382	2.143	2.601	13.7
Benzo (k) fluoranthene	2.076	2.032	2.167	1.700	1.824	1.960	9.8
Benzo (a) pyrene	1.756	1.617	1.724	1.429	1.368	1.579	11.0
Indeno (1,2,3-cd) pyrene	1.538	1.384	1.532	1.260	1.226	1.388	10.5
Dibenzo (a,h) anthracene	1.608	1.465	1.471	1.273	1.203	1.404	11.7
Benzo (g,h,i) perylene	1.749	1.594	1.593	1.353	1.272	1.512	12.9
Fluoranthene-d10	1.015	0.936	0.790	0.807	0.804	0.870	11.5
2-Methylnapthalene-d10	0.712	0.588	0.539	0.499	0.505	0.568	15.4

7H - FORM VII SV-SIM
SEMIVOLATILE SIM CONTINUING CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

Instrument ID: 5972hp64 Calibration Date: 07/29/2008 Time: 1334

Lab File ID: S080729A64.d Init. Calib. Date(s): 07/29/2008 07/29/2008

EPA Sample No.(SSTD0.4##): SSTD0.4W6 Init. Calib. Time(s): 1334 1644

GC Column: RTX-5MS ID: 0.32 (mm)

COMPOUND	$\overline{RRF}$	RRF0.4	MIN RRF	%D	MAX %D
Naphthalene	1.101	1.116	0.700	1.3	25.0
2-Methylnaphthalene	0.789	0.823	0.400	4.3	25.0
Acenaphthylene	1.799	1.831	0.900	1.8	25.0
Acenaphthene	1.206	1.380	0.900	14.4	25.0
Fluorene	1.356	1.450	0.900	6.9	25.0
Pentachlorophenol	0.038	0.035	0.050	-8.7	25.0
Phenanthrene	1.283	1.323	0.700	3.1	25.0
Anthracene	1.119	1.215	0.700	8.6	25.0
Fluoranthene	1.130	1.176	0.600	4.1	25.0
Pyrene	1.639	1.662	0.600	1.4	25.0
Benzo (a) anthracene	1.125	1.189	0.800	5.7	25.0
Chrysene	1.231	1.201	0.700	-2.5	25.0
Benzo (b) fluoranthene	1.990	2.204	0.700	10.8	25.0
Benzo (k) fluoranthene	2.090	1.949	0.700	-6.8	25.0
Benzo (a) pyrene	1.430	1.494	0.700	4.5	25.0
Indeno (1,2,3-cd) pyrene	1.222	1.203	0.500	-1.6	25.0
Dibenzo (a,h) anthracene	1.157	1.151	0.400	-0.5	25.0
Benzo (g,h,i) perylene	1.451	1.451	0.500	0.0	25.0
Fluoranthene-d10	0.939	0.980	0.010	4.3	25.0
2-Methylnapthalene-d10	0.533	0.553	0.010	3.7	25.0

7H - FORM VII SV-SIM
SEMIVOLATILE SIM CONTINUING CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

Instrument ID: 5972hp64 Calibration Date: 07/30/2008 Time: 1243

Lab File ID: S080730A64.d Init. Calib. Date(s): 07/29/2008 07/29/2008

EPA Sample No.(SSTD0.4##): SSTD0.4DX Init. Calib. Time(s): 1334 1644

GC Column: RTX-5MS ID: 0.32 (mm)

COMPOUND	$\overline{RRF}$	RRF0.4	MIN RRF	%D	MAX %D
Naphthalene	1.101	0.966	0.700	-12.3	25.0
2-Methylnaphthalene	0.789	0.690	0.400	-12.5	25.0
Acenaphthylene	1.799	1.550	0.900	-13.9	25.0
Acenaphthene	1.206	1.020	0.900	-15.4	25.0
Fluorene	1.356	1.155	0.900	-14.8	25.0
Pentachlorophenol	0.038	0.032	0.050	-16.0	25.0
Phenanthrene	1.283	1.181	0.700	-8.0	25.0
Anthracene	1.119	1.075	0.700	-3.9	25.0
Fluoranthene	1.130	1.027	0.600	-9.0	25.0
Pyrene	1.639	1.580	0.600	-3.6	25.0
Benzo (a) anthracene	1.125	1.080	0.800	-4.0	25.0
Chrysene	1.231	1.138	0.700	-7.6	25.0
Benzo (b) fluoranthene	1.990	1.905	0.700	-4.3	25.0
Benzo (k) fluoranthene	2.090	1.985	0.700	-5.1	25.0
Benzo (a) pyrene	1.430	1.388	0.700	-2.9	25.0
Indeno (1,2,3-cd) pyrene	1.222	1.199	0.500	-1.9	25.0
Dibenzo (a,h) anthracene	1.157	1.069	0.400	-7.6	25.0
Benzo (g,h,i) perylene	1.451	1.404	0.500	-3.2	25.0
Fluoranthene-d10	0.939	0.848	0.010	-9.7	25.0
2-Methylnapthalene-d10	0.533	0.466	0.010	-12.6	25.0

7H - FORM VII SV-SIM
SEMIVOLATILE SIM CONTINUING CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

Instrument ID: 5972hp64 Calibration Date: 07/30/2008 Time: 1418

Lab File ID: A080730A64.d Init. Calib. Date(s): 07/29/2008 07/29/2008

EPA Sample No.(SSTD0.4##): SSTD0.4DY Init. Calib. Time(s): 1334 1644

GC Column: RTX-5MS ID: 0.32 (mm)

COMPOUND	$\overline{RRF}$	RRF0.4	MIN RRF	%D	MAX %D
Naphthalene	1.101	0.987	0.700	-10.4	25.0
2-Methylnaphthalene	0.789	0.716	0.400	-9.2	25.0
Acenaphthylene	1.799	1.826	0.900	1.5	25.0
Acenaphthene	1.206	1.197	0.900	-0.8	25.0
Fluorene	1.356	1.316	0.900	-3.0	25.0
Pentachlorophenol	0.038	0.033	0.050	-14.9	25.0
Phenanthrene	1.283	1.225	0.700	-4.6	25.0
Anthracene	1.119	1.186	0.700	6.0	25.0
Fluoranthene	1.130	1.091	0.600	-3.4	25.0
Pyrene	1.639	1.596	0.600	-2.6	25.0
Benzo (a) anthracene	1.125	1.062	0.800	-5.6	25.0
Chrysene	1.231	1.205	0.700	-2.1	25.0
Benzo (b) fluoranthene	1.990	2.196	0.700	10.4	25.0
Benzo (k) fluoranthene	2.090	1.824	0.700	-12.7	25.0
Benzo (a) pyrene	1.430	1.420	0.700	-0.7	25.0
Indeno (1,2,3-cd) pyrene	1.222	1.174	0.500	-4.0	25.0
Dibenzo (a,h) anthracene	1.157	1.102	0.400	-4.7	25.0
Benzo (g,h,i) perylene	1.451	1.434	0.500	-1.2	25.0
Fluoranthene-d10	0.939	0.907	0.010	-3.4	25.0
2-Methylnapthalene-d10	0.533	0.486	0.010	-8.9	25.0

7H - FORM VII SV-SIM
SEMIVOLATILE SIM CONTINUING CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

Instrument ID: 5972hp64 Calibration Date: 07/30/2008 Time: 2213

Lab File ID: HB080730A64.d Init. Calib. Date(s): 07/29/2008 07/29/2008

EPA Sample No.(SSTD0.4##): SSTD0.4DZ Init. Calib. Time(s): 1334 1644

GC Column: RTX-5MS ID: 0.32 (mm)

COMPOUND	$\overline{RRF}$	RRF0.4	MIN RRF	%D	MAX %D
Naphthalene	1.101	0.948	0.700	-13.9	25.0
2-Methylnaphthalene	0.789	0.650	0.400	-17.6	25.0
Acenaphthylene	1.799	1.707	0.900	-5.1	25.0
Acenaphthene	1.206	1.170	0.900	-3.0	25.0
Fluorene	1.356	1.233	0.900	-9.0	25.0
Pentachlorophenol	0.038	0.026	0.050	-32.1	25.0
Phenanthrene	1.283	1.080	0.700	-15.8	25.0
Anthracene	1.119	1.170	0.700	4.5	25.0
Fluoranthene	1.130	0.983	0.600	-13.0	25.0
Pyrene	1.639	1.435	0.600	-12.4	25.0
Benzo (a) anthracene	1.125	1.151	0.800	2.3	25.0
Chrysene	1.231	1.170	0.700	-5.0	25.0
Benzo (b) fluoranthene	1.990	1.783	0.700	-10.4	25.0
Benzo (k) fluoranthene	2.090	2.072	0.700	-0.9	25.0
Benzo (a) pyrene	1.430	1.491	0.700	4.3	25.0
Indeno (1,2,3-cd) pyrene	1.222	1.296	0.500	6.0	25.0
Dibenzo (a,h) anthracene	1.157	1.296	0.400	12.1	25.0
Benzo (g,h,i) perylene	1.451	1.368	0.500	-5.7	25.0
Fluoranthene-d10	0.939	0.868	0.010	-7.6	25.0
2-Methylnapthalene-d10	0.533	0.451	0.010	-15.4	25.0

7H - FORM VII SV-SIM
SEMIVOLATILE SIM CONTINUING CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

Instrument ID: 5972hp64 Calibration Date: 07/31/2008 Time: 0210

Lab File ID: C080730A64.d Init. Calib. Date(s): 07/29/2008 07/29/2008

EPA Sample No.(SSTD0.4##): SSTD0.4EA Init. Calib. Time(s): 1334 1644

GC Column: RTX-5MS ID: 0.32 (mm)

COMPOUND	$\overline{RRF}$	RRF0.4	MIN RRF	%D	MAX %D
Naphthalene	1.101	0.956	0.010	-13.2	50.0
2-Methylnaphthalene	0.789	0.644	0.010	-18.3	50.0
Acenaphthylene	1.799	1.675	0.010	-6.9	50.0
Acenaphthene	1.206	1.217	0.010	0.9	50.0
Fluorene	1.356	1.258	0.010	-7.2	50.0
Pentachlorophenol	0.038	0.029	0.010	-25.0	50.0
Phenanthrene	1.283	1.037	0.010	-19.2	50.0
Anthracene	1.119	1.220	0.010	9.0	50.0
Fluoranthene	1.130	1.005	0.010	-11.1	50.0
Pyrene	1.639	1.468	0.010	-10.5	50.0
Benzo (a) anthracene	1.125	1.141	0.010	1.5	50.0
Chrysene	1.231	1.227	0.010	-0.4	50.0
Benzo (b) fluoranthene	1.990	1.579	0.010	-20.6	50.0
Benzo (k) fluoranthene	2.090	2.324	0.010	11.2	50.0
Benzo (a) pyrene	1.430	1.531	0.010	7.1	50.0
Indeno (1,2,3-cd) pyrene	1.222	1.220	0.010	-0.2	50.0
Dibenzo (a,h) anthracene	1.157	1.294	0.010	11.8	50.0
Benzo (g,h,i) perylene	1.451	1.363	0.010	-6.1	50.0
Fluoranthene-d10	0.939	0.868	0.010	-7.6	50.0
2-Methylnapthalene-d10	0.533	0.438	0.010	-17.8	50.0

8E - FORM VIII SV-SIM1
SEMIVOLATILE INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

GC Column: RTX-5MS ID: 0.32 (mm) Init. Calib. Date(s): 07/29/2008 07/29/2008

EPA Sample No.(SSTD020##): SSTD0.4DY Date Analyzed: 07/30/2008

Lab File ID (Standard): A080730A64.d Time Analyzed: 1418

Instrument ID: 5972hp64

		IS1 (DCB) AREA #	RT #	IS2 (NPT) AREA #	RT #	IS3 (ANT) AREA #	RT #
	12 HOUR STD	0	0.00	232073	10.50	98349	14.87
	UPPER LIMIT	0	0.50	464146	11.00	196698	15.37
	LOWER LIMIT	0	-0.50	116037	10.00	49175	14.37
	EPA SAMPLE NO.						
01	VWAI-MW05P			247558	10.50	103467	14.87
02	VWAI-MW07 #2			216645	10.49	*	*
03	VWAI-EB01-072108			238986	10.50	104055	14.90
04	VWAI-EB01-072008			241072	10.50	105912	14.90
05	VWAI-MW05			217694	10.50	93788	14.90
06	VWAI-EB01-072208			236465	10.50	103084	14.90
07	VWAI-MW09			191648	10.49	80330	14.90
08	VWAI-MW01			228053	10.49	94443	14.87
09	SSTD0.4DZ			196671	10.49	79527	14.87
10							
11							
12							
13							
14							
15							
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17							
18							
19							
20							
21							
22							

(JR) (JHJ)

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = 200% of internal standard area
AREA LOWER LIMIT = 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk

8F - FORM VIII SV-SIM2
SEMIVOLATILE INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

EPA Sample No.(SSTD020##): SSTD0.4DZ Date Analyzed: 07/30/2008

Lab File ID (Standard): HB080730A64.d Time Analyzed: 2213

Instrument ID: 5972hp64 GC Column: RTX-5MS ID: 0.32 (mm)

		IS4 (PHN) AREA	#	RT	#	IS5 (CRY) AREA	#	RT	#	IS6 (PRY) AREA	#	RT	#
	12 HOUR STD	116657		18.58		83881		25.27		51165		29.19	
	UPPER LIMIT	233314		19.08		167762		25.77		102330		29.69	
	LOWER LIMIT	58329		18.08		41941		24.77		25583		28.69	
	EPA SAMPLE NO.												
01	VWAI-MW05PDL 10DL	213553		18.55		153447		25.27		108545	*	29.19	
02	VWAI-MW05DL 5PL	209875		18.58		155733		25.27		112586	*	29.19	
03	SSTD0.4EA	111592		18.58		79586		25.27		48550		29.19	
04													
05													
06													
07													
08													
09													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													

J/R-Non Qu.
J/R-No All ND

IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = 200% of internal standard area
AREA LOWER LIMIT = 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.

ENVIRONMENTAL
Data Services, Inc.

LOW CONCENTRATION SEMIVOLATILE ORGANIC COMPOUNDS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807072

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 22, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAI-MW05P	0807072-01	Water
1RE	VWAI-MW05PRE	0807072-01RE	Water
2RE	VWAI-MW07RE	0807072-02RE	Water
3	VWAI-EB01-072108	0807072-03	Water
3RE	VWAI-EB01-072108RE	0807072-03RE	Water
4	VWAI-EB01-072008	0807072-04	Water
4RE	VWAI-EB01-072008RE	0807072-04RE	Water
5	VWAI-MW05	0807072-05	Water
5RE	VWAI-MW05RE	0807072-05RE	Water
6	VWAI-MW08	0807072-06	Water
6RE	VWAI-MW08RE	0807072-06RE	Water
7	VWAI-EB01-072208	0807072-09	Water
7RE	VWAI-EB01-072208RE	0807072-09RE	Water
8	VWAI-MW09	0807072-10	Water
8RE	VWAI-MW09RE	0807072-10RE	Water
9	VWAI-MW01	0807072-11	Water
9RE	VWAI-MW01RE	0807072-11RE	Water
10	VWAI-MW04	0807072-12	Water
10MS	VWAI-MW04MS	0807072-12MS	Water
10MSD	VWAI-MW04MSD	0807072-12MSD	Water
11	VWAI-MW02	0807072-15	Water
12	VWAI-MW03	0807072-16	Water
13	VWAI-EB01-072308	0807072-17	Water
14	VWAI-EB01-072408	0807072-18	Water
15	VWAE-MW03	0807072-20	Water
16	VWAE-MW08	0807072-21	Water
17	VWAE-MW07	0807072-22	Water
18	VWAE-EB01-072708	0807072-23	Water
19	VWAE-MW02	0807072-24	Water

The USEPA Region II SOP HW-35, Revision 1, August 2007: USEPA CLP Statement of Work for Organic Analysis of Low/Medium Concentration of Semivolatile Organic Compounds SOM01.2 Data Validation and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries except the following.

Sample ID	Surrogate	%R	Qualifier
2RE	2-Chlorophenol-d4	38%	J/UJ - All associated compounds
	Nitrobenzene-d5	41%	J/UJ - All associated compounds
	2-Nitrophenol-d4	39%	J/UJ - All associated compounds

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	MS/MSD %R/RPD	Qualifier
10	4-Nitrophenol	104%/98%/Ok	None - Sample ND
	2,4-Dinitrotoluene	97%/Ok/Ok	None - Sample ND
	Pentachlorophenol	105%/Ok/Ok	None - Sample ND

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blank was free of contamination.

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAI-EB01-072008	Benzaldehyde	1.5	None	All ND
VWAI-EB01-072108	Benzaldehyde	1.8	None	All ND
	Acetophenone	1.4	None	All ND
	bis (2-Ethylhexyl) phthalate	2.3	U	1, 5, 5RE
VWAI-EB01-072208	None - ND	-	-	-
VWAI-EB01-072308	Acetophenone	1.3	None	All ND
VWAI-EB01-072408	Acetophenone	1.3	None	All ND
VWAE-EB01-072708	Phenol	1.1	None	All ND
	Diethylphthalate	5.2	None	All ND

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-EB01-072708	Di-n-butylphthalate	3.5	None	All ND
	bis (2-Ethylhexyl) phthalate	2.1	None	All ND

GC/MS Instrument Performance Check - All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were not reported for the samples in this data package.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values with the exception of the following.

CCAL Date	Compound	%D/RRF	Qualifier	Affected Samples
07/27/08 1245	Nitrobenzene	27.9%	J/UJ	1RE, 3RE, 4RE, 5RE, 6RE, 7RE, 8RE, 9RE
07/27/08 2227	Caprolactam	56.0%	J/UJ	1RE, 3RE, 4RE, 5RE, 6RE, 7RE, 8RE, 9RE
08/01/08 1306	Nitrobenzene	31.4%	J/UJ	17

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAI-MW05 ug/L	VWAI-MW05P ug/L	RPD	Qualifier
2-Methylnaphthalene	7.5	5.4	33%	None
Acenaphthene	1.6	1.2	29%	None
Fluorene	2.4	2.1	13%	None

Compound	VWAI-MW05 ug/L	VWAI-MW05P ug/L	RPD	Qualifier
Phenanthrene	3.9	3.3	17%	None

ANNOTATED FORM Is

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-01

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-01A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/22/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	5.0	U	
108-95-2	Phenol	5.0	U	
111-44-4	Bis(2-chloroethyl)ether	5.0	U	
95-57-8	2-Chlorophenol	5.0	U	
95-48-7	2-Methylphenol	5.0	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	5.0	U	
98-86-2	Acetophenone	5.0	U	
106-44-5	4-Methylphenol	5.0	U	
621-64-7	N-Nitroso-di-n-propylamine	5.0	U	
67-72-1	Hexachloroethane	5.0	U	
98-95-3	Nitrobenzene	5.0	U	
78-59-1	Isophorone	5.0	U	
88-75-5	2-Nitrophenol	5.0	U	
105-67-9	2,4-Dimethylphenol	5.0	U	
111-91-1	Bis(2-chloroethoxy)methane	5.0	U	
120-83-2	2,4-Dichlorophenol	5.0	U	
91-20-3	Naphthalene	5.0	~~U~~	R RE
106-47-8	4-Chloroaniline	5.0	U	
87-68-3	Hexachlorobutadiene	5.0	U	
105-60-2	Caprolactam	5.0	U	
59-50-7	4-Chloro-3-methylphenol	5.0	U	
91-57-6	2-Methylnaphthalene	5.4		
77-47-4	Hexachlorocyclopentadiene	5.0	U	
88-06-2	2,4,6-Trichlorophenol	5.0	U	
95-95-4	2,4,5-Trichlorophenol	5.0	U	
92-52-4	1,1'-Biphenyl	5.0	U	
91-58-7	2-Chloronaphthalene	5.0	U	
88-74-4	2-Nitroaniline	10	U	
131-11-3	Dimethylphthalate	5.0	U	
606-20-2	2,6-Dinitrotoluene	5.0	U	
208-96-8	Acenaphthylene	5.0	~~U~~	R RE
99-09-2	3-Nitroaniline	10	U	
83-32-9	Acenaphthene	1.2	~~U~~	R RE

lw 10/24/08

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1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-01

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-01A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/22/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	10	U	
100-02-7	4-Nitrophenol	10	U	
132-64-9	Dibenzofuran	5.0	U	
121-14-2	2,4-Dinitrotoluene	5.0	U	
84-66-2	Diethylphthalate	5.0	U	
86-73-7	Fluorene	2.1	J	
7005-72-3	4-Chlorophenyl-phenylether	5.0	U	
100-01-6	4-Nitroaniline	10	U	
534-52-1	4,6-Dinitro-2-methylphenol	10	U	
86-30-6	N-Nitrosodiphenylamine (1)	5.0	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	5.0	U	
101-55-3	4-Bromophenyl-phenylether	5.0	U	
118-74-1	Hexachlorobenzene	5.0	U	
1912-24-9	Atrazine	5.0	U	
87-86-5	Pentachlorophenol	10	U	
85-01-8	Phenanthrene	3.3	J	
120-12-7	Anthracene	5.0	~~U~~	R RE
86-74-8	Carbazole	5.0	U	
84-74-2	Di-n-butylphthalate	5.0	U	
206-44-0	Fluoranthene	5.0	~~U~~	R RE
129-00-0	Pyrene	5.0	~~U~~	R RE
85-68-7	Butylbenzylphthalate	5.0	U	
91-94-1	3,3'-Dichlorobenzidine	5.0	U	
56-55-3	Benzo (a) anthracene	5.0	~~U~~	R RE
218-01-9	Chrysene	5.0	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	5.0 ~~2.2~~	~~J~~	u BL
117-84-0	Di-n-octylphthalate	5.0	U	
205-99-2	Benzo (b) fluoranthene	5.0	U	R RE
207-08-9	Benzo (k) fluoranthene	5.0	U	
50-32-8	Benzo (a) pyrene	5.0	U	
193-39-5	Indeno (1,2,3-cd) pyrene	5.0	U	
53-70-3	Dibenzo (a,h) anthracene	5.0	U	
191-24-2	Benzo (g,h,i) perylene	5.0	U	
58-90-2	2,3,4,6-Tetrachlorophenol	5.0	U	

[1] Cannot be separated from Diphenylamine

10/24/08

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1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW05P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-01

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-01A60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/22/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl alcohol	14.12	5.4	JN
02	17059-48-2	1H-Indene, 2,3-dihydro-1,6-dimethyl-	20.67	3.3	JN
03	90-12-0	Naphthalene, 1-methyl- $$ .alpha.-Me	24.15	6.9	JN
04	90-12-0	Naphthalene, 1-methyl-(1)	24.70	5.5	JN
05	573-98-8	Naphthalene, 1,2-dimethyl-	26.79	6.2	JN
06	581-42-0	Naphthalene, 2,6-dimethyl-	27.03	23	JN
07	571-61-9	Naphthalene, 1,5-dimethyl-	27.34	18	JN
08	573-98-8	Naphthalene, 1,2-dimethyl-(1)	27.40	8.7	JN
09		UNKNOWN	27.49	4.6	J
10	581-40-8	Naphthalene, 2,3-dimethyl- $$ Guajer	27.72	9.8	JN
11	581-42-0	Naphthalene, 2,6-dimethyl-(1)	27.78	4.0	JN
12	575-41-7	Naphthalene, 1,3-dimethyl-	28.01	5.9	JN
13	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	28.89	4.6	JN
14		UNKNOWN	29.16	4.4	J
15		UNKNOWN	29.23	4.9	J
16	829-26-5	Naphthalene, 2,3,6-trimethyl-	29.32	7.0	JN
17	2245-38-7	Naphthalene, 1,6,7-trimethyl-	29.57	7.2	JN
18	829-26-5	Naphthalene, 2,3,6-trimethyl-(1)	29.60	6.5	JN
19	829-26-5	Naphthalene, 2,3,6-trimethyl-(2)	29.82	8.3	JN
20	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	30.18	4.7	JN
21		UNKNOWN	30.31	3.3	J
22		UNKNOWN	31.43	5.9	J
23	2523-37-7	9H-Fluorene, 9-methyl- $$ Fluorene,	31.68	3.3	JN
24	1730-37-6	9H-Fluorene, 1-methyl-	31.79	4.7	JN
25	132-65-0	Dibenzothiophene	32.39	5.1	JN
26		UNKNOWN	32.87	4.0	J
27	85-08-5	1-Naphthaleneacetic acid, 2-methyl-	34.09	3.0	JN
28	5728-52-9	Felbinac	35.03	4.0	JN
29		UNKNOWN	35.61	4.2	J
30		UNKNOWN	36.17	3.4	J
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

RW 10/24/08

1RE

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05PRE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-01RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-01JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/22/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

use - original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
100-52-7	Benzaldehyde	5.0	U
108-95-2	Phenol	5.0	U
111-44-4	Bis(2-chloroethyl)ether	5.0	U
95-57-8	2-Chlorophenol	5.0	U
95-48-7	2-Methylphenol	5.0	U
108-60-1	2,2'-Oxybis(1-chloropropane)	5.0	U
98-86-2	Acetophenone	5.0	U
106-44-5	4-Methylphenol	5.0	U
621-64-7	N-Nitroso-di-n-propylamine	5.0	U
67-72-1	Hexachloroethane	5.0	U
98-95-3	Nitrobenzene	5.0	~~U~~ UJ CCH
78-59-1	Isophorone	5.0	U
88-75-5	2-Nitrophenol	5.0	U
105-67-9	2,4-Dimethylphenol	5.0	U
111-91-1	Bis(2-chloroethoxy)methane	5.0	U
120-83-2	2,4-Dichlorophenol	5.0	U
91-20-3	Naphthalene	5.0	U
106-47-8	4-Chloroaniline	5.0	U
87-68-3	Hexachlorobutadiene	5.0	U
105-60-2	Caprolactam	5.0	~~U~~ UJ CCH
59-50-7	4-Chloro-3-methylphenol	5.0	U
91-57-6	2-Methylnaphthalene	5.3	
77-47-4	Hexachlorocyclopentadiene	5.0	U
88-06-2	2,4,6-Trichlorophenol	5.0	U
95-95-4	2,4,5-Trichlorophenol	5.0	U
92-52-4	1,1'-Biphenyl	5.0	U
91-58-7	2-Chloronaphthalene	5.0	U
88-74-4	2-Nitroaniline	10	U
131-11-3	Dimethylphthalate	5.0	U
606-20-2	2,6-Dinitrotoluene	5.0	U
208-96-8	Acenaphthylene	5.0	U
99-09-2	3-Nitroaniline	10	U
83-32-9	Acenaphthene	1.1	J

RE

lew 10/24/08

1RE

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05PRE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-01RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-01JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/22/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

use orig. ND

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
51-28-5	2,4-Dinitrophenol	10	U
100-02-7	4-Nitrophenol	10	U
132-64-9	Dibenzofuran	5.0	U
121-14-2	2,4-Dinitrotoluene	5.0	U
84-66-2	Diethylphthalate	5.0	U
86-73-7	Fluorene	1.0	J
7005-72-3	4-Chlorophenyl-phenylether	5.0	U
100-01-6	4-Nitroaniline	10	U
534-52-1	4,6-Dinitro-2-methylphenol	10	U
86-30-6	N-Nitrosodiphenylamine (1)	5.0	U
95-94-3	1,2,4,5-Tetrachlorobenzene	5.0	U
101-55-3	4-Bromophenyl-phenylether	5.0	U
118-74-1	Hexachlorobenzene	5.0	U
1912-24-9	Atrazine	5.0	U
87-86-5	Pentachlorophenol	10	U
85-01-8	Phenanthrene	3.2	J
120-12-7	Anthracene	5.0	U
86-74-8	Carbazole	5.0	U
84-74-2	Di-n-butylphthalate	5.0	U
206-44-0	Fluoranthene	5.0	U
129-00-0	Pyrene	5.0	U
85-68-7	Butylbenzylphthalate	5.0	U
91-94-1	3,3'-Dichlorobenzidine	5.0	U
56-55-3	Benzo (a) anthracene	5.0	U
218-01-9	Chrysene	5.0	U
117-81-7	Bis(2-ethylhexyl)phthalate	5.0	U
117-84-0	Di-n-octylphthalate	5.0	U
205-99-2	Benzo (b) fluoranthene	5.0	U
207-08-9	Benzo (k) fluoranthene	5.0	U
50-32-8	Benzo (a) pyrene	5.0	U
193-39-5	Indeno (1,2,3-cd) pyrene	5.0	U
53-70-3	Dibenzo (a,h) anthracene	5.0	U
191-24-2	Benzo (g,h,i) perylene	5.0	U
58-90-2	2,3,4,6-Tetrachlorophenol	5.0	U

[1]Cannot be separated from Diphenylamine

RE

RW 10/24/08

1RE

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW05PRE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-01RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-01JA60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/22/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

Use original

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl alcohol	14.12	5.8	JN
02	824-22-6	1H-Indene, 2,3-dihydro-4-methyl- $$	18.74	2.3	JN
03	17057-82-8	1H-Indene, 2,3-dihydro-1,2-dimethyl-	20.33	2.6	JN
04	53172-84-2	Benzene, (1-methyl-1-butenyl)-	20.49	2.8	JN
05	6682-71-9	1H-Indene, 2,3-dihydro-4,7-dimethyl-	20.65	3.2	JN
06	2613-76-5	1H-Indene, 2,3-dihydro-1,1,3-trimeth	24.50	2.2	JN
07	91-57-6	Naphthalene, 2-methyl-	24.68	5.8	JN
08	1127-76-0	Naphthalene, 1-ethyl-	26.80	6.4	JN
09	939-27-5	Naphthalene, 2-ethyl-	26.88	2.6	JN
10	581-42-0	Naphthalene, 2,6-dimethyl-	27.03	22	JN
11	581-40-8	Naphthalene, 2,3-dimethyl- $$ Guajer	27.34	19	JN
12	571-61-9	Naphthalene, 1,5-dimethyl-	27.39	8.0	JN
13		UNKNOWN	27.49	4.1	J
14	581-40-8	Naphthalene, 2,3-dimethyl- $$ Guajer	27.71	9.1	JN
15		UNKNOWN	27.78	4.4	J
16	939-27-5	Naphthalene, 2-ethyl- $$ .beta.-Ethy	28.00	5.2	JN
17		UNKNOWN	28.74	2.3	J
18	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	28.88	4.3	JN
19		UNKNOWN	29.15	5.2	J
20	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	29.23	4.9	JN
21	829-26-5	Naphthalene, 2,3,6-trimethyl-	29.30	6.3	JN
22		UNKNOWN	29.44	3.1	J
23	2131-41-1	Naphthalene, 1,4,5-trimethyl- $$ 1,4	29.56	10	JN
24	829-26-5	Naphthalene, 2,3,6-trimethyl-(1)	29.61	4.5	JN
25	2245-38-7	Naphthalene, 1,6,7-trimethyl-	29.83	9.1	JN
26	2245-38-7	Naphthalene, 1,6,7-trimethyl-(1)	30.18	4.2	JN
27	1855-47-6	1-Isopropenylnaphthalene	30.37	2.6	JN
28		UNKNOWN	31.47	4.0	J
29	1430-97-3	9H-Fluorene, 2-methyl-	31.79	3.7	JN
30	132-65-0	Dibenzothiophene $$ [1,1'-Biphenyl]-	32.38	3.4	JN
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

dlw 10/24/08

2 RE

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-02RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-02J2A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/30/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	5.0	U	
108-95-2	Phenol	5.0	U	
111-44-4	Bis(2-chloroethyl)ether	5.0	U	
95-57-8	2-Chlorophenol	5.0	~~U~~	UJ SSL
95-48-7	2-Methylphenol	5.0	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	5.0	U	
98-86-2	Acetophenone	5.0	~~U~~	UJ SSL
106-44-5	4-Methylphenol	5.0	U	
621-64-7	N-Nitroso-di-n-propylamine	5.0	~~U~~	UJ SSL
67-72-1	Hexachloroethane	5.0	~~U~~	UJ SSL
98-95-3	Nitrobenzene	5.0	~~U~~	UJ SSL
78-59-1	Isophorone	5.0	~~U~~	UJ SSL
88-75-5	2-Nitrophenol	5.0	~~U~~	UJ SSL
105-67-9	2,4-Dimethylphenol	5.0	U	
111-91-1	Bis(2-chloroethoxy)methane	5.0	U	
120-83-2	2,4-Dichlorophenol	5.0	U	
91-20-3	Naphthalene	35		
106-47-8	4-Chloroaniline	5.0	U	
87-68-3	Hexachlorobutadiene	5.0	U	
105-60-2	Caprolactam	5.0	U	
59-50-7	4-Chloro-3-methylphenol	5.0	U	
91-57-6	2-Methylnaphthalene	31		
77-47-4	Hexachlorocyclopentadiene	5.0	U	
88-06-2	2,4,6-Trichlorophenol	5.0	U	
95-95-4	2,4,5-Trichlorophenol	5.0	U	
92-52-4	1,1'-Biphenyl	5.0	U	
91-58-7	2-Chloronaphthalene	5.0	U	
88-74-4	2-Nitroaniline	10	U	
131-11-3	Dimethylphthalate	5.0	U	
606-20-2	2,6-Dinitrotoluene	5.0	~~U~~	UJ SSL
208-96-8	Acenaphthylene	5.0	U	
99-09-2	3-Nitroaniline	10	U	
83-32-9	Acenaphthene	1.1	J	

MW 10/24/08

2RE

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-02RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-02J2A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/30/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	10	U	
100-02-7	4-Nitrophenol	10	U	
132-64-9	Dibenzofuran	5.0	U	
121-14-2	2,4-Dinitrotoluene	5.0	~~U~~	UJ SSL
84-66-2	Diethylphthalate	5.0	U	
86-73-7	Fluorene	4.5	J	
7005-72-3	4-Chlorophenyl-phenylether	5.0	U	
100-01-6	4-Nitroaniline	10	U	
534-52-1	4,6-Dinitro-2-methylphenol	10	U	
86-30-6	N-Nitrosodiphenylamine (1)	5.0	~~U~~	UJ SSL
95-94-3	1,2,4,5-Tetrachlorobenzene	5.0	U	
101-55-3	4-Bromophenyl-phenylether	5.0	U	
118-74-1	Hexachlorobenzene	5.0	U	
1912-24-9	Atrazine	5.0	U	
87-86-5	Pentachlorophenol	10	U	
85-01-8	Phenanthrene	2.4	J	
120-12-7	Anthracene	5.0	~~U~~	R RE
86-74-8	Carbazole	5.0	U	
84-74-2	Di-n-butylphthalate	5.0	U	
206-44-0	Fluoranthene	5.0	~~U~~	R RE
129-00-0	Pyrene	5.0	~~U~~	R RE
85-68-7	Butylbenzylphthalate	5.0	U	
91-94-1	3,3'-Dichlorobenzidine	5.0	U	
56-55-3	Benzo (a) anthracene	5.0	~~U~~	R RE
218-01-9	Chrysene	5.0	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	4.2	J	
117-84-0	Di-n-octylphthalate	5.0	U	
205-99-2	Benzo (b) fluoranthene	5.0	U	R RE
207-08-9	Benzo (k) fluoranthene	5.0	U	
50-32-8	Benzo (a) pyrene	5.0	U	
193-39-5	Indeno (1,2,3-cd) pyrene	5.0	U	
53-70-3	Dibenzo (a,h) anthracene	5.0	U	
191-24-2	Benzo (g,h,i) perylene	5.0	U	
58-90-2	2,3,4,6-Tetrachlorophenol	5.0	U	

[1] Cannot be separated from Diphenylamine

RW 10/24/08

2RE

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-02RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-02J2A60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/30/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	95-63-6	Benzene, 1,2,4-trimethyl- $$ .psi.-(	11.43	6.0	JN
02	496-11-7	Indane	13.92	59	JN
03	100-51-6	Benzyl Alcohol $$ Benzenemethanol $$	14.14	6.0	JN
04	135-01-3	Benzene, 1,2-diethyl-	14.65	9.8	JN
05		UNKNOWN	14.90	7.6	J
06	824-63-5	1H-Indene, 2,3-dihydro-2-methyl-	15.92	5.5	JN
07	874-41-9	Benzene, 1-ethyl-2,4-dimethyl-	17.43	15	JN
08	824-22-6	1H-Indene, 2,3-dihydro-4-methyl- $$	18.32	6.3	JN
09	767-58-8	Indan, 1-methyl- $$ 1H-Indene, 2,3-(	18.76	21	JN
10	99-87-6	Benzene, 1-methyl-4-(1-methylethyl)-	18.88	11	JN
11	119-64-2	Naphthalene, 1,2,3,4-tetrahydro-	19.20	4.7	JN
12	1559-81-5	Naphthalene, 1,2,3,4-tetrahydro-1-me	20.35	4.8	JN
13		UNKNOWN	20.49	2.6	J
14	6682-71-9	1H-Indene, 2,3-dihydro-4,7-dimethyl-	20.66	4.0	JN
15	4453-90-1	1,4-Methanonaphthalene, 1,4-dihydro-	24.70	19	JN
16		UNKNOWN	26.18	6.7	J
17		UNKNOWN	26.70	5.1	J
18	1127-76-0	Naphthalene, 1-ethyl-	26.80	3.5	JN
19	571-61-9	Naphthalene, 1,5-dimethyl- $$ 1,5-Di	27.02	15	JN
20	575-37-1	Naphthalene, 1,7-dimethyl- $$ 1,7-Di	27.34	15	JN
21	581-42-0	Naphthalene, 2,6-dimethyl-	27.39	10	JN
22		UNKNOWN	27.50	5.2	J
23	573-98-8	Naphthalene, 1,2-dimethyl- $$ 1,2-Di	27.72	8.0	JN
24		UNKNOWN	27.78	4.5	J
25		UNKNOWN	28.00	7.4	J
26		UNKNOWN	28.73	6.0	J
27	2245-38-7	Naphthalene, 1,6,7-trimethyl-	29.31	3.6	JN
28	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	29.81	6.1	JN
29	941-81-1	4,6,8-Trimethylazulene $$ Azulene, 4	30.17	3.7	JN
30	27323-29-1	Methylcarbazole	34.25	3.4	JN
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072108

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-03

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807072-03A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	1.8	J	
108-95-2	Phenol	4.9	U	
111-44-4	Bis(2-chloroethyl)ether	4.9	U	
95-57-8	2-Chlorophenol	4.9	U	
95-48-7	2-Methylphenol	4.9	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	4.9	U	
98-86-2	Acetophenone	1.4	J	
106-44-5	4-Methylphenol	4.9	U	
621-64-7	N-Nitroso-di-n-propylamine	4.9	U	
67-72-1	Hexachloroethane	4.9	U	
98-95-3	Nitrobenzene	4.9	U	
78-59-1	Isophorone	4.9	U	
88-75-5	2-Nitrophenol	4.9	U	
105-67-9	2,4-Dimethylphenol	4.9	U	
111-91-1	Bis(2-chloroethoxy)methane	4.9	U	
120-83-2	2,4-Dichlorophenol	4.9	U	
91-20-3	Naphthalene	4.9	~~U~~	R RE
106-47-8	4-Chloroaniline	4.9	U	
87-68-3	Hexachlorobutadiene	4.9	U	
105-60-2	Caprolactam	4.9	U	
59-50-7	4-Chloro-3-methylphenol	4.9	U	
91-57-6	2-Methylnaphthalene	4.9	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	4.9	U	
88-06-2	2,4,6-Trichlorophenol	4.9	U	
95-95-4	2,4,5-Trichlorophenol	4.9	U	
92-52-4	1,1'-Biphenyl	4.9	U	
91-58-7	2-Chloronaphthalene	4.9	U	
88-74-4	2-Nitroaniline	9.8	U	
131-11-3	Dimethylphthalate	4.9	U	
606-20-2	2,6-Dinitrotoluene	4.9	U	
208-96-8	Acenaphthylene	4.9	~~U~~	R RE
99-09-2	3-Nitroaniline	9.8	U	
83-32-9	Acenaphthene	4.9	~~U~~	R RE

lw
10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072108

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-03

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807072-03A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	9.8	U	
100-02-7	4-Nitrophenol	9.8	U	
132-64-9	Dibenzofuran	4.9	U	
121-14-2	2,4-Dinitrotoluene	4.9	U	
84-66-2	Diethylphthalate	4.9	U	
86-73-7	Fluorene	4.9	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	4.9	U	
100-01-6	4-Nitroaniline	9.8	U	
534-52-1	4,6-Dinitro-2-methylphenol	9.8	U	
86-30-6	N-Nitrosodiphenylamine (1)	4.9	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	4.9	U	
101-55-3	4-Bromophenyl-phenylether	4.9	U	
118-74-1	Hexachlorobenzene	4.9	U	
1912-24-9	Atrazine	4.9	U	
87-86-5	Pentachlorophenol	9.8	U	
85-01-8	Phenanthrene	4.9	~~U~~	R RE
120-12-7	Anthracene	4.9	~~U~~	R RE
86-74-8	Carbazole	4.9	U	
84-74-2	Di-n-butylphthalate	4.9	U	
206-44-0	Fluoranthene	4.9	~~U~~	R RE
129-00-0	Pyrene	4.9	~~U~~	R RE
85-68-7	Butylbenzylphthalate	4.9	U	
91-94-1	3,3'-Dichlorobenzidine	4.9	U	
56-55-3	Benzo (a) anthracene	4.9	~~U~~	R RE
218-01-9	Chrysene	4.9	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	2.3	J	
117-84-0	Di-n-octylphthalate	4.9	U	
205-99-2	Benzo (b) fluoranthene	4.9	U	R RE
207-08-9	Benzo (k) fluoranthene	4.9	U	
50-32-8	Benzo (a) pyrene	4.9	U	
193-39-5	Indeno (1,2,3-cd) pyrene	4.9	U	
53-70-3	Dibenzo (a,h) anthracene	4.9	U	
191-24-2	Benzo (g,h,i) perylene	4.9	U	
58-90-2	2,3,4,6-Tetrachlorophenol	4.9	U	

[1] Cannot be separated from Diphenylamine

lw
10/24/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-EB01-072108

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-03

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807072-03A60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl alcohol	14.14	4.2	JN
02	121-33-5	Vanillin	27.05	2.3	JN
03		UNKNOWN	29.47	11	J
04		UNKNOWN	29.93	2.4	J
05	0-00-0	7,9-Di-tert-butyl-1-oxaspiro(4,5)dec	34.24	4.4	JN
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

GW
10/24/08

3RE

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072108RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-03RE1

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807072-03JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008 use original

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
100-52-7	Benzaldehyde	2.5	J
108-95-2	Phenol	4.9	U
111-44-4	Bis(2-chloroethyl)ether	4.9	U
95-57-8	2-Chlorophenol	4.9	U
95-48-7	2-Methylphenol	4.9	U
108-60-1	2,2'-Oxybis(1-chloropropane)	4.9	U
98-86-2	Acetophenone	2.0	J
106-44-5	4-Methylphenol	4.9	U
621-64-7	N-Nitroso-di-n-propylamine	4.9	U
67-72-1	Hexachloroethane	4.9	U
98-95-3	Nitrobenzene	4.9	~~U~~ UJ CCH
78-59-1	Isophorone	4.9	U
88-75-5	2-Nitrophenol	4.9	U
105-67-9	2,4-Dimethylphenol	4.9	U
111-91-1	Bis(2-chloroethoxy)methane	4.9	U
120-83-2	2,4-Dichlorophenol	4.9	U
91-20-3	Naphthalene	4.9	U
106-47-8	4-Chloroaniline	4.9	U
87-68-3	Hexachlorobutadiene	4.9	U
105-60-2	Caprolactam	4.9	~~U~~ UJ CCH
59-50-7	4-Chloro-3-methylphenol	4.9	U
91-57-6	2-Methylnaphthalene	4.9	U
77-47-4	Hexachlorocyclopentadiene	4.9	U
88-06-2	2,4,6-Trichlorophenol	4.9	U
95-95-4	2,4,5-Trichlorophenol	4.9	U
92-52-4	1,1'-Biphenyl	4.9	U
91-58-7	2-Chloronaphthalene	4.9	U
88-74-4	2-Nitroaniline	9.8	U
131-11-3	Dimethylphthalate	4.9	U
606-20-2	2,6-Dinitrotoluene	4.9	U
208-96-8	Acenaphthylene	4.9	U
99-09-2	3-Nitroaniline	9.8	U
83-32-9	Acenaphthene	4.9	U

RE

10/24/08

3RE

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072108RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-03RE1

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807072-03JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
51-28-5	2,4-Dinitrophenol	9.8	U
100-02-7	4-Nitrophenol	9.8	U
132-64-9	Dibenzofuran	4.9	U
121-14-2	2,4-Dinitrotoluene	4.9	U
84-66-2	Diethylphthalate	4.9	U
86-73-7	Fluorene	4.9	U
7005-72-3	4-Chlorophenyl-phenylether	4.9	U
100-01-6	4-Nitroaniline	9.8	U
534-52-1	4,6-Dinitro-2-methylphenol	9.8	U
86-30-6	N-Nitrosodiphenylamine (1)	4.9	U
95-94-3	1,2,4,5-Tetrachlorobenzene	4.9	U
101-55-3	4-Bromophenyl-phenylether	4.9	U
118-74-1	Hexachlorobenzene	4.9	U
1912-24-9	Atrazine	4.9	U
87-86-5	Pentachlorophenol	9.8	U
85-01-8	Phenanthrene	4.9	U
120-12-7	Anthracene	4.9	U
86-74-8	Carbazole	4.9	U
84-74-2	Di-n-butylphthalate	4.9	U
206-44-0	Fluoranthene	4.9	U
129-00-0	Pyrene	4.9	U
85-68-7	Butylbenzylphthalate	4.9	U
91-94-1	3,3'-Dichlorobenzidine	4.9	U
56-55-3	Benzo (a) anthracene	4.9	U
218-01-9	Chrysene	4.9	U
117-81-7	Bis(2-ethylhexyl)phthalate	3.2	J
117-84-0	Di-n-octylphthalate	4.9	U
205-99-2	Benzo (b) fluoranthene	4.9	U
207-08-9	Benzo (k) fluoranthene	4.9	U
50-32-8	Benzo (a) pyrene	4.9	U
193-39-5	Indeno (1,2,3-cd) pyrene	4.9	U
53-70-3	Dibenzo (a,h) anthracene	4.9	U
191-24-2	Benzo (g,h,i) perylene	4.9	U
58-90-2	2,3,4,6-Tetrachlorophenol	4.9	U

[1] Cannot be separated from Diphenylamine

RE

lw 10/24/08

3RE

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-EB01-072108RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-03RE1

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807072-03JA60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

use original

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	14.00	2.1	J
02	100-51-6	Benzyl alcohol	14.15	6.2	JN
03	121-33-5	Vanillin $$ Benzaldehyde, 4-hydroxy-	27.07	3.1	JN
04		UNKNOWN	29.92	3.1	J
05		UNKNOWN	34.24	5.7	J
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	2.2	

[2]EPA-designated Registry Number.

RE

lw
10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072008

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-04

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-04A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	1.5	J	
108-95-2	Phenol	5.0	U	
111-44-4	Bis(2-chloroethyl)ether	5.0	U	
95-57-8	2-Chlorophenol	5.0	U	
95-48-7	2-Methylphenol	5.0	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	5.0	U	
98-86-2	Acetophenone	5.0	U	
106-44-5	4-Methylphenol	5.0	U	
621-64-7	N-Nitroso-di-n-propylamine	5.0	U	
67-72-1	Hexachloroethane	5.0	U	
98-95-3	Nitrobenzene	5.0	U	
78-59-1	Isophorone	5.0	U	
88-75-5	2-Nitrophenol	5.0	U	
105-67-9	2,4-Dimethylphenol	5.0	U	
111-91-1	Bis(2-chloroethoxy)methane	5.0	U	
120-83-2	2,4-Dichlorophenol	5.0	U	
91-20-3	Naphthalene	5.0	~~U~~	R RE
106-47-8	4-Chloroaniline	5.0	U	
87-68-3	Hexachlorobutadiene	5.0	U	
105-60-2	Caprolactam	5.0	U	
59-50-7	4-Chloro-3-methylphenol	5.0	U	
91-57-6	2-Methylnaphthalene	5.0	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	5.0	U	
88-06-2	2,4,6-Trichlorophenol	5.0	U	
95-95-4	2,4,5-Trichlorophenol	5.0	U	
92-52-4	1,1'-Biphenyl	5.0	U	
91-58-7	2-Chloronaphthalene	5.0	U	
88-74-4	2-Nitroaniline	10	U	
131-11-3	Dimethylphthalate	5.0	U	
606-20-2	2,6-Dinitrotoluene	5.0	U	
208-96-8	Acenaphthylene	5.0	~~U~~	R RE
99-09-2	3-Nitroaniline	10	U	
83-32-9	Acenaphthene	5.0	~~U~~	R RE

lw
10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072008

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-04

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-04A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	10	U	
100-02-7	4-Nitrophenol	10	U	
132-64-9	Dibenzofuran	5.0	U	
121-14-2	2,4-Dinitrotoluene	5.0	U	
84-66-2	Diethylphthalate	5.0	U	
86-73-7	Fluorene	5.0	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	5.0	U	
100-01-6	4-Nitroaniline	10	U	
534-52-1	4,6-Dinitro-2-methylphenol	10	U	
86-30-6	N-Nitrosodiphenylamine (1)	5.0	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	5.0	U	
101-55-3	4-Bromophenyl-phenylether	5.0	U	
118-74-1	Hexachlorobenzene	5.0	U	
1912-24-9	Atrazine	5.0	U	
87-86-5	Pentachlorophenol	10	U	
85-01-8	Phenanthrene	5.0	~~U~~	R RE
120-12-7	Anthracene	5.0	~~U~~	R RE
86-74-8	Carbazole	5.0	U	
84-74-2	Di-n-butylphthalate	5.0	U	
206-44-0	Fluoranthene	5.0	~~U~~	R RE
129-00-0	Pyrene	5.0	~~U~~	R RE
85-68-7	Butylbenzylphthalate	5.0	U	
91-94-1	3,3'-Dichlorobenzidine	5.0	U	
56-55-3	Benzo (a) anthracene	5.0	~~U~~	R RE
218-01-9	Chrysene	5.0	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	5.0	U	
117-84-0	Di-n-octylphthalate	5.0	U	
205-99-2	Benzo (b) fluoranthene	5.0	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	5.0	~~U~~	
50-32-8	Benzo (a) pyrene	5.0	~~U~~	
193-39-5	Indeno (1,2,3-cd) pyrene	5.0	~~U~~	
53-70-3	Dibenzo (a,h) anthracene	5.0	~~U~~	
191-24-2	Benzo (g,h,i) perylene	5.0	~~U~~	
58-90-2	2,3,4,6-Tetrachlorophenol	5.0	U	

[1] Cannot be separated from Diphenylamine

MW
10/24/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-EB01-072008

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-04

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-04A60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl Alcohol $$ Benzenemethanol $$	14.14	2.4	JN
02	0-00-0	7,9-Di-tert-butyl-1-oxaspiro(4,5)dec	34.24	4.5	JN
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	17	

[2]EPA-designated Registry Number.

fed
10/24/08

4RE

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072008RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-04RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-04JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
100-52-7	Benzaldehyde	2.1	J
108-95-2	Phenol	5.0	U
111-44-4	Bis(2-chloroethyl)ether	5.0	U
95-57-8	2-Chlorophenol	5.0	U
95-48-7	2-Methylphenol	5.0	U
108-60-1	2,2'-Oxybis(1-chloropropane)	5.0	U
98-86-2	Acetophenone	1.6	J
106-44-5	4-Methylphenol	5.0	U
621-64-7	N-Nitroso-di-n-propylamine	5.0	U
67-72-1	Hexachloroethane	5.0	U
98-95-3	Nitrobenzene	5.0	~~U~~ UJ CCH
78-59-1	Isophorone	5.0	U
88-75-5	2-Nitrophenol	5.0	U
105-67-9	2,4-Dimethylphenol	5.0	U
111-91-1	Bis(2-chloroethoxy)methane	5.0	U
120-83-2	2,4-Dichlorophenol	5.0	U
91-20-3	Naphthalene	5.0	U
106-47-8	4-Chloroaniline	5.0	U
87-68-3	Hexachlorobutadiene	5.0	U
105-60-2	Caprolactam	5.0	~~U~~ UJ CCH
59-50-7	4-Chloro-3-methylphenol	5.0	U
91-57-6	2-Methylnaphthalene	5.0	U
77-47-4	Hexachlorocyclopentadiene	5.0	U
88-06-2	2,4,6-Trichlorophenol	5.0	U
95-95-4	2,4,5-Trichlorophenol	5.0	U
92-52-4	1,1'-Biphenyl	5.0	U
91-58-7	2-Chloronaphthalene	5.0	U
88-74-4	2-Nitroaniline	10	U
131-11-3	Dimethylphthalate	5.0	U
606-20-2	2,6-Dinitrotoluene	5.0	U
208-96-8	Acenaphthylene	5.0	U
99-09-2	3-Nitroaniline	10	U
83-32-9	Acenaphthene	5.0	U

RE

LW 10/24/08

4RE

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072008RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-04RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-04JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
51-28-5	2,4-Dinitrophenol	10	U
100-02-7	4-Nitrophenol	10	U
132-64-9	Dibenzofuran	5.0	U
121-14-2	2,4-Dinitrotoluene	5.0	U
84-66-2	Diethylphthalate	5.0	U
86-73-7	Fluorene	5.0	U
7005-72-3	4-Chlorophenyl-phenylether	5.0	U
100-01-6	4-Nitroaniline	10	U
534-52-1	4,6-Dinitro-2-methylphenol	10	U
86-30-6	N-Nitrosodiphenylamine (1)	5.0	U
95-94-3	1,2,4,5-Tetrachlorobenzene	5.0	U
101-55-3	4-Bromophenyl-phenylether	5.0	U
118-74-1	Hexachlorobenzene	5.0	U
1912-24-9	Atrazine	5.0	U
87-86-5	Pentachlorophenol	10	U
85-01-8	Phenanthrene	5.0	U
120-12-7	Anthracene	5.0	U
86-74-8	Carbazole	5.0	U
84-74-2	Di-n-butylphthalate	5.0	U
206-44-0	Fluoranthene	5.0	U
129-00-0	Pyrene	5.0	U
85-68-7	Butylbenzylphthalate	5.0	U
91-94-1	3,3'-Dichlorobenzidine	5.0	U
56-55-3	Benzo (a) anthracene	5.0	U
218-01-9	Chrysene	5.0	U
117-81-7	Bis(2-ethylhexyl)phthalate	5.0	U
117-84-0	Di-n-octylphthalate	5.0	U
205-99-2	Benzo (b) fluoranthene	5.0	U
207-08-9	Benzo (k) fluoranthene	5.0	U
50-32-8	Benzo (a) pyrene	5.0	U
193-39-5	Indeno (1,2,3-cd) pyrene	5.0	U
53-70-3	Dibenzo (a,h) anthracene	5.0	U
191-24-2	Benzo (g,h,i) perylene	5.0	U
58-90-2	2,3,4,6-Tetrachlorophenol	5.0	U

[1] Cannot be separated from Diphenylamine

10/24/08

4RE

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-EB01-072008RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-04RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-04JA60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

use original

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl Alcohol $$ Benzenemethanol $$	14.14	3.5	JN
02	621-59-0	Benzaldehyde, 3-hydroxy-4-methoxy-	27.05	2.6	JN
03		UNKNOWN	29.92	2.9	J
04		UNKNOWN	34.24	6.6	J
05					
06					
07					
08					
09					
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11					
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20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	28	

[2]EPA-designated Registry Number.

JW 10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-05

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-05A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	5.0	U	
108-95-2	Phenol	5.0	U	
111-44-4	Bis(2-chloroethyl)ether	5.0	U	
95-57-8	2-Chlorophenol	5.0	U	
95-48-7	2-Methylphenol	5.0	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	5.0	U	
98-86-2	Acetophenone	5.0	U	
106-44-5	4-Methylphenol	5.0	U	
621-64-7	N-Nitroso-di-n-propylamine	5.0	U	
67-72-1	Hexachloroethane	5.0	U	
98-95-3	Nitrobenzene	5.0	U	
78-59-1	Isophorone	5.0	U	
88-75-5	2-Nitrophenol	5.0	U	
105-67-9	2,4-Dimethylphenol	5.0	U	
111-91-1	Bis(2-chloroethoxy)methane	5.0	U	
120-83-2	2,4-Dichlorophenol	5.0	U	
91-20-3	Naphthalene	5.0	~~U~~	R RE
106-47-8	4-Chloroaniline	5.0	U	
87-68-3	Hexachlorobutadiene	5.0	U	
105-60-2	Caprolactam	5.0	U	
59-50-7	4-Chloro-3-methylphenol	5.0	U	
91-57-6	2-Methylnaphthalene	7.5		
77-47-4	Hexachlorocyclopentadiene	5.0	U	
88-06-2	2,4,6-Trichlorophenol	5.0	U	
95-95-4	2,4,5-Trichlorophenol	5.0	U	
92-52-4	1,1'-Biphenyl	5.0	U	
91-58-7	2-Chloronaphthalene	5.0	U	
88-74-4	2-Nitroaniline	10	U	
131-11-3	Dimethylphthalate	5.0	U	
606-20-2	2,6-Dinitrotoluene	5.0	U	
208-96-8	Acenaphthylene	5.0	~~U~~	R RE
99-09-2	3-Nitroaniline	10	U	
83-32-9	Acenaphthene	1.6	~~U~~	R RE

lw 10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-05

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-05A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	10	U	
100-02-7	4-Nitrophenol	10	U	
132-64-9	Dibenzofuran	5.0	U	
121-14-2	2,4-Dinitrotoluene	5.0	U	
84-66-2	Diethylphthalate	5.0	U	
86-73-7	Fluorene	2.4	~~J~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	5.0	U	
100-01-6	4-Nitroaniline	10	U	
534-52-1	4,6-Dinitro-2-methylphenol	10	U	
86-30-6	N-Nitrosodiphenylamine (1)	5.0	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	5.0	U	
101-55-3	4-Bromophenyl-phenylether	5.0	U	
118-74-1	Hexachlorobenzene	5.0	U	
1912-24-9	Atrazine	5.0	U	
87-86-5	Pentachlorophenol	10	U	
85-01-8	Phenanthrene	3.9	J	
120-12-7	Anthracene	5.0	~~U~~	R RE
86-74-8	Carbazole	5.0	U	
84-74-2	Di-n-butylphthalate	5.0	U	
206-44-0	Fluoranthene	5.0	~~U~~	R RE
129-00-0	Pyrene	5.0	~~U~~	R RE
85-68-7	Butylbenzylphthalate	5.0	U	
91-94-1	3,3'-Dichlorobenzidine	5.0	U	
56-55-3	Benzo (a) anthracene	5.0	~~U~~	R RE
218-01-9	Chrysene	5.0	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	5.0 ~~3.4~~	~~J~~	u BL
117-84-0	Di-n-octylphthalate	5.0	U	
205-99-2	Benzo (b) fluoranthene	5.0	U	R RE
207-08-9	Benzo (k) fluoranthene	5.0	U	
50-32-8	Benzo (a) pyrene	5.0	U	
193-39-5	Indeno (1,2,3-cd) pyrene	5.0	U	
53-70-3	Dibenzo (a,h) anthracene	5.0	U	
191-24-2	Benzo (g,h,i) perylene	5.0	U	
58-90-2	2,3,4,6-Tetrachlorophenol	5.0	U	

[1] Cannot be separated from Diphenylamine

lw 10/24/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-05

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-05A60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl alcohol	14.14	4.2	JN
02	874-35-1	1H-Indene, 2,3-dihydro-5-methyl- $$	18.77	3.0	JN
03	17059-48-2	1H-Indene, 2,3-dihydro-1,6-dimethyl-	20.37	3.1	JN
04	17059-48-2	1H-Indene, 2,3-dihydro-1,6-dimethyl-	20.67	3.7	JN
05	4453-90-1	1,4-Methanonaphthalene, 1,4-dihydro-	24.70	8.0	JN
06	1127-76-0	Naphthalene, 1-ethyl-	26.81	7.6	JN
07	939-27-5	Naphthalene, 2-ethyl-	26.88	3.3	JN
08	581-42-0	Naphthalene, 2,6-dimethyl-	27.05	28	JN
09	575-37-1	Naphthalene, 1,7-dimethyl- $$ 1,7-Di	27.35	25	JN
10	581-42-0	Naphthalene, 2,6-dimethyl-(1)	27.40	9.6	JN
11	54385-63-6	Benzo[b]thiophene, ethyl- $$ Ethylbe	27.51	6.0	JN
12	575-41-7	Naphthalene, 1,3-dimethyl-	27.73	12	JN
13	571-61-9	Naphthalene, 1,5-dimethyl-	27.79	5.6	JN
14	571-58-4	Naphthalene, 1,4-dimethyl-	28.01	6.9	JN
15	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	28.89	4.5	JN
16		UNKNOWN	29.16	5.1	J
17	941-81-1	4,6,8-Trimethylazulene $$ Azulene, 4	29.25	5.0	JN
18	829-26-5	Naphthalene, 2,3,6-trimethyl-	29.32	7.9	JN
19		UNKNOWN	29.43	4.4	J
20	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	29.57	8.9	JN
21	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	29.60	7.6	JN
22	2245-38-7	Naphthalene, 1,6,7-trimethyl-	29.84	9.9	JN
23	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	30.18	5.0	JN
24		UNKNOWN	30.31	3.2	J
25		UNKNOWN	31.45	4.6	J
26	1730-37-6	9H-Fluorene, 1-methyl- $$ Fluorene,	31.69	4.4	JN
27	1430-97-3	9H-Fluorene, 2-methyl-	31.79	4.6	JN
28	132-65-0	Dibenzothiophene	32.40	5.1	JN
29		UNKNOWN	32.87	2.9	J
30	0-00-0	Carbazole, 1,6-dimethyl-	34.92	2.8	JN
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

lW
10/24/08

5 RE

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-05RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-05JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
100-52-7	Benzaldehyde	5.0	U
108-95-2	Phenol	5.0	U
111-44-4	Bis(2-chloroethyl)ether	5.0	U
95-57-8	2-Chlorophenol	5.0	U
95-48-7	2-Methylphenol	5.0	U
108-60-1	2,2'-Oxybis(1-chloropropane)	5.0	U
98-86-2	Acetophenone	5.0	U
106-44-5	4-Methylphenol	5.0	U
621-64-7	N-Nitroso-di-n-propylamine	5.0	U
67-72-1	Hexachloroethane	5.0	U
98-95-3	Nitrobenzene	5.0	~~U~~ UJ CCH
78-59-1	Isophorone	5.0	U
88-75-5	2-Nitrophenol	5.0	U
105-67-9	2,4-Dimethylphenol	5.0	U
111-91-1	Bis(2-chloroethoxy)methane	5.0	U
120-83-2	2,4-Dichlorophenol	5.0	U
91-20-3	Naphthalene	5.0	U
106-47-8	4-Chloroaniline	5.0	U
87-68-3	Hexachlorobutadiene	5.0	U
105-60-2	Caprolactam	5.0	~~U~~ UJ CCH
59-50-7	4-Chloro-3-methylphenol	5.0	U
91-57-6	2-Methylnaphthalene	8.5	
77-47-4	Hexachlorocyclopentadiene	5.0	U
88-06-2	2,4,6-Trichlorophenol	5.0	U
95-95-4	2,4,5-Trichlorophenol	5.0	U
92-52-4	1,1'-Biphenyl	5.0	U
91-58-7	2-Chloronaphthalene	5.0	U
88-74-4	2-Nitroaniline	10	U
131-11-3	Dimethylphthalate	5.0	U
606-20-2	2,6-Dinitrotoluene	5.0	U
208-96-8	Acenaphthylene	5.0	U
99-09-2	3-Nitroaniline	10	U
83-32-9	Acenaphthene	1.7	J

RE

RW 10/24/08

5RE

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-05RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-05JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
51-28-5	2,4-Dinitrophenol	10	U
100-02-7	4-Nitrophenol	10	U
132-64-9	Dibenzofuran	5.0	U
121-14-2	2,4-Dinitrotoluene	5.0	U
84-66-2	Diethylphthalate	5.0	U
86-73-7	Fluorene	3.0	J
7005-72-3	4-Chlorophenyl-phenylether	5.0	U
100-01-6	4-Nitroaniline	10	U
534-52-1	4,6-Dinitro-2-methylphenol	10	U
86-30-6	N-Nitrosodiphenylamine (1)	5.0	U
95-94-3	1,2,4,5-Tetrachlorobenzene	5.0	U
101-55-3	4-Bromophenyl-phenylether	5.0	U
118-74-1	Hexachlorobenzene	5.0	U
1912-24-9	Atrazine	5.0	U
87-86-5	Pentachlorophenol	10	U
85-01-8	Phenanthrene	4.7	J
120-12-7	Anthracene	5.0	U
86-74-8	Carbazole	5.0	U
84-74-2	Di-n-butylphthalate	5.0	U
206-44-0	Fluoranthene	5.0	U
129-00-0	Pyrene	5.0	U
85-68-7	Butylbenzylphthalate	5.0	U
91-94-1	3,3'-Dichlorobenzidine	5.0	U
56-55-3	Benzo (a) anthracene	5.0	U
218-01-9	Chrysene	5.0	U
117-81-7	Bis(2-ethylhexyl)phthalate	5.0 ~~4.0~~	~~J~~ u BL
117-84-0	Di-n-octylphthalate	5.0	U
205-99-2	Benzo (b) fluoranthene	5.0	U
207-08-9	Benzo (k) fluoranthene	5.0	U
50-32-8	Benzo (a) pyrene	5.0	U
193-39-5	Indeno (1,2,3-cd) pyrene	5.0	U
53-70-3	Dibenzo (a,h) anthracene	5.0	U
191-24-2	Benzo (g,h,i) perylene	5.0	U
58-90-2	2,3,4,6-Tetrachlorophenol	5.0	U

[1] Cannot be separated from Diphenylamine

MW 10/24/08

SRE

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW05RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-05RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-05JA60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

use orig. N

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl alcohol	14.14	6.7	JN
02	767-58-8	Indan, 1-methyl- $$ 1H-Indene, 2,3-d	18.75	3.5	JN
03	6682-71-9	1H-Indene, 2,3-dihydro-4,7-dimethyl-	20.35	3.8	JN
04	17057-82-8	1H-Indene, 2,3-dihydro-1,2-dimethyl-	20.66	4.2	JN
05	5557-93-7	Benzene, 1-(1-methylethenyl)-2-(1-me	24.50	2.6	JN
06	90-12-0	Naphthalene, 1-methyl-	24.68	9.5	JN
07	939-27-5	Naphthalene, 2-ethyl-	26.80	9.0	JN
08	1127-76-0	Naphthalene, 1-ethyl-	26.88	3.6	JN
09	581-42-0	Naphthalene, 2,6-dimethyl-	27.04	32	JN
10	575-37-1	Naphthalene, 1,7-dimethyl- $$ 1,7-Di	27.34	27	JN
11	581-42-0	Naphthalene, 2,6-dimethyl-(1)	27.39	11	JN
12		UNKNOWN	27.49	6.0	J
13	575-41-7	Naphthalene, 1,3-dimethyl-	27.71	13	JN
14		UNKNOWN	27.78	5.7	J
15	1127-76-0	Naphthalene, 1-ethyl-(1)	28.00	8.9	JN
16		UNKNOWN	28.75	3.3	J
17	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	28.88	5.6	JN
18		UNKNOWN	28.97	2.9	J
19		UNKNOWN	29.17	6.2	J
20	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	29.24	6.2	JN
21	829-26-5	Naphthalene, 2,3,6-trimethyl-	29.30	8.3	JN
22		UNKNOWN	29.44	4.4	J
23	829-26-5	Naphthalene, 2,3,6-trimethyl-(1)	29.61	7.5	JN
24	829-26-5	Naphthalene, 2,3,6-trimethyl-(2)	29.83	12	JN
25	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,4	30.18	5.4	JN
26		UNKNOWN	30.30	3.3	J
27		UNKNOWN	30.37	3.7	J
28	1730-37-6	9H-Fluorene, 1-methyl-	31.67	4.2	JN
29	1430-97-3	9H-Fluorene, 2-methyl-	31.79	5.0	JN
30	132-65-0	Dibenzothiophene $$ [1,1'-Biphenyl]-	32.38	5.4	JN
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

RE

GW 10/24/08

6

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-06

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-06A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	5.0	U	
108-95-2	Phenol	5.0	U	
111-44-4	Bis(2-chloroethyl)ether	5.0	U	
95-57-8	2-Chlorophenol	5.0	U	
95-48-7	2-Methylphenol	5.0	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	5.0	U	
98-86-2	Acetophenone	5.0	U	
106-44-5	4-Methylphenol	5.0	U	
621-64-7	N-Nitroso-di-n-propylamine	5.0	U	
67-72-1	Hexachloroethane	5.0	U	
98-95-3	Nitrobenzene	5.0	U	
78-59-1	Isophorone	5.0	U	
88-75-5	2-Nitrophenol	5.0	U	
105-67-9	2,4-Dimethylphenol	5.0	U	
111-91-1	Bis(2-chloroethoxy)methane	5.0	U	
120-83-2	2,4-Dichlorophenol	5.0	U	
91-20-3	Naphthalene	5.0	~~U~~	R RE
106-47-8	4-Chloroaniline	5.0	U	
87-68-3	Hexachlorobutadiene	5.0	U	
105-60-2	Caprolactam	5.0	U	
59-50-7	4-Chloro-3-methylphenol	5.0	U	
91-57-6	2-Methylnaphthalene	5.0	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	5.0	U	
88-06-2	2,4,6-Trichlorophenol	5.0	U	
95-95-4	2,4,5-Trichlorophenol	5.0	U	
92-52-4	1,1'-Biphenyl	5.0	U	
91-58-7	2-Chloronaphthalene	5.0	U	
88-74-4	2-Nitroaniline	10	U	
131-11-3	Dimethylphthalate	5.0	U	
606-20-2	2,6-Dinitrotoluene	5.0	U	
208-96-8	Acenaphthylene	5.0	~~U~~	R RE
99-09-2	3-Nitroaniline	10	U	
83-32-9	Acenaphthene	5.0	~~U~~	R RE

10/24/08

6

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-06

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-06A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	10	U	
100-02-7	4-Nitrophenol	10	U	
132-64-9	Dibenzofuran	5.0	U	
121-14-2	2,4-Dinitrotoluene	5.0	U	
84-66-2	Diethylphthalate	5.0	U	
86-73-7	Fluorene	5.0	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	5.0	U	
100-01-6	4-Nitroaniline	10	U	
534-52-1	4,6-Dinitro-2-methylphenol	10	U	
86-30-6	N-Nitrosodiphenylamine (1)	5.0	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	5.0	U	
101-55-3	4-Bromophenyl-phenylether	5.0	U	
118-74-1	Hexachlorobenzene	5.0	U	
1912-24-9	Atrazine	5.0	U	
87-86-5	Pentachlorophenol	10	U	
85-01-8	Phenanthrene	5.0	~~U~~	R RE
120-12-7	Anthracene	5.0	~~U~~	R RE
86-74-8	Carbazole	5.0	U	
84-74-2	Di-n-butylphthalate	5.0	U	
206-44-0	Fluoranthene	5.0	~~U~~	R RE
129-00-0	Pyrene	5.0	~~U~~	R RE
85-68-7	Butylbenzylphthalate	5.0	U	
91-94-1	3,3'-Dichlorobenzidine	5.0	U	
56-55-3	Benzo (a) anthracene	5.0	~~U~~	R RE
218-01-9	Chrysene	5.0	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	5.0	U	
117-84-0	Di-n-octylphthalate	5.0	U	
205-99-2	Benzo (b) fluoranthene	5.0	U	R RE
207-08-9	Benzo (k) fluoranthene	5.0	U	
50-32-8	Benzo (a) pyrene	5.0	U	
193-39-5	Indeno (1,2,3-cd) pyrene	5.0	U	
53-70-3	Dibenzo (a,h) anthracene	5.0	U	
191-24-2	Benzo (g,h,i) perylene	5.0	U	
58-90-2	2,3,4,6-Tetrachlorophenol	5.0	U	

[1] Cannot be separated from Diphenylamine

lew 10/24/08

6

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-06

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-06A60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	11.25	12	J
02	100-51-6	Benzyl alcohol	14.12	3.0	JN
03	134-62-3	Diethyltoluamide $$ Benzamide, N,N-d	30.16	2.2	JN
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

MW 10/24/08

6RE

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW08RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-06RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-06JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008 use original

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
100-52-7	Benzaldehyde	5.0	U
108-95-2	Phenol	5.0	U
111-44-4	Bis(2-chloroethyl)ether	5.0	U
95-57-8	2-Chlorophenol	5.0	U
95-48-7	2-Methylphenol	5.0	U
108-60-1	2,2'-Oxybis(1-chloropropane)	5.0	U
98-86-2	Acetophenone	5.0	U
106-44-5	4-Methylphenol	5.0	U
621-64-7	N-Nitroso-di-n-propylamine	5.0	U
67-72-1	Hexachloroethane	5.0	U
98-95-3	Nitrobenzene	5.0	~~U~~ UJ CCH
78-59-1	Isophorone	5.0	U
88-75-5	2-Nitrophenol	5.0	U
105-67-9	2,4-Dimethylphenol	5.0	U
111-91-1	Bis(2-chloroethoxy)methane	5.0	U
120-83-2	2,4-Dichlorophenol	5.0	U
91-20-3	Naphthalene	5.0	U
106-47-8	4-Chloroaniline	5.0	U
87-68-3	Hexachlorobutadiene	5.0	U
105-60-2	Caprolactam	5.0	~~U~~ UJ CCH
59-50-7	4-Chloro-3-methylphenol	5.0	U
91-57-6	2-Methylnaphthalene	5.0	U
77-47-4	Hexachlorocyclopentadiene	5.0	U
88-06-2	2,4,6-Trichlorophenol	5.0	U
95-95-4	2,4,5-Trichlorophenol	5.0	U
92-52-4	1,1'-Biphenyl	5.0	U
91-58-7	2-Chloronaphthalene	5.0	U
88-74-4	2-Nitroaniline	10	U
131-11-3	Dimethylphthalate	5.0	U
606-20-2	2,6-Dinitrotoluene	5.0	U
208-96-8	Acenaphthylene	5.0	U
99-09-2	3-Nitroaniline	10	U
83-32-9	Acenaphthene	5.0	U

RE

LW 10/24/08

6RE

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW08RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-06RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-06JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
51-28-5	2,4-Dinitrophenol	10	U
100-02-7	4-Nitrophenol	10	U
132-64-9	Dibenzofuran	5.0	U
121-14-2	2,4-Dinitrotoluene	5.0	U
84-66-2	Diethylphthalate	5.0	U
86-73-7	Fluorene	5.0	U
7005-72-3	4-Chlorophenyl-phenylether	5.0	U
100-01-6	4-Nitroaniline	10	U
534-52-1	4,6-Dinitro-2-methylphenol	10	U
86-30-6	N-Nitrosodiphenylamine (1)	5.0	U
95-94-3	1,2,4,5-Tetrachlorobenzene	5.0	U
101-55-3	4-Bromophenyl-phenylether	5.0	U
118-74-1	Hexachlorobenzene	5.0	U
1912-24-9	Atrazine	5.0	U
87-86-5	Pentachlorophenol	10	U
85-01-8	Phenanthrene	5.0	U
120-12-7	Anthracene	5.0	U
86-74-8	Carbazole	5.0	U
84-74-2	Di-n-butylphthalate	5.0	U
206-44-0	Fluoranthene	5.0	U
129-00-0	Pyrene	5.0	U
85-68-7	Butylbenzylphthalate	5.0	U
91-94-1	3,3'-Dichlorobenzidine	5.0	U
56-55-3	Benzo (a) anthracene	5.0	U
218-01-9	Chrysene	5.0	U
117-81-7	Bis(2-ethylhexyl)phthalate	5.0	U
117-84-0	Di-n-octylphthalate	5.0	U
205-99-2	Benzo (b) fluoranthene	5.0	U
207-08-9	Benzo (k) fluoranthene	5.0	U
50-32-8	Benzo (a) pyrene	5.0	U
193-39-5	Indeno (1,2,3-cd) pyrene	5.0	U
53-70-3	Dibenzo (a,h) anthracene	5.0	U
191-24-2	Benzo (g,h,i) perylene	5.0	U
58-90-2	2,3,4,6-Tetrachlorophenol	5.0	U

[1] Cannot be separated from Diphenylamine

RE

LW 10/24/08

6RE

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW08RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-06RE1

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-06JA60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/23/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

use original

RE

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	11.25	12	J
02	100-51-6	Benzyl alcohol	14.14	3.5	JN
03	134-62-3	Diethyltoluamide	30.17	2.4	JN
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

JW 10/24/08

7

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072208

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-09

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-09A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	4.7	U	
108-95-2	Phenol	4.7	U	
111-44-4	Bis(2-chloroethyl)ether	4.7	U	
95-57-8	2-Chlorophenol	4.7	U	
95-48-7	2-Methylphenol	4.7	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	4.7	U	
98-86-2	Acetophenone	4.7	U	
106-44-5	4-Methylphenol	4.7	U	
621-64-7	N-Nitroso-di-n-propylamine	4.7	U	
67-72-1	Hexachloroethane	4.7	U	
98-95-3	Nitrobenzene	4.7	U	
78-59-1	Isophorone	4.7	U	
88-75-5	2-Nitrophenol	4.7	U	
105-67-9	2,4-Dimethylphenol	4.7	U	
111-91-1	Bis(2-chloroethoxy)methane	4.7	U	
120-83-2	2,4-Dichlorophenol	4.7	U	
91-20-3	Naphthalene	4.7	~~U~~	R RE
106-47-8	4-Chloroaniline	4.7	U	
87-68-3	Hexachlorobutadiene	4.7	U	
105-60-2	Caprolactam	4.7	U	
59-50-7	4-Chloro-3-methylphenol	4.7	U	
91-57-6	2-Methylnaphthalene	4.7	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	4.7	U	
88-06-2	2,4,6-Trichlorophenol	4.7	U	
95-95-4	2,4,5-Trichlorophenol	4.7	U	
92-52-4	1,1'-Biphenyl	4.7	U	
91-58-7	2-Chloronaphthalene	4.7	U	
88-74-4	2-Nitroaniline	9.3	U	
131-11-3	Dimethylphthalate	4.7	U	
606-20-2	2,6-Dinitrotoluene	4.7	U	
208-96-8	Acenaphthylene	4.7	~~U~~	R RE
99-09-2	3-Nitroaniline	9.3	U	
83-32-9	Acenaphthene	4.7	~~U~~	R RE

lw
10/24/08

7

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072208

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-09

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-09A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	9.3	U	
100-02-7	4-Nitrophenol	9.3	U	
132-64-9	Dibenzofuran	4.7	U	
121-14-2	2,4-Dinitrotoluene	4.7	U	
84-66-2	Diethylphthalate	4.7	U	
86-73-7	Fluorene	4.7	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	4.7	U	
100-01-6	4-Nitroaniline	9.3	U	
534-52-1	4,6-Dinitro-2-methylphenol	9.3	U	
86-30-6	N-Nitrosodiphenylamine (1)	4.7	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	4.7	U	
101-55-3	4-Bromophenyl-phenylether	4.7	U	
118-74-1	Hexachlorobenzene	4.7	U	
1912-24-9	Atrazine	4.7	U	
87-86-5	Pentachlorophenol	9.3	U	
85-01-8	Phenanthrene	4.7	~~U~~	R RE
120-12-7	Anthracene	4.7	~~U~~	R RE
86-74-8	Carbazole	4.7	U	
84-74-2	Di-n-butylphthalate	4.7	U	
206-44-0	Fluoranthene	4.7	~~U~~	R RE
129-00-0	Pyrene	4.7	~~U~~	R RE
85-68-7	Butylbenzylphthalate	4.7	U	
91-94-1	3,3'-Dichlorobenzidine	4.7	U	
56-55-3	Benzo (a) anthracene	4.7	~~U~~	R RE
218-01-9	Chrysene	4.7	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	4.7	U	
117-84-0	Di-n-octylphthalate	4.7	U	
205-99-2	Benzo (b) fluoranthene	4.7	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	4.7	~~U~~	
50-32-8	Benzo (a) pyrene	4.7	~~U~~	
193-39-5	Indeno (1,2,3-cd) pyrene	4.7	~~U~~	
53-70-3	Dibenzo (a,h) anthracene	4.7	~~U~~	
191-24-2	Benzo (g,h,i) perylene	4.7	~~U~~	
58-90-2	2,3,4,6-Tetrachlorophenol	4.7	U	

[1] Cannot be separated from Diphenylamine

10/24/08

7

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-EB01-072208

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-09

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-09A60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl Alcohol $$ Benzenemethanol $$	14.14	3.7	JN
02	121-33-5	Vanillin $$ Benzaldehyde, 4-hydroxy-	27.05	3.9	JN
03	0-00-0	7,9-Di-tert-butyl-1-oxaspiro(4,5)dec	34.24	5.0	JN
04					
05					
06					
07					
08					
09					
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26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	28	

[2]EPA-designated Registry Number.

JW 10/24/08

7RE

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072208RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-09RE1

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-09JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008 Use original

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
100-52-7	Benzaldehyde	4.7	U
108-95-2	Phenol	4.7	U
111-44-4	Bis(2-chloroethyl)ether	4.7	U
95-57-8	2-Chlorophenol	4.7	U
95-48-7	2-Methylphenol	4.7	U
108-60-1	2,2'-Oxybis(1-chloropropane)	4.7	U
98-86-2	Acetophenone	1.4	J
106-44-5	4-Methylphenol	4.7	U
621-64-7	N-Nitroso-di-n-propylamine	4.7	U
67-72-1	Hexachloroethane	4.7	U
98-95-3	Nitrobenzene	4.7	~~U~~ UJ CH
78-59-1	Isophorone	4.7	U
88-75-5	2-Nitrophenol	4.7	U
105-67-9	2,4-Dimethylphenol	4.7	U
111-91-1	Bis(2-chloroethoxy)methane	4.7	U
120-83-2	2,4-Dichlorophenol	4.7	U
91-20-3	Naphthalene	4.7	U
106-47-8	4-Chloroaniline	4.7	U
87-68-3	Hexachlorobutadiene	4.7	U
105-60-2	Caprolactam	4.7	~~U~~ UJ CH
59-50-7	4-Chloro-3-methylphenol	4.7	U
91-57-6	2-Methylnaphthalene	4.7	U
77-47-4	Hexachlorocyclopentadiene	4.7	U
88-06-2	2,4,6-Trichlorophenol	4.7	U
95-95-4	2,4,5-Trichlorophenol	4.7	U
92-52-4	1,1'-Biphenyl	4.7	U
91-58-7	2-Chloronaphthalene	4.7	U
88-74-4	2-Nitroaniline	9.3	U
131-11-3	Dimethylphthalate	4.7	U
606-20-2	2,6-Dinitrotoluene	4.7	U
208-96-8	Acenaphthylene	4.7	U
99-09-2	3-Nitroaniline	9.3	U
83-32-9	Acenaphthene	4.7	U

10/24/08

7RE

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072208RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-09RE1

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-09JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
51-28-5	2,4-Dinitrophenol	9.3	U
100-02-7	4-Nitrophenol	9.3	U
132-64-9	Dibenzofuran	4.7	U
121-14-2	2,4-Dinitrotoluene	4.7	U
84-66-2	Diethylphthalate	4.7	U
86-73-7	Fluorene	4.7	U
7005-72-3	4-Chlorophenyl-phenylether	4.7	U
100-01-6	4-Nitroaniline	9.3	U
534-52-1	4,6-Dinitro-2-methylphenol	9.3	U
86-30-6	N-Nitrosodiphenylamine (1)	4.7	U
95-94-3	1,2,4,5-Tetrachlorobenzene	4.7	U
101-55-3	4-Bromophenyl-phenylether	4.7	U
118-74-1	Hexachlorobenzene	4.7	U
1912-24-9	Atrazine	4.7	U
87-86-5	Pentachlorophenol	9.3	U
85-01-8	Phenanthrene	4.7	U
120-12-7	Anthracene	4.7	U
86-74-8	Carbazole	4.7	U
84-74-2	Di-n-butylphthalate	4.7	U
206-44-0	Fluoranthene	4.7	U
129-00-0	Pyrene	4.7	U
85-68-7	Butylbenzylphthalate	4.7	U
91-94-1	3,3'-Dichlorobenzidine	4.7	U
56-55-3	Benzo (a) anthracene	4.7	U
218-01-9	Chrysene	4.7	U
117-81-7	Bis(2-ethylhexyl)phthalate	4.7	U
117-84-0	Di-n-octylphthalate	4.7	U
205-99-2	Benzo (b) fluoranthene	4.7	U
207-08-9	Benzo (k) fluoranthene	4.7	U
50-32-8	Benzo (a) pyrene	4.7	U
193-39-5	Indeno (1,2,3-cd) pyrene	4.7	U
53-70-3	Dibenzo (a,h) anthracene	4.7	U
191-24-2	Benzo (g,h,i) perylene	4.7	U
58-90-2	2,3,4,6-Tetrachlorophenol	4.7	U

[1] Cannot be separated from Diphenylamine

QW 10/24/08

7RE

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-EB01-072208RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-09RE1

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-09JA60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

use original

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	10.60	2.9	J
02		UNKNOWN	14.00	1.9	J
03	100-51-6	Benzyl alcohol	14.15	4.7	JN
04	121-33-5	Vanillin $$ Benzaldehyde, 4-hydroxy-	27.06	5.0	JN
05	0-00-0	7,9-Di-tert-butyl-1-oxaspiro(4,5)dec	34.26	6.4	JN
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	32	

[2]EPA-designated Registry Number.

RE

RW 10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW09

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-10

Sample wt/vol: 1050 (g/mL) mL Lab File ID: 0807072-10A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	4.8	U	
108-95-2	Phenol	4.8	U	
111-44-4	Bis(2-chloroethyl)ether	4.8	U	
95-57-8	2-Chlorophenol	4.8	U	
95-48-7	2-Methylphenol	4.8	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	4.8	U	
98-86-2	Acetophenone	4.8	U	
106-44-5	4-Methylphenol	4.8	U	
621-64-7	N-Nitroso-di-n-propylamine	4.8	U	
67-72-1	Hexachloroethane	4.8	U	
98-95-3	Nitrobenzene	4.8	U	
78-59-1	Isophorone	4.8	U	
88-75-5	2-Nitrophenol	4.8	U	
105-67-9	2,4-Dimethylphenol	4.8	U	
111-91-1	Bis(2-chloroethoxy)methane	4.8	U	
120-83-2	2,4-Dichlorophenol	4.8	U	
91-20-3	Naphthalene	4.8	~~U~~	R RE
106-47-8	4-Chloroaniline	4.8	U	
87-68-3	Hexachlorobutadiene	4.8	U	
105-60-2	Caprolactam	4.8	U	
59-50-7	4-Chloro-3-methylphenol	4.8	U	
91-57-6	2-Methylnaphthalene	4.8	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	4.8	U	
88-06-2	2,4,6-Trichlorophenol	4.8	U	
95-95-4	2,4,5-Trichlorophenol	4.8	U	
92-52-4	1,1'-Biphenyl	4.8	U	
91-58-7	2-Chloronaphthalene	4.8	U	
88-74-4	2-Nitroaniline	9.5	U	
131-11-3	Dimethylphthalate	4.8	U	
606-20-2	2,6-Dinitrotoluene	4.8	U	
208-96-8	Acenaphthylene	4.8	~~U~~	R RE
99-09-2	3-Nitroaniline	9.5	U	
83-32-9	Acenaphthene	4.8	~~U~~	R RE

lw 10/29/08

8

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW09

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-10

Sample wt/vol: 1050 (g/mL) mL Lab File ID: 0807072-10A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	9.5	U	
100-02-7	4-Nitrophenol	9.5	U	
132-64-9	Dibenzofuran	4.8	U	
121-14-2	2,4-Dinitrotoluene	4.8	U	
84-66-2	Diethylphthalate	4.8	U	
86-73-7	Fluorene	4.8	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	4.8	U	
100-01-6	4-Nitroaniline	9.5	U	
534-52-1	4,6-Dinitro-2-methylphenol	9.5	U	
86-30-6	N-Nitrosodiphenylamine (1)	4.8	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	4.8	U	
101-55-3	4-Bromophenyl-phenylether	4.8	U	
118-74-1	Hexachlorobenzene	4.8	U	
1912-24-9	Atrazine	4.8	U	
87-86-5	Pentachlorophenol	9.5	U	
85-01-8	Phenanthrene	4.8	~~U~~	R RE
120-12-7	Anthracene	4.8	~~U~~	R RE
86-74-8	Carbazole	4.8	U	
84-74-2	Di-n-butylphthalate	4.8	U	
206-44-0	Fluoranthene	4.8	~~U~~	R RE
129-00-0	Pyrene	4.8	~~U~~	R RE
85-68-7	Butylbenzylphthalate	4.8	U	
91-94-1	3,3'-Dichlorobenzidine	4.8	U	
56-55-3	Benzo (a) anthracene	4.8	~~U~~	R RE
218-01-9	Chrysene	4.8	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	4.8	U	
117-84-0	Di-n-octylphthalate	4.8	U	
205-99-2	Benzo (b) fluoranthene	4.8	U	R RE
207-08-9	Benzo (k) fluoranthene	4.8	U	
50-32-8	Benzo (a) pyrene	4.8	U	
193-39-5	Indeno (1,2,3-cd) pyrene	4.8	U	
53-70-3	Dibenzo (a,h) anthracene	4.8	U	
191-24-2	Benzo (g,h,i) perylene	4.8	U	
58-90-2	2,3,4,6-Tetrachlorophenol	4.8	U	

[1] Cannot be separated from Diphenylamine

fw 10/24/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW09

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-10

Sample wt/vol: 1050 (g/mL) mL Lab File ID: 0807072-10A60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/26/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl alcohol	14.14	4.3	JN
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

MW
10/29/08

8RE

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW09RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-10RE1

Sample wt/vol: 1050 (g/mL) mL Lab File ID: 0807072-10JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008 use original

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
100-52-7	Benzaldehyde	4.8	U
108-95-2	Phenol	4.8	U
111-44-4	Bis(2-chloroethyl)ether	4.8	U
95-57-8	2-Chlorophenol	4.8	U
95-48-7	2-Methylphenol	4.8	U
108-60-1	2,2'-Oxybis(1-chloropropane)	4.8	U
98-86-2	Acetophenone	4.8	U
106-44-5	4-Methylphenol	4.8	U
621-64-7	N-Nitroso-di-n-propylamine	4.8	U
67-72-1	Hexachloroethane	4.8	U
98-95-3	Nitrobenzene	4.8	~~U~~ UJ CCH
78-59-1	Isophorone	4.8	U
88-75-5	2-Nitrophenol	4.8	U
105-67-9	2,4-Dimethylphenol	4.8	U
111-91-1	Bis(2-chloroethoxy)methane	4.8	U
120-83-2	2,4-Dichlorophenol	4.8	U
91-20-3	Naphthalene	4.8	U
106-47-8	4-Chloroaniline	4.8	U
87-68-3	Hexachlorobutadiene	4.8	U
105-60-2	Caprolactam	4.8	~~U~~ UJ CCH
59-50-7	4-Chloro-3-methylphenol	4.8	U
91-57-6	2-Methylnaphthalene	4.8	U
77-47-4	Hexachlorocyclopentadiene	4.8	U
88-06-2	2,4,6-Trichlorophenol	4.8	U
95-95-4	2,4,5-Trichlorophenol	4.8	U
92-52-4	1,1'-Biphenyl	4.8	U
91-58-7	2-Chloronaphthalene	4.8	U
88-74-4	2-Nitroaniline	9.5	U
131-11-3	Dimethylphthalate	4.8	U
606-20-2	2,6-Dinitrotoluene	4.8	U
208-96-8	Acenaphthylene	4.8	U
99-09-2	3-Nitroaniline	9.5	U
83-32-9	Acenaphthene	4.8	U

MW 10/24/08

8RE

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW09RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-10RE1

Sample wt/vol: 1050 (g/mL) mL Lab File ID: 0807072-10JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
51-28-5	2,4-Dinitrophenol	9.5	U
100-02-7	4-Nitrophenol	9.5	U
132-64-9	Dibenzofuran	4.8	U
121-14-2	2,4-Dinitrotoluene	4.8	U
84-66-2	Diethylphthalate	4.8	U
86-73-7	Fluorene	4.8	U
7005-72-3	4-Chlorophenyl-phenylether	4.8	U
100-01-6	4-Nitroaniline	9.5	U
534-52-1	4,6-Dinitro-2-methylphenol	9.5	U
86-30-6	N-Nitrosodiphenylamine (1)	4.8	U
95-94-3	1,2,4,5-Tetrachlorobenzene	4.8	U
101-55-3	4-Bromophenyl-phenylether	4.8	U
118-74-1	Hexachlorobenzene	4.8	U
1912-24-9	Atrazine	4.8	U
87-86-5	Pentachlorophenol	9.5	U
85-01-8	Phenanthrene	4.8	U
120-12-7	Anthracene	4.8	U
86-74-8	Carbazole	4.8	U
84-74-2	Di-n-butylphthalate	4.8	U
206-44-0	Fluoranthene	4.8	U
129-00-0	Pyrene	4.8	U
85-68-7	Butylbenzylphthalate	4.8	U
91-94-1	3,3'-Dichlorobenzidine	4.8	U
56-55-3	Benzo (a) anthracene	4.8	U
218-01-9	Chrysene	4.8	U
117-81-7	Bis(2-ethylhexyl)phthalate	4.8	U
117-84-0	Di-n-octylphthalate	4.8	U
205-99-2	Benzo (b) fluoranthene	4.8	U
207-08-9	Benzo (k) fluoranthene	4.8	U
50-32-8	Benzo (a) pyrene	4.8	U
193-39-5	Indeno (1,2,3-cd) pyrene	4.8	U
53-70-3	Dibenzo (a,h) anthracene	4.8	U
191-24-2	Benzo (g,h,i) perylene	4.8	U
58-90-2	2,3,4,6-Tetrachlorophenol	4.8	U

[1] Cannot be separated from Diphenylamine

RE

RW
01/24/08

8RE

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW09RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-10RE1

Sample wt/vol: 1050 (g/mL) mL Lab File ID: 0807072-10JA60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

use orig. NR

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl Alcohol $$ Benzenemethanol $$	14.14	5.3	JN
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A	2.0	

[2]EPA-designated Registry Number.

RE

fw 10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-11

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-11A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	4.7	U	
108-95-2	Phenol	4.7	U	
111-44-4	Bis(2-chloroethyl)ether	4.7	U	
95-57-8	2-Chlorophenol	4.7	U	
95-48-7	2-Methylphenol	4.7	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	4.7	U	
98-86-2	Acetophenone	4.7	U	
106-44-5	4-Methylphenol	4.7	U	
621-64-7	N-Nitroso-di-n-propylamine	4.7	U	
67-72-1	Hexachloroethane	4.7	U	
98-95-3	Nitrobenzene	4.7	U	
78-59-1	Isophorone	4.7	U	
88-75-5	2-Nitrophenol	4.7	U	
105-67-9	2,4-Dimethylphenol	4.7	U	
111-91-1	Bis(2-chloroethoxy)methane	4.7	U	
120-83-2	2,4-Dichlorophenol	4.7	U	
91-20-3	Naphthalene	4.7	~~U~~	R RE
106-47-8	4-Chloroaniline	4.7	U	
87-68-3	Hexachlorobutadiene	4.7	U	
105-60-2	Caprolactam	4.7	U	
59-50-7	4-Chloro-3-methylphenol	4.7	U	
91-57-6	2-Methylnaphthalene	4.7	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	4.7	U	
88-06-2	2,4,6-Trichlorophenol	4.7	U	
95-95-4	2,4,5-Trichlorophenol	4.7	U	
92-52-4	1,1'-Biphenyl	4.7	U	
91-58-7	2-Chloronaphthalene	4.7	U	
88-74-4	2-Nitroaniline	9.3	U	
131-11-3	Dimethylphthalate	4.7	U	
606-20-2	2,6-Dinitrotoluene	4.7	U	
208-96-8	Acenaphthylene	4.7	~~U~~	R RE
99-09-2	3-Nitroaniline	9.3	U	
83-32-9	Acenaphthene	4.7	~~U~~	R RE

LW
10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-11

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-11A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	9.3	U	
100-02-7	4-Nitrophenol	9.3	U	
132-64-9	Dibenzofuran	4.7	U	
121-14-2	2,4-Dinitrotoluene	4.7	U	
84-66-2	Diethylphthalate	4.7	U	
86-73-7	Fluorene	4.7	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	4.7	U	
100-01-6	4-Nitroaniline	9.3	U	
534-52-1	4,6-Dinitro-2-methylphenol	9.3	U	
86-30-6	N-Nitrosodiphenylamine (1)	4.7	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	4.7	U	
101-55-3	4-Bromophenyl-phenylether	4.7	U	
118-74-1	Hexachlorobenzene	4.7	U	
1912-24-9	Atrazine	4.7	U	
87-86-5	Pentachlorophenol	9.3	U	
85-01-8	Phenanthrene	4.7	~~U~~	R RE
120-12-7	Anthracene	4.7	~~U~~	R RE
86-74-8	Carbazole	4.7	U	
84-74-2	Di-n-butylphthalate	4.7	U	
206-44-0	Fluoranthene	4.7	~~U~~	R RE
129-00-0	Pyrene	4.7	~~U~~	R RE
85-68-7	Butylbenzylphthalate	4.7	U	
91-94-1	3,3'-Dichlorobenzidine	4.7	U	
56-55-3	Benzo (a) anthracene	4.7	~~U~~	R RE
218-01-9	Chrysene	4.7	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	4.7	U	
117-84-0	Di-n-octylphthalate	4.7	U	
205-99-2	Benzo (b) fluoranthene	4.7	U	R RE
207-08-9	Benzo (k) fluoranthene	4.7	U	
50-32-8	Benzo (a) pyrene	4.7	U	
193-39-5	Indeno (1,2,3-cd) pyrene	4.7	U	
53-70-3	Dibenzo (a,h) anthracene	4.7	U	
191-24-2	Benzo (g,h,i) perylene	4.7	U	
58-90-2	2,3,4,6-Tetrachlorophenol	4.7	U	

[1] Cannot be separated from Diphenylamine

lw
10/24/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-11

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-11A60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl alcohol	14.14	3.8	JN
02		UNKNOWN	39.98	3.0	J
03		UNKNOWN	43.30	5.8	J
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

JW 10/24/08

9 RE

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW01RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-11RE1

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-11JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
100-52-7	Benzaldehyde	4.7	U
108-95-2	Phenol	4.7	U
111-44-4	Bis(2-chloroethyl)ether	4.7	U
95-57-8	2-Chlorophenol	4.7	U
95-48-7	2-Methylphenol	4.7	U
108-60-1	2,2'-Oxybis(1-chloropropane)	4.7	U
98-86-2	Acetophenone	4.7	U
106-44-5	4-Methylphenol	4.7	U
621-64-7	N-Nitroso-di-n-propylamine	4.7	U
67-72-1	Hexachloroethane	4.7	U
98-95-3	Nitrobenzene	4.7	~~U~~ UJ CCH
78-59-1	Isophorone	4.7	U
88-75-5	2-Nitrophenol	4.7	U
105-67-9	2,4-Dimethylphenol	4.7	U
111-91-1	Bis(2-chloroethoxy)methane	4.7	U
120-83-2	2,4-Dichlorophenol	4.7	U
91-20-3	Naphthalene	4.7	U
106-47-8	4-Chloroaniline	4.7	U
87-68-3	Hexachlorobutadiene	4.7	U
105-60-2	Caprolactam	4.7	~~U~~ UJ CCH
59-50-7	4-Chloro-3-methylphenol	4.7	U
91-57-6	2-Methylnaphthalene	4.7	U
77-47-4	Hexachlorocyclopentadiene	4.7	U
88-06-2	2,4,6-Trichlorophenol	4.7	U
95-95-4	2,4,5-Trichlorophenol	4.7	U
92-52-4	1,1'-Biphenyl	4.7	U
91-58-7	2-Chloronaphthalene	4.7	U
88-74-4	2-Nitroaniline	9.3	U
131-11-3	Dimethylphthalate	4.7	U
606-20-2	2,6-Dinitrotoluene	4.7	U
208-96-8	Acenaphthylene	4.7	U
99-09-2	3-Nitroaniline	9.3	U
83-32-9	Acenaphthene	4.7	U

RE

lw 10/24/08

9RE

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW01RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-11RE1

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-11JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: ~~1.0~~

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
51-28-5	2,4-Dinitrophenol	9.3	U
100-02-7	4-Nitrophenol	9.3	U
132-64-9	Dibenzofuran	4.7	U
121-14-2	2,4-Dinitrotoluene	4.7	U
84-66-2	Diethylphthalate	4.7	U
86-73-7	Fluorene	4.7	U
7005-72-3	4-Chlorophenyl-phenylether	4.7	U
100-01-6	4-Nitroaniline	9.3	U
534-52-1	4,6-Dinitro-2-methylphenol	9.3	U
86-30-6	N-Nitrosodiphenylamine (1)	4.7	U
95-94-3	1,2,4,5-Tetrachlorobenzene	4.7	U
101-55-3	4-Bromophenyl-phenylether	4.7	U
118-74-1	Hexachlorobenzene	4.7	U
1912-24-9	Atrazine	4.7	U
87-86-5	Pentachlorophenol	9.3	U
85-01-8	Phenanthrene	4.7	U
120-12-7	Anthracene	4.7	U
86-74-8	Carbazole	4.7	U
84-74-2	Di-n-butylphthalate	4.7	U
206-44-0	Fluoranthene	4.7	U
129-00-0	Pyrene	4.7	U
85-68-7	Butylbenzylphthalate	4.7	U
91-94-1	3,3'-Dichlorobenzidine	4.7	U
56-55-3	Benzo (a) anthracene	4.7	U
218-01-9	Chrysene	4.7	U
117-81-7	Bis(2-ethylhexyl)phthalate	4.7	U
117-84-0	Di-n-octylphthalate	4.7	U
205-99-2	Benzo (b) fluoranthene	4.7	U
207-08-9	Benzo (k) fluoranthene	4.7	U
50-32-8	Benzo (a) pyrene	4.7	U
193-39-5	Indeno (1,2,3-cd) pyrene	4.7	U
53-70-3	Dibenzo (a,h) anthracene	4.7	U
191-24-2	Benzo (g,h,i) perylene	4.7	U
58-90-2	2,3,4,6-Tetrachlorophenol	4.7	U

[1] Cannot be separated from Diphenylamine

RE
10/24/08

9RE

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW01RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-11RE1

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-11JA60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/24/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/24/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/27/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

Use Original

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	11.26	2.3	J
02	100-51-6	Benzyl alcohol	14.16	5.6	JN
03	134-62-3	Diethyltoluamide $$ Benzamide, N,N-d	30.17	2.0	JN
04		UNKNOWN	39.96	3.4	J
05		UNKNOWN	43.28	6.2	J
06					
07					
08					
09					
10					
11					
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19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

RRE

JW 10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW04

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-14

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-14A66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/05/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	5.0	U	
108-95-2	Phenol	5.0	U	
111-44-4	Bis(2-chloroethyl)ether	5.0	U	
95-57-8	2-Chlorophenol	5.0	U	
95-48-7	2-Methylphenol	5.0	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	5.0	U	
98-86-2	Acetophenone	5.0	U	
106-44-5	4-Methylphenol	5.0	U	
621-64-7	N-Nitroso-di-n-propylamine	5.0	U	
67-72-1	Hexachloroethane	5.0	U	
98-95-3	Nitrobenzene	5.0	U	
78-59-1	Isophorone	5.0	U	
88-75-5	2-Nitrophenol	5.0	U	
105-67-9	2,4-Dimethylphenol	5.0	U	
111-91-1	Bis(2-chloroethoxy)methane	5.0	U	
120-83-2	2,4-Dichlorophenol	5.0	U	
91-20-3	Naphthalene	1.1	J	
106-47-8	4-Chloroaniline	5.0	U	
87-68-3	Hexachlorobutadiene	5.0	U	
105-60-2	Caprolactam	5.0	U	
59-50-7	4-Chloro-3-methylphenol	5.0	U	
91-57-6	2-Methylnaphthalene	5.0	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	5.0	U	
88-06-2	2,4,6-Trichlorophenol	5.0	U	
95-95-4	2,4,5-Trichlorophenol	5.0	U	
92-52-4	1,1'-Biphenyl	5.0	U	
91-58-7	2-Chloronaphthalene	5.0	U	
88-74-4	2-Nitroaniline	10	U	
131-11-3	Dimethylphthalate	5.0	U	
606-20-2	2,6-Dinitrotoluene	5.0	U	
208-96-8	Acenaphthylene	5.0	~~U~~	R RE
99-09-2	3-Nitroaniline	10	U	
83-32-9	Acenaphthene	5.0	~~U~~	R RE

QW 10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW04

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-14

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-14A66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/05/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	10	U	
100-02-7	4-Nitrophenol	10	U	
132-64-9	Dibenzofuran	5.0	U	
121-14-2	2,4-Dinitrotoluene	5.0	U	
84-66-2	Diethylphthalate	5.0	U	
86-73-7	Fluorene	1.9	J	
7005-72-3	4-Chlorophenyl-phenylether	5.0	U	
100-01-6	4-Nitroaniline	10	U	
534-52-1	4,6-Dinitro-2-methylphenol	10	U	
86-30-6	N-Nitrosodiphenylamine (1)	5.0	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	5.0	U	
101-55-3	4-Bromophenyl-phenylether	5.0	U	
118-74-1	Hexachlorobenzene	5.0	U	
1912-24-9	Atrazine	5.0	U	
87-86-5	Pentachlorophenol	10	U	
85-01-8	Phenanthrene	5.0	~~U~~	R RE
120-12-7	Anthracene	5.0	~~U~~	R RE
86-74-8	Carbazole	5.0	U	
84-74-2	Di-n-butylphthalate	5.0	U	
206-44-0	Fluoranthene	5.0	~~U~~	R RE
129-00-0	Pyrene	5.0	~~U~~	R RE
85-68-7	Butylbenzylphthalate	5.0	U	
91-94-1	3,3'-Dichlorobenzidine	5.0	U	
56-55-3	Benzo (a) anthracene	5.0	~~U~~	R RE
218-01-9	Chrysene	5.0	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	5.0	U	
117-84-0	Di-n-octylphthalate	5.0	U	
205-99-2	Benzo (b) fluoranthene	5.0	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	5.0	~~U~~	
50-32-8	Benzo (a) pyrene	5.0	~~U~~	
193-39-5	Indeno (1,2,3-cd) pyrene	5.0	~~U~~	
53-70-3	Dibenzo (a,h) anthracene	5.0	~~U~~	
191-24-2	Benzo (g,h,i) perylene	5.0	~~U~~	
58-90-2	2,3,4,6-Tetrachlorophenol	5.0	U	

[1] Cannot be separated from Diphenylamine

11/12/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW04

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-14

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-14A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/05/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	496-11-7	Indane	12.58	8.6	JN
02	100-51-6	Benzyl alcohol	12.72	3.9	JN
03	141-93-5	Benzene, 1,3-diethyl-	13.13	4.0	JN
04	824-90-8	1-Phenyl-1-butene	16.09	7.5	JN
05	1075-22-5	1H-Indene, 2,3-dihydro-5,6-dimethyl-	17.32	2.1	JN
06		UNKNOWN	35.00	2.3	J
07		UNKNOWN	38.46	3.2	J
08					
09					
10					
11					
12					
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25					
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28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

LW
10/29/08

11

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-15

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-15A66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/05/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	5.0	U	
108-95-2	Phenol	5.0	U	
111-44-4	Bis(2-chloroethyl)ether	5.0	U	
95-57-8	2-Chlorophenol	5.0	U	
95-48-7	2-Methylphenol	5.0	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	5.0	U	
98-86-2	Acetophenone	5.0	U	
106-44-5	4-Methylphenol	5.0	U	
621-64-7	N-Nitroso-di-n-propylamine	5.0	U	
67-72-1	Hexachloroethane	5.0	U	
98-95-3	Nitrobenzene	5.0	U	
78-59-1	Isophorone	5.0	U	
88-75-5	2-Nitrophenol	5.0	U	
105-67-9	2,4-Dimethylphenol	5.0	U	
111-91-1	Bis(2-chloroethoxy)methane	5.0	U	
120-83-2	2,4-Dichlorophenol	5.0	U	
91-20-3	Naphthalene	5.0	~~U~~	R RE
106-47-8	4-Chloroaniline	5.0	U	
87-68-3	Hexachlorobutadiene	5.0	U	
105-60-2	Caprolactam	5.0	U	
59-50-7	4-Chloro-3-methylphenol	5.0	U	
91-57-6	2-Methylnaphthalene	5.0	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	5.0	U	
88-06-2	2,4,6-Trichlorophenol	5.0	U	
95-95-4	2,4,5-Trichlorophenol	5.0	U	
92-52-4	1,1'-Biphenyl	5.0	U	
91-58-7	2-Chloronaphthalene	5.0	U	
88-74-4	2-Nitroaniline	10	U	
131-11-3	Dimethylphthalate	5.0	U	
606-20-2	2,6-Dinitrotoluene	5.0	U	
208-96-8	Acenaphthylene	5.0	~~U~~	R RE
99-09-2	3-Nitroaniline	10	U	
83-32-9	Acenaphthene	5.0	~~U~~	R RE

lw
10/24/08

11

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-15

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-15A66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/05/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	10	U	
100-02-7	4-Nitrophenol	10	U	
132-64-9	Dibenzofuran	5.0	U	
121-14-2	2,4-Dinitrotoluene	5.0	U	
84-66-2	Diethylphthalate	5.0	U	
86-73-7	Fluorene	5.0	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	5.0	U	
100-01-6	4-Nitroaniline	10	U	
534-52-1	4,6-Dinitro-2-methylphenol	10	U	
86-30-6	N-Nitrosodiphenylamine (1)	5.0	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	5.0	U	
101-55-3	4-Bromophenyl-phenylether	5.0	U	
118-74-1	Hexachlorobenzene	5.0	U	
1912-24-9	Atrazine	5.0	U	
87-86-5	Pentachlorophenol	10	U	
85-01-8	Phenanthrene	5.0	~~U~~	R RE
120-12-7	Anthracene	5.0	~~U~~	R RE
86-74-8	Carbazole	5.0	U	
84-74-2	Di-n-butylphthalate	5.0	U	
206-44-0	Fluoranthene	5.0	~~U~~	R RE
129-00-0	Pyrene	5.0	~~U~~	R RE
85-68-7	Butylbenzylphthalate	5.0	U	
91-94-1	3,3'-Dichlorobenzidine	5.0	U	
56-55-3	Benzo (a) anthracene	5.0	~~U~~	R RE
218-01-9	Chrysene	5.0	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	5.0	U	
117-84-0	Di-n-octylphthalate	5.0	U	
205-99-2	Benzo (b) fluoranthene	5.0	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	5.0	~~U~~	
50-32-8	Benzo (a) pyrene	5.0	~~U~~	
193-39-5	Indeno (1,2,3-cd) pyrene	5.0	~~U~~	
53-70-3	Dibenzo (a,h) anthracene	5.0	~~U~~	
191-24-2	Benzo (g,h,i) perylene	5.0	~~U~~	
58-90-2	2,3,4,6-Tetrachlorophenol	5.0	U	

[1] Cannot be separated from Diphenylamine

lw 10/24/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-15

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-15A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/05/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl Alcohol $$ Benzenemethanol $$	12.72	2.9	JN
02					
03					
04					
05					
06					
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10					
11					
12					
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23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-16

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-16A66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/05/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	5.0	U	
108-95-2	Phenol	5.0	U	
111-44-4	Bis(2-chloroethyl)ether	5.0	U	
95-57-8	2-Chlorophenol	5.0	U	
95-48-7	2-Methylphenol	5.0	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	5.0	U	
98-86-2	Acetophenone	5.0	U	
106-44-5	4-Methylphenol	5.0	U	
621-64-7	N-Nitroso-di-n-propylamine	5.0	U	
67-72-1	Hexachloroethane	5.0	U	
98-95-3	Nitrobenzene	5.0	U	
78-59-1	Isophorone	5.0	U	
88-75-5	2-Nitrophenol	5.0	U	
105-67-9	2,4-Dimethylphenol	5.0	U	
111-91-1	Bis(2-chloroethoxy)methane	5.0	U	
120-83-2	2,4-Dichlorophenol	5.0	U	
91-20-3	Naphthalene	5.0	~~U~~	R RE
106-47-8	4-Chloroaniline	5.0	U	
87-68-3	Hexachlorobutadiene	5.0	U	
105-60-2	Caprolactam	5.0	U	
59-50-7	4-Chloro-3-methylphenol	5.0	U	
91-57-6	2-Methylnaphthalene	2.0	J	
77-47-4	Hexachlorocyclopentadiene	5.0	U	
88-06-2	2,4,6-Trichlorophenol	5.0	U	
95-95-4	2,4,5-Trichlorophenol	5.0	U	
92-52-4	1,1'-Biphenyl	5.0	U	
91-58-7	2-Chloronaphthalene	5.0	U	
88-74-4	2-Nitroaniline	10	U	
131-11-3	Dimethylphthalate	5.0	U	
606-20-2	2,6-Dinitrotoluene	5.0	U	
208-96-8	Acenaphthylene	5.0	~~U~~	R RE
99-09-2	3-Nitroaniline	10	U	
83-32-9	Acenaphthene	5.0	~~U~~	R RE

lw 10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-16

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-16A66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/05/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	10	U	
100-02-7	4-Nitrophenol	10	U	
132-64-9	Dibenzofuran	5.0	U	
121-14-2	2,4-Dinitrotoluene	5.0	U	
84-66-2	Diethylphthalate	5.0	U	
86-73-7	Fluorene	1.4	J	
7005-72-3	4-Chlorophenyl-phenylether	5.0	U	
100-01-6	4-Nitroaniline	10	U	
534-52-1	4,6-Dinitro-2-methylphenol	10	U	
86-30-6	N-Nitrosodiphenylamine (1)	5.0	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	5.0	U	
101-55-3	4-Bromophenyl-phenylether	5.0	U	
118-74-1	Hexachlorobenzene	5.0	U	
1912-24-9	Atrazine	5.0	U	
87-86-5	Pentachlorophenol	10	U	
85-01-8	Phenanthrene	5.0	~~U~~	R RE
120-12-7	Anthracene	5.0	~~U~~	R RE
86-74-8	Carbazole	5.0	U	
84-74-2	Di-n-butylphthalate	5.0	U	
206-44-0	Fluoranthene	5.0	~~U~~	R RE
129-00-0	Pyrene	5.0	~~U~~	R RE
85-68-7	Butylbenzylphthalate	5.0	U	
91-94-1	3,3'-Dichlorobenzidine	5.0	U	
56-55-3	Benzo (a) anthracene	5.0	~~U~~	R RE
218-01-9	Chrysene	5.0	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	5.0	U	
117-84-0	Di-n-octylphthalate	5.0	U	
205-99-2	Benzo (b) fluoranthene	5.0	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	5.0	~~U~~	
50-32-8	Benzo (a) pyrene	5.0	~~U~~	
193-39-5	Indeno (1,2,3-cd) pyrene	5.0	~~U~~	
53-70-3	Dibenzo (a,h) anthracene	5.0	~~U~~	
191-24-2	Benzo (g,h,i) perylene	5.0	~~U~~	
58-90-2	2,3,4,6-Tetrachlorophenol	5.0	U	

[1] Cannot be separated from Diphenylamine

lrw 10/24/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-16

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 0807072-16A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/05/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl Alcohol $$ Benzenemethanol $$	12.72	4.5	JN
02	767-58-8	Indan, 1-methyl- $$ 1H-Indene, 2,3-d	16.09	2.3	JN
03	581-42-0	Naphthalene, 2,6-dimethyl- $$ 2,6-Di	22.57	3.0	JN
04	571-58-4	Naphthalene, 1,4-dimethyl-	22.81	2.7	JN
05	829-26-5	Naphthalene, 2,3,6-trimethyl-	24.76	2.1	JN
06					
07					
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29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

RW
10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072308

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-17

Sample wt/vol: 975 (g/mL) mL Lab File ID: 0807072-17A66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/05/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	5.1	U	
108-95-2	Phenol	5.1	U	
111-44-4	Bis(2-chloroethyl)ether	5.1	U	
95-57-8	2-Chlorophenol	5.1	U	
95-48-7	2-Methylphenol	5.1	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	5.1	U	
98-86-2	Acetophenone	1.3	J	
106-44-5	4-Methylphenol	5.1	U	
621-64-7	N-Nitroso-di-n-propylamine	5.1	U	
67-72-1	Hexachloroethane	5.1	U	
98-95-3	Nitrobenzene	5.1	U	
78-59-1	Isophorone	5.1	U	
88-75-5	2-Nitrophenol	5.1	U	
105-67-9	2,4-Dimethylphenol	5.1	U	
111-91-1	Bis(2-chloroethoxy)methane	5.1	U	
120-83-2	2,4-Dichlorophenol	5.1	U	
91-20-3	Naphthalene	5.1	~~U~~	R RE
106-47-8	4-Chloroaniline	5.1	U	
87-68-3	Hexachlorobutadiene	5.1	U	
105-60-2	Caprolactam	5.1	U	
59-50-7	4-Chloro-3-methylphenol	5.1	U	
91-57-6	2-Methylnaphthalene	5.1	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	5.1	U	
88-06-2	2,4,6-Trichlorophenol	5.1	U	
95-95-4	2,4,5-Trichlorophenol	5.1	U	
92-52-4	1,1'-Biphenyl	5.1	U	
91-58-7	2-Chloronaphthalene	5.1	U	
88-74-4	2-Nitroaniline	10	U	
131-11-3	Dimethylphthalate	5.1	U	
606-20-2	2,6-Dinitrotoluene	5.1	U	
208-96-8	Acenaphthylene	5.1	~~U~~	R RE
99-09-2	3-Nitroaniline	10	U	
83-32-9	Acenaphthene	5.1	~~U~~	R RE

QW
10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072308

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-17

Sample wt/vol: 975 (g/mL) mL Lab File ID: 0807072-17A66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/05/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	10	U	
100-02-7	4-Nitrophenol	10	U	
132-64-9	Dibenzofuran	5.1	U	
121-14-2	2,4-Dinitrotoluene	5.1	U	
84-66-2	Diethylphthalate	5.1	U	
86-73-7	Fluorene	5.1	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	5.1	U	
100-01-6	4-Nitroaniline	10	U	
534-52-1	4,6-Dinitro-2-methylphenol	10	U	
86-30-6	N-Nitrosodiphenylamine (1)	5.1	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	5.1	U	
101-55-3	4-Bromophenyl-phenylether	5.1	U	
118-74-1	Hexachlorobenzene	5.1	U	
1912-24-9	Atrazine	5.1	U	
87-86-5	Pentachlorophenol	10	U	
85-01-8	Phenanthrene	5.1	~~U~~	R RE
120-12-7	Anthracene	5.1	~~U~~	R RE
86-74-8	Carbazole	5.1	U	
84-74-2	Di-n-butylphthalate	5.1	U	
206-44-0	Fluoranthene	5.1	~~U~~	R RE
129-00-0	Pyrene	5.1	~~U~~	R RE
85-68-7	Butylbenzylphthalate	5.1	U	
91-94-1	3,3'-Dichlorobenzidine	5.1	U	
56-55-3	Benzo (a) anthracene	5.1	~~U~~	R RE
218-01-9	Chrysene	5.1	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	5.1	U	
117-84-0	Di-n-octylphthalate	5.1	U	
205-99-2	Benzo (b) fluoranthene	5.1	U	R RE
207-08-9	Benzo (k) fluoranthene	5.1	U	
50-32-8	Benzo (a) pyrene	5.1	U	
193-39-5	Indeno (1,2,3-cd) pyrene	5.1	U	
53-70-3	Dibenzo (a,h) anthracene	5.1	U	
191-24-2	Benzo (g,h,i) perylene	5.1	U	
58-90-2	2,3,4,6-Tetrachlorophenol	5.1	U	

[1]Cannot be separated from Diphenylamine

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-EB01-072308

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-17

Sample wt/vol: 975 (g/mL) mL Lab File ID: 0807072-17A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/05/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl alcohol	12.72	4.1	JN
02	621-59-0	Benzaldehyde, 3-hydroxy-4-methoxy- $	22.55	3.8	JN
03	0-00-0	7,9-Di-tert-butyl-1-oxaspiro(4,5)dec	29.23	6.2	JN
04					
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30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

qel
10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072408

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-18

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-18A66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/06/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	4.7	U	
108-95-2	Phenol	4.7	U	
111-44-4	Bis(2-chloroethyl)ether	4.7	U	
95-57-8	2-Chlorophenol	4.7	U	
95-48-7	2-Methylphenol	4.7	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	4.7	U	
98-86-2	Acetophenone	1.3	J	
106-44-5	4-Methylphenol	4.7	U	
621-64-7	N-Nitroso-di-n-propylamine	4.7	U	
67-72-1	Hexachloroethane	4.7	U	
98-95-3	Nitrobenzene	4.7	U	
78-59-1	Isophorone	4.7	U	
88-75-5	2-Nitrophenol	4.7	U	
105-67-9	2,4-Dimethylphenol	4.7	U	
111-91-1	Bis(2-chloroethoxy)methane	4.7	U	
120-83-2	2,4-Dichlorophenol	4.7	U	
91-20-3	Naphthalene	4.7	~~U~~	R RE
106-47-8	4-Chloroaniline	4.7	U	
87-68-3	Hexachlorobutadiene	4.7	U	
105-60-2	Caprolactam	4.7	U	
59-50-7	4-Chloro-3-methylphenol	4.7	U	
91-57-6	2-Methylnaphthalene	4.7	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	4.7	U	
88-06-2	2,4,6-Trichlorophenol	4.7	U	
95-95-4	2,4,5-Trichlorophenol	4.7	U	
92-52-4	1,1'-Biphenyl	4.7	U	
91-58-7	2-Chloronaphthalene	4.7	U	
88-74-4	2-Nitroaniline	9.3	U	
131-11-3	Dimethylphthalate	4.7	U	
606-20-2	2,6-Dinitrotoluene	4.7	U	
208-96-8	Acenaphthylene	4.7	~~U~~	R RE
99-09-2	3-Nitroaniline	9.3	U	
83-32-9	Acenaphthene	4.7	~~U~~	R RE

lw 10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072408

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-18

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-18A66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/06/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	9.3	U	
100-02-7	4-Nitrophenol	9.3	U	
132-64-9	Dibenzofuran	4.7	U	
121-14-2	2,4-Dinitrotoluene	4.7	U	
84-66-2	Diethylphthalate	4.7	U	
86-73-7	Fluorene	4.7	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	4.7	U	
100-01-6	4-Nitroaniline	9.3	U	
534-52-1	4,6-Dinitro-2-methylphenol	9.3	U	
86-30-6	N-Nitrosodiphenylamine (1)	4.7	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	4.7	U	
101-55-3	4-Bromophenyl-phenylether	4.7	U	
118-74-1	Hexachlorobenzene	4.7	U	
1912-24-9	Atrazine	4.7	U	
87-86-5	Pentachlorophenol	9.3	U	
85-01-8	Phenanthrene	4.7	U	
120-12-7	Anthracene	4.7	~~U~~	R RE
86-74-8	Carbazole	4.7	U	
84-74-2	Di-n-butylphthalate	4.7	U	
206-44-0	Fluoranthene	4.7	~~U~~	R RE
129-00-0	Pyrene	4.7	~~U~~	R RE
85-68-7	Butylbenzylphthalate	4.7	U	
91-94-1	3,3'-Dichlorobenzidine	4.7	U	
56-55-3	Benzo (a) anthracene	4.7	~~U~~	R RE
218-01-9	Chrysene	4.7	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	4.7	U	
117-84-0	Di-n-octylphthalate	4.7	U	
205-99-2	Benzo (b) fluoranthene	4.7	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	4.7	~~U~~	
50-32-8	Benzo (a) pyrene	4.7	~~U~~	
193-39-5	Indeno (1,2,3-cd) pyrene	4.7	~~U~~	
53-70-3	Dibenzo (a,h) anthracene	4.7	~~U~~	
191-24-2	Benzo (g,h,i) perylene	4.7	~~U~~	
58-90-2	2,3,4,6-Tetrachlorophenol	4.7	U	

[1] Cannot be separated from Diphenylamine

LW
10/24/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-EB01-072408

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-18

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-18A66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/25/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/28/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/06/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl alcohol	12.72	3.5	JN
02	90-05-1	Phenol, 2-methoxy-	14.44	2.6	JN
03	121-33-5	Vanillin	22.56	3.3	JN
04	0-00-0	7,9-Di-tert-butyl-1-oxaspiro(4,5)dec	29.23	5.1	JN
05					
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30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

QW
10/24/08

15

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-20

Sample wt/vol: 1050 (g/mL) mL Lab File ID: 0807072-20JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/31/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	4.8	U	
108-95-2	Phenol	4.8	U	
111-44-4	Bis(2-chloroethyl)ether	4.8	U	
95-57-8	2-Chlorophenol	4.8	U	
95-48-7	2-Methylphenol	4.8	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	4.8	U	
98-86-2	Acetophenone	4.8	U	
106-44-5	4-Methylphenol	4.8	U	
621-64-7	N-Nitroso-di-n-propylamine	4.8	U	
67-72-1	Hexachloroethane	4.8	U	
98-95-3	Nitrobenzene	4.8	U	
78-59-1	Isophorone	4.8	U	
88-75-5	2-Nitrophenol	4.8	U	
105-67-9	2,4-Dimethylphenol	4.8	U	
111-91-1	Bis(2-chloroethoxy)methane	4.8	U	
120-83-2	2,4-Dichlorophenol	4.8	U	
91-20-3	Naphthalene	4.8	~~U~~	R RE
106-47-8	4-Chloroaniline	4.8	U	
87-68-3	Hexachlorobutadiene	4.8	U	
105-60-2	Caprolactam	4.8	U	
59-50-7	4-Chloro-3-methylphenol	4.8	U	
91-57-6	2-Methylnaphthalene	4.8	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	4.8	U	
88-06-2	2,4,6-Trichlorophenol	4.8	U	
95-95-4	2,4,5-Trichlorophenol	4.8	U	
92-52-4	1,1'-Biphenyl	4.8	U	
91-58-7	2-Chloronaphthalene	4.8	U	
88-74-4	2-Nitroaniline	9.5	U	
131-11-3	Dimethylphthalate	4.8	U	
606-20-2	2,6-Dinitrotoluene	4.8	U	
208-96-8	Acenaphthylene	4.8	~~U~~	R RE
99-09-2	3-Nitroaniline	9.5	U	
83-32-9	Acenaphthene	4.8	~~U~~	R RE

lw 10/24/08

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1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-20

Sample wt/vol: 1050 (g/mL) mL Lab File ID: 0807072-20JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/31/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	9.5	U	
100-02-7	4-Nitrophenol	9.5	U	
132-64-9	Dibenzofuran	4.8	U	
121-14-2	2,4-Dinitrotoluene	4.8	U	
84-66-2	Diethylphthalate	4.8	U	
86-73-7	Fluorene	4.8	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	4.8	U	
100-01-6	4-Nitroaniline	9.5	U	
534-52-1	4,6-Dinitro-2-methylphenol	9.5	U	
86-30-6	N-Nitrosodiphenylamine (1)	4.8	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	4.8	U	
101-55-3	4-Bromophenyl-phenylether	4.8	U	
118-74-1	Hexachlorobenzene	4.8	U	
1912-24-9	Atrazine	4.8	U	
87-86-5	Pentachlorophenol	9.5	~~U~~	R RE
85-01-8	Phenanthrene	4.8	~~U~~	R RE
120-12-7	Anthracene	4.8	~~U~~	R RE
86-74-8	Carbazole	4.8	U	
84-74-2	Di-n-butylphthalate	4.8	U	
206-44-0	Fluoranthene	4.8	~~U~~	R RE
129-00-0	Pyrene	4.8	~~U~~	R RE
85-68-7	Butylbenzylphthalate	4.8	U	
91-94-1	3,3'-Dichlorobenzidine	4.8	U	
56-55-3	Benzo (a) anthracene	4.8	~~U~~	R RE
218-01-9	Chrysene	4.8	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	3.5	J	
117-84-0	Di-n-octylphthalate	4.8	U	
205-99-2	Benzo (b) fluoranthene	4.8	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	4.8	~~U~~	
50-32-8	Benzo (a) pyrene	4.8	~~U~~	
193-39-5	Indeno (1,2,3-cd) pyrene	4.8	~~U~~	
53-70-3	Dibenzo (a,h) anthracene	4.8	~~U~~	
191-24-2	Benzo (g,h,i) perylene	4.8	~~U~~	
58-90-2	2,3,4,6-Tetrachlorophenol	4.8	U	

[1] Cannot be separated from Diphenylamine

LW 10/24/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-20

Sample wt/vol: 1050 (g/mL) mL Lab File ID: 0807072-20JA60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/31/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	11.18	7.2	J
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

lw 10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-21

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807072-21JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/31/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	4.9	U	
108-95-2	Phenol	4.9	U	
111-44-4	Bis(2-chloroethyl)ether	4.9	U	
95-57-8	2-Chlorophenol	4.9	U	
95-48-7	2-Methylphenol	4.9	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	4.9	U	
98-86-2	Acetophenone	4.9	U	
106-44-5	4-Methylphenol	4.9	U	
621-64-7	N-Nitroso-di-n-propylamine	4.9	U	
67-72-1	Hexachloroethane	4.9	U	
98-95-3	Nitrobenzene	4.9	U	
78-59-1	Isophorone	4.9	U	
88-75-5	2-Nitrophenol	4.9	U	
105-67-9	2,4-Dimethylphenol	4.9	U	
111-91-1	Bis(2-chloroethoxy)methane	4.9	U	
120-83-2	2,4-Dichlorophenol	4.9	U	
91-20-3	Naphthalene	4.9	~~U~~	R RE
106-47-8	4-Chloroaniline	4.9	U	
87-68-3	Hexachlorobutadiene	4.9	U	
105-60-2	Caprolactam	4.9	U	
59-50-7	4-Chloro-3-methylphenol	4.9	U	
91-57-6	2-Methylnaphthalene	4.9	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	4.9	U	
88-06-2	2,4,6-Trichlorophenol	4.9	U	
95-95-4	2,4,5-Trichlorophenol	4.9	U	
92-52-4	1,1'-Biphenyl	4.9	U	
91-58-7	2-Chloronaphthalene	4.9	U	
88-74-4	2-Nitroaniline	9.8	U	
131-11-3	Dimethylphthalate	4.9	U	
606-20-2	2,6-Dinitrotoluene	4.9	U	
208-96-8	Acenaphthylene	4.9	~~U~~	R RE
99-09-2	3-Nitroaniline	9.8	U	
83-32-9	Acenaphthene	4.9	~~U~~	R RE

LW 10/24/08

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1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-21

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807072-21JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/31/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	9.8	U	
100-02-7	4-Nitrophenol	9.8	U	
132-64-9	Dibenzofuran	4.9	U	
121-14-2	2,4-Dinitrotoluene	4.9	U	
84-66-2	Diethylphthalate	4.9	U	
86-73-7	Fluorene	4.9	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	4.9	U	
100-01-6	4-Nitroaniline	9.8	U	
534-52-1	4,6-Dinitro-2-methylphenol	9.8	U	
86-30-6	N-Nitrosodiphenylamine (1)	4.9	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	4.9	U	
101-55-3	4-Bromophenyl-phenylether	4.9	U	
118-74-1	Hexachlorobenzene	4.9	U	
1912-24-9	Atrazine	4.9	U	
87-86-5	Pentachlorophenol	9.8	U	
85-01-8	Phenanthrene	4.9	~~U~~	R RE
120-12-7	Anthracene	4.9	~~U~~	R RE
86-74-8	Carbazole	4.9	U	
84-74-2	Di-n-butylphthalate	4.9	U	
206-44-0	Fluoranthene	4.9	~~U~~	R RE
129-00-0	Pyrene	4.9	~~U~~	R RE
85-68-7	Butylbenzylphthalate	4.9	U	
91-94-1	3,3'-Dichlorobenzidine	4.9	U	
56-55-3	Benzo (a) anthracene	4.9	~~U~~	R RE
218-01-9	Chrysene	4.9	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	4.9	U	
117-84-0	Di-n-octylphthalate	4.9	U	
205-99-2	Benzo (b) fluoranthene	4.9	U	R RE
207-08-9	Benzo (k) fluoranthene	4.9	U	
50-32-8	Benzo (a) pyrene	4.9	U	
193-39-5	Indeno (1,2,3-cd) pyrene	4.9	U	
53-70-3	Dibenzo (a,h) anthracene	4.9	U	
191-24-2	Benzo (g,h,i) perylene	4.9	U	
58-90-2	2,3,4,6-Tetrachlorophenol	4.9	U	

[1] Cannot be separated from Diphenylamine

MW
10/24/08

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1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-21

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807072-21JA60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: _____ Decanted: (Y/N) _____ Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/31/2008

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

kw
10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-22

Sample wt/vol: 950 (g/mL) mL Lab File ID: 0807072-22J2A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	5.3	U	
108-95-2	Phenol	5.3	U	
111-44-4	Bis(2-chloroethyl)ether	5.3	U	
95-57-8	2-Chlorophenol	5.3	U	
95-48-7	2-Methylphenol	5.3	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	5.3	U	
98-86-2	Acetophenone	5.3	U	
106-44-5	4-Methylphenol	5.3	U	
621-64-7	N-Nitroso-di-n-propylamine	5.3	U	
67-72-1	Hexachloroethane	5.3	U	
98-95-3	Nitrobenzene	5.3	~~U~~	UJ CCH
78-59-1	Isophorone	5.3	U	
88-75-5	2-Nitrophenol	5.3	U	
105-67-9	2,4-Dimethylphenol	5.3	U	
111-91-1	Bis(2-chloroethoxy)methane	5.3	U	
120-83-2	2,4-Dichlorophenol	5.3	U	
91-20-3	Naphthalene	5.3	~~U~~	R RE
106-47-8	4-Chloroaniline	5.3	U	
87-68-3	Hexachlorobutadiene	5.3	U	
105-60-2	Caprolactam	5.3	U	
59-50-7	4-Chloro-3-methylphenol	5.3	U	
91-57-6	2-Methylnaphthalene	5.3	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	5.3	U	
88-06-2	2,4,6-Trichlorophenol	5.3	U	
95-95-4	2,4,5-Trichlorophenol	5.3	U	
92-52-4	1,1'-Biphenyl	5.3	U	
91-58-7	2-Chloronaphthalene	5.3	U	
88-74-4	2-Nitroaniline	11	U	
131-11-3	Dimethylphthalate	5.3	U	
606-20-2	2,6-Dinitrotoluene	5.3	U	
208-96-8	Acenaphthylene	5.3	~~U~~	R RE
99-09-2	3-Nitroaniline	11	U	
83-32-9	Acenaphthene	5.3	~~U~~	R RE

lcw 10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-22

Sample wt/vol: 950 (g/mL) mL Lab File ID: 0807072-22J2A60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	11	U	
100-02-7	4-Nitrophenol	11	U	
132-64-9	Dibenzofuran	5.3	U	
121-14-2	2,4-Dinitrotoluene	5.3	U	
84-66-2	Diethylphthalate	5.3	U	
86-73-7	Fluorene	5.3	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	5.3	U	
100-01-6	4-Nitroaniline	11	U	
534-52-1	4,6-Dinitro-2-methylphenol	11	U	
86-30-6	N-Nitrosodiphenylamine (1)	5.3	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	5.3	U	
101-55-3	4-Bromophenyl-phenylether	5.3	U	
118-74-1	Hexachlorobenzene	5.3	U	
1912-24-9	Atrazine	5.3	U	
87-86-5	Pentachlorophenol	11	U	
85-01-8	Phenanthrene	5.3	~~U~~	R RE
120-12-7	Anthracene	5.3	~~U~~	R RE
86-74-8	Carbazole	5.3	U	
84-74-2	Di-n-butylphthalate	5.3	U	
206-44-0	Fluoranthene	5.3	~~U~~	R RE
129-00-0	Pyrene	5.3	~~U~~	R RE
85-68-7	Butylbenzylphthalate	5.3	U	
91-94-1	3,3'-Dichlorobenzidine	5.3	U	
56-55-3	Benzo (a) anthracene	5.3	~~U~~	R RE
218-01-9	Chrysene	5.3	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	5.3	U	
117-84-0	Di-n-octylphthalate	5.3	U	
205-99-2	Benzo (b) fluoranthene	5.3	U	R RE
207-08-9	Benzo (k) fluoranthene	5.3	U	
50-32-8	Benzo (a) pyrene	5.3	U	
193-39-5	Indeno (1,2,3-cd) pyrene	5.3	U	
53-70-3	Dibenzo (a,h) anthracene	5.3	U	
191-24-2	Benzo (g,h,i) perylene	5.3	U	
58-90-2	2,3,4,6-Tetrachlorophenol	5.3	U	

[1] Cannot be separated from Diphenylamine

LW 10/24/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-22

Sample wt/vol: 950 (g/mL) mL Lab File ID: 0807072-22J2A60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/01/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl alcohol	13.93	2.4	JN
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

MW 10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-23

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807072-23JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/31/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	4.9	U	
108-95-2	Phenol	1.1	J	
111-44-4	Bis(2-chloroethyl)ether	4.9	U	
95-57-8	2-Chlorophenol	4.9	U	
95-48-7	2-Methylphenol	4.9	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	4.9	U	
98-86-2	Acetophenone	4.9	U	
106-44-5	4-Methylphenol	4.9	U	
621-64-7	N-Nitroso-di-n-propylamine	4.9	U	
67-72-1	Hexachloroethane	4.9	U	
98-95-3	Nitrobenzene	4.9	U	
78-59-1	Isophorone	4.9	U	
88-75-5	2-Nitrophenol	4.9	U	
105-67-9	2,4-Dimethylphenol	4.9	U	
111-91-1	Bis(2-chloroethoxy)methane	4.9	U	
120-83-2	2,4-Dichlorophenol	4.9	U	
91-20-3	Naphthalene	4.9	~~U~~	R RE
106-47-8	4-Chloroaniline	4.9	U	
87-68-3	Hexachlorobutadiene	4.9	U	
105-60-2	Caprolactam	4.9	U	
59-50-7	4-Chloro-3-methylphenol	4.9	U	
91-57-6	2-Methylnaphthalene	4.9	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	4.9	U	
88-06-2	2,4,6-Trichlorophenol	4.9	U	
95-95-4	2,4,5-Trichlorophenol	4.9	U	
92-52-4	1,1'-Biphenyl	4.9	U	
91-58-7	2-Chloronaphthalene	4.9	U	
88-74-4	2-Nitroaniline	9.8	U	
131-11-3	Dimethylphthalate	4.9	U	
606-20-2	2,6-Dinitrotoluene	4.9	U	
208-96-8	Acenaphthylene	4.9	~~U~~	R RE
99-09-2	3-Nitroaniline	9.8	U	
83-32-9	Acenaphthene	4.9	~~U~~	R RE

RW 10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-23

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807072-23JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/31/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	9.8	U	
100-02-7	4-Nitrophenol	9.8	U	
132-64-9	Dibenzofuran	4.9	U	
121-14-2	2,4-Dinitrotoluene	4.9	U	
84-66-2	Diethylphthalate	5.2		
86-73-7	Fluorene	4.9	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	4.9	U	
100-01-6	4-Nitroaniline	9.8	U	
534-52-1	4,6-Dinitro-2-methylphenol	9.8	U	
86-30-6	N-Nitrosodiphenylamine (1)	4.9	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	4.9	U	
101-55-3	4-Bromophenyl-phenylether	4.9	U	
118-74-1	Hexachlorobenzene	4.9	U	
1912-24-9	Atrazine	4.9	U	
87-86-5	Pentachlorophenol	9.8	U	
85-01-8	Phenanthrene	4.9	~~U~~	R RE
120-12-7	Anthracene	4.9	~~U~~	R RE
86-74-8	Carbazole	4.9	U	
84-74-2	Di-n-butylphthalate	3.5	J	
206-44-0	Fluoranthene	4.9	~~U~~	R RE
129-00-0	Pyrene	4.9	~~U~~	R RE
85-68-7	Butylbenzylphthalate	4.9	U	
91-94-1	3,3'-Dichlorobenzidine	4.9	U	
56-55-3	Benzo (a) anthracene	4.9	~~U~~	R RE
218-01-9	Chrysene	4.9	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	2.1	J	
117-84-0	Di-n-octylphthalate	4.9	U	
205-99-2	Benzo (b) fluoranthene	4.9	U	R RE
207-08-9	Benzo (k) fluoranthene	4.9	U	
50-32-8	Benzo (a) pyrene	4.9	U	
193-39-5	Indeno (1,2,3-cd) pyrene	4.9	U	
53-70-3	Dibenzo (a,h) anthracene	4.9	U	
191-24-2	Benzo (g,h,i) perylene	4.9	U	
58-90-2	2,3,4,6-Tetrachlorophenol	4.9	U	

[1] Cannot be separated from Diphenylamine

MW 10/24/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-EB01-072708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-23

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807072-23JA60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/31/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	100-51-6	Benzyl Alcohol $$ Benzenemethanol $$	14.05	3.1	JN
02		UNKNOWN	23.87	4.6	J
03	74367-33-2	Propanoic acid, 2-methyl-, 2,2-dimet	25.83	2.0	JN
04		UNKNOWN	26.38	2.9	J
05	621-59-0	Benzaldehyde, 3-hydroxy-4-methoxy- $	27.00	9.7	JN
06		UNKNOWN	29.88	5.0	J
07	119-61-9	Benzophenone $$ Methanone, diphenyl-	30.76	3.3	JN
08	84-64-0	1,2-Benzenedicarboxylic acid, butyl	33.60	2.6	JN
09	0-00-0	7,9-Di-tert-butyl-1-oxaspiro(4,5)dec	34.19	6.3	JN
10		UNKNOWN	38.29	5.6	J
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

RW
10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-24

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-24JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/31/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	4.7	U	
108-95-2	Phenol	4.7	U	
111-44-4	Bis(2-chloroethyl)ether	4.7	U	
95-57-8	2-Chlorophenol	4.7	U	
95-48-7	2-Methylphenol	4.7	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	4.7	U	
98-86-2	Acetophenone	4.7	U	
106-44-5	4-Methylphenol	4.7	U	
621-64-7	N-Nitroso-di-n-propylamine	4.7	U	
67-72-1	Hexachloroethane	4.7	U	
98-95-3	Nitrobenzene	4.7	U	
78-59-1	Isophorone	4.7	U	
88-75-5	2-Nitrophenol	4.7	U	
105-67-9	2,4-Dimethylphenol	4.7	U	
111-91-1	Bis(2-chloroethoxy)methane	4.7	U	
120-83-2	2,4-Dichlorophenol	4.7	U	
91-20-3	Naphthalene	4.7	~~U~~	R RE
106-47-8	4-Chloroaniline	4.7	U	
87-68-3	Hexachlorobutadiene	4.7	U	
105-60-2	Caprolactam	4.7	U	
59-50-7	4-Chloro-3-methylphenol	4.7	U	
91-57-6	2-Methylnaphthalene	4.7	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	4.7	U	
88-06-2	2,4,6-Trichlorophenol	4.7	U	
95-95-4	2,4,5-Trichlorophenol	4.7	U	
92-52-4	1,1'-Biphenyl	4.7	U	
91-58-7	2-Chloronaphthalene	4.7	U	
88-74-4	2-Nitroaniline	9.3	U	
131-11-3	Dimethylphthalate	4.7	U	
606-20-2	2,6-Dinitrotoluene	4.7	U	
208-96-8	Acenaphthylene	4.7	~~U~~	R RE
99-09-2	3-Nitroaniline	9.3	U	
83-32-9	Acenaphthene	4.7	~~U~~	R RE

GW 10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-24

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-24JA60.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/31/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	9.3	U	
100-02-7	4-Nitrophenol	9.3	U	
132-64-9	Dibenzofuran	4.7	U	
121-14-2	2,4-Dinitrotoluene	4.7	U	
84-66-2	Diethylphthalate	4.7	U	
86-73-7	Fluorene	4.7	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	4.7	U	
100-01-6	4-Nitroaniline	9.3	U	
534-52-1	4,6-Dinitro-2-methylphenol	9.3	U	
86-30-6	N-Nitrosodiphenylamine (1)	4.7	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	4.7	U	
101-55-3	4-Bromophenyl-phenylether	4.7	U	
118-74-1	Hexachlorobenzene	4.7	U	
1912-24-9	Atrazine	4.7	U	
87-86-5	Pentachlorophenol	9.3	U	
85-01-8	Phenanthrene	4.7	~~U~~	R RE
120-12-7	Anthracene	4.7	~~U~~	R RE
86-74-8	Carbazole	4.7	U	
84-74-2	Di-n-butylphthalate	4.7	U	
206-44-0	Fluoranthene	4.7	~~U~~	R RE
129-00-0	Pyrene	4.7	~~U~~	R RE
85-68-7	Butylbenzylphthalate	4.7	U	
91-94-1	3,3'-Dichlorobenzidine	4.7	U	
56-55-3	Benzo (a) anthracene	4.7	~~U~~	R RE
218-01-9	Chrysene	4.7	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	4.7	U	
117-84-0	Di-n-octylphthalate	4.7	U	
205-99-2	Benzo (b) fluoranthene	4.7	U	R RE
207-08-9	Benzo (k) fluoranthene	4.7	U	
50-32-8	Benzo (a) pyrene	4.7	U	
193-39-5	Indeno (1,2,3-cd) pyrene	4.7	U	
53-70-3	Dibenzo (a,h) anthracene	4.7	U	
191-24-2	Benzo (g,h,i) perylene	4.7	U	
58-90-2	2,3,4,6-Tetrachlorophenol	4.7	U	

[1] Cannot be separated from Diphenylamine

lw 10/24/08

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1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-24

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807072-24JA60.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/29/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 07/31/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	11.18	3.7	J
02	100-51-6	Benzyl alcohol	14.07	3.2	JN
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

LW 10/24/08

USEPA REGION II WORKSHEETS

SOP NO. HW-35/SVOA Data Validation
USEPA Contract Laboratory Program
Statement of Work for Organic Analysis of Low/Medium Concentration of Semivolatile Organic Compounds SOM01.2

Prepared by: George Karras Date: 8/13/07
George Karras, Chemist
Hazardous Waste Support Section

Peer Reviewed by: Russell Arnone Date: 10/3/07
Russell Arnone, Chemist
Hazardous Waste Support Section

Concurred by: Linda M. Manuel Date: 10/9/07
Linda Manuel, Chief
Hazardous Waste Support Section

Approved by: Robert A. Runyon Date: 10/10/07
Robert Runyon, Chief
Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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INTRODUCTION

Scope and Applicability

This SOP offers detailed guidance in evaluating laboratory data generated according to the method in the "USEPA Contract Laboratory Program Statement of Work for Organics Analysis Multi-Media, Multi-Concentration, SOM01.1, May 2005". The validation procedures and actions discussed in this document are based on the requirements set forth in the "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, January 2005". This document attempts to cover technical problems specific to low/Medium concentration of semivolatile compounds. Situations may arise where data limitations must be assessed based on the reviewer's own professional judgement.

In addition to technical requirements, contractual requirements may also be covered in this document. While it is important that instances of contract non-compliance be addressed in the Data Assessment, the technical criteria are always used to qualify the analytical data.

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 as follows:

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.

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

P - Pesticide/Aroclor target analytes when the % Difference between the analyte concentrations obtained from the two dissimilar GC columns is greater than 25%.

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 the USEPA Statement of Work SOM01.2 and National Functional Guidelines mentioned above.

YES NO N/A

. . . . . .

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: N/A **LAB:** CompuChem, Cary, NC

SITE NAME: Vieques ISLAND, PR **SDG No(s).:** 0807072

1.0 Chain of Custody and Sampling Trip Reports

1.1 Are the Traffic Reports/Chain-of-Custody Records present for all samples? [✓] ___ ___

ACTION: If no, contact RSCC, or the TOPO to obtain replacement of missing or illegible copies from the lab.

1.2 Is the Sampling Trip Report present for all samples? [✓] ___ ___

ACTION: If no, contact either RSCC or ask the TOPO to obtain the necessary information from the prime contractor.

2.0 Data Completeness and Deliverables

2.1 Have any missing deliverables been received and added to the data package? ___ [✓] ___

ACTION: Contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the lab. If lab cannot provide them, note the effect on the review of the data package in the Contract Problems/Non-compliance section of the Data Assessment.

2.2 Was CLASS CCS checklist included with the package? [✓] ___ ___

	YES	NO	N/A
2.3 Are there any discrepancies between the Traffic Reports/Chain-of-Custody Records, Sampling Trip Report and Sample Tags?		[✓]	

ACTION: If yes, contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the laboratory.

3.0 Cover Letter SDG Narrative

3.1 Is the SDG Narrative or Cover Letter Present?	[✓]		
3.2 Are case number, SDG number and contract number contained in the SDG Narrative or cover letter (see SOW, Exhibit B, section 2.5.1)? EPA sample numbers in the SDG, detailed documentation of any quality control, sample, shipment, and/or analytical problems encountered in processing the samples? Corrective action taken?	[✓]		
3.3 Does the Narrative contain the following information SOM01.1, page B-12, section 2.5.1)? column used, storage of samples, case#, SDG#, analytical problems, and discrepancies between field and lab weights.	[✓]		
3.5 Did the contractor record the temperature of the cooler on the Form DC-1, Item 9 - Cooler Temperature, and in the SDG Narrative?	[✓]		
3.6 Does the Case Narrative contain the "verbatim" statement (page B-12, section 2.5.1 of the SOM)?	[✓]		

ACTION: If "No", to any question in this section, contact the TOPO to obtain necessary resubmittals. If unavailable, document under the Contract Problems/ Non-Compliance section of the Data Assessment.

	YES	NO	N/A
4.0 Data Validation Checklist			
4.1 Check the package for the following (see SOM reporting requirements, section 2.1, page B-10):			
a. Is the package paginated in ascending order starting from the SDG narrative?	[✓]	___	___
b. Are all forms and copies legible?	[✓]	___	___
c. Assembled in the order set forth in the SOW?	[✓]	___	___
d. Semivolatiles Data present?	[✓]	___	

PART A: Low/Medium Semivolatile Analyses

1.0 Sample Conditions/Problems			
1.1 Do the Traffic Reports/Chain-of-Custody Records, Sampling Trip Report or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	___	[✓]	___

ACTION: If samples were not iced or the ice was melted upon arrival at the laboratory and the temperature of the cooler was > 10° C, then flag all positive results with a "J" and all non-detects "UJ".

2.0 Holding Times			
2.1 Have any SVOA technical holding times, determined from date of collection to date of analysis, been exceeded?	___	[✓]	___

2.2 Preservation: Aqueous and Non-aqueous samples must be cooled at 4°C ± 2°C.

YES NO N/A

. . . . . .

Action: Qualify sample results according to the following table.

Holding Time Actions for Low/Medium Semivolatile Analyses

Matrix	Preserved	Criteria	Action	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤ 7 days (extraction) < 40 days (analysis)	J*	UJ*
	No	> 7 days (extraction) > 40 days (analysis)	J	UJ
	Yes	≤ 7 days (extraction) ≤ 40 days (analysis)	No qualification	
	Yes	> 7 days (extraction) > 40 days (analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	R
Non-aqueous	No	≤ 14 days (extraction) ≤ 40 days (analysis)	J*	UJ*
	No	> 14 days (extraction) > 40 days (analysis)	J	UJ
	Yes	≤ 14 days (extraction) ≤ 40 days (analysis)	No qualification	
	Yes	> 14 days (extraction) > 40 days (analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	R

* Only if cooler temperature exceeds 10° C (see ACTION in Section 1.1 above). No action required if temperature < 10° C.

3.0 Deuterated Monitoring Compound (DMC) Recovery (Form II)

3.1 Are the Semivolatile DMC Recovery Summaries (Form II) present? [✓] ___ ___

	YES	NO	N/A
. . . . .			
ACTION: Contact the TOPO to obtain an explanation/resubmittal from the lab. If missing deliverables are unavailable, document the effect in the Data Assessment.			
3.2 Were outliers marked correctly with an asterisk?	[✓]	___	___
ACTION: Circle all outliers in red.			
3.3 Were more than four of the sixteen (16) Deuterated Monitoring Compounds (DMC's) recoveries outside their corresponding limits?	___	[✓]	___
If yes, were samples re-analyzed?	[ ]	___	✓
Were method blanks re-analyzed?	[ ]	___	✓

Note: Up to four (4) DMCs per sample may fail % recovery but all % recoveries must be > zero.

ACTION: If any DMC is outside the required limits, qualify their associated target compounds (See Table below) as follows:

SEMIVOLATILE DMC AND THEIR ASSOCIATED TARGET COMPOUNDS

Phenol-d5 Benzaldehyde Phenol	**2-Chlorophenol-d4** 2-Chlorophenol	**2-Nitrophenol-d4** Isophorone 2-nitrophenol
Bis(2-Chloroethyl)ether-d8 bis(2-Chloroethyl)ether 2,2'oxybis(1-Chloropropane bis(2-Chloroethoxy)methane	**4-Methylphenol-d8** 2-Methylphenol 4-Methylphenol 2,4 Dimethylphenol	**4-Chloroaniline-d4** 4-Chloroaniline Hexachloro cyclopentadiene 3,3'Dichlorobenzidine

Nitrobenzene-d8 Acetophenone N-Nitro-di-n-propylamine Hexachloroethane Nitrobenzene 2,6-Dinitrotoluene 2,4-Dinitrotoluene N-Nitrodiphenylamine	**2,4-Dichlorophenol-d3** 2,4-Dichlorophenol Hexaclorobutadiene 4-Chloro-3-methylphenol 2,4,6-Trichlorophenol 2,4,5-Trichlorophenol 1,2,4,5-Tetrachloro-benzene Pentachlorophenol 2,3,4,6-Tetrachloro-phenol	**Dimethylphthalate-d6** Caprolactam 1,1'-Biphenyl Dimethylphthalate Diethylphthalate Di-n-butylphthalate Butylbenzylphthalate bis(2-Ethylhexyl)-phthalate Di-n-octylphthalate
Fluorene-d10 Dibenzofuran Fluorene 4-Chlorophenyl-phenylether 4-Bromophenyl-phenylether Carbazole	**Anthracene-d10** Hexachlorobenzene Atrazine Phenanthrene Anthracene	**Pyrene-d10** Fluoranthene Pyrene Benzo(a)anthracene Chrysene
Acenaphthylene-d8 Naphthalene 2-Methylphthalene 2-Chlorophthalene Acenapthylene Acenaphthene	**4-Nitrophenol-d4** 2-Nitroaniline 3-Nitroaniline 2,4-Dinitrophenol 4-Nitrophenol 4-Nitroaniline	**Benzo(a)pyrene-d12** Benzo(b)flur0anthene Benzo(k)fluroanthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)pertlene
4,6-Dinitro-2-methylphenol-d2 4,6-Dinitro-2-methylphenol		

Semivolatile Deuterated Monitoring Compound Recovery Limits for Selective Ion Monitoring (SIM) and the Associated Target Compounds

Fluoranthene-d10 (DMC)	**2-Methylnaphthalene-d10 (DMC)**
Fluoranthene	Naphthalene

Pyrene	2-Methylnaphthalene
Benzo(a)anthracene	Acenaphthylene
Chrysene	Acenaphthene
Benzo(b)fluoranthene	Fluorene
Benzo(k)fluoranthene	Pentachlorophenol
Benzo(a)pyrene	Phenanthrene
Indeno(1,2,3-cd)pyrene	Anthracene
Bibenzo(a,h)anthracene	
Benzo(g,h,i)perylene	

SEMIVOLATILE DEUTERATED MONITORING COMPOUND RECOVERY LIMITS

DMC	Recovery Limits (%) for Water Samples	Recovery Limits (%) for Soil samples
Phenol-d5	39 - 106	17 - 103
Bis-(2-chloroethyl) ether-d8	40 - 105	12 - 9
2-Chlorophenol-d4	41 - 106	13 - 101
4-Methylphenol-d8	25 - 111	8 - 100
Nitrobenzene-d5	43 - 108	16 - 103
2-Nitrophenol-d4	40 - 108	16 - 104
2,4-Dichlorophenol-d3	37 - 105	23 - 104
4-Chloroaniline-d4	1 - 145	1 - 145
Dimethylphthalate-d6	47 - 114	43 - 111
Acenaphthalate-d8	41 - 107	20 - 97
4-Nitrophenol-d4	33 - 116	16 - 166
Fluorene-d10	42 - 111	40 - 108
4,6-Dintro-2-methylphenol-d2	22 - 104	1 - 121

Anthracene-d10	44 - 110	22 - 98
Pyrene-d10	52 - 119	51 - 120
Benzo(a)pyrene-d12	32 - 121	43 - 111
Fluoranthene-d10 (SIM)	5- - 150	50 - 150
2-Methylnaphthalene-d10 (SIM)	50 - 150	50 - 150

Deuterated Monitoring Compound Recovery Action for Semivolatiles

Criteria	Action	
	Detected Associated Compounds	**Non-Detected Associated Compounds**
%R > Upper Acceptance Limit	J	No qualification
%R < Lower acceptance Limit	J	UJ
Lower Acceptance ≤ %R ≤ Upper Acceptance Limit	No qualification	

NOTE: Use the above table to qualify SVOA data including SIM analysis.

NOTE: As per SOM, any sample which has more than 4 DMC's outside the limits, it must be reanalyzed (SOM sec. 11.4.3.1 pg. D-49/Low Medium SVOA).

Blank analysis have DMCs out of specification: 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. For example, if one or more samples in the batch show acceptable DMC recoveries, the reviewer may choose to consider the blank problem to be an isolated occurrence.

ACTION: Note in the Data Assessment under Contract Problems/ Non-Compliance if the Lab did not perform reanalysis and reviewer's judgment regarding blank problem.

	YES	NO	N/A
3.4 Are there any transcription/calculation errors between raw data and form II?		[√]	

ACTION: If large errors exist, ask the TOPO to obtain an explanation/resubmittal from the lab, make any necessary corrections and note errors in the data assessment.

Note: DMC recovery limits criteria and qualification apply to samples diluted 5X and less. For samples diluted greater than 5X, recovery criteria does not apply Because it is assumed DMC is diluted below the quantitation range.

4.0 Matrix Spike/Matrix Spike Duplicate Recovery (Form III)

Note: Data for MS/MSD will not be present unless requested.

	YES	NO	N/A
4.1 Are the MS/MSD Recovery Forms (Form III BNA) present?	[√]		
4.2 Was the MS/MSD analyzed at the required frequency (once per SDG, or every 20 samples, whichever is more frequent)?	[√]		

ACTION: If any MS/MSD data are missing, take action as specified in section 3.1 above.

ACTION: No action is taken on MS/MSD data alone. However, using professional judgement, the validator may use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. If Any MS/MSD % recovery or RPD is out of specification, qualify data to include the consideration of the existence of interference in the raw data. Consideration include, but not limited to the following "Action":

Matrix Spike/Matrix Spike Duplicate Action for Semivolatiles

Criteria	Action	
	Detected Spike Compounds	Non-detected Spike Compounds

YES NO N/A

. . . . . .

%R or RPD > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	Use Professional Judgment
Lower Acceptance Limit ≤ %R; RPD ≤ Upper Acceptance Limit	No qualification required	

Note: If it can be determined that the results of the MS/MSD affects only the sample spiked, limit qualification to only this sample. However, use professional judgment when it is determined through the MS/MSD results that the laboratory is having systematic problem in the analysis of one or more analytes that affect all associated samples.

5.0 Method Blanks (Form IV)

5.1 Is the Semivolatile Method Blank Summary (Form IV BNA) present for aqueous and soil samples? [√] ___ ___

5.2 Frequency of Analysis: For the analysis of SVOA TCL compounds, has a method blank been analyzed for each SDG or every 20 samples, whichever is more frequent? [√] ___ ___

5.3 Has a SVOA method blank been analyzed after the calibration standards. [√] ___ ___

5.4 No target compound concentration may exceed the upper limit of the initial calibration. Did the laboratory perform dilution on compounds exceeding the initial calibration upper limit. [√] ___ ___

ACTION: If any method blank data is missing or dilution was not done, notify the TOPO to obtain resubmittals or an explanation from the lab. If method blank data are unavailable, the reviewer may use professional judgement, or substitute field blank or trip blank data for missing method blank data.

5.5 Chromatography: Review the blank raw data chromatogram (RICs), quant. Reports or data system printout and spectra. Is the

	YES	NO	N/A
. . . . .			
chromatographic performance (baseline stability) acceptable for each instrument?	[✓]	___	___

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

5.6 The validator should verify that the correct identification scheme for EPA blanks was used. (See SOM page B-39, section 3.3.7.3 for more information.)

Was the correct identification scheme used for all SVOA blanks?	[✓]	___	___

ACTION: Contact the TOPO to obtain corrections from the lab, or make the necessary corrections. Document in the "Contract Problems/Non-Compliance section of the Data Assessment all corrections made by the validator.

5.8 Are all detected hits for target compounds in method, and field blanks less than the CRQL?	[ ]	✓	___

Exception: Bis(2-ethylhexyl)phthalate must be less than 5X times their respective CRQLs listed in the method.

ACTION: If no, an explanation and laboratory's corrective actions must be addressed in the case narrative. If the narrative contains no explanation, then make a note in the Contract Problems/Non-Compliance section of the Data Assessment.

6.0 Contamination

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

Note: These limits are not advisory.

6.1 Do any method blanks contain positive SVOA results (TCL and/or TICs)?	✓	[ ]	___

YES NO N/A

. . . . . .

6.2 Do any field/rinse blanks have positive SVOA results (including TICs)? ✓ [ ] ___

NOTE: All field blank results associated with 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 system monitoring compound, instrument performance criteria, spectral or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks. If any blanks are grossly contaminated (i.e.,saturated peaks by GC/MS) all associated sample data should be qualified unusable (R).

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
	Gross contamination	Detects	Qualify results as unusable R
	TIC: aqueous	< 5x blank value	R

YES NO N/A

. . . . . .

	TIC: non-aqueous	< 5x blank value	R

* 5x the CRQL for bis(2-ethylhexyl)Phthalate

NOTE: Analytes qualified "U" for blank contamination are treated as "hits" when qualifying for calibration criteria.
Note: When applied as described in the table above, the contaminant concentration in the blank are multiplied by the sample dilution factor.

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

ACTION: 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.

7.0 GC/MS Instrument Performance Check (Form V)

7.1 Are the GC/MS Instrument Performance Check Forms (Form V) present for decafluorotriphenylphosphine (DFTPP)? [✓] ___ ___

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

7.3 Did the 12-hour clock begin with either the injection of DFTPP, or in cases where a closing continuing calibration (CCV) was used as an opening CCV? [✓] ___ ___

Listed below are some, but not necessarily all, examples of acceptable analytical sequences incorporating the use of the opening/closing CCV. Use these examples as a guide for possible analytical sequences that can be expected.

YES NO N/A

. . . . . .

Conditions for When Example Sequence is Appropriate:	Acceptable Criteria That Must be Met:	Notes:
If time remains on the 12 hour clock after initial calibration sequence	• DFTPP tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets both opening and closing CCV criteria • CCV B meets closing CCV criteria.	The requirement of starting the new 12-hr clock for Analytical Sequence 2 with a new DFTPP tune is waived if CCV A meets opening CCV criteria. If CCV B meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.
If time remains on the 12 hour clock after initial calibration sequence	• DFTPP tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets closing CCV criteria (but does not meet opening CCV criteria). • CCV B meets opening CCV criteria. • CCV C meets closing CCV Criteria.	CCV A does not meet opening criteria, therefore a new DFTPP tune must be performed, immediately followed by CCV B before a method blank and any sample may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new DFTPP tune.
If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV. OR If the most recent closing CCV was not or could not be used as an opening CCV.	• DFTPP tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets both opening and closing CCV criteria. • CCV C meets both opening and closing CCV criteria.	The requirement of starting the new 12 hour clock for Analytical Sequence 2 with a new DFTPP tune is waived if CCV B meets opening CCV criteria. If CCV C meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.

YES NO N/A

. . . . . .

If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV OR If the most recent closing CCV was not or could not be used as an opening CCV	• DFTPP tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets closing CCV criteria (but does not meet opening CCV criteria). • CCV C meets opening CCV Criteria. • CCV D meets both opening and closing CCV criteria.	CCV B does not meet opening CCV criteria, therefore a new DFTPP tune must be performed, immediately followed by CCV B before a method blank and any samples may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new DFTPP tune. The requirement of starting the new 12 hr clock for Analytical Sequence 3 with a new DFTPP tune is waived if CCV D meets opening CCV criteria. If CCV D meets opening criteria, a method blank and subsequent samples may be analyzed after CCV B.

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

NOTE: All ion abundance ratios must be normalized to m/z 198, the nominal base peak, even though the ion abundance of m/z 442 may be up to 100% that of m/z 198.

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

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

ACTION: If ion abundance criteria are not met, professional Judgement to determine to what extent the data may be utilized.

NOTE: Guidelines to aid in the application of professional judgment in evaluating ion abundance criteria are discussed below:

a. Some of the most critical factors in the DFTPP criteria are the non-instrument specific requirements that are also not unduly affected by the location of the spectrum on the chromatographic profile. The m/z ratios for 198/199 and 442/443 are critical. These ratios are based on the natural abundance of carbon 12 and carbon 13 and should always be met. Similarly, the relative abundance of m/z 68, 70, 197, and 441 indicate the condition of the instrument and the suitability of the resolution adjustment. Note that all of the foregoing abundance relate to adjacent ions; they are relatively insensitive to differences in instrument design and position of the spectrum on the chromatographic profile.

YES NO N/A

. . . . . .

b. For the ions at m/z 51, 127, and 275, the actual relative abundance is not as critical. For instance, if m/z 275 has 80.0% relative abundance (criteria 10.0-60.0%) and other criteria are met, the deficiency is minor.

c. The relative abundance of m/z 365 is an indicator of suitable instrument zero adjustment. If relative abundance for m/z 365 is zero, minimum detection limits may be affected. On the other hand, if m/z 365 is present, but < 0.75% minimum abundance criteria, the deficiency is not as serious.

7.6 Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

7.7 Is the number of significant figures for the reported relative abundances consistent with the number given in the ion abundance criteria column on Form V ? [✓] ___ ___

ACTION: If large errors exist, take action as specified in section 3.1 above.

7.8 Is the spectrum of the mass calibration compound acceptable? [✓] ___ ___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

Note: The requirement to analyze the instrument performance check solution is optional when analysis of Polynuclear Hydrocarbon (PAHs)/pentachlorophenol is to be performed by the Selected Ion Monitoring (SIM) technique.

8.0 Target Compound List (TCL) Analytes (Form I)

8.1 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. Regional Control/MS/MSD samples? [✓] ___ ___

c. Blanks (method, field, etc)? [✓] ___ ___

8.2 Are the SVOA Reconstructed Ion Chromatograms, the 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. Regional Control/MS/MSD samples? [✓] ___ ___

	YES	NO	N/A
c. Blanks (method, field, etc)?	[✓]	___	___

ACTION: If any data are missing, take action specified in 3.1 above.

8.3 Is chromatographic performance acceptable with respect to:

	YES	NO	N/A
Baseline stability?	[✓]	___	___
Resolution?	[✓]	___	___
Peak shape?	[✓]	___	___
Full-scale graph (attenuation)?	[✓]	___	___
Other: _____?	[ ]	___	✓

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

	YES	NO	N/A
8.4 Are lab-generated standard mass spectra of the identified SVOA compounds present for each sample?	[✓]	___	___

ACTION: If any mass spectra are missing, take action as specified in 3.1 above. If lab does not generate their own standard spectra, make note under the "Contract Problems/Non-Compliance" section of the Data Assessment. If spectra are unavailable reject "R" the reported results.

	YES	NO	N/A
8.5 Is the RRT of each reported compound within ± 0.06 RRT units of the standard RRT in the continuing calibration verification or initial calibration mid-point standard?	[✓]	___	___
8.6 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
8.7 Do sample and standard relative ion intensities agree to within ± 20% between standard and sample spectra?	[✓]	___	___

ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be 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 sections 8.4-8.7 above.

	YES	NO	N/A
. . . . .			

ACTION: When sample carry-over is suspected, use professional judgment to determine if instrument cross-contamination has affected positive compound identifications.

9.0 Tentatively Identified Compounds (TIC)

		YES	NO	N/A
9.1	Are all Tentatively Identified Compound Forms (Form I SVOA-TIC) present? Do listed TICs include scan number or retention time, as well as the estimated "J" and/or "JN" qualifier?	[✓]	___	___
9.2	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 3.1 above.

ACTION: Verify "JN" qualifier is present for all chemically named TICs having a percent match of greater than or equal 85%. TICs labeled "unknown" are qualified with a "J" qualifier.

		YES	NO	N/A
9.3	Are any target compounds (from any fraction) listed as TICs? (Example: 1,2-dimethylbenzene is xylene - a VOA target analyte - and should not be reported as a TIC.)	___	[✓]	___

ACTION: Flag with "R" only target compound detected in another fraction. (except blank contamination - see blank table in sec 6.3 above)

		YES	NO	N/A
9.4	Are major ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample spectrum?	[✓]	___	___
9.5	Do TICs and "best match" reference spectra relative ion intensities agree within ± 20%?	[✓]	___	___

ACTION: Use professional judgement to determine the acceptability of TIC identifications. If it is determined that an incorrect identification was made, change its identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.

Action: When a compound is not found in any blank, but is detected in a sample and is a suspected artifact of a common laboratory contaminant, solvent preservatives or Aldo condensation, the result should be qualified as

YES NO N/A

. . . . . .

unusable (R). (i.e., common lab contaminants such as CO_2(m/e 44), Siloxanes (m/e 73), diethyl ether, hexane, certain freons and phthalates at < 100 ug/L. Aldol condensation products: 4-hydroxy-4-methyl-2-pentanone, 4-methyl-2-penten-2-one, and 5,5-dimethyl-2(H)-furanone. Solvent preservatives cyclohexene, and related by-products: cyclohexanone, cyclohexenone, cyclohexanol, cyclohexenol, chlorocyclohexene, and chlorocyclohexanol.).

10.0 Compound Quantitation and Reported Detection Limits

10.1 Are there any transcription/calculation errors in Form I results? (Check at least two positive values. Verify that the correct internal standards, quantitation ions, and RRFs were used to calculate Form I results.) ___ [✓] ___

10.2 Are the CRQLs adjusted to reflect sample dilutions? [✓] ___ ___

ACTION: If errors are large, take action as specified in section 3.1 above.

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQLs data from the diluted sample). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original Form I and substituting the data from 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 not to be used, including any in the data summary package.

10.3 For non-aqueous samples, were the percent moisture < 70%? [ ] ___ [✓]

Action: If the % moisture ≥ 70.0% and < 90.0%, qualify detects as "J" and non-detects as approximated "UJ" If the % Moisture ≥ 90%, qualify detects as "J" and non-detects as "R"

11.0 Standards Data (GC/MS)

11.1 Are the reconstructed ion chromatograms, and data system printouts (quant. reports) present for each initial and continuing calibration? [✓] ___ ___

ACTION: If any calibration standard data are missing, take action specified in section 3.1 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI SVOA) present and complete for the semivolatile target compounds (except seven listed below) at concentrations of 5, 10, 20, 40,

	YES	NO	N/A
and 80 µg/ℓ and 4-point calibration at 10, 20, 40, and 80 ug/L for 2,4-dinitrophenol, pentachlorophenol, 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, 4-nitrophenol and 4,6-dinitro-2-methylphenol?	[√]	___	___

Note: If analysis by Selected Ion Monitoring (SIM) technique is requested for PAHs/pentachlorophenols, calibration standards are analyzed at 0.10, 0.20, 0.40, 0.80 and 1.0 ng/uL for each target compound of interest and the associated DMCs. Pentachlorophenol will require only a four-point initial calibration at 0.20, 0.40, 0.80 and 1.0 ng/uL.

ACTION: If any Initial Calibration forms are missing, take action as specified in section 3.1 above.

12.2 Are the relative standard deviation (RSD) stable for SVOA's over the concentration range of the calibration (i.e., %RSD ≤ 20%, and ≤ 40% for poor performers (see table below)?	[ ]	[√]	___

ACTION: Circle all outliers in red.

NOTE: The twenty two (25) poor performers compounds and associated DMCs are listed below. The relative response factor (RRF) for these compounds must be greater than or equal to 0.010. The RRF for all other BNA target compounds must be ≥ 0.050.

Semivolatile Compounds Exhibiting Poor Response

Semivolatile Compounds	
2,2'-Oxybis(1-chloropropane)	Benzaldehyde
4-Chloroaniline	4-Nitroaniline
Hexachlorobutadiene	4,6-Dinitro-2-methylphenol
Hexachlorocyclopentadiene	N-Nitrosodiphenylamine
2-Nitroaniline	3,3'Dichlorobenzidine
3-Nitroaniline	1,1'Biphenyl
2,4-Dinitrophenol	Dimethylphthalate
4-Nitrophenol	Diethylphthalate
Acetophenone	1,2,4,5-Tetrachlorobenzene
Caprolactam	Carbazole

YES NO N/A

. . . . . .

Atrazine	Butylbenzylphthalate
Di-n-butylphthalate	Di-n-octylphthalate
Bis-2(ethylhexyl)phthalate	

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

12.3 Are any $\overline{RRF}$s < 0.050 (< 0.010 for poor performers)? ✓ [ ] ___

ACTION: Circle all outliers in red.

ACTION: Use the following table to qualify for detects and non-detect compounds.

Initial Calibration Actions for Semivolatile Analyses

Criteria for Semivolatile Analysis	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RRF < 0.010 (compounds exhibiting poor response) RRF < 0.050 (all other target compounds)	J	R
RRF ≥ 0.010 (compounds exhibiting poor response) RRF ≥ 0.050 (all other target compounds)	No qualification	
%RSD ≤ 40.0% (compounds exhibiting poor response) %RSD ≤ 20.0% (all other target compounds)	No qualification	
%RSD > 40.0% (compounds exhibiting poor response) %RSD > 20.0% (all other target compounds)	J	No qualification

ACTION: Document in the Data Assessment Report the analytes that fail %RSD and/or RRF criteria.

12.4 Are there any transcription/calculation errors in the reporting of RRFs, RRFs or %RSD values? (Check at least 2 values, but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

ACTION: If errors are large, contact the TOPO to obtain an explanation/resubmittal from the lab, document in the Data Assessment under Contract Problems/Non-Compliance.

	YES	NO	N/A
. . . . .			

13.0 GC/MS Continuing Calibration Verification (CCV) (Form VII)

		YES	NO	N/A
13.1	Are the Continuing Calibration Forms (Form VII SVOA) present and complete for the semivolatile fraction?	✓		
13.2	Did the 12 hour clock begin with either the injection of DFTPP or in cases where a closing CCV can be used as an opening CCV for each instrument?	✓		

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, ask the TOPO to obtain explanation/resubmittal from the laboratory. If continuing calibration data are unavailable, flag all associated sample data as unusable (R).

		YES	NO	N/A
13.3	Do any semivolatile compounds have a % Difference (% D) between the initial RRF and CCV RRF exceeding ± 40% for the poor performers (see table/page 22) or ± 25% for the remaining compounds?	✓		

ACTION: Circle all outliers in red.

		YES	NO	N/A
13.4	Do any semivolatile compounds have a RRF < 0.05 or < 0.01 for the poor performers?	✓		

ACTION: Circle all outliers in red.

Note: Verify that the CCV was run at the required frequency (an opening and closing CCV must be run within 12-hour period) and the CCV was compared to the correct initial calibration. If the mid-point standard from the initial calibration is used as an opening CCV, verify that the result (RRF) of the mid-point standard was compared to the average RRF from the correct initial calibration.

Note: The closing CCV used to bracket the end of a 12-hour analytical sequence may be used as the opening CCV for the new 12-hour analyical sequence, provided that all the technical acceptance criteria are met for an opening CCV (see table below). If the closing CCV does not meet the technical acceptance criteria for an opening CCV, then a DFTPP tune followed by an opening CCV is required and the next 12-hour time period begins with the DFTPP tune.

Action: Use the following table to qualify data based on the technical acceptance criteria for the opening CCV and closing CCV.

Continuing Calibration Verification (CCV) Actions for Low/Medium Semivolatiles Analyses

Criteria for Opening CCV	Criteria for Closing CCV	Action	
		Detected Associated Compounds	Non-Detected Associated Compounds

YES NO N/A

. . . . . .

RRF < 0.010 (poor responders) RRF < 0.050 (for all other compounds)	RRF < 0.010 (for all target compounds)	J	R
RRF ≥ 0.010 (poor responders) RRF ≥ 0.050 (all other target compounds)	RRF ≥ 0.010 (for all target compounds)	No Action	
%D > 40.0 or < -40.0 (poor responders) %D > 25.0 or < -25.0 (all other volatile target compounds)	%D > 50.0 or < -50.0 (for all target compounds)	J	UJ
%D ≤ 40.0 or ≥ -40.0 (poor responders) %D ≤ 25.0 or ≥ -25.0 (all other target compounds)	%D ≤ 50.0 or ≥ -50.0 (for all target compounds)	No Action	
Opening CCV not performed at required frequency *	Closing CCV not performed at required frequency *	R	

* The 12-hour clock begins with either the injection of DFTPP or in cases where a closing CCV can be used as an opening CCV, the 12-hour clock begins with the injection of the opening CCV.

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance if more than two of the required analytes failed the above acceptance criteria.

13.5 Are there any transcription/calculation errors for the reporting of RRFs, or %D between initial RRFs and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors with red pencil.

ACTION: If errors are large, notify the TOPO to obtain explanation/resubmittals from the lab. Document errors in the Contract Problems/Non-Compliance section of the Data Assessment.

Note: All DMCs must meet RRF ≥ 0.010. No qualification of the data is necessary on the DMCs RRF and %RSD/%Diff data alone. However, use professional judgment to evaluate the DMC and %RSD/% Diff data in conjunction with the DMC recoveries to determine the need of qualification of the data.

14.0 Internal Standard (Form VIII)

14.1 Were the internal standard area counts for every sample and blank within the range of 50.0% and 200.0% of its response from the associated 12-hour calibration (opening CCV or mid-point initial calibration standard? [ ] [✓] ___

If no, were affected samples reanalyzed? [✓] ___ ___

ACTION: 1. Circle all outliers with red pencil.

14.2 Are the retention times of the internal standards in sample or blanks within ± 30 seconds from the RT of the

	YES	NO	N/A
internal standard in the 12-hour associated calibration standard (opening CCV or mid-point standard from initial calibration)?	[✓]	___	___

Action: Use the following table to qualify the data

INTERNAL STANDARDS ACTIONS FOR LOW/MEDIUM SEMIVOLATILES

Criteria	ACTION	
	Detected Associated Compounds *	Non-detected Associated Compounds *
Area counts ≥ 50% and ≤ 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	No Action required	
Area counts < 50% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J	R
Area counts > 200% of 12-hour standard (Opening CCV or mid-point standard from initial calibration)	J	No Action
RT difference > 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	R	
RT difference ≤ 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	No Action required	

* For semivolatile compounds associated to each internal standard, see Table 2-Semivolatile standards corresponding Target and Deuterated Monitoring Compounds for Quantitation in SOM01.1, Exhibit D, available at:

Http://www.epa.gov/superfund/programs/clp/som1.htm

Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable "R" if the mass spectral are met.

NOTE: Contract Requirements: The SOM (section 11.4.4 page D-50/SVOA Low/Medium states that any sample which fails the acceptance criteria for internal standard response must be reanalyzed.

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance any sample(s) which failed the above IS acceptance criteria.

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15.0 Field Duplicates

15.1 Were any field duplicates submitted for Low Concentration SVOA analysis? [✓] ___ ___

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

ACTION: Any gross variation between duplicate results must be addressed in the reviewer narrative. If large differences exist, contact the TOPO to confirm identification of field duplicates with the sampler.

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Definitions

CCS - contract compliance screening
CLASS - Contract Laboratory Analytical Services Support
CLP - Contract Laboratory Program
CRQL - Contract Required Quantitation Limit
DFTPP - decafluorotriphenylphosphine
GC/MS - gas chromatography/mass spectroscopy
kg - kilogram
µg - microgram
ℓ - liter
mℓ - milliliter
QC - quality control
RAS - Routine Analytical Services
RIC - reconstructed ion chromatogram
RPD - relative percent difference
RRF - relative response factor
$\overline{\text{RRF}}$ - 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
SOP - standard operating procedure
SOW - Statement of Work
SVOA - semivolatile organic acid
TCL - Target Compound List
TCLP - Toxicity Characteristics Leachate Procedure
TIC - tentatively identified compound
TPO - technical project officer
VTSR - validated time of sample receipt
TOPO - Task Order Project Officer

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References

1. USEPA Contract Laboratory Program of Work for Organic Analysis Multi-Media, Multi-Concentration, SOW/CLPSOM01.1, October 2004
2. National Functional Guidelines for Superfund Organic Methods Data Review January 2005

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

2G - FORM II SV-1
WATER SEMIVOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

	EPA SAMPLE NO.	SDMC1 (PHL) #	SDMC2 (BCE) #	SDMC3 (2CP) #	SDMC4 (4MP) #	SDMC5 (NBZ) #	SDMC6 (2NP) #	SDMC7 (DCP) #	SDMC8 (4CA) #
01	SBLKJW	77	76	77	76	86	81	77	88
02	SBLKKJ	86	84	92	93	83	94	89	69
03	SBLKKZ	89	91	87	88	93	89	84	55
04	VWAE-EB01-07	56	58	54	56	57	55	52	17
05	VWAE-MW02	63	67	64	63	67	65	61	49
06	VWAE-MW03	78	81	77	70	81	78	73	21
07	VWAE-MW07	39	40	38 *	40	41 *	39 *	40	13
08	VWAE-MW08	77	81	76	75	78	79	71	34
09	VWAI-EB01-07	52	53	51	50	55	52	50	55
10	VWAI-EB01-07	74	74	71	72	78	76	71	77
11	VWAI-EB01-07	63	66	64	63	68	66	62	72
12	VWAI-EB01-07	85	83	86	88	90	93	83	64
13	VWAI-EB01-07	61	64	61	58	65	62	57	60
14	VWAI-EB01-07	75	77	76	76	80	80	74	41
15	VWAI-EB01-07	71	66	71	75	67	77	70	43
16	VWAI-EB01-07	69	71	76	78	71	80	73	29
17	VWAI-MW01	72	75	74	69	77	75	70	74
18	VWAI-MW01RE	82	84	82	78	86	83	75	56
19	VWAI-MW02	82	83	88	82	79	93	86	32
20	VWAI-MW03	80	79	85	85	76	88	82	38
21	VWAI-MW04	86	85	92	92	82	94	90	48
22	VWAI-MW04MS	87	83	92	91	81	94	88	56
23	VWAI-MW04MSD	90	82	91	90	79	89	87	52
24	VWAI-MW05	70	66	68	71	72	69	71	54
25	VWAI-MW05P	74	75	72	73	76	73	71	54
26	VWAI-MW05PRE	77	73	75	77	78	76	76	22
27	VWAI-MW05RE	84	73	80	83	80	79	85	31
28	VWAI-MW07	92	94	86	91	93	83	78	55
29	VWAI-MW08	66	64	64	64	69	69	66	65
30	VWAI-MW08RE	75	69	70	72	75	76	73	44

2RS

assoc. (JLW) CMC

			QC LIMITS
SDMC1	(PHL)	= Phenol-d5	(39-106)
SDMC2	(BCE)	= Bis(2-chloroethyl)ether-d8	(40-105)
SDMC3	(2CP)	= 2-Chlorophenol-d4	(41-106)
SDMC4	(4MP)	= 4-Methylphenol-d8	(25-111)
SDMC5	(NBZ)	= Nitrobenzene-d5	(43-108)
SDMC6	(2NP)	= 2-Nitrophenol-d4	(40-108)
SDMC7	(DCP)	= 2,4-Dichlorophenol-d3	(37-105)
SDMC8	(4CA)	= 4-Chloroaniline-d4	(1-145)

Column to be used to flag recovery values
* Value outside of contract required QC limits
D DMC diluted out

3C - FORM III SV-1
WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

Matrix Spike - EPA Sample No.: VWAI-MW04 #10

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS %REC #	QC LIMITS REC.
Phenol	40	0.0	32	79	12-110
2-Chlorophenol	40	0.0	35	86	27-123
N-Nitroso-di-n-propylamine	40	0.0	33	82	41-116
4-Chloro-3-methylphenol	40	0.0	37	94	23-97
Acenaphthene	40	0.0	35	87	46-118
4-Nitrophenol	40	0.0	42	104 *	10-80
2,4-Dinitrotoluene	40	0.0	39	97 *	24-96
Pentachlorophenol	40	0.0	42	105 *	9-103
Pyrene	40	0.0	39	96	26-127

None Sample ND

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD %REC #	%RPD #	QC LIMITS RPD	QC LIMITS REC.
Phenol	40	32	81	2	0-42	12-110
2-Chlorophenol	40	34	85	2	0-40	27-123
N-Nitroso-di-n-propylamine	40	32	81	1	0-38	41-116
4-Chloro-3-methylphenol	40	36	90	3	0-42	23-97
Acenaphthene	40	34	86	2	0-31	46-118
4-Nitrophenol	40	39	98 *	6	0-50	10-80
2,4-Dinitrotoluene	40	37	93	4	0-38	24-96
Pentachlorophenol	40	40	99	6	0-50	9-103
Pyrene	40	36	91	6	0-31	26-127

None Sampl ND

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 9 outside limits
Spike Recovery: 4 out of 18 outside limits

COMMENTS: _____

7E - FORM VII SV-1
SEMIVOLATILE CONTINUING CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

Instrument ID: 5972hp60 Calibration Date: 08/01/2008 Time: 1306

Lab File ID: HH080801A60.d Init. Calib. Date(s): 07/19/2008 07/19/2008

EPA Sample No.(SSTD020##): SSTD020CV Init. Calib. Time(s): 1602 2001

GC Column: RTX-5MS ID: 0.32 (mm)

COMPOUND	$\overline{RRF}$	RRF020	MIN RRF	%D	MAX %D
Benzaldehyde	1.203	1.404	0.010	16.7	40.0
Phenol	1.948	2.209	0.800	13.4	25.0
Bis(2-chloroethyl)ether	1.551	1.659	0.700	7.0	25.0
2-Chlorophenol	1.436	1.595	0.800	11.0	25.0
2-Methylphenol	1.318	1.463	0.700	11.0	25.0
2,2'-Oxybis(1-chloropropane)	3.284	3.933	0.010	19.8	40.0
Acetophenone	2.037	2.253	0.010	10.6	40.0
4-Methylphenol	1.428	1.555	0.600	8.9	25.0
N-Nitroso-di-n-propylamine	0.968	1.188	0.500	22.8	25.0
Hexachloroethane	0.741	0.836	0.300	12.8	25.0
Nitrobenzene	0.491	0.645	0.200	31.4	25.0 (J/UJ)
Isophorone	0.776	0.845	0.400	8.9	25.0
2-Nitrophenol	0.228	0.252	0.100	10.3	25.0
2,4-Dimethylphenol	0.327	0.363	0.200	10.9	25.0
Bis(2-chloroethoxy)methane	0.517	0.575	0.300	11.3	25.0
2,4-Dichlorophenol	0.301	0.320	0.200	6.0	25.0
Naphthalene	1.048	1.135	0.700	8.2	25.0
4-Chloroaniline	0.320	0.292	0.010	-8.7	40.0
Hexachlorobutadiene	0.158	0.165	0.010	4.3	40.0
Caprolactam	0.063	0.069	0.010	9.6	40.0
4-Chloro-3-methylphenol	0.278	0.306	0.200	10.0	25.0
2-Methylnaphthalene	0.524	0.565	0.400	7.6	25.0
Hexachlorocyclopentadiene	0.450	0.462	0.010	2.6	40.0
2,4,6-Trichlorophenol	0.405	0.412	0.200	1.6	25.0
2,4,5-Trichlorophenol	0.449	0.439	0.200	-2.2	25.0
1,1'-Biphenyl	1.532	1.637	0.010	6.8	40.0
2-Chloronaphthalene	1.169	1.224	0.800	4.7	25.0
2-Nitroaniline	0.522	0.580	0.010	11.2	40.0
Dimethylphthalate	1.504	1.518	0.010	0.9	40.0
2,6-Dinitrotoluene	0.382	0.401	0.200	4.8	25.0
Acenaphthylene	2.001	2.117	0.900	5.8	25.0
3-Nitroaniline	0.343	0.234	0.010	-31.7	40.0
Acenaphthene	1.323	1.365	0.900	3.2	25.0
2,4-Dinitrophenol	0.233	0.216	0.010	-7.3	40.0
4-Nitrophenol	0.197	0.183	0.010	-7.1	40.0
Dibenzofuran	1.687	1.771	0.800	5.0	25.0

7E - FORM VII SV-1
SEMIVOLATILE CONTINUING CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Instrument ID: 5972hp60 Calibration Date: 07/27/2008 Time: 1245

Lab File ID: HH080727A60.d Init. Calib. Date(s): 07/19/2008 07/19/2008

EPA Sample No.(SSTD020##): SSTD020CG Init. Calib. Time(s): 1602 2001

GC Column: RTX-5MS ID: 0.32 (mm)

COMPOUND	$\overline{RRF}$	RRF020	MIN RRF	%D	MAX %D
Benzaldehyde	1.203	1.220	0.010	1.4	40.0
Phenol	1.948	1.931	0.800	-0.9	25.0
Bis(2-chloroethyl)ether	1.551	1.583	0.700	2.1	25.0
2-Chlorophenol	1.436	1.461	0.800	1.7	25.0
2-Methylphenol	1.318	1.324	0.700	0.4	25.0
2,2'-Oxybis(1-chloropropane)	3.284	3.337	0.010	1.6	40.0
Acetophenone	2.037	1.989	0.010	-2.4	40.0
4-Methylphenol	1.428	1.438	0.600	0.7	25.0
N-Nitroso-di-n-propylamine	0.968	0.968	0.500	0.1	25.0
Hexachloroethane	0.741	0.733	0.300	-1.1	25.0
Nitrobenzene	0.491	0.628	0.200	27.9	25.0
Isophorone	0.776	0.812	0.400	4.6	25.0
2-Nitrophenol	0.228	0.248	0.100	8.9	25.0
2,4-Dimethylphenol	0.327	0.354	0.200	8.1	25.0
Bis(2-chloroethoxy)methane	0.517	0.561	0.300	8.7	25.0
2,4-Dichlorophenol	0.301	0.320	0.200	6.3	25.0
Naphthalene	1.048	1.108	0.700	5.7	25.0
4-Chloroaniline	0.320	0.290	0.010	-9.3	40.0
Hexachlorobutadiene	0.158	0.170	0.010	7.7	40.0
Caprolactam	0.063	0.062	0.010	-2.3	40.0
4-Chloro-3-methylphenol	0.278	0.306	0.200	10.0	25.0
2-Methylnaphthalene	0.524	0.560	0.400	6.7	25.0
Hexachlorocyclopentadiene	0.450	0.490	0.010	8.9	40.0
2,4,6-Trichlorophenol	0.405	0.430	0.200	6.1	25.0
2,4,5-Trichlorophenol	0.449	0.484	0.200	7.7	25.0
1,1'-Biphenyl	1.532	1.657	0.010	8.1	40.0
2-Chloronaphthalene	1.169	1.262	0.800	7.9	25.0
2-Nitroaniline	0.522	0.555	0.010	6.3	40.0
Dimethylphthalate	1.504	1.574	0.010	4.7	40.0
2,6-Dinitrotoluene	0.382	0.416	0.200	8.7	25.0
Acenaphthylene	2.001	2.133	0.900	6.6	25.0
3-Nitroaniline	0.343	0.244	0.010	-28.7	40.0
Acenaphthene	1.323	1.430	0.900	8.1	25.0
2,4-Dinitrophenol	0.233	0.236	0.010	1.5	40.0
4-Nitrophenol	0.197	0.211	0.010	7.2	40.0
Dibenzofuran	1.687	1.816	0.800	7.7	25.0

(JLUJ)

7E - FORM VII SV-1
SEMIVOLATILE CONTINUING CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Instrument ID: 5972hp60 Calibration Date: 07/27/2008 Time: 2227

Lab File ID: HA080727A60.d Init. Calib. Date(s): 07/19/2008 07/19/2008

EPA Sample No.(SSTD020##): SSTD020CH Init. Calib. Time(s): 1602 2001

GC Column: RTX-5MS ID: 0.32 (mm)

COMPOUND	$\overline{RRF}$	RRF020	MIN RRF	%D	MAX %D
Benzaldehyde	1.203	1.267	0.010	5.3	50.0
Phenol	1.948	2.066	0.010	6.1	50.0
Bis(2-chloroethyl)ether	1.551	1.541	0.010	-0.7	50.0
2-Chlorophenol	1.436	1.493	0.010	3.9	50.0
2-Methylphenol	1.318	1.324	0.010	0.4	50.0
2,2'-Oxybis(1-chloropropane)	3.284	3.420	0.010	4.1	50.0
Acetophenone	2.037	2.083	0.010	2.3	50.0
4-Methylphenol	1.428	1.486	0.010	4.1	50.0
N-Nitroso-di-n-propylamine	0.968	1.015	0.010	4.9	50.0
Hexachloroethane	0.741	0.727	0.010	-1.9	50.0
Nitrobenzene	0.491	0.638	0.010	30.0	50.0
Isophorone	0.776	0.834	0.010	7.5	50.0
2-Nitrophenol	0.228	0.246	0.010	7.8	50.0
2,4-Dimethylphenol	0.327	0.361	0.010	10.2	50.0
Bis(2-chloroethoxy)methane	0.517	0.573	0.010	11.0	50.0
2,4-Dichlorophenol	0.301	0.316	0.010	4.9	50.0
Naphthalene	1.048	1.123	0.010	7.1	50.0
4-Chloroaniline	0.320	0.313	0.010	-2.0	50.0
Hexachlorobutadiene	0.158	0.170	0.010	7.4	50.0
Caprolactam	0.063	0.099	0.010	56.0	50.0
4-Chloro-3-methylphenol	0.278	0.304	0.010	9.5	50.0
2-Methylnaphthalene	0.524	0.563	0.010	7.3	50.0
Hexachlorocyclopentadiene	0.450	0.443	0.010	-1.6	50.0
2,4,6-Trichlorophenol	0.405	0.410	0.010	1.1	50.0
2,4,5-Trichlorophenol	0.449	0.446	0.010	-0.8	50.0
1,1'-Biphenyl	1.532	1.618	0.010	5.6	50.0
2-Chloronaphthalene	1.169	1.213	0.010	3.7	50.0
2-Nitroaniline	0.522	0.577	0.010	10.4	50.0
Dimethylphthalate	1.504	1.555	0.010	3.4	50.0
2,6-Dinitrotoluene	0.382	0.404	0.010	5.6	50.0
Acenaphthylene	2.001	2.041	0.010	2.0	50.0
3-Nitroaniline	0.343	0.294	0.010	-14.4	50.0
Acenaphthene	1.323	1.375	0.010	4.0	50.0
2,4-Dinitrophenol	0.233	0.195	0.010	-16.1	50.0
4-Nitrophenol	0.197	0.184	0.010	-6.2	50.0
Dibenzofuran	1.687	1.801	0.010	6.8	50.0

(Flu 7)

ENVIRONMENTAL
Data Services, Inc.

LOW CONCENTRATION VOLATILE ORGANIC COMPOUNDS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807072

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 22, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAI-MW07	0807072-02	Water
2	VWAI-EB01-072108	0807072-03	Water
2DL	VWAI-EB01-072108DL	0807072-03DL	Water
3	VWAI-EB01-072008	0807072-04	Water
3DL	VWAI-EB01-072008DL	0807072-04DL	Water
4	VWAI-MW05	0807072-05	Water
5	VWAI-MW08	0807072-06	Water
6	VWAI-MW05P	0807072-07	Water
7	VWAI-TB01-072108	0807072-08	Water
8	VWAI-EB01-072208	0807072-09	Water
9	VWAI-MW09	0807072-10	Water
10	VWAI-MW01	0807072-11	Water
11	VWAI-MW04	0807072-12	Water
12	VWAI-TB01-072308	0807072-13	Water
13	VWAI-MW02	0807072-15	Water
14	VWAI-MW03	0807072-16	Water
15	VWAI-EB01-072308	0807072-17	Water
16	VWAI-EB01-072408	0807072-18	Water
17	VWAI-TB01-072408	0807072-19	Water
18	VWAE-MW03	0807072-20	Water
19	VWAE-MW08	0807072-21	Water
20	VWAE-MW07	0807072-22	Water
21	VWAE-EB01-072708	0807072-23	Water
22	VWAE-MW02	0807072-24	Water

The USEPA Region II SOP HW-33, Revision 1, August 2007: USEPA CLP Statement of Work for Organic Analysis of Low/Medium Concentration of Volatile Organic Compounds SOM01.2 Data Validation and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were analyzed within 14 days for preserved water samples.

Surrogates - All samples exhibited acceptable surrogate recoveries except the following.

Sample ID	Surrogate	%R	Qualifier
1	Chloroethane-d5	68%	J/UJ - All associated
	1,1-Dichloroethene-d2	54%	J/UJ - All associated
1 SIM	1,2-Dichloroethane-d4	192%	None - All associated ND
	1,1,2,2-Tetrachloroethane-d2	126%	None - All associated ND
1RE SIM	1,2-Dichloroethane-d4	133%	None - All associated ND
2	Chloroform-d	122%	None - All associated ND
3	Chloroform-d	124%	None - All associated ND
11	1,1-Dichloroethene-d2	52%	J/UJ - All associated

MS/MSD - A MS/MSD sample was not analyzed.

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VBLKEM	Methylene chloride	0.11	U	1, 2DL, 3DL, 8, 9, 11, 12, 15-17
VBLKLB	Methylene chloride	0.18	U	10, 13, 14, 18-21
	1,2,4-Trichlorobenzene	0.16	None	All ND
	1,2,3-Trichlorobenzene	0.20	None	All ND
	2-Hexanone	2.9	None	All ND
VBLKXN	Methylene chloride	0.20	U	2-4, 6

Trip, Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAI-EB01-072108	Acetone	50	None	Sample ND
	Chloroform	31	None	Sample ND
	Toluene	0.16	None	Sample ND
VWAI-EB01-072008	Acetone	52	U	5
	Chloroform	34	None	Sample ND
	Toluene	0.21	None	Sample ND
	1,2-Dibromoethane	0.013	None	Sample ND
VWAI-TB01-072108	None - ND	-	-	-

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAI-EB01-072208	Acetone	14	U	1, 9
VWAI-EB01-072208	Chloroform	0.34		
	Chloromethane	0.14		
VWAI-TB01-072308	None - ND	-	-	-
VWAI-EB01-072308	Acetone	12	U	10, 11
VWAI-EB01-072408	Chloromethane	0.12	None	Sample ND
	Acetone	27	None	Sample ND
	Carbon disulfide	0.18	None	Sample ND
	2-Butanone	1.4	None	Sample ND
VWAE-TB01-072408	None - ND	-	-	-
VWAE-EB01-072708	Acetone	38	U	19, 22
	Carbon disulfide	0.19	None	Sample ND
	2-Butanone	1.7	None	Sample ND

GC/MS Instrument Performance Check - All of the BFB tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - All TICs were correctly reported by the laboratory.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAI-MW05 ug/L	VWAI-MW05P ug/L	RPD	Qualifier
Carbon disulfide	0.11	0.12	9%	None

Compound	VWAI-MW05 ug/L	VWAI-MW05P ug/L	RPD	Qualifier
Methylcyclohexane	0.58	0.55	5%	None
Isopropylbezene	1.5	1.4	7%	None

ANNOTATED FORM Is

1

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-02

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-02D90.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 5.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
75-71-8	Dichlorodifluoromethane	2.5	~~U~~	UJ SSL
74-87-3	Chloromethane	2.5	~~U~~	UJ SSL
75-01-4	Vinyl chloride	2.5	U	
74-83-9	Bromomethane	2.5	~~U~~	UJ SSL
75-00-3	Chloroethane	2.5	~~U~~	UJ SSL
75-69-4	Trichlorofluoromethane	2.5	U	
75-35-4	1,1-Dichloroethene	2.5	~~U~~	UJ SSL
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	2.5	U	
67-64-1	Acetone	25 ~~16~~	~~J~~	U BL
75-15-0	Carbon disulfide	2.5	~~U~~	UJ SSL
79-20-9	Methyl acetate	2.5	U	
75-09-2	Methylene chloride	2.5 ~~1.8~~	~~JB~~	U BL
156-60-5	trans-1,2-Dichloroethene	2.5	~~U~~	UJ SSL
1634-04-4	Methyl tert-butyl ether	2.5	U	
75-34-3	1,1-Dichloroethane	2.5	U	
156-59-2	cis-1,2-Dichloroethene	2.5	~~U~~	UJ SSL
78-93-3	2-Butanone	25	U	
74-97-5	Bromochloromethane	2.5	U	
67-66-3	Chloroform	2.5	U	
71-55-6	1,1,1-Trichloroethane	2.5	U	
110-82-7	Cyclohexane	48		
56-23-5	Carbon tetrachloride	2.5	U	
71-43-2	Benzene	24		
107-06-2	1,2-Dichloroethane	2.5	U	
79-01-6	Trichloroethene	2.5	U	

Report 1,4-Dioxane for Low-Medium VOA analysis only

lwd
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1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-02

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-02D90.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 5.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	21	
78-87-5	1,2-Dichloropropane	2.5	U
75-27-4	Bromodichloromethane	2.5	U
10061-01-5	cis-1,3-Dichloropropene	2.5	U
108-10-1	4-Methyl-2-pentanone	25	U
108-88-3	Toluene	0.98	J
10061-02-6	trans-1,3-Dichloropropene	2.5	U
79-00-5	1,1,2-Trichloroethane	2.5	U
127-18-4	Tetrachloroethene	2.5	U
591-78-6	2-Hexanone	25	U
124-48-1	Dibromochloromethane	2.5	U
106-93-4	1,2-Dibromoethane	2.5	~~U~~ R DL
108-90-7	Chlorobenzene	2.5	U
100-41-4	Ethylbenzene	1.3	J
95-47-6	o-Xylene	2.5	U
179601-23-1	m,p-Xylene	2.6	
100-42-5	Styrene	2.5	U
75-25-2	Bromoform	2.5	U
98-82-8	Isopropylbenzene	26	
79-34-5	1,1,2,2-Tetrachloroethane	2.5	U
541-73-1	1,3-Dichlorobenzene	2.5	U
106-46-7	1,4-Dichlorobenzene	2.5	U
95-50-1	1,2-Dichlorobenzene	2.5	U
96-12-8	1,2-Dibromo-3-chloropropane	2.5	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	2.5	U
87-61-6	1,2,3-Trichlorobenzene	2.5	U

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-02

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-02D90.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 5.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	78-78-4	Butane, 2-methyl-	5.27	21	JN
02		UNKNOWN	5.68	19	J
03		UNKNOWN	8.02	7.9	J
04		UNKNOWN	8.72	6.4	J
05		UNKNOWN	9.33	21	J
06	1113-56-0	1,3-Pentadiene, 2,3-dimethyl-	9.62	9.1	JN
07		UNKNOWN	10.00	4.0	J
08	591-47-9	Cyclohexene, 4-methyl-	10.38	8.4	JN
09		UNKNOWN	10.49	16	J
10		UNKNOWN	10.86	8.9	J
11		UNKNOWN	11.36	7.3	J
12		UNKNOWN	13.34	77	J
13	622-96-8	Benzene, 1-ethyl-4-methyl- $$ Tolue	13.65	8.5	JN
14		UNKNOWN	13.91	9.4	J
15	135-01-3	Benzene, 1,2-diethyl-	14.24	18	JN
16	496-11-7	Indane	14.33	100	JN
17	933-98-2	Benzene, 1-ethyl-2,3-dimethyl-	14.64	43	JN
18	1005-64-7	(E)-1-Phenyl-1-butene $$ Benzene, 1	14.74	9.9	JN
19	767-58-8	Indan, 1-methyl-	14.80	37	JN
20	95-93-2	Benzene, 1,2,4,5-tetramethyl-	15.00	34	JN
21	934-10-1	3-Phenylbut-1-ene $$ 1-Methyl-2-pro	15.34	8.1	JN
22	76089-59-3	1,3-Cyclopentadiene, 1,2,3,4-tetram	15.45	19	JN
23	767-58-8	Indan, 1-methyl-(1)	15.50	38	JN
24		UNKNOWN	15.69	6.8	J
25	56253-64-6	Benzene, (2-methyl-1-butenyl)- $$ 2	15.76	6.6	JN
26		UNKNOWN	15.84	7.1	J
27	17057-82-8	1H-Indene, 2,3-dihydro-1,2-dimethyl	15.94	10	JN
28	275-51-4	Azulene	16.20	17	JN
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

LW
10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-02 Lab File ID: 0807072-02R291.d

Sample Vol:(mL) 25.0 Date Received: 07/23/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/02/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

lw
10/22/08

1RE

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW07RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-02RE1 Lab File ID: 0807072-02R391.d

Sample Vol:(mL) 25.0 Date Received: 07/23/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/04/2008

Use original

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

RE

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lw 10/22/08

2

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072108

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: - SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-03

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0390.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	50	
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	11	~~B~~ u BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	31 ~~30~~	~~E~~ R DL
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

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1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072108

2

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-03

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0390.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
108-87-2	Methylcyclohexane	0.50	U	
78-87-5	1,2-Dichloropropane	0.50	U	
75-27-4	Bromodichloromethane	0.50	U	
10061-01-5	cis-1,3-Dichloropropene	0.50	U	
108-10-1	4-Methyl-2-pentanone	5.0	U	
108-88-3	Toluene	0.16	J	
10061-02-6	trans-1,3-Dichloropropene	0.50	U	
79-00-5	1,1,2-Trichloroethane	0.50	U	
127-18-4	Tetrachloroethene	0.50	U	
591-78-6	2-Hexanone	5.0	U	
124-48-1	Dibromochloromethane	0.50	U	
106-93-4	1,2-Dibromoethane	0.50	~~U~~	R DL
108-90-7	Chlorobenzene	0.50	U	
100-41-4	Ethylbenzene	0.50	U	
95-47-6	o-Xylene	0.50	U	
179601-23-1	m,p-Xylene	0.50	U	
100-42-5	Styrene	0.50	U	
75-25-2	Bromoform	0.50	U	
98-82-8	Isopropylbenzene	0.50	U	
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U	
541-73-1	1,3-Dichlorobenzene	0.50	U	
106-46-7	1,4-Dichlorobenzene	0.50	U	
95-50-1	1,2-Dichlorobenzene	0.50	U	
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~	R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U	
87-61-6	1,2,3-Trichlorobenzene	0.50	U	

lw 10/22/08

2

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-EB01-072108

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-03

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0390.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
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16					
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19					
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21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

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1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072108

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-03 Lab File ID: 0807072-03R291.d

Sample Vol:(mL) 25.0 Date Received: 07/23/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/01/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

JCW
10/22/08

2DL

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072108DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-03RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-03D90.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 3.1

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Use original

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	1.6	U
74-87-3	Chloromethane	1.6	U
75-01-4	Vinyl chloride	1.6	U
74-83-9	Bromomethane	1.6	U
75-00-3	Chloroethane	1.6	U
75-69-4	Trichlorofluoromethane	1.6	U
75-35-4	1,1-Dichloroethene	1.6	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.6	U
67-64-1	Acetone	60	D
75-15-0	Carbon disulfide	1.6	U
79-20-9	Methyl acetate	1.6	U
75-09-2	Methylene chloride	12	~~BD~~ U BL
156-60-5	trans-1,2-Dichloroethene	1.6	U
1634-04-4	Methyl tert-butyl ether	1.6	U
75-34-3	1,1-Dichloroethane	1.6	U
156-59-2	cis-1,2-Dichloroethene	1.6	U
78-93-3	2-Butanone	16	U
74-97-5	Bromochloromethane	1.6	U
67-66-3	Chloroform	31	D
71-55-6	1,1,1-Trichloroethane	1.6	U
110-82-7	Cyclohexane	1.6	U
56-23-5	Carbon tetrachloride	1.6	U
71-43-2	Benzene	1.6	U
107-06-2	1,2-Dichloroethane	1.6	U
79-01-6	Trichloroethene	1.6	U

RE

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW 10/22/08

2DL

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072108DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-03RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-03D90.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 3.1

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	1.6	U
78-87-5	1,2-Dichloropropane	1.6	U
75-27-4	Bromodichloromethane	1.6	U
10061-01-5	cis-1,3-Dichloropropene	1.6	U
108-10-1	4-Methyl-2-pentanone	16	U
108-88-3	Toluene	1.6	U
10061-02-6	trans-1,3-Dichloropropene	1.6	U
79-00-5	1,1,2-Trichloroethane	1.6	U
127-18-4	Tetrachloroethene	1.6	U
591-78-6	2-Hexanone	16	U
124-48-1	Dibromochloromethane	0.38	JD
106-93-4	1,2-Dibromoethane	1.6	U
108-90-7	Chlorobenzene	1.6	U
100-41-4	Ethylbenzene	1.6	U
95-47-6	o-Xylene	1.6	U
179601-23-1	m,p-Xylene	1.6	U
100-42-5	Styrene	1.6	U
75-25-2	Bromoform	0.87	JD
98-82-8	Isopropylbenzene	1.6	U
79-34-5	1,1,2,2-Tetrachloroethane	1.6	U
541-73-1	1,3-Dichlorobenzene	1.6	U
106-46-7	1,4-Dichlorobenzene	1.6	U
95-50-1	1,2-Dichlorobenzene	1.6	U
96-12-8	1,2-Dibromo-3-chloropropane	1.6	U
120-82-1	1,2,4-Trichlorobenzene	1.6	U
87-61-6	1,2,3-Trichlorobenzene	1.6	U

RC

R

LW 10/22/08

2DL

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-EB01-072108DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-03RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-03D90.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 3.1

Use original

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	5.96	14	JD
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

RE

lw 10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072008

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-04

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0490.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	52	
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	12	~~B~~ u BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	34 ~~32~~	~~E~~ R DL
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

lw 10/22/08

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1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072008

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-04

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0490.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.21	J
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ R DL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

lw 10/22/08

3

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-EB01-072008

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-04

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0490.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	5.96	1.2	J
02		UNKNOWN	6.44	18	J
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lew 10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072008

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-04 Lab File ID: 0807072-04R291.d

Sample Vol:(mL) 25.0 Date Received: 07/23/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/01/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg)ug/L	Q
106-93-4	1,2-Dibromoethane	0.013	J
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

few 10/22/08

3DL

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072008DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-04RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-04D90.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 3.6 Use - Original

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ~~ug/kg~~) ug/L	Q
75-71-8	Dichlorodifluoromethane	1.8	U
74-87-3	Chloromethane	1.8	U
75-01-4	Vinyl chloride	1.8	U
74-83-9	Bromomethane	1.8	U
75-00-3	Chloroethane	1.8	U
75-69-4	Trichlorofluoromethane	1.8	U
75-35-4	1,1-Dichloroethene	1.8	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.8	U
67-64-1	Acetone	63	D
75-15-0	Carbon disulfide	1.8	U
79-20-9	Methyl acetate	1.8	U
75-09-2	Methylene chloride	12	~~BD~~ u BL
156-60-5	trans-1,2-Dichloroethene	1.8	U
1634-04-4	Methyl tert-butyl ether	1.8	U
75-34-3	1,1-Dichloroethane	1.8	U
156-59-2	cis-1,2-Dichloroethene	1.8	U
78-93-3	2-Butanone	18	U
74-97-5	Bromochloromethane	1.8	U
67-66-3	Chloroform	34	D
71-55-6	1,1,1-Trichloroethane	1.8	U
110-82-7	Cyclohexane	1.8	U
56-23-5	Carbon tetrachloride	1.8	U
71-43-2	Benzene	1.8	U
107-06-2	1,2-Dichloroethane	1.8	U
79-01-6	Trichloroethene	1.8	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

lw 10/22/08

3DL

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072008DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-04RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-04D90.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 3.6

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL) Use ORIGINAL

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	1.8	U
78-87-5	1,2-Dichloropropane	1.8	U
75-27-4	Bromodichloromethane	1.8	U
10061-01-5	cis-1,3-Dichloropropene	1.8	U
108-10-1	4-Methyl-2-pentanone	18	U
108-88-3	Toluene	1.8	U
10061-02-6	trans-1,3-Dichloropropene	1.8	U
79-00-5	1,1,2-Trichloroethane	1.8	U
127-18-4	Tetrachloroethene	1.8	U
591-78-6	2-Hexanone	18	U
124-48-1	Dibromochloromethane	1.8	U
106-93-4	1,2-Dibromoethane	1.8	U
108-90-7	Chlorobenzene	1.8	U
100-41-4	Ethylbenzene	1.8	U
95-47-6	o-Xylene	1.8	U
179601-23-1	m,p-Xylene	1.8	U
100-42-5	Styrene	1.8	U
75-25-2	Bromoform	1.8	U
98-82-8	Isopropylbenzene	1.8	U
79-34-5	1,1,2,2-Tetrachloroethane	1.8	U
541-73-1	1,3-Dichlorobenzene	1.8	U
106-46-7	1,4-Dichlorobenzene	1.8	U
95-50-1	1,2-Dichlorobenzene	1.8	U
96-12-8	1,2-Dibromo-3-chloropropane	1.8	U
120-82-1	1,2,4-Trichlorobenzene	1.8	U
87-61-6	1,2,3-Trichlorobenzene	1.8	U

lw 10/22/08

3DL

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-EB01-072008DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-04RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-04D90.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 3.6 use orig. wt

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	6.44	17	JD
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lw 10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-05

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0590.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.11	J
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50 ~~0.11~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW 10/22/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-05

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0590.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.58	
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ R DL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	1.5	
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

LW
10/22/08

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-05

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0590.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	11.85	0.52	J
02		UNKNOWN	13.33	1.3	J
03	93-53-8	Benzeneacetaldehyde, .alpha.-methyl	13.91	3.1	JN
04		UNKNOWN	14.20	0.60	J
05	135-01-3	Benzene, 1,2-diethyl- $$ Benzene, (	14.24	1.8	JN
06		UNKNOWN	14.34	0.57	J
07	527-84-4	Benzene, 1-methyl-2-(1-methylethyl)	14.64	3.6	JN
08		UNKNOWN	14.73	1.4	J
09		UNKNOWN	14.79	5.1	J
10		UNKNOWN	14.86	1.4	J
11	4175-53-5	1H-Indene, 2,3-dihydro-1,3-dimethyl	14.95	2.2	JN
12	95-93-2	Benzene, 1,2,4,5-tetramethyl-	14.99	5.5	JN
13		UNKNOWN	15.06	1.8	J
14		UNKNOWN	15.15	3.4	J
15		UNKNOWN	15.27	2.5	J
16	4489-84-3	Benzene, (3-methyl-2-butenyl)-	15.35	2.1	JN
17		UNKNOWN	15.40	1.1	J
18		UNKNOWN	15.45	3.3	J
19	767-58-8	Indan, 1-methyl-	15.49	10	JN
20	119-64-2	Naphthalene, 1,2,3,4-tetrahydro-	15.69	2.0	JN
21		UNKNOWN	15.76	5.0	J
22	6682-71-9	1H-Indene, 2,3-dihydro-4,7-dimethyl	15.84	11	JN
23		UNKNOWN	15.94	13	J
24		UNKNOWN	16.04	0.87	J
25		UNKNOWN	16.09	2.6	J
26		UNKNOWN	16.29	7.5	J
27	5557-93-7	Benzene, 1-(1-methylethenyl)-2-(1-m	16.38	5.9	JN
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lw
10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-05 Lab File ID: 0807072-05R291.d

Sample Vol:(mL) 25.0 Date Received: 07/23/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/01/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	1.1	

Rew
10/22/08

5

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-06

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0690.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0 ~~2.7~~	~~J~~ U BL
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

JW 10/22/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-06

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0690.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ RDL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ RDL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

lw
10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-06

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0690.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	6.44	5.8	J
02		UNKNOWN	12.86	0.77	J
03	2131-42-2	Naphthalene, 1,4,6-trimethyl-	13.02	0.93	JN
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

dlw
10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-06 Lab File ID: 0807072-06R291.d

Sample Vol:(mL) 25.0 Date Received: 07/23/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/01/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

lw
10/22/08

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1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-07

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0790.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.12	J
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50 ~~0.11~~	~~JB~~ u BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

lw 10/22/08

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1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-07

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0790.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.55	
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ R DL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	1.4	
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

lw 10/22/08

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW05P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-07

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0790.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	17059-48-2	1H-Indene, 2,3-dihydro-1,6-dimethyl	15.94	13	JN
02	1560-06-1	Benzene, 2-butenyl-	15.50	7.8	JN
03	6682-71-9	1H-Indene, 2,3-dihydro-4,7-dimethyl	15.84	7.2	JN
04		UNKNOWN	16.28	7.0	J
05		UNKNOWN	16.39	5.7	J
06	95-93-2	Benzene, 1,2,4,5-tetramethyl-	14.99	5.6	JN
07		UNKNOWN	15.76	4.9	J
08		UNKNOWN	14.79	4.6	J
09		UNKNOWN	15.89	3.9	J
10		UNKNOWN	16.09	3.7	J
11	535-77-3	Benzene, 1-methyl-3-(1-methylethyl)	15.45	3.5	JN
12		UNKNOWN	15.16	3.4	J
13	933-98-2	Benzene, 1-ethyl-2,3-dimethyl-	14.64	3.3	JN
14	135-98-8	Benzene, (1-methylpropyl)-	13.92	2.5	JN
15	53172-84-2	Benzene, (1-methyl-1-butenyl)-	15.35	2.2	JN
16		UNKNOWN	15.69	2.1	J
17	20836-11-7	2,2-Dimethylindene, 2,3-dihydro- $$	14.94	1.9	JN
18		UNKNOWN	15.27	1.9	J
19		UNKNOWN	15.07	1.8	J
20	135-01-3	Benzene, 1,2-diethyl- $$ Benzene, (	14.24	1.8	JN
21		UNKNOWN	14.73	1.5	J
22		UNKNOWN	15.53	1.5	J
23	4489-84-3	Benzene, (3-methyl-2-butenyl)-	14.85	1.4	JN
24	2245-38-7	Naphthalene, 1,6,7-trimethyl-	13.50	0.98	JN
25	40650-41-7	1H-Indene, 2,3-dihydro-1,1,5-trimet	16.05	0.96	JN
26	4551-51-3	1H-Indene, octahydro-, cis-	13.75	0.96	JN
27		UNKNOWN	15.41	0.92	J
28	103-65-1	Benzene, propyl-	13.34	0.89	JN
29		UNKNOWN	14.35	0.67	J
30		UNKNOWN	15.24	0.59	J
	E966796[1]	Total Alkanes	N/A	0.57	

[1]EPA-designated Registry Number.

10/22/08

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1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW05P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-07 Lab File ID: 0807072-07R291.d

Sample Vol:(mL) 25.0 Date Received: 07/23/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/01/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

lw 10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-TB01-072108

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-08

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0890.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

MW
10/22/08

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1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-TB01-072108

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-08

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0890.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ R DL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

10/22/08

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-TB01-072108

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-08

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0890.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/23/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	829-26-5	Naphthalene, 2,3,6-trimethyl-	12.86	2.0	JN
02	2131-42-2	Naphthalene, 1,4,6-trimethyl- $$ 1,	13.04	1.7	JN
03	2245-38-7	Naphthalene, 1,6,7-trimethyl- $$ Na	13.50	0.84	JN
04		UNKNOWN	13.68	1.4	J
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

MW 10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-TB01-072108

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-08 Lab File ID: 0807072-08R291.d

Sample Vol:(mL) 25.0 Date Received: 07/23/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/01/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

lew 10/22/08

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1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072208

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-09

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0990.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/24/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.13	J
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	14	
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.88	~~B~~ U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.34	J
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

lw 10/22/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072208

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-09

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0990.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/24/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
108-87-2	Methylcyclohexane	0.50	U	
78-87-5	1,2-Dichloropropane	0.50	U	
75-27-4	Bromodichloromethane	0.50	U	
10061-01-5	cis-1,3-Dichloropropene	0.50	U	
108-10-1	4-Methyl-2-pentanone	5.0	U	
108-88-3	Toluene	0.50	U	
10061-02-6	trans-1,3-Dichloropropene	0.50	U	
79-00-5	1,1,2-Trichloroethane	0.50	U	
127-18-4	Tetrachloroethene	0.50	U	
591-78-6	2-Hexanone	5.0	U	
124-48-1	Dibromochloromethane	0.50	U	
106-93-4	1,2-Dibromoethane	0.50	~~U~~	R DL
108-90-7	Chlorobenzene	0.50	U	
100-41-4	Ethylbenzene	0.50	U	
95-47-6	o-Xylene	0.50	U	
179601-23-1	m,p-Xylene	0.50	U	
100-42-5	Styrene	0.50	U	
75-25-2	Bromoform	0.50	U	
98-82-8	Isopropylbenzene	0.50	U	
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U	
541-73-1	1,3-Dichlorobenzene	0.50	U	
106-46-7	1,4-Dichlorobenzene	0.50	U	
95-50-1	1,2-Dichlorobenzene	0.50	U	
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~	R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U	
87-61-6	1,2,3-Trichlorobenzene	0.50	U	

lw 10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-EB01-072208

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-09

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-0990.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/24/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	6.44	3.7	J
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lcw
10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072208

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-09 Lab File ID: 0807072-09R291.d

Sample Vol:(mL) 25.0 Date Received: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/01/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg)ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

JW 10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW09

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-10

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1090.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/24/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
75-71-8	Dichlorodifluoromethane	0.50	U	
74-87-3	Chloromethane	0.50	U	
75-01-4	Vinyl chloride	0.50	U	
74-83-9	Bromomethane	0.50	U	
75-00-3	Chloroethane	0.50	U	
75-69-4	Trichlorofluoromethane	0.50	U	
75-35-4	1,1-Dichloroethene	0.50	U	
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U	
67-64-1	Acetone	11		u BL
75-15-0	Carbon disulfide	0.50	U	
79-20-9	Methyl acetate	0.50	U	
75-09-2	Methylene chloride	0.50 ~~0.35~~	~~JB~~	u BL
156-60-5	trans-1,2-Dichloroethene	0.50	U	
1634-04-4	Methyl tert-butyl ether	0.50	U	
75-34-3	1,1-Dichloroethane	0.50	U	
156-59-2	cis-1,2-Dichloroethene	0.50	U	
78-93-3	2-Butanone	5.0	U	
74-97-5	Bromochloromethane	0.50	U	
67-66-3	Chloroform	0.50	U	
71-55-6	1,1,1-Trichloroethane	0.50	U	
110-82-7	Cyclohexane	0.50	U	
56-23-5	Carbon tetrachloride	0.50	U	
71-43-2	Benzene	0.50	U	
107-06-2	1,2-Dichloroethane	0.50	U	
79-01-6	Trichloroethene	0.50	U	

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW 6/22/08

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1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW09

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-10

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1090.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/24/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ RL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.18	J
179601-23-1	m,p-Xylene	0.56	
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ RDL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

LW 10/22/08

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW09

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-10

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1090.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/24/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	6.44	1.8	J
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lew 10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW09

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-10 Lab File ID: 0807072-10R291.d

Sample Vol:(mL) 25.0 Date Received: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/01/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

fw
10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-11

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1190.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/24/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50 ~~0.35~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

fcw 10/22/08

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1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-11

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1190.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/24/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
108-87-2	Methylcyclohexane	0.50	U	
78-87-5	1,2-Dichloropropane	0.50	U	
75-27-4	Bromodichloromethane	0.50	U	
10061-01-5	cis-1,3-Dichloropropene	0.50	U	
108-10-1	4-Methyl-2-pentanone	5.0	U	
108-88-3	Toluene	0.50	U	
10061-02-6	trans-1,3-Dichloropropene	0.50	U	
79-00-5	1,1,2-Trichloroethane	0.50	U	
127-18-4	Tetrachloroethene	0.50	U	
591-78-6	2-Hexanone	5.0	U	
124-48-1	Dibromochloromethane	0.50	U	
106-93-4	1,2-Dibromoethane	0.50	~~U~~	RDL
108-90-7	Chlorobenzene	0.50	~~U~~	
100-41-4	Ethylbenzene	0.50	U	
95-47-6	o-Xylene	0.16	J	
179601-23-1	m,p-Xylene	0.48	J	
100-42-5	Styrene	0.50	U	
75-25-2	Bromoform	0.50	U	
98-82-8	Isopropylbenzene	0.50	U	
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U	
541-73-1	1,3-Dichlorobenzene	0.50	U	
106-46-7	1,4-Dichlorobenzene	0.50	U	
95-50-1	1,2-Dichlorobenzene	0.50	U	
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~	RDL
120-82-1	1,2,4-Trichlorobenzene	0.50	U	
87-61-6	1,2,3-Trichlorobenzene	0.50	U	

LW 10/22/08

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-11

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1190.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/24/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lw 10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-11 Lab File ID: 0807072-11R291.d

Sample Vol:(mL) 25.0 Date Received: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/01/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg)ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

lw 10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW04

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-12

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1290.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/24/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
75-71-8	Dichlorodifluoromethane	0.50	U	
74-87-3	Chloromethane	0.50	U	
75-01-4	Vinyl chloride	0.50	U	
74-83-9	Bromomethane	0.50	U	
75-00-3	Chloroethane	0.50	U	
75-69-4	Trichlorofluoromethane	0.50	U	
75-35-4	1,1-Dichloroethene	0.50	~~U~~	UJ SSL
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U	
67-64-1	Acetone	8.1		U BL
75-15-0	Carbon disulfide	0.50	U	
79-20-9	Methyl acetate	0.50	U	
75-09-2	Methylene chloride	0.70	~~B~~	U BL
156-60-5	trans-1,2-Dichloroethene	0.50	~~U~~	UJ SSL
1634-04-4	Methyl tert-butyl ether	0.50	U	
75-34-3	1,1-Dichloroethane	0.50	U	
156-59-2	cis-1,2-Dichloroethene	0.50	~~U~~	UJ SSL
78-93-3	2-Butanone	5.0	U	
74-97-5	Bromochloromethane	0.50	U	
67-66-3	Chloroform	0.16	J	
71-55-6	1,1,1-Trichloroethane	0.50	U	
110-82-7	Cyclohexane	3.6		
56-23-5	Carbon tetrachloride	0.50	U	
71-43-2	Benzene	5.0		
107-06-2	1,2-Dichloroethane	0.50	U	
79-01-6	Trichloroethene	0.50	U	

Report 1,4-Dioxane for Low-Medium VOA analysis only

10/22/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW04

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-12

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1290.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/24/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.55	
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.10	J
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ R DL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.12	J
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.14	J
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	2.9	
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

lw 10/22/08

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW04

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-12

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1290.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/24/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	5.28	6.1	J
02		UNKNOWN	7.05	0.69	J
03		UNKNOWN	10.38	0.77	J
04		UNKNOWN	10.50	4.0	J
05		UNKNOWN	10.63	2.8	J
06		UNKNOWN	10.85	0.88	J
07	473-91-6	Cyclopentene, 1,2,3-trimethyl- $$	11.36	2.8	JN
08	103-65-1	Benzene, propyl-	13.34	9.0	JN
09	622-96-8	Benzene, 1-ethyl-4-methyl-	13.65	0.78	JN
10		UNKNOWN	13.91	2.3	J
11	135-01-3	Benzene, 1,2-diethyl-	14.24	7.9	JN
12	873-49-4	Benzene, cyclopropyl- $$ Cyclopropa	14.33	14	JN
13	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	14.64	0.83	JN
14	768-49-0	Benzene, (2-methyl-1-propenyl)- $$	14.74	1.3	JN
15	767-58-8	Indan, 1-methyl-	14.80	2.7	JN
16		UNKNOWN	14.86	0.63	J
17	4489-84-3	Benzene, (3-methyl-2-butenyl)-	14.95	0.82	JN
18	95-93-2	Benzene, 1,2,4,5-tetramethyl-	14.99	1.0	JN
19		UNKNOWN	15.16	0.97	J
20	17057-82-8	1H-Indene, 2,3-dihydro-1,2-dimethyl	15.35	0.83	JN
21	768-00-3	Benzene, (1-methyl-1-propenyl)-, (E	15.50	9.6	JN
22		UNKNOWN	15.77	0.62	J
23		UNKNOWN	15.84	2.7	J
24	6682-71-9	1H-Indene, 2,3-dihydro-4,7-dimethyl	15.94	3.8	JN
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lw 10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW04

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-12 Lab File ID: 0807072-12R291.d

Sample Vol:(mL) 25.0 Date Received: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/01/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

lw 10/22/08

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1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-TB01-072308

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-13

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1390.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/24/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50 ~~34~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW 10/22/08

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1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-TB01-072308

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-13

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1390.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/24/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ R DL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-TB01-072308

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-13

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1390.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/24/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lw
10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-TB01-072308

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-13 Lab File ID: 0807072-13R291.d

Sample Vol:(mL) 25.0 Date Received: 07/24/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/01/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

lew 10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-15

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1590.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/25/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50 ~~0.20~~	~~JB~~ U BC
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

lw 10/22/08

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1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-15

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1590.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/25/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ R DL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

lw 10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-15

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1590.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/25/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lw 10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-15 Lab File ID: 0807072-15R291.d

Sample Vol:(mL) 25.0 Date Received: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/01/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

lw
10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-16

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1690.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/25/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50 ~~0.23~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	2.3	
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.14	J
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

lew 10/22/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-16

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1690.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/25/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.83	
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ R DL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.25	J
179601-23-1	m,p-Xylene	0.62	
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.69	
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

lw 10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-16

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1690.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/25/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	5.27	10	J
02		UNKNOWN	7.24	1.2	J
03		UNKNOWN	8.24	2.9	J
04		UNKNOWN	9.27	1.7	J
05		UNKNOWN	9.33	1.1	J
06		UNKNOWN	9.39	0.51	J
07		UNKNOWN	9.99	0.52	J
08		UNKNOWN	10.52	1.2	J
09		UNKNOWN	11.36	1.1	J
10		UNKNOWN	11.80	0.55	J
11		UNKNOWN	13.34	1.8	J
12		UNKNOWN	13.92	1.0	J
13	135-01-3	Benzene, 1,2-diethyl-	14.25	2.4	JN
14		UNKNOWN	14.33	2.2	J
15	874-41-9	Benzene, 1-ethyl-2,4-dimethyl-	14.64	0.86	JN
16		UNKNOWN	14.80	1.8	J
17	535-77-3	Benzene, 1-methyl-3-(1-methylethyl)	15.00	1.3	JN
18		UNKNOWN	15.35	0.72	J
19	767-58-8	Indan, 1-methyl-	15.50	4.2	JN
20		UNKNOWN	15.85	1.9	J
21	6682-71-9	1H-Indene, 2,3-dihydro-4,7-dimethyl	15.94	3.3	JN
22		UNKNOWN	16.39	0.85	J
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A	7.9	

[1]EPA-designated Registry Number.

LW 10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-16 Lab File ID: 0807072-16R391.d

Sample Vol:(mL) 25.0 Date Received: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/04/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

MW 10/22/08

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1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072308

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-17

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1790.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/25/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	12	
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.82	~~B~~ U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

RW 10/22/08

15

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072308

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-17

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1790.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/25/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
108-87-2	Methylcyclohexane	0.50	U	
78-87-5	1,2-Dichloropropane	0.50	U	
75-27-4	Bromodichloromethane	0.50	U	
10061-01-5	cis-1,3-Dichloropropene	0.50	U	
108-10-1	4-Methyl-2-pentanone	5.0	U	
108-88-3	Toluene	0.50	U	
10061-02-6	trans-1,3-Dichloropropene	0.50	U	
79-00-5	1,1,2-Trichloroethane	0.50	U	
127-18-4	Tetrachloroethene	0.50	U	
591-78-6	2-Hexanone	5.0	U	
124-48-1	Dibromochloromethane	0.50	U	
106-93-4	1,2-Dibromoethane	0.50	~~U~~	R DL
108-90-7	Chlorobenzene	0.50	U	
100-41-4	Ethylbenzene	0.50	U	
95-47-6	o-Xylene	0.50	U	
179601-23-1	m,p-Xylene	0.50	U	
100-42-5	Styrene	0.50	U	
75-25-2	Bromoform	0.50	U	
98-82-8	Isopropylbenzene	0.50	U	
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U	
541-73-1	1,3-Dichlorobenzene	0.50	U	
106-46-7	1,4-Dichlorobenzene	0.50	U	
95-50-1	1,2-Dichlorobenzene	0.50	U	
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~	R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U	
87-61-6	1,2,3-Trichlorobenzene	0.50	U	

lw
10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-EB01-072308

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-17

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1790.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/25/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	5.96	2.7	J
02		UNKNOWN	6.44	3.1	J
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lw 10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072308

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-17 Lab File ID: 0807072-17R291.d

Sample Vol:(mL) 25.0 Date Received: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/01/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

lw
10/22/08

1b

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072408

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-18

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1890.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/25/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.12	J
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	27	
75-15-0	Carbon disulfide	0.18	J
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50 ~~0.37~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	1.4	J
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW
10/22/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072408

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-18

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1890.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/25/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ R DL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

lw 10/22/08

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-EB01-072408

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-18

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1890.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/25/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

RW 10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-EB01-072408

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-18 Lab File ID: 0807072-18R291.d

Sample Vol:(mL) 25.0 Date Received: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/01/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

lw 10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-TB01-072408

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-19

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1990.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/25/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50 ~~0.37~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

MW 11/27/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-TB01-072408

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-19

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1990.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/25/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
108-87-2	Methylcyclohexane	0.50	U	
78-87-5	1,2-Dichloropropane	0.50	U	
75-27-4	Bromodichloromethane	0.50	U	
10061-01-5	cis-1,3-Dichloropropene	0.50	U	
108-10-1	4-Methyl-2-pentanone	5.0	U	
108-88-3	Toluene	0.50	U	
10061-02-6	trans-1,3-Dichloropropene	0.50	U	
79-00-5	1,1,2-Trichloroethane	0.50	U	
127-18-4	Tetrachloroethene	0.50	U	
591-78-6	2-Hexanone	5.0	U	
124-48-1	Dibromochloromethane	0.50	U	
106-93-4	1,2-Dibromoethane	0.50	~~U~~	R DL
108-90-7	Chlorobenzene	0.50	U	
100-41-4	Ethylbenzene	0.50	U	
95-47-6	o-Xylene	0.50	U	
179601-23-1	m,p-Xylene	0.50	U	
100-42-5	Styrene	0.50	U	
75-25-2	Bromoform	0.50	U	
98-82-8	Isopropylbenzene	0.50	U	
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U	
541-73-1	1,3-Dichlorobenzene	0.50	U	
106-46-7	1,4-Dichlorobenzene	0.50	U	
95-50-1	1,2-Dichlorobenzene	0.50	U	
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~	R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U	
87-61-6	1,2,3-Trichlorobenzene	0.50	U	

lw 10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-TB01-072408

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-19

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-1990.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/25/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lw 10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-TB01-072408

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-19 Lab File ID: 0807072-19R291.d

Sample Vol:(mL) 25.0 Date Received: 07/25/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/01/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

RW 10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-20

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2090.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50 ~~0.13~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.43	J
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW 12/22/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-20

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2090.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
108-87-2	Methylcyclohexane	0.50	U	
78-87-5	1,2-Dichloropropane	0.50	U	
75-27-4	Bromodichloromethane	0.50	U	
10061-01-5	cis-1,3-Dichloropropene	0.50	U	
108-10-1	4-Methyl-2-pentanone	5.0	U	
108-88-3	Toluene	0.50	U	
10061-02-6	trans-1,3-Dichloropropene	0.50	U	
79-00-5	1,1,2-Trichloroethane	0.50	U	
127-18-4	Tetrachloroethene	0.50	U	
591-78-6	2-Hexanone	5.0	U	
124-48-1	Dibromochloromethane	0.50	U	
106-93-4	1,2-Dibromoethane	0.50	~~U~~	R DL
108-90-7	Chlorobenzene	0.50	U	
100-41-4	Ethylbenzene	0.50	U	
95-47-6	o-Xylene	0.50	U	
179601-23-1	m,p-Xylene	0.50	U	
100-42-5	Styrene	0.50	U	
75-25-2	Bromoform	0.50	U	
98-82-8	Isopropylbenzene	0.50	U	
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U	
541-73-1	1,3-Dichlorobenzene	0.50	U	
106-46-7	1,4-Dichlorobenzene	0.50	U	
95-50-1	1,2-Dichlorobenzene	0.50	U	
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U	R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U	
87-61-6	1,2,3-Trichlorobenzene	0.50	U	

lw 10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-20

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2090.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	6.44	2.1	J
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

LW
10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW03

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-20 Lab File ID: 0807072-2091.d

Sample Vol:(mL) 25.0 Date Received: 07/29/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/02/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg)ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

lw 10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-21

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2190.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.10	J
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.13	J
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	14	u BL
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50 ~~0.16~~	~~JB~~ u BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.23	J
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

lw 10/22/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-21

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2190.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
108-87-2	Methylcyclohexane	0.50	U	
78-87-5	1,2-Dichloropropane	0.50	U	
75-27-4	Bromodichloromethane	0.50	U	
10061-01-5	cis-1,3-Dichloropropene	0.50	U	
108-10-1	4-Methyl-2-pentanone	5.0	U	
108-88-3	Toluene	0.50	U	
10061-02-6	trans-1,3-Dichloropropene	0.50	U	
79-00-5	1,1,2-Trichloroethane	0.50	U	
127-18-4	Tetrachloroethene	0.50	U	
591-78-6	2-Hexanone	5.0	U	
124-48-1	Dibromochloromethane	0.50	U	
106-93-4	1,2-Dibromoethane	0.50	~~U~~	R DL
108-90-7	Chlorobenzene	0.50	U	
100-41-4	Ethylbenzene	0.50	U	
95-47-6	o-Xylene	0.50	U	
179601-23-1	m,p-Xylene	0.50	U	
100-42-5	Styrene	0.50	U	
75-25-2	Bromoform	0.50	U	
98-82-8	Isopropylbenzene	0.50	U	
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U	
541-73-1	1,3-Dichlorobenzene	0.50	U	
106-46-7	1,4-Dichlorobenzene	0.50	U	
95-50-1	1,2-Dichlorobenzene	0.50	U	
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~	R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U	
87-61-6	1,2,3-Trichlorobenzene	0.50	U	

lrw 10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-21

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2190.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	6.44	4.8	J
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lrw 10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-21 Lab File ID: 0807072-2191.d

Sample Vol:(mL) 25.0 Date Received: 07/29/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/02/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-22

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2290.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50 ~~0.15~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.10	J
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

RW 10/22/08

20

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-22

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2290.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
108-87-2	Methylcyclohexane	0.50	U	
78-87-5	1,2-Dichloropropane	0.50	U	
75-27-4	Bromodichloromethane	0.50	U	
10061-01-5	cis-1,3-Dichloropropene	0.50	U	
108-10-1	4-Methyl-2-pentanone	5.0	U	
108-88-3	Toluene	0.50	U	
10061-02-6	trans-1,3-Dichloropropene	0.50	U	
79-00-5	1,1,2-Trichloroethane	0.50	U	
127-18-4	Tetrachloroethene	0.50	U	
591-78-6	2-Hexanone	5.0	U	
124-48-1	Dibromochloromethane	0.50	U	
106-93-4	1,2-Dibromoethane	0.50	~~U~~	R DL
108-90-7	Chlorobenzene	0.50	U	
100-41-4	Ethylbenzene	0.50	U	
95-47-6	o-Xylene	0.50	U	
179601-23-1	m,p-Xylene	0.50	U	
100-42-5	Styrene	0.50	U	
75-25-2	Bromoform	0.50	U	
98-82-8	Isopropylbenzene	0.50	U	
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U	
541-73-1	1,3-Dichlorobenzene	0.50	U	
106-46-7	1,4-Dichlorobenzene	0.50	U	
95-50-1	1,2-Dichlorobenzene	0.50	U	
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~	R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U	
87-61-6	1,2,3-Trichlorobenzene	0.50	U	

lcw
10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-22

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2290.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	6.43	5.2	J
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
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17					
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19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lW 10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW07

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-22 Lab File ID: 0807072-2291.d

Sample Vol:(mL) 25.0 Date Received: 07/29/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/02/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

lw 10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-23

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2390.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	38	
75-15-0	Carbon disulfide	0.19	J
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50 ~~0.17~~	~~JB~~ U BC
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	1.7	J
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

lw 10/22/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-23

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2390.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
108-87-2	Methylcyclohexane	0.50	U	
78-87-5	1,2-Dichloropropane	0.50	U	
75-27-4	Bromodichloromethane	0.50	U	
10061-01-5	cis-1,3-Dichloropropene	0.50	U	
108-10-1	4-Methyl-2-pentanone	5.0	U	
108-88-3	Toluene	0.50	U	
10061-02-6	trans-1,3-Dichloropropene	0.50	U	
79-00-5	1,1,2-Trichloroethane	0.50	U	
127-18-4	Tetrachloroethene	0.50	U	
591-78-6	2-Hexanone	5.0	U	
124-48-1	Dibromochloromethane	0.50	U	
106-93-4	1,2-Dibromoethane	0.50	~~U~~	R DL
108-90-7	Chlorobenzene	0.50	U	
100-41-4	Ethylbenzene	0.50	U	
95-47-6	o-Xylene	0.50	U	
179601-23-1	m,p-Xylene	0.50	U	
100-42-5	Styrene	0.50	U	
75-25-2	Bromoform	0.50	U	
98-82-8	Isopropylbenzene	0.50	U	
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U	
541-73-1	1,3-Dichlorobenzene	0.50	U	
106-46-7	1,4-Dichlorobenzene	0.50	U	
95-50-1	1,2-Dichlorobenzene	0.50	U	
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~	R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U	
87-61-6	1,2,3-Trichlorobenzene	0.50	U	

lw
10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-EB01-072708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-23

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2390.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	67-63-0	Isopropyl Alcohol $$ 2-Propanol $$	6.44	66	JN
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

hw
10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072708

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-23 Lab File ID: 0807072-2391.d

Sample Vol:(mL) 25.0 Date Received: 07/29/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/02/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

lw
10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-24

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2490.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0 ~~3.3~~	~~J~~ u BL
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.20	J
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW 12/22/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-24

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2490.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
108-87-2	Methylcyclohexane	0.50	U	
78-87-5	1,2-Dichloropropane	0.50	U	
75-27-4	Bromodichloromethane	0.50	U	
10061-01-5	cis-1,3-Dichloropropene	0.50	U	
108-10-1	4-Methyl-2-pentanone	5.0	U	
108-88-3	Toluene	0.50	U	
10061-02-6	trans-1,3-Dichloropropene	0.50	U	
79-00-5	1,1,2-Trichloroethane	0.50	U	
127-18-4	Tetrachloroethene	0.50	U	
591-78-6	2-Hexanone	5.0	U	
124-48-1	Dibromochloromethane	0.50	U	
106-93-4	1,2-Dibromoethane	0.50	~~U~~	R DL
108-90-7	Chlorobenzene	0.50	U	
100-41-4	Ethylbenzene	0.50	U	
95-47-6	o-Xylene	0.50	U	
179601-23-1	m,p-Xylene	0.50	U	
100-42-5	Styrene	0.50	U	
75-25-2	Bromoform	0.50	U	
98-82-8	Isopropylbenzene	0.50	U	
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U	
541-73-1	1,3-Dichlorobenzene	0.50	U	
106-46-7	1,4-Dichlorobenzene	0.50	U	
95-50-1	1,2-Dichlorobenzene	0.50	U	
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~	R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U	
87-61-6	1,2,3-Trichlorobenzene	0.50	U	

lw 10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-24

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2490.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	6.44	4.2	J
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lcw 10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW02

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Lab Sample ID: 0807072-24 Lab File ID: 0807072-2491.d

Sample Vol:(mL) 25.0 Date Received: 07/29/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/02/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

LW 10/22/08

USEPA REGION II WORKSHEETS

SOP HW-33/VOA
Revision 1
August 2007

USEPA Contract Laboratory Program
Statement of Work for Organic Analysis of Low/Medium Concentration of VolatileOrganic Compounds SOM01.2
Data Validation

Prepared by: George Karras Date: 8/13/07
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Peer Reviewed by: Russell Arnone Date: 10/3/07
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Approved by: Robert M. Runyon Date: 10/10/07
Robert Runyon, Chief
Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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INTRODUCTION

Scope and Applicability

This SOP offers detailed guidance in evaluating laboratory data generated according to the method in the "USEPA Contract Laboratory Program Statement of Work for Organics Analysis Multi-Media, Multi-Concentration, SOM01.1, May 2005". The validation procedures and actions discussed in this document are based on the requirements set forth in the "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, January 2005". This document attempts to cover technical problems specific to low/Medium concentration of volatile compounds. Situations may arise where data limitations must be assessed based on the reviewer's own professional judgement.

In addition to technical requirements, contractual requirements may also be covered in this document. While it is important that instances of contract non-compliance be addressed in the Data Assessment, the technical criteria are always used to qualify the analytical data.

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 as follows:

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.

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

P - Pesticide/Aroclor target analytes when the % Difference between the analyte concentrations obtained from the two dissimilar GC columns is greater than 25%.

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 the USEPA Statement of Work SOM01.2 and National Functional Guidelines mentioned above.

YES NO N/A

. . . . . .

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: N/A **LAB:** Compuchem, Cary, NC

SITE NAME: Vieques Island, PR **SDG No(s).:** 0807072

1.0 Chain of Custody and Sampling Trip Reports

1.1 Are the Traffic Reports/Chain-of-Custody Records present for all samples? [✓] ___ ___

ACTION: If no, contact RSCC, or the TOPO to obtain replacement of missing or illegible copies from the lab.

1.2 Is the Sampling Trip Report present for all samples? [✓] ___ ___

ACTION: If no, contact either RSCC or ask the TOPO to obtain the necessary information from the prime contractor.

2.0 Data Completeness and Deliverables

2.1 Have any missing deliverables been received and added to the data package? ___ [✓] ___

ACTION: Contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the lab. If lab cannot provide them, note the effect on the review of the data package in the Contract Problems/Non-compliance section of the Data Assessment.

2.2 Was CLASS CCS checklist included with the package? [✓] ___ ___

	YES	NO	N/A
. . . . .			
2.3 Are there any discrepancies between the Traffic Reports/Chain-of-Custody Records, and Sampling Trip Report?		[✓]	

ACTION: If yes, contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the laboratory.

3.0 Cover Letter SDG Narrative

3.1 Is the SDG Narrative or Cover Letter Present?	[✓]		
3.2 Are case number, SDG number and contract number contained in the SDG Narrative or cover letter (see SOW, Exhibit B, section 2.5.1)? EPA sample numbers in the SDG, detailed documentation of any quality control, sample, shipment, and/or analytical problems encountered in processing the samples? Corrective action taken?	[✓]		
3.3 Does the Narrative contain the following information SOM01.1, page B-12, section 2.5.1)? Description of trap, column used, storage of samples, case#, SDG#, analytical problems, and discrepancies between field and lab weights.	[✓]		
3.4 Does the narrative, VOA section, contain a list of all TICs identified as alkanes and their estimated concentrations?	[✓]		
3.5 Did the contractor record the temperature of the cooler on the Form DC-1, Item 9 - Cooler Temperature, and in the SDG Narrative?	[✓]		
3.6 Does the narrative contain a list of the pH values determined for each water sample submitted for volatiles analysis (SOW, page B-13, section 2.5.1.2)?	[✓]		

	YES	NO	N/A
. . . . .			
3.7 Does the Case Narrative contain the "verbatim" statement (page B-12, section 2.5.1 of the SOM)?	[✓]	___	___

ACTION: If "No", to any question in this section, contact the TOPO to obtain necessary resubmittals. If unavailable, document under the Contract Problems/ Non-Compliance section of the Data Assessment.

4.0 Data Validation Checklist

4.1 Check the package for the following (see SOM reporting requirements, section 2.1, page B-10):

a. Is the package paginated in ascending order starting from the SDG narrative?	[✓]	___	___
b. Are all forms and copies legible?	[✓]	___	___
c. Assembled in the order set forth in the SOW?	[✓]	___	___
d. Low/Med Concentration Volatiles Data present?	[✓]	___	___

Action: Take action as specified in section 3.7 above.

PART A: Low/Medium Volatile ANALYSES

1.0 Sample Conditions/Problems

1.1 Do the Traffic Reports/Chain-of-Custody Records, Sampling Trip Report or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	___	[✓]	___

ACTION: If samples were not iced or the ice was melted upon arrival at the laboratory and the temperature of the

YES NO N/A

. . . . . .

cooler was > 10° C, then flag all positive results with a "J" and all non-detects "UJ".

ACTION: If both 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".

2.0 Holding Times

2.1 Have any VOA technical holding times, determined from date of collection to date of analysis, been exceeded? ___ [✓] ___

2.2 Preservation: Aqueous samples must be preserved with HCL to pH of 2 or below and cooled at 4°C ± 2°C. Non-aqueous samples: frozen (less than -7°C) or properly cooled (4°C ± 2°C) and preserved with $NaHSO_4$.

Action: Qualify sample results according to the following table.

Holding Time Actions for Low/Medium Volatile Analyses

Matrix	Preserved	Criteria	ACTION	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤ 7 Days	NO Action	
	No	> 7 Days	J	R
	Yes	≤ 14 Days	No Action	
	Yes	> 14 Days	J	R
Non-Aqueous	No	≤ 14 Days	J	R
	Yes	≤ 14 Days	No Action	
	Yes/No	> 14 Days	J	R

3.0 Deuterated Monitoring Compound (DMC) Recovery (Form II)

. . . . . .

	YES	NO	N/A
3.1 Are the Volatile SMC Recovery Summaries (Form II present?	[✓]	___	___

ACTION: Contact the TOPO to obtain an explanation/resubmittal from the lab. If missing deliverables are unavailable, document the effect in the Data Assessment.

3.2 Were outliers marked correctly with an asterisk?	[✓]	___	___

ACTION: Circle all outliers in red.

3.3 Were more than three of the fourteen (14) Deuterated Monitoring Compounds (DMC's) recoveries outside their corresponding limits?	___	[✓]	___
If yes, were samples re-analyzed?	[✓]	___	✓
Were method blanks re-analyzed?	[ ]	___	✓

ACTION: If any DMC is outside the required limits (see Table below), qualify their associated target compounds (See Table below) as follows:

VOLATILE DMC AND THEIR ASSOCIATED TARGET COMPOUNDS

Chloroethane-d5	**1,2-Dichloropropane-d6**	**1,2-Dichlorobenzene-d4**
Dichlorodifluoromethane Chloromethane Bromomethane Chloroethane Carbon Disulfide	Cyclohexane Methylcyclohexane 1,2-Dichloropropane Bromodichloromethane	Chlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene 1,2,3-Trichlorobenzene

YES NO N/A

. . . . . .

1,4-Dioxane-d8 1,4-Dioxane	**trans-1,3-Dichloropropene-d4** cis-1,3-Dichloropropene trans-1,3-Dichloropropene 1,1,2-Trichloroethane	**Chloroform-d** 1,1-Dichloroethane Bromochloromethane Chloroform Dibromochloromethane Bromoform
2-Butanone-d5 Acetone 2-butanone	**1,1-dichloroethene-d2** 1,1-dichloroethene trans-1,2-Dichloroethene cis-1,2-Dichloroethene	**2-Hexanone-d5** 4-Methyl-2-pentanone 2-Hexanone
Vinyl Chloride-d3 Vinyl Chloride	**Benzene-d6** Benzene	**1,1,2,2-Tetrachloroethane-d2** 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane
1,2-Dichloroethane-d4 Trichlorofluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Methyl Acetate Methylene Chloride Methyl tert-Butyl Ether Carbon Tetrachloride 1,2-Dichloroethane 1,1,1-Trichloroethane 1,2-Dibromoethane	**Toluene-d8** Trichloroethene Toluene Tetrachloroethene Ethylbenzene o-Xylenes m,p-Xylene Styrene Isopropylbenzene	

YES NO N/A

. . . . . .

VOLATILE DEUTERATED MONITORING COMPOUND RECOVERY LIMITS

DMC	Recovery Limits (%) for Water Samples	Recovery Limits (%) for Soil samples
Vinyl Chloride-d3	65 - 131	68 - 122
Chloroethane-d5	71 - 131	61 - 130
1,1-Dichloroethene-d2	55 - 104	45 - 132
2-Butanone-d5	49 - 155	20 - 182
Chloroform-d	78 - 121	72 - 123
1,2-Dichloroethane-d4	78 - 129	79 - 122
Benzene-d6	77 - 124	80 - 121
1,2-Dichloropropane-d6	79 - 124	74 - 124
Toluene-d8	77 - 121	78 - 121
trans-1,3-Dichloropropene-d4	73 - 121	72 - 130
2-Hexanone-d5	28 - 135	17 - 184
1,4-Dioxane-d8	50 - 150	50 - 150
1,1,2,2-Tetrachloroethane-d2	73 - 125	56 - 161
1,2-Dichlorobenzene-d4	80 - 131	70 - 131

1. For any recovery greater than the upper limit:

   a. Qualify "J" all positive associated target compounds.
   b. Do not qualify associated non-detects.

2. For any recovery greater than or equal to 20%, but less than the lower limit:

   a. Qualify "J" all positive associated target compounds.
   b. Qualify "UJ" associated non-detects.

3. For any recovery less than 20%:

YES NO N/A

. . . . . .

a. Qualify "J" all positive associated target compounds.
b. Qualify "R" all associated non-detects.

NOTE: Up to three (3) DMC's per sample, excluding 1,4-Dioxane-d8, may fail to meet the recovery limits. (SOM, sec. 11.3.4, pg. D-45/Low Medium VOA). Recovery limits for 1,4-Dioxane-d8 are advisory.
As per SOM, any sample which has more than 3 DMC's outside the limits, it must be reanalyzed (SOM sec. 11.4.3.1 pg. D-46/Low Medium VOA).

ACTION: Note in the Data Assessment under Contract Problems/ Non-Compliance if the Lab did not perform reanalysis.

3.4 Are there any transcription/calculation errors between raw data and form II? ___ [✓] ___

ACTION: If large errors exist, ask the TOPO to obtain an explanation/resubmittal from the lab, make any necessary corrections and note errors in the data assessment.

Note: DMC recovery limits criteria and qualifications apply to samples diluted 5X and less. For samples diluted greater than 5X, recovery criteria does not apply because it is assumed DMC is diluted below the quantitation range.

4.0 Matrix Spike/Matrix Spike Duplicate Recovery (Form III)

Note: Data for MS/MSD will not be present unless requested.

4.1 Are the MS/MSD Recovery Forms (Form III Low/Med VOA) present? [ ] ___ ✓

4.2 Was the MS/MSD analyzed at the required frequency (once per SDG, or every 20 samples, whichever is more frequent)? [ ] ___ ✓

ACTION: If any MS/MSD data are missing, take action as specified in section 3.1 above.

ACTION: No action is taken on MS/MSD data alone. However, using professional judgement, the validator may

YES NO N/A

. . . . . .

use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. If any MS/MSD % recovery or RPD is out of specification, qualify data to include the consideration of the existence of interference in the raw data. Consideration include, but not limited to the following "Action":

Criteria	Action	
	Detected Spiked Compounds	**Non-detected Spiked Compounds**
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use Professional Judgement
Lower Acceptance Limit ≤ %R; RPD ≤ Upper Acceptance Limits	No qualification	

5.0 <u>Method Blanks (Form IV)</u>

5.1 Is the Volatile Method Blank Summary (Form IV VOA) present for aqueous and soil samples? [✓] ___ ___

5.2 <u>Frequency of Analysis</u>: For the analysis of Low/ Med Concentration VOA TCL compounds, has a method blank been analyzed for each SDG or every 20 samples, whichever is more frequent? [✓] ___ ___

5.3 Has a VOA method blank been analyzed after the calibration standards and once every 12 hours time period for each GC/MS instrument used? [✓] ___ ___

5.4 Was a VOA instrument blank analyzed after each sample/dilution that contains a target compound exceeding the initial calibration range (see SOM, page D-48/Low/Medium VOA, section 12.1.1.3)? [✓] ___ ___

YES NO N/A

. . . . . .

ACTION: If any method/instrument blank data are missing, notify the TOPO to obtain resubmittals or an explanation from the lab. If method blank data are unavailable, the reviewer may use professional judgement, or substitute field blank or trip blank data for missing method blank data.

If an instrument blank was not analyzed after a sample containing a target analyte exceeding the initial calibration standards, inspect the sample chromatogram acquired immediately after this sample for possible carryover. The system is considered uncontaminated if the target analyte is below CRQL. Use professional judgement to determine if carryover occurred and qualify analyte(s) accordingly.

5.5 Was a storage blank analyzed once per SDG after all the samples were analyzed? [✓] ___ ___

ACTION: If storage blank data is missing, contact the TOPO to obtain any missing deliverables from the laboratory. If unavailable, note in the Contract Problems/Non-Compliance section of the Data Assessment.

5.6 The validator should verify that the correct identification scheme for EPA blanks was used. (See SOM page B-39, section 3.3.7.3 for more information.)

Was the correct identification scheme used for all Low/Med VOA blanks? [✓] ___ ___

ACTION: Contact the TOPO to obtain corrections from the lab, or make the necessary corrections. Document in the "Contract Problems/Non-Compliance section of the Data Assessment all corrections made by the validator.

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

Also compare the storage blank raw data with the method blank. Determine if contamination in the storage blank is also present in the method blank.

	YES	NO	N/A
. . . . .			
Is the chromatographic performance (baseline stability) for each instrument acceptable for Low/Medium VOAs?	[✓]	___	___

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

5.8 Are all detected hits for target compounds in method, and storage blanks less than the CRQL?	[✓]	___	___

Exception: Methylene Chloride, Acetone and 2-butanone must be less than 2X times their respective CRQLs.

ACTION: If no, an explanation and laboratory's corrective actions must be addressed in the case narrative. If the narrative contains no explanation, then make a note in the Contract Problems/Non-Compliance section of the Data Assessment.

6.0 Contamination

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

6.1 Does the storage blank contain positive results (TCL and/or TICs) for Low/Med Concentration VOAs?	✓	[ ]	___
6.2 Do any method/reagent/instrument blanks contain positive results (including TICs) for Low/Med Concentration VOAs?	✓	[ ]	___

NOTE: Contaminated instrument blanks are unacceptable under this SOW (see page D-50/VOA, section 12.1.5.2).

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance if a contaminated instrument blank was submitted.

YES NO N/A

. . . . . .

ACTION: Sample analysis results after the high concentration sample must be evaluated for carryover. Sample must meet the maximum carryover criteria as listed in SOM sec. 11.3.8 p. D-46/VOA.("the sample must not contain a concentration above the CRQL for the target compounds that exceeded the limit in the contaminated sample.")

6.3 Do any field/trip/rinse blanks have positive hits for Low/Med VOA results (including TICs)? ✓ [ ] ___

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

NOTE: All field blank results associated with a particular group of samples (may exceed one per case) must be used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Field blanks & trip blanks must be qualified for system monitoring compound, instrument performance criteria, spectral or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks. If any blanks are grossly contaminated (i.e., saturated by GC/MS), all associated sample data should be qualified unusable (R).

Blank Type	Blank Result	Sample Result	Action for Samples
	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
Method, Field,		≥ CRQL*	No qualification required

YES NO N/A

. . . . . .

Trip, Storage, Instrument **	> 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
	Gross contamination	Detects	Qualify results as unusable R
	TIC > 2ug/L	Detects	See "Action" below

* 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: Analytes qualified "U" for blank contamination are treated as "hits" when qualifying for calibration criteria.

Note: When applied as described in the table above, the contaminant concentration in the blank are multiplied by the sample dilution factor.

ACTION : For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

6.4 Are there field/rinse/equipment blanks associated with every sample? ✓ 1 ___ ___

ACTION: Note in data assessment that there is no associated field/rinse/equipment blank.

<u>Exception</u>: samples taken from a drinking water tap do not have associated field blanks.

7.0 <u>GC/MS Instrument Performance Check (Form V)</u>

	YES	NO	N/A
7.1 Are the GC/MS Instrument Performance Check Forms (Form V) present for Bromofluorobenzene (BFB)?	[✓]	___	___
7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the BFB provided for each twelve hour shift?	[✓]	___	___
7.3 Did the 12-hour clock begin with either the injection of BFB, or in cases where a closing continuing calibration (CCV) was used as an opening CCV?	[✓]	___	___

Listed below are some, but not necessarily all, examples of acceptable analytical sequences incorporating the use of the opening/closing CCV. Use these examples as a guide for possible analytical sequences that can be expected.

Conditions for When Example Sequence is Appropriate:	**Acceptable Criteria That Must be Met:**	**Notes:**
If time remains on the 12 hour clock after initial calibration sequence	• BFB tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets both opening and closing CCV criteria • CCV B meets closing CCV criteria.	The requirement of starting the new 12-hr clock for Analytical Sequence 2 with a new BFB tune is waived if CCV A meets opening CCV criteria. If CCV B meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.
If time remains on the 12 hour clock after initial calibration sequence	• BFB tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets closing CCV criteria (but does not meet opening CCV criteria). • CCV B meets opening CCV criteria. • CCV C meets closing CCV Criteria.	CCV A does not meet opening criteria, therefore a new BFB tune must be performed, immediately followed by CCV B before a method blank and any samples may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new BFB tune.

YES NO N/A

. . . . . .

If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV. OR If the most recent closing CCV was not or could not be used as an opening CCV.	• BFB tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets both opening and closing CCV criteria. • CCV C meets both opening and closing CCV criteria.	The requirement of starting the new 12 hour clock for Analytical Sequence 2 with a new BFB tune is waived if CCV B meets opening CCV criteria. If CCV C meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.
If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV OR If the most recent closing CCV was not or could not be used as an opening CCV	• BFB tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets closing CCV criteria (but does not meet opening CCV criteria). • CCV C meets opening CCV Criteria. • CCV D meets both opening and closing CCV criteria.	CCV B does not meet opening CCV criteria, therefore a new BFB tune must be performed, immediately followed by CCV B before a method blank and any samples may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new BFB tune. The requirement of starting the new 12 hr clock for Analytical Sequence 3 with a new BFB tune is waived if CCV D meets opening CCV criteria. If CCV D meets opening criteria, a method blank and subsequent samples may be analyzed after CCV B.

7.4 Have the ion abundances been normalized to m/z 95 [✓] ___ ___

NOTE: All ion abundance ratios must be normalized to m/z 95, the nominal base peak, even though the ion abundance of m/z 174 may be up to 120% that of m/z 95.

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

7.5 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, professional Judgement may be applied to determine to what extent the data may be utilized.

. . . . . .

	YES	NO	N/A
7.6 Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.)	___	[✓]	___
7.7 Is the number of significant figures for the reported relative abundances consistent with the number given in the ion abundance criteria column on Form V ?	[✓]	___	___

ACTION: If large errors exist, take action as specified in section 3.1 above.

7.8 Is the spectrum of the mass calibration compound acceptable?	[✓]	___	___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

8.0 <u>Target Compound List (TCL) Analytes (Form I)</u>

8.1 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. Regional Control/MS/MSD samples?	[✓]	___	___
c. Blanks (method, trip, etc)?	[✓]	___	___

8.2 Are the VOA Reconstructed Ion Chromatograms, the 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. Regional Control/MS/MSD samples?	[✓]	___	___
c. Blanks (method, trip, etc)?	[✓]	___	___

ACTION: If any data are missing, take action specified in 3.1 above.

8.3 Is chromatographic performance acceptable with respect to:

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

	YES	NO	N/A
. . . . .			
Other: _____?	[ ]	___	✓

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

8.4	Are lab-generated standard mass spectra of the identified VOA compounds present for each sample?	[✓]	___	___

ACTION: If any mass spectra are missing, take action as specified in 3.1 above. If lab does not generate their own standard spectra, make note under the "Contract Problems/Non-Compliance" section of the Data Assessment. If spectra are unavailable reject "R" the reported results.

8.5	Is the RRT of each reported compound within ± 0.06 RRT units of the standard RRT in the continuing calibration?	[✓]	___	___
8.6	Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
8.7	Do sample and standard relative ion intensities agree to within ± 20%?	[✓]	___	___

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 sections 8.4-8.7 above.

ACTION: When sample carry-over is suspected, review section 6.2/Action #2 above before determining if instrument cross-contamination has affected positive compound identifications.

9.0 Tentatively Identified Compounds (TIC)

9.1	Are all Tentatively Identified Compound Forms (Form I VOA-TIC) present? Do listed TICs include scan number or retention time, as well as the estimated "J" and/or "JN" qualifier?	[✓]	___	___
9.2	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?	[✓]	___	___

	YES	NO	N/A
. . . . .			
b. Blanks?	[✓]	___	___
b. Are Alkanes listed in/or part of the Case Narrative?	[✓]	___	___

ACTION: If any TIC data are missing, take action specified in 3.1 above.

ACTION: Verify "JN" qualifier is present for all chemically named TICs having a percent match of greater than or equal 85%. TICs labeled "unknown" are qualified with a "J" qualifier.

9.3 Are any target compounds (from any fraction) listed as TICs? (Example: 1,2-dimethylbenzene is xylene - a VOA target analyte - and should not be reported as a TIC.)	___	[✓]	___

ACTION: Flag with "R" only target compound detected in another fraction (except blank contamination).

9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
9.5 Do TICs and "best match" reference spectra relative ion intensities agree within ± 20%?	[✓]	___	___

ACTION: Use professional judgement to determine the acceptability of TIC identifications. If it is determined that an incorrect identification was made, change its identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.

Action: When a compound is not found in any blank, but is detected in a sample and is a suspected artifact of a common laboratory contaminant, solvent preservatives or Aldo condensation, the result should be qualified as unusable (R). (i.e., common lab contaminants such as CO_2(m/e 44), Siloxanes (m/e 73), diethyl ether, hexane, certain freons. Aldol condensation products: 4-hydroxy-4-methyl-2-pentanone, 4-methyl-2-penten-2-one, and 5,5-dimethyl-2(H)-furanone. Solvent preservatives cyclohexene, and related by-products: cyclohexanone, cyclohexenone, cyclohexanol, cyclohexenone, chlorocyclohexene, and chlorocyclohexanol.).

10.0 Compound Quantitation and Reported Detection Limits

10.1 Are there any transcription/calculation errors in Form I results? (Check at least two positive values. Verify that the correct internal standards, quantitation ions, and RRFs were used to calculate Form I results.)	___	[✓]	___
10.2 Are the CRQLs adjusted to reflect sample dilutions and per cent moisture?	[✓]	___	___

	YES	NO	N/A
. . . . .			

ACTION: If errors are large, take action as specified in section 3.1 above.

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQLs data from the diluted sample). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original Form I and substituting the data from 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 not to be used, including any in the data summary package.

!0.3 For non-aqueous samples, were the percent moisture < 70%?	[ ]	___	✓

Action: If the % moisture ≥ 70.0% and < 90.0%, qualify detects as "J" and non-detects as approximated "UJ" If the % Moisture ≥ 90%, qualify detects as "J" and non-detects as "R"

11.0 Standards Data (GC/MS)

11.1 Are the reconstructed ion chromatograms, and data system printouts (quant. reports) present for each initial and continuing calibration?	[✓]	___	___

ACTION: If any calibration standard data are missing, take action specified in section 3.1 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI LCV) present and complete for the volatile fraction at concentrations of 5, 10, 50, 100, and 200 µg/ℓ for non-ketones, 10, 20, 100, 200 and 400 ug/L for ketones and 100, 200, 1000, 2000, and 4000 ug/L for 1,4-dioxane.	[✓]	___	___

ACTION: If any Initial Calibration forms are missing, take action as specified in section 3.1 above.

12.2 Are the relative standard deviation (RSD) stable for VOA's over the concentration range of the calibration (i.e., %RSD ≤ 20.%, ≤ 40% for poor performers (see table below), ≤ 50% for 1,4-dioxane)?	[✓]	___	___

ACTION: Circle all outliers in red.

NOTE: The twenty two (22) poor performers compounds and associated DMCs are listed below. The relative response factor (RRF) for these compounds must be greater than or equal to 0.010.

YES NO N/A

. . . . . .

Volatile Compounds Exhibiting Poor Response

Volatile Compounds	
Acetone	1,2-Dibromo-3-chloropropane
2-Butanone	Isopropylbenzene
Carbon disulfide	Methyl acetate
Chloroethane	Methylene chloride
Chloromethane	Methylcyclohexane
Cyclohexane	Methyl tert-butyl ether
1,4-Dioxane	trans-1,2-Dichloroethene
1,2-Dibromoethane	4-Methyl-2-pentanone
Dichlorodifluoromethane	2-Hexanone
cis-1,2-dichloroethene	Trichlorofluoromethane
1,2-Dichloropropane	1,1,2-Trichloro-1,2,2-trifluoroethane

ACTION: If %RSD > 20.0%, (> 40.0% for the poor performers, and > 50% for 1,4-dioxane), qualify associated positive results for that analyte "J" (estimated). If %RSD is > 90, flag all non-detects for that analyte "R" (unusable) and positive results "J".

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

12.3 Are any $\overline{RRF}$s < 0.050 (< 0.010 for poor performers)? ___ [✓] ___

ACTION: Circle all outliers in red.

ACTION: If any $\overline{RRF}$ values are < 0.05 or < 0.01 for poor performers, qualify associated non-detects unusable (R) and associated positive results estimated (J).

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance the analytes that fail %RSD and/or RRF criteria.

12.4 Are there any transcription /calculation errors in the reporting of RRFs, $\overline{RRF}$s or %RSD values? (Check at least 2 values, but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

YES NO N/A

. . . . . .

ACTION: If errors are large, contact the TOPO to obtain an explanation/resubmittal from the lab, document in the Data Assessment under Contract Problems/Non-Compliance.

13.0 GC/MS Continuing Calibration Verification (CCV) (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the volatile fraction? [✓] ___ ___

13.2 Did the 12 hour clock begin with either the injection of BFB or in cases where a closing CCV can be used as an opening CCV for each instrument? [✓] ___ ___

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, ask the TOPO to obtain explanation/resubmittal from the laboratory. If continuing calibration data are unavailable, flag all associated sample data as unusable (R).

13.3 Do any volatile compounds have a % Difference (% D) between the initial RRF and CCV RRF exceeding ± 50% for 1,4-Dioxane, ± 40% for the poor performers or ± 25% for the remaining compounds? ___ [✓] ___

ACTION: Circle all outliers in red.

13.4 Do any volatile compounds have a RRF < 0.05 or < 0.01 for the poor performers? ___ [✓] ___

ACTION: Circle all outliers in red.

Note: Verify that the CCV was run at the required frequency (an opening and closing CCV must be run within 12-hour period) and the CCV was compared to the correct initial calibration. If the mid-point standard from the initial calibration is used as an opening CCV, verify that the result (RRF) of the mid-point standard was compared to the average RRF from the correct initial calibration.

Note: The closing CCV used to bracket the end of a 12-hour analytical sequence may be used as the opening CCV for the new 12-hour analyical sequence, provided that all the technical acceptance criteria are met for an opening CCV (see table below). If the closing CCV does not meet the technical acceptance criteria for an opening CCV, then a BFB tune followed by an opening CCV is required and the next 12-hour time period begins with the BFB tune.

Action: Use the following table to qualify data based on the technical acceptance criteria for the opening CCV and closing CCV.

Continuing Calibration Verification (CCV) Actions for Low/Medium Volatiles Analyses

Criteria for	Criteria for	Action

YES NO N/A

. . . . . .

Opening CCV	Closing CCV	Detected Associated Compounds	Non-Detected Associated Compounds
RRF < 0.010 (poor responders) RRF < 0.050 (all other volatile target compounds)	RRF < 0.010 (for all volatile target compounds)	J	R
RRF ≥ 0.010 (poor responders) RRF ≥ 0.050 (for all other compounds)	RRF ≥ 0.010 (for all target volatile compounds)	No Action	
%D > 50.0 or < -50.0 (1,4-Dioxane) %D > 40.0 or < -40.0 (poor responders) %D > 25.0 or < -25.0 (all other volatile target compounds)	%D > 50.0 or < -50.0 (for all volatile target compounds)	J	UJ
%D ≤ 50.0 or ≥ -50.0 (1,4-Dioxane) %D ≤ 40.0 or ≥ -40.0 (poor responders) %D ≤ 25.0 or ≥ -25.0 (all other volatile target compounds)	%D ≤ 50.0 or ≥ -50.0 (for all volatile target compounds)	No Action	
Opening CCV not performed at required frequency *	Closing CCV not performed at required frequency *	R	

* See section 13.2 above

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance if more than two of the required analytes failed the above acceptance criteria.

13.5 Are there any transcription/calculation errors for the reporting of RRFs, or %D between initial RRFs and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ ✓ ___

ACTION: Circle errors with red pencil.

ACTION: If errors are large, notify the TOPO to obtain explanation/resubmittals from the lab. Document errors in the Contract Problems/Non-Compliance section of the Data Assessment.

Note: All DMCs must meet RRF ≥ 0.010. No qualification of the data is necessary on the DMCs RRF and %RSD/%Diff data alone. However, use professional judgment to evaluate the DMC and %RSD/% Diff data in conjunction with the DMC recoveries to determine the need of qualification of the data.

14.0 Internal Standard (Form VIII)

14.1 Were the internal standard area counts for every sample and blank within the range of 50.0% and 200.0% of its response in the most recent opening CCV standard calibration? ✓ ___ ___

	YES	NO	N/A
. . . . .			
If no, were affected sample reanalyzed?	[ ]	___	✓

ACTION: 1. Circle all outliers with red pencil.

14.2 Are the retention times of the internal standards in sample or blanks within ±30 seconds from the RT of the internal standard in the 12-hour associated calibration standard (opening CCV or mid-point standard from initial calibration)?	✓	___	___

Action: Use the following table to qualify the data:

INTERNAL STANDARDS ACTIONS FOR LOW/MEDIUM VOLATILES

Criteria	ACTION	
	Detected Associated Compounds *	Non-detected Associated Compounds *
Area counts ≥ 50% and ≤ 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	No Action	
Area counts < 50% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J	R
Area counts > 200% of 12-hour standard (Opening CCV or mid-point standard from initial calibration)	J	No Action
RT difference > 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	R**	R
RT difference ≤ 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	No Action	

* For volatile compounds associated to each internal standard, see Table 3-Low/Medium Volatile Target Compounds and Deuterated Monitoring Compounds with Corresponding Internal Standards for Quantitation in SOM01.1, Exhibit D, available at:

Http://www.epa.gov/superfund/programs/clp/som1.htm

** Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable "R" if the mass spectral are met.

NOTE: Contract Requirements: The SOM (section 11.4.1 page D-46/VOA Low/Medium states that any sample which fails the acceptance criteria for IS response must be reanalyzed.

. . . . . .

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance any sample(s) which failed the above IS acceptance criteria.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Low/Medium Concentration VOA analysis? ✓ ___ ___

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

ACTION: Any gross variation between duplicate results must be addressed in the reviewer narrative. If large differences exist, contact the TOPO to confirm identification of field duplicates with the sampler.

. . . . . .

Definitions

BFB - bromofluorobenzene
CCS - contract compliance screening
CLASS - Contract Laboratory Analytical Services Support
CLP - Contract Laboratory Program
CRQL - Contract Required Quantitation Limit
GC/MS - gas chromatography/mass spectroscopy
kg - kilogram
µg - microgram
ℓ - liter
mℓ - milliliter
QC - quality control
RAS - Routine Analytical Services
RIC - reconstructed ion chromatogram
RPD - relative percent difference
RRF - relative response factor
$\overline{RRF}$ - 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
SOP - standard operating procedure
SOW - Statement of Work
TCL - Target Compound List
TCLP - Toxicity Characteristics Leachate Procedure
TIC - tentatively identified compound
TPO - technical project officer
VOA - volatile organic acid
VTSR - validated time of sample receipt
TOPO - Task Order Project Officer

References

. . . . . .

1. USEPA Contract Laboratory Program of Work for Organic Analysis Multi-Media, Multi-Concentration, SOW/CLPSOM01.1, October 2004
2. National Functional Guidelines for Superfund Organic Methods Data Review January 2005

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18346

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Page 1 of 1

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City / State / Zip: Virginia Beach, VA 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: JA / KL

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM 2mL	Total Metals (AES/ms) PL	Cyanide 250mL	Diss. Metals (AES/ms) PL	TPH-GRO	TPH-DRO/ORO 2mL	CNS Alkalinity 250mL	Sulfide 500mL	TOC 2-40mL	MFE 2(JD)	Ferrous Fe 125mL	pH / Sample Info (Lab Use) Metal	Diss. Metal	Cyanide	Sulfide	TOC	Ferrous Fe
0807092-01 1583201	MWA1-MW05P-08C	7/21/08	0915	(GW)			DISS MTL = 1583301							X	X	X	X		X	X	X	X		X	<2	<2	>12	>9	<2	<2
1583202	MWA1-MW05-08C	↓	↓	(GW)			DISS MTL = 1583302								X	X	X			X	X	X		X	<2	<2	>12	>9	<2	<2

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: L. Rambert	Date/Time: 7/21/08 1400	Received by: Jennifer Dover	Date/Time: 7/22/08 9:00
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 2.3 °C

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

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

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St., Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Kenji Butler/Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N
Are high concentrations expected? (Y) or N? If yes, which ID(s)?

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

CompuChem No (Lab Use Only)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOCs	VOC SIM	Low SVOC, SVOC SIM (2AL)	Total Metals (AES/MS) (PL)	Cyanide 250mL	Diss. Metals (AES/MS) (PL)	TPH-GRO	TPH-DRO & ORO (2AL)	CNNS, Alkalinity 250mL	Sulfide 500mL	TOC	MEE	Ferrous Fe 125mL	T. Metals	Cyanide	Diss. Metals	Sulfide	TOC	Ferrous Fe
~~[illegible]~~ 1583203	VWA1-MW07-08C	7/22/08	0940	GW	12		2	2	2	DISS MTL =		1583203		X	X	X	X		X	X	X	X	X	X	<2	>12	<2	>9	<2	<2

Lab Use Only

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

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

Comments

Mistake

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/22/08 1230	Received by: Jennifer Dover	Date/Time: 7/23/08 9:10
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? (Y) or N
On Ice? (Y) or N
Cooler Temp: 0.1 °C

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

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland Street, Ste 101
City / State / Zip: Virginia Beach, VA 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: JA/KL

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM 2xL	Total Metals (AES/ms) PL	Cyanide 250 mL	Diss. Metals (AES/ms) PL	TPH-GRO	TPH-DRO+ORO 2xL	CNNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Total Metals	Total Metals	Diss. Metals	DISS MR
9,080101212-03 1583205	VWAI-EB01-072108	7/21/08	1650	QC	8		1	2				DISS MTL = 1583204		X	X	X	X		X						<2	>12	<2	
1583204	VWAI-MW08-08C	7/22/08	1430	GW	2		1	1							X	X									<2	>12		
—	VWAI-MW07-08C	7/22/08	0940	GW	2									(X) did not receive in cooler (JD) 7/23/08														

Rec'd on COC 18339

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/22/08 1230	Received by: Jennifer Dove	Date/Time: 7/23/08 9:10
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 1.8 °C

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

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Page 1 of ____

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Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron/K. Lambert

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM 2AL	Total Metals (AES/MS) PL	Cyanide 250mL	Diss. Metals (AES/MS) PL	TPH-GRO	TPH-DRO & ORO 2AL	CANS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) T. Metals	Cyanide	Diss. Metals
0807072-04 583206	VWA1-EB01-072008	7/24/08	1836	QC	7	~~2~~	1	2	DISS MTL		= 1583305			X	X	X	X		X						<2	>12	<2
0807072-05	VWA1-MW05-08C		0915	GW										X					X								

7/21/08 on containers

7/23/08

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: K. Lambert	Date/Time: 7/23/08 1200	Received by: Jennifer Dore	Date/Time: 7/23/08 9:10
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 2.6 °C

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

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Courier:
Airbill No.:
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M HILL
Address: 5700 Cleveland St. Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss. Metals (AES/MS)	TPH-GRO	TPH-DRO & ORO	CNNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use)
0807072-13	VWAI-TB01-072308	7/23/08	—	QC	10	10						X	X					X					X		
0807072-09	VWAI-EB01-072208	7/22/08	1800	QC	8	8						X	X					X							
0807072-10	VWAI-MW09-08C	7/23/08	1630	GW	8	8						X	X					X							
0807072-11	VWAI-MW01-08C	7/23/08	1035	GW	8	8						X	X					X							
0807072-12	VWAI-MW04-08C	7/23/08	1045	GW	30	30						X	X					X					X		

Lab Use Only

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

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

Comments

MS/MSD on VWAI-MW04-08C

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/23/08 13:30	Received by: Jennifer Dover	Date/Time: 7/24/08 900
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 2.1 °C

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

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Sampling Complete? Y or N

Client/Reporting Information

Company Name: Chelsea Bennet/ChemHut
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Stephen Brand
Phone #: 757.671.6211
Sampler's Name: K. Butler/J. Acaron

Project Information

Project Name: Vieques CTO ~~[illegible]~~-10
Sampling Location: W-AOC-E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss. Metals (AES/MS)	TPH-GRO	TPH-DRO & ORO	CNMS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) T. Metals	Cyanide	Diss. Metals	Sulfide	TOC	Ferrous Fe
1583207	VWAI-MW04-08C	7/23/08	1045	GW			DISS=	1583207							X(2)	X(3)	X(2)			X	X	X		X	<2	>12	<2	>9	<2	<2

Lab Use Only

Sample Unpacked By: Jennifer Doner
Sample Order Entry By: [illegible]
Samples Received in Good Condition? Y or N
If no, explain: JD see comments →

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

Comments

MS/MSD on VWAI-MW04-08C
*rec'd VWAI-MW01-08C dissolved metal in cooler with VWAI-MW04-08C

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/23/08 13:30	Received by: Jennifer Doner	Date/Time: JD 7/24/08 7/24/08 9:00
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 1.1 °C

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

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Renji Butler, Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss. Metals (AES/MS)	TPH-GRO	TPH-DRO/ORO	CNNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) T. Metals	Cyanide	Diss. Metals
0807072-09 1583708	VWAI-EB01-072208	7/22/08	1800	QC	7		1	2		DISS	1583308			X	X	X	X		X						<2	>12	<2

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/23/08 13:30	Received by: Jennifer Dover	Date/Time: 7/24/08 900
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 2.0 °C

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

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Renji Butler / Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N
Are high concentrations expected? (Y) or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOCs	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/ms)	Cyanide	Diss. Metals (AES/ms)	TPH-GRO	TPH-DRO & ORO	CNNS, Alkalinity Sulfide	TOC	MEE	Ferrous Fe	T. Metals	Cyanide	Diss. Metals		
0807012-10 1583309	VIWAI-MW09-080C	7/22/08	1630	GW	7		1	2		DISS	= 1583309			X	X	X	X		X					<2	>12	<2		

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/23/08 1330	Received by: Jennifer Doe	Date/Time: 7/24/08 900
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontract? Y or N If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 0.2 °C

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

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Chem Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Kenji Butler/Juan Acaron

Project Information

Project Name: Vieques SCTO-10
Sampling Location: AOC-E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss. Metals (AES/MS)	TPH-GRO	TPH-DRO & ORO	CNMS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	Cyanide Diss. Metals	pH / Sample Info (Lab Use)
080702-11 1583210	VWA1-MW01-08C	7/23/08	1035	GW		DISS=		X		15833	10			X	X*	X	X		X							>12 <2

*did not receive Metals for VWA1-MW01-08C 7/24/08

Lab Use Only

Sample Unpacked By: Jennifer Dore
Sample Order Entry By:
Samples Received in Good Condition? Y or N
If no, explain: see comments →

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

Comments

*rec'd VWA1-MW04-08C (1) Dissolved Metal & (1) Total Metal ~~in cooler~~ (2) ~~bottles~~ VWA1-MW01-08C. Cooler.

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/23/08 1330	Received by: Jennifer Dore	Date/Time: 7/24/08 900
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 1.6 °C

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

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: W-AOC-E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N: Where indicated
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC Sim	Total Metals, Tl (AES/MS)	Cyanide	Diss. Metals, Tl, (AES/MS)	TPH-GRO	TPH-DRO & ORO	CNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use)
0807072-19	VIWAI-TB01-072408	7/24/08	—	QC	8	8						X	X					X							
0807072-17	VIWAI-EB01-072308	7/23/08	1800	QC	8	8						X	X					X							
0807072-18	VIWAI-EB01-072408	7/24/08	07:40	QC	8	8						X	X					X							
0807072-15	VIWAI-MW02-08C	↓	12:00	GW	8	8						X	X					X							
0807072-16	VIWAI-MW03-08C	↓	13:00	GW	8	8						X	X					X							
0807072-14	VIWAI-MW04-08C	7/23/08	1045	GW	4									X					X						

Lab Use Only

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

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

Comments

MS/MSD on VIWAI-MW04-08C

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/24/08 13:30	Received by: Jennifer Doer	Date/Time: 7/25/08 9:15
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 6.6 °C

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

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Page 1 of 1

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

Courier:
Airbill No.:
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LC SVOC, SVOC SIM	Total Metals, Tl (AES/MS)	Cyanide	Diss. Metals, Tl (AES/MS)	TPH-GRO	TPH-DRO & ORO	CWAS, Alkalinity	Sulfate	TOC	MEE	Ferrous Fe	Total Metals	Diss Metals	Cyanide				Rt / Sample Info (Lab Use)
0807072-13 / 158321	VWAI-EB01-072304	7/23/04	1800	QC	7		1	2	DISS = 158331					X	X	X	X		X						<2	<2	>12				
0807072-14	VWAI-MW04-08C	↓	1045	GW	2									X																	

Lab Use Only

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

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

Comments

MS/MSD on VWAI-MW04-08C

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/24/08 13:30	Received by: Jennifer Dore	Date/Time: 7/25/08 9:15
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 0.8 °C

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

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Phone: 919-379-4100 Fax 919-379-4040

Courier
Airbill No.
Sampling Complete? Y or N

Client Recording Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757 671 6208
Sampler's Name: Renji Bitten / Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOCs	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss. Metals (AES/MS)	TPH-GRO	TPH-DRO & ORO	CNNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) T. Metals	Cyanide	Diss. Metals
0807072-13 1583309	VIWA1-MW09-080C	7/22/08	1630	GW	7		1	2		DI55	= 1583309			X	X	X	X		X						<2	>12	<2
0807072-14	VIWA																										

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/23/08 1330	Received by: Jennifer Doner	Date/Time: 7/24/08 900
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontract? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 0.2 °C

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

Client/Reporting Information

Company Name: Cham Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Viegues SCTO-10
Sampling Location: AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N
Are high concentrations expected? (Y) or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss. Metals (AFS/MS)	TPH-GRO	TPH-DRO & ORO	CNMS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH Sample Info (Lab Use) Cyanide	Diss. Metals
0807072-11 1583210	VWA1-MW01-08C	7/23/08	1035	(GW)		DISS=		(HNO3)	1583310					X	(X)*	X	(X)		X						>12	<2

*did not receive Metals for VWA1-MW01-08C 7/24/08

Lab Use Only

Sample Unpacked By: Jennifer Dore
Sample Order Entry By:
Samples Received in Good Condition? Y or (N)
If no, explain: See comments →

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

Comments

*rec'd VWA1-MW04-08C (1) Dissolved Metal & (1) Total Metal ~~in a cooler~~ (2) ~~bottles~~ VWA1-MW01-08C. Cooler.

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/23/08 1330	Received by: Jennifer Dore	Date/Time: 7/24/08 900
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? (Y) or N
On Ice? (Y) or N
Cooler Temp: 16 °C

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

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: W-AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N: Where indicated
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LowSVOC, SVOC Sim	Total Metals, Tl (AES/MS)	Cyanide	Diss. Metals, Tl, (AES,MS)	TPH-GRO	TPH-DRO&ORO	CNNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use)
0807072-19	VIWAI-TB01-072408	7/24/08	—	QC	8	8						X	X					X							
0807072-17	VIWAI-EB01-072308	7/23/08	1800	QC	8	8						X	X					X							
0807072-18	VIWAI-EB01-072408	7/24/08	07:40	QC	8	8						X	X					X							
0807072-15	VIWAI-MW02-08C	↓	12:00	GW	8	8						X	X					X							
0807072-16	VIWAI-MW03-08C	↓	13:00	GW	8	8						X	X					X							
0807072-14	VIWAI-MW04-08C	7/25/08	1045	GW	4									X					X						

Lab Use Only

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

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

Comments

MS/MSD on VIWAI-MW04-08C

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/24/08 13:30	Received by: Jennifer Doer	Date/Time: 7/25/08 9:15
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 6.6 °C

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

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LCSVOC, SVOC SIM	Total Metals, TI (AES/MS)	Cyanide	Diss. Metals, TI (AES/MS)	TPH-GRO	TPH-DRO & ORO	CNNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	Total Metals	Diss. Metals	Cyanide			
0807072-13 1583241	VWAI-EB01-072304	7/23/04	1800	QC	7		1	2	DI 55 = 1583331					X	X	X	X		X						<2	<2	>12			
0807072-14	VWAI-MW04-08C	↓	1045	GW	2									X																

Lab Use Only

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

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

Comments

MS/MSD on VWAI-MW04-08C

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/24/08 13:30	Received by: Jennifer Doren	Date/Time: 7/25/08 9:15
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 0.8 °C

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

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CHAIN OF CUSTODY

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: Cham Hill	Project Name: Vieques CTO-10
Address: 5700 Cleveland St, Ste 101	Sampling Location: AOCE #1
City: Va Beach State: VA Zip: 23462	Turnaround time: 28-Day
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757.671.6208	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: Juan Acaron	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	SVOC SIM	Low SVOC, SVOC SIM	Total Metals, Tl (AES,ms)	Cyanide	Diss. Metals, Tl (AES,ms)	TPH-GRO	TPH-DRO/ORO	CNNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Total Metals	Diss. Metals	Cyanide
0807072-18 / 1583212	VWA1-EB01-072408	7/24/08	07:40	QC	7		1	2		DISS = 1583312				X	X	X	X		X						<2	<2	<12
0807072-14	VWA1-MW04-08C	7/23/08	10:45	GW	2														X								

Lab Use Only:

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

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

Comments

MS/MSD on VWA1-MW04-08C

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/24/08 13:30	Received by: Jennifer Dore	Date/Time: 7/25/08 9:15
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where? | Custody Seal(s) intact? Y or N | On Ice? Y or N | Cooler Temp: 2.1 °C

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

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Courier:
Airbill No.:
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: W-AOC-E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N: Where indicated
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM	Total Metals, Hg (AES & MS)	Cyanide	Diss. Metals, Tl (AES/MS)	TPH-GRO	TPH-DRO & ORO	CNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use)
0807072-13 583213	VWAI-MW02-08C	7/24/08	1200	GW	7		1	2		DIS	-1583313			X	X	X	X		X						
0807072-14	VWAI-MW04-08C	7/23/08	1045	GW	2									X											

Lab Use Only

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

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

Comments

MS/MSD on VWAI-MW04-08C

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/24/08 13:30	Received by: Jennifer Dore	Date/Time: 7/25/08 9:15
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 2.4 °C

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

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Courier:
Airbill No.:
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: JA/RL

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss. Metals (AES/MS)	TPH-GRO	TPH-DRO & ORO	CNDS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH (Sample Info (Lab Use)) Metals Diss.	Cyanide			
680~~7012~~-14 583214	VIWAI-MW03-08C	7/24/08	13:40	GW	7		1	2	DISS =		1583314			X	X	X	X		X						<2	<2	>12		
680~~7072~~-14	VIWAI-MW04-08C	7/23/08	10:45	GW	2														X										

Lab Use Only

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

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

Comments

MS/MSD on VIWAI-MW04-08C

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/24/08 13:30	Received by: Jennifer Dover	Date/Time: 7/25/08 8:15
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 2.6 °C

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

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: JAY RL

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOCE #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC 3-40 ml	VOC SIM 3-40 ml	Low SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss Metals (AES/MS)	TPH-GRO 2-40 ml	TPH-DRO/ORO	CNNS Alkalinity	Sulfide	TOC 2-40 ml	MEE 2-40 ml	Ferrous Fe	pH / Sample Info (Lab Use) TOC
0807072-20	VWAE-MW03-08C	07/27/08	1740		8	8						X	X					X							
0807072-21	VWAE-MW08-08C	7/27/08	1745		8	8						X	X					X							
0807072-22	VWAE-MW07-08C	7/27/08	1250		8	8						X	X					X							
~~0807089-01~~ 586401	VWAE-MW04-08C	7/28/08	0810		12	10			2			X	X					X				X	X		<2
	VWAE-MW04-08CMS	7/28/08	0810		12	10			2			X	X					X				X	X		<2
	VWAE-MW04-08CMSD	7/28/08	0810		12	10			2			X	X					X				X	X		<2
0807072-23	VWAE-EB01-072708	7/27/08	1435		8	8						X	X					X							
0807089-02	VWAE-MW06-08C	7/27/08	0940		8	8						X	X					X							
0807089-03	VWAE-TB01-072808	7/28/08	1000		12	10			2			X	X					X				X	X		
0807072-24	VWAE-MW02-08C	7/27/08	1435		8	8						X	X					X							

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

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

Comments

VHBLCXM → 0807089-04

Sample Custody

Relinquished by: [signature]	Date/Time: 7/28/08	Received by: [signature]	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 0.1° °C

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

White & Yellow copy to lab • Pink copy for customer

* VWAE-TB01-072808 - Did not Receive 2-40 ml vial for TOC

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CHAIN OF CUSTODY

Page 1 of ____

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: CH2M Hill	Project Name: Vieques CTO-10
Address: 5700 Cleveland St, Ste 101	Sampling Location: AOC E #1
City / State / Zip: Virginia Beach, VA 23462	Turnaround time: 28-Day
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757.671.6208	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: JA/KL	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/IMS)	Cyanide	Diss. Metals (AES/IMS)	TPH-GRO	TPH-DRO/ORO	CANS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Total Metals	Cyanide	Diss Metals
C807072-19 1583219	VWAE-MW02-08C	7/27/08	1435		7		1	2	DISS=		1583319			X	X	X	X		X						<2	<2	<2
C807072-21	VWAE-MW08-08C	7/27/08	1735		2														X								

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: [signature]	Date/Time: 7/28/08 1135	Received by: [signature]	Date/Time: 7-29-08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontract? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 1.8 °C

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

White & Yellow copy to lab • Pink copy for customer

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CHAIN OF CUSTODY

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.2708
Sampler's Name: JA

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LC SVOC, SVOC SIM	Total Metals, Tl (AES/ms)	Cyanide	Diss. Metals, Tl (AES/ms)	TPH-GRO	TPH-DRO & ORO	CNMS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Total Metals	Cyanide	Diss Metals
0801012-00 1583215	VWAE-MW03-08	7/27/08	1740		7		1	2		DISS=	1583315			X	X	X	X		X						<2	>12	<2
1583217	VWAE-MW07-08	7/27/08	1250		3		1	2		DISS=	1583317				X	X	X								<2	>12	<2

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/28/08 1140	Received by: Diane Bal	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N, If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 3.7°C

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

White & Yellow copy to lab • Pink copy for customer

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CHAIN OF CUSTODY

Page 1 of 1

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CHam Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: JA / KL

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LowSVOC, SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss. Metals (AES/MS)	TPH-GRO	TPH-DRO & ORO	CNAS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use)
0807089-01 1583216	VWAE-MW08-08C	7/27/08	1745	5			1	2		DISS=	1583316			X	X	X	X								
0807089-02	VWAE-MW06-08C	7/27/08	0940	4										X					X						

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: [signature]	Date/Time: 7/28/08 1135	Received by: Diane Byrd	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 1.2 °C

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

White & Yellow copy to lab • Pink copy for customer

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CHAIN OF CUSTODY

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CHam Hill
Address: 5700 Cleveland St., Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC-E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LC SVOC, SVOC SIM	Total Metals, TI (AES, MS)	Cyanide	Diss. Metals, TI (AES, MS)	TPH-GRO	TPH-DRO/ORO	CNNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use): Cyanide	Sulfide
08071072-22	VWAE-MW07-08C	7/27/08	1250		4									X					X							
1586901	VWAE-MW04-08C	7/28/08	0810		4	1	1				1					X				X	X			X	X	
	VWAE-MW04-08C MS	7/28/08	0810		4	1	1				1					X				X	X			X	X	
	VWAE-MW04-08C MSD	7/28/08	0810		4	1	1				1					X				X	X			X	X	
																X										

Lab Use Only

Sample Unpacked By: D. Byrd
Sample Order Entry By:
Samples Received in Good Condition? Y or N
If no, explain:
Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

Sample Custody

Relinquished by:	Date/Time: 7/28/08 1130	Received by: D. Byrd	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 0.4°C

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

White & Yellow copy to lab • Pink copy for customer

18394

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CHAIN OF CUSTODY

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Cham Hill
Address: 5700 Cleveland St, Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LC SVOC, SVOC SIM	Total Metals, Tl (AES/MS)	Cyanide	Diss. Metals, Tl (AES,MS)	TPH-GRO	TPH-DRO & ORO	CANS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Total Metals	Cyanide	Diss. Metals		
08072223 1583218	VWAE-EB01-072708	7/27/08	~~0940~~ 1400		7		1	2	DISS=		1583218			X	X	X	X		X						<2	>12	<2		
1586902	VWAE-MW06-08C	7/27/08	0940		3		1	2	DISS=		1583320				X	X	X								<2	>12	<2		

bottle for VWAE-MW06-08C and COC for arsenic panel "VWAE" also now

7/28/08

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/28/08 1135	Received by:	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontract? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 1.4 °C

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

White & Yellow copy to lab • Pink copy for customer

SUPPORT DOCUMENTATION

2A - FORM II VOA-1
WATER VOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

Level: (TRACE or LOW) TRACE

	EPA SAMPLE NO.	VDMC1 (VCL) #	VDMC2 (CLA) #	VDMC3 (DCE) #	VDMC4 (BUT) #	VDMC5 (CLF) #	VDMC6 (DCA) #	VDMC7 (BEN) #
01	VBLKEM	86	85	74	78	105	100	105
02	VBLKKX	84	85	67	84	101	90	107
03	VBLKLB	95	94	80	89	108	98	103
04	VBLKLE	97	101	68	83	105	101	105
05	VHBLKXN	100	104	68	61	114	98	108
06	VWAE-EB01-07270	95	98	85	91	113	106	103
07	VWAE-MW02	92	99	84	86	112	104	103
08	VWAE-MW03	86	91	80	89	108	104	101
09	VWAE-MW07	95	100	87	85	114	106	105
10	VWAE-MW08	91	96	83	83	109	103	101
11	VWAE-TB01-07240	81	84	64	74	97	89	100
#3 12	VWAI-EB01-07200	84	89	74	77	124 *	94	102
#3DL 13	VWAI-EB01-07200	82	85	68	78	106	92	100
#2 14	VWAI-EB01-07210	86	84	72	79	122 *	94	102
#2DL 15	VWAI-EB01-07210 DL	80	83	74	80	105	91	99
16	VWAI-EB01-07220	91	87	63	67	100	92	102
17	VWAI-EB01-07230	84	87	65	71	103	95	101
18	VWAI-EB01-07240	86	89	64	70	102	93	102
19	VWAI-MW01	85	93	80	90	110	104	99
20	VWAI-MW02	91	96	84	84	111	102	107
21	VWAI-MW03	78	82	70	83	92	91	102
#11 22	VWAI-MW04	66	73	52 *	76	83	83	95
23	VWAI-MW05	82	85	73	74	103	94	100
24	VWAI-MW05P	75	80	71	83	98	95	96
1 25	VWAI-MW07	67	68 *	54 *	75	80	78	95
26	VWAI-MW08	74	78	68	80	95	89	95
27	VWAI-MW09	77	83	66	80	96	93	98
28	VWAI-TB01-07210	75	77	66	89	94	90	92
29	VWAI-TB01-07230	84	86	61	63	101	94	104
30								

(J) None-A[illegible] assoc. N[illegible]

(J) ↓

all assoc (J/UJ)

all as. (J/UJ)

		QC LIMITS
VDMC1	(VCL) = Vinyl chloride-d3	(65-131)
VDMC2	(CLA) = Chloroethane-d5	(71-131)
VDMC3	(DCE) = 1,1-Dichloroethene-d2	(55-104)
VDMC4	(BUT) = 2-Butanone-d5	(49-155)
VDMC5	(CLF) = Chloroform-d	(78-121)
VDMC6	(DCA) = 1,2-Dichloroethane-d4	(78-129)
VDMC7	(BEN) = Benzene-d6	(77-124)

Column to be used to flag recovery values
* Value outside of contract required QC limits

Page 1 of 1

SOM01.2 (8/2007)

2E - FORM II VOA-SIM1
TRACE SIM (WATER) VOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

	EPA SAMPLE NO.	VDMC1 (VCL) #	VDMC2 (CLA) #	VDMC3 (DCE) #	VDMC4 (BUT) #	VDMC5 (CLF) #	VDMC6 (DCA) #	VDMC7 (BEN) #
01	VBLKEU						93	
02	VBLKEV						90	
03	VBLKPA						83	
04	VHBLKXN						85	
05	VWAE-EB01-07270						90	
06	VWAE-MW02						93	
07	VWAE-MW03						83	
08	VWAE-MW07						87	
09	VWAE-MW08						84	
10	VWAE-TB01-07240						90	
11	VWAI-EB01-07200						89	
12	VWAI-EB01-07210						91	
13	VWAI-EB01-07220						92	
14	VWAI-EB01-07230						91	
15	VWAI-EB01-07240						92	
16	VWAI-MW01						83	
17	VWAI-MW02						86	
18	VWAI-MW03						85	
19	VWAI-MW04						98	
20	VWAI-MW05						97	
21	VWAI-MW05P						83	
22	VWAI-MW07						194 *	
23	VWAI-MW07RE						133 *	
24	VWAI-MW08						85	
25	VWAI-MW09						83	
26	VWAI-TB01-07210						91	
27	VWAI-TB01-07230						91	
28								
29								
30								

\$ 1
\$ IRE

None
Both ND

		QC LIMITS
VDMC1	(VCL) = Vinyl chloride-d3	(65-131)
VDMC2	(CLA) = Chloroethane-d5	(71-131)
VDMC3	(DCE) = 1,1-Dichloroethene-d2	(55-104)
VDMC4	(BUT) = 2-Butanone-d5	(49-155)
VDMC5	(CLF) = Chloroform-d	(78-121)
VDMC6	(DCA) = 1,2-Dichloroethane-d4	(78-129)
VDMC7	(BEN) = Benzene-d6	(77-124)

Column to be used to flag recovery values
* Value outside of contract required QC limits

2F - FORM II VOA-SIM2
TRACE SIM (WATER) VOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: _____ SDG No.: 0807072

	EPA SAMPLE NO.	VDMC8 (DPA) #	VDMC9 (TOL) #	VDMC10 (TDP) #	VDMC11 (HEX) #	VDMC12 (DXE) #	VDMC13 (TCA) #	VDMC14 (DCZ) #	TOT OUT
01	VBLKEU						97		0
02	VBLKEV						94		0
03	VBLKPA						85		0
04	VHBLKXN						92		0
05	VWAE-EB01-0727(						95		0
06	VWAE-MW02						97		0
07	VWAE-MW03						91		0
08	VWAE-MW07						95		0
09	VWAE-MW08						93		0
10	VWAE-TB01-0724(						95		0
11	VWAI-EB01-0720(						91		0
12	VWAI-EB01-0721(						93		0
13	VWAI-EB01-0722(						95		0
14	VWAI-EB01-0723(						96		0
15	VWAI-EB01-0724(						97		0
16	VWAI-MW01						91		0
17	VWAI-MW02						95		0
18	VWAI-MW03						86		0
19	VWAI-MW04						105		0
20	VWAI-MW05						117		0
21	VWAI-MW05P						101		0
22	VWAI-MW07						126 *		2
23	VWAI-MW07RE						101		1
24	VWAI-MW08						90		0
25	VWAI-MW09						87		0
26	VWAI-TB01-0721(						94		0
27	VWAI-TB01-0723(						94		0
28									
29									
30									

+1

None
ND

		QC LIMITS
VDMC8 (DPA)	= 1,2-Dichloropropane-d6	(79-124)
VDMC9 (TOL)	= Toluene-d8	(77-121)
VDMC10 (TDP)	= trans-1,3-Dichloropropene-d4	(73-121)
VDMC11 (HEX)	= 2-Hexanone-d5	(28-135)
VDMC12 (DXE)	= 1,4-Dioxane-d8	(50-150)
VDMC13 (TCA)	= 1,1,2,2-Tetrachloroethane-d2	(73-125)
VDMC14 (DCZ)	= 1,2-Dichlorobenzene-d4	(80-131)

Column to be used to flag recovery values
* Values outside of contract required QC limits

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKEM

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8073001-BLK1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 8073001-BLK1R90.d

Level: (TRACE/LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.11	J
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKEM

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8073001-BLK1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 8073001-BLK1R90.d

Level: (TRACE/LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VBLKEM

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8073001-BLK1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 8073001-BLK1R90.d

Level: (TRACE or LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKLB

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8073009-BLK1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 8073009-BLK190.d

Level: (TRACE/LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.18	J
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKLB

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8073009-BLK1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 8073009-BLK190.d

Level: (TRACE/LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	2.9	J
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.16	J
87-61-6	1,2,3-Trichlorobenzene	0.20	J

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VBLKLB

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8073009-BLK1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 8073009-BLK190.d

Level: (TRACE or LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
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11					
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22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VHBLKXN

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-25

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2590.d

Level: (TRACE/LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.20	JB
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VHBLKXN

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-25

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2590.d

Level: (TRACE/LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VHBLKXN

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807072 Mod. Ref No.: SDG No.: 0807072

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807072-25

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807072-2590.d

Level: (TRACE or LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

ENVIRONMENTAL
Data Services, Inc.

DIESEL RANGE ORGANICS (DRO/ORO)

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807089

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 22, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAI-MW06	0807089-02	Water
2	VWAE-MW01	0807089-05	Water
3	VWAE-MW01P	0807089-06	Water
4	VWAE-MW05	0807089-07	Water
5	VWAE-MW06	0807089-08	Water
6	VWAE-EB01-072808	0807089-09	Water
7	VWAE-EB01-072908	0807089-10	Water
8	VWAE-MW04	0807089-11	Water
8MS	VWAE-MW04MS	0807089-11MS	Water
8MSD	VWAE-MW04MSD	0807089-11MSD	Water

The USEPA "Contract Laboratory Program National Functional Guidelines for Organic Data Review," October 1999, method criteria and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD samples exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blanks were free of contamination.

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. mg/L	Qualifier	Affected Samples
VWAE-EB01-072808	None - ND	-	-	-
VWAE-EB01-072908	None - ND	-	-	-
VWAE-EB01-072708	None - ND	-	-	-

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and/or correlation coefficient and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAE-MW01 mg/L	VWAE-MW01P mg/L	RPD	Qualifier
Diesel	0.29	0.34	16%	None

ANNOTATED FORM Is

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW06

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-02

Sample wt/vol: 900.0 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/29/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/03/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 1.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.56	U
	ORO	1.1	U

FORM I PEST

LW 10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. 2

VWAE-MW01

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-05

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/30/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/03/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 1.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.29	J
	ORO	1.0	U

FORM I PEST

MW
10/25/08

3

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW01P

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-06

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/30/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/03/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 1.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.34	J
----------	ORO	1.0	U

FORM I PEST

lw 10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. 4

VWAE-MW05

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-07

Sample wt/vol: 950.0 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/30/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/03/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 1.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.56	
	ORO	2.1	

FORM I PEST

lw 10/25/08

5

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW06

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-08

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/30/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/03/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 1.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
	ORO	1.0	U

FORM I PEST

lw
10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. 6

VWAE-EB0
1-072808

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-09

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/30/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/03/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 1.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.50	U
----------	ORO	1.0	U

FORM I PEST

lw
10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. 7

VWAE-EB0
1-072908

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-10

Sample wt/vol: 925.0 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/30/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/03/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 1.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.54	U
	ORO	1.1	U

FORM I PEST

LW
10/25/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. 8

VWAE-MW04

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-11

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/30/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 2500(uL) Date Analyzed: 08/03/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 1.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.15	J
----------	ORO	1.0	U

FORM I PEST

lw 10/25/08

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

ENVIRONMENTAL
Data Services, Inc.

GASOLINE RANGE ORGANICS (GRO)

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807089

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 22, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-MW04	0807089-01	Water
1MS	VWAE-MW04MS	0807089-01MS	Water
1MSD	VWAE-MW04MSD	0807089-01MSD	Water
2	VWAI-MW06	0807089-02	Water
3	VWAE-TB01-072808	0807089-03	Water
4	VWAE-MW01	0807089-05	Water
5	VWAE-MW01P	0807089-06	Water
6	VWAE-MW05	0807089-07	Water
7	VWAE-MW06	0807089-08	Water
8	VWAE-EB01-072808	0807089-09	Water
9	VWAE-EB01-072908	0807089-10	Water
10	VWAE-TB01-072908	0807089-12	Water

The USEPA "Contract Laboratory Program National Functional Guidelines for Organic Data Review," October 1999, method criteria and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were analyzed within 14 days for water samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD sample exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS sample exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. mg/L	Qualifier	Affected Samples
VBLKAO	GRO	0.04	U	2, 3, 7-9

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-EB01-072708	None - ND	-	-	-
VWAE-TB01-072808	None - ND	-	-	-
VWAE-EB01-072808	None - ND	-	-	-
VWAE-EB01-072908	None - ND	-	-	-
VWAE-TB01-072908	None - ND	-	-	-

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAE-MW01 mg/L	VWAE-MW01P mg/L	RPD	Qualifier
GRO	1.4	1.5	7%	None

ANNOTATED FORM Is

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

E 10A 9/23/02
VWA1-MW04

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-01

Sample wt/vol: 1 (g/ml) ML Lab File ID: 117X0807089-01

Level: (low/med) LOW Date Received: 07/29/08

% Moisture: not dec. _____ Date Analyzed: 08/05/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.55	

AMENDED DATA

FORM I GC VOA

MW
10/25/08

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO. 2

VWAI-MW06

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-02

Sample wt/vol: 900 (g/ml) ML Lab File ID: 118X0807089-02

Level: (low/med) LOW Date Received: 07/29/08

% Moisture: not dec. _____ Date Analyzed: 08/05/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.0002~~	J

U BL

FORM I GC VOA

lw 10/25/08

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO. 3

VWAE-TB0
1-072808

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-03

Sample wt/vol: 1 (g/ml) ML Lab File ID: 119X0807089-03

Level: (low/med) LOW Date Received: 07/29/08

% Moisture: not dec. _____ Date Analyzed: 08/05/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.2~~	~~J~~ U BL

FORM I GC VOA

MW
10/25/08

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO. 4

VWAE-MW01

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-05

Sample wt/vol: 1 (g/ml) ML Lab File ID: 120X0807089-05

Level: (low/med) LOW Date Received: 07/30/08

% Moisture: not dec. _____ Date Analyzed: 08/05/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	1.4	

FORM I GC VOA

LW 10/25/08

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FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-MW01P

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-06

Sample wt/vol: 1 (g/ml) ML Lab File ID: 122X0807089-06

Level: (low/med) LOW Date Received: 07/30/08

% Moisture: not dec. _____ Date Analyzed: 08/05/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	1.5	

FORM I GC VOA

LW
10/25/08

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO. 6

VWAE-MW05

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-07

Sample wt/vol: 1 (g/ml) ML Lab File ID: 123X0807089-07

Level: (low/med) LOW Date Received: 07/30/08

% Moisture: not dec. _____ Date Analyzed: 08/05/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	4.8	

FORM I GC VOA

LW 10/25/08

7

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-MW06

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-08

Sample wt/vol: 1000 (g/ml) ML Lab File ID: 124X0807089-08

Level: (low/med) LOW Date Received: 07/30/08

% Moisture: not dec. _____ Date Analyzed: 08/05/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.00021~~	~~J~~ U BL

FORM I GC VOA

lw
10/25/08

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO. 8

VWAE-EB0
1-072808

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-09

Sample wt/vol: 1000 (g/ml) ML Lab File ID: 125X0807089-09

Level: (low/med) LOW Date Received: 07/30/08

% Moisture: not dec. _____ Date Analyzed: 08/05/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.0002~~	~~J~~ U BL

FORM I GC VOA

LW
10/25/08

9

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-EB0
1-072908

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-10

Sample wt/vol: 920 (g/ml) ML Lab File ID: 126X0807089-10

Level: (low/med) LOW Date Received: 07/30/08

% Moisture: not dec. _____ Date Analyzed: 08/05/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.00023~~	J

u BL

FORM I GC VOA

RW
10/25/08

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO. 10

VWAE-TB0
1-072908

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 0807089-12

Sample wt/vol: 1 (g/ml) ML Lab File ID: 127X0807089-12

Level: (low/med) LOW Date Received: 07/30/08

% Moisture: not dec. _____ Date Analyzed: 08/05/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.580 ~~0.22~~	~~J~~ u BL

FORM I GC VOA

MEW
10/25/08

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VBLKAO

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 0807089

Matrix: (soil/water) WATER Lab Sample ID: 8080504-BLK1

Sample wt/vol: 5 (g/ml) ML Lab File ID: 115X8080504-BLK1

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 08/05/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.04	J

FORM I GC VOA

ENVIRONMENTAL
Data Services, Inc.

POLYNUCLEAR AROMATIC HYDROCARBONS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807089

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 24, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAI-MW06	0807089-02	Water
2	VWAE-MW01	0807089-05	Water
2RE	VWAE-MW01RE	0807089-05RE	Water
3	VWAE-MW01P	0807089-06	Water
3DL	VWAE-MW01PDL	0807089-06DL	Water
4	VWAE-MW05	0807089-07	Water
4DL	VWAE-MW05DL	0807089-07DL	Water
5	VWAE-MW06	0807089-08	Water
5RE	VWAE-MW06RE	0807089-08RE	Water
6	VWAE-EB01-072808	0807089-09	Water
6RE	VWAE-EB01-072808RE	0807089-09RE	Water
7	VWAE-EB01-072908	0807089-10	Water
8	VWAE-MW04	0807089-11	Water
8MS	VWAE-MW04MS	0807089-11MS	Water
8MSD	VWAE-MW04MSD	0807089-11MSD	Water
8RE	VWAE-MW04RE	0807089-11RE	Water

The USEPA Region II SOP HW-35, Revision 1, August 2007: USEPA CLP Statement of Work for Organic Analysis of Low/Medium Concentration of Semivolatile Organic Compounds SOM01.2 Data Validation and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries except the following.

Sample ID	Surrogate	%R	Qualifier
4	Fluoranthene-d10	34%	J/UJ

MS/MSD - The MS/MSD samples exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	MS/MSD %R/RPD	Qualifier
8	Pentachlorophenol	135%/191%/Ok	None - ND

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
SBLKJE	Naphthalene	0.044	U	1, 5RE, 6RE, 8, 8RE

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Action Level ug/L	Qualifier	Affected Samples
VWAE-EB01-072808	None - ND	-	-	-	-
VWAE-EB01-072908	None - ND	-	-	-	-
VWAE-EB01-072708	None - ND	-	-	-	-

GC/MS Instrument Performance Check - All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - Several samples were either reanalyzed or analyzed at various dilutions due to high concentrations of target compounds. The reviewer replaced the original results with the dilution or reanalysis results. The original Form Is should be used for reporting purposes.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values with the exception of the following.

ICAL Date	Compound	RRF	Qualifier	Affected Samples
08/12/08	Pentachlorophenol	0.040	J/R	2, 2RE, 3DL, 4DL, 5RE, 6, 6RE, 7, 8RE

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values with the exception of the following.

CCAL Date	Compound	%D/RRF	Qualifier	Affected Samples
08/08/08	Pentachlorophenol	36.4%	J/UJ	2-5, 8

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Sample ID	Internal Standard	Area Count	Qualifier
4	Phenanthrene-d10	Low	None - Already qualified due to surrogate
6	Acenaphthene-d10	Low	J/R
6RE	Acenaphthene-d10	Low	J/R

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAE-MW01 ug/L	VWAE-MW01P ug/L	RPD	Qualifier
Naphthalene	4.8	4.3	11%	None
Acenaphthylene	0.18	0.17	6%	None
Acenaphthene	0.21	0.22	5%	None
Fluorene	0.67	0.68	1%	None
2-Methylnaphthalene	5.1	4.3	17%	None
Phenanthrene	0.60	0.61	2%	None
Anthracene	0.21	0.21	0%	None
Fluoranthene	0.14	0.14	0%	None
Pyrene	0.29	0.32	10%	None

ANNOTATED FORM Is

1

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-02

Sample wt/vol: 975 (g/mL) mL Lab File ID: 0807089-02J3B64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/13/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.10 ~~0.049~~	~~JB~~ U BL
91-57-6	2-Methylnaphthalene	0.10	U
208-96-8	Acenaphthylene	0.10	U
83-32-9	Acenaphthene	0.10	U
86-73-7	Fluorene	0.10	U
87-86-5	Pentachlorophenol	0.21	~~U~~ R JCB
85-01-8	Phenanthrene	0.10	U
120-12-7	Anthracene	0.10	U
206-44-0	Fluoranthene	0.10	U
129-00-0	Pyrene	0.10	U
56-55-3	Benzo (a) anthracene	0.10	U
218-01-9	Chrysene	0.10	U
205-99-2	Benzo (b) fluoranthene	0.10	U
207-08-9	Benzo (k) fluoranthene	0.10	U
50-32-8	Benzo (a) pyrene	0.10	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.10	U
53-70-3	Dibenzo (a,h) anthracene	0.10	U
191-24-2	Benzo (g,h,i) perylene	0.10	U

LW 10/24/08

2

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-05

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807089-05A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/09/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	4.8J ~~4.8~~ LR	~~BE~~
91-57-6	2-Methylnaphthalene	5.1J ~~5.1~~ LR	~~E~~
208-96-8	Acenaphthylene	0.18	
83-32-9	Acenaphthene	0.21	
86-73-7	Fluorene	0.67	
87-86-5	Pentachlorophenol	0.19	~~U~~
85-01-8	Phenanthrene	0.60	
120-12-7	Anthracene	0.21	
206-44-0	Fluoranthene	0.14	
129-00-0	Pyrene	0.29	
56-55-3	Benzo (a) anthracene	0.093	U
218-01-9	Chrysene	0.093	U
205-99-2	Benzo (b) fluoranthene	0.093	U
207-08-9	Benzo (k) fluoranthene	0.093	U
50-32-8	Benzo (a) pyrene	0.093	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.093	U
53-70-3	Dibenzo (a,h) anthracene	0.093	U
191-24-2	Benzo (g,h,i) perylene	0.093	U

~~R DL~~ ~~R RE~~
~~R DL~~ ~~R RE~~
UJ CCH

SOM01.2 (8/2007)

MW ~~10/24/08~~ 11/12/08

2RE

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-05RE1

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807089-05JA64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Use original

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/13/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
91-20-3	Naphthalene	3.9	~~E~~	J LR
91-57-6	2-Methylnaphthalene	3.7	E	J LR
208-96-8	Acenaphthylene	0.15		
83-32-9	Acenaphthene	0.18		
86-73-7	Fluorene	0.57		
87-86-5	Pentachlorophenol	0.19	~~U~~	R JCB
85-01-8	Phenanthrene	0.52		
120-12-7	Anthracene	0.20		
206-44-0	Fluoranthene	0.12		
129-00-0	Pyrene	0.28		
56-55-3	Benzo (a) anthracene	0.093	U	
218-01-9	Chrysene	0.093	U	
205-99-2	Benzo (b) fluoranthene	0.093	U	
207-08-9	Benzo (k) fluoranthene	0.093	U	
50-32-8	Benzo (a) pyrene	0.093	U	
193-39-5	Indeno (1,2,3-cd) pyrene	0.093	U	
53-70-3	Dibenzo (a,h) anthracene	0.093	U	
191-24-2	Benzo (g,h,i) perylene	0.093	U	

RE

lw 10/24/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-06

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807089-06A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/09/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	4.3 ~~4.5~~	~~BE~~ ~~R DE~~ RE
91-57-6	2-Methylnaphthalene	4.3 ~~4.8~~	~~E~~ ~~R DE~~ RE
208-96-8	Acenaphthylene	0.17	
83-32-9	Acenaphthene	0.22	
86-73-7	Fluorene	0.68	
87-86-5	Pentachlorophenol	0.20	~~U~~ UJCCH
85-01-8	Phenanthrene	0.61	
120-12-7	Anthracene	0.21	
206-44-0	Fluoranthene	0.14	
129-00-0	Pyrene	0.32	
56-55-3	Benzo (a) anthracene	0.098	U
218-01-9	Chrysene	0.098	U
205-99-2	Benzo (b) fluoranthene	0.098	U
207-08-9	Benzo (k) fluoranthene	0.098	U
50-32-8	Benzo (a) pyrene	0.098	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.098	U
53-70-3	Dibenzo (a,h) anthracene	0.098	U
191-24-2	Benzo (g,h,i) perylene	0.098	U

lw 10/24/08

3DL

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01PDL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-06RE1

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807089-06DA64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Use - Original

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/13/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	4.3	~~B~~D
91-57-6	2-Methylnaphthalene	4.3	D
208-96-8	Acenaphthylene	0.98	U
83-32-9	Acenaphthene	0.43	JD
86-73-7	Fluorene	0.72	JD
87-86-5	Pentachlorophenol	2.0	~~U~~
85-01-8	Phenanthrene	1.1	D
120-12-7	Anthracene	0.98	U
206-44-0	Fluoranthene	0.98	U
129-00-0	Pyrene	0.98	U
56-55-3	Benzo (a) anthracene	0.98	U
218-01-9	Chrysene	0.98	U
205-99-2	Benzo (b) fluoranthene	0.98	U
207-08-9	Benzo (k) fluoranthene	0.98	U
50-32-8	Benzo (a) pyrene	0.98	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.98	U
53-70-3	Dibenzo (a,h) anthracene	0.98	U
191-24-2	Benzo (g,h,i) perylene	0.98	U

R DL

R ICB

MW
10/24/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-07

Sample wt/vol: 900 (g/mL) mL Lab File ID: 0807089-07A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/09/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
91-20-3	Naphthalene	35 J ~~36~~ LR	~~E~~	~~RDL~~ R RE
91-57-6	2-Methylnaphthalene	16 J ~~20~~ LR	~~E~~	~~RDL~~ R RE
208-96-8	Acenaphthylene	0.27		J SSL
83-32-9	Acenaphthene	0.48		J SSL
86-73-7	Fluorene	1.4 ~~1.3~~	~~E~~	R ~~DL~~
87-86-5	Pentachlorophenol	0.63		J CCH
85-01-8	Phenanthrene	0.45		J SSL
120-12-7	Anthracene	0.11		
206-44-0	Fluoranthene	0.068	J	
129-00-0	Pyrene	0.38		
56-55-3	Benzo (a) anthracene	0.058	J	
218-01-9	Chrysene	0.056	J	
205-99-2	Benzo (b) fluoranthene	0.11	U	UJ SSL
207-08-9	Benzo (k) fluoranthene	0.11	U	
50-32-8	Benzo (a) pyrene	0.11	U	
193-39-5	Indeno (1,2,3-cd) pyrene	0.11	U	
53-70-3	Dibenzo (a,h) anthracene	0.11	U	
191-24-2	Benzo (g,h,i) perylene	0.11	U	

lw
10/24/08

4DL

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW05DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-07RE1

Sample wt/vol: 900 (g/mL) mL Lab File ID: 0807089-07DJA64_N.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008 Use original

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/14/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 4.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	35	~~BDE~~ J LR
91-57-6	2-Methylnaphthalene	16	~~DE~~ J LR
208-96-8	Acenaphthylene	0.44	U
83-32-9	Acenaphthene	0.47	D
86-73-7	Fluorene	1.4	D
87-86-5	Pentachlorophenol	2.0	~~D~~ J ICB
85-01-8	Phenanthrene	1.5	D
120-12-7	Anthracene	0.37	JD
206-44-0	Fluoranthene	0.23	JD
129-00-0	Pyrene	0.49	D
56-55-3	Benzo (a) anthracene	0.44	U
218-01-9	Chrysene	0.44	U
205-99-2	Benzo (b) fluoranthene	0.44	U
207-08-9	Benzo (k) fluoranthene	0.44	U
50-32-8	Benzo (a) pyrene	0.44	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.44	U
53-70-3	Dibenzo (a,h) anthracene	0.44	U
191-24-2	Benzo (g,h,i) perylene	0.44	U

DL

R

lw 10/24/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-08

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807089-08A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/09/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.10	~~B~~
91-57-6	2-Methylnaphthalene	0.035	J
208-96-8	Acenaphthylene	0.093	U
83-32-9	Acenaphthene	0.093	U
86-73-7	Fluorene	0.093	U
87-86-5	Pentachlorophenol	0.19	~~U~~ UJ CCH
85-01-8	Phenanthrene	0.093	U
120-12-7	Anthracene	0.093	U
206-44-0	Fluoranthene	0.093	U
129-00-0	Pyrene	0.093	U
56-55-3	Benzo (a) anthracene	0.093	U
218-01-9	Chrysene	0.093	U
205-99-2	Benzo (b) fluoranthene	0.093	U
207-08-9	Benzo (k) fluoranthene	0.093	U
50-32-8	Benzo (a) pyrene	0.093	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.093	U
53-70-3	Dibenzo (a,h) anthracene	0.093	U
191-24-2	Benzo (g,h,i) perylene	0.093	U

GW
10/24/08

5RE

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW06RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-08RE1

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807089-08JA64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/13/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.093 ~~0.049~~	~~JB~~ U BL
91-57-6	2-Methylnaphthalene	0.093	U
208-96-8	Acenaphthylene	0.093	U
83-32-9	Acenaphthene	0.093	U
86-73-7	Fluorene	0.093	U
87-86-5	Pentachlorophenol	0.19	~~U~~ R ICB
85-01-8	Phenanthrene	0.093	U
120-12-7	Anthracene	0.093	U
206-44-0	Fluoranthene	0.093	U
129-00-0	Pyrene	0.093	U
56-55-3	Benzo (a) anthracene	0.093	U
218-01-9	Chrysene	0.093	U
205-99-2	Benzo (b) fluoranthene	0.093	U
207-08-9	Benzo (k) fluoranthene	0.093	U
50-32-8	Benzo (a) pyrene	0.093	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.093	U
53-70-3	Dibenzo (a,h) anthracene	0.093	U
191-24-2	Benzo (g,h,i) perylene	0.093	U

R RE

LW 10/24/08

6

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-09

Sample wt/vol: 975 (g/mL) mL Lab File ID: 0807089-09JA64_N.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Use Reanalysis

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/14/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.10	U
91-57-6	2-Methylnaphthalene	0.10	U
208-96-8	Acenaphthylene	0.10	U
83-32-9	Acenaphthene	0.10	U
86-73-7	Fluorene	0.10	U
87-86-5	Pentachlorophenol	0.21	U
85-01-8	Phenanthrene	0.10	U
120-12-7	Anthracene	0.10	U
206-44-0	Fluoranthene	0.10	U
129-00-0	Pyrene	0.10	U
56-55-3	Benzo (a) anthracene	0.10	U
218-01-9	Chrysene	0.10	U
205-99-2	Benzo (b) fluoranthene	0.10	U
207-08-9	Benzo (k) fluoranthene	0.10	U
50-32-8	Benzo (a) pyrene	0.10	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.10	U
53-70-3	Dibenzo (a,h) anthracene	0.10	U
191-24-2	Benzo (g,h,i) perylene	0.10	U

R BSC → R ICB

RE

R

NW 10/24/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072808RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-09RE1

Sample wt/vol: 975 (g/mL) mL Lab File ID: 0807089-09J2A64_N.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/14/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.10 ~~0.099~~	~~JB~~ U BL
91-57-6	2-Methylnaphthalene	0.067	J
208-96-8	Acenaphthylene	0.079	~~J~~ J ISL
83-32-9	Acenaphthene	0.092	~~J~~
86-73-7	Fluorene	0.094	~~J~~
87-86-5	Pentachlorophenol	0.21	U R ICB
85-01-8	Phenanthrene	0.090	J
120-12-7	Anthracene	0.099	J
206-44-0	Fluoranthene	0.084	J
129-00-0	Pyrene	0.13	
56-55-3	Benzo (a) anthracene	0.084	J
218-01-9	Chrysene	0.093	J
205-99-2	Benzo (b) fluoranthene	0.047	J
207-08-9	Benzo (k) fluoranthene	0.050	J
50-32-8	Benzo (a) pyrene	0.064	J
193-39-5	Indeno (1,2,3-cd) pyrene	0.061	J
53-70-3	Dibenzo (a,h) anthracene	0.048	J
191-24-2	Benzo (g,h,i) perylene	0.10	U

MW 10/24/08

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072908

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-10

Sample wt/vol: 900 (g/mL) mL Lab File ID: 0807089-10JA64_N.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/14/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.11	U
91-57-6	2-Methylnaphthalene	0.11	U
208-96-8	Acenaphthylene	0.11	U
83-32-9	Acenaphthene	0.11	U
86-73-7	Fluorene	0.11	U
87-86-5	Pentachlorophenol	0.22	~~U~~ R ICB
85-01-8	Phenanthrene	0.11	U
120-12-7	Anthracene	0.11	U
206-44-0	Fluoranthene	0.11	U
129-00-0	Pyrene	0.11	U
56-55-3	Benzo (a) anthracene	0.11	U
218-01-9	Chrysene	0.11	U
205-99-2	Benzo (b) fluoranthene	0.11	U
207-08-9	Benzo (k) fluoranthene	0.11	U
50-32-8	Benzo (a) pyrene	0.11	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.11	U
53-70-3	Dibenzo (a,h) anthracene	0.11	U
191-24-2	Benzo (g,h,i) perylene	0.11	U

hW
10/24/08

8

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW04

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-11

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807089-11A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/09/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.093 ~~0.082~~	~~JB~~ U BL
91-57-6	2-Methylnaphthalene	0.050	J
208-96-8	Acenaphthylene	0.033	J
83-32-9	Acenaphthene	0.064	~~J~~ J MSH
86-73-7	Fluorene	0.093	U
87-86-5	Pentachlorophenol	0.19	~~U~~ UJ CCH
85-01-8	Phenanthrene	0.077	J
120-12-7	Anthracene	0.093	U
206-44-0	Fluoranthene	0.028	J
129-00-0	Pyrene	0.093	U
56-55-3	Benzo (a) anthracene	0.093	U
218-01-9	Chrysene	0.093	U
205-99-2	Benzo (b) fluoranthene	0.093	U
207-08-9	Benzo (k) fluoranthene	0.093	U
50-32-8	Benzo (a) pyrene	0.093	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.093	U
53-70-3	Dibenzo (a,h) anthracene	0.093	U
191-24-2	Benzo (g,h,i) perylene	0.093	U

MW 10/24/08

8R

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW04RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-11RE1

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807089-11JA64N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008 Use original

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/13/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.093 ~~0.071~~	~~JB~~ U BL
91-57-6	2-Methylnaphthalene	0.044	J
208-96-8	Acenaphthylene	0.072	J
83-32-9	Acenaphthene	0.054	J
86-73-7	Fluorene	0.093	U
87-86-5	Pentachlorophenol	0.19	~~U~~ R ICB
85-01-8	Phenanthrene	0.080	J
120-12-7	Anthracene	0.093	U
206-44-0	Fluoranthene	0.030	J
129-00-0	Pyrene	0.093	U
56-55-3	Benzo (a) anthracene	0.093	U
218-01-9	Chrysene	0.093	U
205-99-2	Benzo (b) fluoranthene	0.093	U
207-08-9	Benzo (k) fluoranthene	0.093	U
50-32-8	Benzo (a) pyrene	0.093	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.093	U
53-70-3	Dibenzo (a,h) anthracene	0.093	U
191-24-2	Benzo (g,h,i) perylene	0.093	U

RE

RW 10/24/08

USEPA REGION II WORKSHEETS

(Please refer to Semivolatile Organic Report for Worksheets)

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

1F - FORM I SV-SIM
SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
SBLKJE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8073007-BLK4

Sample wt/vol: 1000 (g/mL) mL Lab File ID: 80737BLKJ2A64_N2.d

Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received:

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 1.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/13/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
91-20-3	Naphthalene	0.044	J
91-57-6	2-Methylnaphthalene	0.10	U
208-96-8	Acenaphthylene	0.10	U
83-32-9	Acenaphthene	0.10	U
86-73-7	Fluorene	0.10	U
87-86-5	Pentachlorophenol	0.20	U
85-01-8	Phenanthrene	0.10	U
120-12-7	Anthracene	0.10	U
206-44-0	Fluoranthene	0.10	U
129-00-0	Pyrene	0.10	U
56-55-3	Benzo (a) anthracene	0.10	U
218-01-9	Chrysene	0.10	U
205-99-2	Benzo (b) fluoranthene	0.10	U
207-08-9	Benzo (k) fluoranthene	0.10	U
50-32-8	Benzo (a) pyrene	0.10	U
193-39-5	Indeno (1,2,3-cd) pyrene	0.10	U
53-70-3	Dibenzo (a,h) anthracene	0.10	U
191-24-2	Benzo (g,h,i) perylene	0.10	U

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1, 5RE, 6RE, 8, 8

2L - FORM II SV-SIM1
WATER SEMIVOLATILE SIM DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: _____ SDG No.: 0807089

	EPA SAMPLE NO.	SDMC17 (FLN) #	SDMC18 (2MN) #	TOT OUT
01	SBLKJE	83	55	0
02	VWAE-EB01-072808	86	71	0
03	VWAE-EB01-072808RE	93	73	0
04	VWAE-EB01-072908	89	59	0
05	VWAE-MW01	83	81	0
06	VWAE-MW01P	86	81	0
07	VWAE-MW01PDL	89	60	0
08	VWAE-MW01RE	76	59	0
09	VWAE-MW04	82	87	0
10	VWAE-MW04MS	100	84	0
11	VWAE-MW04MSD	100	88	0
12	VWAE-MW04RE	84	58	0
13	VWAE-MW04REMS	88	65	0
14	VWAE-MW04REMSD	87	67	0
D4 15	VWAE-MW05	34 *	92	1 J/UJ
16	VWAE-MW05DL	117	72	0
17	VWAE-MW06	82	80	0
18	VWAE-MW06RE	79	54	0
19	VWAI-MW06	90	56	0
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

	QC LIMITS
SDMC17 (FLN) = Fluoranthene-d10	(50-150)
SDMC18 (2MN) = 2-Methylnaphthalene-d10	(50-150)

Column to be used to flag recovery values
* Value outside of contract required QC limits
D DMC diluted out

3E - FORM III SV-SIM1
WATER SEMIVOLATILE SIM MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: _____ SDG No.: 0807089

Matrix Spike - EPA Sample No.: VWAE-MW04 48

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS %REC #	QC LIMITS REC.
Acenaphthene	0.43	0.064	0.41	95	46-118
Pentachlorophenol	0.43	0.0	0.58	135 *	9-103
Pyrene	0.43	0.0	0.42	98	26-127

J - None ND

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD %REC #	%RPD #	QC LIMITS	
					RPD	REC.
Acenaphthene	0.43	0.52	119 *	23	0-31	46-118
Pentachlorophenol	0.43	0.83	191 *	34	0-50	9-103
Pyrene	0.43	0.49	113	14	0-31	26-127

J

J - None ND

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 3 outside limits
Spike Recovery: 3 out of 6 outside limits

COMMENTS: _____

6H - FORM VI SV-SIM
SEMIVOLATILE ORGANICS SIM INITIAL CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: _____ SDG No.: 0807089

Instrument ID: 5972hp64 Calibration Date(s): 08/12/2008 08/12/2008

Calibration Time(s): 1345 1655

LAB FILE ID: RRF0.1= U080812B64.d RRF0.2= W080812B64.d

RRF0.4= S080812B64.d RRF0.8= V080812B64.d RRF001= T080812B64.d

COMPOUND	RRF0.1	RRF0.2	RRF0.4	RRF0.8	RRF001	$\overline{RRF}$	% RSD
Naphthalene	1.245	1.054	0.915	0.874	0.879	0.993	16.0
2-Methylnaphthalene	1.042	0.859	0.832	0.731	0.741	0.841	14.9
Acenaphthylene	2.076	1.824	1.913	1.622	1.671	1.821	10.1
Acenaphthene	1.447	1.301	1.193	1.096	1.024	1.212	13.8
Fluorene	1.452	1.343	1.270	1.115	1.071	~~1.250~~	12.7
Pentachlorophenol		0.047	0.039	0.040	0.035	0.040	12.7
Phenanthrene	1.495	1.306	1.336	1.104	1.118	~~1.272~~	12.9
Anthracene	1.359	1.122	1.129	0.967	0.946	1.105	15.0
Fluoranthene	1.285	1.146	1.193	1.003	0.996	1.125	11.1
Pyrene	1.763	1.595	1.657	1.323	1.323	1.532	13.1
Benzo (a) anthracene	1.386	1.264	1.331	1.058	1.066	1.221	12.4
Chrysene	1.488	1.288	1.273	1.064	1.041	1.231	14.9
Benzo (b) fluoranthene	3.080	2.662	2.739	2.382	2.143	2.601	13.7
Benzo (k) fluoranthene	2.076	2.032	2.167	1.700	1.824	1.960	9.8
Benzo (a) pyrene	1.756	1.617	1.724	1.429	1.368	1.579	11.0
Indeno (1,2,3-cd) pyrene	1.538	1.384	1.532	1.260	1.226	1.388	10.5
Dibenzo (a,h) anthracene	1.608	1.465	1.471	1.273	1.203	1.404	11.7
Benzo (g,h,i) perylene	1.749	1.594	1.593	1.353	1.272	1.512	12.9
Fluoranthene-d10	1.015	0.936	0.790	0.807	0.804	0.870	11.5
2-Methylnapthalene-d10	0.712	0.588	0.539	0.499	0.505	0.568	15.4

(JR)

2, 2RE, 3DL
4DL, 5RE
6, 6RE, 7
8RE

7H - FORM VII SV-SIM
SEMIVOLATILE SIM CONTINUING CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: _____ SDG No.: 0807089

Instrument ID: 5972hp64 Calibration Date: 08/08/2008 Time: 1010

Lab File ID: S080808A64.d Init. Calib. Date(s): 08/07/2008 08/07/2008

EPA Sample No.(SSTD0.4##): SSTD0.4EK Init. Calib. Time(s): 0921 1231

GC Column: RTX-5MS ID: 0.32 (mm)

COMPOUND	$\overline{RRF}$	RRF0.4	MIN RRF	%D	MAX %D
Naphthalene	1.054	1.091	0.700	3.6	25.0
2-Methylnaphthalene	0.785	0.795	0.400	1.4	25.0
Acenaphthylene	2.064	2.152	0.900	4.3	25.0
Acenaphthene	1.243	1.385	0.900	11.4	25.0
Fluorene	1.326	1.461	0.900	10.2	25.0
Pentachlorophenol	0.079	0.108	0.050	36.4	25.0
Phenanthrene	1.376	1.413	0.700	2.7	25.0
Anthracene	1.216	1.344	0.700	10.5	25.0
Fluoranthene	1.184	1.217	0.600	2.8	25.0
Pyrene	1.708	1.911	0.600	11.9	25.0
Benzo (a) anthracene	1.337	1.443	0.800	7.9	25.0
Chrysene	1.298	1.399	0.700	7.8	25.0
Benzo (b) fluoranthene	1.942	2.106	0.700	8.4	25.0
Benzo (k) fluoranthene	2.131	2.171	0.700	1.9	25.0
Benzo (a) pyrene	1.663	1.814	0.700	9.1	25.0
Indeno (1,2,3-cd) pyrene	1.450	1.631	0.500	12.5	25.0
Dibenzo (a,h) anthracene	1.399	1.615	0.400	15.5	25.0
Benzo (g,h,i) perylene	1.522	1.689	0.500	11.0	25.0
Fluoranthene-d10	0.945	0.967	0.010	2.3	25.0
2-Methylnapthalene-d10	0.532	0.537	0.010	0.9	25.0

(2,3,4,5,8)

JWJ

8F - FORM VIII SV-SIM2
SEMIVOLATILE INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

EPA Sample No.(SSTD020##): SSTD0.4EM Date Analyzed: 08/09/2008

Lab File ID (Standard): HB080808A64.d Time Analyzed: 0113

Instrument ID: 5972hp64 GC Column: RTX-5MS ID: 0.32 (mm)

		IS4 (PHN) AREA #	RT #	IS5 (CRY) AREA #	RT #	IS6 (PRY) AREA #	RT #
	12 HOUR STD	82219	19.14	65678	25.88	43342	30.02
	UPPER LIMIT	164438	19.64	131356	26.38	86684	30.52
	LOWER LIMIT	41110	18.64	32839	25.38	21671	29.52
	EPA SAMPLE NO.						
01	VWAE-MW04	98250	19.14	72298	25.90	62693	30.07
02	VWAE-MW04MS	73988	19.14	59734	25.90	44966	30.07
03	VWAE-MW04MSD	75444	19.14	65679	25.90	52876	30.09
04	VWAE-MW01	89468	19.14	66111	25.90	56309	30.09
05	VWAE-MW01P	87539	19.14	61030	25.90	51680	30.09
06	VWAE-MW05	218766 *	19.14	64552	25.90	61206	30.09
07	VWAE-MW06	86232	19.14	60204	25.90	77633	30.05
08	SSTD0.4EN	72046	19.14	68880	25.90	41564	30.06
09							
10							
11							
12							
13							
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16							
17							
18							
19							
20							
21							
22							
23							

J - IVAR A.O due to Surrogate

IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = 200% of internal standard area
AREA LOWER LIMIT = 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.

8E - FORM VIII SV-SIM1
SEMIVOLATILE INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

GC Column: RTX-5MS ID: 0.32 (mm) Init. Calib. Date(s): 08/12/2008 08/12/2008

EPA Sample No.(SSTD020##): SSTD0.4EW Date Analyzed: 08/14/2008

Lab File ID (Standard): A080814A64.d Time Analyzed: 1258

Instrument ID: 5972hp64

		IS1 (DCB) AREA	#	RT	#	IS2 (NPT) AREA	#	RT	#	IS3 (ANT) AREA	#	RT	#
	12 HOUR STD	0		0.00		221822		10.94		112525		15.36	
	UPPER LIMIT	0		0.50		443644		11.44		225050		15.86	
	LOWER LIMIT	0		-0.50		110911		10.44		56263		14.86	
	EPA SAMPLE NO.												
01	VWAE-MW05DL					136942		10.92		63483		15.36	
*6 02	VWAE-EB01-072808					120417		10.92		54016	*	15.33	(JR)
03	VWAE-EB01-072908					129560		10.92		59182		15.36	
*6RE 04	VWAE-EB01-072808RE					113863		10.92		51941	*	15.33	(JR)
05	SSTD0.4EX					224493		10.92		~~120084~~		15.36	
06													
07													
08													
09													
10													
11													
12													
13													
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17													
18													
19													
20													
21													
22													

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = 200% of internal standard area
AREA LOWER LIMIT = 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk

ENVIRONMENTAL
Data Services, Inc.

LOW CONCENTRATION SEMIVOLATILE ORGANIC COMPOUNDS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807089

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 24, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAI-MW06	0807089-02	Water
2	VWAE-MW01	0807089-05	Water
3	VWAE-MW01P	0807089-06	Water
4	VWAE-MW05	0807089-07	Water
5	VWAE-MW06	0807089-08	Water
6	VWAE-EB01-072808	0807089-09	Water
7	VWAE-EB01-072908	0807089-10	Water
8	VWAE-MW04	0807089-11	Water
8MS	VWAE-MW04MS	0807089-11MS	Water
8MSD	VWAE-MW04MSD	0807089-11MSD	Water

The USEPA Region II SOP HW-35, Revision 1, August 2007: USEPA CLP Statement of Work for Organic Analysis of Low/Medium Concentration of Semivolatile Organic Compounds SOM01.2 Data Validation and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries except the following.

Sample ID	Surrogate	%R	Qualifier
4	4-Chloroaniline-d4	0%	J/R

MS/MSD - The MS/MSD samples exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	MS/MSD %R/RPD	Qualifier
8	4-Nitrophenol	83%/81%/Ok	None - ND

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blank was free of contamination.

Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-EB01-072808	Diethylphthalate	4.7	None	All ND
	di-n-Butylphthalate	2.7	None	All ND
VWAE-EB01-072908	Acetophenone	1.4	None	All ND
VWAE-EB01-072708	Phenol	1.1	None	All ND
	Diethylphthalate	5.2	None	All ND
	Di-n-butylphthalate	3.5	None	All ND

GC/MS Instrument Performance Check - All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were correctly reported by the laboratory.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values with the exception of the following.

CCAL Date	Compound	%D/RRF	Qualifier	Affected Samples
08/07/08	Hexachloroethane	28.6%	J/UJ	All samples
	bis (2-Chloroethoxy) methane	29.2%	J/UJ	All samples

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAE-MW01 ug/L	VWAE-MW01P ug/L	RPD	Qualifier
Naphthalene	4.8	4.3	11%	None
2-Methylnaphthalene	6.3	5.7	10%	None

ANNOTATED FORM Is

1

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-02

Sample wt/vol: 975 (g/mL) mL Lab File ID: 0807089-02JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	5.1	U	
108-95-2	Phenol	5.1	U	
111-44-4	Bis(2-chloroethyl)ether	5.1	U	
95-57-8	2-Chlorophenol	5.1	U	
95-48-7	2-Methylphenol	5.1	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	5.1	U	
98-86-2	Acetophenone	5.1	U	
106-44-5	4-Methylphenol	5.1	U	
621-64-7	N-Nitroso-di-n-propylamine	5.1	U	
67-72-1	Hexachloroethane	5.1	U	UJ CCH
98-95-3	Nitrobenzene	5.1	U	
78-59-1	Isophorone	5.1	U	
88-75-5	2-Nitrophenol	5.1	U	
105-67-9	2,4-Dimethylphenol	5.1	U	
111-91-1	Bis(2-chloroethoxy)methane	5.1	~~U~~	UJ CCH
120-83-2	2,4-Dichlorophenol	5.1	U	
91-20-3	Naphthalene	5.1	~~U~~	R RE
106-47-8	4-Chloroaniline	5.1	U	
87-68-3	Hexachlorobutadiene	5.1	U	
105-60-2	Caprolactam	5.1	U	
59-50-7	4-Chloro-3-methylphenol	5.1	U	
91-57-6	2-Methylnaphthalene	5.1	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	5.1	U	
88-06-2	2,4,6-Trichlorophenol	5.1	U	
95-95-4	2,4,5-Trichlorophenol	5.1	U	
92-52-4	1,1'-Biphenyl	5.1	U	
91-58-7	2-Chloronaphthalene	5.1	U	
88-74-4	2-Nitroaniline	10	U	
131-11-3	Dimethylphthalate	5.1	U	
606-20-2	2,6-Dinitrotoluene	5.1	U	
208-96-8	Acenaphthylene	5.1	~~U~~	R RE
99-09-2	3-Nitroaniline	10	U	
83-32-9	Acenaphthene	5.1	~~U~~	R RE

fw 1/8/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-02

Sample wt/vol: 975 (g/mL) mL Lab File ID: 0807089-02JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	10	U	
100-02-7	4-Nitrophenol	10	U	
132-64-9	Dibenzofuran	5.1	U	
121-14-2	2,4-Dinitrotoluene	5.1	U	
84-66-2	Diethylphthalate	5.1	U	
86-73-7	Fluorene	5.1	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	5.1	U	
100-01-6	4-Nitroaniline	10	U	
534-52-1	4,6-Dinitro-2-methylphenol	10	U	
86-30-6	N-Nitrosodiphenylamine (1)	5.1	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	5.1	U	
101-55-3	4-Bromophenyl-phenylether	5.1	U	
118-74-1	Hexachlorobenzene	5.1	U	
1912-24-9	Atrazine	5.1	U	
87-86-5	Pentachlorophenol	10	U	
85-01-8	Phenanthrene	5.1	~~U~~	R RE
120-12-7	Anthracene	5.1	~~U~~	R RE
86-74-8	Carbazole	5.1	U	
84-74-2	Di-n-butylphthalate	5.1	U	
206-44-0	Fluoranthene	5.1	~~U~~	R RE
129-00-0	Pyrene	5.1	~~U~~	R RE
85-68-7	Butylbenzylphthalate	5.1	U	
91-94-1	3,3'-Dichlorobenzidine	5.1	U	
56-55-3	Benzo (a) anthracene	5.1	~~U~~	R RE
218-01-9	Chrysene	5.1	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	5.1	U	
117-84-0	Di-n-octylphthalate	5.1	U	
205-99-2	Benzo (b) fluoranthene	5.1	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	5.1	~~U~~	R RE
50-32-8	Benzo (a) pyrene	5.1	~~U~~	R RE
193-39-5	Indeno (1,2,3-cd) pyrene	5.1	~~U~~	R RE
53-70-3	Dibenzo (a,h) anthracene	5.1	~~U~~	R RE
191-24-2	Benzo (g,h,i) perylene	5.1	~~U~~	R RE
58-90-2	2,3,4,6-Tetrachlorophenol	5.1	U	

[1]Cannot be separated from Diphenylamine

lw 10/24/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-02

Sample wt/vol: 975 (g/mL) mL Lab File ID: 0807089-02JA66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/29/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	10.60	23	J
02	1610-18-0	Prometon	27.32	4.7	JN
03		UNKNOWN	30.82	4.1	J
04		UNKNOWN	35.00	11	J
05		UNKNOWN	38.46	9.9	J
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

MW 10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-05

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807089-05JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	4.7	U	
108-95-2	Phenol	4.7	U	
111-44-4	Bis(2-chloroethyl)ether	4.7	U	
95-57-8	2-Chlorophenol	4.7	U	
95-48-7	2-Methylphenol	4.7	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	4.7	U	
98-86-2	Acetophenone	4.7	U	
106-44-5	4-Methylphenol	4.7	U	
621-64-7	N-Nitroso-di-n-propylamine	4.7	U	
67-72-1	Hexachloroethane	4.7	~~U~~	UJ CCH
98-95-3	Nitrobenzene	4.7	U	
78-59-1	Isophorone	4.7	U	
88-75-5	2-Nitrophenol	4.7	U	
105-67-9	2,4-Dimethylphenol	4.7	U	
111-91-1	Bis(2-chloroethoxy)methane	4.7	~~U~~	UJ CCH
120-83-2	2,4-Dichlorophenol	4.7	U	
91-20-3	Naphthalene	4.8		
106-47-8	4-Chloroaniline	4.7	U	
87-68-3	Hexachlorobutadiene	4.7	U	
105-60-2	Caprolactam	4.7	U	
59-50-7	4-Chloro-3-methylphenol	4.7	U	
91-57-6	2-Methylnaphthalene	6.3		
77-47-4	Hexachlorocyclopentadiene	4.7	U	
88-06-2	2,4,6-Trichlorophenol	4.7	U	
95-95-4	2,4,5-Trichlorophenol	4.7	U	
92-52-4	1,1'-Biphenyl	4.7	U	
91-58-7	2-Chloronaphthalene	4.7	U	
88-74-4	2-Nitroaniline	9.3	U	
131-11-3	Dimethylphthalate	4.7	U	
606-20-2	2,6-Dinitrotoluene	4.7	U	
208-96-8	Acenaphthylene	4.7	~~U~~	R RE
99-09-2	3-Nitroaniline	9.3	U	
83-32-9	Acenaphthene	4.7	~~U~~	R RE

lw
10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-05

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807089-05JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	9.3	U	
100-02-7	4-Nitrophenol	9.3	U	
132-64-9	Dibenzofuran	4.7	U	
121-14-2	2,4-Dinitrotoluene	4.7	U	
84-66-2	Diethylphthalate	4.7	U	
86-73-7	Fluorene	4.7	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	4.7	U	
100-01-6	4-Nitroaniline	9.3	U	
534-52-1	4,6-Dinitro-2-methylphenol	9.3	U	
86-30-6	N-Nitrosodiphenylamine (1)	4.7	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	4.7	U	
101-55-3	4-Bromophenyl-phenylether	4.7	U	
118-74-1	Hexachlorobenzene	4.7	U	
1912-24-9	Atrazine	4.7	U	
87-86-5	Pentachlorophenol	9.3	~~U~~	R RE
85-01-8	Phenanthrene	4.7	~~U~~	R RE
120-12-7	Anthracene	4.7	~~U~~	R RE
86-74-8	Carbazole	4.7	U	
84-74-2	Di-n-butylphthalate	4.7	U	
206-44-0	Fluoranthene	4.7	~~U~~	R RE
129-00-0	Pyrene	4.7	~~U~~	R RE
85-68-7	Butylbenzylphthalate	4.7	U	
91-94-1	3,3'-Dichlorobenzidine	4.7	U	
56-55-3	Benzo (a) anthracene	4.7	~~U~~	R RE
218-01-9	Chrysene	4.7	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	4.7	U	
117-84-0	Di-n-octylphthalate	4.7	U	
205-99-2	Benzo (b) fluoranthene	4.7	U	R RE
207-08-9	Benzo (k) fluoranthene	4.7	U	
50-32-8	Benzo (a) pyrene	4.7	U	
193-39-5	Indeno (1,2,3-cd) pyrene	4.7	U	
53-70-3	Dibenzo (a,h) anthracene	4.7	U	
191-24-2	Benzo (g,h,i) perylene	4.7	U	
58-90-2	2,3,4,6-Tetrachlorophenol	4.7	U	

[1] Cannot be separated from Diphenylamine

hw 10/24/08

2

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-05

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807089-05JA66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	496-11-7	Indane	12.60	8.8	JN
02	100-51-6	Benzyl alcohol	12.77	2.7	JN
03	135-01-3	Benzene, 1,2-diethyl-	13.13	3.8	JN
04	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	13.32	2.3	JN
05		UNKNOWN	14.42	1.9	J
06	95-93-2	Benzene, 1,2,4,5-tetramethyl-	15.14	5.7	JN
07	824-90-8	1-Phenyl-1-butene $$ Benzene, 1-bute	15.78	4.1	JN
08	767-58-8	Indan, 1-methyl- $$ 1H-Indene, 2,3-d	16.10	7.3	JN
09	99-87-6	Benzene, 1-methyl-4-(1-methylethyl)-	16.17	3.6	JN
10	767-59-9	1H-Indene, 1-methyl-	16.24	1.9	JN
11	56253-64-6	Benzene, (2-methyl-1-butenyl)- $$ 2-	17.28	1.9	JN
12		UNKNOWN	17.46	1.9	J
13		UNKNOWN	17.63	3.4	J
14		UNKNOWN	17.81	2.0	J
15		UNKNOWN	18.06	3.5	J
16		UNKNOWN	19.45	1.9	J
17		UNKNOWN	19.76	2.0	J
18		UNKNOWN	20.16	3.3	J
19	4453-90-1	1,4-Methanonaphthalene, 1,4-dihydro-	20.85	4.2	JN
20	571-61-9	Naphthalene, 1,5-dimethyl- $$ 1,5-Di	22.57	2.7	JN
21	571-58-4	Naphthalene, 1,4-dimethyl-	22.82	2.9	JN
22		UNKNOWN	23.02	4.1	J
23	719-22-2	2,5-Cyclohexadiene-1,4-dione, 2,6-bi	23.61	2.0	JN
24		UNKNOWN	24.48	2.1	J
25		UNKNOWN	25.28	2.9	J
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

lw 10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-06

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807089-06JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	4.9	U	
108-95-2	Phenol	4.9	U	
111-44-4	Bis(2-chloroethyl)ether	4.9	U	
95-57-8	2-Chlorophenol	4.9	U	
95-48-7	2-Methylphenol	4.9	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	4.9	U	
98-86-2	Acetophenone	4.9	U	
106-44-5	4-Methylphenol	4.9	U	
621-64-7	N-Nitroso-di-n-propylamine	4.9	U	
67-72-1	Hexachloroethane	4.9	~~U~~	UJ CH
98-95-3	Nitrobenzene	4.9	U	
78-59-1	Isophorone	4.9	U	
88-75-5	2-Nitrophenol	4.9	U	
105-67-9	2,4-Dimethylphenol	4.9	U	
111-91-1	Bis(2-chloroethoxy)methane	4.9	~~U~~	UJ CH
120-83-2	2,4-Dichlorophenol	4.9	U	
91-20-3	Naphthalene	4.3	J	
106-47-8	4-Chloroaniline	4.9	U	
87-68-3	Hexachlorobutadiene	4.9	U	
105-60-2	Caprolactam	4.9	U	
59-50-7	4-Chloro-3-methylphenol	4.9	U	
91-57-6	2-Methylnaphthalene	5.7		
77-47-4	Hexachlorocyclopentadiene	4.9	U	
88-06-2	2,4,6-Trichlorophenol	4.9	U	
95-95-4	2,4,5-Trichlorophenol	4.9	U	
92-52-4	1,1'-Biphenyl	4.9	U	
91-58-7	2-Chloronaphthalene	4.9	U	
88-74-4	2-Nitroaniline	9.8	U	
131-11-3	Dimethylphthalate	4.9	U	
606-20-2	2,6-Dinitrotoluene	4.9	U	
208-96-8	Acenaphthylene	4.9	~~U~~	R RE
99-09-2	3-Nitroaniline	9.8	U	
83-32-9	Acenaphthene	4.9	~~U~~	R RE

lW 10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-06

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807089-06JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	9.8	U	
100-02-7	4-Nitrophenol	9.8	U	
132-64-9	Dibenzofuran	4.9	U	
121-14-2	2,4-Dinitrotoluene	4.9	U	
84-66-2	Diethylphthalate	4.9	U	
86-73-7	Fluorene	4.9	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	4.9	U	
100-01-6	4-Nitroaniline	9.8	U	
534-52-1	4,6-Dinitro-2-methylphenol	9.8	U	
86-30-6	N-Nitrosodiphenylamine (1)	4.9	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	4.9	U	
101-55-3	4-Bromophenyl-phenylether	4.9	U	
118-74-1	Hexachlorobenzene	4.9	U	
1912-24-9	Atrazine	4.9	U	
87-86-5	Pentachlorophenol	9.8	~~U~~	R RE
85-01-8	Phenanthrene	4.9	~~U~~	R RE
120-12-7	Anthracene	4.9	~~U~~	R RE
86-74-8	Carbazole	4.9	U	
84-74-2	Di-n-butylphthalate	4.9	U	
206-44-0	Fluoranthene	4.9	~~U~~	R RE
129-00-0	Pyrene	4.9	~~U~~	R RE
85-68-7	Butylbenzylphthalate	4.9	U	
91-94-1	3,3'-Dichlorobenzidine	4.9	U	
56-55-3	Benzo (a) anthracene	4.9	~~U~~	R RE
218-01-9	Chrysene	4.9	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	4.9	U	
117-84-0	Di-n-octylphthalate	4.9	U	
205-99-2	Benzo (b) fluoranthene	4.9	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	4.9	~~U~~	
50-32-8	Benzo (a) pyrene	4.9	~~U~~	
193-39-5	Indeno (1,2,3-cd) pyrene	4.9	~~U~~	
53-70-3	Dibenzo (a,h) anthracene	4.9	~~U~~	
191-24-2	Benzo (g,h,i) perylene	4.9	~~U~~	
58-90-2	2,3,4,6-Tetrachlorophenol	4.9	U	

[1] Cannot be separated from Diphenylamine

LW ~~10/24/08~~ 11/12/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW01P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-06

Sample wt/vol: 1030 (g/mL) mL Lab File ID: 0807089-06JA66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	873-49-4	Benzene, cyclopropyl-	12.60	7.6	JN
02	141-93-5	Benzene, 1,3-diethyl-	13.14	3.5	JN
03	135-01-3	Benzene, 1,2-diethyl- $$ Benzene, o-	13.32	2.1	JN
04	95-93-2	Benzene, 1,2,4,5-tetramethyl-	15.13	5.2	JN
05	824-90-8	1-Phenyl-1-butene $$ Benzene, 1-bute	15.79	3.8	JN
06	767-58-8	Indan, 1-methyl-	16.09	6.5	JN
07	527-53-7	Benzene, 1,2,3,5-tetramethyl-	16.17	3.1	JN
08	56253-64-6	Benzene, (2-methyl-1-butenyl)- $$ 2-	17.64	2.9	JN
09		UNKNOWN	18.07	2.8	J
10		UNKNOWN	20.16	2.6	J
11	4453-90-1	1,4-Methanonaphthalene, 1,4-dihydro-	20.85	3.9	JN
12	571-61-9	Naphthalene, 1,5-dimethyl- $$ 1,5-Di	22.57	2.5	JN
13	575-41-7	Naphthalene, 1,3-dimethyl- $$ 1,3-Di	22.82	2.7	JN
14	480-63-7	Benzoic acid, 2,4,6-trimethyl- $$ .b	23.01	3.6	JN
15		UNKNOWN	24.47	2.1	J
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

lw 10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-07

Sample wt/vol: 900 (g/mL) mL Lab File ID: 0807089-07JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	5.6	U	
108-95-2	Phenol	5.6	U	
111-44-4	Bis(2-chloroethyl)ether	5.6	U	
95-57-8	2-Chlorophenol	5.6	U	
95-48-7	2-Methylphenol	5.6	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	5.6	U	
98-86-2	Acetophenone	5.6	U	
106-44-5	4-Methylphenol	5.6	U	
621-64-7	N-Nitroso-di-n-propylamine	5.6	U	
67-72-1	Hexachloroethane	5.6	~~U~~	UJ CCH
98-95-3	Nitrobenzene	5.6	U	
78-59-1	Isophorone	5.6	U	
88-75-5	2-Nitrophenol	5.6	U	
105-67-9	2,4-Dimethylphenol	5.6	U	
111-91-1	Bis(2-chloroethoxy)methane	5.6	~~U~~	UJ CCH
120-83-2	2,4-Dichlorophenol	5.6	U	
91-20-3	Naphthalene	33		
106-47-8	4-Chloroaniline	5.6	~~U~~	R SSL
87-68-3	Hexachlorobutadiene	5.6	U	
105-60-2	Caprolactam	5.6	U	
59-50-7	4-Chloro-3-methylphenol	5.6	U	
91-57-6	2-Methylnaphthalene	21		
77-47-4	Hexachlorocyclopentadiene	5.6	~~U~~	R SSL
88-06-2	2,4,6-Trichlorophenol	5.6	U	
95-95-4	2,4,5-Trichlorophenol	5.6	U	
92-52-4	1,1'-Biphenyl	5.6	U	
91-58-7	2-Chloronaphthalene	5.6	U	
88-74-4	2-Nitroaniline	11	U	
131-11-3	Dimethylphthalate	5.6	U	
606-20-2	2,6-Dinitrotoluene	5.6	U	
208-96-8	Acenaphthylene	5.6	~~U~~	R RE
99-09-2	3-Nitroaniline	11	U	
83-32-9	Acenaphthene	5.6	~~U~~	R RE

lw 10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-07

Sample wt/vol: 900 (g/mL) mL Lab File ID: 0807089-07JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	11	U	
100-02-7	4-Nitrophenol	11	U	
132-64-9	Dibenzofuran	5.6	U	
121-14-2	2,4-Dinitrotoluene	5.6	U	
84-66-2	Diethylphthalate	5.6	U	
86-73-7	Fluorene	1.0	~~J~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	5.6	U	
100-01-6	4-Nitroaniline	11	U	
534-52-1	4,6-Dinitro-2-methylphenol	11	U	
86-30-6	N-Nitrosodiphenylamine (1)	5.6	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	5.6	U	
101-55-3	4-Bromophenyl-phenylether	5.6	U	
118-74-1	Hexachlorobenzene	5.6	U	
1912-24-9	Atrazine	5.6	U	
87-86-5	Pentachlorophenol	11	~~U~~	R RE
85-01-8	Phenanthrene	5.6	~~U~~	R RE
120-12-7	Anthracene	5.6	~~U~~	R RE
86-74-8	Carbazole	5.6	U	
84-74-2	Di-n-butylphthalate	5.6	U	
206-44-0	Fluoranthene	5.6	~~U~~	R RE
129-00-0	Pyrene	5.6	~~U~~	R RE
85-68-7	Butylbenzylphthalate	5.6	U	
91-94-1	3,3'-Dichlorobenzidine	5.6	~~U~~	R SSL
56-55-3	Benzo (a) anthracene	5.6	~~U~~	R RE
218-01-9	Chrysene	5.6	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	5.6	U	
117-84-0	Di-n-octylphthalate	5.6	U	
205-99-2	Benzo (b) fluoranthene	5.6	U	R RE
207-08-9	Benzo (k) fluoranthene	5.6	U	
50-32-8	Benzo (a) pyrene	5.6	U	
193-39-5	Indeno (1,2,3-cd) pyrene	5.6	U	
53-70-3	Dibenzo (a,h) anthracene	5.6	U	
191-24-2	Benzo (g,h,i) perylene	5.6	U	
58-90-2	2,3,4,6-Tetrachlorophenol	5.6	U	

[1] Cannot be separated from Diphenylamine

lw
10/24/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-07

Sample wt/vol: 900 (g/mL) mL Lab File ID: 0807089-07JA66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	622-96-8	Benzene, 1-ethyl-4-methyl-	10.12	5.9	JN
02	526-73-8	Benzene, 1,2,3-trimethyl- $$ Hemimel	10.32	4.7	JN
03	611-14-3	Benzene, 1-ethyl-2-methyl-	10.72	6.2	JN
04		UNKNOWN	11.54	5.2	J
05	526-73-8	Benzene, 1,2,3-trimethyl- $$ Hemimel	12.18	7.3	JN
06	496-11-7	Indane	12.60	18	JN
07	141-93-5	Benzene, 1,3-diethyl-	13.13	6.7	JN
08	135-01-3	Benzene, 1,2-diethyl- $$ Benzene, o-	13.32	4.6	JN
09	1758-88-9	Benzene, 2-ethyl-1,4-dimethyl-	13.99	2.7	JN
10	767-58-8	Indan, 1-methyl-	14.07	2.8	JN
11	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	14.42	2.7	JN
12	95-93-2	Benzene, 1,2,4,5-tetramethyl-	15.14	9.5	JN
13	95-93-2	Benzene, 1,2,4,5-tetramethyl-(1)	15.26	3.5	JN
14	824-90-8	1-Phenyl-1-butene $$ Benzene, 1-bute	15.78	7.9	JN
15	768-00-3	Benzene, (1-methyl-1-propenyl)-, (E)	16.10	14	JN
16	527-84-4	Benzene, 1-methyl-2-(1-methylethyl)-	16.17	6.4	JN
17	622-76-4	Benzene, 1-butynyl- $$ 1-Butyne, 1-p	16.24	3.0	JN
18	119-64-2	Naphthalene, 1,2,3,4-tetrahydro-	16.44	2.6	JN
19	17059-48-2	1H-Indene, 2,3-dihydro-1,6-dimethyl-	17.29	2.8	JN
20		UNKNOWN	17.34	2.5	J
21	97664-19-2	Benzene, 1-methyl-2-(1-methyl-2-prop	17.65	4.4	JN
22		UNKNOWN	17.81	3.5	J
23		UNKNOWN	18.06	5.9	J
24		UNKNOWN	19.76	3.1	J
25	4453-90-1	1,4-Methanonaphthalene, 1,4-dihydro-	20.86	12	JN
26	571-61-9	Naphthalene, 1,5-dimethyl- $$ 1,5-Di	22.58	3.9	JN
27	581-42-0	Naphthalene, 2,6-dimethyl- $$ 2,6-Di	22.82	4.4	JN
28	582-16-1	Naphthalene, 2,7-dimethyl-	22.88	3.0	JN
29		UNKNOWN	23.50	2.6	J
30		UNKNOWN	24.47	2.6	J
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

MW 10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-08

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807089-08JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	4.7	U	
108-95-2	Phenol	4.7	U	
111-44-4	Bis(2-chloroethyl)ether	4.7	U	
95-57-8	2-Chlorophenol	4.7	U	
95-48-7	2-Methylphenol	4.7	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	4.7	U	
98-86-2	Acetophenone	4.7	U	
106-44-5	4-Methylphenol	4.7	U	
621-64-7	N-Nitroso-di-n-propylamine	4.7	U	
67-72-1	Hexachloroethane	4.7	~~U~~	UJ CCH
98-95-3	Nitrobenzene	4.7	U	
78-59-1	Isophorone	4.7	U	
88-75-5	2-Nitrophenol	4.7	U	
105-67-9	2,4-Dimethylphenol	4.7	U	
111-91-1	Bis(2-chloroethoxy)methane	4.7	~~U~~	UJ CCH
120-83-2	2,4-Dichlorophenol	4.7	U	
91-20-3	Naphthalene	4.7	~~U~~	R RE
106-47-8	4-Chloroaniline	4.7	U	
87-68-3	Hexachlorobutadiene	4.7	U	
105-60-2	Caprolactam	4.7	U	
59-50-7	4-Chloro-3-methylphenol	4.7	U	
91-57-6	2-Methylnaphthalene	4.7	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	4.7	U	
88-06-2	2,4,6-Trichlorophenol	4.7	U	
95-95-4	2,4,5-Trichlorophenol	4.7	U	
92-52-4	1,1'-Biphenyl	4.7	U	
91-58-7	2-Chloronaphthalene	4.7	U	
88-74-4	2-Nitroaniline	9.3	U	
131-11-3	Dimethylphthalate	4.7	U	
606-20-2	2,6-Dinitrotoluene	4.7	U	
208-96-8	Acenaphthylene	4.7	~~U~~	R RE
99-09-2	3-Nitroaniline	9.3	U	
83-32-9	Acenaphthene	4.7	~~U~~	R RE

lew 10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-08

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807089-08JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	9.3	U	
100-02-7	4-Nitrophenol	9.3	U	
132-64-9	Dibenzofuran	4.7	U	
121-14-2	2,4-Dinitrotoluene	4.7	U	
84-66-2	Diethylphthalate	4.7	U	
86-73-7	Fluorene	4.7	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	4.7	U	
100-01-6	4-Nitroaniline	9.3	U	
534-52-1	4,6-Dinitro-2-methylphenol	9.3	U	
86-30-6	N-Nitrosodiphenylamine (1)	4.7	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	4.7	U	
101-55-3	4-Bromophenyl-phenylether	4.7	U	
118-74-1	Hexachlorobenzene	4.7	U	
1912-24-9	Atrazine	4.7	U	
87-86-5	Pentachlorophenol	9.3	~~U~~	R RE
85-01-8	Phenanthrene	4.7	~~U~~	R RE
120-12-7	Anthracene	4.7	~~U~~	R RE
86-74-8	Carbazole	4.7	U	
84-74-2	Di-n-butylphthalate	4.7	U	
206-44-0	Fluoranthene	4.7	~~U~~	R RE
129-00-0	Pyrene	4.7	~~U~~	R RE
85-68-7	Butylbenzylphthalate	4.7	U	
91-94-1	3,3'-Dichlorobenzidine	4.7	U	
56-55-3	Benzo (a) anthracene	4.7	~~U~~	R RE
218-01-9	Chrysene	4.7	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	4.7	U	
117-84-0	Di-n-octylphthalate	4.7	U	
205-99-2	Benzo (b) fluoranthene	4.7	U	R RE
207-08-9	Benzo (k) fluoranthene	4.7	U	
50-32-8	Benzo (a) pyrene	4.7	U	
193-39-5	Indeno (1,2,3-cd) pyrene	4.7	U	
53-70-3	Dibenzo (a,h) anthracene	4.7	U	
191-24-2	Benzo (g,h,i) perylene	4.7	U	
58-90-2	2,3,4,6-Tetrachlorophenol	4.7	U	

[1] Cannot be separated from Diphenylamine

11/12/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-08

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807089-08JA66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	0-00-0	N-Cbz-glycyl-glycine-p-nitrophenyl e	12.77	2.1	JN
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
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24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

gW 10/24/08

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1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-09

Sample wt/vol: 975 (g/mL) mL Lab File ID: 0807089-09JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	5.1	U	
108-95-2	Phenol	5.1	U	
111-44-4	Bis(2-chloroethyl)ether	5.1	U	
95-57-8	2-Chlorophenol	5.1	U	
95-48-7	2-Methylphenol	5.1	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	5.1	U	
98-86-2	Acetophenone	5.1	U	
106-44-5	4-Methylphenol	5.1	U	
621-64-7	N-Nitroso-di-n-propylamine	5.1	U	
67-72-1	Hexachloroethane	5.1	~~U~~	UJCCH
98-95-3	Nitrobenzene	5.1	U	
78-59-1	Isophorone	5.1	U	
88-75-5	2-Nitrophenol	5.1	U	
105-67-9	2,4-Dimethylphenol	5.1	U	
111-91-1	Bis(2-chloroethoxy)methane	5.1	~~U~~	UJCCH
120-83-2	2,4-Dichlorophenol	5.1	U	
91-20-3	Naphthalene	5.1	~~U~~	R RE
106-47-8	4-Chloroaniline	5.1	U	
87-68-3	Hexachlorobutadiene	5.1	U	
105-60-2	Caprolactam	5.1	U	
59-50-7	4-Chloro-3-methylphenol	5.1	U	
91-57-6	2-Methylnaphthalene	5.1	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	5.1	U	
88-06-2	2,4,6-Trichlorophenol	5.1	U	
95-95-4	2,4,5-Trichlorophenol	5.1	U	
92-52-4	1,1'-Biphenyl	5.1	U	
91-58-7	2-Chloronaphthalene	5.1	U	
88-74-4	2-Nitroaniline	10	U	
131-11-3	Dimethylphthalate	5.1	U	
606-20-2	2,6-Dinitrotoluene	5.1	U	
208-96-8	Acenaphthylene	5.1	~~U~~	
99-09-2	3-Nitroaniline	10	U	
83-32-9	Acenaphthene	5.1	~~U~~	

LW 10/24/08

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1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-09

Sample wt/vol: 975 (g/mL) mL Lab File ID: 0807089-09JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	10	U	
100-02-7	4-Nitrophenol	10	U	
132-64-9	Dibenzofuran	5.1	U	
121-14-2	2,4-Dinitrotoluene	5.1	U	
84-66-2	Diethylphthalate	4.7	J	
86-73-7	Fluorene	5.1	U	
7005-72-3	4-Chlorophenyl-phenylether	5.1	U	
100-01-6	4-Nitroaniline	10	U	
534-52-1	4,6-Dinitro-2-methylphenol	10	U	
86-30-6	N-Nitrosodiphenylamine (1)	5.1	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	5.1	U	
101-55-3	4-Bromophenyl-phenylether	5.1	U	
118-74-1	Hexachlorobenzene	5.1	U	
1912-24-9	Atrazine	5.1	U	
87-86-5	Pentachlorophenol	10	U	
85-01-8	Phenanthrene	5.1	~~U~~	R RE
120-12-7	Anthracene	5.1	~~U~~	R RE
86-74-8	Carbazole	5.1	U	
84-74-2	Di-n-butylphthalate	2.7	J	
206-44-0	Fluoranthene	5.1	~~U~~	R RE
129-00-0	Pyrene	5.1	~~U~~	R RE
85-68-7	Butylbenzylphthalate	5.1	U	
91-94-1	3,3'-Dichlorobenzidine	5.1	U	
56-55-3	Benzo (a) anthracene	5.1	~~U~~	R RE
218-01-9	Chrysene	5.1	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	5.1	U	
117-84-0	Di-n-octylphthalate	5.1	U	
205-99-2	Benzo (b) fluoranthene	5.1	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	5.1	~~U~~	
50-32-8	Benzo (a) pyrene	5.1	~~U~~	
193-39-5	Indeno (1,2,3-cd) pyrene	5.1	~~U~~	
53-70-3	Dibenzo (a,h) anthracene	5.1	~~U~~	
191-24-2	Benzo (g,h,i) perylene	5.1	~~U~~	
58-90-2	2,3,4,6-Tetrachlorophenol	5.1	U	

[1] Cannot be separated from Diphenylamine

DMW
10/24/08

6

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-EB01-072808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-09

Sample wt/vol: 975 (g/mL) mL Lab File ID: 0807089-09JA66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	20.30	3.6	J
02		UNKNOWN	25.05	3.5	J
03	119-61-9	Benzophenone $$ Methanone, diphenyl-	25.91	2.1	JN
04	0-00-0	7,9-Di-tert-butyl-1-oxaspiro(4,5)dec	29.23	4.3	JN
05					
06					
07					
08					
09					
10					
11					
12					
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22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

CW
10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072908

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-10

Sample wt/vol: 900 (g/mL) mL Lab File ID: 0807089-10JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	5.6	U	
108-95-2	Phenol	5.6	U	
111-44-4	Bis(2-chloroethyl)ether	5.6	U	
95-57-8	2-Chlorophenol	5.6	U	
95-48-7	2-Methylphenol	5.6	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	5.6	U	
98-86-2	Acetophenone	1.4	J	
106-44-5	4-Methylphenol	5.6	U	
621-64-7	N-Nitroso-di-n-propylamine	5.6	U	
67-72-1	Hexachloroethane	5.6	~~U~~	UJ CCH
98-95-3	Nitrobenzene	5.6	U	
78-59-1	Isophorone	5.6	U	
88-75-5	2-Nitrophenol	5.6	U	
105-67-9	2,4-Dimethylphenol	5.6	U	
111-91-1	Bis(2-chloroethoxy)methane	5.6	~~U~~	UJ CCH
120-83-2	2,4-Dichlorophenol	5.6	U	
91-20-3	Naphthalene	5.6	~~U~~	R RE
106-47-8	4-Chloroaniline	5.6	U	
87-68-3	Hexachlorobutadiene	5.6	U	
105-60-2	Caprolactam	5.6	U	
59-50-7	4-Chloro-3-methylphenol	5.6	U	
91-57-6	2-Methylnaphthalene	5.6	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	5.6	U	
88-06-2	2,4,6-Trichlorophenol	5.6	U	
95-95-4	2,4,5-Trichlorophenol	5.6	U	
92-52-4	1,1'-Biphenyl	5.6	U	
91-58-7	2-Chloronaphthalene	5.6	U	
88-74-4	2-Nitroaniline	11	U	
131-11-3	Dimethylphthalate	5.6	U	
606-20-2	2,6-Dinitrotoluene	5.6	U	
208-96-8	Acenaphthylene	5.6	~~U~~	R RE
99-09-2	3-Nitroaniline	11	U	
83-32-9	Acenaphthene	5.6	~~U~~	R RE

RW
10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072908

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-10

Sample wt/vol: 900 (g/mL) mL Lab File ID: 0807089-10JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: . Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	11	U	
100-02-7	4-Nitrophenol	11	U	
132-64-9	Dibenzofuran	5.6	U	
121-14-2	2,4-Dinitrotoluene	5.6	U	
84-66-2	Diethylphthalate	5.6	U	
86-73-7	Fluorene	5.6	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	5.6	U	
100-01-6	4-Nitroaniline	11	U	
534-52-1	4,6-Dinitro-2-methylphenol	11	U	
86-30-6	N-Nitrosodiphenylamine (1)	5.6	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	5.6	U	
101-55-3	4-Bromophenyl-phenylether	5.6	U	
118-74-1	Hexachlorobenzene	5.6	U	
1912-24-9	Atrazine	5.6	U	
87-86-5	Pentachlorophenol	11	U	
85-01-8	Phenanthrene	5.6	~~U~~	R RE
120-12-7	Anthracene	5.6	~~U~~	R RE
86-74-8	Carbazole	5.6	U	
84-74-2	Di-n-butylphthalate	5.6	U	
206-44-0	Fluoranthene	5.6	U	
129-00-0	Pyrene	5.6	~~U~~	R RE
85-68-7	Butylbenzylphthalate	5.6	U	
91-94-1	3,3'-Dichlorobenzidine	5.6	U	
56-55-3	Benzo (a) anthracene	5.6	~~U~~	R RE
218-01-9	Chrysene	5.6	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	5.6	U	
117-84-0	Di-n-octylphthalate	5.6	U	
205-99-2	Benzo (b) fluoranthene	5.6	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	5.6	~~U~~	
50-32-8	Benzo (a) pyrene	5.6	~~U~~	
193-39-5	Indeno (1,2,3-cd) pyrene	5.6	~~U~~	
53-70-3	Dibenzo (a,h) anthracene	5.6	~~U~~	
191-24-2	Benzo (g,h,i) perylene	5.6	~~U~~	
58-90-2	2,3,4,6-Tetrachlorophenol	5.6	U	

[1] Cannot be separated from Diphenylamine

CW
10/24/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-EB01-072908

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-10

Sample wt/vol: 900 (g/mL) mL Lab File ID: 0807089-10JA66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	0-00-0	7,9-Di-tert-butyl-1-oxaspiro(4,5)dec	29.24	3.2	JN
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

hw 10/24/08

1D - FORM I SV-1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW04

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-11

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807089-11JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
100-52-7	Benzaldehyde	4.7	U	
108-95-2	Phenol	4.7	U	
111-44-4	Bis(2-chloroethyl)ether	4.7	U	
95-57-8	2-Chlorophenol	4.7	U	
95-48-7	2-Methylphenol	4.7	U	
108-60-1	2,2'-Oxybis(1-chloropropane)	4.7	U	
98-86-2	Acetophenone	4.7	U	
106-44-5	4-Methylphenol	4.7	U	
621-64-7	N-Nitroso-di-n-propylamine	4.7	U	
67-72-1	Hexachloroethane	4.7	~~U~~	UJ CCH
98-95-3	Nitrobenzene	4.7	U	
78-59-1	Isophorone	4.7	U	
88-75-5	2-Nitrophenol	4.7	U	
105-67-9	2,4-Dimethylphenol	4.7	U	
111-91-1	Bis(2-chloroethoxy)methane	4.7	~~U~~	UJ CCH
120-83-2	2,4-Dichlorophenol	4.7	U	
91-20-3	Naphthalene	4.7	~~U~~	R RE
106-47-8	4-Chloroaniline	4.7	U	
87-68-3	Hexachlorobutadiene	4.7	U	
105-60-2	Caprolactam	4.7	U	
59-50-7	4-Chloro-3-methylphenol	4.7	U	
91-57-6	2-Methylnaphthalene	4.7	~~U~~	R RE
77-47-4	Hexachlorocyclopentadiene	4.7	U	
88-06-2	2,4,6-Trichlorophenol	4.7	U	
95-95-4	2,4,5-Trichlorophenol	4.7	U	
92-52-4	1,1'-Biphenyl	4.7	U	
91-58-7	2-Chloronaphthalene	4.7	U	
88-74-4	2-Nitroaniline	9.3	U	
131-11-3	Dimethylphthalate	4.7	U	
606-20-2	2,6-Dinitrotoluene	4.7	U	
208-96-8	Acenaphthylene	4.7	~~U~~	R RE
99-09-2	3-Nitroaniline	9.3	U	
83-32-9	Acenaphthene	4.7	~~U~~	R RE

lw 10/24/08

1E - FORM I SV-2
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW04

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-11

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807089-11JA66.d

Level: (LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
51-28-5	2,4-Dinitrophenol	9.3	U	
100-02-7	4-Nitrophenol	9.3	U	
132-64-9	Dibenzofuran	4.7	U	
121-14-2	2,4-Dinitrotoluene	4.7	U	
84-66-2	Diethylphthalate	4.7	U	
86-73-7	Fluorene	4.7	~~U~~	R RE
7005-72-3	4-Chlorophenyl-phenylether	4.7	U	
100-01-6	4-Nitroaniline	9.3	U	
534-52-1	4,6-Dinitro-2-methylphenol	9.3	U	
86-30-6	N-Nitrosodiphenylamine (1)	4.7	U	
95-94-3	1,2,4,5-Tetrachlorobenzene	4.7	U	
101-55-3	4-Bromophenyl-phenylether	4.7	U	
118-74-1	Hexachlorobenzene	4.7	U	
1912-24-9	Atrazine	4.7	U	
87-86-5	Pentachlorophenol	9.3	~~U~~	R RE
85-01-8	Phenanthrene	4.7	~~U~~	↓ ↓
120-12-7	Anthracene	4.7	~~U~~	
86-74-8	Carbazole	4.7	U	
84-74-2	Di-n-butylphthalate	4.7	U	
206-44-0	Fluoranthene	4.7	~~U~~	R RE
129-00-0	Pyrene	4.7	~~U~~	R RE
85-68-7	Butylbenzylphthalate	4.7	U	
91-94-1	3,3'-Dichlorobenzidine	4.7	U	
56-55-3	Benzo (a) anthracene	4.7	~~U~~	R RE
218-01-9	Chrysene	4.7	~~U~~	R RE
117-81-7	Bis(2-ethylhexyl)phthalate	4.7	U	
117-84-0	Di-n-octylphthalate	4.7	U	
205-99-2	Benzo (b) fluoranthene	4.7	~~U~~	R RE
207-08-9	Benzo (k) fluoranthene	4.7	~~U~~	↓ ↓
50-32-8	Benzo (a) pyrene	4.7	~~U~~	
193-39-5	Indeno (1,2,3-cd) pyrene	4.7	~~U~~	
53-70-3	Dibenzo (a,h) anthracene	4.7	~~U~~	
191-24-2	Benzo (g,h,i) perylene	4.7	~~U~~	
58-90-2	2,3,4,6-Tetrachlorophenol	4.7	U	

[1] Cannot be separated from Diphenylamine

10/24/08

1K - FORM I SV-TIC
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW04

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-11

Sample wt/vol: 1080 (g/mL) mL Lab File ID: 0807089-11JA66.d

Level: (TRACE or LOW/MED) LOW Extraction: (Type) CONT

% Moisture: Decanted: (Y/N) Date Received: 07/30/2008

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/31/2008

Injection Volume: 2.0 (uL) GPC Factor: 1.0 Date Analyzed: 08/07/2008

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	18.03	2.4	J
02	768-95-6	1-Adamantanol	19.44	1.9	JN
03		UNKNOWN	24.46	2.8	J
04		UNKNOWN	24.90	3.2	J
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[2]	Total Alkanes	N/A		

[2]EPA-designated Registry Number.

lw 10/24/08

USEPA REGION II WORKSHEETS

SOP NO. HW-35/SVOA Data Validation
USEPA Contract Laboratory Program
Statement of Work for Organic Analysis of Low/Medium Concentration of Semivolatile Organic Compounds SOM01.2

Prepared by: _____ Date: 8/13/07
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Peer Reviewed by: _____ Date: 10/3/07
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Linda Mauel, Chief
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Robert Runyon, Chief
Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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INTRODUCTION

Scope and Applicability

This SOP offers detailed guidance in evaluating laboratory data generated according to the method in the "USEPA Contract Laboratory Program Statement of Work for Organics Analysis Multi-Media, Multi-Concentration, SOM01.1, May 2005". The validation procedures and actions discussed in this document are based on the requirements set forth in the "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, January 2005". This document attempts to cover technical problems specific to low/Medium concentration of semivolatile compounds. Situations may arise where data limitations must be assessed based on the reviewer's own professional judgement.

In addition to technical requirements, contractual requirements may also be covered in this document. While it is important that instances of contract non-compliance be addressed in the Data Assessment, the technical criteria are always used to qualify the analytical data.

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 as follows:

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.

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

P - Pesticide/Aroclor target analytes when the % Difference between the analyte concentrations obtained from the two dissimilar GC columns is greater than 25%.

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 the USEPA Statement of Work SOM01.2 and National Functional Guidelines mentioned above.

YES NO N/A

. . . . . .

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: N/A **LAB:** Compuchem, NC

SITE NAME: Vieques Island, PR **SDG No(s).:** 0807089

1.0 Chain of Custody and Sampling Trip Reports

1.1 Are the Traffic Reports/Chain-of-Custody Records present for all samples? [✓] ___ ___

ACTION: If no, contact RSCC, or the TOPO to obtain replacement of missing or illegible copies from the lab.

1.2 Is the Sampling Trip Report present for all samples? [✓] ___ ___

ACTION: If no, contact either RSCC or ask the TOPO to obtain the necessary information from the prime contractor.

2.0 Data Completeness and Deliverables

2.1 Have any missing deliverables been received and added to the data package? ___ [✓] ___

ACTION: Contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the lab. If lab cannot provide them, note the effect on the review of the data package in the Contract Problems/Non-compliance section of the Data Assessment.

2.2 Was CLASS CCS checklist included with the package? [✓] ___ ___

	YES	NO	N/A
2.3 Are there any discrepancies between the Traffic Reports/Chain-of-Custody Records, Sampling Trip Report and Sample Tags?	___	[✓]	___

ACTION: If yes, contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the laboratory.

3.0 <u>Cover Letter SDG Narrative</u>

3.1 Is the SDG Narrative or Cover Letter Present?	[✓]	___	___
3.2 Are case number, SDG number and contract number contained in the SDG Narrative or cover letter (see SOW, Exhibit B, section 2.5.1)? EPA sample numbers in the SDG, detailed documentation of any quality control, sample, shipment, and/or analytical problems encountered in processing the samples? Corrective action taken?	[✓]	___	___
3.3 Does the Narrative contain the following information SOM01.1, page B-12, section 2.5.1)? column used, storage of samples, case#, SDG#, analytical problems, and discrepancies between field and lab weights.	[✓]	___	___
3.5 Did the contractor record the temperature of the cooler on the Form DC-1, Item 9 - Cooler Temperature, and in the SDG Narrative?	[✓]	___	___
3.6 Does the Case Narrative contain the "verbatim" statement (page B-12, section 2.5.1 of the SOM)?	[✓]	___	___

ACTION: If "No", to any question in this section, contact the TOPO to obtain necessary resubmittals. If unavailable, document under the Contract Problems/ Non-Compliance section of the Data Assessment.

	YES	NO	N/A
4.0 Data Validation Checklist			
4.1 Check the package for the following (see SOM reporting requirements, section 2.1, page B-10):			
a. Is the package paginated in ascending order starting from the SDG narrative?	[✓]	___	___
b. Are all forms and copies legible?	[✓]	___	___
c. Assembled in the order set forth in the SOW?	[✓]	___	___
d. Semivolatiles Data present?	[✓]	___	

PART A: Low/Medium Semivolatile Analyses

	YES	NO	N/A
1.0 Sample Conditions/Problems			
1.1 Do the Traffic Reports/Chain-of-Custody Records, Sampling Trip Report or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	___	[✓]	___

ACTION: If samples were not iced or the ice was melted upon arrival at the laboratory and the temperature of the cooler was > 10° C, then flag all positive results with a "J" and all non-detects "UJ".

	YES	NO	N/A
2.0 Holding Times			
2.1 Have any SVOA technical holding times, determined from date of collection to date of analysis, been exceeded?	___	[✓]	___

2.2 Preservation: Aqueous and Non-aqueous samples must be cooled at 4°C ± 2°C.

YES NO N/A

. . . . . .

Action: Qualify sample results according to the following table.

Holding Time Actions for Low/Medium Semivolatile Analyses

Matrix	Preserved	Criteria	Action	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤ 7 days (extraction) < 40 days (analysis)	J*	UJ*
	No	> 7 days (extraction) > 40 days (analysis)	J	UJ
	Yes	≤ 7 days (extraction) ≤ 40 days (analysis)	No qualification	
	Yes	> 7 days (extraction) > 40 days (analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	R
Non-aqueous	No	≤ 14 days (extraction) ≤ 40 days (analysis)	J*	UJ*
	No	> 14 days (extraction) > 40 days (analysis)	J	UJ
	Yes	≤ 14 days (extraction) ≤ 40 days (analysis)	No qualification	
	Yes	> 14 days (extraction) > 40 days (analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	R

* Only if cooler temperature exceeds 10° C (see ACTION in Section 1.1 above). No action required if temperature < 10° C.

3.0 Deuterated Monitoring Compound (DMC) Recovery (Form II)

3.1 Are the Semivolatile DMC Recovery Summaries (Form II) present? [√] ___ ___

	YES	NO	N/A
. . . . .			
ACTION: Contact the TOPO to obtain an explanation/resubmittal from the lab. If missing deliverables are unavailable, document the effect in the Data Assessment.			
3.2 Were outliers marked correctly with an asterisk?	[√]	___	___
ACTION: Circle all outliers in red.			
3.3 Were more than four of the sixteen (16) Deuterated Monitoring Compounds (DMC's) recoveries outside their corresponding limits?	___	[√]	___
If yes, were samples re-analyzed?	[ ]	___	√
Were method blanks re-analyzed?	[ ]	___	√

Note: Up to four (4) DMCs per sample may fail % recovery but all % recoveries must be > zero.

ACTION: If any DMC is outside the required limits, qualify their associated target compounds (See Table below) as follows:

SEMIVOLATILE DMC AND THEIR ASSOCIATED TARGET COMPOUNDS

Phenol-d5 Benzaldehyde Phenol	**2-Chlorophenol-d4** 2-Chlorophenol	**2-Nitrophenol-d4** Isophorone 2-nitrophenol
Bis(2-Chloroethyl)ether-d8 bis(2-Chloroethyl)ether 2,2'oxybis(1-Chloropropane bis(2-Chloroethoxy)methane	**4-Methylphenol-d8** 2-Methylphenol 4-Methylphenol 2,4 Dimethylphenol	**4-Chloroaniline-d4** 4-Chloroaniline Hexachloro cyclopentadiene 3,3'Dichlorobenzidine

YES NO N/A

. . . . . .

Nitrobenzene-d8 Acetophenone N-Nitro-di-n-propylamine Hexachloroethane Nitrobenzene 2,6-Dinitrotoluene 2,4-Dinitrotoluene N-Nitrodiphenylamine	**2,4-Dichlorophenol-d3** 2,4-Dichlorophenol Hexaclorobutadiene 4-Chloro-3-methylphenol 2,4,6-Trichlorophenol 2,4,5-Trichlorophenol 1,2,4,5-Tetrachloro-benzene Pentachlorophenol 2,3,4,6-Tetrachloro-phenol	**Dimethylphthalate-d6** Caprolactam 1,1'-Biphenyl Dimethylphthalate Diethylphthalate Di-n-butylphthalate Butylbenzylphthalate bis(2-Ethylhexyl)-phthalate Di-n-octylphthalate
Fluorene-d10 Dibenzofuran Fluorene 4-Chlorophenyl-phenylether 4-Bromophenyl-phenylether Carbazole	**Anthracene-d10** Hexachlorobenzene Atrazine Phenanthrene Anthracene	**Pyrene-d10** Fluoranthene Pyrene Benzo(a)anthracene Chrysene
Acenaphthylene-d8 Naphthalene 2-Methylphthalene 2-Chlorophthalene Acenapthylene Acenaphthene	**4-Nitrophenol-d4** 2-Nitroaniline 3-Nitroaniline 2,4-Dinitrophenol 4-Nitrophenol 4-Nitroaniline	**Benzo(a)pyrene-d12** Benzo(b)flur0anthene Benzo(k)fluroanthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)pertlene
4,6-Dinitro-2-methylphenol-d2 4,6-Dinitro-2-methylphenol		

Semivolatile Deuterated Monitoring Compound Recovery Limits for Selective Ion Monitoring (SIM) and the Associated Target Compounds

Fluoranthene-d10 (DMC)	**2-Methylnaphthalene-d10 (DMC)**
Fluoranthene	Naphthalene

Pyrene	2-Methylnaphthalene
Benzo(a)anthracene	Acenaphthylene
Chrysene	Acenaphthene
Benzo(b)fluoranthene	Fluorene
Benzo(k)fluoranthene	Pentachlorophenol
Benzo(a)pyrene	Phenanthrene
Indeno(1,2,3-cd)pyrene	Anthracene
Bibenzo(a,h)anthracene	
Benzo(g,h,i)perylene	

SEMIVOLATILE DEUTERATED MONITORING COMPOUND RECOVERY LIMITS

DMC	Recovery Limits (%) for Water Samples	Recovery Limits (%) for Soil samples
Phenol-d5	39 - 106	17 - 103
Bis-(2-chloroethyl) ether-d8	40 - 105	12 - 9
2-Chlorophenol-d4	41 - 106	13 - 101
4-Methylphenol-d8	25 - 111	8 - 100
Nitrobenzene-d5	43 - 108	16 - 103
2-Nitrophenol-d4	40 - 108	16 - 104
2,4-Dichlorophenol-d3	37 - 105	23 - 104
4-Chloroaniline-d4	1 - 145	1 - 145
Dimethylphthalate-d6	47 - 114	43 - 111
Acenaphthalate-d8	41 - 107	20 - 97
4-Nitrophenol-d4	33 - 116	16 - 166
Fluorene-d10	42 - 111	40 - 108
4,6-Dintro-2-methylphenol-d2	22 - 104	1 - 121

Anthracene-d10	44 - 110	22 - 98
Pyrene-d10	52 - 119	51 - 120
Benzo(a)pyrene-d12	32 - 121	43 - 111
Fluoranthene-d10 (SIM)	5- - 150	50 - 150
2-Methylnaphthalene-d10 (SIM)	50 - 150	50 - 150

Deuterated Monitoring Compound Recovery Action for Semivolatiles

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
%R > Upper Acceptance Limit	J	No qualification
%R < Lower acceptance Limit	J	UJ
Lower Acceptance ≤ %R ≤ Upper Acceptance Limit	No qualification	

NOTE: Use the above table to qualify SVOA data including SIM analysis.

NOTE: As per SOM, any sample which has more than 4 DMC's outside the limits, it must be reanalyzed (SOM sec. 11.4.3.1 pg. D-49/Low Medium SVOA).

Blank analysis have DMCs out of specification: 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. For example, if one or more samples in the batch show acceptable DMC recoveries, the reviewer may choose to consider the blank problem to be an isolated occurrence.

ACTION: Note in the Data Assessment under Contract Problems/ Non-Compliance if the Lab did not perform reanalysis and reviewer's judgment regarding blank problem.

	YES	NO	N/A
3.4 Are there any transcription/calculation errors between raw data and form II?	___	[√]	___

ACTION: If large errors exist, ask the TOPO to obtain an explanation/resubmittal from the lab, make any necessary corrections and note errors in the data assessment.

Note: DMC recovery limits criteria and qualification apply to samples diluted 5X and less. For samples diluted greater than 5X, recovery criteria does not apply Because it is assumed DMC is diluted below the quantitation range.

4.0 Matrix Spike/Matrix Spike Duplicate Recovery (Form III)

Note: Data for MS/MSD will not be present unless requested.

4.1 Are the MS/MSD Recovery Forms (Form III BNA) present?	[√]	___	___
4.2 Was the MS/MSD analyzed at the required frequency (once per SDG, or every 20 samples, whichever is more frequent)?	[√]	___	___

ACTION: If any MS/MSD data are missing, take action as specified in section 3.1 above.

ACTION: No action is taken on MS/MSD data alone. However, using professional judgement, the validator may use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. If Any MS/MSD % recovery or RPD is out of specification, qualify data to include the consideration of the existence of interference in the raw data. Consideration include, but not limited to the following "Action":

Matrix Spike/Matrix Spike Duplicate Action for Semivolatiles

Criteria	Action	
	Detected Spike Compounds	Non-detected Spike Compounds

YES NO N/A

. . . . . .

%R or RPD > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	Use Professional Judgment
Lower Acceptance Limit ≤ %R; RPD ≤ Upper Acceptance Limit	No qualification required	

Note: If it can be determined that the results of the MS/MSD affects only the sample spiked, limit qualification to only this sample. However, use professional judgment when it is determined through the MS/MSD results that the laboratory is having systematic problem in the analysis of one or more analytes that affect all associated samples.

5.0 Method Blanks (Form IV)

5.1 Is the Semivolatile Method Blank Summary (Form IV BNA) present for aqueous and soil samples? [✓] ___ ___

5.2 Frequency of Analysis: For the analysis of SVOA TCL compounds, has a method blank been analyzed for each SDG or every 20 samples, whichever is more frequent? [✓] ___ ___

5.3 Has a SVOA method blank been analyzed after the calibration standards. [✓] ___ ___

5.4 No target compound concentration may exceed the upper limit of the initial calibration. Did the laboratory perform dilution on compounds exceeding the initial calibration upper limit. [✓] ___ ___

ACTION: If any method blank data is missing or dilution was not done, notify the TOPO to obtain resubmittals or an explanation from the lab. If method blank data are unavailable, the reviewer may use professional judgement, or substitute field blank or trip blank data for missing method blank data.

5.5 Chromatography: Review the blank raw data chromatogram (RICs), quant. Reports or data system printout and spectra. Is the

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

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

5.6 The validator should verify that the correct identification scheme for EPA blanks was used. (See SOM page B-39, section 3.3.7.3 for more information.)

Was the correct identification scheme used for all SVOA blanks?	[√]	___	___

ACTION: Contact the TOPO to obtain corrections from the lab, or make the necessary corrections. Document in the "Contract Problems/Non-Compliance section of the Data Assessment all corrections made by the validator.

5.8 Are all detected hits for target compounds in method, and field blanks less than the CRQL?	[√]	___	___

Exception: Bis(2-ethylhexyl)phthalate must be less than 5X times their respective CRQLs listed in the method.

ACTION: If no, an explanation and laboratory's corrective actions must be addressed in the case narrative. If the narrative contains no explanation, then make a note in the Contract Problems/Non-Compliance section of the Data Assessment.

6.0 Contamination

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

Note: These limits are not advisory.

6.1 Do any method blanks contain positive SVOA results (TCL and/or TICs)?	√	[ ]	___

YES NO N/A

. . . . . .

6.2 Do any field/rinse blanks have positive SVOA results (including TICs)? ✓ [ ] ___

NOTE: All field blank results associated with 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 system monitoring compound, instrument performance criteria, spectral or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks. If any blanks are grossly contaminated (i.e.,saturated peaks by GC/MS) all associated sample data should be qualified unusable (R).

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
	Gross contamination	Detects	Qualify results as unusable R
	TIC: aqueous	< 5x blank value	R

YES NO N/A

. . . . . .

	TIC: non-aqueous	< 5x blank value	R

* 5x the CRQL for bis(2-ethylhexyl)Phthalate

NOTE: Analytes qualified "U" for blank contamination are treated as "hits" when qualifying for calibration criteria.
Note: When applied as described in the table above, the contaminant concentration in the blank are multiplied by the sample dilution factor.

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

ACTION: 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.

7.0 GC/MS Instrument Performance Check (Form V)

7.1 Are the GC/MS Instrument Performance Check Forms (Form V) present for decafluorotriphenylphosphine (DFTPP)? [√] ___ ___

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

7.3 Did the 12-hour clock begin with either the injection of DFTPP, or in cases where a closing continuing calibration (CCV) was used as an opening CCV? [√] ___ ___

Listed below are some, but not necessarily all, examples of acceptable analytical sequences incorporating the use of the opening/closing CCV. Use these examples as a guide for possible analytical sequences that can be expected.

YES NO N/A

Conditions for When Example Sequence is Appropriate:	Acceptable Criteria That Must be Met:	Notes:
If time remains on the 12 hour clock after initial calibration sequence	• DFTPP tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets both opening and closing CCV criteria • CCV B meets closing CCV criteria.	The requirement of starting the new 12-hr clock for Analytical Sequence 2 with a new DFTPP tune is waived if CCV A meets opening CCV criteria. If CCV B meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.
If time remains on the 12 hour clock after initial calibration sequence	• DFTPP tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets closing CCV criteria (but does not meet opening CCV criteria). • CCV B meets opening CCV criteria. • CCV C meets closing CCV Criteria.	CCV A does not meet opening criteria, therefore a new DFTPP tune must be performed, immediately followed by CCV B before a method blank and any sample may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new DFTPP tune.
If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV. OR If the most recent closing CCV was not or could not be used as an opening CCV.	• DFTPP tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets both opening and closing CCV criteria. • CCV C meets both opening and closing CCV criteria.	The requirement of starting the new 12 hour clock for Analytical Sequence 2 with a new DFTPP tune is waived if CCV B meets opening CCV criteria. If CCV C meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.

YES NO N/A

. . . . . .

If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV OR If the most recent closing CCV was not or could not be used as an opening CCV	• DFTPP tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets closing CCV criteria (but does not meet opening CCV criteria). • CCV C meets opening CCV Criteria. • CCV D meets both opening and closing CCV criteria.	CCV B does not meet opening CCV criteria, therefore a new DFTPP tune must be performed, immediately followed by CCV B before a method blank and any samples may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new DFTPP tune. The requirement of starting the new 12 hr clock for Analytical Sequence 3 with a new DFTPP tune is waived if CCV D meets opening CCV criteria. If CCV D meets opening criteria, a method blank and subsequent samples may be analyzed after CCV B.

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

NOTE: All ion abundance ratios must be normalized to m/z 198, the nominal base peak, even though the ion abundance of m/z 442 may be up to 100% that of m/z 198.

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

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

ACTION: If ion abundance criteria are not met, professional Judgement to determine to what extent the data may be utilized.

NOTE: Guidelines to aid in the application of professional judgment in evaluating ion abundance criteria are discussed below:

a. Some of the most critical factors in the DFTPP criteria are the non-instrument specific requirements that are also not unduly affected by the location of the spectrum on the chromatographic profile. The m/z ratios for 198/199 and 442/443 are critical. These ratios are based on the natural abundance of carbon 12 and carbon 13 and should always be met. Similarly, the relative abundance of m/z 68, 70, 197, and 441 indicate the condition of the instrument and the suitability of the resolution adjustment. Note that all of the foregoing abundance relate to adjacent ions; they are relatively insensitive to differences in instrument design and position of the spectrum on the chromatographic profile.

	YES	NO	N/A
. . . . .			

b. For the ions at m/z 51, 127, and 275, the actual relative abundance is not as critical. For instance, if m/z 275 has 80.0% relative abundance (criteria 10.0-60.0%) and other criteria are met, the deficiency is minor.

c. The relative abundance of m/z 365 is an indicator of suitable instrument zero adjustment. If relative abundance for m/z 365 is zero, minimum detection limits may be affected. On the other hand, if m/z 365 is present, but < 0.75% minimum abundance criteria, the deficiency is not as serious.

		YES	NO	N/A
7.6	Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.)	___	[✓]	___
7.7	Is the number of significant figures for the reported relative abundances consistent with the number given in the ion abundance criteria column on Form V ?	[✓]	___	___

ACTION: If large errors exist, take action as specified in section 3.1 above.

		YES	NO	N/A
7.8	Is the spectrum of the mass calibration compound acceptable?	[✓]	___	___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

Note: The requirement to analyze the instrument performance check solution is optional when analysis of Polynuclear Hydrocarbon (PAHs)/pentachlorophenol is to be performed by the Selected Ion Monitoring (SIM) technique.

8.0 Target Compound List (TCL) Analytes (Form I)

		YES	NO	N/A
8.1	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. Regional Control/MS/MSD samples?	[✓]	___	___
	c. Blanks (method, field, etc)?	[✓]	___	___
8.2	Are the SVOA Reconstructed Ion Chromatograms, the 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. Regional Control/MS/MSD samples?	[✓]	___	___

	YES	NO	N/A
c. Blanks (method, field, etc)?	[✓]	___	___

ACTION: If any data are missing, take action specified in 3.1 above.

8.3 Is chromatographic performance acceptable with respect to:

	YES	NO	N/A
Baseline stability?	[✓]	___	___
Resolution?	[✓]	___	___
Peak shape?	[✓]	___	___
Full-scale graph (attenuation)?	[✓]	___	___
Other: _____?	[ ]	___	✓

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

	YES	NO	N/A
8.4 Are lab-generated standard mass spectra of the identified SVOA compounds present for each sample?	[✓]	___	___

ACTION: If any mass spectra are missing, take action as specified in 3.1 above. If lab does not generate their own standard spectra, make note under the "Contract Problems/Non-Compliance" section of the Data Assessment. If spectra are unavailable reject "R" the reported results.

	YES	NO	N/A
8.5 Is the RRT of each reported compound within ± 0.06 RRT units of the standard RRT in the continuing calibration verification or initial calibration mid-point standard?	[✓]	___	___
8.6 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
8.7 Do sample and standard relative ion intensities agree to within ± 20% between standard and sample spectra?	[✓]	___	___

ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be 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 sections 8.4-8.7 above.

	YES	NO	N/A
. . . . .			

ACTION: When sample carry-over is suspected, use professional judgment to determine if instrument cross-contamination has affected positive compound identifications.

9.0 Tentatively Identified Compounds (TIC)

		YES	NO	N/A
9.1	Are all Tentatively Identified Compound Forms (Form I SVOA-TIC) present? Do listed TICs include scan number or retention time, as well as the estimated "J" and/or "JN" qualifier?	✓		
9.2	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 3.1 above.

ACTION: Verify "JN" qualifier is present for all chemically named TICs having a percent match of greater than or equal 85%. TICs labeled "unknown" are qualified with a "J" qualifier.

		YES	NO	N/A
9.3	Are any target compounds (from any fraction) listed as TICs? (Example: 1,2-dimethylbenzene is xylene - a VOA target analyte - and should not be reported as a TIC.)		✓	
9.4	Are major ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample spectrum?	✓		
9.5	Do TICs and "best match" reference spectra relative ion intensities agree within ± 20%?	✓		

ACTION: Use professional judgement to determine the acceptability of TIC identifications. If it is determined that an incorrect identification was made, change its identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.

Action: When a compound is not found in any blank, but is detected in a sample and is a suspected artifact of a common laboratory contaminant, solvent preservatives or Aldo condensation, the result should be qualified as

YES NO N/A

. . . . . .

unusable (R). (i.e., common lab contaminants such as CO_2(m/e 44), Siloxanes (m/e 73), diethyl ether, hexane, certain freons and phthalates at < 100 ug/L. Aldol condensation products: 4-hydroxy-4-methyl-2-pentanone, 4-methyl-2-penten-2-one, and 5,5-dimethyl-2(H)-furanone. Solvent preservatives cyclohexene, and related by-products: cyclohexanone, cyclohexenone, cyclohexanol, cyclohexenol, chlorocyclohexene, and chlorocyclohexanol.).

10.0 Compound Quantitation and Reported Detection Limits

10.1 Are there any transcription/calculation errors in Form I results? (Check at least two positive values. Verify that the correct internal standards, quantitation ions, and RRFs were used to calculate Form I results.) ___ [✓] ___

10.2 Are the CRQLs adjusted to reflect sample dilutions? [✓] ___ ___

ACTION: If errors are large, take action as specified in section 3.1 above.

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQLs data from the diluted sample). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original Form I and substituting the data from 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 not to be used, including any in the data summary package.

10.3 For non-aqueous samples, were the percent moisture < 70%? [ ] ___ [✓]

Action: If the % moisture ≥ 70.0% and < 90.0%, qualify detects as "J" and non-detects as approximated "UJ" If the % Moisture ≥ 90%, qualify detects as "J" and non-detects as "R"

11.0 Standards Data (GC/MS)

11.1 Are the reconstructed ion chromatograms, and data system printouts (quant. reports) present for each initial and continuing calibration? [✓] ___ ___

ACTION: If any calibration standard data are missing, take action specified in section 3.1 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI SVOA) present and complete for the semivolatile target compounds (except seven listed below) at concentrations of 5, 10, 20, 40,

	YES	NO	N/A
and 80 µg/ℓ and 4-point calibration at 10, 20, 40, and 80 ug/L for 2,4-dinitrophenol, pentachlorophenol, 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, 4-nitrophenol and 4,6-dinitro-2-methylphenol?	[✓]	___	___

Note: If analysis by Selected Ion Monitoring (SIM) technique is requested for PAHs/pentachlorophenols, calibration standards are analyzed at 0.10, 0.20, 0.40, 0.80 and 1.0 ng/uL for each target compound of interest and the associated DMCs. Pentachlorophenol will require only a four-point initial calibration at 0.20, 0.40, 0.80 and 1.0 ng/uL.

ACTION: If any Initial Calibration forms are missing, take action as specified in section 3.1 above.

	YES	NO	N/A
12.2 Are the relative standard deviation (RSD) stable for SVOA's over the concentration range of the calibration (i.e., %RSD ≤ 20%, and ≤ 40% for poor performers (see table below)?	[✓]	___	___

ACTION: Circle all outliers in red.

NOTE: The twenty two (25) poor performers compounds and associated DMCs are listed below. The relative response factor (RRF) for these compounds must be greater than or equal to 0.010. The RRF for all other BNA target compounds must be ≥ 0.050.

Semivolatile Compounds Exhibiting Poor Response

Semivolatile Compounds	
2,2'-Oxybis(1-chloropropane)	Benzaldehyde
4-Chloroaniline	4-Nitroaniline
Hexachlorobutadiene	4,6-Dinitro-2-methylphenol
Hexachlorocyclopentadiene	N-Nitrosodiphenylamine
2-Nitroaniline	3,3'Dichlorobenzidine
3-Nitroaniline	1,1'Biphenyl
2,4-Dinitrophenol	Dimethylphthalate
4-Nitrophenol	Diethylphthalate
Acetophenone	1,2,4,5-Tetrachlorobenzene
Caprolactam	Carbazole

YES NO N/A

. . . . . .

Atrazine	Butylbenzylphthalate
Di-n-butylphthalate	Di-n-octylphthalate
Bis-2(ethylhexyl)phthalate	

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

12.3 Are any $\overline{RRF}$s < 0.050 (< 0.010 for poor performers)? ✓ [ ] ___

ACTION: Circle all outliers in red.

ACTION: Use the following table to qualify for detects and non-detect compounds.

Initial Calibration Actions for Semivolatile Analyses

Criteria for Semivolatile Analysis	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RRF < 0.010 (compounds exhibiting poor response) RRF < 0.050 (all other target compounds)	J	R
RRF ≥ 0.010 (compounds exhibiting poor response) RRF ≥ 0.050 (all other target compounds)	No qualification	
%RSD ≤ 40.0% (compounds exhibiting poor response) %RSD ≤ 20.0% (all other target compounds)	No qualification	
%RSD > 40.0% (compounds exhibiting poor response) %RSD > 20.0% (all other target compounds)	J	No qualification

ACTION: Document in the Data Assessment Report the analytes that fail %RSD and/or RRF criteria.

12.4 Are there any transcription/calculation errors in the reporting of RRFs, RRFs or %RSD values? (Check at least 2 values, but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

ACTION: If errors are large, contact the TOPO to obtain an explanation/resubmittal from the lab, document in the Data Assessment under Contract Problems/Non-Compliance.

	YES	NO	N/A
. . . . .			
13.0 GC/MS Continuing Calibration Verification (CCV) (Form VII)			
13.1 Are the Continuing Calibration Forms (Form VII SVOA) present and complete for the semivolatile fraction?	[✓]	___	___
13.2 Did the 12 hour clock begin with either the injection of DFTPP or in cases where a closing CCV can be used as an opening CCV for each instrument?	[✓]	___	___
ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, ask the TOPO to obtain explanation/resubmittal from the laboratory. If continuing calibration data are unavailable, flag all associated sample data as unusable (R).			
13.3 Do any semivolatile compounds have a % Difference (% D) between the initial RRF and CCV RRF exceeding ± 40% for the poor performers (see table/page 22) or ± 25% for the remaining compounds?	✓	[ ]	___
ACTION: Circle all outliers in red.			
13.4 Do any semivolatile compounds have a RRF < 0.05 or < 0.01 for the poor performers?	✓	[ ]	___
ACTION: Circle all outliers in red.			

Note: Verify that the CCV was run at the required frequency (an opening and closing CCV must be run within 12-hour period) and the CCV was compared to the correct initial calibration. If the mid-point standard from the initial calibration is used as an opening CCV, verify that the result (RRF) of the mid-point standard was compared to the average RRF from the correct initial calibration.

Note: The closing CCV used to bracket the end of a 12-hour analytical sequence may be used as the opening CCV for the new 12-hour analyical sequence, provided that all the technical acceptance criteria are met for an opening CCV (see table below). If the closing CCV does not meet the technical acceptance criteria for an opening CCV, then a DFTPP tune followed by an opening CCV is required and the next 12-hour time period begins with the DFTPP tune.

Action: Use the following table to qualify data based on the technical acceptance criteria for the opening CCV and closing CCV.

Continuing Calibration Verification (CCV) Actions for Low/Medium Semivolatiles Analyses

Criteria for Opening CCV	Criteria for Closing CCV	Action	
		Detected Associated Compounds	Non-Detected Associated Compounds

YES NO N/A

. . . . . .

RRF < 0.010 (poor responders) RRF < 0.050 (for all other compounds)	RRF < 0.010 (for all target compounds)	J	R
RRF ≥ 0.010 (poor responders) RRF ≥ 0.050 (all other target compounds)	RRF ≥ 0.010 (for all target compounds)	No Action	
%D > 40.0 or < -40.0 (poor responders) %D > 25.0 or < -25.0 (all other volatile target compounds)	%D > 50.0 or < -50.0 (for all target compounds)	J	UJ
%D ≤ 40.0 or ≥ -40.0 (poor responders) %D ≤ 25.0 or ≥ -25.0 (all other target compounds)	%D ≤ 50.0 or ≥ -50.0 (for all target compounds)	No Action	
Opening CCV not performed at required frequency *	Closing CCV not performed at required frequency *	R	

* The 12-hour clock begins with either the injection of DFTPP or in cases where a closing CCV can be used as an opening CCV, the 12-hour clock begins with the injection of the opening CCV.

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance if more than two of the required analytes failed the above acceptance criteria.

13.5 Are there any transcription/calculation errors for the reporting of RRFs, or %D between initial RRFs and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [√] ___

ACTION: Circle errors with red pencil.

ACTION: If errors are large, notify the TOPO to obtain explanation/resubmittals from the lab. Document errors in the Contract Problems/Non-Compliance section of the Data Assessment.

Note: All DMCs must meet RRF ≥ 0.010. No qualification of the data is necessary on the DMCs RRF and %RSD/%Diff data alone. However, use professional judgment to evaluate the DMC and %RSD/% Diff data in conjunction with the DMC recoveries to determine the need of qualification of the data.

14.0 Internal Standard (Form VIII)

14.1 Were the internal standard area counts for every sample and blank within the range of 50.0% and 200.0% of its response from the associated 12-hour calibration (opening CCV or mid-point initial calibration standard? [ ] [√] ___

If no, were affected samples reanalyzed? [√] ___ ___

ACTION: 1. Circle all outliers with red pencil.

14.2 Are the retention times of the internal standards in sample or blanks within ± 30 seconds from the RT of the

	YES	NO	N/A
internal standard in the 12-hour associated calibration standard (opening CCV or mid-point standard from initial calibration)?	✓		

Action: Use the following table to qualify the data

INTERNAL STANDARDS ACTIONS FOR LOW/MEDIUM SEMIVOLATILES

Criteria	ACTION	
	Detected Associated Compounds *	Non-detected Associated Compounds *
Area counts ≥ 50% and ≤ 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	No Action required	
Area counts < 50% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J	R
Area counts > 200% of 12-hour standard (Opening CCV or mid-point standard from initial calibration)	J	No Action
RT difference > 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	R	
RT difference ≤ 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	No Action required	

* For semivolatile compounds associated to each internal standard, see Table 2-Semivolatile standards corresponding Target and Deuterated Monitoring Compounds for Quantitation in SOM01.1, Exhibit D, available at:

Http://www.epa.gov/superfund/programs/clp/som1.htm

Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable "R" if the mass spectral are met.

NOTE: Contract Requirements: The SOM (section 11.4.4 page D-50/SVOA Low/Medium states that any sample which fails the acceptance criteria for internal standard response must be reanalyzed.

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance any sample(s) which failed the above IS acceptance criteria.

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15.0 Field Duplicates

15.1 Were any field duplicates submitted for Low Concentration SVOA analysis? N1 ___ ___

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

ACTION: Any gross variation between duplicate results must be addressed in the reviewer narrative. If large differences exist, contact the TOPO to confirm identification of field duplicates with the sampler.

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Definitions

CCS - contract compliance screening
CLASS - Contract Laboratory Analytical Services Support
CLP - Contract Laboratory Program
CRQL - Contract Required Quantitation Limit
DFTPP - decafluorotriphenylphosphine
GC/MS - gas chromatography/mass spectroscopy
kg - kilogram
µg - microgram
ℓ - liter
mℓ - milliliter
QC - quality control
RAS - Routine Analytical Services
RIC - reconstructed ion chromatogram
RPD - relative percent difference
RRF - relative response factor
$\overline{RRF}$ - 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
SOP - standard operating procedure
SOW - Statement of Work
SVOA - semivolatile organic acid
TCL - Target Compound List
TCLP - Toxicity Characteristics Leachate Procedure
TIC - tentatively identified compound
TPO - technical project officer
VTSR - validated time of sample receipt
TOPO - Task Order Project Officer

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References

1. USEPA Contract Laboratory Program of Work for Organic Analysis Multi-Media, Multi-Concentration, SOW/CLPSOM01.1, October 2004
2. National Functional Guidelines for Superfund Organic Methods Data Review January 2005

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

2G - FORM II SV-1
WATER SEMIVOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: _____ SDG No.: 0807089

	EPA SAMPLE NO.	SDMC1 (PHL) #	SDMC2 (BCE) #	SDMC3 (2CP) #	SDMC4 (4MP) #	SDMC5 (NBZ) #	SDMC6 (2NP) #	SDMC7 (DCP) #	SDMC8 (4CA) #
01	SBLKJD	69	67	70	73	62	70	65	38
02	VWAE-EB01-07	76	70	76	80	70	78	71	36
03	VWAE-EB01-07	69	62	68	73	64	70	63	39
04	VWAE-MW01	79	73	80	87	73	81	78	1
05	VWAE-MW01P	79	70	78	86	67	80	76	2
06	VWAE-MW04	74	68	72	81	65	73	72	1
07	VWAE-MW04MS	91	84	89	97	78	90	87	3
08	VWAE-MW04MSD	86	74	83	91	75	85	85	3
#4 09	VWAE-MW05	78	72	79	85	72	83	78	0 * (J/R)
10	VWAE-MW06	84	77	84	87	79	88	81	22
11	VWAI-MW06	65	59	66	68	62	70	65	40
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

		QC LIMITS
SDMC1	(PHL) = Phenol-d5	(39-106)
SDMC2	(BCE) = Bis(2-chloroethyl)ether-d8	(40-105)
SDMC3	(2CP) = 2-Chlorophenol-d4	(41-106)
SDMC4	(4MP) = 4-Methylphenol-d8	(25-111)
SDMC5	(NBZ) = Nitrobenzene-d5	(43-108)
SDMC6	(2NP) = 2-Nitrophenol-d4	(40-108)
SDMC7	(DCP) = 2,4-Dichlorophenol-d3	(37-105)
SDMC8	(4CA) = 4-Chloroaniline-d4	(1-145)

\# Column to be used to flag recovery values
* Value outside of contract required QC limits
D DMC diluted out

3C - FORM III SV-1
WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: _____ SDG No.: 0807089

Matrix Spike - EPA Sample No.: VWAE-MW04 #8

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS %REC #	QC LIMITS REC.
Phenol	40	0.0	30	75	12-110
2-Chlorophenol	40	0.0	31	77	27-123
N-Nitroso-di-n-propylamine	40	0.0	34	85	41-116
4-Chloro-3-methylphenol	40	0.0	33	82	23-97
Acenaphthene	40	0.0	30	74	46-118
4-Nitrophenol	40	0.0	33	83 *	10-80
2,4-Dinitrotoluene	40	0.0	34	85	24-96
Pentachlorophenol	40	0.0	34	86	9-103
Pyrene	40	0.0	34	86	26-127

None ND

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD %REC #	%RPD #	QC LIMITS	
					RPD	REC.
Phenol	37	28	75	0	0-42	12-110
2-Chlorophenol	37	28	76	1	0-40	27-123
N-Nitroso-di-n-propylamine	37	30	82	3	0-38	41-116
4-Chloro-3-methylphenol	37	30	82	0	0-42	23-97
Acenaphthene	37	27	73	1	0-31	46-118
4-Nitrophenol	37	30	81 *	2	0-50	10-80
2,4-Dinitrotoluene	37	31	85	1	0-38	24-96
Pentachlorophenol	37	32	87	1	0-50	9-103
Pyrene	37	33	88	3	0-31	26-127

None ND

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 9 outside limits
Spike Recovery: 2 out of 18 outside limits

COMMENTS: _____

7E - FORM VII SV-1
SEMIVOLATILE CONTINUING CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: _____ SDG No.: 0807089

Instrument ID: 5972hp66 Calibration Date: 08/07/2008 Time: 1326

Lab File ID: HA080807A66.d Init. Calib. Date(s): 08/05/2008 08/05/2008

EPA Sample No.(SSTD020##): SSTD020HF Init. Calib. Time(s): 0903 1328

GC Column: RTX-5MS ID: 0.32 (mm)

(all samples)

COMPOUND	$\overline{RRF}$	RRF020	MIN RRF	%D	MAX %D
Benzaldehyde	0.846	0.979	0.010	15.7	40.0
Phenol	1.252	1.424	0.800	13.8	25.0
Bis(2-chloroethyl)ether	0.921	1.067	0.700	15.9	25.0
2-Chlorophenol	1.218	1.426	0.800	17.1	25.0
2-Methylphenol	0.967	1.187	0.700	22.8	25.0
2,2'-Oxybis(1-chloropropane)	0.943	1.260	0.010	33.6	40.0
Acetophenone	1.493	1.836	0.010	22.9	40.0
4-Methylphenol	1.022	1.253	0.600	22.6	25.0
N-Nitroso-di-n-propylamine	0.463	0.547	0.500	18.2	25.0
Hexachloroethane	0.683	0.879	0.300	28.6	25.0 (J/UJ)
Nitrobenzene	0.321	0.382	0.200	19.2	25.0
Isophorone	0.512	0.610	0.400	19.3	25.0
2-Nitrophenol	0.200	0.226	0.100	13.4	25.0
2,4-Dimethylphenol	0.335	0.383	0.200	14.4	25.0
Bis(2-chloroethoxy)methane	0.349	0.451	0.300	29.2	25.0 (J/UJ)
2,4-Dichlorophenol	0.299	0.330	0.200	10.5	25.0
Naphthalene	0.918	1.006	0.700	9.7	25.0
4-Chloroaniline	0.392	0.443	0.010	13.0	40.0
Hexachlorobutadiene	0.235	0.252	0.010	7.5	40.0
Caprolactam	0.090	0.117	0.010	30.7	40.0
4-Chloro-3-methylphenol	0.265	0.292	0.200	10.3	25.0
2-Methylnaphthalene	0.596	0.630	0.400	5.7	25.0
Hexachlorocyclopentadiene	0.574	0.617	0.010	7.5	40.0
2,4,6-Trichlorophenol	0.419	0.459	0.200	9.6	25.0
2,4,5-Trichlorophenol	0.455	0.508	0.200	11.7	25.0
1,1'-Biphenyl	1.393	1.493	0.010	7.2	40.0
2-Chloronaphthalene	1.079	1.174	0.800	8.9	25.0
2-Nitroaniline	0.346	0.418	0.010	20.5	40.0
Dimethylphthalate	1.349	1.459	0.010	8.1	40.0
2,6-Dinitrotoluene	0.312	0.356	0.200	14.2	25.0
Acenaphthylene	1.810	1.949	0.900	7.6	25.0
3-Nitroaniline	0.253	0.276	0.010	8.8	40.0
Acenaphthene	1.145	1.210	0.900	5.7	25.0
2,4-Dinitrophenol	0.188	0.204	0.010	8.7	40.0
4-Nitrophenol	0.277	0.293	0.010	6.0	40.0
Dibenzofuran	1.606	1.807	0.800	12.5	25.0

ENVIRONMENTAL
Data Services, Inc.

LOW CONCENTRATION VOLATILE ORGANIC COMPOUNDS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 0807089

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 22, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-MW04	0807089-01	Water
1MS	VWAE-MW04MS	0807089-01MS	Water
1MSD	VWAE-MW04MSD	0807089-01MSD	Water
1DL	VWAE-MW04DL	0807089-01DL	Water
2	VWAI-MW06	0807089-02	Water
3	VWAE-TB01-072808	0807089-03	Water
4	VWAE-MW01	0807089-05	Water
4DL	VWAE-MW01DL	0807089-05DL	Water
5	VWAE-MW01P	0807089-06	Water
5DL	VWAE-MW01PDL	0807089-06DL	Water
6	VWAE-MW05	0807089-07	Water
6DL	VWAE-MW05DL	0807089-07DL	Water
7	VWAE-MW06	0807089-08	Water
8	VWAE-EB01-072808	0807089-09	Water
9	VWAE-EB01-072908	0807089-10	Water
10	VWAE-TB01-072908	0807089-12	Water

The USEPA Region II SOP HW-33, Revision 1, August 2007: USEPA CLP Statement of Work for Organic Analysis of Low/Medium Concentration of Volatile Organic Compounds SOM01.2 Data Validation and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were analyzed within 14 days for preserved water samples.

Surrogates - All samples exhibited acceptable surrogate recoveries except the following.

Sample ID	Surrogate	%R	Qualifier
6	Vinyl chloride-d3	62%	J/UJ
7RE SIM	1,2-Dichloroethane-d4	76%	J/UJ

MS/MSD - The MS/MSD samples exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VBLKLB	Methylene chloride	0.18	U	1-8
	2-Hexanone	2.9	U	4, 6
	1,2,4-Trichlorobenzene	0.16	None	All ND
	1,2,3-Trichlorobenzene	0.20	None	All ND
VBLKLE	Methylene chloride	0.17	U	1DL, 4DL, 5DL, 6DL, 9, 10
	2-Hexanone	3.3	U	6DL
	1,2,4-Trichlorobenzene	0.12	None	All ND
	1,2,3-Trichlorobenzene	0.16	None	All ND

Trip, Field, Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-TB01-072808	None - ND	-	-	-
VWAE-EB01-072808	Chloromethane	0.21	U	1
	Acetone	36	U	1, 2
	Carbon disulfide	0.15	U	1
	2-Butanone	1.6	U	2
VWAE-EB01-072908	Acetone	69	U	4, 4DL, 5, 6, 6DL
	Chloroform	27	U	4-6
	Toluene	0.33	U	4-6
VWAE-TB01-072908	None - ND	-	-	-

GC/MS Instrument Performance Check - All of the BFB tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were correctly reported by the laboratory.

Compound Quantitation and Reported Detection Limits - Several samples exhibited high concentrations of target compounds and were flagged (E) by the laboratory. The laboratory diluted and reanalyzed these samples. The reviewer replaced the original results with the dilution results. The original Form Is should be used for reporting purposes.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values with the exception of the following.

ICAL Date	Compound	%RSD	Qualifier	Affected Samples
07/28/08	1,1-Dichloroethene	37.7%	None	All ND

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAE-MW01 ug/L	VWAE-MW01P ug/L	RPD	Qualifier
MTBE	160	150	6%	None
Cyclohexane	3.3	3.4	3%	None
Benzene	3.9	3.8	3%	None
Methylcyclohexane	3.3	3.1	6%	None
Chlorobenzene	0.15	0.15	0%	None
Ethylbenzene	11	10	10%	None
o-Xylene	0.19	0.22	15%	None
m,p-Xylene	0.86	0.80	7%	None
Isopropylbenzene	6.5	6.5	0%	None
1,2-Dichlorobenzene	4.1	4.3	5%	None

ANNOTATED FORM Is

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWA~~I~~E-MW04 9/23/08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-01

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0190.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
75-71-8	Dichlorodifluoromethane	0.50	U	
74-87-3	Chloromethane	0.50 ~~0.14~~	~~J~~	U BL
75-01-4	Vinyl chloride	0.50	U	
74-83-9	Bromomethane	0.50	U	
75-00-3	Chloroethane	0.50	U	
75-69-4	Trichlorofluoromethane	0.50	U	
75-35-4	1,1-Dichloroethene	0.50	U	
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U	
67-64-1	Acetone	5.5		U BL
75-15-0	Carbon disulfide	0.50 ~~0.13~~	~~J~~	U BL
79-20-9	Methyl acetate	0.50	U	
75-09-2	Methylene chloride	0.50 ~~0.12~~	~~JB~~	U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U	
1634-04-4	Methyl tert-butyl ether	110 ~~140~~	~~E~~	R OL
75-34-3	1,1-Dichloroethane	0.50	U	
156-59-2	cis-1,2-Dichloroethene	0.50	U	
78-93-3	2-Butanone	5.0	U	
74-97-5	Bromochloromethane	0.50	U	
67-66-3	Chloroform	0.50	U	
71-55-6	1,1,1-Trichloroethane	0.50	U	
110-82-7	Cyclohexane	0.36	J	
56-23-5	Carbon tetrachloride	0.50	U	
71-43-2	Benzene	0.50	U	
107-06-2	1,2-Dichloroethane	0.50	U	
79-01-6	Trichloroethene	0.50	U	

Report 1,4-Dioxane for Low-Medium VOA analysis only

AMENDED DATA

SOM01.2 (8/2007)

10/22/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWA~~I~~E-MW04 DB 9/23/08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-01

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0190.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.24	J
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.19	J
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ RDL
108-90-7	Chlorobenzene	0.48	J
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	2.9	
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

AMENDED DATA

SOM01.2 (8/2007)

MW 10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
E VWAY-MW04 DB 9/23/08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-01

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0190.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	4.31	3.2	J
02		UNKNOWN	6.44	2.4	J
03		UNKNOWN	8.24	1.2	J
04	105-05-5	Benzene, 1,4-diethyl-	14.25	1.1	JN
05		UNKNOWN	14.33	0.52	J
06		UNKNOWN	15.35	0.82	J
07	4489-84-3	Benzene, (3-methyl-2-butenyl)-	15.94	0.86	JN
08		UNKNOWN	16.40	0.60	J
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

AMENDED DATA

SOM01.2 (8/2007)

MW 12/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWA~~1~~E-MW04

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: _____ SDG No.: 0807089

Lab Sample ID: 0807089-01 Lab File ID: 0807089-0191.d

Sample Vol:(mL) 25.0 Date Received: 07/29/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/02/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

LW 10/2/08

1PL

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
E 9/28/08
VWA~~7~~-MW04DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-01RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-01D390.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 8.3

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

Use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	4.2	U
74-87-3	Chloromethane	4.2	U
75-01-4	Vinyl chloride	4.2	U
74-83-9	Bromomethane	4.2	U
75-00-3	Chloroethane	4.2	U
75-69-4	Trichlorofluoromethane	4.2	U
75-35-4	1,1-Dichloroethene	4.2	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	4.2	U
67-64-1	Acetone	42	U
75-15-0	Carbon disulfide	4.2	U
79-20-9	Methyl acetate	4.2	U
75-09-2	Methylene chloride	4.2 ~~1.4~~	~~JBD~~ U BL
156-60-5	trans-1,2-Dichloroethene	4.2	U
1634-04-4	Methyl tert-butyl ether	110	D
75-34-3	1,1-Dichloroethane	4.2	U
156-59-2	cis-1,2-Dichloroethene	4.2	U
78-93-3	2-Butanone	42	U
74-97-5	Bromochloromethane	4.2	U
67-66-3	Chloroform	4.2	U
71-55-6	1,1,1-Trichloroethane	4.2	U
110-82-7	Cyclohexane	4.2	U
56-23-5	Carbon tetrachloride	4.2	U
71-43-2	Benzene	4.2	U
107-06-2	1,2-Dichloroethane	4.2	U
79-01-6	Trichloroethene	4.2	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

AMENDED DATA

SOM01.2 (8/2007)

10/22/08

1DL

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWA~~1~~5-MW04DL 9/23/08

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-01RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-01D390.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 8.3

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	4.2	U
78-87-5	1,2-Dichloropropane	4.2	U
75-27-4	Bromodichloromethane	4.2	U
10061-01-5	cis-1,3-Dichloropropene	4.2	U
108-10-1	4-Methyl-2-pentanone	42	U
108-88-3	Toluene	4.2	U
10061-02-6	trans-1,3-Dichloropropene	4.2	U
79-00-5	1,1,2-Trichloroethane	4.2	U
127-18-4	Tetrachloroethene	4.2	U
591-78-6	2-Hexanone	42	U
124-48-1	Dibromochloromethane	4.2	U
106-93-4	1,2-Dibromoethane	4.2	U
108-90-7	Chlorobenzene	4.2	U
100-41-4	Ethylbenzene	4.2	U
95-47-6	o-Xylene	4.2	U
179601-23-1	m,p-Xylene	4.2	U
100-42-5	Styrene	4.2	U
75-25-2	Bromoform	4.2	U
98-82-8	Isopropylbenzene	4.2	U
79-34-5	1,1,2,2-Tetrachloroethane	4.2	U
541-73-1	1,3-Dichlorobenzene	4.2	U
106-46-7	1,4-Dichlorobenzene	4.2	U
95-50-1	1,2-Dichlorobenzene	3.2	JD
96-12-8	1,2-Dibromo-3-chloropropane	4.2	U
120-82-1	1,2,4-Trichlorobenzene	4.2	U
87-61-6	1,2,3-Trichlorobenzene	4.2	U

RE

AMENDED DATA

SOM01.2 (8/2007)

10/22/08

1DL

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
E 9/22/08 MB
VWA~~I~~-MW04DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-01RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-01D390.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 8.3

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

Use - original

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

AMENDED DATA

SOM01.2 (8/2007)

MW 10/2/2008

2

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-02

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0290.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
75-71-8	Dichlorodifluoromethane	0.50	U	
74-87-3	Chloromethane	0.50	U	
75-01-4	Vinyl chloride	0.50	U	
74-83-9	Bromomethane	0.50	U	
75-00-3	Chloroethane	0.50	U	
75-69-4	Trichlorofluoromethane	0.50	U	
75-35-4	1,1-Dichloroethene	0.50	U	
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U	
67-64-1	Acetone	5.1		U BL
75-15-0	Carbon disulfide	0.50	U	
79-20-9	Methyl acetate	0.50	U	
75-09-2	Methylene chloride	0.50 ~~0.11~~	~~JB~~	U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U	
1634-04-4	Methyl tert-butyl ether	0.50	U	
75-34-3	1,1-Dichloroethane	0.50	U	
156-59-2	cis-1,2-Dichloroethene	0.50	U	
78-93-3	2-Butanone	6.8		U BL
74-97-5	Bromochloromethane	0.50	U	
67-66-3	Chloroform	0.50	U	
71-55-6	1,1,1-Trichloroethane	0.50	U	
110-82-7	Cyclohexane	0.50	U	
56-23-5	Carbon tetrachloride	0.50	U	
71-43-2	Benzene	0.50	U	
107-06-2	1,2-Dichloroethane	0.50	U	
79-01-6	Trichloroethene	0.19	J	

Report 1,4-Dioxane for Low-Medium VOA analysis only

OW
10/22/08

2

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-02

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0290.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ R DL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

fw 10/22/08

2

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAI-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-02

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0290.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	6.44	4.5	J
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

GW 10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAI-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Lab Sample ID: 0807089-02 Lab File ID: 0807089-0291.d

Sample Vol:(mL) 25.0 Date Received: 07/29/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/02/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

AW
10/22/08

3

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-TB01-072808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-03

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0390.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50 ~~0.12~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

MW 10/22/08

3

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-TB01-072808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-03

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0390.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ R DL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-TB01-072808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-03

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0390.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/29/2008

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

EW
10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-TB01-072808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Lab Sample ID: 0807089-03 Lab File ID: 0807089-0391.d

Sample Vol:(mL) 25.0 Date Received: 07/29/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/02/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

fw
10/22/08

4

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-05

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0590.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
75-71-8	Dichlorodifluoromethane	0.50	U	
74-87-3	Chloromethane	0.50	U	
75-01-4	Vinyl chloride	0.50	U	
74-83-9	Bromomethane	0.50	U	
75-00-3	Chloroethane	0.50	U	
75-69-4	Trichlorofluoromethane	0.50	U	
75-35-4	1,1-Dichloroethene	0.50	U	
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U	
67-64-1	Acetone	7.2		u BL
75-15-0	Carbon disulfide	0.50	U	
79-20-9	Methyl acetate	0.50	U	
75-09-2	Methylene chloride	0.50 ~~0.26~~	~~JB~~	u BL
156-60-5	trans-1,2-Dichloroethene	0.50	U	
1634-04-4	Methyl tert-butyl ether	160 ~~140~~	~~E~~	R DL
75-34-3	1,1-Dichloroethane	0.50	U	
156-59-2	cis-1,2-Dichloroethene	0.50	U	
78-93-3	2-Butanone	5.0	U	
74-97-5	Bromochloromethane	0.50	U	
67-66-3	Chloroform	0.50 ~~0.14~~	~~J~~	u BL
71-55-6	1,1,1-Trichloroethane	0.50	U	
110-82-7	Cyclohexane	3.3		
56-23-5	Carbon tetrachloride	0.50	U	
71-43-2	Benzene	3.9		
107-06-2	1,2-Dichloroethane	0.50	U	
79-01-6	Trichloroethene	0.50	U	

Report 1,4-Dioxane for Low-Medium VOA analysis only

lw 10/22/08

4

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-05

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0590.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
108-87-2	Methylcyclohexane	3.3		
78-87-5	1,2-Dichloropropane	0.50	U	
75-27-4	Bromodichloromethane	0.50	U	
10061-01-5	cis-1,3-Dichloropropene	0.50	U	
108-10-1	4-Methyl-2-pentanone	5.0	U	
108-88-3	Toluene	0.50 ~~0.34~~	~~J~~	U BL
10061-02-6	trans-1,3-Dichloropropene	0.50	U	
79-00-5	1,1,2-Trichloroethane	0.50	U	
127-18-4	Tetrachloroethene	0.50	U	
591-78-6	2-Hexanone	5.0 ~~1.4~~	~~JB~~	U BL
124-48-1	Dibromochloromethane	0.50	U	
106-93-4	1,2-Dibromoethane	0.50	~~U~~	R DL
108-90-7	Chlorobenzene	0.15	J	
100-41-4	Ethylbenzene	11		
95-47-6	o-Xylene	0.19	J	
179601-23-1	m,p-Xylene	0.86		
100-42-5	Styrene	0.50	U	
75-25-2	Bromoform	0.50	U	
98-82-8	Isopropylbenzene	6.5		
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U	
541-73-1	1,3-Dichlorobenzene	0.50	U	
106-46-7	1,4-Dichlorobenzene	0.50	U	
95-50-1	1,2-Dichlorobenzene	4.1		
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~	R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U	
87-61-6	1,2,3-Trichlorobenzene	0.50	U	

lw 12/22/08

4

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-05

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0590.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	874-41-9	Benzene, 1-ethyl-2,4-dimethyl-	14.64	20	JN
02		UNKNOWN	14.34	19	J
03		UNKNOWN	15.50	16	J
04	95-93-2	Benzene, 1,2,4,5-tetramethyl-	14.99	14	JN
05	103-65-1	Benzene, propyl-	13.34	14	JN
06	767-58-8	Indan, 1-methyl-	14.80	13	JN
07	934-10-1	3-Phenylbut-1-ene $$ 1-Methyl-2-pro	15.33	10	JN
08	141-93-5	Benzene, 1,3-diethyl-	14.24	9.8	JN
09	4489-84-3	Benzene, (3-methyl-2-butenyl)-	15.76	8.1	JN
10	99-87-6	Benzene, 1-methyl-4-(1-methylethyl)	15.45	7.9	JN
11		UNKNOWN	4.31	7.4	J
12		UNKNOWN	8.24	6.1	J
13		UNKNOWN	15.94	5.5	J
14	611-14-3	Benzene, 1-ethyl-2-methyl-	13.64	4.9	JN
15	119-64-2	Naphthalene, 1,2,3,4-tetrahydro-	15.69	4.0	JN
16		UNKNOWN	9.33	3.9	J
17	135-98-8	Benzene, (1-methylpropyl)-	13.92	3.9	JN
18	275-51-4	Azulene	16.20	3.8	JN
19		UNKNOWN	10.50	3.5	J
20	824-90-8	1-Phenyl-1-butene $$ Benzene, 1-but	14.74	3.3	JN
21		UNKNOWN	16.29	3.1	J
22		UNKNOWN	16.39	3.0	J
23		UNKNOWN	15.07	2.9	J
24		UNKNOWN	6.93	2.5	J
25	6682-71-9	1H-Indene, 2,3-dihydro-4,7-dimethyl	15.84	2.5	JN
26	764-13-6	2,4-Hexadiene, 2,5-dimethyl-	11.35	2.4	JN
27	4218-48-8	Benzene, 1-ethyl-4-(1-methylethyl)-	15.89	2.2	JN
28	591-47-9	Cyclohexene, 4-methyl-	10.86	2.0	JN
29	1113-56-0	1,3-Pentadiene, 2,3-dimethyl-	9.63	2.0	JN
30	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	14.55	1.7	JN
	E966796[1]	Total Alkanes	N/A	14	

[1]EPA-designated Registry Number.

lcw
10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Lab Sample ID: 0807089-05 Lab File ID: 0807089-0591.d

Sample Vol:(mL) 25.0 Date Received: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/04/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

QW
10/22/08

4DL

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-05RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-05D290.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 8.3 USE ORIGINAL

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ~~ug/kg~~) ug/L	Q
75-71-8	Dichlorodifluoromethane	4.2	U
74-87-3	Chloromethane	4.2	U
75-01-4	Vinyl chloride	4.2	U
74-83-9	Bromomethane	4.2	U
75-00-3	Chloroethane	4.2	U
75-69-4	Trichlorofluoromethane	4.2	U
75-35-4	1,1-Dichloroethene	4.2	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	4.2	U
67-64-1	Acetone	42 ~~19~~	~~JD~~ U BL
75-15-0	Carbon disulfide	4.2	U
79-20-9	Methyl acetate	4.2	U
75-09-2	Methylene chloride	4.2 ~~1.3~~	~~JBD~~ U BL
156-60-5	trans-1,2-Dichloroethene	4.2	U
1634-04-4	Methyl tert-butyl ether	160	D
75-34-3	1,1-Dichloroethane	4.2	U
156-59-2	cis-1,2-Dichloroethene	4.2	U
78-93-3	2-Butanone	42	U
74-97-5	Bromochloromethane	4.2	U
67-66-3	Chloroform	4.2	U
71-55-6	1,1,1-Trichloroethane	4.2	U
110-82-7	Cyclohexane	2.5	JD
56-23-5	Carbon tetrachloride	4.2	U
71-43-2	Benzene	4.9	D
107-06-2	1,2-Dichloroethane	4.2	U
79-01-6	Trichloroethene	4.2	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

MW 10/22/08

4DL

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW01DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-05RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-05D290.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 8.3

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL) Use 8mg, NA

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	2.3	JD
78-87-5	1,2-Dichloropropane	4.2	U
75-27-4	Bromodichloromethane	4.2	U
10061-01-5	cis-1,3-Dichloropropene	4.2	U
108-10-1	4-Methyl-2-pentanone	42	U
108-88-3	Toluene	4.2	U
10061-02-6	trans-1,3-Dichloropropene	4.2	U
79-00-5	1,1,2-Trichloroethane	4.2	U
127-18-4	Tetrachloroethene	4.2	U
591-78-6	2-Hexanone	42	U
124-48-1	Dibromochloromethane	4.2	U
106-93-4	1,2-Dibromoethane	4.2	~~U~~ R DL
108-90-7	Chlorobenzene	4.2	U
100-41-4	Ethylbenzene	9.3	D
95-47-6	o-Xylene	4.2	U
179601-23-1	m,p-Xylene	4.2	U
100-42-5	Styrene	4.2	U
75-25-2	Bromoform	4.2	U
98-82-8	Isopropylbenzene	4.2	JD
79-34-5	1,1,2,2-Tetrachloroethane	4.2	U
541-73-1	1,3-Dichlorobenzene	4.2	U
106-46-7	1,4-Dichlorobenzene	4.2	U
95-50-1	1,2-Dichlorobenzene	5.1	D
96-12-8	1,2-Dibromo-3-chloropropane	4.2	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	4.2	U
87-61-6	1,2,3-Trichlorobenzene	4.2	U

RE

RE

RW 10/22/08

4DL

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW01DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-05RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-05D290.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 8.3 Use Orig. ins

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	8.24	7.6	JD
02		UNKNOWN	12.93	4.3	JD
03		UNKNOWN	13.34	19	JD
04	622-96-8	Benzene, 1-ethyl-4-methyl-	13.65	6.3	JDN
05		UNKNOWN	13.91	4.6	JD
06	135-01-3	Benzene, 1,2-diethyl-	14.25	8.2	JDN
07		UNKNOWN	14.33	23	JD
08	527-84-4	Benzene, 1-methyl-2-(1-methylethyl)	14.64	21	JDN
09	1005-64-7	(E)-1-Phenyl-1-butene $$ Benzene, 1	14.80	13	JDN
10	95-93-2	Benzene, 1,2,4,5-tetramethyl-	15.00	19	JDN
11	768-49-0	Benzene, (2-methyl-1-propenyl)- $$	15.34	10	JDN
12	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	15.45	6.9	JDN
13	767-58-8	Indan, 1-methyl-	15.50	19	JDN
14		UNKNOWN	15.77	10	JD
15		UNKNOWN	15.94	4.2	JD
16		UNKNOWN	16.21	13	JD
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

lw 10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-06

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0690.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
75-71-8	Dichlorodifluoromethane	0.50	U	
74-87-3	Chloromethane	0.14	J	
75-01-4	Vinyl chloride	0.50	U	
74-83-9	Bromomethane	0.50	U	
75-00-3	Chloroethane	0.50	U	
75-69-4	Trichlorofluoromethane	0.50	U	
75-35-4	1,1-Dichloroethene	0.50	U	
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U	
67-64-1	Acetone	6.9		u BL
75-15-0	Carbon disulfide	0.50	U	
79-20-9	Methyl acetate	0.50	U	
75-09-2	Methylene chloride	0.50 ~~0.28~~	~~JB~~	u BL
156-60-5	trans-1,2-Dichloroethene	0.50	U	
1634-04-4	Methyl tert-butyl ether	150 ~~150~~	~~E~~	RDL
75-34-3	1,1-Dichloroethane	0.50	U	
156-59-2	cis-1,2-Dichloroethene	0.50	U	
78-93-3	2-Butanone	5.0	U	
74-97-5	Bromochloromethane	0.50	U	
67-66-3	Chloroform	0.50 ~~0.17~~	~~J~~	u BL
71-55-6	1,1,1-Trichloroethane	0.50	U	
110-82-7	Cyclohexane	3.4		
56-23-5	Carbon tetrachloride	0.50	U	
71-43-2	Benzene	3.8		
107-06-2	1,2-Dichloroethane	0.50	U	
79-01-6	Trichloroethene	0.50	U	

Report 1,4-Dioxane for Low-Medium VOA analysis only

lw 10/22/08

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1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-06

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0690.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
108-87-2	Methylcyclohexane	3.1		
78-87-5	1,2-Dichloropropane	0.50	U	
75-27-4	Bromodichloromethane	0.50	U	
10061-01-5	cis-1,3-Dichloropropene	0.50	U	
108-10-1	4-Methyl-2-pentanone	5.0	U	
108-88-3	Toluene	0.50 ~~0.34~~	~~J~~	U BL
10061-02-6	trans-1,3-Dichloropropene	0.50	U	
79-00-5	1,1,2-Trichloroethane	0.50	U	
127-18-4	Tetrachloroethene	0.50	U	
591-78-6	2-Hexanone	5.0	U	
124-48-1	Dibromochloromethane	0.50	U	
106-93-4	1,2-Dibromoethane	0.50	~~U~~	R DL
108-90-7	Chlorobenzene	0.15	J	
100-41-4	Ethylbenzene	10		
95-47-6	o-Xylene	0.22	J	
179601-23-1	m,p-Xylene	0.80		
100-42-5	Styrene	0.50	U	
75-25-2	Bromoform	0.50	U	
98-82-8	Isopropylbenzene	6.5		
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U	
541-73-1	1,3-Dichlorobenzene	0.50	U	
106-46-7	1,4-Dichlorobenzene	0.50	U	
95-50-1	1,2-Dichlorobenzene	4.3		
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~	R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U	
87-61-6	1,2,3-Trichlorobenzene	0.50	U	

lw 10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW01P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-06

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0690.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	933-98-2	Benzene, 1-ethyl-2,3-dimethyl-	14.64	20	JN
02		UNKNOWN	14.33	19	J
03	767-58-8	Indan, 1-methyl-(1)	15.50	16	JN
04	488-23-3	Benzene, 1,2,3,4-tetramethyl- $$ P	14.99	14	JN
05	103-65-1	Benzene, propyl-	13.34	13	JN
06	767-58-8	Indan, 1-methyl-	14.80	12	JN
07	824-90-8	1-Phenyl-1-butene $$ Benzene, 1-but	15.33	9.8	JN
08	135-01-3	Benzene, 1,2-diethyl-	14.24	9.6	JN
09		UNKNOWN	4.31	8.2	J
10	4489-84-3	Benzene, (3-methyl-2-butenyl)-	15.76	8.1	JN
11		UNKNOWN	15.45	7.9	J
12		UNKNOWN	8.24	6.0	J
13	97664-18-1	Benzene, 1-methyl-4-(1-methyl-2-pr	15.94	5.3	JN
14	611-14-3	Benzene, 1-ethyl-2-methyl-	13.64	5.0	JN
15	119-64-2	Naphthalene, 1,2,3,4-tetrahydro-	15.68	4.2	JN
16	93-53-8	Benzeneacetaldehyde, .alpha.-methyl	13.91	3.9	JN
17	1528-22-9	Cyclobutane, (1-methylethylidene)-	10.50	3.7	JN
18		UNKNOWN	9.33	3.5	J
19	768-49-0	Benzene, (2-methyl-1-propenyl)-	14.74	3.3	JN
20		UNKNOWN	16.38	3.2	J
21		UNKNOWN	16.29	3.2	J
22		UNKNOWN	15.06	2.8	J
23	17057-82-8	1H-Indene, 2,3-dihydro-1,2-dimethyl	15.84	2.8	JN
24	1515-79-3	5,5-Dimethyl-1,3-hexadiene	11.36	2.7	JN
25		UNKNOWN	15.89	2.6	J
26		UNKNOWN	6.93	2.6	J
27		UNKNOWN	10.38	2.3	J
28		UNKNOWN	10.86	2.1	J
29	0-00-0	1,2-Butadiene, 3-phenyl-	15.56	1.8	JN
30	108-67-8	Benzene, 1,3,5-trimethyl-	13.42	1.6	JN
	E966796[1]	Total Alkanes	N/A	18	

[1]EPA-designated Registry Number.

lw 10/22/08

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1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01P

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Lab Sample ID: 0807089-06 Lab File ID: 0807089-0691.d

Sample Vol:(mL) 25.0 Date Received: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/04/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

10/22/08

5DL

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW01PDL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-06RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-06D290.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 10.0 Use original

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U
67-64-1	Acetone	50	U
75-15-0	Carbon disulfide	5.0	U
79-20-9	Methyl acetate	5.0	U
75-09-2	Methylene chloride	5.0 ~~1.7~~	~~JBD~~ U BL
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl tert-butyl ether	150	D
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-Butanone	50	U
74-97-5	Bromochloromethane	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
110-82-7	Cyclohexane	5.0	U
56-23-5	Carbon tetrachloride	5.0	U
71-43-2	Benzene	5.2	D
107-06-2	1,2-Dichloroethane	5.0	U
79-01-6	Trichloroethene	5.0	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

RE

AW 10/22/08

5DL

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW01PDL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-06RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-06D290.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 10.0 use orig

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	2.2	JD
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	50	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-Hexanone	50	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	9.7	D
95-47-6	o-Xylene	5.0	U
179601-23-1	m,p-Xylene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	4.4	JD
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	4.8	JD
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	U

LW 10/22/08

SDL

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW01PDL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-06RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-06D290.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 10.0 Use original

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	13.34	16	JD
02		UNKNOWN	13.64	12	JD
03	135-01-3	Benzene, 1,2-diethyl- $$ Benzene, c	14.24	8.1	JDN
04		UNKNOWN	14.33	23	JD
05	933-98-2	Benzene, 1-ethyl-2,3-dimethyl-	14.64	21	JDN
06		UNKNOWN	14.80	12	JD
07	488-23-3	Benzene, 1,2,3,4-tetramethyl- $$ Pr	15.00	13	JDN
08		UNKNOWN	15.34	7.5	JD
09	1758-88-9	Benzene, 2-ethyl-1,4-dimethyl- $$ p	15.45	6.7	JDN
10	3333-13-9	Benzene, 1-methyl-4-(2-propenyl)- $	15.50	18	JDN
11		UNKNOWN	15.76	9.3	JD
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

LW
10/22/08

6

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-07

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0790.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
75-71-8	Dichlorodifluoromethane	0.50	U	
74-87-3	Chloromethane	0.10	J	
75-01-4	Vinyl chloride	0.50	~~U~~	UJ SSL
74-83-9	Bromomethane	0.50	U	
75-00-3	Chloroethane	0.50	U	
75-69-4	Trichlorofluoromethane	0.50	U	
75-35-4	1,1-Dichloroethene	0.50	U	
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U	
67-64-1	Acetone	55		U BL
75-15-0	Carbon disulfide	1.1		
79-20-9	Methyl acetate	0.50	U	
75-09-2	Methylene chloride	5.0 ~~0.16~~	~~JB~~	U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U	
1634-04-4	Methyl tert-butyl ether	560 ~~430~~	~~E~~	R DL
75-34-3	1,1-Dichloroethane	0.50	U	
156-59-2	cis-1,2-Dichloroethene	0.50	U	
78-93-3	2-Butanone	5.0	U	
74-97-5	Bromochloromethane	0.50	U	
67-66-3	Chloroform	0.50 ~~0.12~~	~~J~~	U BL
71-55-6	1,1,1-Trichloroethane	0.50	U	
110-82-7	Cyclohexane	3.8		
56-23-5	Carbon tetrachloride	0.50	U	
71-43-2	Benzene	16		
107-06-2	1,2-Dichloroethane	0.50	U	
79-01-6	Trichloroethene	0.50	U	

Report 1,4-Dioxane for Low-Medium VOA analysis only

RW 10/22/08

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1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-07

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0790.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q	
108-87-2	Methylcyclohexane	4.7		
78-87-5	1,2-Dichloropropane	0.50	U	
75-27-4	Bromodichloromethane	0.50	U	
10061-01-5	cis-1,3-Dichloropropene	0.50	U	
108-10-1	4-Methyl-2-pentanone	5.0	U	
108-88-3	Toluene	0.77		u BL
10061-02-6	trans-1,3-Dichloropropene	0.50	U	
79-00-5	1,1,2-Trichloroethane	0.50	U	
127-18-4	Tetrachloroethene	0.50	U	
591-78-6	2-Hexanone	5.0 ~~1.3~~	~~JB~~	u BL
124-48-1	Dibromochloromethane	0.50	U	
106-93-4	1,2-Dibromoethane	0.50	~~U~~	R DL
108-90-7	Chlorobenzene	0.21	J	
100-41-4	Ethylbenzene	54 ~~47~~	~~E~~	R DL
95-47-6	o-Xylene	2.5		
179601-23-1	m,p-Xylene	28 ~~36~~	~~E~~	R DL
100-42-5	Styrene	0.50	U	
75-25-2	Bromoform	0.50	U	
98-82-8	Isopropylbenzene	14		
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U	
541-73-1	1,3-Dichlorobenzene	0.50	U	
106-46-7	1,4-Dichlorobenzene	0.50	U	
95-50-1	1,2-Dichlorobenzene	6.1		
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~	R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U	
87-61-6	1,2,3-Trichlorobenzene	0.50	U	

LW
10/22/08

6

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-07

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0790.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:(ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	67-63-0	Isopropyl Alcohol	6.43	4.1	JN
02	591-47-9	Cyclohexene, 4-methyl-	10.38	2.2	JN
03	103-65-1	Benzene, propyl-	13.33	44	JN
04	622-96-8	Benzene, 1-ethyl-4-methyl- $$ Tolue	13.42	25	JN
05	611-14-3	Benzene, 1-ethyl-2-methyl-	13.64	28	JN
06	108-67-8	Benzene, 1,3,5-trimethyl-	13.77	44	JN
07	135-98-8	Benzene, (1-methylpropyl)-	13.91	7.1	JN
08	535-77-3	Benzene, 1-methyl-3-(1-methylethyl)	13.96	2.6	JN
09	526-73-8	Benzene, 1,2,3-trimethyl- $$ Hemime	14.14	28	JN
10	141-93-5	Benzene, 1,3-diethyl-	14.24	23	JN
11		UNKNOWN	14.33	67	J
12	1074-17-5	Benzene, 1-methyl-2-propyl-	14.50	5.2	JN
13	933-98-2	Benzene, 1-ethyl-2,3-dimethyl-	14.55	14	JN
14	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	14.63	52	JN
15	824-90-8	1-Phenyl-1-butene $$ Benzene, 1-but	14.74	10	JN
16	3454-07-7	Benzene, 1-ethenyl-4-ethyl-	14.80	28	JN
17	527-84-4	Benzene, 1-methyl-2-(1-methylethyl)	14.93	5.8	JN
18	527-53-7	Benzene, 1,2,3,5-tetramethyl-	14.99	34	JN
19	2870-04-4	Benzene, 2-ethyl-1,3-dimethyl-	15.04	21	JN
20	1685-82-1	1H-Indene, 2,3-dihydro-4,6-dimethyl	15.27	5.3	JN
21	934-10-1	3-Phenylbut-1-ene $$ 1-Methyl-2-pro	15.33	28	JN
22	95-93-2	Benzene, 1,2,4,5-tetramethyl-	15.45	22	JN
23	767-58-8	Indan, 1-methyl-	15.50	45	JN
24	119-64-2	Naphthalene, 1,2,3,4-tetrahydro-	15.69	13	JN
25		UNKNOWN	15.76	21	J
26	20836-11-7	2,2-Dimethylindene, 2,3-dihydro- $$	15.94	14	JN
27	700-12-9	Benzene, pentamethyl- $$ Pentamethy	16.09	3.4	JN
28	91-20-3	Naphthalene(1)	16.19	39	JN
29		UNKNOWN	16.29	11	J
30	63158-17-8	Methyl 4-phenyl-2-butenoate	16.39	8.2	JN
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

LW
10/22/08

6

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW05

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Lab Sample ID: 0807089-07 Lab File ID: 0807089-0791.d

Sample Vol:(mL) 25.0 Date Received: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/04/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

MW
10/22/08

6DL

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW05DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-07RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-07D390.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 33.3 Use ORIGINAL

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	17	U
74-87-3	Chloromethane	17	U
75-01-4	Vinyl chloride	17	U
74-83-9	Bromomethane	17	U
75-00-3	Chloroethane	17	U
75-69-4	Trichlorofluoromethane	17	U
75-35-4	1,1-Dichloroethene	17	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	17	U
67-64-1	Acetone	170 ~~120~~	~~JD~~ U BL
75-15-0	Carbon disulfide	17	U
79-20-9	Methyl acetate	17	U
75-09-2	Methylene chloride	17 U ~~7.4~~	~~JBD~~ BL
156-60-5	trans-1,2-Dichloroethene	17	U
1634-04-4	Methyl tert-butyl ether	560	D
75-34-3	1,1-Dichloroethane	17	U
156-59-2	cis-1,2-Dichloroethene	17	U
78-93-3	2-Butanone	170	U
74-97-5	Bromochloromethane	17	U
67-66-3	Chloroform	17	U
71-55-6	1,1,1-Trichloroethane	17	U
110-82-7	Cyclohexane	17	U
56-23-5	Carbon tetrachloride	17	U
71-43-2	Benzene	22	D
107-06-2	1,2-Dichloroethane	17	U
79-01-6	Trichloroethene	17	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

MW 10/22/08

6DL

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW05DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-07RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-07D390.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 33.3

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	3.4	JD
78-87-5	1,2-Dichloropropane	17	U
75-27-4	Bromodichloromethane	17	U
10061-01-5	cis-1,3-Dichloropropene	17	U
108-10-1	4-Methyl-2-pentanone	170	U
108-88-3	Toluene	17	U
10061-02-6	trans-1,3-Dichloropropene	17	U
79-00-5	1,1,2-Trichloroethane	17	U
127-18-4	Tetrachloroethene	17	U
591-78-6	2-Hexanone	170 ~~43~~	~~JBD~~ u BL
124-48-1	Dibromochloromethane	17	U
106-93-4	1,2-Dibromoethane	17	U
108-90-7	Chlorobenzene	17	U
100-41-4	Ethylbenzene	54	D
95-47-6	o-Xylene	17	U
179601-23-1	m,p-Xylene	28	D
100-42-5	Styrene	17	U
75-25-2	Bromoform	17	U
98-82-8	Isopropylbenzene	9.6	JD
79-34-5	1,1,2,2-Tetrachloroethane	17	U
541-73-1	1,3-Dichlorobenzene	17	U
106-46-7	1,4-Dichlorobenzene	17	U
95-50-1	1,2-Dichlorobenzene	7.3	JD
96-12-8	1,2-Dibromo-3-chloropropane	17	U
120-82-1	1,2,4-Trichlorobenzene	17	U
87-61-6	1,2,3-Trichlorobenzene	17	U

RE

CW 10/22/08

6DL

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW05DL

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-07RE1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-07D390.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 33.3

Use orig. NA

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	13.34	34	JD
02		UNKNOWN	13.46	21	JD
03	620-14-4	Benzene, 1-ethyl-3-methyl-	13.64	21	JDN
04	108-67-8	Benzene, 1,3,5-trimethyl-	13.78	42	JDN
05		UNKNOWN	14.24	18	JD
06		UNKNOWN	14.34	58	JD
07	934-80-5	Benzene, 4-ethyl-1,2-dimethyl-	14.64	40	JDN
08	3333-13-9	Benzene, 1-methyl-4-(2-propenyl)- $	14.80	20	JDN
09	76089-59-3	1,3-Cyclopentadiene, 1,2,3,4-tetran	14.99	40	JDN
10		UNKNOWN	15.35	21	JD
11	934-10-1	3-Phenylbut-1-ene $$ 1-Methyl-2-pro	15.50	69	JDN
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

RL

MW 10/22/08

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1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-08

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0890.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50	U
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.11	J
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

MW
10/22/08

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1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-08

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0890.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.16	J
106-93-4	1,2-Dibromoethane	0.50	~~U~~ R DL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.15	J
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

MW 10/22/08

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1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-08

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0890.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01	275-51-4	Azulene $$ Bicyclo[5.3.0]decapentae	16.21	2.3	JN
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

MW
10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW06

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Lab Sample ID: 0807089-08 Lab File ID: 0807089-0891.d

Sample Vol:(mL) 25.0 Date Received: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/04/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

flw
10/22/08

1RE

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-MW06RE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Lab Sample ID: 0807089-08RE1 Lab File ID: 0807089-08R91.d

Sample Vol:(mL) 25.0 Date Received: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/04/2008

Dilution Factor: 1.0

use original

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	~~U~~ UJ SSL
96-12-8	1,2-Dibromo-3-chloropropane	0.050	~~U~~ UJ SSL

R RE

LW 10/22/08

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1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-09

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0990.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.21	J
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	36	
75-15-0	Carbon disulfide	0.15	J
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	2.8	~~B~~ U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	1.6	J
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

LW 10/22/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-09

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0990.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ R OL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ R OL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

RW 10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-EB01-072808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-09

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-0990.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 07/31/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01		UNKNOWN	6.44	7.3	J
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

LW 10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072808

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Lab Sample ID: 0807089-09 Lab File ID: 0807089-0991.d

Sample Vol:(mL) 25.0 Date Received: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/02/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

MW 10/22/08

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072908

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-10

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-10D290.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 2.5

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	1.3	U
74-87-3	Chloromethane	1.3	U
75-01-4	Vinyl chloride	1.3	U
74-83-9	Bromomethane	1.3	U
75-00-3	Chloroethane	1.3	U
75-69-4	Trichlorofluoromethane	1.3	U
75-35-4	1,1-Dichloroethene	1.3	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.3	U
67-64-1	Acetone	69	
75-15-0	Carbon disulfide	1.3	U
79-20-9	Methyl acetate	1.3	U
75-09-2	Methylene chloride	11	~~B~~ U BL
156-60-5	trans-1,2-Dichloroethene	1.3	U
1634-04-4	Methyl tert-butyl ether	1.3	U
75-34-3	1,1-Dichloroethane	1.3	U
156-59-2	cis-1,2-Dichloroethene	1.3	U
78-93-3	2-Butanone	13	U
74-97-5	Bromochloromethane	1.3	U
67-66-3	Chloroform	27	
71-55-6	1,1,1-Trichloroethane	1.3	U
110-82-7	Cyclohexane	1.3	U
56-23-5	Carbon tetrachloride	1.3	U
71-43-2	Benzene	1.3	U
107-06-2	1,2-Dichloroethane	1.3	U
79-01-6	Trichloroethene	1.3	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

MW 10/22/08

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1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072908

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-10

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-10D290.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 2.5

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	1.3	U
78-87-5	1,2-Dichloropropane	1.3	U
75-27-4	Bromodichloromethane	1.3	U
10061-01-5	cis-1,3-Dichloropropene	1.3	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	0.33	J
10061-02-6	trans-1,3-Dichloropropene	1.3	U
79-00-5	1,1,2-Trichloroethane	1.3	U
127-18-4	Tetrachloroethene	1.3	U
591-78-6	2-Hexanone	13	U
124-48-1	Dibromochloromethane	1.3	U
106-93-4	1,2-Dibromoethane	1.3	~~U~~ RDL
108-90-7	Chlorobenzene	1.3	U
100-41-4	Ethylbenzene	1.3	U
95-47-6	o-Xylene	1.3	U
179601-23-1	m,p-Xylene	1.3	U
100-42-5	Styrene	1.3	U
75-25-2	Bromoform	1.3	U
98-82-8	Isopropylbenzene	1.3	U
79-34-5	1,1,2,2-Tetrachloroethane	1.3	U
541-73-1	1,3-Dichlorobenzene	1.3	U
106-46-7	1,4-Dichlorobenzene	1.3	U
95-50-1	1,2-Dichlorobenzene	1.3	U
96-12-8	1,2-Dibromo-3-chloropropane	1.3	~~U~~ RDL
120-82-1	1,2,4-Trichlorobenzene	1.3	U
87-61-6	1,2,3-Trichlorobenzene	1.3	U

lw 10/22/08

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-EB01-072908

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-10

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-10D290.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 2.5

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

LW
10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-EB01-072908

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Lab Sample ID: 0807089-10 Lab File ID: 0807089-1091.d

Sample Vol:(mL) 25.0 Date Received: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/02/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

gw 10/22/08

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1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-TB01-072908

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-12

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-12R90.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.50 ~~0.23~~	~~JB~~ U BL
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

RW 10/22/08

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-TB01-072908

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-12

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-12R90.d

Level: (TRACE/LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	~~U~~ R DL
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	~~U~~ R DL
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U

LW 10/22/08

10

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VWAE-TB01-072908

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0807089-12

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 0807089-12R90.d

Level: (TRACE or LOW/MED) TRACE Date Received: 07/30/2008

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

10/22/08

1C - FORM I VOA-SIM
TRACE VOLATILE ORGANICS SIM ANALYSIS DATA SHEET

EPA SAMPLE NO.
VWAE-TB01-072908

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Lab Sample ID: 0807089-12 Lab File ID: 0807089-1291.d

Sample Vol:(mL) 25.0 Date Received: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Date Analyzed: 08/02/2008

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
106-93-4	1,2-Dibromoethane	0.050	U
96-12-8	1,2-Dibromo-3-chloropropane	0.050	U

MW
10/22/08

USEPA REGION II WORKSHEETS

SOP HW-33/VOA
Revision 1
August 2007

USEPA Contract Laboratory Program
Statement of Work for Organic Analysis of Low/Medium Concentration of VolatileOrganic Compounds SOM01.2
Data Validation

Prepared by: George Karras Date: 8/13/07
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Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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INTRODUCTION

Scope and Applicability

This SOP offers detailed guidance in evaluating laboratory data generated according to the method in the "USEPA Contract Laboratory Program Statement of Work for Organics Analysis Multi-Media, Multi-Concentration, SOM01.1, May 2005". The validation procedures and actions discussed in this document are based on the requirements set forth in the "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, January 2005". This document attempts to cover technical problems specific to low/Medium concentration of volatile compounds. Situations may arise where data limitations must be assessed based on the reviewer's own professional judgement.

In addition to technical requirements, contractual requirements may also be covered in this document. While it is important that instances of contract non-compliance be addressed in the Data Assessment, the technical criteria are always used to qualify the analytical data.

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 as follows:

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.

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

P - Pesticide/Aroclor target analytes when the % Difference between the analyte concentrations obtained from the two dissimilar GC columns is greater than 25%.

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 the USEPA Statement of Work SOM01.2 and National Functional Guidelines mentioned above.

YES NO N/A

. . . . . .

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: N/A **LAB:** CompuChem, Cary NC

SITE NAME: Vieques Island, PR **SDG No(s).:** 0807089

1.0 Chain of Custody and Sampling Trip Reports

1.1 Are the Traffic Reports/Chain-of-Custody Records present for all samples? [✓] ___ ___

ACTION: If no, contact RSCC, or the TOPO to obtain replacement of missing or illegible copies from the lab.

1.2 Is the Sampling Trip Report present for all samples? [✓] ___ ___

ACTION: If no, contact either RSCC or ask the TOPO to obtain the necessary information from the prime contractor.

2.0 Data Completeness and Deliverables

2.1 Have any missing deliverables been received and added to the data package? ___ [✓] ___

ACTION: Contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the lab. If lab cannot provide them, note the effect on the review of the data package in the Contract Problems/Non-compliance section of the Data Assessment.

2.2 Was CLASS CCS checklist included with the package? [✓] ___ ___

	YES	NO	N/A
. . . . .			
2.3 Are there any discrepancies between the Traffic Reports/Chain-of-Custody Records, and Sampling Trip Report?	___	[✓]	___

ACTION: If yes, contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the laboratory.

3.0 <u>Cover Letter SDG Narrative</u>

3.1 Is the SDG Narrative or Cover Letter Present?	[✓]	___	___
3.2 Are case number, SDG number and contract number contained in the SDG Narrative or cover letter (see SOW, Exhibit B, section 2.5.1)? EPA sample numbers in the SDG, detailed documentation of any quality control, sample, shipment, and/or analytical problems encountered in processing the samples? Corrective action taken?	[✓]	___	___
3.3 Does the Narrative contain the following information SOM01.1, page B-12, section 2.5.1)? Description of trap, column used, storage of samples, case#, SDG#, analytical problems, and discrepancies between field and lab weights.	[✓]	___	___
3.4 Does the narrative, VOA section, contain a list of all TICs identified as alkanes and their estimated concentrations?	[✓]	___	___
3.5 Did the contractor record the temperature of the cooler on the Form DC-1, Item 9 - Cooler Temperature, and in the SDG Narrative?	[✓]	___	___
3.6 Does the narrative contain a list of the pH values determined for each water sample submitted for volatiles analysis (SOW, page B-13, section 2.5.1.2)?	[✓]	___	___

	YES	NO	N/A
. . . . .			
3.7 Does the Case Narrative contain the "verbatim" statement (page B-12, section 2.5.1 of the SOM)?	[✓]	___	___

ACTION: If "No", to any question in this section, contact the TOPO to obtain necessary resubmittals. If unavailable, document under the Contract Problems/ Non-Compliance section of the Data Assessment.

4.0 Data Validation Checklist

4.1 Check the package for the following (see SOM reporting requirements, section 2.1, page B-10):

a. Is the package paginated in ascending order starting from the SDG narrative?	[✓]	___	___
b. Are all forms and copies legible?	[✓]	___	___
c. Assembled in the order set forth in the SOW?	[✓]	___	___
d. Low/Med Concentration Volatiles Data present?	[✓]	___	___

Action: Take action as specified in section 3.7 above.

PART A: Low/Medium Volatile ANALYSES

1.0 Sample Conditions/Problems

1.1 Do the Traffic Reports/Chain-of-Custody Records, Sampling Trip Report or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	___	[✓]	___

ACTION: If samples were not iced or the ice was melted upon arrival at the laboratory and the temperature of the

YES NO N/A

. . . . . .

cooler was > 10° C, then flag all positive results with a "J" and all non-detects "UJ".

ACTION: If both 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".

2.0 Holding Times

2.1 Have any VOA technical holding times, determined from date of collection to date of analysis, been exceeded? ___ [✓] ___

2.2 Preservation: Aqueous samples must be preserved with HCL to pH of 2 or below and cooled at 4°C ± 2°C. Non-aqueous samples: frozen (less than -7°C) or properly cooled (4°C ± 2°C) and preserved with $NaHSO_4$.

Action: Qualify sample results according to the following table.

Holding Time Actions for Low/Medium Volatile Analyses

Matrix	Preserved	Criteria	ACTION	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤ 7 Days	NO Action	
	No	> 7 Days	J	R
	Yes	≤ 14 Days	No Action	
	Yes	> 14 Days	J	R
Non-Aqueous	No	≤ 14 Days	J	R
	Yes	≤ 14 Days	No Action	
	Yes/No	> 14 Days	J	R

3.0 Deuterated Monitoring Compound (DMC) Recovery (Form II)

	YES	NO	N/A
3.1 Are the Volatile SMC Recovery Summaries (Form II present?	[✓]	___	___

ACTION: Contact the TOPO to obtain an explanation/resubmittal from the lab. If missing deliverables are unavailable, document the effect in the Data Assessment.

3.2 Were outliers marked correctly with an asterisk?	[✓]	___	___

ACTION: Circle all outliers in red.

3.3 Were more than three of the fourteen (14) Deuterated Monitoring Compounds (DMC's) recoveries outside their corresponding limits?	___	[✓]	___
If yes, were samples re-analyzed?	[ ]	___	✓
Were method blanks re-analyzed?	[ ]	___	✓

ACTION: If any DMC is outside the required limits (see Table below), qualify their associated target compounds (See Table below) as follows:

VOLATILE DMC AND THEIR ASSOCIATED TARGET COMPOUNDS

Chloroethane-d5	**1,2-Dichloropropane-d6**	**1,2-Dichlorobenzene-d4**
Dichlorodifluoromethane Chloromethane Bromomethane Chloroethane Carbon Disulfide	Cyclohexane Methylcyclohexane 1,2-Dichloropropane Bromodichloromethane	Chlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene 1,2,3-Trichlorobenzene

YES NO N/A

. . . . . .

1,4-Dioxane-d8 1,4-Dioxane	**trans-1,3-Dichloropropene-d4** cis-1,3-Dichloropropene trans-1,3-Dichloropropene 1,1,2-Trichloroethane	**Chloroform-d** 1,1-Dichloroethane Bromochloromethane Chloroform Dibromochloromethane Bromoform
2-Butanone-d5 Acetone 2-butanone	**1,1-dichloroethene-d2** 1,1-dichloroethene trans-1,2-Dichloroethene cis-1,2-Dichloroethene	**2-Hexanone-d5** 4-Methyl-2-pentanone 2-Hexanone
Vinyl Chloride-d3 Vinyl Chloride	**Benzene-d6** Benzene	**1,1,2,2-Tetrachloroethane-d2** 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane
1,2-Dichloroethane-d4 Trichlorofluoromethane 1,1,2-Trichloro-1,2,2-trifluoroethane Methyl Acetate Methylene Chloride Methyl tert-Butyl Ether Carbon Tetrachloride 1,2-Dichloroethane 1,1,1-Trichloroethane 1,2-Dibromoethane	**Toluene-d8** Trichloroethene Toluene Tetrachloroethene Ethylbenzene o-Xylenes m,p-Xylene Styrene Isopropylbenzene	

YES NO N/A

. . . . . .

VOLATILE DEUTERATED MONITORING COMPOUND RECOVERY LIMITS

DMC	Recovery Limits (%) for Water Samples	Recovery Limits (%) for Soil samples
Vinyl Chloride-d3	65 - 131	68 - 122
Chloroethane-d5	71 - 131	61 - 130
1,1-Dichloroethene-d2	55 - 104	45 - 132
2-Butanone-d5	49 - 155	20 - 182
Chloroform-d	78 - 121	72 - 123
1,2-Dichloroethane-d4	78 - 129	79 - 122
Benzene-d6	77 - 124	80 - 121
1,2-Dichloropropane-d6	79 - 124	74 - 124
Toluene-d8	77 - 121	78 - 121
trans-1,3-Dichloropropene-d4	73 - 121	72 - 130
2-Hexanone-d5	28 - 135	17 - 184
1,4-Dioxane-d8	50 - 150	50 - 150
1,1,2,2-Tetrachloroethane-d2	73 - 125	56 - 161
1,2-Dichlorobenzene-d4	80 - 131	70 - 131

1. For any recovery greater than the upper limit:

   a. Qualify "J" all positive associated target compounds.
   b. Do not qualify associated non-detects.

2. For any recovery greater than or equal to 20%, but less than the lower limit:

   a. Qualify "J" all positive associated target compounds.
   b. Qualify "UJ" associated non-detects.

3. For any recovery less than 20%:

YES NO N/A

. . . . . .

a. Qualify "J" all positive associated target compounds.
b. Qualify "R" all associated non-detects.

NOTE: Up to three (3) DMC's per sample, excluding 1,4-Dioxane-d8, may fail to meet the recovery limits. (SOM, sec. 11.3.4, pg. D-45/Low Medium VOA). Recovery limits for 1,4-Dioxane-d8 are advisory.
As per SOM, any sample which has more than 3 DMC's outside the limits, it must be reanalyzed (SOM sec. 11.4.3.1 pg. D-46/Low Medium VOA).

ACTION: Note in the Data Assessment under Contract Problems/ Non-Compliance if the Lab did not perform reanalysis.

3.4 Are there any transcription/calculation errors between raw data and form II? ___ [✓] ___

ACTION: If large errors exist, ask the TOPO to obtain an explanation/resubmittal from the lab, make any necessary corrections and note errors in the data assessment.

Note: DMC recovery limits criteria and qualifications apply to samples diluted 5X and less. For samples diluted greater than 5X, recovery criteria does not apply because it is assumed DMC is diluted below the quantitation range.

4.0 Matrix Spike/Matrix Spike Duplicate Recovery (Form III)

Note: Data for MS/MSD will not be present unless requested.

4.1 Are the MS/MSD Recovery Forms (Form III Low/Med VOA) present? [✓] ___ ___

4.2 Was the MS/MSD analyzed at the required frequency (once per SDG, or every 20 samples, whichever is more frequent)? [✓] ___ ___

ACTION: If any MS/MSD data are missing, take action as specified in section 3.1 above.

ACTION: No action is taken on MS/MSD data alone. However, using professional judgement, the validator may

YES NO N/A

. . . . . .

use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. If any MS/MSD % recovery or RPD is out of specification, qualify data to include the consideration of the existence of interference in the raw data. Consideration include, but not limited to the following "Action":

Criteria	Action	
	Detected Spiked Compounds	**Non-detected Spiked Compounds**
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use Professional Judgement
Lower Acceptance Limit ≤ %R; RPD ≤ Upper Acceptance Limits	No qualification	

5.0 <u>Method Blanks (Form IV)</u>

5.1 Is the Volatile Method Blank Summary (Form IV VOA) present for aqueous and soil samples? [✓] ___ ___

5.2 <u>Frequency of Analysis</u>: For the analysis of Low/Med Concentration VOA TCL compounds, has a method blank been analyzed for each SDG or every 20 samples, whichever is more frequent? [✓] ___ ___

5.3 Has a VOA method blank been analyzed after the calibration standards and once every 12 hours time period for each GC/MS instrument used? [✓] ___ ___

5.4 Was a VOA instrument blank analyzed after each sample/dilution that contains a target compound exceeding the initial calibration range (see SOM, page D-48/Low/Medium VOA, section 12.1.1.3)? [✓] ___ ___

YES NO N/A

. . . . . .

ACTION: If any method/instrument blank data are missing, notify the TOPO to obtain resubmittals or an explanation from the lab. If method blank data are unavailable, the reviewer may use professional judgement, or substitute field blank or trip blank data for missing method blank data.

If an instrument blank was not analyzed after a sample containing a target analyte exceeding the initial calibration standards, inspect the sample chromatogram acquired immediately after this sample for possible carryover. The system is considered uncontaminated if the target analyte is below CRQL. Use professional judgement to determine if carryover occurred and qualify analyte(s) accordingly.

5.5 Was a storage blank analyzed once per SDG after all the samples were analyzed? [√] ___ ___

ACTION: If storage blank data is missing, contact the TOPO to obtain any missing deliverables from the laboratory. If unavailable, note in the Contract Problems/Non-Compliance section of the Data Assessment.

5.6 The validator should verify that the correct identification scheme for EPA blanks was used. (See SOM page B-39, section 3.3.7.3 for more information.)

Was the correct identification scheme used for all Low/Med VOA blanks? [√] ___ ___

ACTION: Contact the TOPO to obtain corrections from the lab, or make the necessary corrections. Document in the "Contract Problems/Non-Compliance section of the Data Assessment all corrections made by the validator.

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

Also compare the storage blank raw data with the method blank. Determine if contamination in the storage blank is also present in the method blank.

	YES	NO	N/A
. . . . .			
Is the chromatographic performance (baseline stability) for each instrument acceptable for Low/Medium VOAs?	[✓]	___	___

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

5.8 Are all detected hits for target compounds in method, and storage blanks less than the CRQL?	[✓]	___	___

Exception: Methylene Chloride, Acetone and 2-butanone must be less than 2X times their respective CRQLs.

ACTION: If no, an explanation and laboratory's corrective actions must be addressed in the case narrative. If the narrative contains no explanation, then make a note in the Contract Problems/Non-Compliance section of the Data Assessment.

6.0 Contamination

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

6.1 Does the storage blank contain positive results (TCL and/or TICs) for Low/Med Concentration VOAs?	✓	[ ]	___
6.2 Do any method/reagent/instrument blanks contain positive results (including TICs) for Low/Med Concentration VOAs?	✓	[ ]	___

NOTE: Contaminated instrument blanks are unacceptable under this SOW (see page D-50/VOA, section 12.1.5.2).

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance if a contaminated instrument blank was submitted.

YES NO N/A

. . . . . .

ACTION: Sample analysis results after the high concentration sample must be evaluated for carryover. Sample must meet the maximum carryover criteria as listed in SOM sec. 11.3.8 p. D-46/VOA.("the sample must not contain a concentration above the CRQL for the target compounds that exceeded the limit in the contaminated sample.")

6.3 Do any field/trip/rinse blanks have positive hits for Low/Med VOA results (including TICs)? ✓ [ ] ___

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

NOTE: All field blank results associated with a particular group of samples (may exceed one per case) must be used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Field blanks & trip blanks must be qualified for system monitoring compound, instrument performance criteria, spectral or calibration QC problems.

ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks. If any blanks are grossly contaminated (i.e., saturated by GC/MS), all associated sample data should be qualified unusable (R).

Blank Type	Blank Result	Sample Result	Action for Samples
	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
Method, Field,		≥ CRQL*	No qualification required

YES NO N/A

. . . . . .

Trip, Storage, Instrument **	> 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
	Gross contamination	Detects	Qualify results as unusable R
	TIC > 2ug/L	Detects	See "Action" below

* 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: Analytes qualified "U" for blank contamination are treated as "hits" when qualifying for calibration criteria.

Note: When applied as described in the table above, the contaminant concentration in the blank are multiplied by the sample dilution factor.

ACTION : For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).

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

ACTION: Note in data assessment that there is no associated field/rinse/equipment blank.

<u>Exception</u>: samples taken from a drinking water tap do not have associated field blanks.

7.0 <u>GC/MS Instrument Performance Check (Form V)</u>

	YES	NO	N/A
. . . . .			
7.1 Are the GC/MS Instrument Performance Check Forms (Form V) present for Bromofluorobenzene (BFB)?	[✓]	___	___
7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the BFB provided for each twelve hour shift?	[✓]	___	___
7.3 Did the 12-hour clock begin with either the injection of BFB, or in cases where a closing continuing calibration (CCV) was used as an opening CCV?	[✓]	___	___

Listed below are some, but not necessarily all, examples of acceptable analytical sequences incorporating the use of the opening/closing CCV. Use these examples as a guide for possible analytical sequences that can be expected.

Conditions for When Example Sequence is Appropriate:	**Acceptable Criteria That Must be Met:**	**Notes:**
If time remains on the 12 hour clock after initial calibration sequence	• BFB tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets both opening and closing CCV criteria • CCV B meets closing CCV criteria.	The requirement of starting the new 12-hr clock for Analytical Sequence 2 with a new BFB tune is waived if CCV A meets opening CCV criteria. If CCV B meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.
If time remains on the 12 hour clock after initial calibration sequence	• BFB tunes meet instrument performance criteria. • The five initial calibration standards meet initial calibration criteria. • CCV A meets closing CCV criteria (but does not meet opening CCV criteria). • CCV B meets opening CCV criteria. • CCV C meets closing CCV Criteria.	CCV A does not meet opening criteria, therefore a new BFB tune must be performed, immediately followed by CCV B before a method blank and any samples may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new BFB tune.

YES NO N/A

. . . . . .

If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV. OR If the most recent closing CCV was not or could not be used as an opening CCV.	• BFB tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets both opening and closing CCV criteria. • CCV C meets both opening and closing CCV criteria.	The requirement of starting the new 12 hour clock for Analytical Sequence 2 with a new BFB tune is waived if CCV B meets opening CCV criteria. If CCV C meets opening CCV criteria, a method blank and subsequent samples may be analyzed immediately after CCV B.
If more than 12 hrs have elapsed since the most recent initial calibration or closing CCV OR If the most recent closing CCV was not or could not be used as an opening CCV	• BFB tunes meet instrument performance criteria. • CCV A meets opening CCV criteria. • CCV B meets closing CCV criteria (but does not meet opening CCV criteria). • CCV C meets opening CCV Criteria. • CCV D meets both opening and closing CCV criteria.	CCV B does not meet opening CCV criteria, therefore a new BFB tune must be performed, immediately followed by CCV B before a method blank and any samples may be analyzed. In this case, the new 12 hr clock and Analytical Sequence 2 begins with the injection of the new BFB tune. The requirement of starting the new 12 hr clock for Analytical Sequence 3 with a new BFB tune is waived if CCV D meets opening CCV criteria. If CCV D meets opening criteria, a method blank and subsequent samples may be analyzed after CCV B.

7.4 Have the ion abundances been normalized to m/z 95 [✓] ___ ___

NOTE: All ion abundance ratios must be normalized to m/z 95, the nominal base peak, even though the ion abundance of m/z 174 may be up to 120% that of m/z 95.

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

7.5 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, professional Judgement may be applied to determine to what extent the data may be utilized.

	YES	NO	N/A
. . . . .			
7.6 Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.)	___	[✓]	___
7.7 Is the number of significant figures for the reported relative abundances consistent with the number given in the ion abundance criteria column on Form V ?	[✓]	___	___

ACTION: If large errors exist, take action as specified in section 3.1 above.

7.8 Is the spectrum of the mass calibration compound acceptable?	[✓]	___	___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

8.0 <u>Target Compound List (TCL) Analytes (Form I)</u>

8.1 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. Regional Control/MS/MSD samples?	[✓]	___	___
c. Blanks (method, trip, etc)?	[✓]	___	___

8.2 Are the VOA Reconstructed Ion Chromatograms, the 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. Regional Control/MS/MSD samples?	[✓]	___	___
c. Blanks (method, trip, etc)?	[✓]	___	___

ACTION: If any data are missing, take action specified in 3.1 above.

8.3 Is chromatographic performance acceptable with respect to:

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

	YES	NO	N/A
. . . . .			
Other: _____?	[ ]	___	✓

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

8.4	Are lab-generated standard mass spectra of the identified VOA compounds present for each sample?	[✓]	___	___

ACTION: If any mass spectra are missing, take action as specified in 3.1 above. If lab does not generate their own standard spectra, make note under the "Contract Problems/Non-Compliance" section of the Data Assessment. If spectra are unavailable reject "R" the reported results.

8.5	Is the RRT of each reported compound within ± 0.06 RRT units of the standard RRT in the continuing calibration?	[✓]	___	___
8.6	Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
8.7	Do sample and standard relative ion intensities agree to within ± 20%?	[✓]	___	___

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 sections 8.4-8.7 above.

ACTION: When sample carry-over is suspected, review section 6.2/Action #2 above before determining if instrument cross-contamination has affected positive compound identifications.

9.0 Tentatively Identified Compounds (TIC)

9.1	Are all Tentatively Identified Compound Forms (Form I VOA-TIC) present? Do listed TICs include scan number or retention time, as well as the estimated "J" and/or "JN" qualifier?	[✓]	___	___
9.2	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?	[✓]	___	___

	YES	NO	N/A
. . . . .			
b. Blanks?	[✓]	___	___
b. Are Alkanes listed in/or part of the Case Narrative?	[✓]	___	___

ACTION: If any TIC data are missing, take action specified in 3.1 above.

ACTION: Verify "JN" qualifier is present for all chemically named TICs having a percent match of greater than or equal 85%. TICs labeled "unknown" are qualified with a "J" qualifier.

9.3 Are any target compounds (from any fraction) listed as TICs? (Example: 1,2-dimethylbenzene is xylene - a VOA target analyte - and should not be reported as a TIC.)	___	[✓]	___

ACTION: Flag with "R" only target compound detected in another fraction (except blank contamination).

9.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]	___	___
9.5 Do TICs and "best match" reference spectra relative ion intensities agree within ± 20%?	[✓]	___	___

ACTION: Use professional judgement to determine the acceptability of TIC identifications. If it is determined that an incorrect identification was made, change its identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate.

Action: When a compound is not found in any blank, but is detected in a sample and is a suspected artifact of a common laboratory contaminant, solvent preservatives or Aldo condensation, the result should be qualified as unusable (R). (i.e., common lab contaminants such as CO_2(m/e 44), Siloxanes (m/e 73), diethyl ether, hexane, certain freons. Aldol condensation products: 4-hydroxy-4-methyl-2-pentanone, 4-methyl-2-penten-2-one, and 5,5-dimethyl-2(H)-furanone. Solvent preservatives cyclohexene, and related by-products: cyclohexanone, cyclohexenone, cyclohexanol, cyclohexenone, chlorocyclohexene, and chlorocyclohexanol.).

10.0 Compound Quantitation and Reported Detection Limits

10.1 Are there any transcription/calculation errors in Form I results? (Check at least two positive values. Verify that the correct internal standards, quantitation ions, and RRFs were used to calculate Form I results.)	___	[✓]	___
10.2 Are the CRQLs adjusted to reflect sample dilutions and per cent moisture?	[✓]	___	___

	YES	NO	N/A
. . . . .			

ACTION: If errors are large, take action as specified in section 3.1 above.

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQLs data from the diluted sample). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original Form I and substituting the data from 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 not to be used, including any in the data summary package.

!0.3 For non-aqueous samples, were the percent moisture < 70%?	[X]	___	✓

Action: If the % moisture ≥ 70.0% and < 90.0%, qualify detects as "J" and non-detects as approximated "UJ" If the % Moisture ≥ 90%, qualify detects as "J" and non-detects as "R"

11.0 Standards Data (GC/MS)

11.1 Are the reconstructed ion chromatograms, and data system printouts (quant. reports) present for each initial and continuing calibration?	[✓]	___	___

ACTION: If any calibration standard data are missing, take action specified in section 3.1 above.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI LCV) present and complete for the volatile fraction at concentrations of 5, 10, 50, 100, and 200 µg/ℓ for non-ketones, 10, 20, 100, 200 and 400 ug/L for ketones and 100, 200, 1000, 2000, and 4000 ug/L for 1,4-dioxane.	[✓]	___	___

ACTION: If any Initial Calibration forms are missing, take action as specified in section 3.1 above.

12.2 Are the relative standard deviation (RSD) stable for VOA's over the concentration range of the calibration (i.e., %RSD ≤ 20.%, ≤ 40% for poor performers (see table below), ≤ 50% for 1,4-dioxane)?	[✓]	___	___

ACTION: Circle all outliers in red.

NOTE: The twenty two (22) poor performers compounds and associated DMCs are listed below. The relative response factor (RRF) for these compounds must be greater than or equal to 0.010.

YES NO N/A

. . . . . .

Volatile Compounds Exhibiting Poor Response

Volatile Compounds	
Acetone	1,2-Dibromo-3-chloropropane
2-Butanone	Isopropylbenzene
Carbon disulfide	Methyl acetate
Chloroethane	Methylene chloride
Chloromethane	Methylcyclohexane
Cyclohexane	Methyl tert-butyl ether
1,4-Dioxane	trans-1,2-Dichloroethene
1,2-Dibromoethane	4-Methyl-2-pentanone
Dichlorodifluoromethane	2-Hexanone
cis-1,2-dichloroethene	Trichlorofluoromethane
1,2-Dichloropropane	1,1,2-Trichloro-1,2,2-trifluoroethane

ACTION: If %RSD > 20.0%, (> 40.0% for the poor performers, and > 50% for 1,4-dioxane), qualify associated positive results for that analyte "J" (estimated). If %RSD is > 90, flag all non-detects for that analyte "R" (unusable) and positive results "J".

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

12.3 Are any $\overline{RRF}$s < 0.050 (< 0.010 for poor performers)? ___ [✓] ___

ACTION: Circle all outliers in red.

ACTION: If any $\overline{RRF}$ values are < 0.05 or < 0.01 for poor performers, qualify associated non-detects unusable (R) and associated positive results estimated (J).

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance the analytes that fail %RSD and/or RRF criteria.

12.4 Are there any transcription /calculation errors in the reporting of RRFs, $\overline{RRF}$s or %RSD values? (Check at least 2 values, but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors in red.

. . . . . .

	YES	NO	N/A

ACTION: If errors are large, contact the TOPO to obtain an explanation/resubmittal from the lab, document in the Data Assessment under Contract Problems/Non-Compliance.

13.0 GC/MS Continuing Calibration Verification (CCV) (Form VII)

		YES	NO	N/A
13.1	Are the Continuing Calibration Forms (Form VII) present and complete for the volatile fraction?	✓		
13.2	Did the 12 hour clock begin with either the injection of BFB or in cases where a closing CCV can be used as an opening CCV for each instrument?	✓		

ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, ask the TOPO to obtain explanation/resubmittal from the laboratory. If continuing calibration data are unavailable, flag all associated sample data as unusable (R).

		YES	NO	N/A
13.3	Do any volatile compounds have a % Difference (% D) between the initial RRF and CCV RRF exceeding ± 50% for 1,4-Dioxane, ± 40% for the poor performers or ± 25% for the remaining compounds?		✓	

ACTION: Circle all outliers in red.

		YES	NO	N/A
13.4	Do any volatile compounds have a RRF < 0.05 or < 0.01 for the poor performers?		✓	

ACTION: Circle all outliers in red.

Note: Verify that the CCV was run at the required frequency (an opening and closing CCV must be run within 12-hour period) and the CCV was compared to the correct initial calibration. If the mid-point standard from the initial calibration is used as an opening CCV, verify that the result (RRF) of the mid-point standard was compared to the average RRF from the correct initial calibration.

Note: The closing CCV used to bracket the end of a 12-hour analytical sequence may be used as the opening CCV for the new 12-hour analyical sequence, provided that all the technical acceptance criteria are met for an opening CCV (see table below). If the closing CCV does not meet the technical acceptance criteria for an opening CCV, then a BFB tune followed by an opening CCV is required and the next 12-hour time period begins with the BFB tune.

Action: Use the following table to qualify data based on the technical acceptance criteria for the opening CCV and closing CCV.

Continuing Calibration Verification (CCV) Actions for Low/Medium Volatiles Analyses

Criteria for	Criteria for	Action

YES NO N/A

. . . . . .

Opening CCV	Closing CCV	Detected Associated Compounds	Non-Detected Associated Compounds
RRF < 0.010 (poor responders) RRF < 0.050 (all other volatile target compounds)	RRF < 0.010 (for all volatile target compounds)	J	R
RRF ≥ 0.010 (poor responders) RRF ≥ 0.050 (for all other compounds)	RRF ≥ 0.010 (for all target volatile compounds)	No Action	
%D > 50.0 or < -50.0 (1,4-Dioxane) %D > 40.0 or < -40.0 (poor responders) %D > 25.0 or < -25.0 (all other volatile target compounds)	%D > 50.0 or < -50.0 (for all volatile target compounds)	J	UJ
%D ≤ 50.0 or ≥ -50.0 (1,4-Dioxane) %D ≤ 40.0 or ≥ -40.0 (poor responders) %D ≤ 25.0 or ≥ -25.0 (all other volatile target compounds)	%D ≤ 50.0 or ≥ -50.0 (for all volatile target compounds)	No Action	
Opening CCV not performed at required frequency *	Closing CCV not performed at required frequency *	R	

* See section 13.2 above

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance if more than two of the required analytes failed the above acceptance criteria.

13.5 Are there any transcription/calculation errors for the reporting of RRFs, or %D between initial RRFs and continuing RRFs? (Check at least two values but if errors are found, check more.) ___ [✓] ___

ACTION: Circle errors with red pencil.

ACTION: If errors are large, notify the TOPO to obtain explanation/resubmittals from the lab. Document errors in the Contract Problems/Non-Compliance section of the Data Assessment.

Note: All DMCs must meet RRF ≥ 0.010. No qualification of the data is necessary on the DMCs RRF and %RSD/%Diff data alone. However, use professional judgment to evaluate the DMC and %RSD/% Diff data in conjunction with the DMC recoveries to determine the need of qualification of the data.

14.0 Internal Standard (Form VIII)

14.1 Were the internal standard area counts for every sample and blank within the range of 50.0% and 200.0% of its response in the most recent opening CCV standard calibration? [✓] ___ ___

	YES	NO	N/A
. . . . .			
If no, were affected sample reanalyzed?	[ ]	___	✓

ACTION: 1. Circle all outliers with red pencil.

14.2 Are the retention times of the internal standards in sample or blanks within ±30 seconds from the RT of the internal standard in the 12-hour associated calibration standard (opening CCV or mid-point standard from initial calibration)?	[✓]	___	___

Action: Use the following table to qualify the data:

INTERNAL STANDARDS ACTIONS FOR LOW/MEDIUM VOLATILES

Criteria	ACTION	
	Detected Associated Compounds *	Non-detected Associated Compounds *
Area counts ≥ 50% and ≤ 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	No Action	
Area counts < 50% of 12-hour standard (opening CCV or mid-point standard from initial calibration)	J	R
Area counts > 200% of 12-hour standard (Opening CCV or mid-point standard from initial calibration)	J	No Action
RT difference > 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	R**	R
RT difference ≤ 30.0 seconds between samples and 12-hour standard (Opening CCV or mid-point standard from initial calibration)	No Action	

* For volatile compounds associated to each internal standard, see Table 3-Low/Medium Volatile Target Compounds and Deuterated Monitoring Compounds with Corresponding Internal Standards for Quantitation in SOM01.1, Exhibit D, available at:

Http://www.epa.gov/superfund/programs/clp/som1.htm

** Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable "R" if the mass spectral are met.

NOTE: Contract Requirements: The SOM (section 11.4.1 page D-46/VOA Low/Medium states that any sample which fails the acceptance criteria for IS response must be reanalyzed.

. . . . . .

ACTION: Document in the Data Assessment under Contract Problems/Non-Compliance any sample(s) which failed the above IS acceptance criteria.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Low/Medium Concentration VOA analysis? ☑ ___ ___

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

ACTION: Any gross variation between duplicate results must be addressed in the reviewer narrative. If large differences exist, contact the TOPO to confirm identification of field duplicates with the sampler.

. . . . . .

Definitions

BFB - bromofluorobenzene
CCS - contract compliance screening
CLASS - Contract Laboratory Analytical Services Support
CLP - Contract Laboratory Program
CRQL - Contract Required Quantitation Limit
GC/MS - gas chromatography/mass spectroscopy
kg - kilogram
µg - microgram
ℓ - liter
mℓ - milliliter
QC - quality control
RAS - Routine Analytical Services
RIC - reconstructed ion chromatogram
RPD - relative percent difference
RRF - relative response factor
$\overline{RRF}$ - 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
SOP - standard operating procedure
SOW - Statement of Work
TCL - Target Compound List
TCLP - Toxicity Characteristics Leachate Procedure
TIC - tentatively identified compound
TPO - technical project officer
VOA - volatile organic acid
VTSR - validated time of sample receipt
TOPO - Task Order Project Officer

References

. . . . . .

1. USEPA Contract Laboratory Program of Work for Organic Analysis Multi-Media, Multi-Concentration, SOW/CLPSOM01.1, October 2004
2. National Functional Guidelines for Superfund Organic Methods Data Review January 2005

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: JAM RL

Project Information

Project Name: Vieques CTD-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC 3-40 ml	VOC SIM 3-40 ml	LowSVOC, SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss Metals (AES/MS)	TPH-GRO 2-40 ml	TPH-DRO & ORO	CNNS Alkalinity	Sulfide	TOC 2-40 ml	MEE 2-40 ml	Ferrous Fe	pH / Sample Info (Lab Use) TOC
0807072-20	VWAE-MW03-08C	07/27/08	1740		8	8						X	X					X							
0807072-21	VWAE-MW08-08C	7/27/08	1745		8	8						X	X					X							
0807072-22	VWAE-MW07-08C	7/27/08	1250		8	8						X	X					X							
~~0807089-01~~ 15869101	VWAE-MW04-08C	7/28/08	0810		12	10			2			X	X					X				X	X		<2
	VWAE-MW04-08CMS	7/28/08	0810		12	10			2			X	X					X				X	X		<2
	VWAE-MW04-08CMSD	7/28/08	0810		12	10			2			X	X					X				X	X		<2
0807072-23	VWAE-EB01-072708	7/27/08	1435		8	8						X	X					X							
0807089-02	VWAE-MW06-08C	7/27/08	0940		8	8						X	X					X							
0807089-03*	VWAE-TB01-072808	7/28/08	1000		12	10			2			X	X					X				(X)	X		
0807072-24	VWAE-MW02-08C	7/27/08	1435		8	8						X	X					X							

Lab Use Only

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

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

Comments

VHBLCXM → 0807089-04

Sample Custody

Relinquished by: [signature]	Date/Time: 7/28/08	Received by: [signature]	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 0.1° °C

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

White & Yellow copy to lab • Pink copy for customer

* VWAE-TB01-072808 - Did not receive 2-40 ml vials for TOC

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

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: CH2M Hill	Project Name: Vieques CTD-10
Address: 5700 Cleveland St, Ste 101	Sampling Location: AOC E #1
City / State / Zip: Virginia Beach, VA 23462	Turnaround time: 28-Day
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757.671.6208	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: JA/KL	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/IMS)	Cyanide	Diss. Metals (AES/IMS)	TPH-GRO	TPH-DRO/ORO	CNMS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Total Metals	Cyanide	Diss. Metals
C807072-20 1583219	VWAE-MW02-08C	7/27/08	1435		7		1	2		DISS=	1583319			X	X	X	X		X						<2	>12	<2
C807072-21	VWAE-MW08-08C	7/27/08	1735		2														X								

Lab Use Only

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

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA
[signature] 07.29.08

Comments

Sample Custody

Relinquished by: [signature]	Date/Time: 7/28/08 1135	Received by: [signature]	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 1.8 °C

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

White & Yellow copy to lab • Pink copy for customer

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.2708
Sampler's Name: JA

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LC SVOC, SVOC SIM	Total Metals, Tl (AES/ms)	Cyanide	Diss. Metals, Tl (AES/ms)	TPH-GRO	TPH-DRO & ORO	CNNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Total Metals	Cyanide	Diss Metals
0807012-08 1583215	VWAE-MW03-08C	7/27/08	1740		7		1	2		DISS=	15833	15		X	X	X	X		X						<2	>12	<2
1583217	VWAE-MW07-08C	7/27/08	1250		3		1	2		DISS=	15833	17			X	X	X								<2	>12	<2

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: [signature]	Date/Time: 7/28/08 1140	Received by: Diane Bpl	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 3.7 °C

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

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CHAIN OF CUSTODY

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: CHam Hill	Project Name: Vieques CTD-10
Address: 5700 Cleveland St, Ste 101	Sampling Location: AOC-E #1
City: Virginia Beach State: VA Zip: 23462	Turnaround time: 28-Day
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757.671.6208	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: JA / KL	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LowSVOC, SVOC SIM	Total Metals (AES/ms)	Cyanide	Diss. Metals (AES/ms)	TPH-GRO	TPH-DRO & ORO	CNAS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use)
0807089-01 1583216	VWAE-MW08-08C	7/27/08	1745	5			1	2		DISS=	1583316			X	X	X	X								
0807089-02	VWAT-MW06-08C	7/27/08	0940	4										X					X						

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/28/08 1135	Received by: Diane Byrd	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 1.2 °C

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Page 1 of 1

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St., Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC-E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LC SVOC, SVOC SIM	Total Metals, Tl (AES, ms)	Cyanide	Diss. Metals, Tl (AES, ms)	TPH-GRO	TPH-DRO & ORO	CNNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Cyanide	Sulfide
0807072-22	VWAE-MW07-08C	7/27/08	1250		4									X					X							
1586901	VWAE-MW04-08C	7/28/08	0810		4	1	1				1					X				X	X			X	>12	>9
	VWAE-MW04-08C MS	7/28/08	0810		4	1	1				1					X				X	X			X	>12	>9
	VWAE-MW04-08C MSD	7/28/08	0810		4	1	1				1					X				X	X			X	>12	>9
																X									7.17	

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/28/08 1157	Received by: Diane Byrd	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 0.4 °C

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: CH2M Hill	Project Name: Vieques CTO-10
Address: 5700 Cleveland St, Ste 101	Sampling Location: AOC E&I
City: Va Beach State: VA Zip: 23462	Turnaround time: 28-Day
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757.671.6208	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: Juan Acaron	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LC,SVOC,SVOC SIM	Total Metals, Tl (AES/MS)	Cyanide	Diss. Metals, Tl (AES,MS)	TPH-GRO	TPH-DRO & ORO	CANS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Total Metals	Cyanide	Diss. Metals
~~0807012-03~~ 1583218	VWAE-EB01-072708	7/27/08	~~0940~~ 1400		7		1	2	DISS=		1583318			X	X	X	X		X						<2	>12	<2
1586902	VWAE-MW06-08C	7/27/08	0940		3		1	2	DISS=		1583320				X	X	X								<2	>12	<2

bottle has VWAE-MW06-08C and COC for "Total" and "Diss" Arsenic Please add "VWAE" also
7/31/08

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/28/08 1135	Received by:	Date/Time: 7/29/08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where? Custody Seal(s) intact? Y or N On Ice? Y or N Cooler Temp: 1.4 °C

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: CH2M Hill	Project Name: Vieques CTO-10
Address: 5700 Cleveland St, Ste 101	Sampling Location: AOC E + I
City: Va Beach State: VA Zip: 23462	Turnaround time: 28 days
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757-671-2708	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: J. Acaron	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC Sim	TPH-GRO	MEE	TOC	TCLP VOC	TCLP SVOC, PEST, HERB, Metals, PCB	Reactive, Sulfide + CN, Corr, Ign			pH / Sample Info (Lab Use) TOC
0807089-03 1584903	VWAE-MW01-08C	7/29/08	0750		12	10			2			X	X	X	X	X						<2
0807089-00 1584904	VWAE-MW01P-08C	7/29/08	0750		12	10			2			X	X	X	X	X						<2
0807089-01 1584905	VWAE-MW05-08C	7/29/08	0720		12	10			2			X	X	X	X	X						<2
0807089-09	VWAE-EB01-072808	7/28/08	1730		8	8						X	X	X								
0807089-10	VWAE-EB01-072908	7/29/08	0645		8	8						X	X	X								
0807089-08	VWAE-MW06-08C	7/28/08	1625		8	8						X	X	X								
1587801	VWAE-WW01-072908	7/29/08	0930		3	3											X					
1587701	VWAE-WS01-072808	7/28/08	1600		3												X	X	X	SOM		
0807089-12	VWAE-TB01-072908	7/29/08	1015		10	10						X	X	X	X							

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/29/08 1100	Received by: Jennifer Doer	Date/Time: 7/30/08 9:05
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 2 °C

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Courier:
Airbill No.:
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: CH2M Hill	Project Name: Virginia CTO-10
Address: 5700 Cleveland St, Ste 101	Sampling Location: NOC E + I
City: Va Beach State: Va Zip: 234	Turnaround time: 28 DAY
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757-671-6208	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: JA / PK	Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type): Low Sulf, Sulf SIM; TPH-GRO + DRO

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Low Sulf, Sulf SIM	TPH-GRO + DRO	pH / Sample Info (Lab Use)
0807089-05	VWAE-MW01-08C	7/29/08	0750		4							X	X	
0807089-06	VWAE-MW01P-08C	7/29/08	0750		4							X	X	

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/29/08 1200	Received by: Jennifer Dore	Date/Time: 7/30/08 9:05
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 1.5 °C

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Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Courier:
Airbill No.:
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: CH2M Hill	Project Name: Viegues CTO-10
Address: 5200 Cleveland St, Ste 107	Sampling Location: AOC E + I
City: VA Beach State: VA Zip: 23462	Turnaround time: 28-DAY
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757-671-2708	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: JA	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Low SVOC, SVOC SIM	TPH-DRO-ORO	pH / Sample Info (Lab Use)
0807089-07	VWAE-MW05-08C	7/29/08	0720		4							X	X	
0807089-08	VWAE-MW06-08C	7/28/08	1625		4							X	X	

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/29/08 12a	Received by: Jennifer Dorn	Date/Time: 7/30/08 9:05
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 1.2 °C

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: CH2M Hill	Project Name: Vieques CTO-10
Address: 5700 Cleveland St, Ste 101	Sampling Location: AOC E+T
City: Va Beach State: VA Zip: 23462	Turnaround time: 28-DAY
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757-671-2708	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: JA	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Low SVOC, SVOC SIM	TPH - DRO (OR)	pH / Sample Info (Lab Use)
0807089-11	VWAE-MW04-08C MS	7/28/08	0810		4							X	X	
✓	VWAE-MW04-08C MSD	7/28/08	0810		4							X	X	

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: [illegible]	Date/Time: 7/29/08	Received by: Jennifer Doan	Date/Time: 7/30/08 9:05
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 1.3 °C

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CHAIN OF CUSTODY

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757-671-2708
Sampler's Name: J. Acaron

Project Information

Project Name: Vieques CTO-ID
Sampling Location: AOC E+T
Turnaround time: 28-DAY
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	TPH-DRO + ORO	Low SVOC, SVOC SIM	TCLP SVOC, Pest, Herb, metals	pH / Sample Info (Lab Use)
08070891	VWAE-MW04-072C	7/28/08	0810		4							X	X		
15878501	VWAE WW01-072908	7/29/08	0930		4									X	

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: [signature]	Date/Time: 7/29/08	Received by: Jennifer Doner	Date/Time: 7/30/08 9:05
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where? Custody Seal(s) intact? Y or N On Ice? Y or N Cooler Temp: 0.1 °C

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CHAIN OF CUSTODY

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Page 1 of 1

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: CH2M Hill	Project Name: Vieques CTO-10
Address: 5700 Cleveland St, Ste 101	Sampling Location: AOC E+I
City: Va Beach State: Va Zip: 23462	Turnaround time: 28 DAY
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757-671-6208	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: JA/PK	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	LC SVOC, SVOC SIM	Total Metals, TI (AES/ms)	Diss. Metals, TI (AES/ms)	Cyanide	TPH-DRO+ORO						pH / Sample Info (Lab Use) T. Metals	D. Metals	Cyanide
0807089-09 (1586907)	VWAE-EB01-072808	7/28/08	1730		7		1	2				X	X	X	X	X	DISS =		1588102			<2	<2	>12
0807089-10	VWAE-EB01-072908	7/29/08	0645		2											X								

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/29/08	Received by: Jennifer Dore	Date/Time: 7/30/08 9:05
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 0.5 °C

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CHAIN OF CUSTODY

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757-671-2708
Sampler's Name: J. Bracken, P. Kish

Project Information

Project Name: Viegues CTO-10
Sampling Location: AOC E+I
Turnaround time: 28-DAY
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other 2W Methanol Wash	Total Metals (AES/MS)	Diss. Metals (AES/MS)	CN	Sulfide	Ferrous Fe	CNMS, AIK					pH / Sample Info (Lab Use) T.Metals	D.Metals	Cyanide	sulfide	Ferrous Fe
1586903	VWAE-MW01-08C	7/29/08	0750		6	1	1	2			1	X	X	X	X	X	X	DISS=1588103				<2	<2	>12	>9	<2
1586904	VWAE MW01P-08C	7/29/08	0750		6	1	1	2			1	X	X	X	X	X	X	DISS=1588104				<2	<2	>12	>9	<2
1586905*	VWAE-MW05-08C	7/29/08	0720 ~~0810~~		3		1	2				X	X	X				DISS=1588105				<2	<2			

Lab Use Only

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

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

Comments

*rec'd Cyanide for VWAE-MW05-08C in another cooler (JD) 7/30/08

Sample Custody

Relinquished by: [signature]	Date/Time: 7/29/08 1200	Received by: Jennifer Dover	Date/Time: 7/30/08 9:05
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where? | Custody Seal(s) intact? Y or N | On Ice? Y or N | Cooler Temp: 0.8 °C

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Phone: 919-379-4100 Fax 919-379-4040

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: CH2M Hill	Project Name: Vieques CTG-10
Address: 5700 Cleveland St, Ste 101	Sampling Location: AOC E + I
City: Va Beach State: VA Zip: 23462	Turnaround time: 28-DAY
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757-671-2708	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: JA	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Low SVOC, SVOC SIM	Total Metals (AES/MS)	Diss Metals (AES/MS)	CN	Total PCBs 8082	Reactive Sulfide, CN, Corr, Ign					pH / Sample Info (Lab Use) T. Metals	D. Metals	Cyanide		
~~0807088-10~~ 1588608	VWAE-EB01-~~072907~~ 072908	7/29/08	0645		5		1	2				X	X	X	X			DISS = 1588107				<2	<2	>12		
1588001	VWAE-WW01-072908	7/29/08	0930		4											X	X									

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/29/08	Received by: Jennifer Doler	Date/Time: 7/30/08 9:05
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 1.3 °C

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

White & Yellow copy to lab • Pink copy for customer

18468

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CHAIN OF CUSTODY

Page 1 of 1

CompuChem
a division of Liberty Analytical Corp.

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St., Ste 101
City: Va. Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757-671-2708
Sampler's Name: JA

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E + I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Total Metals (AES/MS)	Diss. Metals (AES/MS)	CN	Ferrous Fe	CMMS, AIK					pH / Sample Info (Lab Use) T. Metals	D. Metals	Cyanide	Ferrous Fe
1586901	VWAE-MW04-08C MS	7/29/08	0810					2				X	X				DISS= 1588101				<2	<2		
	VWAE-MW04-08C MSD	7/29/08	0810					2				X	X				DISS=				<2	<2		
*	VWAE-MW04-08C	7/29/08	0810					2				X	X				DISS=				<2	<2		
1586906	VWAE-MW06-08C	7/28/08	1625				1	2				X	X	X			DISS= 1588106				<2	<2	>12	
1586905	VWAE-MW05-08C	7/29/08	0720			1	1							X	X	X							>12	<2

Lab Use Only

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

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

Comments

* one Total Metal bottle for VWAE-MW04-08C ~~was~~ top was loose (JD) 7/30/08

Sample Custody

Relinquished by: [signature]	Date/Time: 7/29/08	Received by: Jennifer Dorn	Date/Time: 7/30/08 9:05
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?		Custody Seal(s) intact? Y or N	On Ice? Y or N

Cooler Temp: 0.3 °C

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

White & Yellow copy to lab • Pink copy for customer

SUPPORT DOCUMENTATION

2A - FORM II VOA-1
WATER VOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: _____ SDG No.: 0807089

Level: (TRACE or LOW) TRACE

	EPA SAMPLE NO.	VDMC1 (VCL) #	VDMC2 (CLA) #	VDMC3 (DCE) #	VDMC4 (BUT) #	VDMC5 (CLF) #	VDMC6 (DCA) #	VDMC7 (BEN) #
01	VBLKLB	95	94	80	89	108	98	103
02	VBLKLE	97	101	68	83	105	101	105
03	VHBLKXM	100	104	68	61	114	98	108
04	VWAE-EB01-07280	82	84	72	90	99	91	100
05	VWAE-EB01-07290	87	93	69	80	109	101	100
06	VWAE-MW01	66	73	63	76	80	82	88
07	VWAE-MW01DL	82	85	60	84	94	98	100
08	VWAE-MW01P	68	74	63	85	81	83	90
09	VWAE-MW01PDL	87	92	65	79	98	97	106
#6 ~~10~~	VWAE-MW05	62 *	71	61	91	79	80	88
11	VWAE-MW05DL	85	89	69	83	103	98	105
12	VWAE-MW06	73	78	67	93	93	91	98
13	VWAE-TB01-07280	94	98	83	90	109	102	104
14	VWAE-TB01-07290	93	97	66	72	107	104	105
15	VWAI-MW04	82	92	79	75	101	100	99
16	VWAI-MW04DL	96	97	63	75	102	93	103
17	VWAI-MW04MS	80	88	99	78	99	99	97
18	VWAI-MW04MSD	81	87	98	79	98	100	96
19	VWAI-MW06	93	101	87	86	113	106	100
20								
21								
22								
23								
24								
25								
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27								
28								
29								
30								

AB 9/23/08

AMENDED DATA

		QC LIMITS
VDMC1	(VCL) = Vinyl chloride-d3	(65-131)
VDMC2	(CLA) = Chloroethane-d5	(71-131)
VDMC3	(DCE) = 1,1-Dichloroethene-d2	(55-104)
VDMC4	(BUT) = 2-Butanone-d5	(49-155)
VDMC5	(CLF) = Chloroform-d	(78-121)
VDMC6	(DCA) = 1,2-Dichloroethane-d4	(78-129)
VDMC7	(BEN) = Benzene-d6	(77-124)

Column to be used to flag recovery values
* Value outside of contract required QC limits

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SOM01.2 (8/2007)

2E - FORM II VOA-SIM1
TRACE SIM (WATER) VOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: _____ SDG No.: 0807089

	EPA SAMPLE NO.	VDMC1 (VCL) #	VDMC2 (CLA) #	VDMC3 (DCE) #	VDMC4 (BUT) #	VDMC5 (CLF) #	VDMC6 (DCA) #	VDMC7 (BEN) #
01	VBLKEV						90	
02	VBLKPA						83	
03	VHBLKXM						85	
04	VWAE-EB01-07280						93	
05	VWAE-EB01-07290						94	
06	VWAE-MW01						91	
07	VWAE-MW01P						84	
08	VWAE-MW05						91	
09	VWAE-MW06						78	
10	VWAE-MW06RE						76 *	
11	VWAE-TB01-07280						90	
12	VWAE-TB01-07290						94	
13	VWAI-MW04						100	
14	VWAI-MW06						91	
15								
16								
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22								
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#7RE

Jlu

NB 9/23/08

		QC LIMITS
VDMC1	(VCL) = Vinyl chloride-d3	(65-131)
VDMC2	(CLA) = Chloroethane-d5	(71-131)
VDMC3	(DCE) = 1,1-Dichloroethene-d2	(55-104)
VDMC4	(BUT) = 2-Butanone-d5	(49-155)
VDMC5	(CLF) = Chloroform-d	(78-121)
VDMC6	(DCA) = 1,2-Dichloroethane-d4	(78-129)
VDMC7	(BEN) = Benzene-d6	(77-124)

Column to be used to flag recovery values
* Value outside of contract required QC limits

AMENDED DATA

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKLB

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8073009-BLK1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 8073009-BLK190.d

Level: (TRACE/LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.18	J
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKLB

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8073009-BLK1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 8073009-BLK190.d

Level: (TRACE/LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	2.9	J
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.16	J
87-61-6	1,2,3-Trichlorobenzene	0.20	J

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VBLKLB

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8073009-BLK1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 8073009-BLK190.d

Level: (TRACE or LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 07/30/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKLE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8080104-BLK1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 8080104-BLK190.d

Level: (TRACE/LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
75-71-8	Dichlorodifluoromethane	0.50	U
74-87-3	Chloromethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
74-83-9	Bromomethane	0.50	U
75-00-3	Chloroethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
75-35-4	1,1-Dichloroethene	0.50	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	0.50	U
79-20-9	Methyl acetate	0.50	U
75-09-2	Methylene chloride	0.17	J
156-60-5	trans-1,2-Dichloroethene	0.50	U
1634-04-4	Methyl tert-butyl ether	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
156-59-2	cis-1,2-Dichloroethene	0.50	U
78-93-3	2-Butanone	5.0	U
74-97-5	Bromochloromethane	0.50	U
67-66-3	Chloroform	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
110-82-7	Cyclohexane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
71-43-2	Benzene	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
79-01-6	Trichloroethene	0.50	U

Report 1,4-Dioxane for Low-Medium VOA analysis only

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKLE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8080104-BLK1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 8080104-BLK190.d

Level: (TRACE/LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 25.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-87-2	Methylcyclohexane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
75-27-4	Bromodichloromethane	0.50	U
10061-01-5	cis-1,3-Dichloropropene	0.50	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	0.50	U
10061-02-6	trans-1,3-Dichloropropene	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
127-18-4	Tetrachloroethene	0.50	U
591-78-6	2-Hexanone	3.3	J
124-48-1	Dibromochloromethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
95-47-6	o-Xylene	0.50	U
179601-23-1	m,p-Xylene	0.50	U
100-42-5	Styrene	0.50	U
75-25-2	Bromoform	0.50	U
98-82-8	Isopropylbenzene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U
95-50-1	1,2-Dichlorobenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.12	J
87-61-6	1,2,3-Trichlorobenzene	0.16	J

1J - FORM I VOA-TIC
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
VBLKLE

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: SDG No.: 0807089

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 8080104-BLK1

Sample wt/vol: 25.0 (g/mL) mL Lab File ID: 8080104-BLK190.d

Level: (TRACE or LOW/MED) TRACE Date Received:

% Moisture: not dec. Date Analyzed: 08/01/2008

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/kg) ug/L Purge Volume: 25.0 (mL)

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01					
02					
03					
04					
05					
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07					
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20					
21					
22					
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25					
26					
27					
28					
29					
30					
	E966796[1]	Total Alkanes	N/A		

[1]EPA-designated Registry Number.

6A - FORM VI VOA-1
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: COMPUCHEM Contract: N26470-08-D-1000

Lab Code: LIBRTY Case No.: 0807089 Mod. Ref No.: _____ SDG No.: 0807089

Instrument ID: 5973hp90 Calibration Date(s): 07/28/2008 07/28/2008

Heated Purge: (Y/N) Y Calibration Time(s): 1937 2200

Purge Volume: 25.0 (mL)

GC Column: SPB-624 ID: 0.32 (mm) Length: 60 (m)

LAB FILE ID: _____ RRF0.5= RRF1.0=

RRF5.0= 8G28010-CAL390.d RRF10= RRF20=

COMPOUND	RRF0.5	RRF1.0	RRF5.0	RRF10	RRF20	$\overline{RRF}$	% RSD
Dichlorodifluoromethane	1.349	1.259	1.232	1.153	0.932	1.185	13.3
Chloromethane	0.730	0.667	0.587	0.546	0.454	0.597	17.9
Vinyl chloride	0.819	0.749	0.683	0.645	0.533	0.686	15.8
Bromomethane	0.723	0.630	0.608	0.595	0.497	0.611	13.2
Chloroethane	0.353	0.291	0.306	0.300	0.257	0.301	11.4
Trichlorofluoromethane	1.559	1.488	1.426	1.404	1.167	1.409	10.5
1,1-Dichloroethene	0.323	0.729	0.649	0.622	0.301	0.525	37.8
1,1,2-Trichloro-1,2,2-trifluoroethane	0.519	0.809	0.734	0.714	0.417	0.639	25.6
Acetone	0.046	0.030	0.024	0.022	0.023	0.029	35.1
Carbon disulfide	1.471	1.497	1.485	1.439	1.199	1.418	8.8
Methyl acetate	0.100	0.093	0.072	0.067	0.062	0.079	20.8
Methylene chloride	0.440	0.368	0.345	0.324	0.275	0.350	17.3
trans-1,2-Dichloroethene	0.365	0.372	0.408	0.384	0.320	0.370	8.7
Methyl tert-butyl ether	0.291	0.270	0.352	0.393	0.385	0.338	16.4
1,1-Dichloroethane	0.797	0.768	0.751	0.749	0.634	0.740	8.4
cis-1,2-Dichloroethene	0.299	0.332	0.362	0.360	0.306	0.332	8.9
2-Butanone	0.035	0.034	0.042	0.041	0.039	0.038	9.2
Bromochloromethane	0.151	0.158	0.145	0.141	0.122	0.143	9.5
Chloroform	0.910	0.963	0.824	0.764	0.637	0.820	15.6
1,1,1-Trichloroethane	1.238	1.141	1.016	0.965	0.825	1.037	15.4
Cyclohexane	0.403	0.335	0.499	0.521	0.443	0.440	17.0
Carbon tetrachloride	1.201	1.209	1.003	0.945	0.800	1.032	16.9
Benzene	1.586	1.469	1.390	1.300	1.138	1.377	12.3
1,2-Dichloroethane	0.532	0.465	0.437	0.414	0.354	0.440	14.9
Trichloroethene	0.448	0.405	0.428	0.439	0.394	0.423	5.4
Methylcyclohexane	0.479	0.410	0.549	0.562	0.477	0.495	12.4

Report 1,4-Dioxane for Low-Medium VOA analysis only

ENVIRONMENTAL
Data Services, Inc.

TOTAL METALS & CYANIDE
USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 15832

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 29, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAI-MW05P	1583201	Water
2	VWAI-MW05	1583202	Water
3	VWAI-MW07	1583203	Water
4	VWAI-MW08	1583204	Water
5	VWAI-EB01-072108	1583205	Water
6	VWAI-EB01-072008	1583206	Water
7	VWAI-MW04	1583207	Water
7MS	VWAI-MW04MS	1583207MS	Water
7MSD	VWAI-MW04MSD	1583207MSD	Water
8	VWAI-EB01-072208	1583208	Water
9	VWAI-MW09	1583209	Water
10	VWAI-MW01	1583210	Water
11	VWAI-EB01-072308	1583211	Water
12	VWAI-EB01-072408	1583212	Water
13	VWAI-MW02	1583213	Water
14	VWAI-MW03	1583214	Water
15	VWAE-MW03	1583215	Water
16	VWAI-MW08	1583216	Water
17	VWAI-MW07	1583217	Water
18	VWAE-EB01-072708	1583218	Water
19	VWAE-MW02	1583219	Water

The USEPA Region II SOP No. HW-2, Revision 13, September 2006: Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were prepared and analyzed within 14 days for cyanide, 28 days for mercury and 180 days for all other metals.

Calibration - The ICV and CCV %R values were acceptable.

CRDL Standard - The CRDL standards exhibited acceptable %R values.

Method and Calibration Blanks - The following table summarizes method blank and continuing calibration blank contamination.

Compound	Conc. ug/L	Qualifier	Affected Samples
Aluminum	46.945	U	3, 4, 7, 11-13, 15, 16, 19
Calcium	33.365	U	5, 6, 8, 11, 12, 18
Magnesium	50.38	U	5, 6, 8, 11, 12, 18
Potassium	18.814	U	1-4, 6-9, 13-17, 19
Sodium	532.659	U	5, 6, 8, 11, 12, 18

ICP Interference Check Sample - All %R values were acceptable.

Matrix Spike/Matrix Spike Duplicate - The matrix spike/matrix spike duplicate sample exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	%R/RPD	Qualifier	Affected Samples
7	Silver	45%	J/UJ	All samples

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAI-MW05 ug/L	VWAI-MW05P ug/L	RPD	Qualifier
Antimony	0.28	0.25	11%	None
Arsenic	9.9	9.9	0%	None
Barium	87.3	84.7	3%	None
Calcium	55100	54200	2%	None
Chromium	3.4	3.4	0%	None
Cobalt	0.84	0.80	5%	None
Copper	3.4	3.6	6%	None
Iron	127	132	4%	None
Lead	0.28	0.057	132%	None
Magnesium	42000	41200	2%	None
Manganese	1260	1270	1%	None
Nickel	3.5	3.6	3%	None
Selenium	0.81	0.95	16%	None
Sodium	231000	228000	1%	None
Vanadium	0.99	0.98	1%	None
Zinc	4.1	3.2	25%	None

LCS - The LCS samples exhibited acceptable %R values.

ICP Serial Dilution - The ICP serial dilution sample exhibited acceptable %D values except the following.

ICP Sample ID	Compound	%D	Qualifier	Affected Samples
7	Potassium	31%	None	All ND

Field and Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAI-EB01-072108	Iron	37.1	None	All associated >CRDL or ND
VWAI-EB01-072008	Iron	35.1	None	All associated >CRDL or ND
VWAI-EB01-072208	Iron	24.6	None	All associated >CRDL or ND
VWAI-EB01-072308	Iron	56.0	None	All associated >CRDL or ND
	Zinc	0.19	None	All associated >CRDL or ND
VWAI-EB01-072408	Iron	98.2	None	All associated >CRDL or ND
VWAI-EB01-072708	Iron	17.6	U	15, 19
VWAI-EB01-072708	Copper	0.035	None	All associated >CRDL or ND

Compound Quantitation - No discrepancies were identified.

Total vs. Dissolved Comparison - The total vs. dissolved comparison sample results are summarized in the tables below.

Compound	VWAI-MW05P (T) ug/L	VWAI-MW05P (D) ug/L	%D	Qualifier
Antimony	0.25	0.41	64%	R
Zinc	3.2	5.4	69%	R

Compound	VWAI-MW05 (T) ug/L	VWAI-MW05 (D) ug/L	%D	Qualifier
Antimony	0.28	0.38	36%	J
Zinc	4.1	5.5	34%	J

Compound	VWAI-MW08 (T) ug/L	VWAI-MW08 (D) ug/L	%D	Qualifier
Zinc	2.7	5.0	25%	J

Compound	VWAI-MW09 (T) ug/L	VWAI-MW09 (D) ug/L	%D	Qualifier
Zinc	1.8	3.2	78%	R

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW05P

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583201

Level (low/med): LOW Date Received: 07/22/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.25	~~J~~	R	MS	OT
7440-38-2	Arsenic	9.9			MS	
7440-39-3	Barium	84.7			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	3.4			MS	
7440-48-4	Cobalt	0.80	J		MS	
7440-50-8	Copper	3.6			MS	
7439-92-1	Lead	0.057	J		MS	
7439-96-5	Manganese	1270			MS	
7440-02-0	Nickel	3.6			MS	
7782-49-2	Selenium	0.95	J		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	0.98	J		MS	
7440-66-6	Zinc	~~3.2~~		R	MS	OT

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW05P

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583201

Level (low/med): LOW Date Received: 07/22/2008

Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	200	U		P
7440-70-2	Calcium	54200			P
7439-89-6	Iron	132			P
7439-95-4	Magnesium	41200			P
7439-97-6	Mercury	0.20	U		CV
7440-09-7	Potassium	5000 ~~155~~	~~J~~	U ~~E~~	P
7440-23-5	Sodium	228000			P
57-12-5	Cyanide	10.0	U		AS

BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1A-IN

INORGANIC ANALYSIS DATA SHEET

2

EPA SAMPLE NO.

VWAI-MW05

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583202

Level (low/med): LOW Date Received: 07/22/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.28	~~J~~	J	MS	OT
7440-38-2	Arsenic	9.9			MS	
7440-39-3	Barium	87.3			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	3.4			MS	
7440-48-4	Cobalt	0.84	J		MS	
7440-50-8	Copper	3.4			MS	
7439-92-1	Lead	~~0.28~~	~~J~~	R	MS	OT
7439-96-5	Manganese	1260			MS	
7440-02-0	Nickel	3.5			MS	
7782-49-2	Selenium	0.81	J		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	0.99	J		MS	
7440-66-6	Zinc	4.1		J	MS	OT

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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2

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW05

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583202

Level (low/med): LOW Date Received: 07/22/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	200	U		P
7440-70-2	Calcium	55100			P
7439-89-6	Iron	127			P
7439-95-4	Magnesium	42000			P
7439-97-6	Mercury	0.20	U		CV
7440-09-7	Potassium	~~162~~ 5600	J	~~E~~ L	P
7440-23-5	Sodium	231000			P
57-12-5	Cyanide	10.0	U		AS

BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW07

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583203

Level (low/med): LOW Date Received: 07/23/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	0.29	J		MS
7440-38-2	Arsenic	4.8			MS
7440-39-3	Barium	64.7			MS
7440-41-7	Beryllium	1.0	U		MS
7440-43-9	Cadmium	1.0	U		MS
7440-47-3	Chromium	1.6	J		MS
7440-48-4	Cobalt	0.96	J		MS
7440-50-8	Copper	4.4			MS
7439-92-1	Lead	0.58	J		MS
7439-96-5	Manganese	1680			MS
7440-02-0	Nickel	3.7			MS
7782-49-2	Selenium	0.93	J		MS
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS
7440-28-0	Thallium	1.0	U		MS
7440-62-2	Vanadium	1.2	J		MS
7440-66-6	Zinc	7.0			MS

MSL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

3

EPA SAMPLE NO.

VWAI-MW07

ab Name: COMPUCHEM Contract:

ab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

atrix (soil/water): WATER Lab Sample ID: 1583203

evel (low/med): LOW Date Received: 07/23/2008

Solids: 0.0

oncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~30.0~~	~~J~~	U	P	BL
7440-70-2	Calcium	64600			P	
7439-89-6	Iron	1080			P	
7439-95-4	Magnesium	54000			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~277~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	168000			P	
57-12-5	Cyanide	10.0	U		AS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW08

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583204

Level (low/med): LOW Date Received: 07/23/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.32	J		MS	
7440-38-2	Arsenic	1.2			MS	
7440-39-3	Barium	83.1			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	0.53	J		MS	
7440-48-4	Cobalt	0.49	J		MS	
7440-50-8	Copper	3.6			MS	
7439-92-1	Lead	0.21	J		MS	
7439-96-5	Manganese	171			MS	
7440-02-0	Nickel	2.8			MS	
7782-49-2	Selenium	2.5	J		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	26.2			MS	
7440-66-6	Zinc	2.7		J	MS	OT

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW08

ab Name: COMPUCHEM Contract:

ab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

atrix (soil/water): WATER Lab Sample ID: 1583204

evel (low/med): LOW Date Received: 07/23/2008

Solids: 0.0

oncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~100~~	~~J~~	U	P	BL
7440-70-2	Calcium	63400			P	
7439-89-6	Iron	100	U		P	
7439-95-4	Magnesium	35400			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~454~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	205000			P	
57-12-5	Cyanide	10.0	U		AS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072108

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583205

Level (low/med): LOW Date Received: 07/23/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0	U		MS	
7440-38-2	Arsenic	1.0	U		MS	
7440-39-3	Barium	10.0	U		MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0	U		MS	
7440-50-8	Copper	2.0	U		MS	
7439-92-1	Lead	1.0	U		MS	
7439-96-5	Manganese	1.0	U		MS	
7440-02-0	Nickel	1.0	U		MS	
7782-49-2	Selenium	5.0	U		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	5.0	U		MS	
7440-66-6	Zinc	2.0	U		MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072108

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583205

Level (low/med): LOW Date Received: 07/23/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200	U		P	
7440-70-2	Calcium	5000 ~~50.8~~	~~J~~	U	P	BL
7439-89-6	Iron	37.1	J		P	
7439-95-4	Magnesium	5000 ~~16.7~~	~~J~~	U	P	BL
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000	U	~~E~~	P	
7440-23-5	Sodium	5000 ~~381~~	~~J~~	U	P	BL
57-12-5	Cyanide	10.0	U		AS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072008

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583206

Level (low/med): LOW Date Received: 07/23/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	2.0	U		MS
7440-38-2	Arsenic	1.0	U		MS
7440-39-3	Barium	10.0	U		MS
7440-41-7	Beryllium	1.0	U		MS
7440-43-9	Cadmium	1.0	U		MS
7440-47-3	Chromium	2.0	U		MS
7440-48-4	Cobalt	1.0	U		MS
7440-50-8	Copper	2.0	U		MS
7439-92-1	Lead	1.0	U		MS
7439-96-5	Manganese	1.0	U		MS
7440-02-0	Nickel	1.0	U		MS
7782-49-2	Selenium	5.0	U		MS
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS MSL
7440-28-0	Thallium	1.0	U		MS
7440-62-2	Vanadium	5.0	U		MS
7440-66-6	Zinc	2.0	U		MS

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

6

EPA SAMPLE NO.

VWAI-EB01-072008

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583206

Level (low/med): LOW Date Received: 07/23/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200	U		P	
7440-70-2	Calcium	5000 ~~146~~	~~J~~	U	P	BL
7439-89-6	Iron	35.1	J		P	
7439-95-4	Magnesium	5000 ~~38.7~~	~~J~~	U	P	BL
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~4.6~~	~~J~~	U E	P	BL
7440-23-5	Sodium	5000 ~~403~~	~~J~~	U	P	BL
57-12-5	Cyanide	10.0	U		AS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

US EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW04

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583207

Level (low/med): LOW Date Received: 07/24/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	0.26	J		MS
7440-38-2	Arsenic	5.1			MS
7440-39-3	Barium	86.3			MS
7440-41-7	Beryllium	1.0	U		MS
7440-43-9	Cadmium	1.0	U		MS
7440-47-3	Chromium	0.30	J		MS
7440-48-4	Cobalt	0.65	J		MS
7440-50-8	Copper	2.6			MS
7439-92-1	Lead	0.076	J		MS
7439-96-5	Manganese	1830			MS
7440-02-0	Nickel	2.0			MS
7782-49-2	Selenium	1.2	J		MS
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS MSL
7440-28-0	Thallium	1.0	U		MS
7440-62-2	Vanadium	1.6	J		MS
7440-66-6	Zinc	3.7			MS

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1A-IN

INORGANIC ANALYSIS DATA SHEET

7

EPA SAMPLE NO.

VWAI-MW04

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583207

Level (low/med): LOW Date Received: 07/24/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~62.7~~	~~J~~	U	P	BL
7440-70-2	Calcium	57700			P	
7439-89-6	Iron	139			P	
7439-95-4	Magnesium	48400			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~251~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	150000			P	
57-12-5	Cyanide	10.0	U		AS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

LW 10/28/08

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

8

EPA SAMPLE NO.

VWAI-EB01-072208

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583208

Level (low/med): LOW Date Received: 07/24/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	2.0	U		MS
7440-38-2	Arsenic	1.0	U		MS
7440-39-3	Barium	10.0	U		MS
7440-41-7	Beryllium	1.0	U		MS
7440-43-9	Cadmium	1.0	U		MS
7440-47-3	Chromium	2.0	U		MS
7440-48-4	Cobalt	1.0	U		MS
7440-50-8	Copper	2.0	U		MS
7439-92-1	Lead	1.0	U		MS
7439-96-5	Manganese	1.0	U		MS
7440-02-0	Nickel	1.0	U		MS
7782-49-2	Selenium	5.0	U		MS
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS
7440-28-0	Thallium	1.0	U		MS
7440-62-2	Vanadium	5.0	U		MS
7440-66-6	Zinc	2.0	U		MS

MSL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072208

ab Name: COMPUCHEM Contract:

ab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

atrix (soil/water): WATER Lab Sample ID: 1583208

evel (low/med): LOW Date Received: 07/24/2008

Solids: 0.0

oncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200	U		P	
7440-70-2	Calcium	5000 ~~55.0~~	~~J~~	U	P	BL
7439-89-6	Iron	24.6	J		P	
7439-95-4	Magnesium	5000 ~~18.5~~	~~J~~	U	P	BL
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~6.3~~	~~J~~	U E	P	BL
7440-23-5	Sodium	5000 ~~523~~	~~J~~	U	P	BL
57-12-5	Cyanide	10.0	U		AS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Form IA-IN LW 10/28/08

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW09

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583209

Level (low/med): LOW Date Received: 07/24/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.075	J		MS	
7440-38-2	Arsenic	0.83	J		MS	
7440-39-3	Barium	43.7			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	0.79	J		MS	
7440-48-4	Cobalt	0.92	J		MS	
7440-50-8	Copper	5.0			MS	
7439-92-1	Lead	0.23	J		MS	
7439-96-5	Manganese	263			MS	
7440-02-0	Nickel	6.2			MS	
7782-49-2	Selenium	1.2	J		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	28.5			MS	
7440-66-6	Zinc	1.8	~~J~~	R	MS	OT

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW09

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583209

Level (low/med): LOW Date Received: 07/24/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	393			P
7440-70-2	Calcium	54600			P
7439-89-6	Iron	313			P
7439-95-4	Magnesium	48800			P
7439-97-6	Mercury	0.20	U		CV
7440-09-7	Potassium	5000 ~~320~~	~~J~~	U ~~E~~	P BL
7440-23-5	Sodium	273000			P
57-12-5	Cyanide	10.0	U		AS

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW01

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583210

Level (low/med): LOW Date Received: 07/24/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
57-12-5	Cyanide	10.0	U		AS

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

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EPA SAMPLE NO.

VWAI-EB01-072308

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583211

Level (low/med): LOW Date Received: 07/25/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0	U		MS	
7440-38-2	Arsenic	1.0	U		MS	
7440-39-3	Barium	10.0	U		MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0	U		MS	
7440-50-8	Copper	2.0	U		MS	
7439-92-1	Lead	1.0	U		MS	
7439-96-5	Manganese	1.0	U		MS	
7440-02-0	Nickel	1.0	U		MS	
7782-49-2	Selenium	5.0	U		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	5.0	U		MS	
7440-66-6	Zinc	0.19	J		MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1A-IN

INORGANIC ANALYSIS DATA SHEET

11

EPA SAMPLE NO.

VWAI-EB01-072308

ab Name: COMPUCHEM Contract:

ab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

atrix (soil/water): WATER Lab Sample ID: 1583211

evel (low/med): LOW Date Received: 07/25/2008

Solids: 0.0

oncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~31.2~~	~~J~~	U	P	BL
7440-70-2	Calcium	5000 ~~210~~	~~J~~	U	P	BL
7439-89-6	Iron	56.0	J		P	
7439-95-4	Magnesium	5000 ~~53.7~~	~~J~~	U	P	BL
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000	U	~~E~~	P	
7440-23-5	Sodium	5000 ~~544~~	~~J~~	U	P	BL
57-12-5	Cyanide	10.0	U		AS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072408

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583212

Level (low/med): LOW Date Received: 07/25/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	2.0	U		MS
7440-38-2	Arsenic	1.0	U		MS
7440-39-3	Barium	10.0	U		MS
7440-41-7	Beryllium	1.0	U		MS
7440-43-9	Cadmium	1.0	U		MS
7440-47-3	Chromium	2.0	U		MS
7440-48-4	Cobalt	1.0	U		MS
7440-50-8	Copper	2.0	U		MS
7439-92-1	Lead	1.0	U		MS
7439-96-5	Manganese	1.0	U		MS
7440-02-0	Nickel	1.0	U		MS
7782-49-2	Selenium	5.0	U		MS
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS MSL
7440-28-0	Thallium	1.0	U		MS
7440-62-2	Vanadium	5.0	U		MS
7440-66-6	Zinc	2.0	U		MS

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072408

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583212

Level (low/med): LOW Date Received: 07/25/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~34.7~~	~~J~~	U	P	BL
7440-70-2	Calcium	5000 ~~767~~	~~J~~	U	P	BL
7439-89-6	Iron	98.2	J		P	
7439-95-4	Magnesium	5000 ~~123~~	~~J~~	U	P	BL
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000	U	~~B~~	P	
7440-23-5	Sodium	5000 ~~491~~	~~J~~	U	P	BL
57-12-5	Cyanide	10.0	U		AS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

13

EPA SAMPLE NO.

VWAI-MW02

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583213

Level (low/med): LOW Date Received: 07/25/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	0.37	J		MS
7440-38-2	Arsenic	0.65	J		MS
7440-39-3	Barium	41.0			MS
7440-41-7	Beryllium	1.0	U		MS
7440-43-9	Cadmium	1.0	U		MS
7440-47-3	Chromium	1.7	J		MS
7440-48-4	Cobalt	0.78	J		MS
7440-50-8	Copper	2.3			MS
7439-92-1	Lead	0.057	J		MS
7439-96-5	Manganese	1200			MS
7440-02-0	Nickel	6.3			MS
7782-49-2	Selenium	0.95	J		MS
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS MSL
7440-28-0	Thallium	1.0	U		MS
7440-62-2	Vanadium	29.3			MS
7440-66-6	Zinc	2.2			MS

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW02

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583213

Level (low/med): LOW Date Received: 07/25/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~47.3~~	~~J~~	U	P	BL
7440-70-2	Calcium	89900			P	
7439-89-6	Iron	100	U		P	
7439-95-4	Magnesium	59500			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~472~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	76300			P	
57-12-5	Cyanide	10.0	U		AS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW03

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583214

Level (low/med): LOW Date Received: 07/25/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	0.055	J		MS
7440-38-2	Arsenic	3.3			MS
7440-39-3	Barium	83.3			MS
7440-41-7	Beryllium	1.0	U		MS
7440-43-9	Cadmium	1.0	U		MS
7440-47-3	Chromium	7.4			MS
7440-48-4	Cobalt	0.60	J		MS
7440-50-8	Copper	2.6			MS
7439-92-1	Lead	1.0	U		MS
7439-96-5	Manganese	1700			MS
7440-02-0	Nickel	15.7			MS
7782-49-2	Selenium	0.81	J		MS
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS
7440-28-0	Thallium	1.0	U		MS
7440-62-2	Vanadium	0.64	J		MS
7440-66-6	Zinc	2.7			MS

MSL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW03

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583214

Level (low/med): LOW Date Received: 07/25/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	233			P
7440-70-2	Calcium	78000			P
7439-89-6	Iron	644			P
7439-95-4	Magnesium	57200			P
7439-97-6	Mercury	0.20	U		CV
7440-09-7	Potassium	5000 ~~316~~	~~J~~	U ~~E~~	P BC
7440-23-5	Sodium	94600			P
57-12-5	Cyanide	10.0	U		AS

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW03

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583215

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.020	J		MS	
7440-38-2	Arsenic	0.54	J		MS	
7440-39-3	Barium	157			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	1.0	J		MS	
7440-48-4	Cobalt	0.24	J		MS	
7440-50-8	Copper	2.5			MS	
7439-92-1	Lead	0.092	J		MS	
7439-96-5	Manganese	39.9		J	MS	OT
7440-02-0	Nickel	2.2			MS	
7782-49-2	Selenium	2.9	J		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	13.0			MS	
7440-66-6	Zinc	2.4		J	MS	OT

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW03

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583215

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~157~~	~~J~~	U	P	BL
7440-70-2	Calcium	60700			P	
7439-89-6	Iron	100 ~~74.1~~	~~J~~	U	P	BL
7439-95-4	Magnesium	39100			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~1350~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	133000			P	
57-12-5	Cyanide	10.0	U		AS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW08

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583216

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	0.037	J		MS
7440-38-2	Arsenic	0.52	J		MS
7440-39-3	Barium	129			MS
7440-41-7	Beryllium	1.0	U		MS
7440-43-9	Cadmium	1.0	U		MS
7440-47-3	Chromium	0.52	J		MS
7440-48-4	Cobalt	0.26	J		MS
7440-50-8	Copper	2.0	J		MS
7439-92-1	Lead	0.056	J		MS
7439-96-5	Manganese	8.7			MS
7440-02-0	Nickel	1.9			MS
7782-49-2	Selenium	2.7	J		MS
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS MSL
7440-28-0	Thallium	1.0	U		MS
7440-62-2	Vanadium	13.5			MS
7440-66-6	Zinc	2.6			MS

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

US EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

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EPA SAMPLE NO.

VWAE-MW08

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583216

Level (low/med): LOW Date Received: 07/29/2008

Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~70.1~~	~~J~~	U	P	BL
7440-70-2	Calcium	52800			P	
7439-89-6	Iron	100	U		P	
7439-95-4	Magnesium	34500			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~1300~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	121000			P	
57-12-5	Cyanide	10.0	U		AS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW07

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583217

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	2.0	U		MS
7440-38-2	Arsenic	0.58	J		MS
7440-39-3	Barium	103			MS
7440-41-7	Beryllium	1.0	U		MS
7440-43-9	Cadmium	1.0	U		MS
7440-47-3	Chromium	0.60	J		MS
7440-48-4	Cobalt	0.63	J		MS
7440-50-8	Copper	2.0	J		MS
7439-92-1	Lead	0.13	J		MS
7439-96-5	Manganese	22.8			MS
7440-02-0	Nickel	2.1			MS
7782-49-2	Selenium	2.1	J		MS
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS MSL
7440-28-0	Thallium	1.0	U		MS
7440-62-2	Vanadium	21.0			MS
7440-66-6	Zinc	2.4			MS

Color Before: COLORLESS Clarity Before: CLEAR Texture:

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Comments:

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW07

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583217

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	347			P
7440-70-2	Calcium	46600			P
7439-89-6	Iron	413			P
7439-95-4	Magnesium	31900			P
7439-97-6	Mercury	0.20	U		CV
7440-09-7	Potassium	5000 ~~1080~~	~~J~~	U ~~E~~	P BL
7440-23-5	Sodium	112000			P
57-12-5	Cyanide	10.0	U		AS

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Comments:

Form IA-IN 10/28/08

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-072708

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583218

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	2.0	U		MS
7440-38-2	Arsenic	1.0	U		MS
7440-39-3	Barium	10.0	U		MS
7440-41-7	Beryllium	1.0	U		MS
7440-43-9	Cadmium	1.0	U		MS
7440-47-3	Chromium	2.0	U		MS
7440-48-4	Cobalt	1.0	U		MS
7440-50-8	Copper	0.035	J		MS
7439-92-1	Lead	1.0	U		MS
7439-96-5	Manganese	1.0	U		MS
7440-02-0	Nickel	1.0	U		MS
7782-49-2	Selenium	5.0	U		MS
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS
7440-28-0	Thallium	1.0	U		MS
7440-62-2	Vanadium	5.0	U		MS
7440-66-6	Zinc	2.0	U		MS

MSL

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Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-072708

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583218

Level (low/med): LOW Date Received: 07/29/2008

Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200	U		P	
7440-70-2	Calcium	5000 ~~89.9~~	~~J~~	U	P	BL
7439-89-6	Iron	17.6	J		P	
7439-95-4	Magnesium	5000 ~~8.6~~	~~J~~	U	P	BL
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000	U	~~E~~	P	
7440-23-5	Sodium	5000 ~~499~~	~~J~~	U	P	BL
57-12-5	Cyanide	10.0	U		AS	

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Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW02

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583219

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	0.11	J		MS
7440-38-2	Arsenic	0.33	J		MS
7440-39-3	Barium	132			MS
7440-41-7	Beryllium	1.0	U		MS
7440-43-9	Cadmium	1.0	U		MS
7440-47-3	Chromium	4.8			MS
7440-48-4	Cobalt	0.27	J		MS
7440-50-8	Copper	2.4			MS
7439-92-1	Lead	1.0	U		MS
7439-96-5	Manganese	12.7			MS
7440-02-0	Nickel	16.1			MS
7782-49-2	Selenium	2.7	J		MS
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS MSL
7440-28-0	Thallium	1.0	U		MS
7440-62-2	Vanadium	13.5			MS
7440-66-6	Zinc	2.6			MS

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Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW02

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Lab Sample ID: 1583219

Level (low/med): LOW Date Received: 07/29/2008

Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~115~~	~~J~~	U	P	BL
7440-70-2	Calcium	54700			P	
7439-89-6	Iron	100 ~~95.3~~	~~J~~	U	P	BL
7439-95-4	Magnesium	32200			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~1100~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	131000			P	
57-12-5	Cyanide	10.0	U		AS	

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Comments:

USEPA REGION II WORKSHEETS

Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 (SOP Revision 13)

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Robert Runyon, Chief
Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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I.0 Scope

I.I 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	----

Total Metals
+ Cyanid

Site: Vieques Island, PR

Case #: N/A

SDG #: 15832

Samples: **Soil** 19- **Water**

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report			
Present?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.2 Record of Communication (from RSCC)			
Present?	[✓]	___	___
ACTION: If no, request from the RSCC.			
A.1.3 Sampling Trip Report			
Present and complete?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.4 Chain of Custody/Sample Traffic Report			
Present?	[✓]	___	___
Legible?	[✓]	___	___
Signature of sample custodian present?	[✓]	___	___
ACTION: If no, contact RSCC/WAM/PO.			
A.1.5 Cover Page			
Present?	[✓]	___	___
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	[✓]	___	___
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[✓]	___	___

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[✓]	___	___
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[✓]	___	___

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

Laboratory Name?	[✓]	___	___
Laboratory Code?	[✓]	___	___
RAS/Non-RAS Case No.?	[✓]	___	___
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[✓]	___	___

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

(a) all analytes analyzed by ICP-AES?	___	[✓]	___
(b) all analytes analyzed by ICP-MS?	___	[✓]	___
(c) Mercury?	___	[✓]	___
(d) Cyanide?	___	[✓]	___

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

Digestion Log for ICP-AES (Form XII)present?	[✓]	___	___
Digestion Log for ICP-MS (Form XII) present?	[✓]	___	___
Digestion Log for mercury (Form XII) present?	[✓]	___	___
Distillation Log for cyanide (Form XII) present?	[✓]	___	___

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	[√]	_	_
Are percent solids calculations present for soils/sediments?	[_]	_	√
Are preparation dates present on the sample preparation logs/bench sheets?	[√]	_	_

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

ICP-AES?	[√]	_	_
ICP-MS?	[√]	_	_
Mercury?	[√]	_	_
Cyanide?	[√]	_	_

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

Legible?	[√]	_	_
Properly labeled?	[√]	_	_

Are all field samples, QC samples and field QC samples present on:

Digestion/Distillation log?	[√]	_	_
Instrument Printouts?	[√]	_	_

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A

A.1.9 **Technical Holding Times**: (Aqueous and soil samples)

(Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)

A.1.9.1 Cyanide distillation(14 days)exceeded?		[✓]	
Mercury analysis(28 days) exceeded?		[✓]	
Other Metals analysis(180 days)exceeded?		[✓]	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

A.1.9.2 Is pH of aqueous samples for:			
Metals Analysis ≤ 2?	[✓]		
Cyanide Analysis ≥ 12?	[✓]		

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

A.1.9.3 Is the cooler temperature ≤ 10 C°?	[✓]		

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[ ]	___	✓
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[✓]	___	___
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]	✓	___

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

		YES	NO	N/A
A.1.11.1	Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]	___	___
	Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]	___	___
	Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[✓]	___	___
	Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[✓]	___	___

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

		YES	NO	N/A
	Is one initial calibration standard at the CRQL level for cyanide and mercury?	[✓]	___	___

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

		YES	NO	N/A
	Mercury Analysis?	[✓]	___	___
	Cyanide Analysis?	[✓]	___	___
	ICP-AES(more than 2 point Calib.)?	[✓]	___	___
	ICP-MS (more than 2 point calib.)?	[✓]	___	___

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[✓]	___	___

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

	YES	NO	N/A
Metals - 90-110%R?	[✓]	___	___
Hg - 80-120%R?	[✓]	___	___
Cyanide - 85-115%R?	[✓]	___	___

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [✓] ___ ___

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? **(Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)**	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[✓]	___	___
For each cyanide run, was a CRQL standard analyzed?	[✓]	___	___

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
*** True value of the CRQL Standard**

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? [✓] ___ ___

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.

A.1.14 Initial and Continuing Calibration Blanks - Form III

	YES	NO	N/A
A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___
Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by			

	YES	NO	N/A
using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[✓]	___	___

ACTION:
If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".

A.1.14.2 Circle with red pencil on each Form III all Calib. Blank values that are:

≥ MDL but ≤ CRQL

> CRQL

A.1.14.2.1 When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	✓	[___]	___

ACTION:
If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.

A.1.14.2.2 When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[✓]	___

ACTION:
If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".

A.1.14.2.3 Is any Calibration Blank value below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run.

2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J), but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL? ✓ [___] ___

ACTION:
If yes, change sample result ≥ MDL

	YES	NO	N/A
but ≤ CRQL to CRQL with a "U".			
..1.15.2.2 When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[√]	___
If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	√
If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	√

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

	YES	NO	N/A
..1.15.2.3 Is the Prep. Blank concentration below the negative CRQL?	___	[√]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

	YES	NO	N/A
..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".			
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.

1.16.3 **ICP-MS Method**

1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
..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
..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.			
..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.			
..1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	___	[✓]	___
	(b) between 30-74%?	___	[✓]	___
	(c) between 126-150%?	___	[✓]	___
	(d) greater than 150%?	___	[✓]	___
	ACTION: If the matrix spike recovery is less than 30%,reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			
(**NOTE**:Replace "N" with "J", "R" as appropriate.)			
..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?	[✓]	___	___

		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.			
..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.			
..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.			
..1.18.4	**Aqueous**			
..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:

> ± 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),

is any RPD ≥ 35% but < 120%?	___	[___]	√
is any RPD ≥ 120%?	___	[___]	√

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R) and red-line the associated sample data ≥ CRQL.			
..1.18.5.2	When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[___]	√
	> ± 4 x CRQL	___	[___]	√

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

..1.19 **Field Duplicates**

Aqueous Field Duplicates

..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			
..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.

..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.			
..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**

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".			
1.1.21	**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.			
1.1.21.1	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.			
1.1.21.2	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			
1.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[___]	✓	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
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.)			
1.22	**Total/Dissolved or Inorganic/Total Analytes**			
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.			
1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	✓	[___]	___

		YES	NO	N/A
1.1.22.3	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.			
1.1.23	**Field Blank - Form I** **NOTE: Designate "Field Blank" as such on Form I**			
1.1.23.1	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.

1.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

1.1.24.1	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.

1.1.24.2 **Method Detection Limits - Form IX**

1.1.24.2.1	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
1.1.24.2.2	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.			
1.1.24.3	**Linear Ranges - Form XI**			
1.1.24.3.1	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.			
1.1.25	**ICP-MS Tune Analysis - Form XIV**			
1.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
1.1.25.2	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
).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".			
).1.26	**ICP-MS Internal Standards - Form XV**			
).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.			
).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			

:han the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

ı.1.27 **Percent Solids of Sediments**

ı.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [___] ___

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative - See EDS data validation report

:ase# _____ **Site:** _____ **Matrix: Soil** ____

:DG# _____ **Lab:** _____ **Water** ____

:ampling Team: _____ **Reviewer:** _____ **Other** _____

ı.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**.

ı.2.2 **Laboratory Qualifiers:**
The CLP laboratory applies a contractual qualifier on all

'orm I'S and the QC Form when a QC analysis is outside the control limits. These ıualifiers are not applied on the Lotus or XLS spreadsheets. These qualifiers and their ıeanings 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 For 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.

ı.2.3.1 **Data Case Description**:

ı.2.3.2 **CSF Audit**:

A.2.3.3 **Technical Review:**

A.2.3.4 **Contract-Problem/Non-Compliance:**

HWSS Reviewer: _____ Date:_____
Signature

Contractor Reviewer: _____ Date:_____
Signature

Verified by: _____ Date:_____
Signature

CASE #
SDG #

Contract Laboratory Program
REGION II/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

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:

Summary of Resolution:

_____
Signature

Date: _____

FIELD DUPLICATES

Sample No. **Field Duplicate No.** **Sample Matrix:**

Lab 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									
Manganese									

					YES	NO	N/A		
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

Total/Dissolved Concentrations

Lab Code **Case No.** **SDG No.** **Sample Matrix: Water**

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

SECTION A (TO BE COMPLETED BY REGIONAL SENDING OFFICIAL)

Initiated By:

Name, Affiliation, Phone Number

_____

Case Number: _____
- OLM
- OLC
- ILM

Details 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

SECTION B (TO BE COMPLETED BY SMO)

Name of SMO Contact _____ Date: _____

ıate of Laboratory Notification (Verbal): _____

.e-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
inal 9/3/99

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

ype of Review: _____ Date:_____ Case# _____SDG#___

ite: _____ Lab Name: _____

eviewer's Initials:_____ Number of Samples:_____

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														

CHAIN OF CUSTODY

18346

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CHAIN OF CUSTODY

Page 1 of 1

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: CH2M Hill	Project Name: Vieques CTO-10
Address: 5700 Cleveland St, Ste 101	Sampling Location: AOC E&I
City: Virginia Beach State: VA Zip: 23462	Turnaround time: 28-Day
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757.671.6208	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: JA / KL	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC, SIM	Low SVOC, SVOC SIM 2 mL	Total Metals (AES/ms) PL	Cyanide 250 mL	Diss. Metals (AES/ms) PL	TPH-GRO	TPH-DRO/ORO 2 mL	CNNS Alkalinity 250 mL	Sulfide 500 mL	TOC 2-40 mL	MEE 2 (D)	Ferrous Fe 125 mL	pH / Sample Info (Lab Use): Metal	Diss. Metal	Cyanide	Sulfide	TOC	Ferrous Fe
~~0807092-01~~ 1583201	VWAI-MW05P-08C	7/21/08	0915	(GW)			DISS MTL = 1583301							X	X	X	X		X	X	X	X		X	<2	<2	>12	>9	<2	<2
1583202	VWAI-MW05-08C	↓	↓	(GW)			DISS MTL = 1583302								X	X	X			X	X	X		X	<2	<2	>12	>9	<2	<2

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: L. Lambert	Date/Time: 7/21/08 1400	Received by: Jennifer Doer	Date/Time: 7/22/08 9:00
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?		Custody Seal(s) intact? Y or N	On Ice? Y or N

Cooler Temp: 2.3 °C

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

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Page 1 of 1

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

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St., Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Kenji Butler / Juan Accaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N
Are high concentrations expected? (Y) or N? If yes, which ID(s)?

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

CompuChem No (Lab Use Only)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOCs	VOC SIM	Low SVOC, SVOC SIM (2AL)	Total Metals (AES/MS) (PL)	Cyanide (250mL)	Disc. Metals (AES/MS) (PL)	TPH-GRO	TPH-DRO & ORO (2AL)	CNNS, Alkalinity (250mL)	Sulfide (500mL)	TOC	MEE	Ferrous Fe (125mL)	T. Metals	Cyanide	Diss. Metals	Sulfide	TOC	Ferrous Fe
~~1583203~~ 1583203	VWA1-MW07-08C	7/22/08	0940	GW	12		2	2	2	DI SM TR =		1583203		X	X	X	X		X	X	X	X	X	X	<2	>12	<2	>9	<2	<2

Lab Use Only

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

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

Comments

Mistake

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/22/08 1230	Received by: Jennifer Dover	Date/Time: 7/23/08 9:10
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? (Y) or N
On Ice? (Y) or N
Cooler Temp: 0.1 °C

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

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Page 1 of 1

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland Street, Ste 101
City / State / Zip: Virginia Beach, VA 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: JA/KL

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM 2AL	Total Metals (AES/ms) PL	Cyanide 250 mL	Diss. Metals (AES/ms) PL	TPH-GRO	TPH-DRO & ORO 2AL	CNMS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab use) Total Metals	Cyanide	Diss Metals	DISS MR
1583205	VWAI-EB01-072108	7/21/08	1650	QC	8		1	2			DISS MTL = 1583204			X	X	X	X		X						<2	<2	<2	
1583204	VWAI-MW08-08C	7/22/08	1430	GW	2		1	1							X	X									<2	>12		
—	VWAI-MW07-08C	7/22/08	0940	GW	2									X														

did not receive in cooler JO 7/23/08

rec'd on COC 18339

Lab Use Only

Sample Unpacked By: Jennifer Dove
Sample Order Entry By: [illegible]
Samples Received in Good Condition? Y or N
If no, explain:
Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/22/08 1230	Received by: Jennifer Dove	Date/Time: 7/23/08 9:10
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 1.8 °C

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

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron/K. Lambert

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM 2AL	Total Metals (AES/MS) PL	Cyanide 250mL	Diss. Metals (AES/MS) PL	TPH-GRO	TPH-DRO & ORO 2AL	CNNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Total Metals	Cyanide	Diss. Metals
0807072-04 1583206	VWA1-EB01-072008	7/24/08	1830	QC	7	X	1	2		DISS MTL	= 1583305			X	X	X	X		X						<2	>12	<2
0807072-05	VWA1-MW05-08C		0915	GW										X					X								

7/21/08 on containers

7/23/08

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: K. Lambert	Date/Time: 7/23/08 1200	Received by: Jennifer Doe	Date/Time: 7/23/08 9:10
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 2.6 °C

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

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CHAIN OF CUSTODY

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Courier:
Airbill No.:
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: JA / KL

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOCs, SVOC SIM	Total Metals (AES/ms)	Cyanide	Diss. Metals (AES/ms)	TPH-GRO	TPH-DRO, GRO	CNMS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use)				
0807072-08	VWAI-TB01-072108	7/21/08	—	QC	10	10						X	X					X					X						
0807072-04	VWAI-EB01-072008	7/20/08	1836	QC	10	10						X	X					X									DISS. MTL		
0807072-06	VWAI-PB MW08-08C	7/20/08	1430	GW	13	8		1				X	X	X			X	X	X						L2		1583306		
0807072-05	VWAI-MW05-08C	7/21/08	0915	GW	10	10						X	X					X					X						
0807072-01	VWAI-MW05P-08C	7/21/08	0915	GW	10	10						X	X					X					X						
0807072-03	VWAI-EB01-072108	7/21/08	1650	QC	8	8						X	X					X											
0807072-02	VWAI-MW07-08C	7/20/08	0940	GW	10	10						X	X					X					X						

Lab Use Only

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

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

Comments

Mistake - placed in another cooler

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/22/08 1230	Received by: Jennifer Dore	Date/Time: 7/23/08 9:10
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 2.1 °C

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

White & Yellow copy to lab • Pink copy for customer

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CHAIN OF CUSTODY

Page ____ of ____

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Phone: 919-379-4100 Fax 919-379-4040

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

Client/Reporting Information

Company Name: Chelsea Bennet/CH2MHILL
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Stephen Brand
Phone #: 757.671.6211
Sampler's Name: K. Butler / J Acaron

Project Information

Project Name: Vieques CTO ~~[illegible]~~-10
Sampling Location: W-AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N
Are high concentrations expected? (Y) or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC, SIM	Low SVOC, SVOC SIM	Total Metals (AES/ms)	Cyanide	Diss. Metals (AES/ms)	TPH-GRO	TPH-DRO & ORO	CMMS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use): T. Metals	Cyanide	Diss. Metals	Sulfide	TOC	Ferrous Fe
1583207	VIWAI-MW04-08C	7/23/08	1045	GW			DISS=	1583307							X(2)	X(3)	X(2)			X	X	X		X	<2	>12	<2	>9	<2	<2
															(2)		(3)													

Lab Use Only

Sample Unpacked By: Jennifer Dorn
Sample Order Entry By: [illegible]
Samples Received in Good Condition? (Y) or (N)
If no, explain: JD see comments →

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

Comments

MS/MSD on VIWAI-MW04-08C
*rec'd VIWAI-MW01-08C dissolved metal in cooler with VIWAI-MW04-08C
JD 7/24/08

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/23/08 13:30	Received by: Jennifer Dorn	Date/Time: 7/24/08 9:00
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?		Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N — Cooler Temp: 1.7 °C

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

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CHAIN OF CUSTODY

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Phone: 919-379-4100 Fax 919-379-4040

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Renji Butler, Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss. Metals (AES/MS)	TPH-GRO	TPH-DRO SORO	CNNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	T. Metals	Cyanide	Diss. Metals		
0807072-01 1583208	VWAI-EB01-072208	7/22/08	1800	QC	7		1	2		DISS	F 1583308			X	X	X	X		X						<2	>12	<2		

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/23/08 13:30	Received by: Jennifer Dover	Date/Time: 7/24/08 900
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 2.0 °C

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

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CHAIN OF CUSTODY

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

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N
Are high concentrations expected? (Y) or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOCs	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/ms)	Cyanide	Diss. Metals (AES/ms)	TPH-GRO	TPH-DRO & ORO	CNKS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) T. Metals	Cyanide	Diss. Metals
0807012-10 1583309	VWAI-MW09-080C	7/22/08	1630	GW	7		1	2		DISS = 1583309				X	X	X	X		X						<2	>12	<2

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/23/08 1330	Received by: Jennifer Dore	Date/Time: 7/24/08 900
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?		Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N — Cooler Temp: 0.2 °C

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

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CHAIN OF CUSTODY

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Cham Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Viegius SCTO-10
Sampling Location: AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss. Metals (AES/MS)	TPH-GRO	TPH-DRO & ORO	CNNS, Alkalinity	Sulfate	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Cyanide	Diss Metals
0807072-11 1583210	VWA1-MW01-08C	7/23/08	1035	GW		DISS=		~~X~~	15833	10				X	X*	X	X		X						>12	<2

*did not receive metals for VWA1-MW01-08C 7/24/08

Lab Use Only

Sample Unpacked By: Jennifer Dore
Sample Order Entry By: [illegible]
Samples Received in Good Condition? Y or N
If no, explain: see comments →

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

Comments

*rec'd VWA1-MW04-08C (1) Dissolved Metal & (1) Total Metal ~~in cooler~~ (2) ~~bottles~~ VWA1-MW01-08C. Cooler.

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/23/08 1330	Received by: Jennifer Dore	Date/Time: 7/24/08 900
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 1.6 °C

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

White & Yellow copy to lab • Pink copy for customer

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CHAIN OF CUSTODY

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Cary, NC 27513
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Page 1 of 1

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LC SVOC, SVOC SIM	Total Metals, TI (AES/MS)	Cyanide	Diss. Metals, TI (AES/MS)	TPH-GRO	TPH-DRO & ORO	CNMS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	Total Metals	DISS Metals	Cyanide	pH / Sample Info (Lab Use)
0807072-13 1583211	VWAI-EB01-072304	7/23/04	1800	QC	7		1	2	DISS = 1583			31		X	X	X	X		X						<2	<2	>12	
0807072-14	VWAI-MW04-08C	↓	1045	GW	2									X														

Lab Use Only

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

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

Comments

MS/MSD on VWAI-MW04-08C

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/24/08 13:30	Received by: Jennifer Doren	Date/Time: 7/25/08 9:15
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 0.8 °C

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

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18397

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CHAIN OF CUSTODY

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Page 1 of 1

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Cham Hill
Address: 5700 Cleveland St, Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOCE #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	SVOC SIM	LowSVOC, SVOC SIM	Total Metals, Tl (AES,MS)	Cyanide	Diss. Metals, Tl (AES,MS)	TPH-GRO	TPH-DRO/ORO	CNMS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	Total Metals	Diss. Metals	Cyanide	Sample Info (Lab Use)
~~0807072-18~~ 1583212	VIWA1-EB01-072408	7/24/08	07:40	QC	7		1	2		DISS = 1583312				X	X	X	X		X						<2	<2	<12	
0807072-14	VIWA1-MW04-08C	7/23/08	10:45	GW	2														X									

Lab Use Only

Sample Unpacked By: Jennifer Dore
Sample Order Entry By: JY Dore
Samples Received in Good Condition? Y or N
If no, explain:

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

Comments

MS/MSD on VIWA1-MW04-08C

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/24/08 13:30	Received by: Jennifer Dore	Date/Time: 7/25/08 9:15
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where? Custody Seal(s) intact? Y or N On Ice? Y or N Cooler Temp: 2.1 °C

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Page 1 of 1

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: W-AOC-E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N: Where indicated
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM	Total Metals, TI (AES&MS)	Cyanide	Diss. Metals, TI (AES/MS)	TPH-GRO	TPH-DRO&ORO	TANS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use)
0807072-13 583213	VWAI-MW02-08C	7/24/08	1200	GW	7		1	2		DISS	-1583313			X	X	X	X		X						
0807072-14	VWAI-MW04-08C	7/23/08	1045	GW	2									X											

Lab Use Only

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

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

Comments

MS/MSD on VWAI-MW04-08C

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/24/08 13:30	Received by: Jennifer Dore	Date/Time: 7/25/08 9:15
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 2.4 °C

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

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CHAIN OF CUSTODY

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Courier:
Airbill No.:
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: JA/RL

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss. Metals (AES/MS)	TPH-GRO	TPH-DRO & ORO	CANS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH/Sample Info (Lab Use) Diss. Metals	Cyanide
680/072-14 583214	VIWAI-MW03-08C	7/24/08	1340	GW	7		1	2	DISS =		1583314			X	X	X	X		X						<2	<2 >12
680/072-14	VIWAI-MW04-08C	7/23/08	1045	GW	2														X							

Lab Use Only

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

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

Comments

MS/MSD on VIWAI-MW04-08C

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/24/08 13:30	Received by: Jennifer Dove	Date/Time: 7/25/08 8:15
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?		Custody Seal(s) intact? Y or N	On Ice? Y or N

Cooler Temp: 2.6 °C

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

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Page 1 of ____

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: CH2M Hill	Project Name: Vieques CTO-10
Address: 5700 Cleveland St, Ste 101	Sampling Location: AOC E #1
City: Virginia Beach, State: VA, Zip: 23462	Turnaround time: 28-Day
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757.671.6208	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: JA/KL	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss. Metals (AES/MS)	TPH-GRO	TPH-DRO+ORO	CMMS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Total Metals	Cyanide	Diss. Metals
~~080701221~~ 1583219	VWAE-MW02-08C	7/27/08	1435		7		1	2	DISS=		1583319			X	X	X	X		X						<2	<2	<2
C80707221	VWAE-MW08-08C	7/27/08	1735		2														X								

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: [signature]	Date/Time: 7/28/08 1135	Received by: [signature]	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where? | Custody Seal(s) intact? Y or N | On Ice? Y or N | Cooler Temp: 1.8 °C

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

White & Yellow copy to lab • Pink copy for customer

18395

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CHAIN OF CUSTODY

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Courier:
Airbill No.:
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.2708
Sampler's Name: JA

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LC,SVOC,SVOC SIM	Total Metals, Tl (AES/ms)	Cyanide	Diss. Metals, Tl (AES/ms)	TPH-GRO	TPH-DRO & ORO	CNNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Total Metals	Cyanide	Diss. Metals
0801012-08 1583215	VWAE-MW03-08C	7/27/08	1740		7		1	2		DISS=	1583215			X	X	X	X		X						<2	>12	<2
1583217	VWAE-MW07-08C	7/27/08	1250		3		1	2		DISS=	1583217				X	X	X								<2	>12	<2

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: [signature]	Date/Time: 7/28/08 1140	Received by: Diane Bal	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 3.7°C

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

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CHAIN OF CUSTODY

Page 1 of 1

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: JA / KL

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC-E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LowSVOC, SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss. Metals (AES/MS)	TPH-GRO	TPH-DRO & ORO	CNAS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use)
0807089-01 1583216	VWAE-MW08-08C	7/27/08	1745	5			1	2		DISS=	1583316			X	X	X	X								
0807089-02	VWAI-MW06-08C	7/27/08	0940	4										X					X						

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: [signature]	Date/Time: 7/28/08 1135	Received by: Diane Byrd	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 1.2 °C

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

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CHAIN OF CUSTODY

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Page 1 of 1

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St., Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC-E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LC SVOC, SVOC SIM & L	Total Metals, TI (AES, MS)	Cyanide	Diss. Metals, TI (AES, MS)	TPH-GRO	TPH-DRO & ORO	CNNS Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use): Cyanide	Sulfide
0807072-22	VWAE-MW07-02C	7/27/08	1250		4									X					X							
1586901	VWAE-MW04-08C	7/28/08	0810		4	1	1				1					X				X	X			X	X	
	VWAE-MW04-08C MS	7/28/08	0810		4	1	1				1					X				X	X			X	X	
	VWAE-MW04-08C MSD	7/28/08	0810		4	1	1				1					X				X	X			X	X	
																X										

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: [signature]	Date/Time: 7/28/08 1156	Received by: [signature]	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?		Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 0.4 °C

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

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CHAIN OF CUSTODY

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Page 1 of 1

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Cham Hill
Address: 5700 Cleveland St, Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CID-10
Sampling Location: AOC E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LC SVOC, SVOC SIM	Total Metals, Tl (AES/MS)	Cyanide	Diss. Metals, Tl (AES/MS)	TPH-GRO	TPH-DRO & ORO	CANS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Total Metals	Cyanide	Diss. Metals
0807072-03 1583218	VWAE-EB01-072708	7/27/08	1400		7		1	2	DISS=		1583218			X	X	X	X		X						<2	>12	<2
1586902	VWAE-MW06-08C	7/27/08	0940		3		1	2	DISS=		1583320				X	X	X								<2	>12	<2

bottle has VWAE-MW06-08C and COC for organic portion. VWAE also has
7/28/08

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/28/08 1135	Received by:	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where? Custody Seal(s) intact? Y or N On Ice? Y or N Cooler Temp: 1.4 °C

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

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SUPPORT DOCUMENTATION

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract: _____

Lab Code: LIBRTY Case No.: _____ NRAS No.: _____ SDG NO.: 15832

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	200.000	U	200.000	U	200.000	U	46.945	J	21.677	J	P
Calcium	5000.000	U	5000.000	U	5000.000	U	33.365	J	19.377	J	P
Iron	100.000	U	100.000	U	100.000	U	100.000	U	100.000	U	P
Magnesium	5000.000	U	20.876	J	16.432	J	50.338	J	28.879	J	P
Mercury	-0.076	J	0.200	U	0.200	U	0.200	U	0.200	U	CV
Potassium	5000.000	U	5000.000	U	5000.000	U	5000.000	U	5000.000	U	P
Sodium	258.584	J	438.484	J	427.596	J	532.659	J	307.031	J	P
Cyanide	10.000	U	10.000	U	10.000	U	10.000	U	10.000	U	AS

(u)

AL = 46.945 ug/L (3, 4, 7, 11, 12, 13, 15, 16, 19)

Ca = 33.365 ug/L (5, 6, 7, 8, 11, 12, 18

Mg = 50.338 ug/L (5, 6, 8, 11, 12, 18)

K = 18.814 ug/L (1-4, 6-9, 13-17, 19)

Na = 532.659 ug/L (5, 6, 8, 11, 12, 18)

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract: _____

Lab Code: LIBRTY Case No.: _____ NRAS No.: _____ SDG NO.: 15832

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		
Analyte		C	1	C	2	C	3	C		C	M
Aluminum			30.974	J	35.099	J	200.000	U			P
Calcium			5000.000	U	5000.000	U	5000.000	U			P
Iron			100.000	U	100.000	U	100.000	U			P
Magnesium			31.947	J	37.964	J	5000.000	U			P
Mercury			0.200	U	0.200	U	0.200	U			CV
Potassium			5000.000	U	5000.000	U	18.814	J			P
Sodium			524.517	J	234.506	J	438.569	J			P
Cyanide			10.000	U	10.000	U					AS

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract: _____

Lab Code: LIBRTY Case No.: _____ NRAS No.: _____ SDG NO.: 15832

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		
Analyte		C	1	C	2	C	3	C		C	M
Aluminum			200.000	U	200.000	U	21.528	J			P
Calcium			5000.000	U	5000.000	U	5000.000	U			P
Iron			100.000	U	100.000	U	100.000	U			P
Magnesium			5000.000	U	15.419	J	20.119	J			P
Mercury			0.200	U	0.200	U					CV
Potassium			19.290	J	5000.000	U	5000.000	U			P
Sodium			493.015	J	237.222	J	237.176	J			P

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		
		C	1	C	2	C	3	C		C	M
Antimony	~~0.039~~	~~J~~	2.000	U	2.000	U	2.000	U	2.000	U	MS
Arsenic	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Barium	10.000	U	10.000	U	10.000	U	10.000	U	10.000	U	MS
Beryllium	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Cadmium	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Chromium	2.000	U	2.000	U	2.000	U	2.000	U	2.000	U	MS
Cobalt	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Copper	2.000	U	2.000	U	2.000	U	2.000	U	2.000	U	MS
Lead	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Manganese	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Nickel	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Selenium	5.000	U	5.000	U	5.000	U	5.000	U	5.000	U	MS
Silver	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Thallium	~~0.006~~	~~J~~	1.000	U	1.000	U	1.000	U	1.000	U	MS
Vanadium	5.000	U	~~0.017~~	~~J~~	5.000	U	5.000	U	5.000	U	MS
Zinc	2.000	U	2.000	U	2.000	U	2.000	U	2.000	U	MS

NA

None

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Antimony			2.000	U	2.000	U					MS
Arsenic			1.000	U	1.000	U					MS
Barium			10.000	U	10.000	U					MS
Beryllium			1.000	U	1.000	U					MS
Cadmium			1.000	U	1.000	U					MS
Chromium			2.000	U	2.000	U					MS
Cobalt			1.000	U	1.000	U					MS
Copper			2.000	U	2.000	U					MS
Lead			1.000	U	1.000	U					MS
Manganese			1.000	U	1.000	U					MS
Nickel			1.000	U	1.000	U					MS
Selenium			5.000	U	5.000	U					MS
Silver			1.000	U	1.000	U					MS
Thallium			1.000	U	0.008	J					MS
Vanadium			5.000	U	5.000	U					MS
Zinc			2.000	U	2.000	U					MS

None all ND

US EPA - CLP

5A-IN

MATRIX SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

VWAI-MW04S

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Antimony	75 - 125	102.5570		0.2608	J	100.00	102		MS
Arsenic	75 - 125	36.8583		5.0873		40.00	79		MS
Barium	75 - 125	2043.9910		86.2944		2000.00	98		MS
Beryllium	75 - 125	51.9090		1.0000	U	50.00	104		MS
Cadmium	75 - 125	48.8770		1.0000	U	50.00	98		MS
Chromium	75 - 125	179.2559		0.2977	J	200.00	89		MS
Cobalt	75 - 125	447.7970		0.6505	J	500.00	89		MS
Copper	75 - 125	211.0618		2.5913		250.00	83		MS
Lead	75 - 125	22.0250		0.0764	J	20.00	110		MS
Manganese	75 - 125	2206.7590		1833.2842		500.00	75		MS
Nickel	75 - 125	426.1388		2.0361		500.00	85		MS
Selenium	75 - 125	11.4132		1.1528	J	10.00	~~103~~		MS
Silver	75 - 125	22.6221		1.0000	U	50.00	45	N	MS
Thallium	75 - 125	54.0283		1.0000	U	50.00	~~108~~		MS
Vanadium	75 - 125	478.4344		1.6348	J	500.00	95		MS
Zinc	75 - 125	392.9962		3.6662		500.00	78		MS

(J/UJ)

Comments:

US EPA - CLP

8-IN

ICP-AES and ICP-MS SERIAL DILUTIONS

EPA SAMPLE NO.

VWAI-MW04L

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15832

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	62.74	J	1000.00	U	100		P
Calcium	57651.75		58002.10		1		P
Iron	139.14		500.00	U	100		P
Magnesium	48381.95		48077.26		1		P
Potassium	250.82	J	328.78	J	31	E	P
Sodium	150232.60		150087.90		0		P

→ None can ND!

ENVIRONMENTAL
Data Services, Inc.

DISSOLVED METALS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 15833

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 29, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAI-MW05P	1583301	Water
2	VWAI-MW05	1583302	Water
3	VWAI-MW07	1583303	Water
4	VWAI-EB01-072108	1583304	Water
5	VWAI-EB01-072008	1583305	Water
6	VWAI-MW08	1583306	Water
7	VWAI-MW04	1583307	Water
7MS	VWAI-MW04MS	1583307MS	Water
7MSD	VWAI-MW04MSD	1583307MSD	Water
8	VWAI-EB01-072208	1583308	Water
9	VWAI-MW09	1583309	Water
10	VWAI-MW01	1583310	Water
11	VWAI-EB01-072308	1583311	Water
12	VWAI-EB01-072408	1583312	Water
13	VWAI-MW02	1583313	Water
14	VWAI-MW03	1583314	Water
15	VWAE-MW03	1583315	Water
16	VWAI-MW08	1583316	Water
17	VWAI-MW07	1583317	Water
18	VWAE-EB01-072708	1583318	Water
19	VWAE-MW02	1583319	Water
20	VWAI-MW06	1583320	Water

The USEPA Region II SOP No. HW-2, Revision 13, September 2006: Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were prepared and analyzed within 28 days for mercury and 180 days for all other metals.

Calibration - The ICV and CCV %R values were acceptable.

CRDL Standard - The CRDL standards exhibited acceptable %R values.

Method and Calibration Blanks - The following table summarizes method blank and continuing calibration blank contamination.

Compound	Conc. ug/L	Qualifier	Affected Samples
Aluminum	47.794	U	3, 8, 11, 15
Calcium	33.365	U	4, 5, 8, 11, 12, 18
Chromium	0.063	U	1-3, 6, 9, 10, 13-15, 17-20
Iron	17.451	U	1, 2, 4, 5, 7, 8, 11, 12, 15
Magnesium	50.338	U	4, 5, 8, 11, 12
Potassium	20.386	U	1-3, 5-11, 13-17, 19, 20
Sodium	560.720	U	4, 5, 8, 11, 12, 18
Thallium	0.042	U	4, 5, 8, 11, 12, 16
Vanadium	0.048	U	1-5, 7, 8, 11, 12, 14, 16

ICP Interference Check Sample - All %R values were acceptable.

Matrix Spike/Matrix Spike Duplicate - The matrix spike/matrix spike duplicate sample exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	%R/RPD	Qualifier	Affected Samples
7	Antimony	126%	J	Positive results in all samples
	Lead	132%	J	
	Manganese	168%	R	All Samples
	Silver	52%	J/UJ	All Samples
	Thallium	131%	J	Positive results in all samples

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAI-MW05 ug/L	VWAI-MW05P ug/L	RPD	Qualifier
Arsenic	10.3	11.6	12%	None
Barium	85.8	92.3	7%	None
Calcium	55500	55800	1%	None
Cobalt	0.75	0.91	19%	None

Compound	VWAI-MW05 ug/L	VWAI-MW05P ug/L	RPD	Qualifier
Copper	2.1	3.0	35%	None
Lead	0.088	0.10	13%	None
Magnesium	42400	42500	0%	None
Manganese	1050	1310	22%	None
Nickel	2.6	3.1	18%	None
Selenium	0.80	0.91	13%	None
Sodium	231000	232000	0%	None
Zinc	5.5	5.4	2%	None

LCS - The LCS samples exhibited acceptable %R values.

ICP Serial Dilution - The ICP serial dilution sample exhibited acceptable %D values except the following.

ICP Sample ID	Compound	%D	Qualifier	Affected Samples
7	Potassium	22	J	Positive results in all samples

Field and Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAI-EB01-072108	None - ND	-	-	-
VWAI-EB01-072008	None - ND	-	-	-
VWAI-EB01-072208	None - ND	-	-	-
VWAI-EB01-072308	None - ND	-	-	-
VWAI-EB01-072408	None - ND	-	-	-
VWAE-EB01-072708	Antimony	0.019	U	15, 17, 19
	Arsenic	0.65	U	15, 17, 19
	Barium	104	R	17
	Cobalt	0.69	U	15, 17, 19
	Copper	2.0	R	17, 19
	Lead	0.18	U	15, 19
	Manganese	21.5	U	17
	Nickel	2.5	R	17
	Selenium	2.0	U	15, 17, 19
	Vanadium	21.6	R	15, 17, 19
	Zinc	3.2	R	17, 19

Compound Quantitation - No discrepancies were identified.

Total vs. Dissolved Comparison - The total vs. dissolved comparison sample results are summarized in the tables below.

Compound	VWAI-MW05P (T) ug/L	VWAI-MW05P (D) ug/L	%D	Qualifier
Antimony	0.25	0.41	64%	R
Zinc	3.2	5.4	69%	R

Compound	VWAI-MW05 (T) ug/L	VWAI-MW05 (D) ug/L	%D	Qualifier
Antimony	0.28	0.38	36%	J
Zinc	4.1	5.5	34%	J

Compound	VWAI-MW08 (T) ug/L	VWAI-MW08 (D) ug/L	%D	Qualifier
Zinc	2.7	5.0	25%	J

Compound	VWAI-MW09 (T) ug/L	VWAI-MW09 (D) ug/L	%D	Qualifier
Zinc	1.8	3.2	78%	R

Compound	VWAE-MW03 (T) ug/L	VWAE-MW03 (D) ug/L	%D	Qualifier
Manganese	39.9	54.8	37%	J
Zinc	2.4	3.5	46%	J

ANNOTATED FORM Is

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW05P

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583301

Level (low/med): LOW Date Received: 07/22/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.41	~~J~~	~~J~~ ~~N~~ R	MS	MSH, OT
7440-38-2	Arsenic	11.6			MS	
7440-39-3	Barium	92.3			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0 ~~1.0~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	0.91	J		MS	
7440-50-8	Copper	3.0			MS	
7439-92-1	Lead	0.10	~~J~~	~~J~~ ~~N~~	MS	~~MSH~~
7439-96-5	Manganese	1310		R ~~N~~	MS	MSH
7440-02-0	Nickel	3.1			MS	
7782-49-2	Selenium	0.91	J		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U	~~N~~	MS	
7440-62-2	Vanadium	5.0 ~~1.1~~	~~J~~	U	MS	BL
7440-66-6	Zinc	~~5.4~~		R	MS	OT

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW05P

b Name: COMPUCHEM Contract:

b Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

trix (soil/water): WATER Lab Sample ID: 1583301

vel (low/med): LOW Date Received: 07/22/2008

Solids: 0.0

ncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200	U		P	
7440-70-2	Calcium	55800			P	
7439-89-6	Iron	100 ~~90.1~~	~~J~~	U	P	BU
7439-95-4	Magnesium	42500			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~164~~	~~J~~	U ~~E~~	P	BU
7440-23-5	Sodium	232000			P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

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2

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW05

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583302

Level (low/med): LOW Date Received: 07/22/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.38	~~J~~	J ~~N~~	MS	MSH, ~~OT~~
7440-38-2	Arsenic	10.3			MS	
7440-39-3	Barium	85.8			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	7.0 ~~0.87~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	0.75	J		MS	
7440-50-8	Copper	2.1			MS	
7439-92-1	Lead	0.088	~~J~~	~~J~~ ~~N~~	MS	MSH
7439-96-5	Manganese	1050		~~R~~ ~~N~~	MS	MSH
7440-02-0	Nickel	2.6			MS	
7782-49-2	Selenium	0.80	J		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U	~~N~~	MS	
7440-62-2	Vanadium	5.0 ~~0.91~~	~~J~~	U	MS	BL
7440-66-6	Zinc	5.5		J	MS	OT

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW05

ıb Name: COMPUCHEM Contract:

ıb Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

ıtrix (soil/water): WATER Lab Sample ID: 1583302

ıvel (low/med): LOW Date Received: 07/22/2008

Solids: 0.0

ıncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200	U		P	
7440-70-2	Calcium	55500			P	
7439-89-6	Iron	100 ~~93.1~~	~~J~~	U	P	BL
7439-95-4	Magnesium	42400			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~151~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	231000			P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

3

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW07

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583303

Level (low/med): LOW Date Received: 07/23/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.19	~~J~~	J ~~N~~	MS	MSH
7440-38-2	Arsenic	5.3			MS	
7440-39-3	Barium	64.2			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0 ~~0.42~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	0.99	J		MS	
7440-50-8	Copper	2.1			MS	
7439-92-1	Lead	0.16	~~J~~	J ~~N~~	MS	MSH
7439-96-5	Manganese	1680		R ~~N~~	MS	MSH
7440-02-0	Nickel	3.7			MS	
7782-49-2	Selenium	0.95	J		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U	~~N~~	MS	
7440-62-2	Vanadium	5.0 ~~1.2~~	~~J~~	U	MS	BL
7440-66-6	Zinc	5.3			MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

3

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW07

ab Name: COMPUCHEM Contract:

ab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

atrix (soil/water): WATER Lab Sample ID: 1583303

evel (low/med): LOW Date Received: 07/23/2008

Solids: 0.0

oncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~89.0~~	~~J~~	U	P	BL
7440-70-2	Calcium	67200			P	
7439-89-6	Iron	1030			P	
7439-95-4	Magnesium	56300			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~294~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	172000			P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

Form IA-IN LW 10/29/08

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072108

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583304

Level (low/med): LOW Date Received: 07/23/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0	U	~~N~~	MS	
7440-38-2	Arsenic	1.0	U		MS	
7440-39-3	Barium	10.0	U		MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0	U		MS	
7440-50-8	Copper	2.0	U		MS	
7439-92-1	Lead	1.0	U	~~N~~	MS	
7439-96-5	Manganese	1.0	~~U~~	R ~~N~~	MS	MSH
7440-02-0	Nickel	1.0	U		MS	
7782-49-2	Selenium	5.0	U		MS	
7440-22-4	Silver	1.0	U	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0 ~~0.013~~	~~J~~	U ~~N~~	MS	BL
7440-62-2	Vanadium	5.0 ~~0.034~~	~~J~~	U	MS	BL
7440-66-6	Zinc	2.0	U		MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

Form IA-IN LW 12/12/08 ILM05.4

4

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072108

ıb Name: COMPUCHEM Contract:

ıb Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

ıtrix (soil/water): WATER Lab Sample ID: 1583304

ıvel (low/med): LOW Date Received: 07/23/2008

Solids: 0.0

ncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200	U		P	
7440-70-2	Calcium	5000 ~~107~~	~~J~~	U	P	BL
7439-89-6	Iron	100 ~~35.3~~	~~J~~	U	P	BL
7439-95-4	Magnesium	5000 ~~21.7~~	~~J~~	U	P	BL
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000	U	~~E~~	P	
7440-23-5	Sodium	5000 ~~492~~	~~J~~	U	P	BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072008

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583305

Level (low/med): LOW Date Received: 07/23/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0	U	~~N~~	MS	
7440-38-2	Arsenic	1.0	U		MS	
7440-39-3	Barium	10.0	U		MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0	U		MS	
7440-50-8	Copper	2.0	U		MS	
7439-92-1	Lead	1.0	U	~~N~~	MS	
7439-96-5	Manganese	1.0	~~U~~	R ~~N~~	MS	MSH
7440-02-0	Nickel	1.0	U		MS	
7782-49-2	Selenium	5.0	U		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0 ~~0.018~~	~~J~~	U ~~N~~	MS	BL
7440-62-2	Vanadium	5.0 ~~0.057~~	~~J~~	U	MS	BL
7440-66-6	Zinc	2.0	U		MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072008

ıb Name: COMPUCHEM Contract:

ıb Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

ıtrix (soil/water): WATER Lab Sample ID: 1583305

ɜvel (low/med): LOW Date Received: 07/23/2008

Solids: 0.0

ɔncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200	U		P	
7440-70-2	Calcium	5000 ~~152~~	~~J~~	U	P	BL
7439-89-6	Iron	100 ~~33.8~~	~~J~~	U	P	BL
7439-95-4	Magnesium	5000 ~~39.0~~	~~J~~	U	P	BL
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~12.2~~	~~J~~	U ~~B~~	P	BL
7440-23-5	Sodium	5000 ~~581~~	~~J~~	U	P	BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW08

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583306

Level (low/med): LOW Date Received: 07/23/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.37	~~J~~	J ~~N~~	MS	MSH
7440-38-2	Arsenic	1.5			MS	
7440-39-3	Barium	87.8			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	20 ~~0.21~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	0.44	J		MS	
7440-50-8	Copper	3.3			MS	
7439-92-1	Lead	0.11	~~J~~	J ~~N~~	MS	MSH
7439-96-5	Manganese	148		~~R~~ ~~N~~	MS	MSH
7440-02-0	Nickel	2.7			MS	
7782-49-2	Selenium	2.7	J		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U	~~N~~	MS	
7440-62-2	Vanadium	32.8			MS	
7440-66-6	Zinc	5.0		J	MS	OT

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

6

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW08

ıb Name: COMPUCHEM Contract:

ıb Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

ıtrix (soil/water): WATER Lab Sample ID: 1583306

ıvel (low/med): LOW Date Received: 07/23/2008

Solids: 0.0

ɔncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	200	U		P
7440-70-2	Calcium	65600			P
7439-89-6	Iron	100	U		P
7439-95-4	Magnesium	36400			P
7439-97-6	Mercury	0.20	U		CV
7440-09-7	Potassium	5000 ~~440~~	~~J~~	U E	P
7440-23-5	Sodium	211000			P

BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW04

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583307

Level (low/med): LOW Date Received: 07/24/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.29	~~J~~	J ~~N~~	MS	MSH
7440-38-2	Arsenic	5.5			MS	
7440-39-3	Barium	79.5			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	0.59	J		MS	
7440-50-8	Copper	1.8	J		MS	
7439-92-1	Lead	1.0	U	~~N~~	MS	
7439-96-5	Manganese	1670		R ~~N~~	MS	MSH
7440-02-0	Nickel	1.8			MS	
7782-49-2	Selenium	1.1	J		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U	~~N~~	MS	
7440-62-2	Vanadium	5.0 ~~1.5~~	~~J~~	U	MS	BC
7440-66-6	Zinc	2.5			MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW04

b Name: COMPUCHEM Contract:

b Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

ıtrix (soil/water): WATER Lab Sample ID: 1583307

ıvel (low/med): LOW Date Received: 07/24/2008

Solids: 0.0

ɔncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200	U		P	
7440-70-2	Calcium	59200			P	
7439-89-6	Iron	100 ~~53.2~~	~~J~~	U	P	BU
7439-95-4	Magnesium	49800			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~252~~	~~J~~	U ~~E~~	P	BU
7440-23-5	Sodium	154000			P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

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EPA SAMPLE NO.

VWAI-EB01-072208

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583308

Level (low/med): LOW Date Received: 07/24/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0	U	~~N~~	MS	
7440-38-2	Arsenic	1.0	U		MS	
7440-39-3	Barium	10.0	U		MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0	U		MS	
7440-50-8	Copper	2.0	U		MS	
7439-92-1	Lead	1.0	U	~~N~~	MS	
7439-96-5	Manganese	1.0	~~U~~	R ~~N~~	MS	MSH
7440-02-0	Nickel	1.0	U		MS	
7782-49-2	Selenium	5.0	U		MS	
7440-22-4	Silver	1.0	U	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0 ~~0.016~~	~~J~~	U ~~N~~	MS	BL
7440-62-2	Vanadium	5.0 ~~0.041~~	J	U	MS	BL
7440-66-6	Zinc	2.0	U		MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

8

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072208

ıb Name: COMPUCHEM Contract:

ıb Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

ıtrix (soil/water): WATER Lab Sample ID: 1583308

ıvel (low/med): LOW Date Received: 07/24/2008

Solids: 0.0

ɔncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~29.5~~	~~J~~	U	P	BL
7440-70-2	Calcium	5000 ~~159~~	J	U	P	BL
7439-89-6	Iron	100 ~~58.5~~	~~J~~	U	P	BL
7439-95-4	Magnesium	5000 45.9	~~J~~	U	P	BL
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~14.9~~	~~J~~	U ~~B~~	P	BL
7440-23-5	Sodium	5000 ~~550~~	J	U	P	BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW09

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583309

Level (low/med): LOW Date Received: 07/24/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.079	~~J~~	J ~~N~~	MS	MSH
7440-38-2	Arsenic	0.88	J		MS	
7440-39-3	Barium	37.7			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0 ~~0.28~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	0.80	J		MS	
7440-50-8	Copper	3.3			MS	
7439-92-1	Lead	0.18	~~J~~	J ~~N~~	MS	MSH
7439-96-5	Manganese	220		~~R~~ ~~N~~	MS	MSH
7440-02-0	Nickel	5.4			MS	
7782-49-2	Selenium	1.0	J		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U	~~N~~	MS	
7440-62-2	Vanadium	26.5			MS	
7440-66-6	Zinc	3.2		R	MS	OT

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

9

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW09

ıb Name: COMPUCHEM Contract:

ıb Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

ıtrix (soil/water): WATER Lab Sample ID: 1583309

ıvel (low/med): LOW Date Received: 07/24/2008

Solids: 0.0

ɔncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	200	U		P
7440-70-2	Calcium	54600			P
7439-89-6	Iron	100	U		P
7439-95-4	Magnesium	49200			P
7439-97-6	Mercury	0.20	U		CV
7440-09-7	Potassium	5800 ~~301~~	~~J~~	u ~~E~~	P BL
7440-23-5	Sodium	271000			P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

Form IA-IN LW 10/29/08

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW01

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583310

Level (low/med): LOW Date Received: 07/24/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.21	~~J~~	J ~~N~~	MS	MSH
7440-38-2	Arsenic	0.97	J		MS	
7440-39-3	Barium	18.8			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0 ~~0.34~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	0.17	J		MS	
7440-50-8	Copper	2.0			MS	
7439-92-1	Lead	0.12	~~J~~	J ~~N~~	MS	MSH
7439-96-5	Manganese	4.0		R ~~N~~	MS	MSH
7440-02-0	Nickel	3.7			MS	
7782-49-2	Selenium	3.5	J		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U	~~N~~	MS	
7440-62-2	Vanadium	42.2			MS	
7440-66-6	Zinc	3.1			MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

10

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW01

b Name: COMPUCHEM Contract:

b Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

trix (soil/water): WATER Lab Sample ID: 1583310

vel (low/med): LOW Date Received: 07/24/2008

Solids: 0.0

ncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	200	U		P
7440-70-2	Calcium	86200			P
7439-89-6	Iron	100	U		P
7439-95-4	Magnesium	50500			P
7439-97-6	Mercury	0.20	U		CV
7440-09-7	Potassium	5000 ~~742~~	~~J~~	U ~~B~~	P
7440-23-5	Sodium	108000			P

BC

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

Form IA-IN lw 10/29/08

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072308

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583311

Level (low/med): LOW Date Received: 07/25/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0	U	~~N~~	MS	
7440-38-2	Arsenic	1.0	U		MS	
7440-39-3	Barium	10.0	U		MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0	U		MS	
7440-50-8	Copper	2.0	U		MS	
7439-92-1	Lead	1.0	U	~~N~~	MS	
7439-96-5	Manganese	1.0	~~U~~	R ~~N~~	MS	MSH
7440-02-0	Nickel	1.0	U		MS	
7782-49-2	Selenium	5.0	U		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0 ~~0.020~~	~~J~~	U ~~N~~	MS	BL
7440-62-2	Vanadium	5.0 ~~0.044~~	~~J~~	U	MS	BL
7440-66-6	Zinc	2.0	U		MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

11

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072308

ıb Name: COMPUCHEM Contract:

ıb Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

ıtrix (soil/water): WATER Lab Sample ID: 1583311

ɜvel (low/med): LOW Date Received: 07/25/2008

Solids: 0.0

ɔncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	206 ~~34.3~~	~~J~~	U	P	BL
7440-70-2	Calcium	5000 ~~731~~	~~J~~	U	P	BL
7439-89-6	Iron	100 ~~66.0~~	~~J~~	U	P	BL
7439-95-4	Magnesium	5000 ~~123~~	~~J~~	U	P	BL
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~8.7~~	~~J~~	U ~~B~~	P	BL
7440-23-5	Sodium	5000 ~~406~~	~~J~~	U	P	BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072408

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583312

Level (low/med): LOW Date Received: 07/25/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0	U	~~N~~	MS	
7440-38-2	Arsenic	1.0	U		MS	
7440-39-3	Barium	10.0	U		MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0	U		MS	
7440-50-8	Copper	2.0	U		MS	
7439-92-1	Lead	1.0	U	~~N~~	MS	
7439-96-5	Manganese	1.0	~~U~~	R ~~N~~	MS	MSH
7440-02-0	Nickel	1.0	U		MS	
7782-49-2	Selenium	5.0	U		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0 ~~0.028~~	~~J~~	U ~~N~~	MS	BL
7440-62-2	Vanadium	5.0 ~~0.069~~	~~J~~	U	MS	BL
7440-66-6	Zinc	2.0	U		MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-EB01-072408

ıb Name: COMPUCHEM Contract:

ıb Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

ıtrix (soil/water): WATER Lab Sample ID: 1583312

ıvel (low/med): LOW Date Received: 07/25/2008

Solids: 0.0

ɔncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200	U		P	
7440-70-2	Calcium	5000 ~~434~~	~~J~~	U	P	BL
7439-89-6	Iron	100 ~~60.6~~	~~J~~	U	P	BL
7439-95-4	Magnesium	5000 ~~66.0~~	~~J~~	U	P	BL
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000	U	~~E~~	P	
7440-23-5	Sodium	5000 ~~419~~	~~J~~	U	P	BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

 LW 10/29/08

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW02

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583313

Level (low/med): LOW Date Received: 07/25/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.32	~~J~~	J ~~N~~	MS	MSH
7440-38-2	Arsenic	0.63	J		MS	
7440-39-3	Barium	38.3			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0 ~~0.42~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	0.70	J		MS	
7440-50-8	Copper	1.9	J		MS	
7439-92-1	Lead	0.058	~~J~~	J ~~N~~	MS	MSH
7439-96-5	Manganese	1050		R ~~N~~	MS	MSH
7440-02-0	Nickel	5.0			MS	
7782-49-2	Selenium	0.94	J		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U	~~N~~	MS	
7440-62-2	Vanadium	26.9			MS	
7440-66-6	Zinc	1.8	J		MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

13

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW02

ıb Name: COMPUCHEM Contract:

ıb Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

ıtrix (soil/water): WATER Lab Sample ID: 1583313

ıvel (low/med): LOW Date Received: 07/25/2008

Solids: 0.0

ɔncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	200	U		P
7440-70-2	Calcium	91700			P
7439-89-6	Iron	100	U		P
7439-95-4	Magnesium	60700			P
7439-97-6	Mercury	0.20	U		CV
7440-09-7	Potassium	5000 ~~450~~	~~J~~	U ~~E~~	P
7440-23-5	Sodium	78400			P

BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

Form IA-IN LW 10/29/08

14

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW03

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583314

Level (low/med): LOW Date Received: 07/25/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.059	~~J~~	J ~~N~~	MS	MSH
7440-38-2	Arsenic	3.1			MS	
7440-39-3	Barium	76.7			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0 ~~1.4~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	0.46	J		MS	
7440-50-8	Copper	0.99	J		MS	
7439-92-1	Lead	0.064	~~J~~	J ~~N~~	MS	MSH
7439-96-5	Manganese	1450		R ~~N~~	MS	MSH
7440-02-0	Nickel	12.3			MS	
7782-49-2	Selenium	0.84	J		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U	~~N~~	MS	
7440-62-2	Vanadium	5.0 ~~0.48~~	~~J~~	U	MS	BL
7440-66-6	Zinc	2.0			MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

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Comments: DISSOLVED

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW03

ab Name: COMPUCHEM Contract:

ab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

atrix (soil/water): WATER Lab Sample ID: 1583314

evel (low/med): LOW Date Received: 07/25/2008

Solids: 0.0

oncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	200	U		P
7440-70-2	Calcium	79500			P
7439-89-6	Iron	321			P
7439-95-4	Magnesium	58600			P
7439-97-6	Mercury	0.20	U		CV
7440-09-7	Potassium	5000 ~~310~~	~~J~~	U E	P
7440-23-5	Sodium	96400			P

BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW03

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583315

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0 ~~0.028~~	~~J~~	U ~~N~~	MS	BL
7440-38-2	Arsenic	1.0 ~~0.55~~	~~J~~	U	MS	BL
7440-39-3	Barium	162			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0 ~~1.4~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	1.0 ~~0.36~~	~~J~~	U	MS	BL
7440-50-8	Copper	2.4			MS	
7439-92-1	Lead	1.0 ~~0.16~~	~~J~~	U ~~N~~	MS	BL
7439-96-5	Manganese	54.8		R ~~N~~	MS	MSH, OT
7440-02-0	Nickel	2.5			MS	
7782-49-2	Selenium	5.0 ~~2.8~~	~~J~~	U	MS	BL
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U	~~N~~	MS	
7440-62-2	Vanadium	14.1		R	MS	BL
7440-66-6	Zinc	3.5		J	MS	OT

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW03

ıb Name: COMPUCHEM Contract:

ıb Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

ıtrix (soil/water): WATER Lab Sample ID: 1583315

ıvel (low/med): LOW Date Received: 07/29/2008

Solids: 0.0

ɔncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~136~~	~~J~~	U	P	BL
7440-70-2	Calcium	65900			P	
7439-89-6	Iron	100 ~~31.8~~	~~J~~	U	P	BL
7439-95-4	Magnesium	42400			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~1590~~	J	U ~~B~~	P	BL
7440-23-5	Sodium	144000			P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

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Comments: DISSOLVED

Form IA-IN 10/29/08

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW08

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583316

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0	U	~~N~~	MS	
7440-38-2	Arsenic	1.0	U		MS	
7440-39-3	Barium	10.0	U		MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0	U		MS	
7440-50-8	Copper	2.0	U		MS	
7439-92-1	Lead	1.0	U	~~N~~	MS	
7439-96-5	Manganese	1.0	~~U~~	R ~~N~~	MS	MSH
7440-02-0	Nickel	1.0	U		MS	
7782-49-2	Selenium	5.0	U		MS	
7440-22-4	Silver	1.0	U	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0 ~~0.035~~	~~J~~	U ~~N~~	MS	BL
7440-62-2	Vanadium	5.0 ~~0.069~~	~~J~~	U	MS	BL
7440-66-6	Zinc	2.0	U		MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW08

ab Name: COMPUCHEM Contract:

ab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

atrix (soil/water): WATER Lab Sample ID: 1583316

evel (low/med): LOW Date Received: 07/29/2008

Solids: 0.0

oncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	200	U		P
7440-70-2	Calcium	53600			P
7439-89-6	Iron	100	U		P
7439-95-4	Magnesium	35200			P
7439-97-6	Mercury	0.20	U		CV
7440-09-7	Potassium	5000 ~~1330~~	~~J~~	U ~~E~~	P
7440-23-5	Sodium	123000			P

BL

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Comments: DISSOLVED

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW07

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583317

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0 ~~0.040~~	~~J~~	U ~~N~~	MS	BL
7440-38-2	Arsenic	1.0 ~~0.56~~	~~J~~	U	MS	BL
7440-39-3	Barium	128		R	MS	BL
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0 ~~0.42~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	1.0 ~~0.083~~	~~J~~	U	MS	BL
7440-50-8	Copper	1.8	~~J~~	R	MS	BL
7439-92-1	Lead	1.0	U	~~N~~	MS	
7439-96-5	Manganese	1.0 ~~0.83~~	~~J~~	~~UJ~~ ~~N~~ R	MS	MSL, BL
7440-02-0	Nickel	1.7		R	MS	BL
7782-49-2	Selenium	5.0 ~~2.5~~	~~J~~	U	MS	BL
7440-22-4	Silver	1.0	~~J~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U	~~N~~	MS	
7440-62-2	Vanadium	13.4		R	MS	BL
7440-66-6	Zinc	2.0		R	MS	BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW07

ab Name: COMPUCHEM Contract:

ab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

atrix (soil/water): WATER Lab Sample ID: 1583317

evel (low/med): LOW Date Received: 07/29/2008

Solids: 0.0

oncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	220			P
7440-70-2	Calcium	47300			P
7439-89-6	Iron	206			P
7439-95-4	Magnesium	32400			P
7439-97-6	Mercury	0.20	U		CV
7440-09-7	Potassium	5000 ~~1100~~	~~J~~	U E/	P
7440-23-5	Sodium	115000			P

BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

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Comments: DISSOLVED

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-072708

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583318

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.019	~~J~~	J ~~N~~	MS	MSH
7440-38-2	Arsenic	0.65	J		MS	
7440-39-3	Barium	104			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0 ~~1.9~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	0.69	J		MS	
7440-50-8	Copper	2.0			MS	
7439-92-1	Lead	0.18	~~J~~	J ~~N~~	MS	MSH
7439-96-5	Manganese	21.5		~~R~~ ~~N~~	MS	MSH
7440-02-0	Nickel	2.5			MS	
7782-49-2	Selenium	2.0	J		MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U	~~N~~	MS	
7440-62-2	Vanadium	21.6			MS	
7440-66-6	Zinc	3.2			MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-072708

b Name: COMPUCHEM Contract:

b Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

trix (soil/water): WATER Lab Sample ID: 1583318

vel (low/med): LOW Date Received: 07/29/2008

Solids: 0.0

ncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200	U		P	
7440-70-2	Calcium	5880 ~~18.9~~	~~J~~	U	P	BL
7439-89-6	Iron	100	U		P	
7439-95-4	Magnesium	5000	U		P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000	U		P	
7440-23-5	Sodium	5880 ~~390~~	~~J~~	U	P	BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW02

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583319

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0 ~~0.11~~	~~J~~	U ~~N~~	MS	BL
7440-38-2	Arsenic	1.0 ~~0.38~~	~~J~~	U	MS	BL
7440-39-3	Barium	130			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0 ~~1.3~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	1.0 ~~0.14~~	~~J~~	U	MS	BL
7440-50-8	Copper	1.6	~~J~~	R	MS	BL
7439-92-1	Lead	1.0 ~~0.068~~	~~J~~	U ~~N~~	MS	BL
7439-96-5	Manganese	4.2		R ~~N~~	MS	MSH
7440-02-0	Nickel	12.0			MS	
7782-49-2	Selenium	5.0 ~~2.7~~	~~J~~	U	MS	BL
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U	~~N~~	MS	
7440-62-2	Vanadium	12.9		R	MS	BL
7440-66-6	Zinc	2.4		R	MS	BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

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1A-IN

INORGANIC ANALYSIS DATA SHEET

19

EPA SAMPLE NO.

VWAE-MW02

ıb Name: COMPUCHEM Contract:

ıb Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

ıtrix (soil/water): WATER Lab Sample ID: 1583319

ıvel (low/med): LOW Date Received: 07/29/2008

Solids: 0.0

ɔncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	200	U		P
7440-70-2	Calcium	55800			P
7439-89-6	Iron	100	U		P
7439-95-4	Magnesium	32900			P
7439-97-6	Mercury	0.20	U		CV
7440-09-7	Potassium	5000 ~~1140~~	~~J~~	U ~~E~~	P
7440-23-5	Sodium	134000			P

BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

Form IA-IN 10/29/08

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW06

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Lab Sample ID: 1583320

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	1.2	~~J~~	J ~~N~~	MS	MSH
7440-38-2	Arsenic	1.6			MS	
7440-39-3	Barium	17.0			MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0 ~~0.77~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	0.27	J		MS	
7440-50-8	Copper	4.6			MS	
7439-92-1	Lead	0.15	~~J~~	J ~~N~~	MS	MSH
7439-96-5	Manganese	7.6		R ~~N~~	MS	MSH
7440-02-0	Nickel	3.0			MS	
7782-49-2	Selenium	6.1			MS	
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U	~~N~~	MS	
7440-62-2	Vanadium	46.5			MS	
7440-66-6	Zinc	5.3			MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW06

ıb Name: COMPUCHEM Contract:

ıb Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

ıtrix (soil/water): WATER Lab Sample ID: 1583320

ɜvel (low/med): LOW Date Received: 07/29/2008

Solids: 0.0

ɔncentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	200	U		P
7440-70-2	Calcium	43800			P
7439-89-6	Iron	100	U		P
7439-95-4	Magnesium	21300			P
7439-97-6	Mercury	0.20	U		CV
7440-09-7	Potassium	5000 ~~942~~	~~J~~	u ~~E~~	P
7440-23-5	Sodium	379000			P

BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

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Comments: DISSOLVED

USEPA REGION II WORKSHEETS

SOP # HW-2
Revision 13
September 2006

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

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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I.0 Scope

I.I 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	----

Dissolved metals

Site: Vieques Island, PR

Case #: N/A

SDG #: 15833

Samples: **Soil** 20 **Water**

	YES	NO	N/A
A.1.1 **Contract Compliance Screening Report**			
Present?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.2 **Record of Communication (from RSCC)**			
Present?	[✓]	___	___
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.4 **Chain of Custody/Sample Traffic Report**			
Present?	[✓]	___	___
Legible?	[✓]	___	___
Signature of sample custodian present?	[✓]	___	___
ACTION: If no, contact RSCC/WAM/PO.			
A.1.5 **Cover Page**			
Present?	[✓]	___	___
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	[✓]	___	___
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[✓]	___	___

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[✓]	___	___
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[✓]	___	___

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

Laboratory Name?	[✓]	___	___
Laboratory Code?	[✓]	___	___
RAS/Non-RAS Case No.?	[✓]	___	___
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[✓]		

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

	YES	NO	N/A
(a) all analytes analyzed by ICP-AES?		[✓]	
(b) all analytes analyzed by ICP-MS?		[✓]	
(c) Mercury?		[✓]	
(d) Cyanide?		[✓]	

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

	YES	NO	N/A
Digestion Log for ICP-AES (Form XII)present?	[✓]		
Digestion Log for ICP-MS (Form XII) present?	[✓]		
Digestion Log for mercury (Form XII) present?	[✓]		
Distillation Log for cyanide (Form XII) present?	[✓]		

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	[✓]		
Are percent solids calculations present for soils/sediments?	[ ]		✓
Are preparation dates present on the sample preparation logs/bench sheets?	[✓]		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	[✓]		
ICP-MS?	[✓]		
Mercury?	[✓]		
Cyanide?	[✓]		

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	[✓]		
Properly labeled?	[✓]		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	[✓]		
Instrument Printouts?	[✓]		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A
A.1.9 Technical Holding Times: (Aqueous and soil samples) (Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)			
A.1.9.1 Cyanide distillation(14 days)exceeded?		[✓]	
Mercury analysis(28 days) exceeded?		[✓]	
Other Metals analysis(180 days)exceeded?		[✓]	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

	YES	NO	N/A
A.1.9.2 Is pH of aqueous samples for:			
Metals Analysis ≤ 2?	[✓]		
Cyanide Analysis ≥ 12?	[✓]		

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

	YES	NO	N/A
A.1.9.3 Is the cooler temperature ≤ 10 C°?	[✓]		

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 Final Data Correctness - Form I

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[___]	___	✓
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[✓]	___	___
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]	✓	___

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]	___	___
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]	___	___
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[✓]	___	___
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[✓]	___	___

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[✓]	___	___

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

	YES	NO	N/A
A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:			

		YES	NO	N/A
	Mercury Analysis?	[✓]	___	___
	Cyanide Analysis?	[✓]	___	___
	ICP-AES(more than 2 point Calib.)?	[✓]	___	___
	ICP-MS (more than 2 point calib.)?	[✓]	___	___

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[✓]	___	___

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

Metals - 90-110%R?	[✓]	___	___
Hg - 80-120%R?	[✓]	___	___
Cyanide - 85-115%R?	[✓]	___	___

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects,
if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN).
Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [✓] ___ ___

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? (Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[✓]	___	___
For each cyanide run, was a CRQL standard analyzed?	[✓]	___	___

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? [✓] ___ ___

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.

A.1.14 Initial and Continuing Calibration Blanks - Form III

A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___
Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by			

		YES	NO	N/A
	using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[√]	___	___
	ACTION: If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".			
A.1.14.2	Circle with red pencil on each Form III all Calib. Blank values that are: ≥ MDL but ≤ CRQL; > CRQL			
A.1.14.2.1	When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	√	[___]	___
	ACTION: If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.			
A.1.14.2.2	When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[√]	___
	ACTION: If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".			
A.1.14.2.3	Is any Calibration Blank value below the negative CRQL?	___	[√]	___
	ACTION: If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.			

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run.

2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J),but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL? ✓ [___] ___

ACTION:
If yes, change sample result ≥ MDL

	YES	NO	N/A
but ≤ CRQL to CRQL with a "U".			
..1.15.2.2 When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

	YES	NO	N/A
..1.15.2.3 Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

	YES	NO	N/A
..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".			
..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.

..1.16.3 **ICP-MS Method**

	YES	NO	N/A
..1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
..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
..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.			
..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.			
..1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	___	[✓]	___
	(b) between 30-74%?	✓	[___]	___
	(c) between 126-150%?	✓	[___]	___
	(d) greater than 150%?	✓	[___]	___
	ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			
(**NOTE**:Replace "N" with "J", "R" as appropriate.)			
..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?	[✓]	___	___

		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.			
..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.			
..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.			
..1.18.4	**Aqueous**			
..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:

> ± 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),

is any RPD ≥ 35% but < 120%?	___	[___]	✓
is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R) and red-line the associated sample data ≥ CRQL.			
..1.18.5.2	When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL	___	[___]	✓

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

..1.19 **Field Duplicates**

Aqueous Field Duplicates

..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			
..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.

..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.			
..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**

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".			
1.1.21	**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.			
1.1.21.1	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.			
1.1.21.2	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			
1.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[✓]	___	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
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.)			
1.22	**Total/Dissolved or Inorganic/Total Analytes**			
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.			
1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	✓	[___]	___

		YES	NO	N/A
1.1.22.3	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.

1.1.23 **Field Blank - Form I**
NOTE: Designate "Field Blank" as such on Form I

		YES	NO	N/A
1.1.23.1	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.

1.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

1.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

1.1.24.2 **Method Detection Limits - Form IX**

1.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
1.1.24.2.2	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.			
1.1.24.3	**Linear Ranges - Form XI**			
1.1.24.3.1	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.			
1.1.25	**ICP-MS Tune Analysis - Form XIV**			
1.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
1.1.25.2	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
).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".

ı.1.26 **ICP-MS Internal Standards - Form XV**

ı.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.

ı.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

:han the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

ı.1.27 **Percent Solids of Sediments**

ı.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [___] ✓

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative – See EDS data validation report

:ase# _____ **Site:** _____ **Matrix: Soil** ____

:DG# _____ **Lab:** _____ **Water** ____

:ampling Team: _____ **Reviewer:** _____ **Other** _____

ı.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**.

ı.2.2 **Laboratory Qualifiers:**
The CLP laboratory applies a contractual qualifier on all

'orm I'S and the QC Form when a QC analysis is outside the control limits. These ıualifiers are not applied on the Lotus or XLS spreadsheets. These qualifiers and their ıeanings 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 For 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.

ı.2.3.1 **Data Case Description**:

ı.2.3.2 **CSF Audit**:

A.2.3.3 **Technical Review:**

A.2.3.4 **Contract-Problem/Non-Compliance:**

HWSS Reviewer: _____ Date:_____
Signature

Contractor Reviewer: _____ Date:_____
Signature

Verified by: _____ Date:_____
Signature

CASE #
SDG #

Contract Laboratory Program
REGION II/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: _____

ESAT Reviewer/Date: _____

Type of Analysis: ___Inorganic_____

Laboratory Name: _____

Lab Contact: _____

Call Initiated By: ___Laboratory _X_Region II

:nquiry made in reference to data for the following sample number(s):

;ummary of Questions/Issues Discussed:

;ummary of Resolution:

_____
Signature

Date: _____

FIELD DUPLICATES

Sample No. **Field Duplicate No.** **Sample Matrix:**

Lab 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									
Manganese									

					YES	NO	N/A		
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

Total/Dissolved Concentrations

Lab Code **Case No.** **SDG No.** **Sample Matrix: Water**

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

SECTION A (TO BE COMPLETED BY REGIONAL SENDING OFFICIAL)

Initiated By:

Name, Affiliation, Phone Number

_____

Case Number: _____
- OLM
- OLC
- ILM

Details 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

SECTION B (TO BE COMPLETED BY SMO)

Name of SMO Contact _____ Date: _____

)ate of Laboratory Notification (Verbal): _____

:e-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
inal 9/3/99

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

ype of Review: _____ Date:_____ Case# _____SDG#___

ite: _____ Lab Name: _____

eviewer's Initials:_____ Number of Samples:_____

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														

CHAIN OF CUSTODY

18346

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CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City / State / Zip: Virginia Beach, VA 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: JA / KL

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM 2 mL	Total Metals (AES/MS) PL	Cyanide 250 mL	Diss. Metals (AES/MS) PL	TPH-GRO	TPH-DRO/ORO 2 mL	CNNS, Alkalinity 250 mL	Sulfide 500 mL	TOC 2-40 mL	MEE 2 (5)	Ferrous Fe 125 mL	pH / Sample Info (Lab Use): Metal	Diss. Metal	Cyanide	Sulfide	TOC	Ferrous Fe
0807092-01 / 1583201	VWAI-MW05P-08C	7/21/08	0915	(GW)			DISS MTL = 1583301							X	X	X	X		X	X	X	X		X	<2	<2	>12	>9	<2	<2
1583202	VWAI-MW05-08C	↓	↓	(GW)			DISS MTL = 1583302								X	X	X			X	X	X		X	<2	<2	>12	>9	<2	<2

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time:	Received by:	Date/Time:
L. Rambert	7/21/08 1400	Jennifer Dorer	7/22/08 9:00

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 2.3 °C

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

White & Yellow copy to lab • Pink copy for customer

SUPPORT DOCUMENTATION

US EPA - CLP

5A-IN

MATRIX SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

VWAI-MW04S

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M	
Antimony	75 - 125	126.4594		0.2878	J	100.00	126	N	MS	J
Arsenic	75 - 125	49.1752		5.5300		40.00	109		MS	
Barium	75 - 125	2289.8100		79.5055		2000.00	111		MS	
Beryllium	75 - 125	57.3055		1.0000	U	50.00	115		MS	
Cadmium	75 - 125	54.5470		1.0000	U	50.00	109		MS	
Chromium	75 - 125	220.8725		2.0000	U	200.00	110		MS	
Cobalt	75 - 125	531.1268		0.5946	J	500.00	106		MS	
Copper	75 - 125	257.2457		1.8443	J	250.00	102		MS	
Lead	75 - 125	26.4551		1.0000	U	20.00	132	N	MS	J
Manganese	75 - 125	2507.9940		1668.0125		500.00	168	N	MS	R
Nickel	75 - 125	496.7908		1.8225		500.00	99		MS	
Selenium	75 - 125	12.6019		1.0864	J	10.00	115		MS	
Silver	75 - 125	26.1725		1.0000	U	50.00	52	N	MS	J/UJ
Thallium	75 - 125	65.4758		1.0000	U	50.00	131	N	MS	J
Vanadium	75 - 125	582.3757		1.5200	J	500.00	116		MS	
Zinc	75 - 125	460.6940		2.5230		500.00	92		MS	

Comments:

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract: _____

Lab Code: LIBRTY Case No.: _____ NRAS No.: _____ SDG NO.: 15833

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		
		C	1	C	2	C	3	C		C	M
Aluminum	200.000	U	200.000	U	200.000	U	46.945	J	200.000	U	P
Calcium	5000.000	U	5000.000	U	5000.000	U	33.365	J	5000.000	U	P
Iron	100.000	U	100.000	U	100.000	U	100.000	U	17.451	J	P
Magnesium	5000.000	U	20.876	J	16.432	J	50.338	J	5000.000	U	P
Mercury	-0.076	J	0.200	U	0.200	U	0.200	U	0.200	U	CV
Potassium	5000.000	U	5000.000	U	5000.000	U	5000.000	U	-5.032	J	P
Sodium	258.584	J	438.484	J	427.596	J	532.659	J	560.720	J	P

AL = 47.794 ug/L → (a) (#3, 8, 11, 15)

Ca = 33.365 ug/L → (#4, 5, 8, 11, 12, 18)

Fe = 17.451 ug/L → (1, 2, 4, 5, 7, 8, 11, 12, 15)

Mg = 50.338 ug/L → (4, 5, 8, 11, 12)

K = 20.386 ug/L → (1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 19, 20)

Na = 560.720 ug/L → (4, 5, 8, 11, 12, 18)

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Antimony	0.042	J	2.000	U	2.000	U	2.000	U	2.000	U	MS
Arsenic	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Barium	10.000	U	10.000	U	10.000	U	10.000	U	10.000	U	MS
Beryllium	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Cadmium	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Chromium	2.000	U	2.000	U	2.000	U	0.063	J	2.000	U	MS
Cobalt	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Copper	2.000	U	2.000	U	2.000	U	2.000	U	2.000	U	MS
Lead	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Manganese	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Nickel	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Selenium	5.000	U	5.000	U	5.000	U	5.000	U	5.000	U	MS
Silver	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Thallium	0.007	J	1.000	U	0.014	J	0.032	J	0.016	J	MS
Vanadium	0.015	J	5.000	U	0.035	J	0.048	J	0.033	J	MS
Zinc	2.000	U	2.000	U	2.000	U	2.000	U	2.000	U	MS

(u)

Cr 0.063 ug/L = (1-3, 6, 9, 10, 13, 14, 15, 17, 18, 19, 20)

Tl = 0.042 ug/L = (4, 5, 8, 11, 12, 16)

V = 0.048 = (1, 2, 3, 4, 5, 7, 8, 11, 12, 14, 16

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract: _____

Lab Code: LIBRTY Case No.: _____ NRAS No.: _____ SDG NO.: 15833

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Antimony			2.000	U							MS
Arsenic			1.000	U							MS
Barium			10.000	U							MS
Beryllium			1.000	U							MS
Cadmium			1.000	U							MS
Chromium			2.000	U							MS
Cobalt			1.000	U							MS
Copper			2.000	U							MS
Lead			1.000	U							MS
Manganese			1.000	U							MS
Nickel			1.000	U							MS
Selenium			5.000	U							MS
Silver			1.000	U							MS
Thallium			0.042	J							MS
Vanadium			0.029	J							MS
Zinc			2.000	U							MS

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract: _____

Lab Code: LIBRTY Case No.: _____ NRAS No.: _____ SDG NO.: 15833

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum			30.974	J	35.099	J	200.000	U			P
Calcium			5000.000	U	5000.000	U	5000.000	U			P
Iron			100.000	U	100.000	U	100.000	U			P
Magnesium			31.947	J	37.964	J	5000.000	U			P
Mercury			0.200	U	0.200	U	0.200	U			CV
Potassium			5000.000	U	5000.000	U	18.814	J			P
Sodium			524.517	J	234.506	J	438.569	J			P

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum			200.000	U	200.000	U	21.528	J			P
Calcium			5000.000	U	5000.000	U	5000.000	U			P
Iron			100.000	U	100.000	U	100.000	U			P
Magnesium			5000.000	U	15.419	J	20.119	J			P
Mercury			0.200	U	0.200	U	0.200	U			CV
Potassium			19.290	J	5000.000	U	5000.000	U			P
Sodium			493.015	J	237.222	J	237.176	J			P

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15833

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum			29.702	J	47.794	J					P
Calcium			5000.000	U	5000.000	U					P
Iron			100.000	U	100.000	U					P
Magnesium			5000.000	U	24.113	J					P
Mercury			0.200	U	0.200	U	~~-0.108~~	~~J~~			CV
Potassium			20.386	J	18.230	J					P
Sodium			386.027	J	400.752	J					P

ENVIRONMENTAL
Data Services, Inc.

TOTAL METALS & CYANIDE
USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 15842

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 29, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SS21-0506	1584201	Soil
1MS	VWAE-SS21-0506MS	1584201MS	Soil
1MSD	VWAE-SS21-0506MSD	1584201MSD	Soil
2	VWAE-SB21-1820	1584202	Soil
3	VWAE-SB21-0910	1584203	Soil
4	VWAE-SB21P-0910	1584204	Soil
5	VWAE-SB21-1618	1584205	Soil
6	VWAE-SB21-3638	1584206	Soil
7	VWAE-SB20-1618	1584207	Soil
8	VWAE-SB20P-1618	1584208	Soil
9	VWAE-SB20-2022	1584209	Soil
10	VWAE-SS20-0406	1584210	Soil

The USEPA Region II SOP No. HW-2, Revision 13, September 2006: Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were prepared and analyzed within 14 days for cyanide, 28 days for mercury and 180 days for all other metals.

Calibration - The ICV and CCV %R values were acceptable.

CRDL Standard - The CRDL standards exhibited acceptable %R values.

Method and Calibration Blanks - The following table summarizes method blank and continuing calibration blank contamination.

Compound	Conc.	Qualifier	Affected Samples
Nickel	0.603 ug/L	U	2, 5-9
Sodium	39.713 mg/kg	U	All samples

ICP Interference Check Sample - All %R values were acceptable.

Matrix Spike/Matrix Spike Duplicate - The matrix spike/matrix spike duplicate sample exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	%R	Qualifier	Affected Samples
1	Antimony	47%	J/UJ	All samples
	Lead	299%	R	All samples

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAE-SB21-0910 mg/kg	VWAE-SB21P-0910 mg/kg	RPD	Qualifier
Aluminum	11900	9230	25%	None
Arsenic	0.51	1.2 U	NC	None
Barium	97.4	118	19%	None
Beryllium	0.17	0.19	11%	None
Calcium	2590	2340	10%	None
Chromium	9.8	10.9	11%	None
Cobalt	7.3	9.5	26%	None
Copper	33.8	34.8	3%	None
Iron	18900	16500	14%	None
Magnesium	3170	3250	2%	None
Manganese	551	771	33%	None
Nickel	5.3	5.3	0%	None
Potassium	1160	1210	4%	None
Vanadium	61.6	50.8	19%	None
Zinc	86.2	109	23%	None

Compound	VWAE-SB20-1618 mg/kg	VWAE-SB20P-1618 mg/kg	RPD	Qualifier
Aluminum	7290	8500	15%	None
Arsenic	0.31	0.38	20%	None
Barium	65.3	78.1	18%	None
Beryllium	0.10	0.12	18%	None
Calcium	2010	2300	13%	None
Chromium	6.7	9.8	38%	None
Cobalt	5.1	6.0	16%	None
Copper	19.3	23.2	18%	None
Iron	14100	16100	13%	None

Compound	VWAE-SB20-1618 mg/kg	VWAE-SB20P-1618 mg/kg	RPD	Qualifier
Magnesium	2030	2460	19%	None
Manganese	367	423	14%	None
Potassium	976	1090	11%	None
Vanadium	43.5	48.5	11%	None
Zinc	20.2	23.9	17%	None

LCS - The LCS samples exhibited acceptable %R values.

ICP Serial Dilution - The ICP serial dilution sample exhibited acceptable %D values except the following.

ICP Sample ID	Compound	%D	Qualifier	Affected Samples
1	Potassium	14%	J	Positive results in all samples

Field and Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-EB01-071708	Manganese	1.8	None	All >CRDL
	Zinc	3.4	None	All >CRDL
VWAE-EB02-071708	Manganese	1.2	None	All >CRDL
	Zinc	3.2	None	All >CRDL
VWAE-EB01-071808	Manganese	0.34	None	All >CRDL
	Zinc	4.5	None	All >CRDL

Compound Quantitation - No discrepancies were identified.

ANNOTATED FORM Is

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SS21-0506

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584201

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 89.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	20500			P	
7440-36-0	Antimony	6.7	~~U~~	UJ ~~N~~	P	MSL
7440-38-2	Arsenic	0.82	J		P	
7440-39-3	Barium	139			P	
7440-41-7	Beryllium	0.34	J		P	
7440-43-9	Cadmium	0.56	U		P	
7440-70-2	Calcium	3600			P	
7440-47-3	Chromium	13.2			P	
7440-48-4	Cobalt	13.7			P	
7440-50-8	Copper	40.2			P	
7439-89-6	Iron	28600			P	
7439-92-1	Lead	~~3.2~~		R ~~N~~	P	MSH
7439-95-4	Magnesium	4570			P	
7439-96-5	Manganese	1100			P	
7439-97-6	Mercury	0.11	U		CV	
7440-02-0	Nickel	8.4			P	
7440-09-7	Potassium	1890		J ~~E~~	P	SD
7782-49-2	Selenium	3.9	U		P	
7440-22-4	Silver	0.19	J		P	
7440-23-5	Sodium	561 ~~163~~	~~J~~	U	P	BL
7440-62-2	Vanadium	71.7			P	
7440-66-6	Zinc	48.6			P	
57-12-5	Cyanide	2.8	U		AS	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SS21-0506

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584201

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 89.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	0.56	U		MS

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

2

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-1820

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584202

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 88.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5460			P	
7440-36-0	Antimony	6.6	~~U~~	UJ ~~N~~	P	MSL
7440-38-2	Arsenic	1.1	U		P	
7440-39-3	Barium	49.3			P	
7440-41-7	Beryllium	0.086	J		P	
7440-43-9	Cadmium	0.55	U		P	
7440-70-2	Calcium	1720			P	
7440-47-3	Chromium	4.6			P	
7440-48-4	Cobalt	3.6	J		P	
7440-50-8	Copper	13.1			P	
7439-89-6	Iron	10600			P	
7439-92-1	Lead	~~5.3~~		R ~~N~~	P	MSH
7439-95-4	Magnesium	1540			P	
7439-96-5	Manganese	278			P	
7439-97-6	Mercury	0.11	U		CV	
7440-02-0	Nickel	4.4 ~~1.8~~	~~J~~	U	P	BL
7440-09-7	Potassium	660		J ~~E~~	P	SD
7782-49-2	Selenium	3.8	U		P	
7440-22-4	Silver	1.1	U		P	
7440-23-5	Sodium	549 ~~112~~	~~J~~	U	P	BL
7440-62-2	Vanadium	31.8			P	
7440-66-6	Zinc	17.4			P	
57-12-5	Cyanide	2.8	U		AS	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-1820

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584202

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 88.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	0.57	U		MS

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

3

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-0910

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584203

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 83.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	11900			P	
7440-36-0	Antimony	7.1	~~U~~	UJ ~~N~~	P	MSL
7440-38-2	Arsenic	0.51	J		P	
7440-39-3	Barium	97.4			P	
7440-41-7	Beryllium	0.17	J		P	
7440-43-9	Cadmium	0.59	U		P	
7440-70-2	Calcium	2590			P	
7440-47-3	Chromium	9.8			P	
7440-48-4	Cobalt	7.3			P	
7440-50-8	Copper	33.8			P	
7439-89-6	Iron	18900			P	
7439-92-1	Lead	12~~.6~~		R ~~N~~	P	MSH
7439-95-4	Magnesium	3170			P	
7439-96-5	Manganese	551			P	
7439-97-6	Mercury	0.12	U		CV	
7440-02-0	Nickel	5.3			P	
7440-09-7	Potassium	1160		J ~~E~~	P	SD
7782-49-2	Selenium	4.2	U		P	
7440-22-4	Silver	1.2	U		P	
7440-23-5	Sodium	594 ~~165~~	~~J~~	U	P	BL
7440-62-2	Vanadium	61.6			P	
7440-66-6	Zinc	86.2			P	
57-12-5	Cyanide	3.0	U		AS	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

3

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-0910

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584203

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 83.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	0.57	U		MS

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

4

EPA SAMPLE NO.

VWAE-SB21P-0910

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584204

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 86.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	9230			P	
7440-36-0	Antimony	7.0	~~U~~	UJ ~~N~~	P	MSL
7440-38-2	Arsenic	1.2	U		P	
7440-39-3	Barium	118			P	
7440-41-7	Beryllium	0.19	J		P	
7440-43-9	Cadmium	0.58	U		P	
7440-70-2	Calcium	2340			P	
7440-47-3	Chromium	10.9			P	
7440-48-4	Cobalt	9.5			P	
7440-50-8	Copper	34.8			P	
7439-89-6	Iron	16500			P	
7439-92-1	Lead	~~19.1~~		R ~~N~~	P	MSH
7439-95-4	Magnesium	3250			P	
7439-96-5	Manganese	771			P	
7439-97-6	Mercury	0.11	U		CV	
7440-02-0	Nickel	5.3			P	
7440-09-7	Potassium	1210		J ~~E~~	P	SD
7782-49-2	Selenium	4.1	U		P	
7440-22-4	Silver	1.2	U		P	
7440-23-5	Sodium	581 ~~188~~	~~J~~	U	P	BL
7440-62-2	Vanadium	50.8			P	
7440-66-6	Zinc	109			P	
57-12-5	Cyanide	2.9	U		AS	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

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1A-IN

INORGANIC ANALYSIS DATA SHEET

4

EPA SAMPLE NO.

VWAE-SB21P-0910

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584204

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 86.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	0.56	U		MS

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

5

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-1618

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584205

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 91.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	8700			P	
7440-36-0	Antimony	6.3	~~U~~	UJ ~~N~~	P	MSL
7440-38-2	Arsenic	0.42	J		P	
7440-39-3	Barium	79.6			P	
7440-41-7	Beryllium	0.13	J		P	
7440-43-9	Cadmium	0.52	U		P	
7440-70-2	Calcium	2110			P	
7440-47-3	Chromium	8.8			P	
7440-48-4	Cobalt	6.1			P	
7440-50-8	Copper	23.3			P	
7439-89-6	Iron	16400			P	
7439-92-1	Lead	~~6.3~~		R ~~N~~	P	MSH
7439-95-4	Magnesium	2390			P	
7439-96-5	Manganese	496			P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	4.2 ~~3.7~~	~~J~~	U	P	BL
7440-09-7	Potassium	1210		J ~~E~~	P	SD
7782-49-2	Selenium	3.7	U		P	
7440-22-4	Silver	1.0	U		P	
7440-23-5	Sodium	523 ~~154~~	~~J~~	U	P	BL
7440-62-2	Vanadium	49.9			P	
7440-66-6	Zinc	24.7			P	
57-12-5	Cyanide	2.7	U		AS	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-1618

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584205

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 91.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	0.55	U		MS

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

Form IA-IN RW 10/29/08

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-3638

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584206

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 79.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	6690			P	
7440-36-0	Antimony	7.5	~~U~~	UJ ~~N~~	P	MSL
7440-38-2	Arsenic	0.51	J		P	
7440-39-3	Barium	66.4			P	
7440-41-7	Beryllium	0.13	J		P	
7440-43-9	Cadmium	0.63	U		P	
7440-70-2	Calcium	5840			P	
7440-47-3	Chromium	59.3			P	
7440-48-4	Cobalt	1.1	J		P	
7440-50-8	Copper	9.1			P	
7439-89-6	Iron	12000			P	
7439-92-1	Lead	~~3.2~~		R ~~N~~	P	MSH
7439-95-4	Magnesium	2180			P	
7439-96-5	Manganese	264			P	
7439-97-6	Mercury	0.51			CV	
7440-02-0	Nickel	5.0 ~~4.2~~	~~J~~	U	P	BL
7440-09-7	Potassium	1220		J ~~E~~	P	SD
7782-49-2	Selenium	4.4	U		P	
7440-22-4	Silver	1.3	U		P	
7440-23-5	Sodium	626 ~~228~~	~~J~~	U	P	BL
7440-62-2	Vanadium	10.9			P	
7440-66-6	Zinc	14.5			P	
57-12-5	Cyanide	3.2	U		AS	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

Form IA-IN 10/29/08

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1A-IN

INORGANIC ANALYSIS DATA SHEET

6

EPA SAMPLE NO.

VWAE-SB21-3638

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584206

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 79.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	0.61	U		MS

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

7

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-1618

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584207

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 92.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	7290			P	
7440-36-0	Antimony	6.3	~~U~~	UJ ~~N~~	P	MSL
7440-38-2	Arsenic	0.31	J		P	
7440-39-3	Barium	65.3			P	
7440-41-7	Beryllium	0.10	J		P	
7440-43-9	Cadmium	0.52	U		P	
7440-70-2	Calcium	2010			P	
7440-47-3	Chromium	6.7			P	
7440-48-4	Cobalt	5.1	J		P	
7440-50-8	Copper	19.3			P	
7439-89-6	Iron	14100			P	
7439-92-1	Lead	~~1.3~~		R ~~N~~	P	MSH
7439-95-4	Magnesium	2030			P	
7439-96-5	Manganese	367			P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	4.2 ~~2.9~~	~~J~~	U	P	BL
7440-09-7	Potassium	976		J ~~E~~	P	SD
7782-49-2	Selenium	3.6	U		P	
7440-22-4	Silver	1.0	U		P	
7440-23-5	Sodium	521 ~~128~~	~~J~~	U	P	BL
7440-62-2	Vanadium	43.5			P	
7440-66-6	Zinc	20.2			P	
57-12-5	Cyanide	2.7	U		AS	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

7

EPA SAMPLE NO.

VWAE-SB20-1618

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584207

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 92.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	0.54	U		MS

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20P-1618

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584208

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 93.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	8500			P	
7440-36-0	Antimony	6.4	~~U~~	UJ ~~N~~	P	MSL
7440-38-2	Arsenic	0.38	J		P	
7440-39-3	Barium	78.1			P	
7440-41-7	Beryllium	0.12	J		P	
7440-43-9	Cadmium	0.53	U		P	
7440-70-2	Calcium	2300			P	
7440-47-3	Chromium	9.8			P	
7440-48-4	Cobalt	6.0			P	
7440-50-8	Copper	23.2			P	
7439-89-6	Iron	16100			P	
7439-92-1	Lead	~~1.9~~		R ~~N~~	P	MSH
7439-95-4	Magnesium	2460			P	
7439-96-5	Manganese	423			P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	4.3 ~~3.9~~	~~J~~	U	P	BL
7440-09-7	Potassium	1090		J ~~E~~	P	SD
7782-49-2	Selenium	3.7	U		P	
7440-22-4	Silver	1.1	U		P	
7440-23-5	Sodium	532 ~~131~~	~~J~~	U	P	BL
7440-62-2	Vanadium	48.5			P	
7440-66-6	Zinc	23.9			P	
57-12-5	Cyanide	2.7	U		AS	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20P-1618

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584208

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 93.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	0.51	U		MS

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-2022

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584209

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 91.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	9080			P	
7440-36-0	Antimony	6.5	~~U~~	UJ ~~N~~	P	MSL
7440-38-2	Arsenic	1.1	U		P	
7440-39-3	Barium	76.6			P	
7440-41-7	Beryllium	0.14	J		P	
7440-43-9	Cadmium	0.54	U		P	
7440-70-2	Calcium	2200			P	
7440-47-3	Chromium	7.9			P	
7440-48-4	Cobalt	6.0			P	
7440-50-8	Copper	22.1			P	
7439-89-6	Iron	15600			P	
7439-92-1	Lead	~~1.4~~		R ~~N~~	P	MSH
7439-95-4	Magnesium	2350			P	
7439-96-5	Manganese	451			P	
7439-97-6	Mercury	0.11	U		CV	
7440-02-0	Nickel	4.3 ~~3.9~~	~~J~~	U	P	BL
7440-09-7	Potassium	1080		J ~~N~~	P	SD
7782-49-2	Selenium	3.8	U		P	
7440-22-4	Silver	1.1	U		P	
7440-23-5	Sodium	543 ~~133~~	~~J~~	U	P	BL
7440-62-2	Vanadium	45.7			P	
7440-66-6	Zinc	28.2			P	
57-12-5	Cyanide	2.7	U		AS	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

Form IA-IN CW 10/29/08

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-2022

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584209

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 91.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	0.53	U		MS

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

10

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SS20-0406

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584210

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 88.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	16000			P	
7440-36-0	Antimony	6.5	~~U~~	UJ ~~N~~	P	MSL
7440-38-2	Arsenic	0.71	J		P	
7440-39-3	Barium	115			P	
7440-41-7	Beryllium	0.21	J		P	
7440-43-9	Cadmium	0.55	U		P	
7440-70-2	Calcium	3210			P	
7440-47-3	Chromium	16.8			P	
7440-48-4	Cobalt	10.6			P	
7440-50-8	Copper	34.1			P	
7439-89-6	Iron	23700			P	
7439-92-1	Lead	2.3		~~R~~ ~~N~~	P	MSH
7439-95-4	Magnesium	3390			P	
7439-96-5	Manganese	687			P	
7439-97-6	Mercury	0.11	U		CV	
7440-02-0	Nickel	7.4			P	
7440-09-7	Potassium	1830		J ~~E~~	P	SD
7782-49-2	Selenium	3.8	U		P	
7440-22-4	Silver	1.1	U		P	
7440-23-5	Sodium	546 ~~134~~	~~J~~	U	P	BL
7440-62-2	Vanadium	62.9			P	
7440-66-6	Zinc	43.9			P	
57-12-5	Cyanide	2.8	U		AS	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

Form IA-IN MW 10/29/08

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1A-IN

INORGANIC ANALYSIS DATA SHEET

10

EPA SAMPLE NO.

VWAE-SS20-0406

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Lab Sample ID: 1584210

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 88.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	0.55	U		MS

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

USEPA REGION II WORKSHEETS

Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 (SOP Revision 13)

PREPARED BY: _____ Date: 12-08-06
Hanif Sheikh, Chemist
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Peer Reviewed by: _____ Date: 12-08-06
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Concurred by: _____ Date: 12/8/06
Linda Mauel, Chief
Hazardous Waste Support Section

Approved by: _____ Date: 12/8/06
Robert Runyon, Chief
Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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I.0 Scope

I.I 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 Island, PR

Case #: NA

SDG #: 15842

Samples: 10 **Soil** **Water**

	YES	NO	N/A
A.1.1 **Contract Compliance Screening Report**			
Present?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.2 **Record of Communication (from RSCC)**			
Present?	[✓]	___	___
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.4 **Chain of Custody/Sample Traffic Report**			
Present?	[✓]	___	___
Legible?	[✓]	___	___
Signature of sample custodian present?	[✓]	___	___
ACTION: If no, contact RSCC/WAM/PO.			
A.1.5 **Cover Page**			
Present?	[✓]	___	___
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	[✓]	___	___
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[✓]	___	___

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[✓]	___	___
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[✓]	___	___

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

Laboratory Name?	[✓]	___	___
Laboratory Code?	[✓]	___	___
RAS/Non-RAS Case No.?	[✓]	___	___
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[✓]	___	___

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

(a) all analytes analyzed by ICP-AES?	___	[✓]	___
(b) all analytes analyzed by ICP-MS?	___	[✓]	___
(c) Mercury?	___	[✓]	___
(d) Cyanide?	___	[✓]	___

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

Digestion Log for ICP-AES (Form XII)present?	[✓]	___	___
Digestion Log for ICP-MS (Form XII) present?	[✓]	___	___
Digestion Log for mercury (Form XII) present?	[✓]	___	___
Distillation Log for cyanide (Form XII) present?	[✓]	___	___

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	[✓]		
Are percent solids calculations present for soils/sediments?	[✓]		
Are preparation dates present on the sample preparation logs/bench sheets?	[✓]		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	[✓]		
ICP-MS?	[✓]		
Mercury?	[✓]		
Cyanide?	[✓]		

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	[✓]		
Properly labeled?	[✓]		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	[✓]		
Instrument Printouts?	[✓]		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A
A.1.9 Technical Holding Times: (Aqueous and soil samples) (Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)			
A.1.9.1 Cyanide distillation(14 days)exceeded?	_	[✓]	_
Mercury analysis(28 days) exceeded?	_	[✓]	_
Other Metals analysis(180 days)exceeded?	___	[✓]	_

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

A.1.9.2 Is pH of aqueous samples for:			
Metals Analysis ≤ 2?	[✓]	___	___
Cyanide Analysis ≥ 12?	[✓]	_	_

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

A.1.9.3 Is the cooler temperature ≤ 10 C°?	[✓]	_	_

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 Final Data Correctness - Form I

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

	YES	NO	N/A
Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[✓]	___	___
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[✓]	___	___
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]	✓	___

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]	___	___
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]	___	___
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[✓]	___	___
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[✓]	___	___

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[✓]	___	___

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

		YES	NO	N/A
	Mercury Analysis?	[✓]	___	___
	Cyanide Analysis?	[✓]	___	___
	ICP-AES(more than 2 point Calib.)?	[✓]	___	___
	ICP-MS (more than 2 point calib.)?	[✓]	___	___

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[✓]	___	___

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

	YES	NO	N/A
Metals - 90-110%R?	[✓]	___	___
Hg - 80-120%R?	[✓]	___	___
Cyanide - 85-115%R?	[✓]	___	___

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [✓] ___ ___

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? (Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)	[✓]	___	___
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.

A.1.14 Initial and Continuing Calibration Blanks - Form III

A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___
Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by			

	YES	NO	N/A
using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[✓]	___	___

ACTION:
If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".

A.1.14.2 Circle with red pencil on each Form III all Calib. Blank values that are:

≥ MDL but ≤ CRQL

> CRQL

A.1.14.2.1 When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	✓	[___]	___

ACTION:
If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.

A.1.14.2.2 When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[✓]	___

ACTION:
If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".

A.1.14.2.3 Is any Calibration Blank value below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run.
2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J),but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL? ✓ [___] ___

ACTION:
If yes, change sample result ≥ MDL

	YES	NO	N/A
but ≤ CRQL to CRQL with a "U".			
..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.

..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).

..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".			
..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.

..1.16.3 **ICP-MS Method**

	YES	NO	N/A
..1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
..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
..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.			
..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.			
..1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	___	[___]	✓
	(b) between 30-74%?	___	[___]	✓
	(c) between 126-150%?	___	[___]	✓
	(d) greater than 150%?	___	[___]	✓
	ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

	YES	NO	N/A

as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.

(**NOTE**:Replace "N" with "J", "R" as appropriate.)

..1.17.5 **Soil/Sediment**

Are any spike recoveries:

	YES	NO	N/A
(a) less than 10%?	___	[✓]	___
(b) between 10-74%?	✓	[___]	___
(c) between 126-200%?	___	[✓]	___
(d) greater than 200%?	✓	[___]	___

ACTION:
If yes for any of the above, proceed as follows:

If the matrix spike recovery is less than 10%,reject (R) and red-line all associated data (detects & non-detects); if between 10-74%,qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL.
(**NOTE**:Replace "N" with "J" or "R" as appropriate.)

..1.18 **Lab Duplicates) - Form VI**

..1.18.1 Was the lab duplicate analysis performed:

	YES	NO	N/A
For each SDG?	[✓]	___	___
On one of the SDG samples?	[✓]	___	___
For each matrix type?	[✓]	___	___
For each concentration range (low or med.)?	[✓]	___	___
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	[✓]	___	___
Was a lab duplicate prepared and analyzed with the SDG samples?	[✓]	___	___

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
..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.			
..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.			
..1.18.4	**Aqueous**			
..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:

> ± 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),

is any RPD ≥ 35% but < 120%?	___	[✓]	___
is any RPD ≥ 120%?	___	[✓]	___

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R) and red-line the associated sample data ≥ CRQL.			
..1.18.5.2	When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[✓]	___
	> ± 4 x CRQL	___	[✓]	___

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

..1.19 **Field Duplicates**

Aqueous Field Duplicates

..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),

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:

> ± 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			
..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.

..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.			
..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

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".			
1.1.21	**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.			
1.1.21.1	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.			
1.1.21.2	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			
1.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[✓]	___	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
1.1.21.4	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.)			
1.1.22	**Total/Dissolved or Inorganic/Total Analytes**			
1.1.22.1	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.			
1.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

		YES	NO	N/A
1.1.22.3	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.			
1.1.23	**Field Blank - Form I** **NOTE**: **Designate "Field Blank" as such on Form I**			
1.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[___]	___	✓
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	___	[___]	✓
	If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL).			
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[___]	✓
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓

ACTION:
If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results)greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L. Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

	YES	NO	N/A
Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.			

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
1.1.24.2.2	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.			
1.1.24.3	**Linear Ranges - Form XI**			
1.1.24.3.1	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.			
1.1.25	**ICP-MS Tune Analysis - Form XIV**			
1.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
1.1.25.2	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
).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".

ı.1.26 **ICP-MS Internal Standards - Form XV**

ı.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.

ı.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

:han 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.

Inorganic Data Review Narrative - See EDS data validation report

:ase# _____ **Site:** _____ **Matrix: Soil** ____

:DG# _____ **Lab:** _____ **Water** ____

:ampling Team: _____ **Reviewer:** _____ **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

'orm I'S and the QC Form when a QC analysis is outside the control limits. These ıualifiers are not applied on the Lotus or XLS spreadsheets. These qualifiers and their ıeanings 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 Foı 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.

ı.2.3.1 **Data Case Description**:

ı.2.3.2 **CSF Audit**:

A.2.3.3 **Technical Review:**

A.2.3.4 **Contract-Problem/Non-Compliance:**

HWSS Reviewer: _____ Date:_____
Signature

Contractor Reviewer: _____ Date:_____
Signature

Verified by: _____ Date:_____
Signature

CASE #
SDG #

Contract Laboratory Program
REGION II/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

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:

Summary of Resolution:

Signature Date: _____

FIELD DUPLICATES

Sample No. **Field Duplicate No.** **Sample Matrix:**

Lab 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									
Manganese									

					YES	NO	N/A		
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

Total/Dissolved Concentrations

Lab Code **Case No.** **SDG No.** **Sample Matrix: Water**

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

ECTION A (TO BE COMPLETED BY REGIONAL SENDING OFFICIAL)

nitiated By:

Name, Affiliation, Phone Number

_____

Case Number: _____
- OLM
- OLC
- ILM

Details 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)

Name of SMO Contact _____ Date: _____

)ate 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
'inal 9/3/99

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

'ype of Review: _____ Date:_____ Case# _____SDG#___

:ite: _____ Lab Name: _____

:eviewer's Initials:_____ Number of Samples:_____

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														

CHAIN OF CUSTODY

18332

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CompuChem
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CHAIN OF CUSTODY

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

Page 1 of 1

Courier:
Airbill No.:
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Chelsea Bennet / CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Stephen Brand
Phone #: 757.671.6211
Sampler's Name: K. Butler / J. Acaron

Project Information

Project Name: Vieques CTO ~~[illegible]~~-10
Sampling Location: W-AOC-E
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (EnCores)	SVOCs, SVOC Sim, DRO, ORO (8270)	8PLP SVOC, Metals, TPH-GRO, ORO, DRO	Total Metals, TI, CN (4 C7)	Grain Size, Atterberg Limits (8 C2)	VOCs (liquid)	SVOC, SVOC Sim	Total Metals, TI	Cyanide	TPH-GRO	TPH-DRO & ORO (2 A2)	TOC	pH / Sample Info (Lab Use) SAB
~~CPB 7/17/08~~	~~WVAE-EB01-071708~~	~~7/17/08~~	~~0640~~	~~QC~~																				
0807038-08 1584201	WVAE-SS21-0506-08C	7/16/08	0803	SO	6								X (3)		X (3)									
0807038-12 1584202	WVAE-SB21-1820-08C	7/16/08	1020	SO	3								X		X	X								
0807038-09 1584203	WVAE-SB21-0910-08C	↓	0910	SO	2								X		X									
0807038-10 1584204	WVAE-SB21P-0910-08C		0910	SO	2								X		X									
0807038-11 1584205	WVAE-SB21-1618-08C	↓	0940	SO	3								X	X	X									
0807042-03	WVAE-EB01-071708	7/17/08	0640	QC	2														NO →	X	X			

Sample IDs should all start w/ "WVAE" (!) 7/21/08

Lab Use Only

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

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

Comments

WVAE-SS21-0506-08C is MS/MSD
X Bottle not in COC (mistake)

Sample Custody

Relinquished by: [signature]	Date/Time: 7/17/08 1330	Received by: Jennifer Dove	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 2.4 °C

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

White & Yellow copy to lab • Pink copy for customer

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CHAIN OF CUSTODY

Page 1 of 1

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Renji Butler / Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores) (3-encore)	VOCs (Liquid) (3-40 ml)	SVOCs, SVOC SIM, DRO, ORO	TPH-GRO (soil) (2-encore)	Total Metals, Tl, CN	Grain Size, Atterberg Limits (2 kg)	SVOC, SVOC SIM (liquid) (1 L)	Total Metals, Tl (liquid) (250 ml)	CN (liquid)	TPH-GRO (liquid) (2-40 ml)	TPH-DRO & ORO (liquid)	TOC (liquid) (2-4 oz)	pH / Sample Info (Lab Use) Water	Cyanide
0807042-03 1584401	VWAE-EB01-071708	7/17/08	0840	QC	11	5	1	1	2				X					X	X	X	X	X	X	0	<2>12
0807038-13	VWAE-SB21-3436-08C		0905	SO	5							X			X										
0807038-14	VWAE-SB21-3638-08C		1156	SO	5							X			X										
0807042-04	VWAE-TB01-071708		—	QC	5	5							X								X				
0807098-16	VWAE-SS20-0406-08C		1300	SO	5							X			X										

Lab Use Only

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

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

Comments

VWAE-SS20-0406-08C has a jar for % Moisture included
~~SB21-3436 Scan: pH 2oz, 4oz, TL, CN, TOC 4oz, SV, SV SIM, DRO/ORO 8oz; SPLP 4oz, 8oz, VOA 2, 8oz, TL~~

Sample Custody

Relinquished by:	Date/Time: 7/17/08 1330	Received by: Jennifer Dove	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 2.6 °C

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

White & Yellow copy to lab • Pink copy for customer

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Page 1 of 1

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CHAIN OF CUSTODY

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

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

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757-671-6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Vieques
Sampling Location: AOC E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N
Are high concentrations expected? (Y) or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores)	SVOCs, SVOC,SIM, DRO, ORO	SPLP Metals, SVOC, TPH (GRO, DRO, ORO)	Total Metals, Tl, CN	Grain Size, Atterberg Limits	SPLP VOCs (liquid)	SVOC, SVOC SIM liquid	Total Metals, Tl	Cyanide PH	TPH-GRO	TPH-DRO & ORO	TOC, %	pH / Sample Info (Lab Use)
0801038 1584353	VWAE-SB21-2930-08C	7-16-08	1127	SO	7			SPLP = 1584501					X	X	X	X	X		X			X	
0801038-14 1584206	VWAE-SB21-3438-08C	7-17-08	1156	SO	2								X		X								
0801038-13 1584207 1584502	VWAE-SB21-3436-08C	7-17-08	0905	SO				SPLP = 1584502					X	X	X		X		X			X	
	~~VWAE-SB21~~																						

*only rec'd SVOC, SIM, DRO, ORO & T. Metals, Tl, CN 4 ea for VWAE-SB21-2930-08C (JD) 7/18/08

Lab Use Only

Sample Unpacked By: Jennifer Dover
Sample Order Entry By:
Samples Received in Good Condition? Y or (N)
If no, explain:
Cyanide samples checked for sulfide & chlorine? Y or (NA)
625 & Phenol samples checked for chlorine? Y or (NA)
608 samples checked for pH between 5.0-9.0? Y or (NA)

Comments

~~Mistake~~

Sample Custody

Relinquished by:	Date/Time: 7/17/08 1330	Received by: Jennifer Dover	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 1.8 °C

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

White & Yellow copy to lab • Pink copy for customer

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CHAIN OF CUSTODY

Page 1 of 1

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland Street, Ste 101
City / State / Zip: Virginia Beach, VA 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N: where indicated
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (encores)	SVOCs, SVOC SIM, DRO, ORO (8 oz)	TPH-GRO	Total Metals, TI, CN (4 oz)	Grain Size, Atterberg Limits	VOCs	SVOCs, SVOC SIM (AL)	Total Metals, TI (1-PL)	Cyanide (250 ml)	TPH-GRO	TPH-DRO & ORO (2-AL)	TOC (2-40 ml)	pH / Sample Info (Lab Use) Total Metals	TOC	Cyanide		
080704-06 1584402	* VWAE-EB01-071808	7/18/08	0700	QC	8		1	1	2								⊗	X ⊗	X	X		X	X	<2	<2	>2		
080704-01 1584301	VWAE-SB20-0810-08C	7/18/08	0745	SO	6								X		X													
080708-14 1584207	VWAE-SB20-1618-08C	↓	0818	SO	2								X		X													
080708-14 1584208	VWAE-SB20P-1618-08C		0818	SO	2								X		X													
080708-14 1584209	VWAE-SB20-2022-08C	↓	0825	SO	2								X		X													

Lab Use Only

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

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

Comments

⊗ - Mistake
MS/MSD on VWAE-SB20-0810-08C
* 1 of 2 SVOC Amber Liters broken - VWAE-EB01 7-18-08

Sample Custody

Relinquished by:	Date/Time: 7/18/08 1330	Received by: Diane Byrd	Date/Time: 7-21-08 745
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 3.8 °C

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

White & Yellow copy to lab • Pink copy for customer

18364

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CHAIN OF CUSTODY

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

Page 1 of 1

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

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: W-AOC-E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N: where indicated
Are high concentrations expected? (Y) or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	SVOC-SVOC-SIM (2-AL (liquid))	Total Metals-TI (1 PL)	Cyanide (1-250 ml)	TPH-DRO-ORO (2-AL)	TOC (2-40ml)	SVOC-SVOC-SIM-DRO-ORO (1-8 oz)	Total Metals-TI-CN (1-4 oz)	TOC (4 oz)	SPLP-VOA (4-oz)	SPLP-SVOC-Metals-TPH (8 oz)	pH (2 oz)	Grain Size, Atterberg Limits	pH Sample Info (Lab Use)				
0807042-01 1584413	VIWAE-EB02-071708	7/17/08	1810	QC	7		1	1	2			X	X	X	X	X								<2	>12	<2		KLB
1584303	VIWAE-SB21-2930-08C	7/16/08	1127	SO	5								SPLP=						X	X	X	X	X					
0807038-22 1584210	VIWAE-SS20-0406-08C	7/17/08	1300	SO	2												X	X										
0807038-23	VIWAE-SB20-2830-08C	7/18/08	0940	SO	2												X	X										

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/18/08	Received by: Diane Byrd	Date/Time: 7/21/08 145
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 5.9 °C

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

White & Yellow copy to lab • Pink copy for customer

SUPPORT DOCUMENTATION

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract: _____

Lab Code: LIBRTY Case No.: _____ NRAS No.: _____ SDG NO.: 15842

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M	
Aluminum	200.000	U	31.684	J	19.583	J	42.831	J	20.000	U	P	>CRD
Antimony	60.000	U	60.000	U	-3.234	J	-2.914	J	6.000	U	P	
Arsenic	-3.878	J	10.000	U	-3.920	J	10.000	U	-0.379	J	P	
Barium	-0.917	J	-0.813	J	-0.833	J	-0.703	J	20.000	U	P	
Beryllium	5.000	U	5.000	U	5.000	U	5.000	U	0.500	U	P	
Cadmium	5.000	U	5.000	U	5.000	U	5.000	U	0.500	U	P	
Calcium	5000.000	U	57.890	J	41.819	J	70.347	J	16.815	J	P	>CRDL
Chromium	10.000	U	10.000	U	10.000	U	10.000	U	1.000	U	P	
Cobalt	50.000	U	50.000	U	50.000	U	50.000	U	-0.246	J	P	
Copper	25.000	U	25.000	U	25.000	U	25.000	U	2.500	U	P	
Iron	100.000	U	23.975	J	25.150	J	23.966	J	10.000	U	P	>CRDL
Lead	10.000	U	10.000	U	2.914	J	10.000	U	0.346	J	P	
Magnesium	5000.000	U	44.004	J	30.438	J	55.323	J	5.744	J	P	>CRD
Manganese	-0.615	J	-0.449	J	-0.490	J	-0.378	J	1.500	U	P	
Mercury	0.200	U	-0.079	J	-0.096	J	0.200	U	0.100	U	CV	
Nickel	40.000	U	40.000	U	0.543	J	40.000	U	4.000	U	P	
Potassium	5000.000	U	5000.000	U	5000.000	U	5000.000	U	500.000	U	P	
Selenium	35.000	U	35.000	U	35.000	U	35.000	U	3.500	U	P	
Silver	10.000	U	10.000	U	10.000	U	10.000	U	1.000	U	P	
Sodium	5000.000	U	5000.000	U	5000.000	U	5000.000	U	39.713	J	P	All U
Vanadium	50.000	U	50.000	U	50.000	U	50.000	U	5.000	U	P	
Zinc	60.000	U	60.000	U	60.000	U	60.000	U	0.886	J	P	>CRD
Cyanide	10.000	U	10.000	U	10.000	U	10.000	U	2.500	U	AS	

Na 39.713 mg/kg → all samples (U)

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum			41.842	J	74.703	J	49.785	J			P
Antimony			60.000	U	60.000	U	-3.885	J			P
Arsenic			10.000	U	10.000	U	10.000	U			P
Barium			-0.769	J	-0.619	J	-0.768	J			P
Beryllium			5.000	U	0.351	J	5.000	U			P
Cadmium			5.000	U	5.000	U	5.000	U			P
Calcium			44.963	J	65.545	J	46.880	J			P
Chromium			10.000	U	10.000	U	10.000	U			P
Cobalt			50.000	U	50.000	U	50.000	U			P
Copper			25.000	U	25.000	U	25.000	U			P
Iron			20.515	J	26.916	J	28.041	J			P
Lead			10.000	U	10.000	U	10.000	U			P
Magnesium			38.586	J	57.395	J	40.523	J			P
Manganese			15.000	U	15.000	U	15.000	U			P
Mercury			0.200	U	0.200	U	0.200	U			CV
Nickel			0.603	J	40.000	U	40.000	U			P
Potassium			5000.000	U	5000.000	U	5000.000	U			P
Selenium			35.000	U	35.000	U	-3.960	J			P
Silver			10.000	U	10.000	U	10.000	U			P
Sodium			5000.000	U	5000.000	U	5000.000	U			P
Vanadium			50.000	U	50.000	U	50.000	U			P
Zinc			60.000	U	60.000	U	60.000	U			P
Cyanide			10.000	U	10.000	U					AS

U

Ni 0.603 ug/L → (2,5-9)

US EPA - CLP

5A-IN

MATRIX SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

VWAE-SS21-0506S

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 89.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Antimony	75 - 125	10.5069		6.7265	U	22.42	47	N	P
Arsenic	75 - 125	7.7674		0.8255	J	8.97	77		P
Barium	75 - 125	577.0303		138.8906		448.43	98		P
Beryllium	75 - 125	10.9321		0.3430	J	11.21	94		P
Cadmium	75 - 125	9.1442		0.5605	U	11.21	82		P
Chromium	75 - 125	57.8343		13.2279		44.84	99		P
Cobalt	75 - 125	120.8348		13.7332		112.11	96		P
Copper	75 - 125	91.8231		40.1685		56.05	92		P
Lead	75 - 125	16.5657		3.1769		4.48	299	N	P
Manganese		1251.9280		1097.9180		112.11	137		P
Mercury	75 - 125	0.5207		0.1121	U	0.56	93		CV
Nickel	75 - 125	111.7489		8.3926		112.11	92		P
Selenium	75 - 125	9.0413		3.9238	U	11.21	81		P
Silver	75 - 125	10.7603		0.1924	J	11.21	94		P
Vanadium	75 - 125	169.6647		71.7436		112.11	87		P
Zinc	75 - 125	146.9228		48.6255		112.11	88		P
Cyanide	75 - 125	5.2239		2.8027	U	5.61	93		AS

Comments:

US EPA - CLP

8-IN

ICP-AES and ICP-MS SERIAL DILUTIONS

EPA SAMPLE NO.

VWAE-SS21-0506L

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Matrix (soil/water): SOIL Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	183109.50		184411.90		1		P
Antimony	60.00	U	300.00	U			P
Arsenic	7.36	J	50.00	U	100		P
Barium	1238.90		1268.16		2		P
Beryllium	3.06	J	2.78	J	9		P
Cadmium	5.00	U	25.00	U			P
Calcium	32081.23		33335.84		4		P
Chromium	117.99		121.37		3		P
Cobalt	122.50		113.58	J	7		P
Copper	358.30		359.94		0		P
Iron	255313.40		266954.60		5		P
Lead	28.34		31.58	J	11		P
Magnesium	40777.09		42242.86		4		P
Manganese	9793.43		9992.25		2		P
Nickel	74.86		76.28	J	2		P
Potassium	16843.57		14516.97	J	14	E	P
Selenium	35.00	U	175.00	U			P
Silver	1.72	J	3.54	J	106		P
Sodium	1451.67	J	1418.33	J	2		P
Vanadium	639.95		662.32		3		P
Zinc	433.74		467.74		8		P

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15842

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Thallium	0.044	J	0.041	J	0.030	J	0.028	J	0.500	U	MS

None - all Samples are ND.

ENVIRONMENTAL
Data Services, Inc.

TOTAL METALS & CYANIDE
USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 15843

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 29, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SB20-0810	1584301	Soil
1MS	VWAE-SB20-0810MS	1584301MS	Soil
1MSD	VWAE-SB20-0810MSD	1584301MSD	Soil
2	VWAE-SB21-3436	1584302	Soil
3	VWAE-SB21-2930	1584303	Soil
4	VWAE-SB20-2830	1584304	Soil

The USEPA Region II SOP No. HW-2, Revision 13, September 2006: Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were prepared and analyzed within 14 days for cyanide, 28 days for mercury and 180 days for all other metals.

Calibration - The ICV and CCV %R values were acceptable.

CRDL Standard - The CRDL standards exhibited acceptable %R values.

Method and Calibration Blanks - The following table summarizes method blank and continuing calibration blank contamination.

Compound	Conc.	Qualifier	Affected Samples
Beryllium	0.289 ug/L	U	All samples
Sodium	56.635 mg/kg	U	All samples

ICP Interference Check Sample - All %R values were acceptable.

Matrix Spike/Matrix Spike Duplicate - The matrix spike/matrix spike duplicate sample exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	%R/RPD	Qualifier	Affected Samples
1	Cobalt	Ok/52	J	Positive results in all samples
	Manganese	Ok/68	J	Positive results in all samples
	Antimony	37%/Ok	J/UJ	All samples
	Barium	131%/45	J	Positive results in all samples
	Selenium	60%/Ok	J/UJ	All samples

Field Duplicates - Field duplicate samples were not included in this data package.

LCS - The LCS samples exhibited acceptable %R values.

ICP Serial Dilution - The ICP serial dilution sample exhibited acceptable %D values except the following.

ICP Sample ID	Compound	%D	Qualifier	Affected Samples
1	Potassium	11%	J	Positive results in all samples

Field and Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-EB01-071708	Manganese	1.8	None	All >CRDL
	Zinc	3.4	None	All >CRDL
VWAE-EB02-071708	Manganese	1.2	None	All >CRDL
	Zinc	3.2	None	All >CRDL
VWAE-EB01-071808	Manganese	0.34	None	All >CRDL
	Zinc	4.5	None	All >CRDL

Compound Quantitation - No discrepancies were identified.

ANNOTATED FORM Is

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-0810

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15843

Matrix (soil/water): SOIL Lab Sample ID: 1584301

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 87.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	19700			P	
7440-36-0	Antimony	6.8	~~U~~	UJ ~~N~~	P	MSL
7440-38-2	Arsenic	0.84	J		P	
7440-39-3	Barium	224		J ~~N*~~	P	MDP, ~~MSH~~
7440-41-7	Beryllium	0.57 ~~0.33~~	~~J~~	U	P	BL
7440-43-9	Cadmium	0.57	U		P	
7440-70-2	Calcium	4240			P	
7440-47-3	Chromium	16.1			P	
7440-48-4	Cobalt	18.8		J ~~*~~	P	MDP
7440-50-8	Copper	44.5			P	
7439-89-6	Iron	27700			P	
7439-92-1	Lead	3.8			P	
7439-95-4	Magnesium	5050			P	
7439-96-5	Manganese	1120		J ~~*~~	P	MDP
7439-97-6	Mercury	0.11	U		CV	
7440-02-0	Nickel	9.2			P	
7440-09-7	Potassium	2430		J ~~E~~	P	SD
7782-49-2	Selenium	4.0	~~U~~	UJ ~~N~~	P	MSL
7440-22-4	Silver	1.1	U		P	
7440-23-5	Sodium	570 ~~314~~	~~J~~	U	P	BL
7440-62-2	Vanadium	71.7			P	
7440-66-6	Zinc	49.2			P	
57-12-5	Cyanide	2.9	U		AS	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-0810

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15843

Matrix (soil/water): SOIL Lab Sample ID: 1584301

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 87.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	0.57	U	Ø	MS

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

2

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-3436

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15843

Matrix (soil/water): SOIL Lab Sample ID: 1584302

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 92.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	11000			P	
7440-36-0	Antimony	6.3	~~U~~	UJ ~~N~~	P	MSL
7440-38-2	Arsenic	0.54	J		P	
7440-39-3	Barium	111		J ~~N*~~	P	MDP, MSH
7440-41-7	Beryllium	0.53 ~~0.19~~	J	U	P	BL
7440-43-9	Cadmium	0.53	U		P	
7440-70-2	Calcium	5740			P	
7440-47-3	Chromium	21.7			P	
7440-48-4	Cobalt	7.3		J ~~*~~	P	MDP
7440-50-8	Copper	17.3			P	
7439-89-6	Iron	14800			P	
7439-92-1	Lead	3.6			P	
7439-95-4	Magnesium	3970			P	
7439-96-5	Manganese	309		J ~~*~~	P	MDP
7439-97-6	Mercury	0.11	U		CV	
7440-02-0	Nickel	6.3			P	
7440-09-7	Potassium	491	~~J~~	J ~~E~~	P	SD
7782-49-2	Selenium	3.7	~~U~~	UJ N	P	MSL
7440-22-4	Silver	1.1	U		P	
7440-23-5	Sodium	528 ~~234~~	~~J~~	U	P	BL
7440-62-2	Vanadium	37.0			P	
7440-66-6	Zinc	25.9			P	
57-12-5	Cyanide	2.7	U		AS	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-3436

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15843

Matrix (soil/water): SOIL Lab Sample ID: 1584302

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 92.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	0.53	U	D	MS

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

Form IA-IN MW 10/29/08

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

3

EPA SAMPLE NO.

VWAE-SB21-2930

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15843

Matrix (soil/water): SOIL Lab Sample ID: 1584303

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 88.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	13100			P	
7440-36-0	Antimony	6.6	~~U~~	UJ ~~N~~	P	MSL
7440-38-2	Arsenic	0.57	J		P	
7440-39-3	Barium	126		J ~~N*~~	P	MDP, ~~MSH~~
7440-41-7	Beryllium	0.55 ~~0.42~~	~~J~~	U	P	BL
7440-43-9	Cadmium	0.55	U		P	
7440-70-2	Calcium	2290			P	
7440-47-3	Chromium	10.1			P	
7440-48-4	Cobalt	15.0		J ~~*~~	P	MDP
7440-50-8	Copper	25.5			P	
7439-89-6	Iron	22800			P	
7439-92-1	Lead	7.7			P	
7439-95-4	Magnesium	2080			P	
7439-96-5	Manganese	480		J ~~*~~	P	MDP
7439-97-6	Mercury	0.11	U		CV	
7440-02-0	Nickel	3.6	J		P	
7440-09-7	Potassium	596		J ~~E~~	P	SD
7782-49-2	Selenium	3.9	~~U~~	UJ ~~N~~	P	MSL
7440-22-4	Silver	1.1	U		P	
7440-23-5	Sodium	554 ~~257~~	~~J~~	U	P	BL
7440-62-2	Vanadium	76.5			P	
7440-66-6	Zinc	26.6			P	
57-12-5	Cyanide	2.8	U		AS	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

3

EPA SAMPLE NO.

VWAE-SB21-2930

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15843

Matrix (soil/water): SOIL Lab Sample ID: 1584303

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 88.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	0.55	U	D	MS

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

Form IA-IN MW 10/29/08

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

4

EPA SAMPLE NO.

VWAE-SB20-2830

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15843

Matrix (soil/water): SOIL Lab Sample ID: 1584304

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 89.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	30200			P	
7440-36-0	Antimony	6.7	~~U~~	UJ ~~N~~	P	MSL
7440-38-2	Arsenic	2.2			P	
7440-39-3	Barium	356		J ~~N*~~	P	MDP, ~~MSH~~
7440-41-7	Beryllium	0.56 ~~0.40~~	~~J~~	U	P	BL
7440-43-9	Cadmium	0.56	U		P	
7440-70-2	Calcium	10500			P	
7440-47-3	Chromium	39.3			P	
7440-48-4	Cobalt	29.5		J ~~*~~	P	MDP
7440-50-8	Copper	68.2			P	
7439-89-6	Iron	53400			P	
7439-92-1	Lead	1.7			P	
7439-95-4	Magnesium	19900			P	
7439-96-5	Manganese	1250		J ~~*~~	P	MDP
7439-97-6	Mercury	0.11	U		CV	
7440-02-0	Nickel	23.5			P	
7440-09-7	Potassium	256	~~J~~	J ~~E~~	P	SD
7782-49-2	Selenium	3.9	~~U~~	UJ ~~N~~	P	MSL
7440-22-4	Silver	1.1	U		P	
7440-23-5	Sodium	559 ~~532~~	~~J~~	U	P	BL
7440-62-2	Vanadium	176			P	
7440-66-6	Zinc	69.1			P	
57-12-5	Cyanide	2.8	U		AS	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

Form IA-IN DW 10/29/08

4

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-2830

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15843

Matrix (soil/water): SOIL Lab Sample ID: 1584304

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 89.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	0.53	U	D	MS

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

Form IA-IN RW 10/29/08

USEPA REGION II WORKSHEETS

Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 (SOP Revision 13)

PREPARED BY: _____ Date: 12-08-06
Hanif Sheikh, Chemist
Hazardous Waste Support Section

Peer Reviewed by: _____ Date: 12-08-06
Russell Arnone, Chemist
Hazardous Waste Support Section

Concurred by: _____ Date: 12/8/06
Linda Mauel, Chief
Hazardous Waste Support Section

Approved by: _____ Date: 12/11/06
Robert Runyon, Chief
Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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I.0 Scope

I.I 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 Island

Case #: NA

SDG #: 15843

Samples: 4 **Soil** **Water**

	YES	NO	N/A
A.1.1 **Contract Compliance Screening Report** Present?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.2 **Record of Communication (from RSCC)** Present?	[✓]	___	___
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report** Present and complete?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.4 **Chain of Custody/Sample Traffic Report** Present?	[✓]	___	___
Legible?	[✓]	___	___
Signature of sample custodian present?	[✓]	___	___
ACTION: If no, contact RSCC/WAM/PO.			
A.1.5 **Cover Page** Present?	[✓]	___	___
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	[✓]	___	___
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on: (a) Traffic Report Sheet?	[✓]	___	___

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 SDG Narrative, DC-1 & DC-2 Form

Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[✓]	___	___
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[✓]	___	___

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 Form I to XV

A.1.7.1 Are all the Form I through Form XV labeled with:

Laboratory Name?	[✓]	___	___
Laboratory Code?	[✓]	___	___
RAS/Non-RAS Case No.?	[✓]	___	___
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[✓]	___	___

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

(a) all analytes analyzed by ICP-AES?	___	[✓]	___
(b) all analytes analyzed by ICP-MS?	___	[✓]	___
(c) Mercury?	___	[✓]	___
(d) Cyanide?	___	[✓]	___

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

Digestion Log for ICP-AES (Form XII)present?	[✓]	___	___
Digestion Log for ICP-MS (Form XII) present?	[✓]	___	___
Digestion Log for mercury (Form XII) present?	[✓]	___	___
Distillation Log for cyanide (Form XII) present?	[✓]	___	___

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	[ ]		✓
Are percent solids calculations present for soils/sediments?	[✓]		
Are preparation dates present on the sample preparation logs/bench sheets?	[✓]		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

ICP-AES?	[✓]		
ICP-MS?	[✓]		
Mercury?	[✓]		
Cyanide?	[✓]		

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

Legible?	[✓]		
Properly labeled?	[✓]		

Are all field samples, QC samples and field QC samples present on:

Digestion/Distillation log?	[✓]		
Instrument Printouts?	[✓]		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

		YES	NO	N/A
A.1.9 **Technical Holding Times**: (Aqueous and soil samples) (Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)				
A.1.9.1	Cyanide distillation(14 days)exceeded?	_	[✓]	_
	Mercury analysis(28 days) exceeded?	_	[✓]	_
	Other Metals analysis(180 days)exceeded?	___	[✓]	_

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

A.1.9.2	Is pH of aqueous samples for:			
	Metals Analysis ≤ 2?	[✓]	___	___
	Cyanide Analysis ≥ 12?	[✓]	_	_

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

A.1.9.3	Is the cooler temperature ≤ 10 C°?	[✓]	_	_

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

	YES	NO	N/A
Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[✓]	___	___
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[✓]	___	___
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[✓]	___	___

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]	___	___
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]	___	___
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[✓]	___	___
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[✓]	___	___

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[✓]	___	___

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

		YES	NO	N/A
	Mercury Analysis?	[✓]	___	___
	Cyanide Analysis?	[✓]	___	___
	ICP-AES(more than 2 point Calib.)?	[✓]	___	___
	ICP-MS (more than 2 point calib.)?	[✓]	___	___

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[✓]	___	___

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

Metals - 90-110%R?	[✓]	___	___
Hg - 80-120%R?	[✓]	___	___
Cyanide - 85-115%R?	[✓]	___	___

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [✓] ___ ___

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? **(Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)**	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[✓]	___	___
For each cyanide run, was a CRQL standard analyzed?	[✓]	___	___

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
*** True value of the CRQL Standard**

	YES	NO	N/A
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.

A.1.14 Initial and Continuing Calibration Blanks - Form III

A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___
Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by			

	YES	NO	N/A
using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[✓]	___	___

ACTION:
If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".

A.1.14.2 Circle with red pencil on each Form III all Calib. Blank values that are:

≥ MDL but ≤ CRQL

> CRQL

	YES	NO	N/A
A.1.14.2.1 When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	✓	[___]	___

ACTION:
If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.

	YES	NO	N/A
A.1.14.2.2 When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[✓]	___

ACTION:
If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".

	YES	NO	N/A
A.1.14.2.3 Is any Calibration Blank value below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run.

2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J),but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL? ___ ✓ [___] ___

ACTION:
If yes, change sample result ≥ MDL

	YES	NO	N/A
but ≤ CRQL to CRQL with a "U".			
..1.15.2.2 When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

	YES	NO	N/A
..1.15.2.3 Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

	YES	NO	N/A
..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".			
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.

1.16.3 **ICP-MS Method**

	YES	NO	N/A
1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
..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
..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.			
..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.			
..1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	___	[___]	✓
	(b) between 30-74%?	___	[___]	✓
	(c) between 126-150%?	___	[___]	✓
	(d) greater than 150%?	___	[___]	✓
	ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			
(**NOTE:** Replace "N" with "J", "R" as appropriate.)			
..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?	[✓]	___	___

		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.			
..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.			
..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.			
..1.18.4	**Aqueous**			
..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:

> ± 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),

is any RPD ≥ 35% but < 120%?	✓	[___]	___
is any RPD ≥ 120%?	___	[✓]	___

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R) and red-line the associated sample data ≥ CRQL.			
..1.18.5.2	When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[✓]	___
	> ± 4 x CRQL	___	[✓]	___

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

..1.19 **Field Duplicates**

Aqueous Field Duplicates

		YES	NO	N/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			
..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.

..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.			
..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

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".			
1.1.21	**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.			
1.1.21.1	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.			
1.1.21.2	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			
1.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[✓]	___	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
1.1.21.4	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.)			
1.1.22	**Total/Dissolved or Inorganic/Total Analytes**			
1.1.22.1	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.			
1.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

		YES	NO	N/A
1.1.22.3	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.			
1.1.23	**Field Blank - Form I** **NOTE**: **Designate "Field Blank" as such on Form I**			
1.1.23.1	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.

1.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

1.1.24.1	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.

1.1.24.2 **Method Detection Limits - Form IX**

1.1.24.2.1	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
1.1.24.2.2	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.			
1.1.24.3	**Linear Ranges - Form XI**			
1.1.24.3.1	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.			
1.1.25	**ICP-MS Tune Analysis - Form XIV**			
1.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
1.1.25.2	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
).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".			
ı.1.26	**ICP-MS Internal Standards - Form XV**			
ı.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.			
ı.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			

:han 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.

Inorganic Data Review Narrative — See EDS data validation report

:ase# _____ **Site:** _____ **Matrix: Soil** ____

:DG# _____ **Lab:** _____ **Water** ____

:ampling Team: _____ **Reviewer:** _____ **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

'orm I'S and the QC Form when a QC analysis is outside the control limits. These ɟualifiers are not applied on the Lotus or XLS spreadsheets. These qualifiers and their ıeanings 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 For 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.

ı.2.3.1 **Data Case Description**:

ı.2.3.2 **CSF Audit**:

A.2.3.3 **Technical Review:**

A.2.3.4 **Contract-Problem/Non-Compliance:**

HWSS Reviewer: _____ Date:_____
Signature

Contractor Reviewer: _____ Date:_____
Signature

Verified by: _____ Date:_____
Signature

CASE #
SDG #

Contract Laboratory Program
REGION II/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

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:

Summary of Resolution:

Signature _____ Date: _____

FIELD DUPLICATES

Sample No. **Field Duplicate No.** **Sample Matrix:**

Lab 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									
Manganese									

					YES	NO	N/A		
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

Total/Dissolved Concentrations

Lab Code **Case No.** **SDG No.** **Sample Matrix: Water**

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

SECTION A (TO BE COMPLETED BY REGIONAL SENDING OFFICIAL)

Initiated By:

Name, Affiliation, Phone Number

_____

Case Number: _____
- OLM
- OLC
- ILM

Details 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

SECTION B (TO BE COMPLETED BY SMO)

Name 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# ___

Site: _____ Lab Name: _____

Reviewer's Initials: _____ Number of Samples: _____

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														

CHAIN OF CUSTODY

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18341

CHAIN OF CUSTODY

Page 1 of 1

CompuChem
a division of Liberty Analytical Corp.

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

Courier:
Airbill No.:
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757-671-6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Vieques
Sampling Location: AOC E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores)	SVOCs, SVOC SIM, DRO, ORO	SPLP Metals, SVOC, TPH (GRO, DRO, ORO)	Total Metals, Tl, CN	Grain Size, Atterberg Limits	SPLP VOCs (liquid)	SVOC, SVOC SIM (liquid)	Total Metals, Tl	~~Cyanide~~ PH	TPH-GRO	TPH-DRO/ORO	TOC*	pH / Sample Info (Lab Use)
0807038-15 1584303	VWAE-SB21-2930-08C	7-16-08	1127	SO	7			SPLP = 1584501					X	X	X	X	X			X			X	SJB
0807038-14 1584206	VWAE-SB21-3428-08C	7-17-08	1156	SO	2								X		X									
0807038-13 1584207 1584302	VWAE-SB21-3436-08C	7-17-08	0905	SO				SPLP = 1584502					X	X	X		X			X			X	
	~~VWAE-SB21~~																							

*only rec'd SVOC, SIM, DRO, ORO 8C
‡ T. Metals, Tl, CN 4C for
VWAE-SB21-2930-08C JD 7/18/08

Lab Use Only

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

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

Comments

Mistake

Sample Custody

Relinquished by:	Date/Time: 7/17/08 1330	Received by: Jennifer Dover	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 1.8 °C

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

White & Yellow copy to lab • Pink copy for customer

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18363

CHAIN OF CUSTODY

Page 1 of 1

CompuChem
a division of Liberty Analytical Corp.

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Cham Hill
Address: 5700 Cleveland St, Ste. 101
City / State / Zip: Virginia Beach, VA 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: W-AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (Include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (liquid) 3-40mL	VOCs TPH-GRO (liquid) 2-40mL	VOCs (Encores) 3-encores	TPH-GRO (soil) 2-encores	SVOC, SVOC-SIM, DRO, ORO 8270	Total Metals, TI, CN 4oz	TOC 4oz	SPLP-VOA 4oz	SPLP SVOA-Metals-TPH 2oz	pH 2oz	Grain Size, Atterberg Limits 8oz	pH / Sample Info (Lab Use)
0807042-05	VWAE-TB01-071808	7/18/08	—	QC	5	5						X	X										
0807042-06	VWAE-EB01-071808	↓	0700	QC	5	5						X	X										
0807042-07	VWAE-EB02-071708	7/17/08	1810	QC	5	5						X	X										
~~0807064-01~~ 1584301	VWAE-SB20-0810-08C	7/18/08	0745	SO	20			SPLP=						X (9)	X (6)	X	X	X	X	X	X	X	do not receive (rec'd lab)
0807038-17	VWAE-SB20-1618-08C	↓	0818	SO	5									X	X								
0807038-18	VWAE-SB20P-1618-08C	↓	0818	SO	5									X	X								
0807038-19	VWAE-SB20-2022-08C	↓	0825	SO	6									X	X							X	
~~0807038-20~~ 1584304	VWAE-SB20-2830-08C	↓	0940	SO	9			SPLP=						X	X			X	X	X	X		SUB =
0807038-21	VWAE-SB20-3234-08C	↓	1145	SO	5									X	X								

Lab Use Only

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

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

Comments

MS/MSD on VWAE-SB20-0810-08C. (20 Bottles)
Mistake

Sample Custody

Relinquished by: [signature]	Date/Time: 7/18/08	Received by: Jennifer Doer	Date/Time: 7/21/08 7:45
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontract? Y or N If yes, where? Grain size/Atterberg limits to
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 3.6 °C

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

White & Yellow copy to lab • Pink copy for customer

SUPPORT DOCUMENTATION

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15843

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	-26.927	J	-26.612	J	200.000	U	200.000	U	20.000	U	P
Antimony	60.000	U	60.000	U	60.000	U	60.000	U	6.000	U	P
Arsenic	10.000	U	10.000	U	10.000	U	10.000	U	1.000	U	P
Barium	-0.756	J	-0.952	J	-0.755	J	-0.669	J	20.000	U	P
Beryllium	5.000	U	5.000	U	5.000	U	0.289	J	0.500	U	P
Cadmium	5.000	U	5.000	U	5.000	U	5.000	U	0.500	U	P
Calcium	5000.000	U	5000.000	U	5000.000	U	5000.000	U	13.977	J	P
Chromium	10.000	U	10.000	U	10.000	U	10.000	U	1.000	U	P
Cobalt	50.000	U	50.000	U	50.000	U	50.000	U	5.000	U	P
Copper	25.000	U	25.000	U	25.000	U	25.000	U	2.500	U	P
Iron	100.000	U	100.000	U	100.000	U	100.000	U	10.000	U	P
Lead	10.000	U	10.000	U	10.000	U	10.000	U	1.000	U	P
Magnesium	5000.000	U	5000.000	U	5000.000	U	5000.000	U	3.308	J	P
Manganese	-0.682	J	-0.770	J	-0.594	J	-0.433	J	1.500	U	P
Mercury	0.200	U	-0.079	J	-0.096	J	0.200	U	-0.031	J	CV
Nickel	-1.069	J	-0.700	J	-0.635	J	-0.721	J	4.000	U	P
Potassium	5000.000	U	5000.000	U	5000.000	U	5000.000	U	500.000	U	P
Selenium	35.000	U	35.000	U	35.000	U	35.000	U	3.500	U	P
Silver	10.000	U	10.000	U	10.000	U	10.000	U	1.000	U	P
Sodium	5000.000	U	5000.000	U	5000.000	U	5000.000	U	56.635	J	P
Vanadium	50.000	U	50.000	U	50.000	U	50.000	U	5.000	U	P
Zinc	60.000	U	60.000	U	60.000	U	60.000	U	0.969	J	P
Cyanide	10.000	U	10.000	U	10.000	U	10.000	U	2.500	U	AS

all U

an CRDL

an xR

U an

None entered

US EPA - CLP

6-IN

DUPLICATES

EPA SAMPLE NO.

VWAE-SB20-0810D

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15843

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 87.7 % Solids for Duplicate: 87.7

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		19740.2600		20819.8100		5		P
Antimony		6.8415	U	6.8415	U			P
Arsenic		0.8423	J	0.7859	J	7		P
Barium		224.0136		141.1201		45	*	P
Beryllium		0.3264	J	0.3361	J	3		P
Cadmium		0.5701	U	0.5701	U			P
Calcium		4241.6780		4273.5030		1		P
Chromium		16.1149		15.7702		2		P
Cobalt	5.7013	18.8407		11.0864		52	*	P
Copper		44.5085		44.4844		0		P
Iron		27718.5800		29103.2900		5		P
Lead	1.1403	3.8062		3.0960		21		P
Magnesium		5050.8070		5391.8430		7		P
Manganese		1117.1950		551.3011		68	*	P
Mercury		0.1140	U	0.1140	U			CV
Nickel	4.5610	9.2264		7.3779		22		P
Potassium	570.1254	2428.1520		2485.5480		2		P
Selenium		3.9909	U	3.9909	U			P
Silver		1.1403	U	1.1403	U			P
Sodium		314.4675	J	318.1241	J	1		P
Vanadium		71.6678		76.3369		6		P
Zinc		49.2073		49.5704		1		P
Cyanide		2.8506	U	2.8506	U			AS

US EPA - CLP

8-IN

ICP-AES and ICP-MS SERIAL DILUTIONS

EPA SAMPLE NO.

VWAE-SB20-0810L

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15843

Matrix (soil/water): SOIL Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	173122.10		176301.10		2		P
Antimony	60.000	U	300.000	U			P
Arsenic	7.387	J	50.000	U	100		P
Barium	1964.599		1997.414		2		P
Beryllium	2.862	J	2.705	J	5		P
Cadmium	5.000	U	25.000	U			P
Calcium	37199.51		38765.56		4		P
Chromium	141.328		146.171		3		P
Cobalt	165.233		172.966	J	5		P
Copper	390.340		389.596		0		P
Iron	243091.90		255861.10		5		P
Lead	33.38		31.66	J	5		P
Magnesium	44295.57		46032.85		4		P
Manganese	9797.800		10189.700		4		P
Nickel	80.916		82.160	J	2		P
Potassium	21294.89		18926.59	J	11	E	P
Selenium	35.00	U	175.00	U			P
Silver	10.000	U	50.000	U			P
Sodium	2757.88	J	3163.15	J	15		P
Vanadium	628.527		650.372		3		P
Zinc	431.55		466.08		8		P

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15843

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Thallium	0.031	J	0.062	J	0.039	J	0.043	J	0.500	U	MS

None all Samples ND for thallium!

US EPA - CLP

5A-IN

MATRIX SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

VWAE-SB20-0810S

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15843

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 87.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Antimony	75 - 125	8.3999		6.8415	U	22.81	37	N	P
Arsenic	75 - 125	9.2634		0.8423	J	9.12	92		P
Barium	75 - 125	820.9994		224.0136		456.10	131	N	P
Beryllium	75 - 125	11.5746		0.3264	J	11.40	99		P
Cadmium	75 - 125	12.7915		0.5701	U	11.40	112		P
Chromium	75 - 125	62.1581		16.1149		45.61	101		P
Cobalt	75 - 125	140.3178		18.8407		114.03	107		P
Copper	75 - 125	109.6373		44.5085		57.01	114		P
Lead	75 - 125	9.2223		3.8062		4.56	119		P
Manganese		2737.1930		1117.1950		114.03	1421		P
Mercury	75 - 125	0.5302		0.1140	U	0.57	93		CV
Nickel	75 - 125	116.8375		9.2264		114.03	94		P
Selenium	75 - 125	6.7836		3.9909	U	11.40	60	N	P
Silver	75 - 125	11.2438		1.1403	U	11.40	99		P
Vanadium	75 - 125	200.0289		71.6678		114.03	113		P
Zinc	75 - 125	165.3303		49.2073		114.03	102		P
Cyanide	75 - 125	5.0068		2.8506	U	5.70	88		AS

Comments:

ENVIRONMENTAL
Data Services, Inc.

TOTAL METALS & CYANIDE
USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 15844

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 29, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-EB01-071708	1584401	Water
2	VWAE-EB01-071808	1584402	Water
3	VWAE-EB02-071708	1584403	Water

The USEPA Region II SOP No. HW-2, Revision 13, September 2006: Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were prepared and analyzed within 14 days for cyanide, 28 days for mercury and 180 days for all other metals.

Calibration - The ICV and CCV %R values were acceptable.

CRDL Standard - The CRDL standards exhibited acceptable %R values.

Method and Calibration Blanks - The following table summarizes method blank and continuing calibration blank contamination.

Compound	Conc. ug/L	Qualifier	Affected Samples
Barium	0.430	U	1
Calcium	76.411	U	All samples
Chromium	0.629	U	All samples
Magnesium	66.287	U	1

Compound	Conc. ug/L	Qualifier	Affected Samples
Thallium	0.062	U	1
Vanadium	0.977	U	1, 2

ICP Interference Check Sample - All %R values were acceptable.

Matrix Spike/Matrix Spike Duplicate - A MS/MSD sample was not analyzed.

Field Duplicates - Field duplicate samples were not included in this data package.

LCS - The LCS samples exhibited acceptable %R values.

ICP Serial Dilution - The ICP serial dilution sample exhibited acceptable %D values.

Field and Equipment Blank - These samples are blank QC samples to be applied to other packages. Their results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-EB01-071708	Manganese	1.8	None	To be applied to other packages
	Zinc	3.4	None	To be applied to other packages
VWAE-EB01-071808	Manganese	0.34	None	To be applied to other packages
	Zinc	4.5	None	To be applied to other packages
VWAE-EB02-071708	Manganese	1.2	None	To be applied to other packages
	Zinc	3.2	None	To be applied to other packages

Compound Quantitation - No discrepancies were identified.

ANNOTATED FORM Is

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-071708

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15844

Matrix (soil/water): WATER Lab Sample ID: 1584401

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200	U		P	
7440-36-0	Antimony	60.0	U		P	
7440-38-2	Arsenic	10.0	U		P	
7440-39-3	Barium	200	U		P	
7440-41-7	Beryllium	5.0 ~~0.14~~	~~J~~	U	P	BL
7440-43-9	Cadmium	5.0	U		P	
7440-70-2	Calcium	5000 ~~37.7~~	~~J~~	U	P	BL
7440-47-3	Chromium	10.0 ~~0.38~~	~~J~~	U	P	BL
7440-48-4	Cobalt	50.0	U		P	
7440-50-8	Copper	25.0	U		P	
7439-89-6	Iron	100	U		P	
7439-92-1	Lead	10.0	U		P	
7439-95-4	Magnesium	5000 ~~9.1~~	~~J~~	U	P	BL
7439-96-5	Manganese	1.8	J		P	
7439-97-6	Mercury	0.20	U		CV	
7440-02-0	Nickel	40.0	U		P	
7440-09-7	Potassium	5000	U		P	
7782-49-2	Selenium	35.0	U		P	
7440-22-4	Silver	10.0	U		P	
7440-23-5	Sodium	5000	U		P	
7440-62-2	Vanadium	50. ~~0.39~~	~~J~~	U	P	BL
7440-66-6	Zinc	3.4	J		P	
57-12-5	Cyanide	10.0	U		AS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-071708

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15844

Matrix (soil/water): WATER Lab Sample ID: 1584401

Level (low/med): LOW Date Received: 07/18/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	1.0 ~~0.055~~	~~J~~	U	MS

BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

2

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-071808

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15844

Matrix (soil/water): WATER Lab Sample ID: 1584402

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200	U		P	
7440-36-0	Antimony	60.0	U		P	
7440-38-2	Arsenic	10.0	U		P	
7440-39-3	Barium	200	U		P	
7440-41-7	Beryllium	5.0	U		P	
7440-43-9	Cadmium	5.0	U		P	
7440-70-2	Calcium	5000 ~~42.1~~	~~J~~	U	P	BL
7440-47-3	Chromium	10.0 ~~0.71~~	~~J~~	U	P	BL
7440-48-4	Cobalt	50.0	U		P	
7440-50-8	Copper	25.0	U		P	
7439-89-6	Iron	100	U		P	
7439-92-1	Lead	10.0	U		P	
7439-95-4	Magnesium	5000	U		P	
7439-96-5	Manganese	0.34	J		P	
7439-97-6	Mercury	0.20	U		CV	
7440-02-0	Nickel	40.0	U		P	
7440-09-7	Potassium	5000	U		P	
7782-49-2	Selenium	35.0	U		P	
7440-22-4	Silver	10.0	U		P	
7440-23-5	Sodium	5000	U		P	
7440-62-2	Vanadium	50 ~~0.41~~	~~J~~	U	P	BL
7440-66-6	Zinc	4.5	J		P	
57-12-5	Cyanide	10.0	U		AS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

2

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-071808

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15844

Matrix (soil/water): WATER Lab Sample ID: 1584402

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	1.0	U		MS

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

3

EPA SAMPLE NO.

VWAE-EB02-071708

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15844

Matrix (soil/water): WATER Lab Sample ID: 1584403

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	200	U		P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	10.0	U		P
7440-39-3	Barium	200	U		P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	5000 ~~32.3~~	~~J~~	U	P BL
7440-47-3	Chromium	10.0 ~~0.86~~	~~J~~	U	P BL
7440-48-4	Cobalt	50.0	U		P
7440-50-8	Copper	25.0	U		P
7439-89-6	Iron	100	U		P
7439-92-1	Lead	10.0	U		P
7439-95-4	Magnesium	5000	U		P
7439-96-5	Manganese	1.2	J		P
7439-97-6	Mercury	0.20	U		CV
7440-02-0	Nickel	40.0	U		P
7440-09-7	Potassium	5000	U		P
7782-49-2	Selenium	35.0	U		P
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	5000	U		P
7440-62-2	Vanadium	50.0	U		P
7440-66-6	Zinc	3.2	J		P
57-12-5	Cyanide	10.0	U		AS

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

3

EPA SAMPLE NO.

VWAE-EB02-071708

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15844

Matrix (soil/water): WATER Lab Sample ID: 1584403

Level (low/med): LOW Date Received: 07/21/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-28-0	Thallium	1.0	U		MS

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA REGION II WORKSHEETS

SOP # HW-2
Revision 13
September 2006

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
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Robert Runyon, Chief
Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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I.0 Scope

I.I 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 Island

Case #: N/A

SDG #: 15844

Samples: **Soil** 3 **Water**

	YES	NO	N/A
A.1.1 **Contract Compliance Screening Report**			
Present?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.2 **Record of Communication (from RSCC)**			
Present?	[✓]	___	___
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.4 **Chain of Custody/Sample Traffic Report**			
Present?	[✓]	___	___
Legible?	[✓]	___	___
Signature of sample custodian present?	[✓]	___	___
ACTION: If no, contact RSCC/WAM/PO.			
A.1.5 **Cover Page**			
Present?	[✓]	___	___
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	[✓]	___	___
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[✓]	___	___

	YES	NO	N/A
(b) Form I's?	[ ]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[✓]	___	___
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[✓]	___	___

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

Laboratory Name?	[✓]	___	___
Laboratory Code?	[✓]	___	___
RAS/Non-RAS Case No.?	[✓]	___	___
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[✓]	___	___

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

(a) all analytes analyzed by ICP-AES?	___	[✓]	___
(b) all analytes analyzed by ICP-MS?	___	[✓]	___
(c) Mercury?	___	[✓]	___
(d) Cyanide?	___	[✓]	___

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

Digestion Log for ICP-AES (Form XII)present?	[✓]	___	___
Digestion Log for ICP-MS (Form XII) present?	[✓]	___	___
Digestion Log for mercury (Form XII) present?	[✓]	___	___
Distillation Log for cyanide (Form XII) present?	[✓]	___	___

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	[✓]		
Are percent solids calculations present for soils/sediments?	[✓]		
Are preparation dates present on the sample preparation logs/bench sheets?	[✓]		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	[✓]		
ICP-MS?	[✓]		
Mercury?	[✓]		
Cyanide?	[✓]		

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	[✓]		
Properly labeled?	[✓]		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	[✓]		
Instrument Printouts?	[✓]		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A
A.1.9 Technical Holding Times: (Aqueous and soil samples) (Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)			
A.1.9.1 Cyanide distillation(14 days)exceeded?	_	[✓]	_
Mercury analysis(28 days) exceeded?	_	[✓]	_
Other Metals analysis(180 days)exceeded?	___	[✓]	_

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

A.1.9.2 Is pH of aqueous samples for:			
Metals Analysis ≤ 2?	[✓]	___	___
Cyanide Analysis ≥ 12?	[✓]	_	_

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

A.1.9.3 Is the cooler temperature ≤ 10 C°?	[✓]	_	_

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 Final Data Correctness - Form I

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

	YES	NO	N/A
Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[✓]	___	___
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[✓]	___	___
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[✓]	___	___

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]	___	___
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]	___	___
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[✓]	___	___
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[✓]	___	___

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[✓]	___	___

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

	YES	NO	N/A
A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:			

		YES	NO	N/A
	Mercury Analysis?	[✓]	___	___
	Cyanide Analysis?	[✓]	___	___
	ICP-AES(more than 2 point Calib.)?	[✓]	___	___
	ICP-MS (more than 2 point calib.)?	[✓]	___	___

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[✓]	___	___

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

Metals - 90-110%R?	[✓]	___	___
Hg - 80-120%R?	[✓]	___	___
Cyanide - 85-115%R?	[✓]	___	___

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [✓] ___ ___

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? (Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[✓]	___	___
For each cyanide run, was a CRQL standard analyzed?	[✓]	___	___

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? [✓] ___ ___

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.

A.1.14 Initial and Continuing Calibration Blanks - Form III

	YES	NO	N/A
A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___
Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by			

		YES	NO	N/A
	using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[✓]	___	___
	ACTION: If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".			
A.1.14.2	Circle with red pencil on each Form III all Calib. Blank values that are:			
	≥ MDL but ≤ CRQL			
	> CRQL			
A.1.14.2.1	When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	✓	[___]	___
	ACTION: If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.			
A.1.14.2.2	When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[✓]	___
	ACTION: If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".			
A.1.14.2.3	Is any Calibration Blank value below the negative CRQL?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.			

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run.

2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

	YES	NO	N/A
A.1.15.1 Was one Preparation Blank prepared with and analyzed for:			
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J),but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

$\geq$ MDL but $\leq$ CRQL, and

> CRQL

	YES	NO	N/A
A.1.15.2.1 When MDL < CRQL, is any preparation blank value $\geq$ MDL but $\leq$ CRQL?	✓	[___]	___

ACTION:
If yes, change sample result $\geq$ MDL

	YES	NO	N/A
but ≤ CRQL to CRQL with a "U".			
..1.15.2.2 When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

	YES	NO	N/A
..1.15.2.3 Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

	YES	NO	N/A
..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".			
..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.

..1.16.3 **ICP-MS Method**

	YES	NO	N/A
..1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
..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)

Field QC Samples 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
..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.			
..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.			
..1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	___	[___]	✓
	(b) between 30-74%?	___	[___]	✓
	(c) between 126-150%?	___	[___]	✓
	(d) greater than 150%?	___	[___]	✓
	ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			
(**NOTE**:Replace "N" with "J", "R" as appropriate.)			
..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** Field QC Samples only

	YES	NO	N/A
..1.18.1 Was the lab duplicate analysis performed:			
For each SDG?	[___]	___	✓
On one of the SDG samples?	[___]	___	✓
For each matrix type?	[___]	___	✓
For each concentration range (low or med.)?	[___]	___	✓
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	[___]	___	✓
Was a lab duplicate prepared and analyzed with the SDG samples?	[___]	___	✓

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
..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.			
..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.			
..1.18.4	**Aqueous**			
..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:

> ± 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),

is any RPD ≥ 35% but < 120%?	___	[___]	✓
is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R) and red-line the associated sample data ≥ CRQL.			
..1.18.5.2	When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL	___	[___]	✓

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

..1.19 **Field Duplicates**

Aqueous Field Duplicates field QC samples only

..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			
..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.

..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.			
..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**

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".			
1.1.21	**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.			
1.1.21.1	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.			
1.1.21.2	Was a Field Blank or PE sample used for the Serial Dilution Analysis? Only field QC samples in package!	✓	[___]	___
	ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples			
1.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
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.)			
1.22	**Total/Dissolved or Inorganic/Total Analytes**			
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.			
1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

		YES	NO	N/A
1.1.22.3	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.

1.1.23 **Field Blank - Form I**
NOTE: **Designate "Field Blank" as such on Form I**

1.1.23.1	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.

1.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

1.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

1.1.24.2 **Method Detection Limits - Form IX**

1.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
1.1.24.2.2	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.			
1.1.24.3	**Linear Ranges - Form XI**			
1.1.24.3.1	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.			
1.1.25	**ICP-MS Tune Analysis - Form XIV**			
1.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
1.1.25.2	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
1.1 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".

1.1.26 **ICP-MS Internal Standards - Form XV**

		YES	NO	N/A
1.1.26.1	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
1.1.26.2	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

:han 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.

Inorganic Data Review Narrative — See EDS Data Validation report

:ase# _____ **Site:** _____ **Matrix: Soil** ____

:DG# _____ **Lab:** _____ **Water** ____

:ampling Team: _____ **Reviewer:** _____ **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 For 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:**

A.2.3.3 **Technical Review:**

A.2.3.4 **Contract-Problem/Non-Compliance:**

HWSS Reviewer: _____ Date:_____
Signature

Contractor Reviewer: _____ Date:_____
Signature

Verified by: _____ Date:_____
Signature

CASE #
SDG #

Contract Laboratory Program
REGION II/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

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:

Summary of Resolution:

Signature _____ Date: _____

FIELD DUPLICATES

Sample No. **Field Duplicate No.** **Sample Matrix:**

Lab 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									
Manganese									

					YES	NO	N/A		
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

Total/Dissolved Concentrations

Lab Code **Case No.** **SDG No.** **Sample Matrix: Water**

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

SECTION A (TO BE COMPLETED BY REGIONAL SENDING OFFICIAL)

Initiated By:

Name, Affiliation, Phone Number

_____

Case Number: _____
- OLM
- OLC
- ILM

Details 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

SECTION B (TO BE COMPLETED BY SMO)

Name of SMO Contact _____ Date: _____

)ate of Laboratory Notification (Verbal): _____

:e-analysis Start Date: _____ Data Due Date: _____

Return completed form to:
Sample Management Office (SMO)

)istribtion: (1) CLP PO Copy (2) Regional Sending Official Copy (3) SMO File Copy (4) Laboratory Copy
inal 9/3/99

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

ype of Review: _____ Date:_____ Case# _____SDG#___

ite: _____ Lab Name: _____

eviewer's Initials:_____ Number of Samples:_____

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														

CHAIN OF CUSTODY

18336

Page 1 of 1

CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

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

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

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N
Are high concentrations expected? (Y) or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores) 3-encore	VOCs (liquid) 3-40 ml	SVOCs, SVOC SIM, DRO, GRO (soil) 2-encore	TPH-GRO (soil)	Total Metals, TI, CN	Grain Size, Atterberg Limits (2 kg)	SVOC, SVOC SIM (liquid) (2 L)	Total Metals, TI (liquid) (250)	CN (liquid)	TPH-GRO (liquid) (2-40 ml)	TPH-DRO & ORO (liquid) (2-40 ml)	TOC (liquid) (2-40 ml)	pH / Sample Info (Lab Use) MS/MSD	CS/MSD			
0807042-03 1584401	VWAE-EB01-071708	7/17/08	0840	QC	11	5	1	1	2				X					X	X	X	X	X	X	<2	>12			
0807038-13	VWAE-SB21-3436-08C		0905	SO	5							X			X													
0807038-14	VWAE-SB21-3638-08C		1156	SO	5							X			X													
0807042-04	VWAE-TB01-071708		—	QC	5	5							X								X							
0807098-16	VWAE-SS20-0406-08C	↓	1300	SO	5							X			X													

Lab Use Only

Sample Unpacked By: Jennifer Dove
Sample Order Entry By:
Samples Received in Good Condition? (Y) or N
If no, explain:
Cyanide samples checked for sulfide & chlorine? Y or (NA) JD
625 & Phenol samples checked for chlorine? Y or (NA)
608 samples checked for pH between 5.0-9.0? Y or (NA)

Comments

VWAE-SS20-0406-08C has a jar for % Moisture included
~~SB21-3436 hour: pH 2a, 4a, 4a, TI, CN, TOC 4a SV, SV SIM, DRO/ORO 8a, SPLP 4a, 8a, VOA 2, 40 ml, TI~~

Sample Custody

Relinquished by:	Date/Time: 7/17/08 1330	Received by: Jennifer Dove	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 2.6 °C

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

White & Yellow copy to lab • Pink copy for customer

18343

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CHAIN OF CUSTODY

Page 1 of 1

CompuChem
a division of Liberty Analytical Corp.

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: CH2M Hill	Project Name: Vieques CTO-10
Address: 5700 Cleveland Street, Ste 101	Sampling Location: AOC-E #1
City: Virginia Beach State: VA Zip: 23462	Turnaround time: 28-Day
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757.671.6208	Are aqueous samples field filtered for metals? Y or N: Where indicated
Sampler's Name: Kenji Butler / Juan Acaron	Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type): VOCs (encores); SVOCs, SVOC SIM, DRO, ORO (8 oz); TPH-GRO; Total Metals, TI, CN (4 oz); Grain Size, Atterberg Limits; VOCs; SVOCs, SVOC SIM (AL); Total Metals, TI (1-PL); Cyanide (250 ml); TPH-GRO; TPH-DRO & ORO (2-AL); TOC (2-40 ml)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (encores)	SVOCs, SVOC SIM, DRO, ORO	TPH-GRO	Total Metals, TI, CN	Grain Size, Atterberg Limits	VOCs	SVOCs, SVOC SIM	Total Metals, TI	Cyanide	TPH-GRO	TPH-DRO & ORO	TOC	pH / Sample Info (Lab Use)			
0807064-01 1584402	* VIWAE-EB01-071808	7/18/08	0700	QC	8		1	1	2								⊗	X (1)	X	X		X	X	<2	<2	>12	
0807064-01 1584301	VIWAE-SB20-0810-08C	7/18/08	0745	SO	6								X		X												
0807064-17 1584307	VIWAE-SB20-1618-08C	↓	0818	SO	2								X		X												
0807064-18 1584308	VIWAE-SB20P-1618-08C	↓	0818	SO	2								X		X												
0807064-19 1584309	VIWAE-SB20-2022-08C	↓	0825	SO	2								X		X												

Lab Use Only

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

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

Comments
⊗ - Mistake
MS/MSD on VIWAE-SB20-0810-08C
* 1 of 2 SVOC Amber Liters broken - VIWAE-EB01 7-18-08

Sample Custody

Relinquished by: [illegible]	Date/Time: 7/18/08 1330	Received by: Diane Byrd	Date/Time: 7-21-08 745
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 3.8°C

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

White & Yellow copy to lab • Pink copy for customer

18364

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CHAIN OF CUSTODY

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CompuChem
a division of Liberty Analytical Corp.

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

Courier:
Airbill No.:
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: W-AOC-E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N: where indicated
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	SVOC-SVOC-SIM (2-AL (liquid))	Total Metals-TI (1 PL)	Cyanide (1-250)	TPH-DRO+ORO (2-AL)	TOC (2-40mL)	SVOC-SVOC-SIM-DRO-ORO (1 8 oz)	Total Metals-TI-CN (1-4 oz)	TOC (4 oz)	SPLP-VOA (4-oz)	SPLP-SVOC-Metals-TPH (8 oz)	pH (2 oz)	Grain Size After bera Limits	pH Sample Info (Lab Use) Total Metals	Cyanide	TOC	
0807042-07 1584403	VIWAE-EB02-071708	7/17/08	1810	QC	7		1	1	2			X	X	X	X	X								<2	>12	<2		SLB
1584303	VIWAE-SB21-2930-08C	7/16/08	1127	SO	5								SPLP-						X	X	X	X	X				
0807038-22 1584210	VIWAE-SS20-0402-08C	7/17/08	1300	SO	2												X	X									
0807138-23	VIWAE-SB20-2830-08C	7/18/08	0940	SO	2												X	X									

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/18/08	Received by: Dean Byrd	Date/Time: 7/21/08 145
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 5.9 °C

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

White & Yellow copy to lab • Pink copy for customer

SUPPORT DOCUMENTATION

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15844

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		
		C	1	C	2	C	3	C		C	M
Thallium	0.031	J	0.062	J	0.039	J	0.043	J	1.000	U	MS

TL = 0.062 ug/L → U 1

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15844

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		
		C	1	C	2	C	3	C		C	M
Aluminum	200.000	U	45.721	J	200.000	U	34.621	J	200.000	U	P
Antimony	60.000	U	60.000	U	60.000	U	60.000	U	60.000	U	P
Arsenic	10.000	U	10.000	U	10.000	U	10.000	U	10.000	U	P
Barium	-0.829	J	-0.541	J	-0.774	J	-0.486	J	-0.918	J	P
Beryllium	5.000	U	0.340	J	5.000	U	0.430	J	5.000	U	P
Cadmium	5.000	U	5.000	U	5.000	U	5.000	U	5.000	U	P
Calcium	5000.000	U	76.411	J	5000.000	U	54.473	J	24.845	J	P
Chromium	10.000	U	10.000	U	10.000	U	10.000	U	0.629	J	P
Cobalt	50.000	U	50.000	U	50.000	U	50.000	U	-0.809	J	P
Copper	25.000	U	25.000	U	1.499	J	1.286	J	25.000	U	P
Iron	100.000	U	21.484	J	100.000	U	23.800	J	100.000	U	P
Lead	10.000	U	10.000	U	10.000	U	10.000	U	10.000	U	P
Magnesium	5000.000	U	66.287	J	16.645	J	46.193	J	5000.000	U	P
Manganese	-0.609	J	-0.336	J	-0.609	J	-0.358	J	-0.680	J	P
Mercury	0.200	U	-0.079	J	-0.096	J	0.200	U	0.200	U	CV
Nickel	40.000	U	0.779	J	0.563	J	0.526	J	40.000	U	P
Potassium	5000.000	U	5000.000	U	5000.000	U	5000.000	U	5000.000	U	P
Selenium	35.000	U	35.000	U	35.000	U	35.000	U	35.000	U	P
Silver	10.000	U	10.000	U	10.000	U	10.000	U	10.000	U	P
Sodium	5000.000	U	5000.000	U	5000.000	U	5000.000	U	5000.000	U	P
Vanadium	50.000	U	0.977	J	50.000	U	0.797	J	0.445	J	P
Zinc	60.000	U	60.000	U	60.000	U	60.000	U	60.000	U	P
Cyanide	10.000	U	10.000	U	10.000	U	10.000	U	10.000	U	AS

Be 0.430 ug/L → (1)
Ca 76.411 ug/L → All
Cr 0.629 ug/L → (1-3) All
Mg 66.287 ug/L → (1)
V 0.977 ug/L → (1, 2

ENVIRONMENTAL
Data Services, Inc.

SPLP DIESEL RANGE ORGANICS (DRO/ORO)

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 15845

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 26, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SB21-2930	1584501	Leachate
2	VWAE-SB21-3436	1584502	Leachate
3	VWAE-SB20-0810	1584503	Leachate
3MS	VWAE-SB20-0810MS	1584503MS	Leachate
3MSD	VWAE-SB20-0810MSD	1584503MSD	Leachate
4	VWAE-SB20-2830	1584504	Leachate

The USEPA "Contract Laboratory Program National Functional Guidelines for Organic Data Review," October 1999, method criteria and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 14 days for soil samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD samples exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	MS/MSD %R/RPD	Qualifier
3	Diesel	49%/Ok/Ok	J/UJ

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blank was free of contamination.

Field, Equipment Blank - Field QC samples were not included in this data package.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and/or correlation coefficient and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Field Duplicates - Field duplicate samples were not included in this data package.

ANNOTATED FORM Is

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) LEACHATE Lab Sample ID: 1584501

Sample wt/vol: 100.0 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/18/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 1250(uL) Date Analyzed: 08/02/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.97	J
----------	ORO	5.0	U

FORM I PEST

lw 10/24/08

2

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) LEACHATE Lab Sample ID: 1584502

Sample wt/vol: 100.0 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/18/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 1250(uL) Date Analyzed: 08/02/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	0.79	J
----------	ORO	5.0	U

FORM I PEST

LW
10/28/08

3

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) LEACHATE Lab Sample ID: 1584503

Sample wt/vol: 100.0 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/21/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 1250(uL) Date Analyzed: 08/02/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	2.5	~~U~~ UJ MSL
----------	ORO	5.0	U

FORM I PEST

LW
10/28/08

1D
GC EXTRACTABLE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. 4

VWAE-SB20-2830

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) LEACHATE Lab Sample ID: 1584504

Sample wt/vol: 100.0 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/21/08

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/01/08

Concentrated Extract Volume: 1250(uL) Date Analyzed: 08/02/08

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-5	Diesel	2.5	U
----------	ORO	5.0	U

FORM I PEST

MW 10/28/08

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

3E

LEACHATE PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: COMPUCHEM Contract: 8015B DRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix Spike - EPA Sample No.: VWAE-SB20-08

COMPOUND	SPIKE ADDED (mg/L)	SAMPLE CONCENTRATION (mg/L)	MS CONCENTRATION (mg/L)	MS % REC #	QC. LIMITS REC.
Diesel	13	0.0	6.4	49*	50-150
ORO	13	0.0	12	92	50-150

COMPOUND	SPIKE ADDED (mg/L)	MSD CONCENTRATION (mg/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Diesel	13	6.9	53	8	40	50-150
ORO	13	12	92	0	40	50-150

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 2 outside limits
Spike Recovery: 1 out of 4 outside limits

COMMENTS:

FORM III PEST-1

ENVIRONMENTAL
Data Services, Inc.

SPLP GASOLINE RANGE ORGANICS (GRO)

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 15845

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 26, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SB21-2930	1584501	Water
2	VWAE-SB21-3436	1584502	Water
3	VWAE-SB20-0810	1584503	Water
4	VWAE-SB20-2830	1584504	Water

The USEPA "Contract Laboratory Program National Functional Guidelines for Organic Data Review," October 1999, method criteria and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were analyzed within 14 days for water samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - A MS/MSD sample was not analyzed.

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VBLKVJ	GRO	0.037	U	3, 4

Field, Equipment Blank - Field QC samples were not included in this data package.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values.

Field Duplicates - Field duplicate samples were not included in this data package.

ANNOTATED FORM Is

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584501

Sample wt/vol: 5 (g/ml) ML Lab File ID: 052X1584501

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	1.2	

FORM I GC VOA

LW
10/28/08

2

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584502

Sample wt/vol: 5 (g/ml) ML Lab File ID: 053X1584502

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	1.1	

FORM I GC VOA

LW 10/28/08

3

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584503

Sample wt/vol: 5 (g/ml) ML Lab File ID: 054X1584503

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.500 ~~0.068~~ ~~J~~	u BL

FORM I GC VOA

dcw
10/28/08

4

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB20-2830

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584504

Sample wt/vol: 5 (g/ml) ML Lab File ID: 055X1584504

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.580 ~~0.042~~	~~J~~

U BC

FORM I GC VOA

LW
10/28/08

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

FORM 1
GC VOA ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VBLKVJ

Lab Name: COMPUCHEM Contract: 8015B GRO

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 176062

Sample wt/vol: 5 (g/ml) ML Lab File ID: 050X176062

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: RTX-VOLATILES ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) MG/L	Q
9999-99-7	Gasoline	0.037	J

FORM I GC VOA

ENVIRONMENTAL
Data Services, Inc.

SPLP METALS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 15845

Client: CH2M HILL, Inc., Chantilly, Virginia Date: November 1, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SB21-2930	1584501	Leachate
2	VWAE-SB21-3436	1584502	Leachate
3	VWAE-SB20-0810	1584503	Leachate
3MS	VWAE-SB20-0810MS	1584503MS	Leachate
3MSD	VWAE-SB20-0810MSD	1584503MSD	Leachate
4	VWAE-SB20-2830	1584504	Leachate

The USEPA Region II SOP No. HW-2, Revision 13, September 2006: Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were prepared and analyzed within 28 days for mercury and 180 days for all other metals.

Calibration - The ICV and CCV %R values were acceptable.

CRDL Standard - The CRDL standards exhibited acceptable %R values.

Method and Calibration Blanks - The method blank and continuing calibration blanks were free of contamination.

ICP Interference Check Sample - All %R values were acceptable.

Matrix Spike/Matrix Spike Duplicate - The matrix spike/matrix spike duplicate sample exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	%R/RPD	Qualifier	Affected Samples
3	Antimony	46.2%	J/UJ	All Samples

Field Duplicates - Field duplicate samples were not included in this data package.

LCS - The LCS samples exhibited acceptable %R values.

ICP Serial Dilution - The ICP serial dilution sample exhibited acceptable %D values except the following.

ICP Sample ID	Compound	%D	Qualifier	Affected Samples
3	Potassium	12.9%	J	Positive results in all samples
	Zinc	15.8%	J	Positive results in all samples

Field and Equipment Blank - Field QC samples were not analyzed.

Compound Quantitation - No discrepancies were identified.

SW846 - METALS

-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-2930

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix (soil/water): LEACHATE Lab Sample ID: 1584501

Level (low/med): LOW Date Received: 7/18/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	29000			P	
7440-36-0	Antimony	3.5	~~U~~	~~N~~ UJ	P	MSL
7440-38-2	Arsenic	3.2	U		P	
7440-39-3	Barium	165	~~B~~		P	
7440-41-7	Beryllium	0.77	~~B~~		P	
7440-43-9	Cadmium	0.89	U		P	
7440-70-2	Calcium	8210			P	
7440-47-3	Chromium	23.1			P	
7440-48-4	Cobalt	16.1			P	
7440-50-8	Copper	46.5			P	
7439-89-6	Iron	47500			P	
7439-92-1	Lead	17.5			P	
7439-95-4	Magnesium	5920			P	
7439-96-5	Manganese	379			P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	9.6	~~B~~		P	
7440-09-7	Potassium	1260	~~B~~	~~E~~ J	P	SD
7782-49-2	Selenium	4.4	U		P	
7440-22-4	Silver	0.51	U		P	
7440-23-5	Sodium	23900			P	
7440-28-0	Thallium	3.8	U		P	
7440-62-2	Vanadium	168			P	
7440-66-6	Zinc	87.1		~~E~~ J	P	SD

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Form I - IN MW 11/1/08

SW846 - METALS

-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-3436

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix (soil/water): LEACHATE Lab Sample ID: 1584502

Level (low/med): LOW Date Received: 7/18/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	2980			P	
7440-36-0	Antimony	3.5	~~U~~	~~N~~ UJ	P	MSL
7440-38-2	Arsenic	3.2	U		P	
7440-39-3	Barium	35.2	~~B~~		P	
7440-41-7	Beryllium	0.18	U		P	
7440-43-9	Cadmium	0.89	U		P	
7440-70-2	Calcium	3690	~~B~~		P	
7440-47-3	Chromium	3.6	~~B~~		P	
7440-48-4	Cobalt	4.1	U		P	
7440-50-8	Copper	7.3			P	
7439-89-6	Iron	3930			P	
7439-92-1	Lead	1.5	U		P	
7439-95-4	Magnesium	2250	~~B~~		P	
7439-96-5	Manganese	83.1			P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	2.0	~~B~~		P	
7440-09-7	Potassium	253	~~B~~	~~E~~ J	P	SD
7782-49-2	Selenium	4.4	U		P	
7440-22-4	Silver	0.51	U		P	
7440-23-5	Sodium	12000			P	
7440-28-0	Thallium	3.8	U		P	
7440-62-2	Vanadium	39.4			P	
7440-66-6	Zinc	11.8	~~B~~	~~E~~ J	P	SD

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

SW846 - METALS

-1-

3

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-0810

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix (soil/water): LEACHATE Lab Sample ID: 1584503

Level (low/med): LOW Date Received: 7/21/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	34900			P	
7440-36-0	Antimony	4.2	~~B~~	~~N~~ J	P	MSL
7440-38-2	Arsenic	3.2	U		P	
7440-39-3	Barium	173	~~B~~		P	
7440-41-7	Beryllium	0.58	~~B~~		P	
7440-43-9	Cadmium	0.89	U		P	
7440-70-2	Calcium	5780			P	
7440-47-3	Chromium	28.6			P	
7440-48-4	Cobalt	8.7			P	
7440-50-8	Copper	74.7			P	
7439-89-6	Iron	53200			P	
7439-92-1	Lead	3.1			P	
7439-95-4	Magnesium	9450			P	
7439-96-5	Manganese	421			P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	13.2	~~B~~		P	
7440-09-7	Potassium	4070	~~B~~	~~E~~ J	P	SD
7782-49-2	Selenium	4.4	U		P	
7440-22-4	Silver	0.51	U		P	
7440-23-5	Sodium	14400			P	
7440-28-0	Thallium	3.8	U		P	
7440-62-2	Vanadium	130			P	
7440-66-6	Zinc	96.8		~~E~~ J	P	SD

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: BROWN Clarity After: CLOUDY Artifacts:

Comments:

4

SW846 - METALS

-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-2830

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix (soil/water): LEACHATE Lab Sample ID: 1584504

Level (low/med): LOW Date Received: 7/21/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	31400			P	
7440-36-0	Antimony	4.0	~~B~~	~~N~~ J	P	MSL
7440-38-2	Arsenic	3.2	U		P	
7440-39-3	Barium	209			P	
7440-41-7	Beryllium	0.29	~~B~~		P	
7440-43-9	Cadmium	0.89	U		P	
7440-70-2	Calcium	6740			P	
7440-47-3	Chromium	44.4			P	
7440-48-4	Cobalt	18.3			P	
7440-50-8	Copper	83.3			P	
7439-89-6	Iron	61400			P	
7439-92-1	Lead	2.2	~~B~~		P	
7439-95-4	Magnesium	11000			P	
7439-96-5	Manganese	950			P	
7439-97-6	Mercury	0.10	U		CV	
7440-02-0	Nickel	20.6	~~B~~		P	
7440-09-7	Potassium	581	~~B~~	~~E~~ J	P	SD
7782-49-2	Selenium	4.4	U		P	
7440-22-4	Silver	0.51	U		P	
7440-23-5	Sodium	13000			P	
7440-28-0	Thallium	3.8	U		P	
7440-62-2	Vanadium	216			P	
7440-66-6	Zinc	54.9		~~E~~ J	P	SD

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: BROWN Clarity After: CLOUDY Artifacts:

Comments:

Form I - IN 1.1.1.08

USEPA REGION II WORKSHEETS

Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 (SOP Revision 13)

PREPARED BY: _____ Date: 12-08-06
Hanif Sheikh, Chemist
Hazardous Waste Support Section

Peer Reviewed by: _____ Date: 12-08-06
Russell Arnone, Chemist
Hazardous Waste Support Section

Concurred by: _____ Date: 12/8/06
Linda Mauel, Chief
Hazardous Waste Support Section

Approved by: _____ Date: 12/11/06
Robert Runyon, Chief
Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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I.0 Scope

I.I 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 Island, PR

Case #: Na

SDG #: 15845

Samples: **Soil** 4 **Water**

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report			
Present?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.2 Record of Communication (from RSCC)			
Present?	[✓]	___	___
ACTION: If no, request from the RSCC.			
A.1.3 Sampling Trip Report			
Present and complete?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.4 Chain of Custody/Sample Traffic Report			
Present?	[✓]	___	___
Legible?	[✓]	___	___
Signature of sample custodian present?	[✓]	___	___
ACTION: If no, contact RSCC/WAM/PO.			
A.1.5 Cover Page			
Present?	[✓]	___	___
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	[✓]	___	___
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[✓]	___	___

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 SDG Narrative, DC-1 & DC-2 Form

Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[✓]	___	___
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[✓]	___	___

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 Form I to XV

A.1.7.1 Are all the Form I through Form XV labeled with:

Laboratory Name?	[✓]	___	___
Laboratory Code?	[✓]	___	___
RAS/Non-RAS Case No.?	[✓]	___	___
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[✓]	___	___

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

(a) all analytes analyzed by ICP-AES?	___	[✓]	___
(b) all analytes analyzed by ICP-MS?	___	[✓]	___
(c) Mercury?	___	[✓]	___
(d) Cyanide?	___	[✓]	___

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

Digestion Log for ICP-AES (Form XII)present?	[✓]	___	___
Digestion Log for ICP-MS (Form XII) present?	[✓]	___	___
Digestion Log for mercury (Form XII) present?	[✓]	___	___
Distillation Log for cyanide (Form XII) present?	[✓]	___	___

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	[✓]		
Are percent solids calculations present for soils/sediments?	[ ]		✓
Are preparation dates present on the sample preparation logs/bench sheets?	[✓]		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	[✓]		
ICP-MS?	[✓]		
Mercury?	[✓]		
Cyanide?	[✓]		

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	[✓]		
Properly labeled?	[✓]		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	[✓]		
Instrument Printouts?	[✓]		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A
A.1.9 Technical Holding Times: (Aqueous and soil samples) (Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)			
A.1.9.1 Cyanide distillation(14 days)exceeded?		[✓]	
Mercury analysis(28 days) exceeded?		[✓]	
Other Metals analysis(180 days)exceeded?		[✓]	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

	YES	NO	N/A
A.1.9.2 Is pH of aqueous samples for:			
Metals Analysis ≤ 2?	[✓]		
Cyanide Analysis ≥ 12?	[✓]		

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

	YES	NO	N/A
A.1.9.3 Is the cooler temperature ≤ 10 C°?	[✓]		

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 Final Data Correctness - Form I

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[___]	___	✓
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[✓]	___	___
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[✓]	___	___

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]	___	___
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]	___	___
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[✓]	___	___
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[✓]	___	___

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[✓]	___	___

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

		YES	NO	N/A
	Mercury Analysis?	[✓]	___	___
	Cyanide Analysis?	[✓]	___	___
	ICP-AES(more than 2 point Calib.)?	[✓]	___	___
	ICP-MS (more than 2 point calib.)?	[✓]	___	___

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[✓]	___	___

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

	YES	NO	N/A
Metals - 90-110%R?	[✓]	___	___
Hg - 80-120%R?	[✓]	___	___
Cyanide - 85-115%R?	[✓]	___	___

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [✓] ___ ___

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? **(Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)**	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[✓]	___	___
For each cyanide run, was a CRQL standard analyzed?	[✓]	___	___

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
*** True value of the CRQL Standard**

	YES	NO	N/A
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.

A.1.14 Initial and Continuing Calibration Blanks - Form III

	YES	NO	N/A
A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[√]	___	___
Was an initial Calibration Blank analyzed after ICV?	[√]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[√]	___	___

Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by

	YES	NO	N/A
using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[✓]	___	___

ACTION:
If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".

A.1.14.2 Circle with red pencil on each Form III all Calib. Blank values that are:

≥ MDL but ≤ CRQL

> CRQL

	YES	NO	N/A
A.1.14.2.1 When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	✓	[___]	___

ACTION:
If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.

	YES	NO	N/A
A.1.14.2.2 When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[✓]	___

ACTION:
If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".

	YES	NO	N/A
A.1.14.2.3 Is any Calibration Blank value below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run.
2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

	YES	NO	N/A
A.1.15.1 Was one Preparation Blank prepared with and analyzed for:			
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J),but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

	YES	NO	N/A
A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL?	___	[✓]	___

ACTION:
If yes, change sample result ≥ MDL

	YES	NO	N/A
but ≤ CRQL to CRQL with a "U".			
..1.15.2.2 When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[✓]	___
If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[✓]	___

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

	YES	NO	N/A
..1.15.2.3 Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

	YES	NO	N/A
..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".			
..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.

..1.16.3 **ICP-MS Method**

..1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
..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
..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.			
..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.			
..1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	___	[✓]	___
	(b) between 30-74%?	✓	[___]	___
	(c) between 126-150%?	___	[✓]	___
	(d) greater than 150%?	___	[✓]	___
	ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			
(**NOTE**:Replace "N" with "J", "R" as appropriate.)			
..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?	[✓]	___	___

		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.			
..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.			
..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.			
..1.18.4	**Aqueous**			
..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:

> ± 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),

is any RPD ≥ 35% but < 120%?	___	[___]	✓
is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R)and red-line the associated sample data ≥ CRQL.			
..1.18.5.2	When the sample and/or duplicate value <5xCRQL(substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL	___	[___]	✓

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

..1.19 **Field Duplicates**

Aqueous Field Duplicates

..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

.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.

.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.			
..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**

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".			
1.1.21	**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.			
1.1.21.1	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.			
1.1.21.2	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			
1.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[✓]	___	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
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.)			
1.22	**Total/Dissolved or Inorganic/Total Analytes**			
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.			
1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

		YES	NO	N/A
1.1.22.3	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.

1.1.23 **Field Blank - Form I**
NOTE: **Designate "Field Blank" as such on Form I**

1.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[✓]	___	___
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	___	[✓]	___
	If yes, circle the Field Blank value on Form I that is greater than the CRQL,(or 2 x MDL when MDL > CRQL).			
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[✓]	___
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓

ACTION:
If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results)greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L. Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

	YES	NO	N/A
Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.			

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
1.1.24.2.2	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.			
1.1.24.3	**Linear Ranges - Form XI**			
1.1.24.3.1	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.			
1.1.25	**ICP-MS Tune Analysis - Form XIV**			
1.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
1.1.25.2	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
1.1 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".			
1.1.26	**ICP-MS Internal Standards - Form XV**			
1.1.26.1	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.			
1.1.26.2	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			

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 **Percent Solids of Sediments**

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [___] ✓

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative

See EDS data Validation report

Case# _____ **Site:** _____ **Matrix: Soil** ____

SDG# _____ **Lab:** _____ **Water** ____

Sampling Team: _____ **Reviewer:** _____ **Other** _____

A.2.1 **Data Validation Flags:**
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as **estimated**

R and Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully **usable**.

A.2.2 **Laboratory Qualifiers:**
The CLP laboratory applies a contractual qualifier on all

'orm 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 ıeanings 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 For 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.

ı.2.3.1 **Data Case Description**:

ı.2.3.2 **CSF Audit**:

A.2.3.3 **Technical Review:**

A.2.3.4 **Contract-Problem/Non-Compliance:**

HWSS Reviewer: _____ Date:_____
Signature

Contractor Reviewer: _____ Date:_____
Signature

Verified by: _____ Date:_____
Signature

CASE #
SDG #

Contract Laboratory Program
REGION II/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: _____

ESAT Reviewer/Date: _____

Type of Analysis: ___Inorganic_____

Laboratory Name: _____

Lab Contact: _____

Call Initiated By: ___Laboratory _X_Region II

:nquiry made in reference to data for the following sample number(s):

;ummary of Questions/Issues Discussed:

;ummary of Resolution:

Signature _____ Date: _____

FIELD DUPLICATES

Sample No. **Field Duplicate No.** **Sample Matrix:**

Lab 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									
Manganese									

					YES	NO	N/A		
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

Total/Dissolved Concentrations

Lab Code **Case No.** **SDG No.** **Sample Matrix: Water**

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

ECTION A (TO BE COMPLETED BY REGIONAL SENDING OFFICIAL)

nitiated By:

Name, Affiliation, Phone Number

_____

Case Number: _____
- OLM
- OLC
- ILM

Details 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)

Name 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#___

Site: _____ Lab Name: _____

Reviewer's Initials:_____ Number of Samples:_____

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														

CHAIN OF CUSTODY

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CHAIN OF CUSTODY

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CompuChem
a division of Liberty Analytical Corp.

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

Courier:
Airbill No.:
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and Bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores) 3-encores	VOCs (Liquid) 3-40ml	SVOCs, SVOC SIM, DRO, ORO	TPH-GRO (soil) 2-encores	Total Metals, TI, CN	Grain Size, Atterberg Limits	SVOC, SVOC SIM (liquid) 2-1L	Total Metals, TI (liquid) (P)	CN (liquid) 250	TPH-GRO (liquid) 2-40ml	TPH-DRO & ORO (liquid) 2-40ml	TOC (liquid) 2-40ml	pH / Sample Info (Lab Use) Metals	Cyanide			
0807042-03 1584401	VWAE-EB01-071708	7/17/08	0840	QC	11	5	1	1	2				X					X	X	X	X	X		<2	>12			
0807038-13	VWAE-SB21-3436-08C		0905	SO	5							X			X													
0807038-14	VWAE-SB21-3638-08C		1156	SO	5							X			X													
0807042-04	VWAE-TB01-071708		—	QC	5	5							X								X							
0807098-16	VWAE-SS20-0406-08C	↓	1300	SO	5							X			X													

Lab Use Only

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

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

Comments

VWAE-SS20-0406-08C has a jar for % Moisture included
~~SB21-3436 have: pH 2oz, 4oz, TI, CN, TOC 4oz, SV, SV SIM, DRO/ORO 8oz, SPLP 4oz, 8oz, VOA 2, 40ml, TI~~

Sample Custody

Relinquished by:	Date/Time: 7/17/08 1330	Received by: Jennifer Dove	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 2.6 °C

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

White & Yellow copy to lab • Pink copy for customer

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CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

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

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

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757-671-6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Vieques
Sampling Location: AOC E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N
Are high concentrations expected? (Y) or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores)	SVOCs, SVOC SIM, DRO, ORO	SPLP Metals, SVOC, TPH (GRO, DRO, ORO)	Total Metals, Tl, CN	Grain Size, Atterberg Limits	SPLP VOCs (liquid)	SVOC, SVOC SIM liquid	Total Metals, Tl	~~Cyanide~~ pH	TPH-GRO	TPH-DRO+ORO	TOC	pH / Sample Info (Lab Use)
0807038-15 1584303*	VWAE-SB21-2930-08C	7-16-08	1127	SO	7			SPLP = 1584501					X	X	X	X	X			X			X	
0807038-14 1584206	VWAE-SB21-3628-08C	7-17-08	1156	SO	2								X		X									
0807038-13 1584207 1584302	VWAE-SB21-3436-08C	7-17-08	0905	SO				SPLP = 1584502					X	X	X		X			X		X		
	~~VWAE-SB21~~																							

*only rec'd SVOC, SIM, DRO, ORO & T. Metals, Tl, CN 4 2 for VWAE-SB21-2930-08C (JD) 7/18/08

Lab Use Only

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

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

Comments

~~*~~ Mistake

Sample Custody

Relinquished by:	Date/Time: 7/17/08 1330	Received by: Jennifer Dover	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 1.8 °C

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

White & Yellow copy to lab • Pink copy for customer

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CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

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

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

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: W-AOC-E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N: where indicated
Are high concentrations expected? (Y) or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	SVOC-SVOC-SIM (2-AL liquid)	Total Metals-TI (1 PL)	Cyanide (1-250)	TPH-DRO+ORO (2-AL)	TOC (2-40ml)	SVOC-SVOC-SIM-DRO-ORO (1-8 oz)	Total Metals-TI-CN (1-4 oz)	TOC (4 oz)	SPLP-VOA (4-oz)	SPLP-SVOC-Metals-TPH (8 oz)	pH	Grain Size Atterberg Limits (2 oz)	pH / Sample Info (Lab Use) Total metals	Cyanide	TOC	
080704-07 1584403	VIWAE-EB02-071708	7/17/08	1810	QC	7		1	1	2			X	X	X	X	X								<2	>12	<2		SUB
1584303	VIWAE-SB21-2930-08C	7/16/08	1127	SO	5								SPLP=						X	X	X	X	X				
080708-22 1584210	VIWAE-SS20-0406-08C	7/17/08	1300	SO	2												X	X									
080708E-23	VIWAE-SB20-2830-08C	7/18/08	0940	SO	2												X	X									

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/18/08	Received by: Diane Byrd	Date/Time: 7/21/08 745
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 5.9 °C

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

White & Yellow copy to lab • Pink copy for customer

SUPPORT DOCUMENTATION

SW846 - METALS

-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SPLPBLK

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix (soil/water): LEACHATE Lab Sample ID: 175752

Level (low/med): LOW Date Received:

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	39.7	U		P
7440-36-0	Antimony	3.5	U	N	P
7440-38-2	Arsenic	3.2	U		P
7440-39-3	Barium	0.13	U		P
7440-41-7	Beryllium	0.18	U		P
7440-43-9	Cadmium	0.89	U		P
7440-70-2	Calcium	67.7	B		P
7440-47-3	Chromium	0.66	U		P
7440-48-4	Cobalt	4.1	U		P
7440-50-8	Copper	0.73	B		P
7439-89-6	Iron	19.0	B		P
7439-92-1	Lead	1.5	U		P
7439-95-4	Magnesium	22.7	B		P
7439-96-5	Manganese	0.18	U		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	0.76	U		P
7440-09-7	Potassium	7.6	B	E	P
7782-49-2	Selenium	4.4	U		P
7440-22-4	Silver	0.51	U		P
7440-23-5	Sodium	864	B		P
7440-28-0	Thallium	3.8	U		P
7440-62-2	Vanadium	0.52	U		P
7440-66-6	Zinc	3.1	B	E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Form I - IN

SW846 - METALS

3

BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	39.7	U	45.7	B	39.7	U	39.7	U	39.700	U	P
Antimony	3.5	U	3.5	U	3.5	U	3.5	U	3.500	U	P
Arsenic	3.2	U	3.2	U	3.2	U	3.2	U	-3.616	B	P
Barium	-0.8	B	-0.5	B	-0.8	B	-0.5	B	-0.836	B	P
Beryllium	0.2	U	0.3	B	0.2	U	0.4	B	0.180	U	P
Cadmium	0.9	U	0.9	U	0.9	U	0.9	U	0.890	U	P
Calcium	11.5	B	76.4	B	24.4	B	54.5	B	33.011	B	P
Chromium	0.7	U	1.0	B	0.7	U	0.9	B	0.660	U	P
Cobalt	4.1	U	4.1	U	4.1	U	4.1	U	4.100	U	P
Copper	0.6	U	0.8	B	1.5	B	1.3	B	0.620	U	P
Iron	12.6	U	21.5	B	12.6	U	23.8	B	12.600	U	P
Lead	1.5	U	1.5	U	1.5	U	1.5	U	1.500	U	P
Magnesium	9.6	U	66.3	B	16.6	B	16.2	B	9.600	U	P
Manganese	-0.6	B	-0.3	B	-0.6	B	-0.4	B	0.180	U	P
Mercury	0.100	U	0.100	U	0.100	U			0.100	U	CV
Nickel	0.8	U	0.8	B	0.8	U	0.8	U	0.760	U	P
Potassium	5.2	U	14.4	B	6.8	B	14.4	B	5.200	U	P
Selenium	4.4	U	4.4	U	4.4	U	4.4	U	4.400	U	P
Silver	0.5	U	0.5	U	0.5	U	0.5	U	0.510	U	P
Sodium	240.5	U	240.5	U	240.5	U	240.5	U	240.500	U	P
Thallium	3.8	U	3.8	U	3.8	U	3.8	U	3.800	U	P
Vanadium	0.5	U	1.0	B	0.6	B	0.8	B	0.520	U	P
Zinc	0.8	U	0.8	U	0.8	U	0.8	U	3.163	B	P

SW846 - METALS

9
ICP SERIAL DILUTIONS

SAMPLE NO.

VWAE-SB20-0810L

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	34858.21		36052.38		3.4		P
Antimony	4.22	B	17.50	U	100.0		P
Arsenic	3.20	U	16.00	U			P
Barium	173.12	B	174.90	B	1.0		P
Beryllium	0.58	B	1.46	B	151.7		P
Cadmium	0.89	U	4.45	U			P
Calcium	5779.81		6161.98	B	6.6		P
Chromium	28.60		35.55	B	24.3		P
Cobalt	8.71		20.50	U	100.0		P
Copper	74.67		77.30		3.5		P
Iron	53236.26		55141.15		3.6		P
Lead	3.06		7.50	U	100.0		P
Magnesium	9445.44		9814.10	B	3.9		P
Manganese	421.20		431.86		2.5		P
Nickel	13.16	B	15.79	B	20.0		P
Potassium	4070.22	B	3545.16	B	12.9	E	P
Selenium	4.40	U	22.00	U			P
Silver	0.51	U	2.55	U			P
Sodium	14354.82		15042.00	B	4.8		P
Thallium	3.80	U	19.00	U			P
Vanadium	129.60		134.55		3.8		P
Zinc	96.78		112.09		15.8	E	P

ENVIRONMENTAL
Data Services, Inc.

SPLP LOW CONCENTRATION SEMIVOLATILE ORGANIC COMPOUNDS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 15845

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 26, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SB21-2930	1584501	Water
2	VWAE-SB21-3436	1584502	Water
3	VWAE-SB20-0810	1584503	Water
3MS	VWAE-SB20-0810MS	1584503MS	Water
3MSD	VWAE-SB20-0810MSD	1584503MSD	Water
4	VWAE-SB20-2830	1584504	Water

The USEPA Region II SOP HW-6, Revision 14, September 2006: USEPA CLP Organics Data Review and Preliminary Review (CLP/SOW OLMO4.3) and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were extracted within 7 days for water samples and analyzed within 40 days for all samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - The MS/MSD samples exhibited acceptable %R and RPD values.

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blank was free of contamination.

Field, Equipment Blank - Field QC samples were not included in this data package.

GC/MS Instrument Performance Check - All of the DFTPP tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were correctly reported by the laboratory.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values with the exception of the following.

ICAL Date	Compound	%RSD	Qualifier	Affected Samples
08/01/08	Atrazine	56.7%	None	All ND

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values with the exception of the following.

CCAL Date	Compound	%D/RRF	Qualifier	Affected Samples
08/04/08	Pentachlorophenol	34.2%	J/UJ	All samples

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate samples were not included in this data package.

ANNOTATED FORM Is

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584501

Sample wt/vol: 100 (g/mL) ML Lab File ID: 1584501A62

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 07/29/08

Concentrated Extract Volume: 500(uL) Date Analyzed: 08/04/08

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	50	U
108-95-2	Phenol	50	U
111-44-4	bis(2-Chloroethyl)ether	50	U
95-57-8	2-Chlorophenol	50	U
95-48-7	2-Methylphenol	50	U
108-60-1	2,2'-oxybis(1-Chloropropane)	50	U
98-86-2	Acetophenone	50	U
106-44-5	4-Methylphenol	50	U
621-64-7	N-Nitroso-di-n-propylamine	50	U
67-72-1	Hexachloroethane	50	U
98-95-3	Nitrobenzene	50	U
78-59-1	Isophorone	50	U
88-75-5	2-Nitrophenol	50	U
105-67-9	2,4-Dimethylphenol	50	U
111-91-1	bis(2-Chloroethoxy)methane	50	U
120-83-2	2,4-Dichlorophenol	50	U
91-20-3	Naphthalene	71	
106-47-8	4-Chloroaniline	50	U
87-68-3	Hexachlorobutadiene	50	U
105-60-2	Caprolactam	50	U
59-50-7	4-Chloro-3-methylphenol	50	U
91-57-6	2-Methylnaphthalene	52	
77-47-4	Hexachlorocyclopentadiene	50	U
88-06-2	2,4,6-Trichlorophenol	50	U
95-95-4	2,4,5-Trichlorophenol	130	U
92-52-4	1,1'-Biphenyl	50	U
91-58-7	2-Chloronaphthalene	50	U
88-74-4	2-Nitroaniline	130	U
131-11-3	Dimethylphthalate	50	U
606-20-2	2,6-Dinitrotoluene	50	U
208-96-8	Acenaphthylene	50	U
99-09-2	3-Nitroaniline	130	U
83-32-9	Acenaphthene	50	U

MW 10/25/08

1D
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584501

Sample wt/vol: 100 (g/mL) ML Lab File ID: 1584501A62

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 07/29/08

Concentrated Extract Volume: 500(uL) Date Analyzed: 08/04/08

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	130	U
100-02-7	4-Nitrophenol	130	U
132-64-9	Dibenzofuran	50	U
121-14-2	2,4-Dinitrotoluene	50	U
84-66-2	Diethylphthalate	50	U
86-73-7	Fluorene	50	U
7005-72-3	4-Chlorophenyl-phenylether	50	U
100-01-6	4-Nitroaniline	130	U
534-52-1	4,6-Dinitro-2-methylphenol	130	U
86-30-6	N-nitrosodiphenylamine (1)	50	U
101-55-3	4-Bromophenyl-phenylether	50	U
118-74-1	Hexachlorobenzene	50	U
1912-24-9	Atrazine	50	U
87-86-5	Pentachlorophenol	130	~~U~~ UJ CCH
85-01-8	Phenanthrene	50	U
120-12-7	Anthracene	50	U
86-74-8	Carbazole	50	U
84-74-2	Di-n-butylphthalate	50	U
206-44-0	Fluoranthene	50	U
129-00-0	Pyrene	50	U
85-68-7	Butylbenzylphthalate	50	U
91-94-1	3,3'-Dichlorobenzidine	50	U
56-55-3	Benzo(a)anthracene	50	U
218-01-9	Chrysene	50	U
117-81-7	bis(2-Ethylhexyl)phthalate	38	J
117-84-0	Di-n-octylphthalate	50	U
205-99-2	Benzo(b)fluoranthene	50	U
207-08-9	Benzo(k)fluoranthene	50	U
50-32-8	Benzo(a)pyrene	50	U
193-39-5	Indeno(1,2,3-cd)pyrene	50	U
53-70-3	Dibenzo(a,h)anthracene	50	U
191-24-2	Benzo(g,h,i)perylene	50	U

(1) - Cannot be separated from Diphenylamine

lw 10/25/08

2

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584502

Sample wt/vol: 100 (g/mL) ML Lab File ID: 1584502A62

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 07/29/08

Concentrated Extract Volume: 500(uL) Date Analyzed: 08/04/08

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	50	U
108-95-2	Phenol	50	U
111-44-4	bis(2-Chloroethyl)ether	50	U
95-57-8	2-Chlorophenol	50	U
95-48-7	2-Methylphenol	50	U
108-60-1	2,2'-oxybis(1-Chloropropane)	50	U
98-86-2	Acetophenone	50	U
106-44-5	4-Methylphenol	50	U
621-64-7	N-Nitroso-di-n-propylamine	50	U
67-72-1	Hexachloroethane	50	U
98-95-3	Nitrobenzene	50	U
78-59-1	Isophorone	50	U
88-75-5	2-Nitrophenol	50	U
105-67-9	2,4-Dimethylphenol	50	U
111-91-1	bis(2-Chloroethoxy)methane	50	U
120-83-2	2,4-Dichlorophenol	50	U
91-20-3	Naphthalene	80	
106-47-8	4-Chloroaniline	50	U
87-68-3	Hexachlorobutadiene	50	U
105-60-2	Caprolactam	50	U
59-50-7	4-Chloro-3-methylphenol	50	U
91-57-6	2-Methylnaphthalene	52	
77-47-4	Hexachlorocyclopentadiene	50	U
88-06-2	2,4,6-Trichlorophenol	50	U
95-95-4	2,4,5-Trichlorophenol	130	U
92-52-4	1,1'-Biphenyl	50	U
91-58-7	2-Chloronaphthalene	50	U
88-74-4	2-Nitroaniline	130	U
131-11-3	Dimethylphthalate	50	U
606-20-2	2,6-Dinitrotoluene	50	U
208-96-8	Acenaphthylene	50	U
99-09-2	3-Nitroaniline	130	U
83-32-9	Acenaphthene	50	U

LW
10/25/08

2

1D
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584502

Sample wt/vol: 100 (g/mL) ML Lab File ID: 1584502A62

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 07/29/08

Concentrated Extract Volume: 500(uL) Date Analyzed: 08/04/08

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	130	U
100-02-7	4-Nitrophenol	130	U
132-64-9	Dibenzofuran	50	U
121-14-2	2,4-Dinitrotoluene	50	U
84-66-2	Diethylphthalate	50	U
86-73-7	Fluorene	50	U
7005-72-3	4-Chlorophenyl-phenylether	50	U
100-01-6	4-Nitroaniline	130	U
534-52-1	4,6-Dinitro-2-methylphenol	130	U
86-30-6	N-nitrosodiphenylamine (1)	50	U
101-55-3	4-Bromophenyl-phenylether	50	U
118-74-1	Hexachlorobenzene	50	U
1912-24-9	Atrazine	50	U
87-86-5	Pentachlorophenol	130	~~U~~ UJ CCV
85-01-8	Phenanthrene	50	U
120-12-7	Anthracene	50	U
86-74-8	Carbazole	50	U
84-74-2	Di-n-butylphthalate	50	U
206-44-0	Fluoranthene	50	U
129-00-0	Pyrene	50	U
85-68-7	Butylbenzylphthalate	50	U
91-94-1	3,3'-Dichlorobenzidine	50	U
56-55-3	Benzo(a)anthracene	50	U
218-01-9	Chrysene	50	U
117-81-7	bis(2-Ethylhexyl)phthalate	21	J
117-84-0	Di-n-octylphthalate	50	U
205-99-2	Benzo(b)fluoranthene	50	U
207-08-9	Benzo(k)fluoranthene	50	U
50-32-8	Benzo(a)pyrene	50	U
193-39-5	Indeno(1,2,3-cd)pyrene	50	U
53-70-3	Dibenzo(a,h)anthracene	50	U
191-24-2	Benzo(g,h,i)perylene	50	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2 OLM04.2

MW 10/25/08

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. 3

VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584503

Sample wt/vol: 100 (g/mL) ML Lab File ID: 1584503A62

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 07/29/08

Concentrated Extract Volume: 500(uL) Date Analyzed: 08/04/08

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	50	U
108-95-2	Phenol	50	U
111-44-4	bis(2-Chloroethyl)ether	50	U
95-57-8	2-Chlorophenol	50	U
95-48-7	2-Methylphenol	50	U
108-60-1	2,2'-oxybis(1-Chloropropane)	50	U
98-86-2	Acetophenone	50	U
106-44-5	4-Methylphenol	50	U
621-64-7	N-Nitroso-di-n-propylamine	50	U
67-72-1	Hexachloroethane	50	U
98-95-3	Nitrobenzene	50	U
78-59-1	Isophorone	50	U
88-75-5	2-Nitrophenol	50	U
105-67-9	2,4-Dimethylphenol	50	U
111-91-1	bis(2-Chloroethoxy)methane	50	U
120-83-2	2,4-Dichlorophenol	50	U
91-20-3	Naphthalene	50	U
106-47-8	4-Chloroaniline	50	U
87-68-3	Hexachlorobutadiene	50	U
105-60-2	Caprolactam	50	U
59-50-7	4-Chloro-3-methylphenol	50	U
91-57-6	2-Methylnaphthalene	50	U
77-47-4	Hexachlorocyclopentadiene	50	U
88-06-2	2,4,6-Trichlorophenol	50	U
95-95-4	2,4,5-Trichlorophenol	130	U
92-52-4	1,1'-Biphenyl	50	U
91-58-7	2-Chloronaphthalene	50	U
88-74-4	2-Nitroaniline	130	U
131-11-3	Dimethylphthalate	50	U
606-20-2	2,6-Dinitrotoluene	50	U
208-96-8	Acenaphthylene	50	U
99-09-2	3-Nitroaniline	130	U
83-32-9	Acenaphthene	50	U

lw 10/28/08

1D
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. 3

VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584503

Sample wt/vol: 100 (g/mL) ML Lab File ID: 1584503A62

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 07/29/08

Concentrated Extract Volume: 500(uL) Date Analyzed: 08/04/08

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	130	U
100-02-7	4-Nitrophenol	130	U
132-64-9	Dibenzofuran	50	U
121-14-2	2,4-Dinitrotoluene	50	U
84-66-2	Diethylphthalate	50	U
86-73-7	Fluorene	50	U
7005-72-3	4-Chlorophenyl-phenylether	50	U
100-01-6	4-Nitroaniline	130	U
534-52-1	4,6-Dinitro-2-methylphenol	130	U
86-30-6	N-nitrosodiphenylamine (1)	50	U
101-55-3	4-Bromophenyl-phenylether	50	U
118-74-1	Hexachlorobenzene	50	U
1912-24-9	Atrazine	50	U
87-86-5	Pentachlorophenol	130	~~U~~ UJ CCH
85-01-8	Phenanthrene	50	U
120-12-7	Anthracene	50	U
86-74-8	Carbazole	50	U
84-74-2	Di-n-butylphthalate	50	U
206-44-0	Fluoranthene	50	U
129-00-0	Pyrene	50	U
85-68-7	Butylbenzylphthalate	50	U
91-94-1	3,3'-Dichlorobenzidine	50	U
56-55-3	Benzo(a)anthracene	50	U
218-01-9	Chrysene	50	U
117-81-7	bis(2-Ethylhexyl)phthalate	50	U
117-84-0	Di-n-octylphthalate	50	U
205-99-2	Benzo(b)fluoranthene	50	U
207-08-9	Benzo(k)fluoranthene	50	U
50-32-8	Benzo(a)pyrene	50	U
193-39-5	Indeno(1,2,3-cd)pyrene	50	U
53-70-3	Dibenzo(a,h)anthracene	50	U
191-24-2	Benzo(g,h,i)perylene	50	U

(1) - Cannot be separated from Diphenylamine

lw 10/25/08

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. 4

VWAE-SB20-2830

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584504

Sample wt/vol: 100 (g/mL) ML Lab File ID: 1584504A62

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 07/29/08

Concentrated Extract Volume: 500(uL) Date Analyzed: 08/04/08

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	50	U
108-95-2	Phenol	50	U
111-44-4	bis(2-Chloroethyl)ether	50	U
95-57-8	2-Chlorophenol	50	U
95-48-7	2-Methylphenol	50	U
108-60-1	2,2'-oxybis(1-Chloropropane)	50	U
98-86-2	Acetophenone	50	U
106-44-5	4-Methylphenol	50	U
621-64-7	N-Nitroso-di-n-propylamine	50	U
67-72-1	Hexachloroethane	50	U
98-95-3	Nitrobenzene	50	U
78-59-1	Isophorone	50	U
88-75-5	2-Nitrophenol	50	U
105-67-9	2,4-Dimethylphenol	50	U
111-91-1	bis(2-Chloroethoxy)methane	50	U
120-83-2	2,4-Dichlorophenol	50	U
91-20-3	Naphthalene	50	U
106-47-8	4-Chloroaniline	50	U
87-68-3	Hexachlorobutadiene	50	U
105-60-2	Caprolactam	50	U
59-50-7	4-Chloro-3-methylphenol	50	U
91-57-6	2-Methylnaphthalene	50	U
77-47-4	Hexachlorocyclopentadiene	50	U
88-06-2	2,4,6-Trichlorophenol	50	U
95-95-4	2,4,5-Trichlorophenol	130	U
92-52-4	1,1'-Biphenyl	50	U
91-58-7	2-Chloronaphthalene	50	U
88-74-4	2-Nitroaniline	130	U
131-11-3	Dimethylphthalate	50	U
606-20-2	2,6-Dinitrotoluene	50	U
208-96-8	Acenaphthylene	50	U
99-09-2	3-Nitroaniline	130	U
83-32-9	Acenaphthene	50	U

lw
10/25/08

1D
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. 4

VWAE-SB20-2830

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584504

Sample wt/vol: 100 (g/mL) ML Lab File ID: 1584504A62

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 07/29/08

Concentrated Extract Volume: 500(uL) Date Analyzed: 08/04/08

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Extraction: (Type) CONT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	130	U
100-02-7	4-Nitrophenol	130	U
132-64-9	Dibenzofuran	50	U
121-14-2	2,4-Dinitrotoluene	50	U
84-66-2	Diethylphthalate	50	U
86-73-7	Fluorene	50	U
7005-72-3	4-Chlorophenyl-phenylether	50	U
100-01-6	4-Nitroaniline	130	U
534-52-1	4,6-Dinitro-2-methylphenol	130	U
86-30-6	N-nitrosodiphenylamine (1)	50	U
101-55-3	4-Bromophenyl-phenylether	50	U
118-74-1	Hexachlorobenzene	50	U
1912-24-9	Atrazine	50	U
87-86-5	Pentachlorophenol	130	~~U~~ UJ CCL
85-01-8	Phenanthrene	50	U
120-12-7	Anthracene	50	U
86-74-8	Carbazole	50	U
84-74-2	Di-n-butylphthalate	50	U
206-44-0	Fluoranthene	50	U
129-00-0	Pyrene	50	U
85-68-7	Butylbenzylphthalate	50	U
91-94-1	3,3'-Dichlorobenzidine	50	U
56-55-3	Benzo(a)anthracene	50	U
218-01-9	Chrysene	50	U
117-81-7	bis(2-Ethylhexyl)phthalate	21	J
117-84-0	Di-n-octylphthalate	50	U
205-99-2	Benzo(b)fluoranthene	50	U
207-08-9	Benzo(k)fluoranthene	50	U
50-32-8	Benzo(a)pyrene	50	U
193-39-5	Indeno(1,2,3-cd)pyrene	50	U
53-70-3	Dibenzo(a,h)anthracene	50	U
191-24-2	Benzo(g,h,i)perylene	50	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2 OLM04.2

lew
10/25/08

USEPA REGION II WORKSHEETS

SOP # HW-6
Revision # 14
Date: September 2006

CLP Organics Data Review and Preliminary Review (CLP/SOW OLM0 4.3)

Prepared by: George Karras Date: 12/05/06
George Karras, Chemist HWSS

Peer Reviewed by: Russell Amone Date: 12/05/06
Russell Amone, Chemist HWSS

Concurred by: Linda Mauel Date: 12/5/06
Linda Mauel, Chief HWSS

Approved by: Robert Runyon Date: 12/11/06
Robert Runyon, Chief HWSB

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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CLP Data Assessment Attachment 1

BFB ION ABUNDANCE CRITERIA Attachment 2

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INTRODUCTION

Scope and Applicability

This SOP offers detailed guidance in evaluating laboratory data generated according to the methods in the "USEPA Contract Laboratory Program Statement of Work for Organics Analysis OLM04.2," May 1999. The validation methods and actions discussed in this document are based on the requirements set forth in the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review," October 1999. This document attempts to cover technical as well as contractual 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.

In addition to technical requirements, contractual requirements are also covered in this document. While it is important that instances of contract non-compliance be addressed in the Data Assessment, the technical criteria are always used to qualify the analytical data.

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 3.

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. This information is further summarized on the Organic Regional Data Assessment Summary and Data Rejection Summary forms (see attached).

CADRE reports, when available, may be incorporated into the Data Assessment.

Reviewer Qualifications

Data reviewers must possess a working knowledge of the USEPA Statement of Work and National Functional Guidelines mentioned above.

DEFINITIONS

Acronyms

BFB - bromofluorobenzene
BHC - benzene hexachloride
BNA - base neutral acid(another name for Semi Volatiles)
CADRE - Computer Aided Data Review and Evaluation
CARD - CLP Analytical Results Database
CCS - contract compliance screening
CLASS - Contract Laboratory Analytical Services Support
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
MAGIC - Mainframe Access Graphical Interface with CARD
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
$\overline{RRF}$ - 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

Acronyms (cont'd.)

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.

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

P - Pesticide/Aroclor target analytes when the % Difference between the analyte concentrations obtained from the two dissimilar GC columns is greater than 25%.

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

C - Applies to Pesticide results where the identification of the analyte has been confirmed by GC/MS.

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

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: NA LABORATORY: Compuchem, Cary NC

SITE NAME: Vieques Island PR SDG Number(s): 15845

1.0 Chain of Custody and Sampling Trip Reports

		YES	NO	N/A
1.1	Are the Traffic Reports/Chain-of-Custody Records present for all samples?	[✓]		
ACTION:	If no, contact RSCC, or contact the WAM to obtain replacement of missing or illegible copies from the lab.			
1.2	Is the Sampling Trip Report present for all samples and all fractions?	[✓]		
ACTION:	If no, contact either RSCC or ask the WAM to obtain this information from the prime contractor.			

2.0 Data Completeness and Deliverables

		YES	NO	N/A
2.1	Have any missing deliverables been received and added to the data package?			✓
NOTE:	The lab is required to submit data for only two analyses, for each fraction. (i.e., the original sample and one dilution, or the most concentrated dilution analyzed and one further dilution.)			
ACTION:	Contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the lab. If lab cannot provide them, note the effect on the review of the package in the Contract Problems/Non-compliance section of the Data Assessment.			
2.2	Was CLASS CCS checklist included with package?	[✓]		
2.3	Are there any discrepancies between the Traffic Reports/Chain-of-Custody Records, Sampling Report and Sample Tags?		[✓]	
ACTION:	If yes, contact the WAM to obtain an explanation or resubmittal of any missing deliverables from the laboratory.			

3.0 Cover Letter SDG Narrative

		YES	NO	N/A
3.1	Is the Narrative or Cover Letter Present?	[✓]		

		YES	NO	N/A
3.2	Are case number, SDG number and contract number contained in the SDG Narrative or cover letter (see SOW, Exhibit B, section 2.6.1)? EPA sample numbers in the SDG, detailed documentation of any quality control, sample, shipment, and/or analytical problems encountered in processing the samples? Corrective action taken?	[✓]		
3.3	Does the narrative contain the following information:			
	VOA: description of trap and columns used for sample analyses?			
	VOA: a NOTE stating whether Volatile low level soil samples prepared according to the modified SW-846 Method 5035?(p. B-9/VOA, sec 2.6.1)	[✓]		
	VOA: any discrepancies between low level soil weights determined in the field and in the Laboratory? (p. B-10/VOA, sec. 2.6.1)			
	BNA: description of columns used for sample analyses?	[✓]		
	Pest: description of columns used for sample analyses?			
NOTE:	As per section 6.23.3.1 SOW/p. D-11/Pest, Packed columns are not permitted.		[✓]	
3.4	Does the narrative, VOA and BNA sections, contain a list of all TIC's identified as alkanes and their estimated concentrations?	[✓]		
3.5	Is the temperature indicator bottle present in the cooler? If not, did the Laboratory document in the SDG Narrative the alternative technique used to determine the cooler temperature?(Exhibit A/ p. A-5 sec. 4.2.1.2.3.3)	[✓]		
3.6	Does the narrative contain a record of all cooler temperatures? If the temperature of a cooler was exceeded, > 10° C, the lab must list by fraction and sample number, all affected samples.	[✓]		
3.7	Does the Narrative contain a list of sample reanalyses submitted? Did the Lab distinguish whether the reanalysis is billable, and if so why?			
3.8	Does the narrative contain a list of the pH values determined for each water sample submitted for volatile analysis (SOW Exhibit B, section 2.6.1.2)?	[✓]		
3.9	Does the Case Narrative contain the statement, "verbatim", as required in Section B of the SOW?	[✓]		
		[ ]		
		[ ]		

	YES	NO	N/A
	[✓]		

ACTION: If "No", to any question in this section, contact the TOPO to obtain all necessary resubmittals. If information is not available, document in the Data Assessment under Contract Problems/Non-Compliance section.

4.0 Data Validation Checklist

4.1 Check the package for the following discrepancies:

	YES	NO	N/A
a. Is the package paginated in ascending order starting from the SDG narrative?	[✓]		
b. Are all forms and copies legible?	[✓]		
c. Is each fraction assembled in the order set forth in the SOW?	[✓]		
The following checklist is divided into three parts. Part A is for any VOA analyses, Part B is for BNA's and Part C is Pesticide/PCB's.			

Does this package contain:

	YES	NO	N/A
VOA Data?			
BNA Data?	✓		
Pesticide/PCB data?	✓		
ACTION: Complete corresponding parts of checklist.		✓	

YES NO N/A

PART B: BNA ANALYSES

1.0 Sample Conditions/Problems

1.1 Do the Traffic Reports/Chain-of-Custody records or laboratory SDG 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, qualify positive hits "J" and non-detects "R".

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

2.0 Holding Times

2.1 Have any BNA technical holding times, determined from date of collection to date of extraction, been exceeded?

NOTE: Technical Holding Time: Continuous extraction of water samples for BNA analysis must be started within fourteen days of the date of collection. Soil/sediment samples must be extracted within 14 days of collection. Extracts must be analyzed within 40 days of the date of extraction. ___ ✓ ___

Table of Holding Time Violations
(See Chain-of-Custody Records) All ok

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

ACTION: If technical holding times were exceeded, flag all positive results as estimated (J) and sample quantitation limits as estimated (UJ), and document in the Data Assessment that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon reanalysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on 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 were exceeded by more than 28 days, all non-detect data must be qualified "R", unusable.

NOTE: Contractual Holding Times: Extraction of water samples must be started within 5 days VTSR. Soil/sediment samples must be extracted within 10 days of VTSR. This requirement does not apply to Performance Evaluation (PE) samples. Water and soil/sediment extracts must be analyzed within 40 days following

	YES	NO	N/A
extraction.			
ACTION: If contractual holding times are exceeded, document in the Data Assessment.			
NOTE: The data reviewer must note in the Data Assessment whether or not technical and contractual holding times were met.			
3.0 Surrogate Recovery (Form II)			
3.1 Are BNA Surrogate Recovery Summaries (Form II) present for each of the following matrices:			
a. Low Water?	[✓]		
b. Low Soil?	[ ]		✓
c. Med Soil?	[ ]		✓
3.2 Are all the BNA samples listed on the appropriate Surrogate Recovery Summaries for each of the following matrices:			
a. Low Water?	[✓]		
b. Low Soil?	[ ]		✓
c. Med Soil?	[ ]		✓
ACTION: Contact the TOPO to request an explanation or resubmittal of any missing deliverables from the laboratory. If missing deliverables are unavailable, document the effect in the Data Assessment.			
3.3 Were outliers marked correctly with an asterisk?			
ACTION: Circle all outliers with red pencil.			
3.4 Were two or more base-neutral OR acid surrogate recoveries out of specification for any sample or method blank?	[ ]	✓	
If yes, were samples reanalysed?			
Were method blanks reanalysed?		[ ]	✓
ACTION: If all BNA surrogate recoveries are ≥ 10%, but two within the base-neutral or acid fraction do not meet SOW specifications, for the affected fraction only (i.e. acid or base-neutral compounds):	[✓]		
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. Do not qualify non-detects if recoveries are greater than the upper acceptance limit.			
ACTION: If any base-neutral or acid surrogate has a recovery of < 10%:			
1. Qualify positive results for that fraction as estimated (J).			

	YES	NO	N/A

2. Qualify non-detects for that fraction as unusable (R).

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

NOTE: Contractual requirements state that if two surrogate fails acceptance criteria,within the same fraction,i.e. Acid or BN, the sample must be re-analyzed. If sample was not re-analyzed, document in the Data Assessment under Contract Problems/Non-Compliance.

NOTE: The laboratory must submit the following data:

1. If surrogate recoveries and internal standard responses meet the acceptance criteria in the re-analyzed sample, then the laboratory must submit only the re-analysis.

2. If surrogate recoveries and/or internal standard responses fail to meet the acceptance criteria upon re-analysis, then submit data from both analyses.

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

ACTION: If large errors exist, contact the TOPO to request an explanation or resubmittal of corrected deliverables from the laboratory. Make necessary corrections and note errors in the Data Assessment.

4.0 Matrix Spikes (Form III)

4.1 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form (Form III) present?

4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices: — [✓] —

a. Low Water? [✓] — —

b. Low Soil? [✓] — —

c. Med Soil? [ ] — ✓

[ ] — ✓

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

	YES	NO	N/A
ACTION: No action is taken based upon 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 and determine the need for some qualification of the data.			
ACTION: Circle all outliers with red pencil.			
5.0 Blanks (Form IV)			
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 time samples are extracted?	[✓]	___	___
5.3 Has a BNA method blank been analyzed for each GC/MS system used? (See SOW pg. D-55/SVOA, Section 12.1.2.)	[✓]	___	___
	[✓]	___	___
ACTION: If any method blank data are missing, contact the TOPO to obtain an explanation/resubmittal from the lab. If resubmittals are unavailable, use professional judgement to determine if the associated sample data should be qualified.			
5.4 The validator should verify that the correct identification scheme for the EPA Blank samples were used. See page B-30, sec. 3.3.7.3 of the SOW for further information.			
Was the correct identification scheme used for all BNA blanks?			
ACTION: Contact the TOPO to obtain resubmittals from the lab or make the required corrections on the forms. Document all corrections made by the validator in the Data Assessment under Contract Problems/Non-Compliance.	[✓]	___	___
5.5 Chromatography: review the blank raw data - chromatograms (RICs), quant. reports or data system printouts and spectra. Is the chromatographic performance (baseline stability) acceptable for each instrument?			
ACTION: Use professional judgement to determine the effect on the data.			
5.6 Are all detected hits for target compounds less than the CRQL for that analyte in all method blanks?			
Exception: Phthalate esters must be less than five times (5×) the CRQL.	[✓]	___	___
6.0 Contamination			
NOTE: "Water blanks", "drill blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.			
6.1 Do any method/reagent blanks have positive results (TCL and/or TIC)?	[✓]	___	___

YES NO N/A

___ [✓] ___

NOTE: Water: When applied as directed in the table below (page 33), the contaminant concentration in method/ instrument/reagent blanks is multiplied by the sample dilution factor, where necessary.

Soil: If the lab has not already done so, the contaminant concentration in soil blanks is multiplied by 33 times the sample dilution factor and corrected for %moisture (fraction of solid) where necessary. 30 grams of sodium sulfate (1 gram for medium level soils) are used to prepare the soil reagent/method blank as instructed on page D-54/SVOA, section 12.1.3. Contact the TOPO to obtain resubmittals if the soil blanks are not reported in soil units (µg/kg).

6.2 Do any field/rinse blanks have positive BNA results (TCL and/or TIC)?

___ [ ] ✓

ACTION: Prepare a list of samples associated with each contaminated blank. (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 sample data. Do not convert field blank results to account for the difference in soil CRQLs. Blanks may not be qualified because of contamination in another blank. Field blanks must be qualified for surrogate, spectral, instrument performance,calibration and Internal standard QC problems.

ACTION: Follow the directions in the table below to qualify TCL 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".

For:	Flag sample result with a "U" when:	Report CRQL & qualify "U" when:	No qualification is needed when:
Common Phthalate-Esters	Sample conc. is > CRQL, but ≤ 10× blank value.	Sample conc. is < CRQL and ≤ 10× blank value.	Sample conc. is > CRQL and > 10× blank value.

For:	Flag sample result with a "U" when:	Report CRQL & qualify "U" when:	No qualification is needed when:
Other Contaminants	Sample conc. is > CRQL, but ≤ 5× blank value.	Sample conc. is < CRQL and ≤ 5× blank value.	Sample conc. is > CRQL and > 5× blank value.

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

	YES	NO	N/A
ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R" (unusable).			
6.3 Are there field/rinse/equipment blanks associated with every sample?			
ACTION: For low level samples, note in the Data Assessment that there is no associated field/rinse/equipment blank. For analytes with high concentration, use professional judgement on qualification of these values and make a note in the Data Assessment.	[ ]	✓	
Exception: samples taken from a drinking water tap do not have associated field blanks.			
7.0 GC/MS Instrument Performance Check			
7.1 Are the GC/MS Instrument Performance Check Forms (Form V) present for Decafluorotriphenylphosphine (DFTPP)?			
7.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the DFTPP provided for each twelve hour shift?			
7.3 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 number for which no associated GC/MS tuning data are valid.	✓		
	✓		

SAMPLE NUMBERS	DATE	TIME	INSTRUMENT ID

	YES	NO	N/A
ACTION: If the **TOPO** cannot obtain missing data from the lab, reject "R" all data generated outside an acceptable twelve hour calibration interval.			
7.4 Have the ion abundances been normalized to m/z 198 (see SOW, page D-62/SVOA)?	✓		
NOTE: All ion abundance ratios must be normalized to m/z 198, the nominal base peak, even though the ion abundance of m/z 442 may up to 110% that of m/z 198.			
ACTION: If mass assignment is in error, flag all associated sample data as unusable "R".			

		YES	NO	N/A
7.5	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, the Region II TPO must be notified.			
7.6	Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values, but if errors are found check more.)			
7.7	Is the number of significant figures for the reported relative abundances consistent with the number given for each ion in the ion abundance criteria column?		[✓]	
ACTION:	If large errors exist, take action as specified in section 3.5 above.	[✓]		
7.8	Is the mass spectrum of DFTPP acquired according to sec. 9.2.4.2 p. D-20/SVOA ?			
NOTE:	Sec. 9.2.4.2 states that "the mass spectrum of DFTPP MUST be acquired in the following manner: Three scans (the peak apex scan and the scans immediately preceding and following the apex) are acquired and averaged. Background subtraction is required, and MUST be accomplished using a single scan acquired no more than 20 scans prior to the elution of DFTPP. Do NOT subtract part of the DFTPP peak." See Attachment 3 for DFTPP criteria.	[✓]		
ACTION:	If not, then reject "R" all data analyzed under that particular tune.			
7.9	Are the spectra of the mass calibration compound acceptable?			
ACTION:	Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.			
		[✓]		

8.0 <u>Target Compound List (TCL) Analytes (FORM I SV)</u>

8.1	Are the Organic Analysis Data Sheets (Form I SV) 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?	[✓]		
8.2	Has GPC cleanup been performed on all soil/ sediment sample extracts?			
	Has the Laboratory provided the TWO most recent UV traces of the	[ ]		✓

	YES	NO	N/A
calibration solution? GPC calibration and GPC CCV?(D-39/SVOA,sec.10.3.4.4)	[✓]		
ACTION: If data suggests that GPC was not performed, use professional judgement. Make note in Contract Problems/Non-Compliance section of the Data Assessment.			
8.3 Are the BNA Reconstructed Ion Chromatograms, the 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.	[✓]		
8.4 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.			
8.5 Are lab-generated standard mass spectra of identified BNA compounds present for each sample?	[✓]		
ACTION: If any mass spectra are missing, take action specified in 3.2 above. Note under Contract Non-compliance if lab does not generate their own standard spectra. If spectra are missing, reject all positive data.			
8.6 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			
8.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	[✓]		
8.8 Do sample and standard relative ion intensities agree within ±20%?			
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	[✓]		

	YES	NO	N/A
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 8.6, 8.7, and 8.8.	✓		
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.			

NOTE : The maximum dilution factor permitted for low level soils is 30. If a low level soil sample requires a dilution greater than 30, then the medium level method shall be utilized.(p. D-43) SVOA, sec. 10.6.5.4 . Document in the Data Assessment under Contract Problems/Non compliance if any low level soil was analyzed at a dilution factor greater than 30.

9.0 Tentatively Identified Compounds (TIC)

	YES	NO	N/A
9.1 Are all Tentatively Identified Compound Forms (Form I, Part B) present? and do listed TICs include scan number or retention time, estimated concentration and "JN" qualifier?	✓		
9.2 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?	✓		
c. Are Alkanes listed in/or part of the Case Narrative?	✓		
9.3 Are any TCL compounds (from any fraction) listed as TIC compounds? (Example: 1,2-dimethylbenzene is xylene - a VOA TCL - and should not be reported as a TIC.)	✓		
ACTION: Flag with "R" any TCL compound detected in another fraction. (Except blank contamination)			
9.4 Are any TICS reported earlier than 30 sec. before the first semivolatile compound, or three (3) minutes after the last semivolatile compound listed in Exhibit C SVOA?(p.D-45/SVOA,11.1.2.2)		✓	
ACTION: Flag with "R" any TIC compound reported.			

	YES	NO	N/A
9.5 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?			
9.6 Do TIC and "best match" standard relative ion intensities agree within ±20%?	✓		
	✓		

ACTION: Use professional judgement to determine the 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".

9.7 Are any TICs with responses < 10% of the internal standard (as determined by inspection of the peak areas or height) reported?			
ACTION: If yes, cross out questionable TIC(s).		✓	

10.0 Compound Quantitation and Reported Detection Limits

10.1 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.)			
10.2 Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?		✓	
ACTION: If errors are large, take action as specified in section 3.5 above.	✓		

ACTION: When a sample is analyzed at more than one dilution, the lowest CRQLs are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its associated value on the original Form I 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 Is that should not be used, including any in the summary package.

11.0 Standards Data (GC/MS)

11.1 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.

12.0 GC/MS Initial Calibration (Form VI)

12.1 Are the Initial Calibration Forms (Form VI) present and complete for the

	YES	NO	N/A
BNA fraction?	✓		
	✓		

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

12.2	Are the % relative standard deviation (%RSD) values for BNAs ≤ 30% over the concentration range of the calibration?	✓		

ACTION: Circle all outliers with red pencil.

NOTE: Although 25 BNA compounds have a contractual minimum RRF and no maximum %RSD, the technical criteria are the same for all analytes.

NOTE: Eight BNA compounds do not require a 20ng standard. They are 2,4-Dinitrophenol, 2,4,5-Trichlorophenol, 2-Nitroaniline, 3-Nitroaniline, 4-Nitroaniline, 4-Nitrophenol, 4,6-Dinitro-2-methylphenol, and Pentachlorophenol.

ACTION: If the %RSD is > 30.0%, qualify only positive results for that analyte "J" and do not qualify non-detects. When %RSD is > 90%, flag all non-detect results for that analyte "R" (unusable) and all positive results "J" (estimated)for ALL samples analyzed under that particular Initial Calibration.

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

12.3	Are any average RRFs < 0.05?			

ACTION: Circle all outliers with red pencil.

ACTION: If the average RRF is < 0.05 then:

1. "R" all non-detects for ALL samples analyzed under that particular Initial Calibration.	✓	[ ]	
2. "J" all positive results for ALL samples analyzed under that particular Initial Calibration.			

12.4	Are there any transcription/calculation errors in the reporting of RRFs and/or %RSDs? (Check at least two values; if errors are found check more.)			

ACTION: Circle errors with red pencil.

ACTION: If errors are large, take action as specified in section 3.5 above.

	YES	NO	N/A
		✓	

NOTE: Contract Requirement: The SOW allows up to four of the required analytes to fail contractual %RSD or RRF criteria provided the %RSD is ≤ 40% or RRF is ≥ 0.010. (See Table 5, page D-67/SVOA and analytes marked with a "*" on Form VI for a list of required analytes and contractual criteria.) Technical criteria, however, are the same for all analytes.

ACTION: If more than four analytes fail %RSD or RRF criteria, document in the Data Assessment under Contract Problems/Non-Compliance.

13.0 GC/MS Continuing Calibration (Form VII)

13.1 Are the Continuing Calibration Forms (Form VII) present and complete for the BNA fraction?

13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument? ✓1

ACTION: List below all sample analyses that were not analyzed within twelve hours of a continuing calibration standard for each instrument used. ✓1

_____

_____

_____

ACTION: If any forms are missing, or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, contact the TOPO to obtain an explanation/resubmittal from the lab. If continuing calibration data are unavailable, flag all associated sample data as unusable "R".

13.3 Does any BNA compound have a percent difference (%D) between the initial and continuing calibration RRFs which exceeds the ±25.0% criteria? ✓

ACTION: Circle all outliers with red pencil. [ ]

ACTION: Qualify both positive results and non-detects for the outlier compound(s) as estimated "J". When %D is > 90%, reject all non-detects for that analyte, "R", and qualify positive results "J" (estimated) for ALL samples analyzed under that particular Continuing Calibration.

13.4 Are any continuing RRFs < 0.05? ✓

ACTION: Circle all outliers with red pencil.

YES NO N/A

ACTION: If the RRF is < 0.05, qualify as unusable (R) associated non-detects and "J" associated positive values for ALL samples analyzed under that particular Continuing Calibration.

NOTE: Contract Requirement: The SOW allows up to four of the required analytes to fail contractual %D and RRF criteria, provided that the %D is ≤ 40% and the RRF is ≥ 0.010. (See Table 5 page D-67/SVOA or analytes marked with a "*" on Form VI for a list of the required analytes.) Technical criteria, however, are the same for all analytes.

ACTION: If more than four analytes failed %D and RRF criteria, document in the Data Assessment under Contract Problems/Non-Compliance.

13.5 Are there any transcription/calculation errors in the reporting of average relative response factors (RRF) or %difference (%D) between initial and continuing RRFs? (Check at least two values, but if errors are found, check more.)

ACTION: Circle errors with red pencil.

ACTION: If errors are large, take action as specified in section 3.5 above.

14.0 Internal Standards (Form VIII) ___ [✓] ___

14.1 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?

If no, was sample re-analyzed?

ACTION: 1. Circle all outliers with red pencil.

2. List all the outliers below.

[✓] ___ ___

[✓] ___ ___

ACTION: If sample was not reanalysed, document in Data Assessment in Contract Problems/Non-Compliance.

Sample #	Internal Std.	Area	Lower/Upper Limit
			/
			/
			/
			/

(Attach additional sheets if necessary.)
(or attach copies of Form VIIIs)

ACTION: 1. If the internal standard area count is outside the "upper" or "lower" limit, flag with "J" all positive results and non-detects quantitated with this

	YES	NO	N/A
internal standard with the following exceptions: A. Do not qualify non-detects associated with IS area > 100%. B. If the IS area in the sample is < 50%, qualify all analytes associated with that IS estimated (J). If area counts are extremely low (< 25% of the area in the 12 hour standard), or if performance exhibits a major abrupt drop-off, flag all associated non-detects as unusable (R) and positive hits estimated (J).			
14.2 Are the retention times of the 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.			
NOTE: Contractual requirements state that if any internal standard fails the acceptance criteria, the sample must be re-analyzed. If the affected sample was not re-analyzed, document in the Data Assessment under Contract Problems/Non-Compliance.			
15.0 Field Duplicates			
15.1 Were any field duplicates submitted for BNA 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 reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.	[ ]	✓	

CHAIN OF CUSTODY

(Please refer to Volatile Organic Report for COCs)

SUPPORT DOCUMENTATION

6D
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Instrument ID: 5972HP62 Calibration Date(s): 08/01/08 08/01/08

Calibration Times: 0926 1217

LAB FILE ID: RRF20 = HI080801A62 RRF50 = HG080801A62
RRF80 = HK080801A62 RRF120= HJ080801A62 RRF160= HH080801A62

COMPOUND		RRF20	RRF50	RRF80	RRF120	RRF160	$\overline{RRF}$	% RSD
2,4-Dinitrotoluene	*	0.491	0.487	0.507	0.477	0.466	0.486	3.1*
Diethylphthalate		1.646	1.512	1.551	1.499	1.364	1.514	6.7
Fluorene	*	1.470	1.368	1.344	1.307	1.180	1.334	7.9*
4-Chlorophenyl-phenylether	*	0.661	0.621	0.622	0.584	0.532	0.604	8.0*
4-Nitroaniline		0.342	0.283	0.319	0.320	0.312	0.315	6.7
4,6-Dinitro-2-methylphenol		0.150	0.178	0.190	0.187	0.187	0.178	9.1
N-nitrosodiphenylamine (1)		0.554	0.522	0.499	0.479	0.451	0.501	7.9
4-Bromophenyl-phenylether	*	0.243	0.232	0.233	0.223	0.216	0.229	4.5*
Hexachlorobenzene	*	0.308	0.283	0.282	0.277	0.271	0.284	5.1*
Atrazine		0.215	0.182	0.157	0.074	0.035	0.133	56.7
Pentachlorophenol	*	0.179	0.181	0.191	0.187	0.184	0.184	2.7*
Phenanthrene	*	1.245	1.195	1.154	1.104	1.073	1.154	6.0*
Anthracene	*	1.223	1.177	1.119	1.092	1.055	1.133	5.9*
Carbazole		1.105	0.913	0.824	0.859	0.842	0.909	12.6
Di-n-butylphthalate		1.757	1.693	1.627	1.611	1.519	1.641	5.5
Fluoranthene	*	1.278	1.237	1.223	1.186	1.119	1.209	5.0*
Pyrene	*	1.335	1.306	1.286	1.256	1.213	1.279	3.7*
Butylbenzylphthalate		0.750	0.771	0.762	0.753	0.743	0.756	1.4
3,3'-Dichlorobenzidine		0.413	0.382	0.405	0.389	0.386	0.395	3.3
Benzo(a)anthracene	*	1.236	1.233	1.225	1.175	1.156	1.205	3.0*
Chrysene	*	1.243	1.211	1.177	1.155	1.135	1.184	3.7*
bis(2-Ethylhexyl)phthalate		1.102	1.095	1.089	1.078	1.044	1.082	2.1
Di-n-octylphthalate		1.786	1.781	1.726	1.634	1.606	1.707	4.9
Benzo(b)fluoranthene	*	1.328	1.309	1.189	1.124	1.201	1.230	7.0*
Benzo(k)fluoranthene	*	1.320	1.276	1.311	1.096	0.964	1.193	13.2*
Benzo(a)pyrene	*	1.134	1.122	1.099	1.048	1.033	1.087	4.1*
Indeno(1,2,3-cd)pyrene	*	0.996	0.996	1.000	0.901	0.918	0.962	5.0*
Dibenzo(a,h)anthracene	*	1.035	1.018	1.005	0.915	0.914	0.977	6.0*
Benzo(g,h,i)perylene	*	0.939	0.905	0.926	0.885	0.886	0.908	2.6*
Nitrobenzene-d5	*	0.411	0.405	0.409	0.402	0.379	0.401	3.2*
2-Fluorobiphenyl	*	1.342	1.289	1.285	1.208	1.137	1.252	6.4*
Terphenyl-d14	*	0.901	0.879	0.856	0.832	0.798	0.853	4.7*
Phenol-d5	*	1.759	1.640	1.621	1.503	1.461	1.597	7.4*
2-Fluorophenol	*	1.363	1.332	1.302	1.245	1.231	1.295	4.3*
2,4,6-Tribromophenol		0.161	0.155	0.162	0.161	0.160	0.160	1.9
2-Chlorophenol-d4	*	1.519	1.406	1.387	1.272	1.210	1.359	8.9*
1,2-Dichlorobenzene-d4	*	0.957	0.877	0.846	0.740	0.685	0.821	13.2*

(1) Cannot be separated from Diphenylamine
* Compounds with required minimum RRF and maximum %RSD values.
All other compounds must meet a minimum RRF of 0.010.

FORM VI SV-2 OLM04.2

7D
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Instrument ID: 5972HP62 Calibration Date: 08/04/08 Time: 0939

Lab File ID: HG080804A62 Init. Calib. Date(s): 08/01/08 08/01/08

EPA Sample No.(SSTD050##): SSTD050TB Init. Calib. Times: 0926 1217

GC Column: RTX-5MS ID: 0.32 (mm)

COMPOUND	$\overline{RRF}$	RRF50	MIN RRF	%D	MAX %D
2,4-Dinitrotoluene	0.486	0.490	0.200	0.8	25.0
Diethylphthalate	1.514	1.552		2.5	
Fluorene	1.334	1.352	0.900	1.3	25.0
4-Chlorophenyl-phenylether	0.604	0.619	0.400	2.5	25.0
4-Nitroaniline	0.315	0.330		4.8	
4,6-Dinitro-2-methylphenol	0.178	0.154		-13.5	
N-nitrosodiphenylamine(1)	0.501	0.507		1.2	
4-Bromophenyl-phenylether	0.229	0.241	0.100	5.2	25.0
Hexachlorobenzene	0.284	0.292	0.100	2.8	25.0
Atrazine	0.133	0.171		28.6	
Pentachlorophenol	0.184	0.121	0.050	-34.2	25.0
Phenanthrene	1.154	1.169	0.700	1.3	25.0
Anthracene	1.133	1.138	0.700	0.4	25.0
Carbazole	0.909	0.940		3.4	
Di-n-butylphthalate	1.641	1.711		4.3	
Fluoranthene	1.209	1.260	0.600	4.2	25.0
Pyrene	1.279	1.278	0.600	-0.1	25.0
Butylbenzylphthalate	0.756	0.754		-0.3	
3,3'-Dichlorobenzidine	0.395	0.370		-6.3	
Benzo(a)anthracene	1.205	1.223	0.800	1.5	25.0
Chrysene	1.184	1.209	0.700	2.1	25.0
bis(2-Ethylhexyl)phthalate	1.082	1.076		-0.6	
Di-n-octylphthalate	1.707	1.765		3.4	
Benzo(b)fluoranthene	1.230	1.254	0.700	2.0	25.0
Benzo(k)fluoranthene	1.193	1.299	0.700	8.9	25.0
Benzo(a)pyrene	1.087	1.136	0.700	4.5	25.0
Indeno(1,2,3-cd)pyrene	0.962	0.961	0.500	-0.1	25.0
Dibenzo(a,h)anthracene	0.977	1.014	0.400	3.8	25.0
Benzo(g,h,i)perylene	0.908	0.947	0.500	4.3	25.0
Nitrobenzene-d5	0.401	0.422	0.200	5.2	25.0
2-Fluorobiphenyl	1.252	1.257	0.700	0.4	25.0
Terphenyl-d14	0.853	0.850	0.500	-0.4	25.0
Phenol-d5	1.597	1.692	0.800	5.9	25.0
2-Fluorophenol	1.295	1.386	0.600	7.0	25.0
2,4,6-Tribromophenol	0.160	0.155		-3.1	
2-Chlorophenol-d4	1.359	1.507	0.800	10.9	25.0
1,2-Dichlorobenzene-d4	0.821	0.902	0.400	9.9	25.0

(1) Cannot be separated from Diphenylamine
All other compounds must meet a minimum RRF of 0.010.

ENVIRONMENTAL
Data Services, Inc.

SPLP LOW CONCENTRATION VOLATILE ORGANIC COMPOUNDS

USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 15845

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 26, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-SB21-2930	1584501	Water
2	VWAE-SB21-3436	1584502	Water
3	VWAE-SB20-0810	1584503	Water
4	VWAE-SB20-2830	1584504	Water

The USEPA Region II SOP HW-6, Revision 14, September 2006: USEPA CLP Organics Data Review and Preliminary Review (CLP/SOW OLMO4.3) and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were analyzed within 14 days for preserved water samples.

Surrogates - All samples exhibited acceptable surrogate recoveries.

MS/MSD - A MS/MSD sample was not analyzed.

Laboratory Control Sample - The LCS samples exhibited acceptable %R values.

Method Blank - The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
SPLPBLKKD	Acetone	5	U	All samples
SPLPBLKKD	Methylene chloride	3	U	All samples

Trip, Field, Equipment Blank - Field QC samples were not included in this data package.

GC/MS Instrument Performance Check - All of the BFB tunes in the initial and continuing calibrations met the percent relative abundance criteria.

Target Compound List (TCL) Analytes - The Form Is were present with the required header information. All mass spectral data were included and no discrepancies were identified.

Tentatively Identified Compounds (TIC) - TICs were correctly reported by the laboratory.

Compound Quantitation and Reported Detection Limits - No discrepancies were identified.

GC/MS Initial Calibration - The initial calibrations exhibited acceptable %RSD and mean RRF values.

GC/MS Continuing Calibration - The continuing calibrations exhibited acceptable %D and RRF values with the exception of the following.

CCAL Date	Compound	%D/RRF	Qualifier	Affected Samples
07/31/08	Acetone	52.1%	J/UJ	All samples

Internal Standard (IS) Area Performance - All internal standards met response and retention time (RT) criteria.

Field Duplicates - Field duplicate samples were not included in this data package.

ANNOTATED FORM Is

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584501

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450173

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	15	
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	10 ~~9~~	~~J~~ UJ BL CC
75-15-0	Carbon Disulfide	2	J
79-20-9	Methyl Acetate	2	J
75-09-2	Methylene Chloride	10 ~~5~~	~~J~~ U BL
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

MW 10/26/08

1B
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584501

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450173

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	26	
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	27	
1330-20-7	Xylene (Total)	180	
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	5	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	3	J
96-12-8	1,2-Dibromo-3-Chloropropane	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U

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10/26/08

VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584501

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450173

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-05-4	Vinyl acetate	10	U

FORM I VOA-3 OLM04.2

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1F
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VWAE-SB21-2930

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584501

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450173

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
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FORM I VOA-TIC OLM04.2

MW
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584502

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450273

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	11	
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	10 ~~6~~	~~J~~ UJ BC
75-15-0	Carbon Disulfide	3	J
79-20-9	Methyl Acetate	2	J
75-09-2	Methylene Chloride	10 ~~4~~	~~J~~ U B
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

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1B
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584502

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450273

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	19	
1330-20-7	Xylene (Total)	100	
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	5	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	3	J
96-12-8	1,2-Dibromo-3-Chloropropane	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U

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VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584502

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450273

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-05-4	Vinyl acetate	10	U

FORM I VOA-3 OLM04.2

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1F
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VWAE-SB21-3436

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584502

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450273

Level: (low/med) LOW Date Received: 07/18/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
2.				
3.				
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FORM I VOA-TIC OLM04.2

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. 3

VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584503

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450373

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	7	J
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	10 ~~6~~	~~J~~ UJ
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10 ~~3~~	~~J~~ U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

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lw 10/26/08

1B
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584503

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450373

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-Chloropropane	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U

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VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584503

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450373

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-05-4	Vinyl acetate	10	U

FORM I VOA-3 OLM04.2

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1F
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VWAE-SB20-0810

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584503

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450373

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 6 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	3.72	11	J
2. 7446-09-5	SULFUR DIOXIDE	4.00	14	NJ
3.	LABORATORY ARTIFACT	12.78	7	J
4.	UNKNOWN	13.84	8	J
5. 91-20-3	NAPHTHALENE	16.02	12	NJ
6. 91-57-6	NAPHTHALENE, 2-METHYL-	17.50	6	NJ
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FORM I VOA-TIC OLM04.2

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-2830

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584504

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450473

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	2	J
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	10 ~~5~~	~~J~~ UJ BL
75-15-0	Carbon Disulfide	2	J CO
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	10 ~~3~~	~~J~~ U BL
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

AW
10/26/08

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1B
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-2830

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584504

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450473

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-Chloropropane	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U

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VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-SB20-2830

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584504

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450473

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-05-4	Vinyl acetate	10	U

FORM I VOA-3 OLM04.2

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1F
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO. 4

VWAE-SB20-2830

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 1584504

Sample wt/vol: 5 (g/mL) ML Lab File ID: 158450473

Level: (low/med) LOW Date Received: 07/21/08

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

FORM I VOA-TIC OLM04.2

10/26/08

USEPA REGION II WORKSHEETS

SOP # HW-6
Revision # 14
Date: September 2006

CLP Organics Data Review and Preliminary Review (CLP/SOW OLM0 4.3)

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Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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INTRODUCTION

Scope and Applicability

This SOP offers detailed guidance in evaluating laboratory data generated according to the methods in the "USEPA Contract Laboratory Program Statement of Work for Organics Analysis OLM04.2," May 1999. The validation methods and actions discussed in this document are based on the requirements set forth in the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review," October 1999. This document attempts to cover technical as well as contractual 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.

In addition to technical requirements, contractual requirements are also covered in this document. While it is important that instances of contract non-compliance be addressed in the Data Assessment, the technical criteria are always used to qualify the analytical data.

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 3.

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. This information is further summarized on the Organic Regional Data Assessment Summary and Data Rejection Summary forms (see attached).

CADRE reports, when available, may be incorporated into the Data Assessment.

Reviewer Qualifications

Data reviewers must possess a working knowledge of the USEPA Statement of Work and National Functional Guidelines mentioned above.

DEFINITIONS

Acronyms

BFB - bromofluorobenzene
BHC - benzene hexachloride
BNA - base neutral acid(another name for Semi Volatiles)
CADRE - Computer Aided Data Review and Evaluation
CARD - CLP Analytical Results Database
CCS - contract compliance screening
CLASS - Contract Laboratory Analytical Services Support
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
MAGIC - Mainframe Access Graphical Interface with CARD
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
$\underline{RRF}$ - relative response factor
$\overline{RRF}$ - 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

Acronyms (cont'd.)

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.

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

P - Pesticide/Aroclor target analytes when the % Difference between the analyte concentrations obtained from the two dissimilar GC columns is greater than 25%.

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

C - Applies to Pesticide results where the identification of the analyte has been confirmed by GC/MS.

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

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: NA **LABORATORY:** Compuchem, Cary NC

SITE NAME: Vieques Island PR **SDG Number(s):** 15845

1.0 Chain of Custody and Sampling Trip Reports

		YES	NO	N/A
1.1	Are the Traffic Reports/Chain-of-Custody Records present for all samples?	[✓]		
ACTION:	If no, contact RSCC, or contact the WAM to obtain replacement of missing or illegible copies from the lab.			
1.2	Is the Sampling Trip Report present for all samples and all fractions?	[✓]		
ACTION:	If no, contact either RSCC or ask the WAM to obtain this information from the prime contractor.			

2.0 Data Completeness and Deliverables

		YES	NO	N/A
2.1	Have any missing deliverables been received and added to the data package?		[✓]	
NOTE:	The lab is required to submit data for only two analyses, for each fraction. (i.e., the original sample and one dilution, or the most concentrated dilution analyzed and one further dilution.)			
ACTION:	Contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the lab. If lab cannot provide them, note the effect on the review of the package in the Contract Problems/Non-compliance section of the Data Assessment.			
2.2	Was CLASS CCS checklist included with package?	[✓]		
2.3	Are there any discrepancies between the Traffic Reports/Chain-of-Custody Records, Sampling Report and Sample Tags?		[✓]	
ACTION:	If yes, contact the WAM to obtain an explanation or resubmittal of any missing deliverables from the laboratory.			

3.0 Cover Letter SDG Narrative

		YES	NO	N/A
3.1	Is the Narrative or Cover Letter Present?	[✓]		

		YES	NO	N/A
3.2	Are case number, SDG number and contract number contained in the SDG Narrative or cover letter (see SOW, Exhibit B, section 2.6.1)? EPA sample numbers in the SDG, detailed documentation of any quality control, sample, shipment, and/or analytical problems encountered in processing the samples? Corrective action taken?			
3.3	Does the narrative contain the following information:	[✓]		
	VOA: description of trap and columns used for sample analyses?			
VOA:	a NOTE stating whether Volatile low level soil samples prepared according to the modified SW-846 Method 5035?(p. B-9/VOA, sec 2.6.1)	[✓]		
VOA:	any discrepancies between low level soil weights determined in the field and in the Laboratory? (p. B-10/VOA, sec. 2.6.1)			
	BNA: description of columns used for sample analyses?	[✓]		
	Pest: description of columns used for sample analyses?			
NOTE:	As per section 6.23.3.1 SOW/p. D-11/Pest, Packed columns are not permitted.		[✓]	
3.4	Does the narrative, VOA and BNA sections, contain a list of all TIC's identified as alkanes and their estimated concentrations?	[✓]		
3.5	Is the temperature indicator bottle present in the cooler? If not, did the Laboratory document in the SDG Narrative the alternative technique used to determine the cooler temperature?(Exhibit A/ p. A-5 sec. 4.2.1.2.3.3)	[✓]		
3.6	Does the narrative contain a record of all cooler temperatures? If the temperature of a cooler was exceeded, > 10° C, the lab must list by fraction and sample number, all affected samples.	[✓]		
3.7	Does the Narrative contain a list of sample reanalyses submitted? Did the Lab distinguish whether the reanalysis is billable, and if so why?			
3.8	Does the narrative contain a list of the pH values determined for each water sample submitted for volatile analysis (SOW Exhibit B, section 2.6.1.2)?	[✓]		
3.9	Does the Case Narrative contain the statement, "verbatim", as required in Section B of the SOW?	[✓]		
		[ ]		
		[ ]		

	YES	NO	N/A
	[✓]		

ACTION: If "No", to any question in this section, contact the TOPO to obtain all necessary resubmittals. If information is not available, document in the Data Assessment under Contract Problems/Non-Compliance section.

4.0 Data Validation Checklist

4.1 Check the package for the following discrepancies:

	YES	NO	N/A
a. Is the package paginated in ascending order starting from the SDG narrative?	[✓]		
b. Are all forms and copies legible?	[✓]		
c. Is each fraction assembled in the order set forth in the SOW?	[✓]		
The following checklist is divided into three parts. Part A is for any VOA analyses, Part B is for BNA's and Part C is Pesticide/PCB's.			

Does this package contain:

	YES	NO	N/A
VOA Data?			
BNA Data?	✓		
Pesticide/PCB data?	✓		

ACTION: Complete corresponding parts of checklist. ✓

YES NO N/A

PART A: VOA ANALYSES

1.0 Sample Conditions/Problems

1.1 Do the Traffic Reports/Chain-of-Custody Records, Sampling Report or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?

___ [✓] ___

ACTION: If any sample analyzed as a soil, other than TCLP, contains 50% - 90% water, all data shall be flagged as estimated (J). If a soil sample other than TCLP contains more than 90% water, then qualify positive results "J", and non-detects "R".

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

ACTION: If both 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: The smallest soil size permitted is 0.5g. If any soil sample is smaller than 0.5g, document in the Data Assessment under Contract Problems/Non-Compliance.

2.0 Holding Times

2.1 Have any VOA technical holding times, determined from date of collection to date of analysis, been exceeded?

___ [✓] ___

Technical Holding Times for AQUEOUS AND SOIL NON-ENCORE SAMPLES: If unpreserved, aqueous samples, maintained at 4° C for aromatic hydrocarbons analysis must be analyzed within 7 days of collection. If preserved with HCl (pH < 2) and stored at 4° C, then aqueous samples must be analyzed within 14 days of collection. If uncertain about preservation, contact sampler to determine whether or not samples were preserved. The holding time for non-Encore soils is 10 days from date of collection.

ACTION: If technical holding times for aqueous samples and soil non-Encore samples are exceeded, flag all positive results as estimated "J" and sample quantitation limits as estimated "UJ", and document in the Data Assessment 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 must 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

NOTE: Contractual Holding Times: Analysis of water samples must be completed within 10 days of Validated Time of Sample Receipt (VTSR). This requirement does not apply to Performance Evaluation (PE) samples.

Technical Holding Times for soils Encore samples:

i) If sample was preserved ≤ 2 days of VTSR:

1. and analyzed ≤ 14 days from DoC, NO action needed.
2. and analyzed > 14 days from DoC, qualify positive results "J" and non-detects "UJ".
3. and analyzed > 28 days from DoC, qualify positive results "J" and non-detects "R".

ii) If sample was NOT preserved, or preserved > 2 days of VTSR

1. and analyzed ≤ 7 days from DoC, No action needed.
2. and analyzed > 7 days from DoC, qualify AROMATIC analytes only, both positive and non-detects, as estimated "J".
3. and analyzed > 10 days from DoC, qualify ALL positive analytes "J" and ALL non-detects as "UJ".
4. and analyzed ≥ 20 days from DoC, qualify positive results "J" and non-detects "R".

Note: CONTRACT holding times for soil Encore samples are:

1. Samples must be preserved within two (2) days of VTSR and must be analyzed within ten (10) days of VTSR.

2. Samples NOT preserved within two (2) days of VTSR must be analyzed within two (2) days of VTSR.

ACTION: If contractual holding times are exceeded, document in the Data Assessment.

NOTE: The data reviewer must note in the Data Assessment whether or not technical and contractual holding times were met.

Table of Holding Time Violations NA

(See Chain-of-Custody Records)

Sample ID	Sample Matrix	Was Sample Preserved?	Date Sampled	Date Lab Received	Date Analyzed

	YES	NO	N/A
3.0 System Monitoring Compound (SMC) Recovery (Form II)			
3.1 Are the VOA SMC Recovery Summaries (Form II) present for each of the following matrices:			
a. Low Water?	[✓]		
b. Low Soil?	[ ]		✓
c. Med Soil?	[ ]		✓
3.2 Are all the VOA samples listed on the appropriate System Monitoring Compound Recovery Summary for each of the following matrices:			
a. Low Water?	[✓]		
b. Low Soil?	[ ]		✓
c. Med Soil?	[ ]		✓
ACTION: Contact the TOPO to obtain an explanation or resubmittal of any missing deliverables from the laboratory. If missing deliverables are unavailable, document the effect in the Data Assessment.			
3.3 Were outliers marked correctly with an asterisk?			
ACTION: Circle all outliers with red pencil.			
3.4 Was one or more VOA system monitoring compound recovery outside of contract specifications for any sample or method blank?	[ ]		✓
If yes, were samples re-analyzed?			
Were method blanks re-analyzed?		[ ]	✓
ACTION: If recoveries are ≥ 10%, but 1 or more compounds fail to meet SOW specifications:	[ ]		✓
1. All positive results are qualified as estimated "J".	[ ]		✓
2. Flag all non-detects as estimated detection limits "UJ" where recovery is less than the lower acceptance limit.			
3. If SMC recoveries are above allowable levels, qualify positive results "J" and do not qualify non-detects.			
ACTION: If any system monitoring compound recovery is < 10%:			
1. Flag all positive results as estimated "J".			
2. Flag all non-detects as unusable "R".			

	YES	NO	N/A

Professional judgement should be used to qualify data that only have method blank SMC recoveries out of specification in both original and re-analyses. Check the internal standard areas.

NOTE: Contractual requirements state that if any SMC fails the acceptance criteria, the sample must be re-analyzed. If the affected sample was not re-analyzed, document in the Data Assessment under Contract Problems/Non-Compliance.

NOTE: The laboratory must submit the following data:

1. If SMC recoveries and internal standard responses meet the acceptance criteria in the re-analyzed sample, then the laboratory must submit only the re-analysis.

2. If an SMC recovery and/or internal standard response fails to meet the acceptance criteria upon re-analysis, then submit data from both analyses.

(Refer to section 11.4.3.2, page D-45/VOA of the SOW for more information.)

3.5	Are there any transcription/calculation errors between raw data and Form II?			
ACTION:	If large errors exist, contact the TOPO to obtain an explanation or resubmittal of corrected deliverables from the laboratory. Make any necessary corrections and note the effect in the Data Assessment.	___	[✓]	___

4.0 Matrix Spikes (Form III)

4.1	Is the Matrix Spike/Matrix Spike Duplicate Recovery Form (Form III) present?	[✓]	___	___
4.2	Were matrix spikes analyzed at the required frequency for each of the following matrices:			
	a. Low Water?	[✓]	___	___
	b. Low Soil?	[ ]	___	✓
	c. Med Soil?	[ ]	___	✓

ACTION: If any matrix spike data are missing, take the action specified in section 3.2 above.

ACTION: No action is taken based upon MS/MSD data alone. However, using informed professional judgement, the MS/MSD results may be used in conjunction with other QC criteria to determine the need for qualification of the data.

ACTION: Circle all outliers with red pencil.

5.0 Blanks (Form IV)

		YES	NO	N/A
5.1	Is the Method Blank Summary (Form IV) present?	[✓]		
5.2	Frequency of Analysis: for the analysis of VOA TCL compounds, has a reagent/method blank been analyzed during every 12-hour time period on each GC/MS system, before any samples, and for each matrix?(water, low soil or medium soil)	[✓]		
5.3	Has a VOA method blank been analyzed at least once every twelve hours for each matrix/concentration and GC/MS system used?	[✓]		
5.4	Was a VOA instrument blank analyzed after each sample/dilution which contained a target compound that exceeded the initial calibration range?	[✓]		
5.5	Was a VOA storage blank analyzed at the end of all samples for each SDG in a case?	[✓]		
ACTION:	If any method/instrument blank data are missing, contact the TOPO to obtain any missing deliverables from the laboratory. If method blank data are not available, reject "R" all associated positive data. However, using professional judgement, the data reviewer may substitute field blank or trip blank data for missing method blank data. If the instrument blank was not analyzed after a sample with high concentration of reported values, inspect the chromatogram of the sample analyzed immediately after this analysis for possible carryover. Use professional judgement to determine if any contamination occurred and qualify analyte(s) accordingly. If storage blank data is missing, contact the TOPO to obtain any missing deliverables from the laboratory. If unavailable, note in the Contract Problems/Non-Compliance section of the Data Assessment.	[✓]		

Note: A storage blank shall be analyzed and reported as a water sample unless the SDG contains only soil samples. Then, the storage blank may be analyzed and reported as a soil sample. (p. D-49/VOA sec. 12.1.3.5)

5.6	The validator should verify that the correct identification scheme for the EPA Blank samples were used. See page B-30, section 3.3.7.3 of the SOW for further information. Was the correct identification scheme used for all VOA blanks?			
ACTION:	Contact the TOPO to obtain missing deliverables from the lab, or make the required corrections on the forms. Document in the Data Assessment under Contract Problems/Non-compliance if corrections were made by the validator.	[✓]		

	YES	NO	N/A
5.7 Chromatography: review the blank raw data- chromatograms (RICs), quant. reports or data system printouts and spectra. Is the chromatographic performance (baseline stability) for each instrument acceptable for VOA's?			
ACTION: Use professional judgement to determine the effect on the data.			
5.8 Are all detected hits for target compounds in method, instrument and storage blanks less than the CRQL for that analyte?	[✓]	___	___
Exception: Acetone and 2-butanone must be less than 5 times the CRQL, and methylene chloride and Cyclohexane must be less than 2.5 times its CRQL. (p. D-50/VOA sec. 12.1.4.6)			
ACTION: If no, an explanation and laboratory's corrective actions must be addressed in the case narrative. If the narrative contains no explanation, then make a note in the Contract Problems/Non-Compliance section of the Data Assessment.	[✓]	___	___
6.0 Contamination			
NOTE: "Water blanks", "drill blanks", and "distilled water blanks" are validated like any other sample, and are not used to qualify data. Do not confuse them with the other QC blanks discussed below.			
6.1 Do any method/instrument/reagent/storage blanks have positive results (TCL and/or TIC) for VOA's? NOTE: When applied as directed in the table below, the contaminant concentration in these blanks are multiplied by the sample dilution factor and corrected for %moisture when necessary.	✓	[ ]	___
NOTE: A contaminated instrument blank is not allowable under this SOW. The instrument blank must meet the technical acceptance criteria for blank analyses(sec. 12.1.4). See page D-48/VOA, section 12.1.2.4 for additional information. Document in the Data Assessment under Contract Problems/Non-Compliance if contaminated instrument blank was submitted.			
6.2 Do any field/trip/rinse blanks have positive VOA results (TCL and/or TIC)?			
ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)			
NOTE: All field blank results associated with a particular group of samples (may exceed one per case) must be used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped and are not required for non-aqueous matrices. Blanks may not be qualified because of contamination in another blank. Field Blanks & Trip Blanks must be qualified for system monitoring compound, instrument performance criteria, spectral or calibration, and Internal standard QC problems.	___	[ ]	✓
ACTION: Follow the directions in the table below to qualify TCL results due to contamination. Use the largest value from all the associated blanks. If any blanks are grossly contaminated, all associated data should be qualified as unusable "R".			

YES NO N/A

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

ACTION: For TIC compounds, if the concentration in the sample is less than five times the concentration in the most contaminated associated blank, flag the sample data "R".

For:	Flag sample result with a "U" when:	Report CRQL & qualify "U" when:	No qualification is needed when:
TCL COMPOUNDS			
Methylene Chloride, Acetone, Toluene, 2-Butanone, **Cyclohexane**	Sample conc. is > CRQL, but ≤ 10× blank value.	Sample conc. is < CRQL and ≤ 10× blank value.	Sample conc. is > CRQL and > 10× blank value.
Other Contaminants	Sample conc. is > CRQL, but ≤ 5× blank value.	Sample conc. is < CRQL and ≤ 5× blank value.	Sample conc. is > CRQL and > 5× blank value.

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

ACTION: For low level samples, note in the Data Assessment that there is no associated field/rinse/equipment blank. For samples with high concentrations of suspected blank contaminants, use professional judgement to qualify these values and make a note in the Data Assessment.

Exception: samples taken from a drinking water tap do not have associated field blanks.

7.0 GC/MS Instrument Performance Check (Form V)

7.1 Are the GC/MS Instrument Performance Check Forms (Form V) present for Bromofluorobenzene (BFB)? [✓] ___ ___

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

7.3 Is the mass spectrum of BFB acquired according to sec. 9.2.4.1 D-23/VOA? [✓] ___ ___

Note: Sec. 9.2.4.1 states that "the mass spectrum of BFB MUST be acquired in the following manner. Three scans (the peak apex scan and the scans immediately preceding and following the apex) are acquired and averaged. Background subtraction is required, and MUST be accomplished using a single scan no more than 20 scans prior to the elution of BFB. DO NOT background subtract part of the BFB peak." See Attachment 2 for BFB criteria.

	YES	NO	N/A
Action: If not, reject "R" all samples associated with that particular BFB.			
7.4 Has an instrument performance check been analyzed for every analytical sequence on each instrument?			
ACTION: List date, time, instrument ID, and sample numbers for which associated GC/MS tuning data are unavailable.	✓		

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS

	YES	NO	N/A
ACTION: Notify the TOPO to obtain missing data, if possible. If the lab cannot provide the missing data, reject, "R", all data generated outside an acceptable twelve hour calibration interval.			
7.5 Have the ion abundances been normalized to m/z 95 as specified in Exhibit D, page D-56/VOA?			
NOTE: All ion abundance ratios must be normalized to m/z 95, the nominal base peak, even though the ion abundance of m/z 174 may be up to 120% that of m/z 95.	✓		
ACTION: If mass assignment is in error, qualify all associated data as unusable "R".			
7.6 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, the Region II TPO must be notified.	✓		
7.7 Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values, but if errors are found check more.)			
7.8 Is the number of significant figures for the reported relative abundances consistent with the number given for each ion in the ion abundance criteria column?		✓	
ACTION: If large errors exist, take action as specified in section 3.5 above.	✓		
7.9 Are the spectra of the mass calibration compound acceptable?			
ACTION: Use professional judgement to determine whether associated data should be	✓		

	YES	NO	N/A
accepted, qualified, or rejected.			
8.0 Target Compound List (TCL) Analytes (FORM I VOA)			
8.1 Are the Organic Analysis Data Sheets (Form I VOA) 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?	[✓]		
8.2 Are the VOA Reconstructed Ion Chromatograms, the 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.	[ ]		✓
8.3 Is chromatographic performance acceptable with respect to:			
a. Baseline stability?	[✓]		
b. Resolution?	[✓]		
c. Peak shape?	[✓]		
d. Full-scale graph (attenuation)?	[✓]		
e. Other: _____?	[ ]		✓
ACTION: Use professional judgement to determine the acceptability of the data.			
8.4 Are the lab-generated standard mass spectra of the identified VOA compounds present for each sample?			
ACTION: If any mass spectra are missing, take action as specified in 3.2 above. If the lab does not generate its own standard spectra, document in the Contract Problems/Non-compliance section of the Data Assessment.	[✓]		
8.5 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			
8.6 Are all ions present in the standard mass spectrum at a relative			

	YES	NO	N/A
intensity greater than 10% also present in the sample mass spectrum?			
8.7 Do sample and standard relative ion intensities agree within ±20%?	[✓]		
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 8.5, 8.6, and 8.7.	[✓]		
	[✓]		
ACTION: When sample carry-over is suspected, use professional judgement determine if instrument cross-contamination has affected positive compound identifications.			
9.0 Tentatively Identified Compounds (TIC)			
9.1 Are all Tentatively Identified Compound Forms (Form I Part B) present; and do listed TIC's include scan number or retention time, estimated concentration and "JN" qualifier?			
9.2 Are the mass spectra for the TIC's and associated "best match" spectra included in the sample package for each of the following:	[✓]		
a. Samples and/or fractions as appropriate?			
b. Blanks?			
c. Are Alkanes listed in/or part of the Case Narrative?	[✓]		
ACTION: If any TIC data are missing, take action specified in 3.2 above.	[✓]		
ACTION: Add "JN" qualifier to all chemically named TIC's, if missing.	[✓]		
9.3 Are any TCL compounds (from any fraction including all PCB congeners) listed as TIC compounds? (Example: 1,2- dimethylbenzene is xylene, a VOA TCL analyte, and should not be reported as a TIC.)			
ACTION: Flag with "R" only TCL compound detected in another fraction. (Except blank contamination)			
9.4 Are any TIC's reported earlier than 30 sec before the first purgeable compound, or three (3) min. after the last purgeable compound listed in Exhibit C (Volatiles)?			
ACTION: Flag with "R" any TIC compound reported. (p. D38-VOA, sec. 11.1.2.2)		[✓]	
9.5 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?			
9.6 Do TIC and "best match" standard relative ion intensities agree within ±20%?		[✓]	

	YES	NO	N/A
	[✓]		
	[✓]		

ACTION: Use professional judgement to determine the acceptability of TIC identifications. If it is determined an incorrect identification was made, change the identification to "unknown," or to some less specific identification as appropriate. (Example: "C3 substituted benzene.")

Also, when a compound is not found in any blank, but is detected in a sample and is a suspected artifact of a common laboratory contaminant, the result should be qualified as unusable "R". (E.g., Common Lab Contaminants: CO_2 (M/E 44), Siloxanes (M/E 73) hexane, aldol condensation products, solvent preservatives, and related by-products.

9.7 Are TIC's with responses < 10% of the internal standard (as determined by inspection of the peak areas or height) reported?

ACTION: If yes, cross out questionable TIC's.

10.0 Compound Quantitation and Reported Detection Limits

10.1 Are there any transcription/calculation errors in Form I results? (Check at least two positive values. Verify that the correct internal standards, quantitation ions, and RRF were used to calculate Form I results.) — [✓] —

10.2 Are the 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 CRQL's are used (unless a QC exceedance dictates the use of the higher CRQL data from the diluted sample). Replace concentrations that exceeded the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original Form I and substituting the data from the diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form Is not to be used, including any in the data summary package.

11.0 Standards Data (GC/MS)

11.1 Are the Reconstructed Ion Chromatograms, and data system printouts

	YES	NO	N/A
(quant. reports) present for each initial and continuing calibration?			
ACTION: If any calibration standard data are missing, take action specified in 3.2 above.	[✓]		
12.0 GC/MS Initial Calibration (Form VI)			
12.1 Are the Initial Calibration Forms (Form VI) present and complete at concentrations of 10, 20, 50, 100, 200ng for separate calibrations of low water/med soils (unheated purge) and low soils (heated purge)?			
ACTION: If any calibration standard forms are missing, take action specified in 3.2 above.			
12.2 Were all low level soil standards, blanks and samples analyzed by heated purge?	[✓]		
ACTION: If low level soil samples were not heated during purge, qualify positive hits "J" (estimated) and non-detects "R".			
12.3 Are the % relative standard deviation (%RSD) values for VOA's ≤ 30% over the concentration range of the calibration?	[ ]		[✓]
NOTE: Although 23 VOA compounds have a contractual minimum RRF and no maximum %RSD, the technical acceptance criteria are the same for all analytes.			
ACTION: Circle all outliers with red pencil.			
	[✓]		
ACTION: If %RSD is > 30.0%, qualify associated positive results for that analyte "J" (estimated). Do not qualify non-detects. When %RSD is > 90%, flag all non-detects for that analyte "R" (unusable) and positive hits "J" .			
NOTE: Analytes previously qualified "U" for blank contamination are still considered as "hits" when qualifying for initial calibration criteria.			
12.4 Are any average RRFs < 0.05?			
ACTION: Circle all outliers with red pencil.		[✓]	
ACTION: If the average RRF is < 0.05, then qualify associated non-detects with an "R" and flag associated positive data as estimated "J".			
NOTE: Contract Requirement: The SOW allows up to two of the required analytes to fail contractual %RSD or RRF criteria, provided the %RSD is ≤ 40% and RRF is ≥ 0.010. (See Table 5, page D-61/VOA and analytes marked with a "*" on Form VI for required analytes and contractual criteria.) Technical criteria, however, are the same for all analytes.			
ACTION: If more than two analytes failed %RSD or RRF criteria, document in the Data Assessment under Contract Problems/Non-Compliance.			
12.5 Are there any transcription/calculation errors in the reporting of average relative response factors (RRF) or %RSD? (Check at least 2 values, but if errors are found, check more.)			

	YES	NO	N/A
ACTION: Circle errors with red pencil.			
ACTION: If errors are large, contact the TOPO to obtain an explanation/resubmittal from the lab, document in the Data Assessment under Contract Problems/Non-Compliance.			
13.0 GC/MS Continuing Calibration (Form VII)			
13.1 Are the Continuing Calibration Forms (Form VII) present and complete for separate calibration of low water/med soil and low soil samples?		✓	
13.2 Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	✓		
ACTION: If any forms are missing or no continuing calibration standard has been analyzed within twelve hours of every sample analysis, contact the TOPO to request an explanation/resubmittal from the lab. If continuing calibration data are not available, flag all associated sample data as unusable "R".	✓		
ACTION: List below all sample(s) that were not analyzed within twelve hours of the previous continuing calibration.			
13.3 Do any volatile compounds have a percent difference (%D) between the initial and continuing RRF which exceeds the ±25% criteria?			
NOTE: Although **23** VOA compounds have a contractual minimum RRF and no maximum %D, the technical acceptance criteria are the same for all analytes.			
ACTION: Circle all outliers with red pencil.	✓		
ACTION: Qualify both positive results and non-detects for the outlier compound(s) as estimated. When %D is > 90%, qualify all non-detects for that analyte unusable (R) and positive results estimated (J) .			
13.4 Are any continuing calibration RRFs < 0.05?			
ACTION: Circle all outliers with red pencil.			
ACTION: If the RRF is < 0.05, qualify the associated non-detects as unusable "R"			

	YES	NO	N/A
and the associated positive values "J".			
NOTE: Contract Requirement: The SOW allows up to two of the required analytes to fail contractual %D and RRF criteria, provided that the %D is ≤ 40% and the RRF is ≥ 0.010. (See Table 5 pg. D-61/VOA or analytes marked with a "*" on Form VI for required analytes.) Technical criteria, however, are the same for all analytes.	___	[✓]	___
ACTION: If more than two analytes failed %D and RRF, criteria document in the Data Assessment under contract Problems/Non-Compliance.			
13.5 Are there any transcription/calculation errors in the reporting of RRF or %D between initial and continuing RRFs? (Check at least two values, but if errors are found, check more.)			
ACTION: Circle errors with red pencil.	___	[✓]	___
ACTION: If errors are large, contact the TOPO to obtain an explanation/resubmittal from the lab, document in the Data Assessment under Contract Problems/Non-Compliance.			

14.0 Internal Standard (Form VIII)

	YES	NO	N/A
14.1 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?			
If no, was the sample re-analyzed?			
ACTION: 1. Circle all outliers with red pencil.	[✓]	___	___
2. List all the outliers below.	[ ]	___	✓

Sample #	Internal Std.	Area	Lower/Upper Limit
_____	_____	_____	_____/_____
_____	_____	_____	_____/_____
_____	_____	_____	_____/_____

(Attach additional sheets if necessary, or attach copies of Form VIIIs.)

ACTION: If any sample was not re-analyzed, document in the Data Assessment under Contract Problems/Non-Compliance.

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 associated IS area counts are > 100%.

3. If the IS area in the sample is below the "lower limit," < 50%,

	YES	NO	N/A
qualify all analytes associated with that IS estimated, "J". If the area counts are extremely low, < 25% of the area in the 12 hour standard, or if performance exhibits a major abrupt drop- off, flag all associated non-detects as unusable, "R", and positive hits estimated, "J".			
14.2 Are the retention times of the 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.	[✓]		
NOTE: Contractual requirements state that if any internal standard fails the acceptance criteria, the sample must be re-analyzed. If the affected sample was not re-analyzed, document in the Data Assessment under Contract Problems/Non-Compliance.			
15.0 Field Duplicates			
15.1 Were any field duplicates submitted for VOA analysis?	[ ]	✓	
ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.			
ACTION: Any gross variation between 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.			

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

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

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: W-AOC-E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N: where indicated
Are high concentrations expected? (Y) or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	SVOC-SVOC-SIM (2-AL (liquid))	Total Metals-TI (1 PL)	Cyanide (1-250)	TPH-DRO+ORO (2-AL)	TOC (2-40ml)	SVOC-SVOC-SIM-DRO-ORO (1-8 oz)	Total Metals-TI-CN (1-4 oz)	TOC (4 oz)	SPLP-VOA (4-oz)	SPLP-SVOC-Metals-TPH (8 oz)	pH	Grain Size, Atterberg Limits (2 oz)	pH / Sample Info (Lab Use) Total Metals	Cyanide	TOC	
0807042-07 1584413	VIWAE-EB02-071708	7/17/08	1810	QC	7		1	1	2			X	X	X	X	X								<2	>12	<2	SUB
1584303	VIWAE-SB21-0930-08C	7/16/08	1127	SO	5								SPLP						X	X	X	X	X				
0807038-22 1584210	VIWAE-SS20-0940-08C	7/17/08	1300	SO	2												X	X									
0807038-23	VIWAE-SB20-2830-08C	7/18/08	0940	SO	2												X	X									

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: [signature]	Date/Time: 7/18/08	Received by: Diane Byrd	Date/Time: 7/21/08 745
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 5.9 °C

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

White & Yellow copy to lab • Pink copy for customer

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

Courier:
Airbill No.:
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Chelsea Bennet / CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Stephen Brand
Phone #: 757.671.6211
Sampler's Name: K. Butler / J. Acaron

Project Information

Project Name: Vieques CTO ~~[illegible]~~-10
Sampling Location: W-AOC-E
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores) 8021	SVOCs, SVOC Sim, DRO, ORO	SPLP SVOC, Metals, TPH-GRO, ORO, DRO	Total Metals, TI, CN 4E7	Grain Size, Atterberg Limits 8.37	VOCs (liquid)	SVOC, SVOC Sim	Total Metals, TI	Cyanide	TPH-GRO	TPH-DRO & ORO (2AR)	TOC	pH / Sample Info (Lab Use) SUB
~~CPB 7/17/08~~	~~WVAE-EB01-071708~~	~~7/17/08~~	~~0640~~	~~QC~~																				
0807038-08 1584201	WVAE-SS01-0506-08C	7/16/08	0803	SO	6								X 3		X 3									
0807038-12 1584202	WVAE-SB01-1820-08C	7/16/08	1020	SO	3								X		X	X								
0807038-03 1584203	WVAE-SB01-0910-08C	↓	0910	SO	2								X		X									
0807038-10 1584204	WVAE-SB01P-0910-08C		0910	SO	2								X		X									
0807038-11 1584205	WVAE-SB01-1618-08C	↓	0940	SO	3								X	X	X									
0807042-03	WVAE-EB01-071708	7/17/08	0640	QC	2														NO →	X	H			

sample IDs should all start w/ "WVAE" [illegible] 7/21/08

Lab Use Only

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

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

Comments

WVAE-SS01-0506-08C is MS/MSD
⊕ Bottle not in COC (mistake)

Sample Custody

Relinquished by: [signature]	Date/Time: 7/17/08 1330	Received by: Jennifer Dove	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 2.4 °C

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

White & Yellow copy to lab • Pink copy for customer

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Renji Butler / Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores) 3-encore	VOCs (Liquid) 3-40 mL	SVOCs, SVOC SIM, DRO, GRO	TPH-GRO (soil) 2-encore	Total Metals, TI, CN	Grain Size, Atterberg Limits 2K	SVOC, SVOC SIM (liquid) 2	Total Metals, TI (liquid) 250	CN (liquid)	TPH-GRO (liquid) 2-40 mL	TPH-DRO & ORO (liquid)	TOC (liquid) 3-40 mL	pH / Sample Info (Lab Use) Metals	Cyanide
0807042-03 1584401	VWAE-EB01-071708	7/17/08	0440	QC	11	5	1	1	2				X					X	X	X	X			10	<2 >12
0807038-13	VWAE-SB21-3436-08C		0905	SO	5							X			X										
0807038-14	VWAE-SB21-3638-08C		1156	SO	5							X			X										
0807042-04	VWAE-TB01-071708		—	QC	5	5							X								X				
0807098-16	VWAE-SS20-0406-08C	↓	1300	SO	5							X			X										

Lab Use Only

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

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

Comments

VWAE-SS20-0406-08C has a jar for % Moisture included
~~SB21-3436 have pH 2c, 4oz HCl TI, CN TOC 4oz SV, SV SIM, DRO/ORO 8oz; SPLP 4oz, 8oz VOA 2, 40mL VI~~

Sample Custody

Relinquished by:	Date/Time: 7/17/08 1330	Received by: Jennifer Dove	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 2.6 °C

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

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CHAIN OF CUSTODY

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

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

Client/Reporting Information		Project Information	
Company Name	CH2M Hill	Project Name	Vieques
Address	5700 Cleveland St. Ste 101	Sampling Location	AOC E&I
City / State / Zip	Virginia Beach VA 23462	Turnaround time	28-Day
Project Contact	Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?	
Phone #	757-671-6208	Are aqueous samples field filtered for metals? (Y) or N	
Sampler's Name	Kenji Butler / Juan Acaron	Are high concentrations expected? (Y) or N? If yes, which ID(s)?	

Requested Analysis (include method and bottle type): VOCs (Encores); SVOCs, SVOC SIM, DRO, ORO; SPLP Metals, SVOC, TPH (GRO, DRO, ORO); Total Metals, Tl, CN; Grain Size, Atterberg Limits; SPLP VOCs (liquid); SVOC, SVOC SIM liquid; Total Metals, Tl; ~~Cyanide~~ PH; TPH-GRO; TPH-DRO & ORO; TOC*

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (Encores)	SVOCs, SVOC SIM, DRO, ORO	SPLP Metals, SVOC, TPH (GRO, DRO, ORO)	Total Metals, Tl, CN	Grain Size, Atterberg Limits	SPLP VOCs (liquid)	SVOC, SVOC SIM liquid	Total Metals, Tl	~~Cyanide~~ PH	TPH-GRO	TPH-DRO & ORO	TOC*	pH / Sample Info (Lab Use)
~~0807038-15~~ 1584503*	VWAE-SB21-2930-08C	7-16-08	1127	SO	7			SPLP = 1584501					X	X	X	X	X			X			X	
~~0807038-14~~ 1584206	VWAE-SB21-3628-08C	7-17-08	1156	SO	2								X		X									
~~0807038-13~~ ~~1584207~~ 1584502	VWAE-SB21-3436-08C	7-17-08	0905	SO				SPLP = 1584502					X	X	X		X			X			X	
	~~VWAE-SB21~~																							

*only rec'd SVOC, SIM, DRO, ORO & T. Metals, Tl, CN 4 ea for VWAE-SB21-2930-08C (JD) 7/18/08

Lab Use Only:

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

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

Comments: *Mistake

Sample Custody

Relinquished by:	Date/Time: 7/17/08 1330	Received by: Jennifer Dover	Date/Time: 7/18/08 9:20
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 1.8 °C

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

White & Yellow copy to lab • Pink copy for customer

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste. 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: W-AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (Include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (liquid) 3-40mL	VOCs TPH-GRO (liquid) 2-40mL	VOCs (Encores) 3-encores	TPH-GRO (Soil) 2-encores	SVOC, SVOC-SIM, DRO, ORO 8270	Total Metals, TI, CN 4oz	TOC 4oz	SPLP-VOA 4oz	SPLP SVOA-Metals-TPH 8oz	pH 2oz	Grain Size, Atterberg Limits 8oz	pH / Sample Info (Lab Use)
0807042-05	VIWAE-TB01-071808	7/18/08	—	QC	5	5						X	X										
0807042-06	VIWAE-EB01-071808	↓	0700	QC	5	5						X	X										
0807042-07	VIWAE-EB02-071708	7/17/08	1810	QC	5	5						X	X										
0807064-01 1584301	VIWAE-SB20-0810-08C	7/18/08	0745	SO	20			SPLP =		1584503				X (9)	X (6)	⊗	⊗	X	X	X	X	X *	did not receive (rec'd 60)
0807038-17	VIWAE-SB20-1618-08C	|	0818	SO	5									X	X								
0807038-18	VIWAE-SB20P-1618-08C	|	0818	SO	5									X	X								
0807038-19	VIWAE-SB20-2022-08C	|	0825	SO	6									X	X							X	
0807038-20 1584304	VIWAE-SB20-2830-08C	|	0940	SO	9			SPLP =		1584504				X	X			X	X	X	X		SUB =
0807038-21	VIWAE-SB20-3234-08C	↓	1145	SO	5									X	X								

Lab Use Only

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

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

Comments

MS/MSD on VIWAE-SB20-0810-08C (20 Bottles)
⊗ Mistake

Sample Custody

Relinquished by: [signature]	Date/Time: 7/18/08	Received by: Jennifer Dover	Date/Time: 7/21/08 7:45
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where? Grain size/Atterberg limits to	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 3.6 °C

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

White & Yellow copy to lab • Pink copy for customer

18343

Page 1 of 1

CHAIN OF CUSTODY

CompuChem
a division of Liberty Analytical Corp.

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland Street, Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N: Where indicated
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	VOCs (encores)	SVOCs, SVOC SIM, DRO, ORO (8 oz)	TPH-GRO	Total Metals, TI, CN (4 oz)	Grain Size, Atterberg Limits	VOCs	SVOCs, SVOC SIM (AL)	Total Metals, TI (1-PL)	Cyanide (250 ml)	TPH-GRO	TPH-DRO & ORO (2-AL)	TOC (2-40 ml)	pH / Sample Info (Lab Use): Total Metal	TOC	Cyanide		
080704-01 1584402	* VWAE-EB01-071808	7/18/08	0700	QC	8		1	1	2								⊗	X(1)	X	X	X	X	<2	<2	>12		
080704-01 1584201	VWAE-SB20-0810-08C	7/18/08	0745	SO	6								X		X												
080704-01 1584207	VWAE-SB20-1618-08C		0818	SO	2								X		X												
080704-01 1584208	VWAE-SB20P-1618-08C		0818	SO	2								X		X												
080704-01 1584209	VWAE-SB20-2022-08C	↓	0825	SO	2								X		X												

Lab Use Only

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

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

Comments

⊗ - Mistake
MS/MSD on VWAE-SB20-0810-08C
* 1 of 2 SVOC Amber Liters broken - VWAE-EB01 7-18-08

Sample Custody

Relinquished by:	Date/Time: 7/18/08 1330	Received by: Diane Byrd	Date/Time: 7-21-08 745
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 3.8°C

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

White & Yellow copy to lab • Pink copy for customer

99

18364

CHAIN OF CUSTODY

CompuChem
a division of Liberty Analytical Corp.

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: W-AOC-E&I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N: where indicated
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	SVOC-SVOC-SIM (liquid) 2-AL	Total Metals-TI 1 PL 1-250	Cyanide	TPH-DRO+ORO 2-AL	TOC 2-40ml	SVOC-SVOC-SIM-DRO-ORO 1-8 oz	Total Metals-TI-CN 1-4 oz	TOC 4 oz	SPLP-VOA 4-oz	SPLP-SVOC-Metals-TPH 8 oz	pH 2 oz	Grain Size Atterberg Limits	pH / Sample Info (Lab Use) Total metals	Cyanide	TOC		
~~080104-07~~ 1584413	VIWAE-EB02-071708	7/17/08	1810	QC	7		1	1	2			X	X	X	X	X								<2	>12	<2		KUB
1584303	VIWAE-SB21-2930-08C	7/16/08	1127	SO	5								SPLPe						X	X	X	X	X					
~~080108-22~~ 1584210	VIWAE-SS20-0406-08C	7/17/08	1300	SO	2												X	X										
~~080108-23~~	VIWAE-SB20-2830-08C	7/18/08	0940	SO	2												X	X										

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/18/08	Received by: Diane Byrd	Date/Time: 7/21/08 745
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 5.9 °C

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

White & Yellow copy to lab • Pink copy for customer

SUPPORT DOCUMENTATION

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SPLPBLKKD

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Matrix: (soil/water) WATER Lab Sample ID: 175753

Sample wt/vol: 5 (g/mL) ML Lab File ID: 17575373

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 07/31/08

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	5	J
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	3	J
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1,2-Dichloroethane	10	U

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: COMPUCHEM Contract: OLM04.3

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 15845

Instrument ID: 5972HP73 Calibration Date: 07/31/08 Time: 1218

Lab File ID: 8G31005-CCV173 Init. Calib. Date(s): 07/10/08 07/10/08

EPA Sample No.(VSTD050##): VSTD050OU Init. Calib. Times: 1724 1921

Heated Purge: (Y/N) Y

GC Column: SPB-624 ID: 0.32 (mm)

COMPOUND	$\overline{RRF}$	RRF50	MIN RRF	%D	MAX %D
Dichlorodifluoromethane	7.756	6.420		-17.2	
Chloromethane	3.688	2.450		-33.6	
Vinyl Chloride	2.903	2.756	0.100	-5.1	25.0
Bromomethane	1.719	1.418	0.100	-17.5	25.0
Chloroethane	1.039	1.074		3.4	
Trichlorofluoromethane	3.175	4.115		29.6	
1,1-Dichloroethene	3.274	3.398	0.100	3.8	25.0
1,1,2-Trichloro-1,2,2-trifluoroethane	3.970	4.357		9.7	
Acetone	1.181	1.796		52.1	
Carbon Disulfide	12.994	14.125		8.7	
Methyl Acetate	1.919	2.142		11.6	
Methylene Chloride	3.800	4.010		5.5	
trans-1,2-Dichloroethene	3.494	3.787		8.4	
Methyl tert-Butyl Ether	6.333	6.769		6.9	
1,1-Dichloroethane	5.790	6.251	0.200	8.0	25.0
cis-1,2-Dichloroethene	3.422	3.445		0.7	
2-Butanone	1.133	1.474		30.1	
Chloroform	5.646	6.347	0.200	12.4	25.0
1,1,1-Trichloroethane	0.838	0.996	0.100	18.9	25.0
Cyclohexane	0.901	0.958		6.3	
Carbon Tetrachloride	0.745	0.880	0.100	18.1	25.0
Benzene	2.009	2.183	0.500	8.7	25.0
1,2-Dichloroethane	3.387	3.908	0.100	15.4	25.0
Trichloroethene	0.588	0.605	0.300	2.9	25.0
Methylcyclohexane	0.848	0.903		6.5	

an

(J/UJ)

All other compounds must meet a minimum RRF of 0.010.

FORM VII VOA-1 OLM04.2

ENVIRONMENTAL
Data Services, Inc.

TOTAL METALS & CYANIDE
USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 15869

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 31, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-MW04	1586901	Water
1MS	VWAE-MW04MS	1586901MS	Water
1MSD	VWAE-MW04MSD	1586901MSD	Water
2	VWAI-MW06	1586902	Water
3	VWAE-MW01	1586903	Water
4	VWAE-MW01P	1586904	Water
5	VWAE-MW05	1586905	Water
6	VWAE-MW06	1586906	Water
7	VWAE-EB01-072808	1586907	Water
8	VWAE-EB01-072908	1586908	Water

The USEPA Region II SOP No. HW-2, Revision 13, September 2006: Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were prepared and analyzed within 14 days for cyanide, 28 days for mercury and 180 days for all other metals.

Calibration - The ICV and CCV %R values were acceptable.

CRDL Standard - The CRDL standards exhibited acceptable %R values.

Method and Calibration Blanks - The following table summarizes method blank and continuing calibration blank contamination.

Compound	Conc. ug/L	Qualifier	Affected Samples
Aluminum	47.794	U	2, 3, 4, 6
Calcium	33.365	U	7, 8
Magnesium	50.338	U	7
Potassium	20.386	U	1-6, 8
Silver	0.013	U	1
Sodium	532.659	U	7, 8
Chromium	0.061	U	2-6
Vanadium	0.021	U	3, 4, 5, 7

ICP Interference Check Sample - All %R values were acceptable.

Matrix Spike/Matrix Spike Duplicate - The matrix spike/matrix spike duplicate sample exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	%R	Qualifier	Affected Samples
1	Antimony	35%	J/UJ	All Samples
	Arsenic	50%	J/UJ	
	Cobalt	73%	J/UJ	
	Copper	69%	J/UJ	
	Nickel	71%	J/UJ	
	Selenium	55%	J/UJ	
	Silver	30%	J/UJ	
	Zinc	60%	J/UJ	

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAE-MW01 ug/L	VWAE-MW01P ug/L	RPD	Qualifier
Antimony	0.040	0.038	5%	None
Arsenic	2.3	2.1	9%	None
Barium	267	234	13%	None
Calcium	96500	98500	2%	None
Cobalt	0.54	0.48	12%	None
Copper	2.7	2.9	7%	None
Iron	5300	5510	4%	None
Lead	0.20	0.19	5%	None
Magnesium	57300	58300	2%	None
Manganese	1850	1650	11%	None
Nickel	3.1	2.9	7%	None
Selenium	1.8	1.8	0%	None
Sodium	167000	171000	2%	None
Zinc	3.0	4.3	36%	None - Already qualified

LCS - The LCS samples exhibited acceptable %R values.

ICP Serial Dilution - The ICP serial dilution sample exhibited acceptable %D values except the following.

ICP Sample ID	Compound	%D	Qualifier	Affected Samples
1	Barium	42%	J	Positive results in all samples
	Cobalt	34%	J	Positive results in all samples
	Copper	33%	J	Positive results in all samples
	Manganese	48%	J	Positive results in all samples
	Vanadium	38%	J	Positive results in all samples
	Zinc	26%	J	Positive results in all samples

Field and Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-EB01-072808	None - ND	-	-	-
VWAE-EB01-072908	None - ND	-	-	-

Compound Quantitation - No discrepancies were identified.

Total vs. Dissolved Comparison - The total vs. dissolved comparison sample results are all less than 20%.

ANNOTATED FORM Is

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW04

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586901

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.074	~~J~~	J ~~N~~	MS	MSL
7440-38-2	Arsenic	1.5		J ~~N~~	MS	MSL
7440-39-3	Barium	585		J ~~E~~	MS	SD
7440-41-7	Beryllium	0.19	J		MS	
7440-43-9	Cadmium	0.30	J		MS	
7440-47-3	Chromium	9.3			MS	
7440-48-4	Cobalt	6.8		J ~~NE~~	MS	MSL, ~~SD~~
7440-50-8	Copper	44.8		J ~~NE~~	MS	MSL, ~~SD~~
7439-92-1	Lead	6.7		J ~~E~~	MS	SD
7439-96-5	Manganese	4510		J ~~DE~~	MS	SD
7440-02-0	Nickel	6.8		J ~~NE~~	MS	MSL
7782-49-2	Selenium	1.8	~~J~~	J ~~N~~	MS	MSL
7440-22-4	Silver	1.0 ~~0.022~~	~~J~~	UJ N	MS	BL, ~~MSL~~
7440-28-0	Thallium	0.039	J		MS	
7440-62-2	Vanadium	54.3		J ~~E~~	MS	SD
7440-66-6	Zinc	74.9		J ~~NE~~	MS	MSL, ~~SD~~

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW04

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586901

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	8530		J ~~E~~	P	SD
7440-70-2	Calcium	105000			P	
7439-89-6	Iron	15300			P	
7439-95-4	Magnesium	58300			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~1450~~	~~J~~	U	P	BL
7440-23-5	Sodium	146000			P	
57-12-5	Cyanide	10.0	U		AS	

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

2

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW06

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586902

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	1.3	~~J~~	J ~~N~~	MS	MSL
7440-38-2	Arsenic	1.4		J ~~N~~	MS	MSL
7440-39-3	Barium	16.3		J ~~E~~	MS	SD
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0 ~~1.9~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	0.21	~~J~~	J ~~NE~~	MS	MSL, SD
7440-50-8	Copper	5.2		J ~~NE~~	MS	MSL, SD
7439-92-1	Lead	0.070	~~J~~	J ~~E~~	MS	SD
7439-96-5	Manganese	8.9		J ~~E~~	MS	SD
7440-02-0	Nickel	3.0		J ~~NE~~	MS	MSL
7782-49-2	Selenium	4.3	~~J~~	J ~~N~~	MS	MSL
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	42.8		J ~~E~~	MS	SD
7440-66-6	Zinc	2.1		J ~~NE~~	MS	MSL, SD

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

2

EPA SAMPLE NO.

VWAI-MW06

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586902

Level (low/med): LOW Date Received: 07/29/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~45.5~~	~~J~~	U ~~E~~	P	BL
7440-70-2	Calcium	43900			P	
7439-89-6	Iron	100	U		P	
7439-95-4	Magnesium	21200			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~945~~	~~J~~	U	P	BL
7440-23-5	Sodium	378000			P	
57-12-5	Cyanide	10.0	U		AS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

3

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW01

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586903

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.040	~~J~~	J ~~N~~	MS	MSL
7440-38-2	Arsenic	2.3		J ~~N~~	MS	MSL
7440-39-3	Barium	267		J ~~E~~	MS	SD
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0 ~~0.42~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	0.54	~~J~~	J ~~NE~~	MS	MSL, ~~SD~~
7440-50-8	Copper	2.7		J ~~NE~~	MS	MSL, ~~SD~~
7439-92-1	Lead	0.20	~~J~~	J ~~E~~	MS	SD
7439-96-5	Manganese	1850		J ~~E~~	MS	SD
7440-02-0	Nickel	3.1		J ~~NE~~	MS	MSL
7782-49-2	Selenium	2.1	~~J~~	J ~~N~~	MS	MSL
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	5.0 ~~1.1~~	~~J~~	U ~~E~~	MS	BL
7440-66-6	Zinc	3.0		J ~~NE~~	MS	MSL, ~~SD~~

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

3

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW01

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586903

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~15.8~~	~~J~~	U ~~E~~	P	BL
7440-70-2	Calcium	96500			P	
7439-89-6	Iron	5300			P	
7439-95-4	Magnesium	57300			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~2030~~	~~J~~	U	P	BL
7440-23-5	Sodium	167000			P	
57-12-5	Cyanide	10.0	U		AS	

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Comments:

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW01P

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586904

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.038	~~J~~	J ~~N~~	MS	MSL
7440-38-2	Arsenic	2.1		J ~~N~~	MS	MSL
7440-39-3	Barium	234		J ~~E~~	MS	SD
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0 ~~0.32~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	0.48	~~J~~	J ~~NE~~	MS	MSL, SD
7440-50-8	Copper	2.9		J ~~NE~~	MS	MSL, SD
7439-92-1	Lead	0.19	~~J~~	~~J~~ ~~E~~	MS	SD
7439-96-5	Manganese	1650		J ~~E~~	MS	SD
7440-02-0	Nickel	2.9		J ~~NE~~	MS	MSL
7782-49-2	Selenium	1.8	~~J~~	J ~~N~~	MS	MSL
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	5.0 ~~0.96~~	~~J~~	U ~~E~~	MS	BL
7440-66-6	Zinc	4.3		J ~~NE~~	MS	MSL, SD

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Color After: Clarity After: Artifacts:

Comments:

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1A-IN

INORGANIC ANALYSIS DATA SHEET

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EPA SAMPLE NO.

VWAE-MW01P

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586904

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~66.8~~	~~J~~	U ~~B~~	P	BL
7440-70-2	Calcium	98500			P	
7439-89-6	Iron	5510			P	
7439-95-4	Magnesium	58300			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~2070~~	~~J~~	U	P	BL
7440-23-5	Sodium	171000			P	
57-12-5	Cyanide	10.0	U		AS	

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Comments:

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW05

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586905

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.054	~~J~~	J ~~N~~	MS	MSL
7440-38-2	Arsenic	5.6		J ~~N~~	MS	MSL
7440-39-3	Barium	278		J ~~E~~	MS	SD
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	0.032	J		MS	
7440-47-3	Chromium	2.0 ~~1.5~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	0.55	J	J ~~NE~~	MS	MSL, SD
7440-50-8	Copper	3.7		J ~~NE~~	MS	MSL, SD
7439-92-1	Lead	0.70	J	J ~~E~~	MS	SD
7439-96-5	Manganese	1690		J ~~E~~	MS	SD
7440-02-0	Nickel	2.8		J ~~NE~~	MS	MSL
7782-49-2	Selenium	2.3	J	J ~~N~~	MS	MSL
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	5.0 ~~2.5~~	~~J~~	U ~~E~~	MS	BL
7440-66-6	Zinc	6.8		J ~~NE~~	MS	MSL, SD

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Form IA-IN MW 11/21/08

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW05

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586905

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	221		J ~~E~~	P	SD
7440-70-2	Calcium	72700			P	
7439-89-6	Iron	2870			P	
7439-95-4	Magnesium	43300			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~1400~~	~~J~~	U	P	BL
7440-23-5	Sodium	149000			P	
57-12-5	Cyanide	10.0	U		AS	

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Comments:

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW06

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586906

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0	~~U~~	U J ~~N~~	MS	MSL
7440-38-2	Arsenic	0.36	~~U~~	J ~~N~~	MS	MSL
7440-39-3	Barium	240		J ~~E~~	MS	SD
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0 ~~1.8~~	~~J~~	U	MS	BL
7440-48-4	Cobalt	0.38	~~J~~	J ~~NE~~	MS	MSL, SD
7440-50-8	Copper	2.2		J ~~NE~~	MS	MSL, SD
7439-92-1	Lead	0.10	~~J~~	J ~~E~~	MS	SD
7439-96-5	Manganese	49.1		J ~~E~~	MS	SD
7440-02-0	Nickel	3.6		J ~~NE~~	MS	MSL
7782-49-2	Selenium	3.1	~~J~~	J ~~N~~	MS	MSL
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	19.1		J ~~E~~	MS	SD
7440-66-6	Zinc	3.3		J ~~NE~~	MS	MSL, SD

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW06

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586906

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~104~~	~~J~~	U ~~J~~	P	BL
7440-70-2	Calcium	73600			P	
7439-89-6	Iron	100	U		P	
7439-95-4	Magnesium	50600			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~1430~~	~~J~~	U	P	BL
7440-23-5	Sodium	120000			P	
57-12-5	Cyanide	10.0	U		AS	

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Comments:

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1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-072808

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586907

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0	~~U~~	UJ ~~N~~	MS	MSL
7440-38-2	Arsenic	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-39-3	Barium	10.0	U	~~E~~	MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0	~~U~~	UJ ~~NE~~	MS	MSL
7440-50-8	Copper	2.0	~~U~~	UJ ~~NE~~	MS	MSL
7439-92-1	Lead	1.0	U	~~E~~	MS	
7439-96-5	Manganese	1.0	U	~~E~~	MS	
7440-02-0	Nickel	1.0	~~U~~	UJ ~~NE~~	MS	MSL
7782-49-2	Selenium	5.0	~~U~~	UJ ~~N~~	MS	↓
7440-22-4	Silver	1.0	~~U~~	UJ ~~N~~	MS	
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	5.0 ~~0.033~~	~~J~~	U ~~E~~	MS	BL
7440-66-6	Zinc	2.0	~~U~~	UJ ~~NE~~	MS	MSL,

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Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-072808

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586907

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200	U	~~E~~	P	
7440-70-2	Calcium	5000 ~~191~~	~~J~~	U	P	BL
7439-89-6	Iron	100	U		P	
7439-95-4	Magnesium	5000 ~~9.1~~	~~J~~	U	P	BL
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000	U		P	
7440-23-5	Sodium	5000 ~~486~~	~~J~~	U	P	BL
57-12-5	Cyanide	10.0	U		AS	

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Comments:

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-072908

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586908

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0	~~U~~	UJ ~~N~~	MS	MSL
7440-38-2	Arsenic	1.0	~~U~~	UJ ~~N~~	MS	MSL
7440-39-3	Barium	10.0	U	~~E~~	MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0	~~U~~	UJ ~~NE~~	MS	MSL
7440-50-8	Copper	2.0	~~U~~	UJ ~~NE~~	MS	MSL
7439-92-1	Lead	1.0	U	~~E~~	MS	
7439-96-5	Manganese	1.0	U	~~E~~	MS	
7440-02-0	Nickel	1.0	U	UJ ~~NE~~	MS	MSL
7782-49-2	Selenium	5.0	U	~~N~~	MS	↓
7440-22-4	Silver	1.0	U	↓ ~~N~~	MS	↓
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	5.0	U	~~E~~	MS	
7440-66-6	Zinc	2.0	U	UJ ~~NE~~	MS	MSL

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-072908

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Lab Sample ID: 1586908

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200	U	~~E~~	P	
7440-70-2	Calcium	5000 ~~32.6~~	~~J~~	U	P	BL
7439-89-6	Iron	100	U		P	
7439-95-4	Magnesium	5000	U		P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~20.0~~	~~J~~	U	P	BL
7440-23-5	Sodium	5000 ~~643~~	~~J~~	U	P	BL
57-12-5	Cyanide	10.0	U		AS	

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Comments:

USEPA REGION II WORKSHEETS

Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 (SOP Revision 13)

PREPARED BY: _____ Date: 12-08-06
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Hazardous Waste Support Section

Peer Reviewed by: _____ Date: 12-08-06
Russell Arnone, Chemist
Hazardous Waste Support Section

Concurred by: _____ Date: 12/8/06
Linda Mauel, Chief
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Approved by: _____ Date: 12/11/06
Robert Runyon, Chief
Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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I.0 Scope

I.I 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 Island, PR

Case #: NA

SDG #: 15869

Samples: **Soil** 8 **Water**

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report			
Present?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.2 Record of Communication (from RSCC)			
Present?	[✓]	___	___
ACTION: If no, request from the RSCC.			
A.1.3 Sampling Trip Report			
Present and complete?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.4 Chain of Custody/Sample Traffic Report			
Present?	[✓]	___	___
Legible?	[✓]	___	___
Signature of sample custodian present?	[✓]	___	___
ACTION: If no, contact RSCC/WAM/PO.			
A.1.5 Cover Page			
Present?	[✓]	___	___
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	[✓]	___	___
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:	✓		
(a) Traffic Report Sheet?	[ ]	___	___

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[✓]	___	___
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[✓]	___	___

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

Laboratory Name?	[✓]	___	___
Laboratory Code?	[✓]	___	___
RAS/Non-RAS Case No.?	[✓]	___	___
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[✓]	___	___

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

(a) all analytes analyzed by ICP-AES?	___	[✓]	___
(b) all analytes analyzed by ICP-MS?	___	[✓]	___
(c) Mercury?	___	[✓]	___
(d) Cyanide?	___	[✓]	___

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

Digestion Log for ICP-AES (Form XII)present?	[✓]	___	___
Digestion Log for ICP-MS (Form XII) present?	[✓]	___	___
Digestion Log for mercury (Form XII) present?	[✓]	___	___
Distillation Log for cyanide (Form XII) present?	[✓]	___	___

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	[✓]		
Are percent solids calculations present for soils/sediments?	[✓]		
Are preparation dates present on the sample preparation logs/bench sheets?	[✓]		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	[✓]		
ICP-MS?	[✓]		
Mercury?	[✓]		
Cyanide?	[✓]		

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	[✓]		
Properly labeled?	[✓]		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	[✓]		
Instrument Printouts?	[✓]		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

		YES	NO	N/A
A.1.9 **Technical Holding Times**: (Aqueous and soil samples) (Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)				
A.1.9.1	Cyanide distillation(14 days)exceeded?		[✓]	
	Mercury analysis(28 days) exceeded?		[✓]	
	Other Metals analysis(180 days)exceeded?		[✓]	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

A.1.9.2	Is pH of aqueous samples for:			
	Metals Analysis ≤ 2?	[✓]		
	Cyanide Analysis ≥ 12?	[✓]		

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

A.1.9.3	Is the cooler temperature ≤ 10 C°?	[✓]		

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

	YES	NO	N/A
Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[___]	___	✓
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[✓]	___	___
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]	✓	___

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]	___	___
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]	___	___
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[✓]	___	___
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[✓]	___	___

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[✓]	___	___

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

		YES	NO	N/A
	Mercury Analysis?	[✓]	___	___
	Cyanide Analysis?	[✓]	___	___
	ICP-AES(more than 2 point Calib.)?	[✓]	___	___
	ICP-MS (more than 2 point calib.)?	[✓]	___	___

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[✓]	___	___

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

Metals - 90-110%R?	[✓]	___	___
Hg - 80-120%R?	[✓]	___	___
Cyanide - 85-115%R?	[✓]	___	___

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [✓] ___ ___

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? **(Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)**	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[✓]	___	___
For each cyanide run, was a CRQL standard analyzed?	[✓]	___	___

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
*** True value of the CRQL Standard**

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? [✓] ___ ___

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.

A.1.14 Initial and Continuing Calibration Blanks - Form III

	YES	NO	N/A
A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___

Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by

		YES	NO	N/A
	using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[✓]	___	___
	ACTION: If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".			
A.1.14.2	Circle with red pencil on each Form III all Calib. Blank values that are: ≥ MDL but ≤ CRQL; > CRQL			
A.1.14.2.1	When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	✓	[___]	___
	ACTION: If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.			
A.1.14.2.2	When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[✓]	___
	ACTION: If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".			
A.1.14.2.3	Is any Calibration Blank value below the negative CRQL?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.			

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run.

2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J),but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL? ✓ [___] ___

ACTION:
If yes, change sample result ≥ MDL

	YES	NO	N/A
but ≤ CRQL to CRQL with a "U".			
..1.15.2.2 When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

	YES	NO	N/A
..1.15.2.3 Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

	YES	NO	N/A
..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".			
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.

1.16.3 **ICP-MS Method**

	YES	NO	N/A
1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
..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
..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.			
..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.			
..1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	___	[✓]	___
	(b) between 30-74%?	✓	[___]	___
	(c) between 126-150%?	___	[✓]	___
	(d) greater than 150%?	___	[✓]	___
	ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			

(**NOTE**:Replace "N" with "J", "R" as appropriate.)

..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?	[✓]	___	___

		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.			
..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.			
..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.			
..1.18.4	**Aqueous**			
..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:

> ± 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),

is any RPD ≥ 35% but < 120%?	___	[___]	✓
is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R)and red-line the associated sample data ≥ CRQL.			
..1.18.5.2	When the sample and/or duplicate value <5xCRQL(substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL	___	[___]	✓

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

..1.19 **Field Duplicates**

Aqueous Field Duplicates

..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			
..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.

..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.			
..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**

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".			
1.1.21	**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.			
1.1.21.1	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.			
1.1.21.2	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			
1.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[✓]	___	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
1.1.21.4	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.)			
1.1.22	**Total/Dissolved or Inorganic/Total Analytes**			
1.1.22.1	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.			
1.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[✓]	___

		YES	NO	N/A
1.1.22.3	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.			
1.1.23	**Field Blank - Form I** **NOTE**: **Designate "Field Blank" as such on Form I**			
1.1.23.1	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.

1.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

1.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

1.1.24.2 **Method Detection Limits - Form IX**

1.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
1.1.24.2.2	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.			
1.1.24.3	**Linear Ranges - Form XI**			
1.1.24.3.1	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.			
1.1.25	**ICP-MS Tune Analysis - Form XIV**			
1.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
1.1.25.2	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
).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".			
ı.1.26	**ICP-MS Internal Standards - Form XV**			
ı.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.			
ı.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			

:han 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.

Inorganic Data Review Narrative - See EDS data validation report.

:ase# _____ **Site:** _____ **Matrix: Soil** ____

:DG# _____ **Lab:** _____ **Water** ____

:ampling Team: _____ **Reviewer:** _____ **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

'orm I'S and the QC Form when a QC analysis is outside the control limits. These ıualifiers are not applied on the Lotus or XLS spreadsheets. These qualifiers and their ıeanings 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 For 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.

ı.2.3.1 **Data Case Description**:

ı.2.3.2 **CSF Audit**:

A.2.3.3 **Technical Review:**

A.2.3.4 **Contract-Problem/Non-Compliance:**

HWSS Reviewer: _____ Date:_____
Signature

Contractor Reviewer: _____ Date:_____
Signature

Verified by: _____ Date:_____
Signature

CASE #
SDG #

Contract Laboratory Program
REGION II/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

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:

Summary of Resolution:

Signature _____ Date: _____

FIELD DUPLICATES

Sample No. **Field Duplicate No.** **Sample Matrix:**

Lab 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									
Manganese									

					YES	NO	N/A		
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

Total/Dissolved Concentrations

Lab Code **Case No.** **SDG No.** **Sample Matrix: Water**

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

SECTION A (TO BE COMPLETED BY REGIONAL SENDING OFFICIAL)

Initiated By:

Name, Affiliation, Phone Number

_____

Case Number: _____
- OLM
- OLC
- ILM

Details 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

SECTION B (TO BE COMPLETED BY SMO)

Name 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#___

Site: _____ Lab Name: _____

Reviewer's Initials:_____ Number of Samples:_____

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														

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CHAIN OF CUSTODY

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CompuChem
a division of Liberty Analytical Corp.

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St. Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: JAM RL

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOCE #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC 3-40 ml	VOC SIM 3-40 ml	Low SVOC SVOC SIM	Total Metals (AES/ms)	Cyanide	Diss Metals (AES/ms)	TPH-GRO 2-40 ml	TPH-DRO SGRO	CNNS Alkalinity	Sulfide	TOC 2-40 ml	MEE 2-40 ml	Ferrous Fe	pH / Sample Info (Lab Use) TOC
0807072-20	VWAE-MW03-08C	07/27/08	1740		8	8						X	X					X							
0807072-21	VWAE-MW08-08C	7/27/08	1745		8	8						X	X					X							
0807072-22	VWAE-MW07-08C	7/27/08	1250		8	8						X	X					X							
0807089-01 / 1586901	VWAE-MW04-08C	7/28/08	0810		12	10			2			X	X					X				X	X		<2
↓	VWAE-MW04-08CMS	7/28/08	0810		12	10			2			X	X					X				X	X		<2
↓	VWAE-MW04-08CMSD	7/28/08	0810		12	10			2			X	X					X				X	X		<2
0807072-23	VWAE-EB01-072708	7/27/08	1435		8	8						X	X					X							
0807089-02	VWAE-MW06-08C	7/27/08	0940		8	8						X	X					X							
0807089-03*	VWAE-TB01-072808	7/28/08	1000		12	10			2			X	X					X				X	X		
0807072-24	VWAE-MW02-08C	7/27/08	1435		8	8						X	X					X							

Lab Use Only

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

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

Comments

VHBLCXM → 0807089-04

Sample Custody

Relinquished by: [signature]	Date/Time: 7/28/08	Received by: [signature]	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 0.1° °C

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

White & Yellow copy to lab • Pink copy for customer

* VWAE-TB01-072808 - Did not receive 2-40 ml vials for TOC

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CHAIN OF CUSTODY

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: Cham Hill
Address: 5700 Cleveland St., Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Juan Acaron

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC-E & I
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other (NaAsO2, NaOH, ...)	Trace VOC	VOC SIM	LC, SVOC, SVOC SIM & L	Total Metals, TI (AES, MS)	Cyanide	Diss. Metals, TI (AES, MS)	TPH-GRO	TPH-DRO & ORO	CNNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Cyanide	Sulfide
0807072-22	VWAE-MW07-08C	7/28/08	1250		4									X					X							
1586901	VWAE-MW04-08C	7/28/08	0810		4	1	1				1					X				X	X			X	12	19
	VWAE-MW04-08C MS	7/28/08	0810		4	1	1				1					X				X	X			X	12	19
	VWAE-MW04-08C MSD	7/28/08	0810		4	1	1				1					X				X	X			X	12	19
																X									12	

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: [signature]	Date/Time: 7/28/08 1130	Received by: [signature]	Date/Time: 7.29.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 0.4°C

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

White & Yellow copy to lab • Pink copy for customer

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CHAIN OF CUSTODY

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

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Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: CH2M Hill	Project Name: Vieques CTO-10
Address: 5700 Cleveland St, Ste 101	Sampling Location: AOC E&I
City: Va Beach State: VA Zip: 23462	Turnaround time: 28-Day
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757.671.6208	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: Juan Acaron	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	LC SVOC, SVOC SIM	Total Metals, Tl (AES/MS)	Cyanide	Diss. Metals, Tl (AES/MS)	TPH-GRO	TPH-DRO & ORO	CLNS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH / Sample Info (Lab Use) Total Metals	Cyanide	Diss. Metals		
0807012-03 1583218	VWAE-EB01-072708	7/27/08	1400 ~~0740~~		7		1	2	DISS=		1583218			X	X	X	X		X						<2	>12	<2		
1586902	VWAE-MW06-08C	7/27/08	0940		3		1	2	DISS=		1583320				X	X	X								<2	>12	<2		

bottle for VWAE-MW06-08C and COC for organic portion of "VWAE" also has

7/28/08

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/28/08 1135	Received by:	Date/Time: 7.28.08 1020
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where? Custody Seal(s) intact? Y or N On Ice? Y or N Cooler Temp: 1.4 °C

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

White & Yellow copy to lab • Pink copy for customer

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CHAIN OF CUSTODY

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St Ste 101
City: Va Beach State: Va Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757-671-6208
Sampler's Name: JA/PK

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E+I
Turnaround time: 28 DAY
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	LC SVOC, SVOC SIM	Total Metals, TI (AES/ms)	Diss. Metals, TI (AES/ms)	Cyanide	TPH-DRO+ORO						T. Metals	D. Metals	Cyanide
0807089-09 1580907	VWAE-EB01-072808	7/28/08	1730		7		1	2				X	X	X	X	X	DISS =		1588102			<2	<2	>12
0807089-10	VWAE-EB01-072908	7/29/08	0645		2											X								

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 7/29/08	Received by: Jennifer Dore	Date/Time: 7/30/08 9:05
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 0.5 °C

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

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CompuChem
a division of Liberty Analytical Corp.
501 Madison Ave.
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757-671-2708
Sampler's Name: J. Brown, P. Kish

Project Information

Project Name: Viegues CTO-10
Sampling Location: AOC E+I
Turnaround time: 28-DAY
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other 2N Acetic Acid	Total Metals (AES/MS)	Diss. Metals (AES/MS)	CN	Sulfide	Ferrous Fe	CNWS, AIK					pH (Sample Info Lab Use) T.Metals	D.Metals	Cyanide	Sulfide	Ferrous Fe
1588903	VWAE-MW01-08C	7/29/08	0750		6	1	1	2			1	X	X	X	X	X	X	DISS=1588903				<2	<2	>12	>9	<2
1588904	VWAE MW01P-08C	7/29/08	0750		6	1	1	2			1	X	X	X	X	X	X	DISS=1588104				<2	<2	>12	>9	<2
1588905*	VWAE-MW05-08C	7/29/08	0720 ~~0810~~		3		1	2				X	X	X				DISS=1588105				<2	<2			

Lab Use Only

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

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

Comments

*rec'd Cyanide for VWAE-MW05-08C in another cooler JD 7/30/08

Sample Custody

Relinquished by: [illegible]	Date/Time: 7/29/08 1200	Received by: Jennifer Doren	Date/Time: 7/30/08 9:05
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where? Custody Seal(s) intact? Y or N On Ice? Y or N Cooler Temp: 0.8 °C

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

White & Yellow copy to lab • Pink copy for customer

SUPPORT DOCUMENTATION

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	200.000	U	200.000	U	200.000	U	~~46.945~~	J	-16.417	J	P
Calcium	5000.000	U	5000.000	U	5000.000	U	33.365	J	5000.000	U	P
Iron	100.000	U	~~100.000~~	~~U~~	~~100.000~~	~~U~~	~~100.000~~	~~U~~	100.000	U	P
Magnesium	5000.000	U	20.876	J	16.432	J	50.338	J	5000.000	U	P
Mercury	-0.076	J	~~0.200~~	~~U~~	~~0.200~~	~~U~~	0.200	U	0.200	U	CV
Potassium	5000.000	U	5000.000	U	5000.000	U	5000.000	U	5000.000	U	P
Sodium	258.584	J	438.484	J	427.596	J	532.659	J	500.787	J	P
Cyanide	~~10.000~~	~~U~~	~~10.000~~	~~U~~	10.000	U	~~10.000~~	~~U~~	~~10.000~~	~~U~~	AS

~~At 46.945~~

Al 47.794 ug/L (2,3,4,6) (4)

Ca 33.365 ug/L (7,8)

Mg 50.338 ug/L (7)

K 20.386 ug/L (1-6, 8)

Na 532.659 ug/L (7,8)

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum			29.702	J	47.794	J	46.571	J			P
Calcium			5000.000	U	5000.000	U	5000.000	U			P
Iron			100.000	U	100.000	U	100.000	U			P
Magnesium			5000.000	U	24.113	J	23.792	J			P
Mercury			0.200	U	0.200	U	-0.108	J			CV
Potassium			20.386	J	18.230	J	19.878	J			P
Sodium			386.027	J	400.752	J	393.817	J			P

US EPA - CLP

8-IN

ICP-AES and ICP-MS SERIAL DILUTIONS

EPA SAMPLE NO.

VWAE-MW04L

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	8530.19		11247.65		32	E	P
Calcium	104869.90		105215.90		0		P
Iron	15327.86		16059.22		5		P
Magnesium	58279.33		57904.15		1		P
Potassium	1451.65	J	1594.98	J	10		P
Sodium	145501.90		142361.80		2		P

All positive

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		
		C	1	C	2	C	3	C		C	M
Antimony	2.000	U	2.000	U	2.000	U	2.000	U	2.000	U	MS
Arsenic	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Barium	10.000	U	10.000	U	10.000	U	10.000	U	10.000	U	MS
Beryllium	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Cadmium	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Chromium	-0.160	J	-0.147	J	2.000	U	2.000	U	2.000	U	MS
Cobalt	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Copper	2.000	U	2.000	U	2.000	U	2.000	U	2.000	U	MS
Lead	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Manganese	1.000	U	1.000	U	1.000	U	1.000	U	0.027	J	MS
Nickel	1.000	U	1.000	U	1.000	U	1.000	U	0.092	J	MS
Selenium	5.000	U	5.000	U	5.000	U	5.000	U	5.000	U	MS
Silver	1.000	U	0.013	J	1.000	U	1.000	U	1.000	U	MS
Thallium	0.005	J	1.000	U	1.000	U	1.000	U	1.000	U	MS
Vanadium	5.000	U	-0.031	J	5.000	U	5.000	U	5.000	U	MS
Zinc	-0.382	J	-0.260	J	-0.309	J	-0.300	J	0.210	J	MS

(u)

Mn 0.027 > None - au
Ni 0.092 > CRDL

Zn 0.210 > CRDL - None

Ag 0.013 → (1)

V 0.021 → (3-5, 7)

Cr 0.061 (2-6)

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Antimony			2.000	U	2.000	U	2.000	U			MS
Arsenic			1.000	U	1.000	U	1.000	U			MS
Barium			10.000	U	10.000	U	10.000	U			MS
Beryllium			1.000	U	1.000	U	1.000	U			MS
Cadmium			1.000	U	1.000	U	1.000	U			MS
Chromium			0.061	J	0.061	J	0.052	J			MS
Cobalt			1.000	U	1.000	U	1.000	U			MS
Copper			2.000	U	2.000	U	2.000	U			MS
Lead			1.000	U	1.000	U	1.000	U			MS
Manganese			1.000	U	1.000	U	1.000	U			MS
Nickel			1.000	U	1.000	U	1.000	U			MS
Selenium			-0.036	J	5.000	U	5.000	U			MS
Silver			1.000	U	1.000	U	1.000	U			MS
Thallium			1.000	U	1.000	U	1.000	U			MS
Vanadium			0.021	J	0.019	J	5.000	U			MS
Zinc			-0.343	J	-0.342	J	-0.345	J			MS

US EPA - CLP

5A-IN

MATRIX SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

VWAE-MW04S

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M	
Antimony	75 - 125	34.6302		0.0739	J	100.00	35	N	MS	J/UJ
Arsenic	75 - 125	25.6701		1.4706		40.00	60	N	MS	
Barium	75 - 125	2356.1700		584.8441		2000.00	89		MS	
Beryllium	75 - 125	48.9016		0.1867	J	50.00	97		MS	
Cadmium	75 - 125	42.2252		0.3011	J	50.00	84		MS	
Chromium	75 - 125	158.7499		9.3146		200.00	75		MS	
Cobalt	75 - 125	374.1452		6.8138		500.00	73	N	MS	J/UJ
Copper	75 - 125	217.9267		44.7778		250.00	69	N	MS	
Lead	75 - 125	26.5138		6.6612		20.00	99		MS	
Manganese		4852.8110		4512.6422		1000.00	34		MS	
Nickel	75 - 125	360.2076		6.7651		500.00	71	N	MS	J/UJ
Selenium	75 - 125	7.3096		1.8159	J	10.00	55	N	MS	
Silver	75 - 125	14.8423		0.0224	J	50.00	30	N	MS	
Thallium	75 - 125	50.3646		0.0389	J	50.00	101		MS	
Vanadium	75 - 125	444.9111		54.2504		500.00	78		MS	
Zinc	75 - 125	374.0363		74.8691		500.00	60	N	MS	J/UJ

Comments:

US EPA - CLP

8-IN

ICP-AES and ICP-MS SERIAL DILUTIONS

EPA SAMPLE NO.

VWAE-MW04L

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15869

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Antimony	0.07	J	10.00	U	100		MS
Arsenic	1.47		0.97	J	34		MS
Barium	584.84		340.98		42	E	MS
Beryllium	0.19	J	5.00	U	100		MS
Cadmium	0.30	J	0.14	J	53		MS
Chromium	9.31		6.09	J	35		MS
Cobalt	6.81		4.48	J	34	E	MS
Copper	44.78		29.86		33	E	MS
Lead	6.66		3.43	J	48		MS
Manganese	4512.64		2357.38		48	E	MS
Nickel	6.77		4.97	J	27		MS
Selenium	1.82	J	0.78	J	57		MS
Silver	0.02	J	5.00	U	100		MS
Thallium	0.04	J	5.00	U	100		MS
Vanadium	54.25		33.79		38	E	MS
Zinc	74.87		55.37		26	E	MS

ENVIRONMENTAL
Data Services, Inc.

DISSOLVED METALS
USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 15881

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 31, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAE-MW04	1588101	Water
1MS	VWAE-MW04MS	1588101MS	Water
1MSD	VWAE-MW04MSD	1588101MSD	Water
2	VWAE-EB01-072808	1588102	Water
3	VWAE-MW01	1588103	Water
4	VWAE-MW01P	1588104	Water
5	VWAE-MW05	1588105	Water
6	VWAE-MW06	1588106	Water
7	VWAE-EB01-072908	1588107	Water

The USEPA Region II SOP No. HW-2, Revision 13, September 2006: Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were prepared and analyzed within 28 days for mercury and 180 days for all other metals.

Calibration - The ICV and CCV %R values were acceptable.

CRDL Standard - The CRDL standards exhibited acceptable %R values.

Method and Calibration Blanks - The following table summarizes method blank and continuing calibration blank contamination.

Compound	Conc. ug/L	Qualifier	Affected Samples
Aluminum	68.365	U	All samples
Calcium	32.175	U	2, 7
Cobalt	0.007	U	1, 3-6
Magnesium	27.356	U	2, 7
Potassium	592.817	U	1-7
Sodium	592.817	U	2

ICP Interference Check Sample - All %R values were acceptable.

Matrix Spike/Matrix Spike Duplicate - The matrix spike/matrix spike duplicate sample exhibited acceptable %R and RPD values except the following.

MS/MSD Sample ID	Compound	%R	Qualifier	Affected Samples
1	Silver	23%	R	All Samples
	Zinc	74%	J/UJ	All Samples

Field Duplicates - Field duplicate results are summarized below.

Compound	VWAE-MW01 ug/L	VWAE-MW01P ug/L	RPD	Qualifier
Antimony	0.034	0.039	14%	None
Arsenic	1.5	1.7	13%	None
Barium	231	256	10%	None
Calcium	96000	97000	1%	None
Copper	1.9	2.1	10%	None
Iron	4210	4240	1%	None
Magnesium	57800	58500	1%	None
Manganese	1630	1710	5%	None
Nickel	2.1	2.3	9%	None
Selenium	1.8	2.1	15%	None
Sodium	163000	162000	1%	None
Vanadium	0.75	0.86	14%	None
Zinc	1.9	2.4	23%	None

LCS - The LCS samples exhibited acceptable %R values.

ICP Serial Dilution - The ICP serial dilution sample exhibited acceptable %D values except the following.

ICP Sample ID	Compound	%D	Qualifier	Affected Samples
1	Potassium	19%	None	All ND
	Barium	17%	J	Positive results in all samples

ANNOTATED FORM Is

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW04

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Lab Sample ID: 1588101

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.043	J		MS	
7440-38-2	Arsenic	1.7			MS	
7440-39-3	Barium	436		J ~~E~~	MS	SD
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	0.030	J		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0 ~~0.62~~	~~J~~	U	MS	BL
7440-50-8	Copper	2.1		J ~~E~~	MS	SD
7439-92-1	Lead	0.062	J		MS	
7439-96-5	Manganese	4040		~~D~~	MS	
7440-02-0	Nickel	5.2		J ~~E~~	MS	SD
7782-49-2	Selenium	2.1	J		MS	
7440-22-4	Silver	~~1.0~~	~~U~~	R ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	0.65	J		MS	
7440-66-6	Zinc	4.5		J ~~N~~	MS	MSL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW04

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Lab Sample ID: 1588101

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~50.9~~	~~J~~	U	P	BL
7440-70-2	Calcium	96600			P	
7439-89-6	Iron	4080			P	
7439-95-4	Magnesium	55100			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~802~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	139000			P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Form IA-IN 10/31/08

2

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-072808

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Lab Sample ID: 1588102

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0	U		MS	
7440-38-2	Arsenic	1.0	U		MS	
7440-39-3	Barium	10.0	U	~~E~~	MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0	U		MS	
7440-50-8	Copper	2.0	U	~~E~~	MS	
7439-92-1	Lead	1.0	U		MS	
7439-96-5	Manganese	0.17	J		MS	
7440-02-0	Nickel	1.0	U	~~E~~	MS	
7782-49-2	Selenium	5.0	U		MS	
7440-22-4	Silver	~~1.0~~	~~U~~	R ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	5.0	U		MS	
7440-66-6	Zinc	2.0	~~U~~	UJ ~~N~~	MS	MSL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

Form IA-IN MW 10/31/08 ILM05.4

2

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-072808

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Lab Sample ID: 1588102

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~54.8~~	~~J~~	U	P	BL
7440-70-2	Calcium	5000 ~~201~~	~~J~~	U	P	BL
7439-89-6	Iron	100	U		P	
7439-95-4	Magnesium	5000 ~~14.8~~	~~J~~	U	P	BL
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~7.3~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	5000 ~~443~~	~~J~~	U	P	BL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

3

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW01

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Lab Sample ID: 1588103

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.034	J		MS	
7440-38-2	Arsenic	1.5			MS	
7440-39-3	Barium	231		J ~~E~~	MS	SD
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0 ~~0.40~~	~~J~~	U	MS	BL
7440-50-8	Copper	1.9	~~J~~	J ~~E~~	MS	SD
7439-92-1	Lead	1.0	U		MS	
7439-96-5	Manganese	1630			MS	
7440-02-0	Nickel	2.1		J ~~E~~	MS	SD
7782-49-2	Selenium	1.8	J		MS	
7440-22-4	Silver	~~1.0~~	~~U~~	R ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	0.75	J		MS	
7440-66-6	Zinc	1.9	~~J~~	J ~~N~~	MS	MSL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW01

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Lab Sample ID: 1588103

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~83.3~~	~~J~~	U	P	BL
7440-70-2	Calcium	96000			P	
7439-89-6	Iron	4210			P	
7439-95-4	Magnesium	57800			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~1930~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	163000			P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

4

EPA SAMPLE NO.

VWAE-MW01P

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Lab Sample ID: 1588104

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.039	J		MS	
7440-38-2	Arsenic	1.7			MS	
7440-39-3	Barium	256		J ~~E~~	MS	SD
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0 ~~0.43~~	~~J~~	U	MS	BL
7440-50-8	Copper	2.1		J ~~E~~	MS	SD
7439-92-1	Lead	1.0	U		MS	
7439-96-5	Manganese	1710			MS	
7440-02-0	Nickel	2.3		J ~~E~~	MS	SD
7782-49-2	Selenium	2.1	J		MS	
7440-22-4	Silver	~~1.0~~	~~U~~	R ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	0.86	J		MS	
7440-66-6	Zinc	2.4		J ~~N~~	MS	MSL

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

4

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW01P

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Lab Sample ID: 1588104

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~69.2~~	~~J~~	U	P	BL
7440-70-2	Calcium	97000			P	
7439-89-6	Iron	4240			P	
7439-95-4	Magnesium	58500			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~1910~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	162000			P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

5

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW05

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Lab Sample ID: 1588105

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	0.039	J		MS	
7440-38-2	Arsenic	3.1			MS	
7440-39-3	Barium	237		J ~~E~~	MS	SD
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0 ~~0.23~~	~~J~~	U	MS	BL
7440-50-8	Copper	1.8	~~J~~	J ~~E~~	MS	SD
7439-92-1	Lead	0.12	J		MS	
7439-96-5	Manganese	1190			MS	
7440-02-0	Nickel	1.9		J ~~E~~	MS	SD
7782-49-2	Selenium	2.2	J		MS	
7440-22-4	Silver	~~1.0~~	~~U~~	R ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	0.49	J		MS	
7440-66-6	Zinc	3.2		J ~~N~~	MS	MSL

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Comments: DISSOLVED

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW05

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Lab Sample ID: 1588105

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~52.6~~	~~J~~	U	P	BL
7440-70-2	Calcium	70900			P	
7439-89-6	Iron	1360			P	
7439-95-4	Magnesium	43900			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~1370~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	149000			P	

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Comments:

6

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW06

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Lab Sample ID: 1588106

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0	U		MS	
7440-38-2	Arsenic	0.33	J		MS	
7440-39-3	Barium	216		J ~~E~~	MS	SD
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	0.92	J		MS	
7440-48-4	Cobalt	1.0 ~~0.11~~	~~J~~	U	MS	BL
7440-50-8	Copper	2.3		J ~~E~~	MS	SD
7439-92-1	Lead	1.0	U		MS	
7439-96-5	Manganese	20.9			MS	
7440-02-0	Nickel	2.7		J ~~E~~	MS	SD
7782-49-2	Selenium	3.2	J		MS	
7440-22-4	Silver	~~1.0~~	~~U~~	R ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	17.0			MS	
7440-66-6	Zinc	2.0		J ~~N~~	MS	MSL

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Comments: DISSOLVED

Form IA-IN 10/31/08

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-MW06

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Lab Sample ID: 1588106

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~52.0~~	~~J~~	U	P	BL
7440-70-2	Calcium	76200			P	
7439-89-6	Iron	100	U		P	
7439-95-4	Magnesium	52500			P	
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~1330~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	117000			P	

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Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-072908

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Lab Sample ID: 1588107

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0	U		MS	
7440-38-2	Arsenic	1.0	U		MS	
7440-39-3	Barium	10.0	U	~~E~~	MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	2.0	U		MS	
7440-48-4	Cobalt	1.0	U		MS	
7440-50-8	Copper	2.0	U	~~E~~	MS	
7439-92-1	Lead	1.0	U		MS	
7439-96-5	Manganese	1.0	U		MS	
7440-02-0	Nickel	1.0	U	~~E~~	MS	
7782-49-2	Selenium	5.0	U		MS	
7440-22-4	Silver	1.0	U	R ~~N~~	MS	MSL
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	5.0	U		MS	
7440-66-6	Zinc	2.0	~~U~~	UJ ~~N~~	MS	MSL

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Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: DISSOLVED

Form IA-IN 10/31/08 ILM05.4

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAE-EB01-072908

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Lab Sample ID: 1588107

Level (low/med): LOW Date Received: 07/30/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	200 ~~64.5~~	~~J~~	U	P	BL
7440-70-2	Calcium	5000 ~~109~~	~~J~~	U	P	BL
7439-89-6	Iron	100	U		P	
7439-95-4	Magnesium	5000 ~~28.5~~	~~J~~	U	P	BL
7439-97-6	Mercury	0.20	U		CV	
7440-09-7	Potassium	5000 ~~30.1~~	~~J~~	U ~~E~~	P	BL
7440-23-5	Sodium	5000	U		P	

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Comments:

USEPA REGION II WORKSHEETS

Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 (SOP Revision 13)

PREPARED BY: _____ Date: 12-08-06
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Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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I.0 Scope

I.I 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 Island, PR

Case #: NA

SDG #: 15881

Samples: **Soil** 7- **Water**

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report			
Present?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.2 Record of Communication (from RSCC)			
Present?	[✓]	___	___
ACTION: If no, request from the RSCC.			
A.1.3 Sampling Trip Report			
Present and complete?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.4 Chain of Custody/Sample Traffic Report			
Present?	[✓]	___	___
Legible?	[✓]	___	___
Signature of sample custodian present?	[✓]	___	___
ACTION: If no, contact RSCC/WAM/PO.			
A.1.5 Cover Page			
Present?	[✓]	___	___
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	[✓]	___	___
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[✓]	___	___

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[✓]	___	___
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[✓]	___	___

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

Laboratory Name?	[✓]	___	___
Laboratory Code?	[✓]	___	___
RAS/Non-RAS Case No.?	[✓]	___	___
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[✓]	___	___

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

	YES	NO	N/A
(a) all analytes analyzed by ICP-AES?	___	[✓]	___
(b) all analytes analyzed by ICP-MS?	___	[✓]	___
(c) Mercury?	___	[✓]	___
(d) Cyanide?	___	[✓]	___

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

	YES	NO	N/A
Digestion Log for ICP-AES (Form XII)present?	[✓]	___	___
Digestion Log for ICP-MS (Form XII) present?	[✓]	___	___
Digestion Log for mercury (Form XII) present?	[✓]	___	___
Distillation Log for cyanide (Form XII) present?	[✓]	___	___

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	[✓]		
Are percent solids calculations present for soils/sediments?	[✓]		
Are preparation dates present on the sample preparation logs/bench sheets?	[✓]		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	[✓]		
ICP-MS?	[✓]		
Mercury?	[✓]		
Cyanide?	[✓]		

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	[✓]		
Properly labeled?	[✓]		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	[✓]		
Instrument Printouts?	[✓]		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A

A.1.9 **Technical Holding Times**: (Aqueous and soil samples)

(Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)

A.1.9.1 Cyanide distillation(14 days)exceeded?	_	[✓]	_
Mercury analysis(28 days) exceeded?	_	[✓]	_
Other Metals analysis(180 days)exceeded?	___	[✓]	_

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

A.1.9.2 Is pH of aqueous samples for:

Metals Analysis ≤ 2?	[✓]	___	___
Cyanide Analysis ≥ 12?	[✓]	_	_

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

A.1.9.3 Is the cooler temperature ≤ 10 C°? [✓] _ _

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

	YES	NO	N/A
Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[___]	___	✓
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[✓]	___	___
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]	✓	___

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]	___	___
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]	___	___
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[✓]	___	___
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[✓]	___	___

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[✓]	___	___

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

		YES	NO	N/A
	Mercury Analysis?	[✓]	___	___
	Cyanide Analysis?	[✓]	___	___
	ICP-AES(more than 2 point Calib.)?	[✓]	___	___
	ICP-MS (more than 2 point calib.)?	[✓]	___	___

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[✓]	___	___

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

	YES	NO	N/A
Metals - 90-110%R?	[✓]	___	___
Hg - 80-120%R?	[✓]	___	___
Cyanide - 85-115%R?	[✓]	___	___

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects,
if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN).
Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [✓] ___ ___

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? **(Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)**	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[✓]	___	___
For each cyanide run, was a CRQL standard analyzed?	[✓]	___	___

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
*** True value of the CRQL Standard**

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? [✓] ___ ___

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.

A.1.14 Initial and Continuing Calibration Blanks - Form III

	YES	NO	N/A
A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___
Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by			

		YES	NO	N/A
	using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[✓]	___	___
	ACTION: If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".			
A.1.14.2	Circle with red pencil on each Form III all Calib. Blank values that are: ≥ MDL but ≤ CRQL; > CRQL			
A.1.14.2.1	When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	✓	[___]	___
	ACTION: If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.			
A.1.14.2.2	When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[✓]	___
	ACTION: If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".			
A.1.14.2.3	Is any Calibration Blank value below the negative CRQL?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.			

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run.
2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J),but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL? ✓ [___] ___

ACTION:
If yes, change sample result ≥ MDL

	YES	NO	N/A
but ≤ CRQL to CRQL with a "U".			
1.15.2.2 When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

	YES	NO	N/A
1.15.2.3 Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

	YES	NO	N/A
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".			
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.

1.16.3 **ICP-MS Method**

	YES	NO	N/A
1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
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
..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.			
..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.			
..1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	✓	[___]	___
	(b) between 30-74%?	✓	[___]	___
	(c) between 126-150%?	___	[✓]	___
	(d) greater than 150%?	___	[✓]	___
	ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			

(**NOTE**:Replace "N" with "J", "R" as appropriate.)

..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?	[✓]	___	___

		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.			
..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.			
..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.			
..1.18.4	**Aqueous**			
..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:

> ± 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),

is any RPD ≥ 35% but < 120%?	___	[___]	✓
is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R) and red-line the associated sample data ≥ CRQL.			
..1.18.5.2	When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL	___	[___]	___

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

..1.19 **Field Duplicates**

Aqueous Field Duplicates

..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			
..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.

..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.			
..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

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".			
1.1.21	**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.			
1.1.21.1	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.			
1.1.21.2	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			
1.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[✓]	___	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
1.1.21.4	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.)			
1.1.22	**Total/Dissolved or Inorganic/Total Analytes**			
1.1.22.1	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.			
1.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[✓]	___

		YES	NO	N/A
1.1.22.3	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.			
1.1.23	**Field Blank - Form I** **NOTE**: **Designate "Field Blank" as such on Form I**			
1.1.23.1	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.

1.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

1.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

1.1.24.2 **Method Detection Limits - Form IX**

1.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
1.1.24.2.2	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.			
1.1.24.3	**Linear Ranges - Form XI**			
1.1.24.3.1	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.			
1.1.25	**ICP-MS Tune Analysis - Form XIV**			
1.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
1.1.25.2	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
).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".			
).1.26	**ICP-MS Internal Standards - Form XV**			
).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.			
).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			

:han 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.

Inorganic Data Review Narrative _ See EDS data validation report

:ase# _____ **Site:** _____ **Matrix: Soil** ____

:DG# _____ **Lab:** _____ **Water** ____

:ampling Team: _____ **Reviewer:** _____ **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

'orm I'S and the QC Form when a QC analysis is outside the control limits. These ıualifiers are not applied on the Lotus or XLS spreadsheets. These qualifiers and their ıeanings 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 Foı 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.

ı.2.3.1 **Data Case Description**:

ı.2.3.2 **CSF Audit**:

A.2.3.3 **Technical Review:**

A.2.3.4 **Contract-Problem/Non-Compliance:**

HWSS Reviewer: _____ Date:_____
Signature

Contractor Reviewer: _____ Date:_____
Signature

Verified by: _____ Date:_____
Signature

CASE #
SDG #

Contract Laboratory Program
REGION II/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

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:

Summary of Resolution:

_____
Signature

Date: _____

FIELD DUPLICATES

Sample No. **Field Duplicate No.** **Sample Matrix:**

Lab 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									
Manganese									

					YES	NO	N/A		
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

Total/Dissolved Concentrations

Lab Code **Case No.** **SDG No.** **Sample Matrix: Water**

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

SECTION A (TO BE COMPLETED BY REGIONAL SENDING OFFICIAL)

Initiated By:

Name, Affiliation, Phone Number

_____

Case Number: _____
- OLM
- OLC
- ILM

Details 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

SECTION B (TO BE COMPLETED BY SMO)

Name of SMO Contact _____ Date: _____

ate of Laboratory Notification (Verbal): _____

.e-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
inal 9/3/99

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

ype of Review: _____ Date:_____ Case# _____SDG#___

ite: _____ Lab Name: _____

eviewer's Initials:_____ Number of Samples:_____

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														

CHAIN OF CUSTODY

13

18466

Page 1 of 1

CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757-671-2708
Sampler's Name: J. Acacun

Project Information

Project Name: Vieques CTO-ID
Sampling Location: AOC E+T
Turnaround time: 28-DAY
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	TPH-DRO+ORO	Low SVOC, SVOC SIM	TCLP SVOC, Pest, Herb, Metals	pH / Sample Info (Lab Use)
08070891-11	VWAE-MW04-072C	7/23/08	0810		4							X	X		
15878801	VWAE WW01-072908	7/29/08	0930		4									X	

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by: [signature]	Date/Time: 7/29/08	Received by: Jennifer Doner	Date/Time: 7/30/08 9:05
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where? Custody Seal(s) intact? Y or N On Ice? Y or N Cooler Temp: 0.1 °C

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

White & Yellow copy to lab • Pink copy for customer

18463

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CHAIN OF CUSTODY

Page 1 of 1

CompuChem
a division of Liberty Analytical Corp.

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: CH2M Hill	Project Name: Viaques CTO-10
Address: 5700 Cleveland St, Ste 101	Sampling Location: AOC E+I
City: Va Beach State: Va Zip: 23462	Turnaround time: 28 DAY
Project Contact: Chelsea Bennet	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757-671-6208	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: JA/PK	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	LC SVOC, SVOC SIM	Total Metals, TI (AES/ms)	Diss. Metals, TI (AES/ms)	Cyanide	TPH-DRO+ORO						T. Metals	D. Metals	Cyanide		
~~0807089-09~~ 1586907	VWAE-EB01-072808	7/28/08	1730		7		1	2				X	X	X	X	X	DISS =		1588102			<2	<2	>12		
0807089-10	VWAE-EB01-072908	7/29/08	0645		2											X										

Requested Analysis (include method and bottle type)

pH / Sample Info (Lab Use)

Lab Use Only

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

Cyanide samples checked for sulfide & chlorine? Y or NA 30
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

Sample Custody

Relinquished by:	Date/Time: 7/29/08	Received by: Jennifer Dore	Date/Time: 7/30/08 9:05
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?	Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 0.5 °C

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

White & Yellow copy to lab • Pink copy for customer

18486

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CHAIN OF CUSTODY

Page 1 of 1

CompuChem
a division of Liberty Analytical Corp.

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

Courier
Airbill No.
Sampling Complete? Y or N

Client/Reporting Information

Company Name: CH2M Hill
Address: 5700 Cleveland St, Ste 101
City: Va Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757-671-2708
Sampler's Name: J. Brown, P. Kish

Project Information

Project Name: Vieques CTO-10
Sampling Location: AOC E+I
Turnaround time: 28-DAY
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other 2N Acetic Acid	Total Metals (AES/MS)	Diss. Metals (AES/MS)	CN	Sulfide	Ferrous Fe	CNWS, Alk					pH / Sample Info (Lab Use) T. Metals	D. Metals	Cyanide	Sulfide	Ferrous Fe
1586903	VWAE-MW01-08C	7/29/08	0750		6	1	1	2			1	X	X	X	X	X	X	DISS=1588103				<2	<2	>12	>9	<2
1586904	VWAE MW01P-08C	7/29/08	0750		6	1	1	2			1	X	X	X	X	X	X	DISS=1588104				<2	<2	>12	>9	<2
1586905*	VWAE-MW05-08C	7/29/08	~~0810~~ 0720		3		1	2				X	X	X				DISS=1588105				<2	<2			

Lab Use Only

Sample Unpacked By: Jennifer Dove
Sample Order Entry By: Kelly Cox
Samples Received in Good Condition? Y or N
If no, explain:

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

Comments

*rec'd Cyanide for VWAE-MW05-08C in another cooler JD 7/30/08

Sample Custody

Relinquished by: [signature] Date/Time: 7/29/08 1200 Received by: Jennifer Dove Date/Time: 7/30/08 9:05
Relinquished by: Date/Time: Received by: Date/Time:
Subcontact? Y or N If yes, where? Custody Seal(s) intact? Y or N On Ice? Y or N Cooler Temp: 0.8 °C

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

White & Yellow copy to lab • Pink copy for customer

SUPPORT DOCUMENTATION

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract: _____

Lab Code: LIBRTY Case No.: _____ NRAS No.: _____ SDG NO.: 15881

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	200.000	U	200.000	U	36.527	J	54.903	J	28.466	J	P
Calcium	5000.000	U	30.513	J	5000.000	U	30.636	J	20.056	J	P
Iron	100.000	U	100.000	U	100.000	U	100.000	U	100.000	U	P
Magnesium	5000.000	U	24.244	J	21.359	J	27.356	J	5000.000	U	P
Mercury	-0.076	J	0.200	U	0.200	U	0.200	U	0.200	U	CV
Potassium	5000.000	U	5000.000	U	5000.000	U	5000.000	U	5000.000	U	P
Sodium	249.167	J	276.397	J	458.350	J	5000.000	U	350.071	J	P

(1)

Al 68.365 ug/L = (7,11)

Ca 32.175 " (2,7)

Mg 27.356 " (2,7)

K 592.817 " (1-7)

Na = 592.817 ug/L (2)

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract: _____

Lab Code: LIBRTY Case No.: _____ NRAS No.: _____ SDG NO.: 15881

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum			62.055	J	68.365	J	65.179	J			P
Calcium			32.175	J	5000.000	U	5000.000	U			P
Iron			100.000	U	100.000	U	100.000	U			P
Magnesium			24.774	J	23.185	J	5000.000	U			P
Mercury			0.200	U	0.200	U	0.200	U			CV
Potassium			5000.000	U	18.599	J	23.271	J			P
Sodium			5000.000	U	369.682	J	592.817	J			P

US EPA - CLP

8-IN

ICP-AES and ICP-MS SERIAL DILUTIONS

EPA SAMPLE NO.

VWAE-MW04L

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	50.92	J	208.74	J	310		P
Calcium	96609.02		96175.30		0		P
Iron	4078.09		3918.81		4		P
Magnesium	55058.81		54243.90		1		P
Potassium	801.87	J	650.24	J	19	E	P
Sodium	139473.90		137827.60		1		P

J we posit

But - None Au ND!

US EPA - CLP

8-IN

ICP-AES and ICP-MS SERIAL DILUTIONS

EPA SAMPLE NO.

VWAE-MW04L

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Antimony	0.04	J	10.00	U	100		MS
Arsenic	1.68		2.08	J	24		MS
Barium	435.94		511.85		17	E	MS
Beryllium	1.00	U	5.00	U			MS
Cadmium	0.03	J	5.00	U	100		MS
Chromium	2.00	U	10.00	U			MS
Cobalt	0.62	J	0.81	J	31		MS
Copper	2.06		3.47	J	68	E	MS
Lead	0.06	J	0.29	J	383		MS
Manganese	4041.93		4260.25		5		MS
Nickel	5.21		10.49		101	E	MS
Selenium	2.11	J	2.11	J	0		MS
Silver	1.00	U	5.00	U			MS
Thallium	1.00	U	5.00	U			MS
Vanadium	0.64	J	0.75	J	17		MS
Zinc	4.53		9.68	J	114		MS

J pos.

J pos

J pos.

US EPA - CLP

5A-IN

MATRIX SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

VWAE-MW04S

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Antimony	75 - 125	107.8394		0.0427	J	100.00	108		MS
Arsenic	75 - 125	39.1666		1.6834		40.00	94		MS
Barium	75 - 125	2508.0500		435.9376		2000.00	104		MS
Beryllium	75 - 125	50.5574		1.0000	U	50.00	101		MS
Cadmium	75 - 125	47.1133		0.0303	J	50.00	94		MS
Chromium	75 - 125	186.5438		2.0000	U	200.00	93		MS
Cobalt	75 - 125	458.0926		0.6245	J	500.00	91		MS
Copper	75 - 125	213.4256		2.0643		250.00	85		MS
Lead	75 - 125	22.1514		0.0617	J	20.00	110		MS
Manganese		4434.0520		4041.9341		1000.00	39		MS
Nickel	75 - 125	430.4105		5.2067		500.00	85		MS
Selenium	75 - 125	10.7998		2.1071	J	10.00	~~87~~		~~MS~~
Silver	75 - 125	11.2614		1.0000	U	50.00	23	N	MS
Thallium	75 - 125	56.3658		1.0000	U	50.00	~~113~~		~~MS~~
Vanadium	75 - 125	489.2759		0.6447	J	500.00	98		MS
Zinc	75 - 125	375.1310		4.5313		500.00	74	N	MS

R

J/UJ

Comments:

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Antimony			2.000	U	2.000	U	2.000	U			MS
Arsenic			1.000	U	1.000	U	1.000	U			MS
Barium			10.000	U	10.000	U	10.000	U			MS
Beryllium			1.000	U	1.000	U	1.000	U			MS
Cadmium			1.000	U	1.000	U	1.000	U			MS
Chromium			2.000	U	~~2.000~~	~~U~~	2.000	U			MS
Cobalt			1.000	U	0.007	J	1.000	U			MS
Copper			2.000	U	~~2.000~~	~~U~~	2.000	U			MS
Lead			1.000	U	1.000	U	1.000	U			MS
Manganese			1.000	U	1.000	U	1.000	U			MS
Nickel			1.000	U	1.000	U	1.000	U			MS
Selenium			5.000	U	5.000	U	5.000	U			MS
Silver			1.000	U	~~1.000~~	~~U~~	1.000	U			MS
Thallium			1.000	U	0.005	J	1.000	U			MS
Vanadium			5.000	U	~~5.000~~	~~U~~	5.000	U			MS
Zinc			~~0.306~~	~~J~~	~~0.377~~	~~J~~	~~0.360~~	~~J~~			MS

Co = 0.007 ug/L (1,3,4,5,6) U

Tl = 0.005 ug/L - None - ND

Ni 0.218 ug/L
Ag = 0.013 ug/L } all ND or > CRDL

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15881

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Antimony	2.000	U	2.000	U	2.000	U	2.000	U	2.000	U	MS
Arsenic	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Barium	10.000	U	10.000	U	10.000	U	10.000	U	10.000	U	MS
Beryllium	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Cadmium	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Chromium	-0.160	J	-0.147	J	2.000	U	2.000	U	2.000	U	MS
Cobalt	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Copper	2.000	U	2.000	U	2.000	U	2.000	U	2.000	U	MS
Lead	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Manganese	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Nickel	1.000	U	1.000	U	1.000	U	1.000	U	0.218	J	MS
Selenium	5.000	U	5.000	U	5.000	U	5.000	U	5.000	U	MS
Silver	1.000	U	0.013	J	1.000	U	1.000	U	1.000	U	MS
Thallium	0.005	J	1.000	U	1.000	U	1.000	U	1.000	U	MS
Vanadium	5.000	U	-0.031	J	5.000	U	5.000	U	5.000	U	MS
Zinc	-0.382	J	-0.260	J	-0.309	J	-0.300	J	-0.191	J	MS

ENVIRONMENTAL
Data Services, Inc.

DISSOLVED METALS
USEPA Region II - Level IV Review

Site: Vieques Island, CTO-0010 SDG #: 15977

Client: CH2M HILL, Inc., Chantilly, Virginia Date: October 31, 2008

Laboratory: CompuChem, Cary, North Carolina Reviewer: Nancy Weaver

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	VWAI-MW01	1597701	Water

The USEPA Region II SOP No. HW-2, Revision 13, September 2006: Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 and professional judgement were used in evaluating the data in this summary report.

Sample Conditions/Problems - The Traffic Reports/Chain-of-Custody Records, Sampling Report and/or Laboratory Case Narrative did not indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.

Holding Times - All samples were prepared and analyzed within 28 days for mercury and 180 days for all other metals.

Calibration - The ICV and CCV %R values were acceptable.

CRDL Standard - The CRDL standards exhibited acceptable %R values.

Method and Calibration Blanks - The following table summarizes method blank and continuing calibration blank contamination.

Compound	Conc. ug/L	Qualifier	Affected Samples
Potassium	4.669	U	1

ICP Interference Check Sample - All %R values were acceptable.

Matrix Spike/Matrix Spike Duplicate - A MS/MSD sample was not analyzed.

Field Duplicates - Field duplicate samples were not included in this data package.

LCS - The LCS samples exhibited acceptable %R values.

ICP Serial Dilution - The ICP serial dilution sample exhibited acceptable %D values except the following.

ICP Sample ID	Compound	%D	Qualifier	Affected Samples
1	Potassium	20%	None	Sample ND
	Nickel	15%	None	1

Field and Equipment Blank - Field QC results are summarized below.

Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
VWAE-EB01-072308	Iron	56.0	None	Sample ND

Compound Quantitation - No discrepancies were identified.

ANNOTATED FORM Is

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW01

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15977

Matrix (soil/water): WATER Lab Sample ID: 1597701

Level (low/med): LOW Date Received: 08/21/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7440-36-0	Antimony	2.0 ~~0.018~~	~~J~~	U	MS	BL
7440-38-2	Arsenic	1.0	U		MS	
7440-39-3	Barium	1.1	J		MS	
7440-41-7	Beryllium	1.0	U		MS	
7440-43-9	Cadmium	1.0	U		MS	
7440-47-3	Chromium	0.39	J		MS	
7440-48-4	Cobalt	1.0 ~~0.029~~	~~J~~	U	MS	BL
7440-50-8	Copper	2.0 ~~0.54~~	~~J~~	U	MS	BL
7439-92-1	Lead	0.12	J		MS	
7439-96-5	Manganese	2.2			MS	
7440-02-0	Nickel	2.0		J E	MS	SD
7782-49-2	Selenium	5.0	U		MS	
7440-22-4	Silver	1.0	U		MS	
7440-28-0	Thallium	1.0	U		MS	
7440-62-2	Vanadium	5.0 0.076	J	U	MS	BL
7440-66-6	Zinc	4.2			MS	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Form IA-IN 10/31/08

US EPA - CLP

1A-IN

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

VWAI-MW01

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15977

Matrix (soil/water): WATER Lab Sample ID: 1597701

Level (low/med): LOW Date Received: 08/21/2008

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	200	U		P
7440-70-2	Calcium	87900			P
7439-89-6	Iron	100	U		P
7439-95-4	Magnesium	53200			P
7439-97-6	Mercury	0.20	U		CV
7440-09-7	Potassium	5000 ~~810~~	~~J~~	U ~~J~~	P BL
7440-23-5	Sodium	116000			P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

USEPA REGION II WORKSHEETS

SOP # HW-2
Revision 13
September 2006

Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 (SOP Revision 13)

PREPARED BY: _____ Date: 12-08-06
Hanif Sheikh, Chemist
Hazardous Waste Support Section

Peer Reviewed by: _____ Date: 12-08-06
Russell Arnone, Chemist
Hazardous Waste Support Section

Concurred by: _____ Date: 12/8/06
Linda Mauel, Chief
Hazardous Waste Support Section

Approved by: _____ Date: 12/8/06
Robert Runyon, Chief
Hazardous Waste Support Branch

Annual Review

Reviewed by: _____ Date: _____
Name

Reviewed by: _____ Date: _____
Name

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I.0 Scope

I.I 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.l) 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: Viequeo Island, PR

Case #: NA

SDG #: 15977

Samples: **Soil** 1 - **Water**

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report			
Present?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.2 Record of Communication (from RSCC)			
Present?	[✓]	___	___
ACTION: If no, request from the RSCC.			
A.1.3 Sampling Trip Report			
Present and complete?	[✓]	___	___
ACTION: If no, contact RSCC/PO.			
A.1.4 Chain of Custody/Sample Traffic Report			
Present?	[✓]	___	___
Legible?	[✓]	___	___
Signature of sample custodian present?	[✓]	___	___
ACTION: If no, contact RSCC/WAM/PO.			
A.1.5 Cover Page			
Present?	[✓]	___	___
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	[✓]	___	___
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[✓]	___	___

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 SDG Narrative, DC-1 & DC-2 Form

Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[✓]	___	___
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[✓]	___	___

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 Form I to XV

A.1.7.1 Are all the Form I through Form XV labeled with:

Laboratory Name?	[✓]	___	___
Laboratory Code?	[✓]	___	___
RAS/Non-RAS Case No.?	[✓]	___	___
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[✓]	___	___

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

(a) all analytes analyzed by ICP-AES?	___	[✓]	___
(b) all analytes analyzed by ICP-MS?	___	[✓]	___
(c) Mercury?	___	[✓]	___
(d) Cyanide?	___	[✓]	___

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

Digestion Log for ICP-AES (Form XII)present?	[✓]	___	___
Digestion Log for ICP-MS (Form XII) present?	[✓]	___	___
Digestion Log for mercury (Form XII) present?	[✓]	___	___
Distillation Log for cyanide (Form XII) present?	[✓]	___	___

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	[✓]	_	_
Are percent solids calculations present for soils/sediments?	[_]	_	✓
Are preparation dates present on the sample preparation logs/bench sheets?	[✓]	_	_

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	[✓]	_	_
ICP-MS?	[✓]	_	_
Mercury?	[✓]	_	_
Cyanide?	[✓]	_	_

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	[✓]	_	_
Properly labeled?	[✓]	_	_

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	[✓]	_	_
Instrument Printouts?	[✓]	_	_

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A

A.1.9 **Technical Holding Times**: (Aqueous and soil samples)

(Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)

A.1.9.1 Cyanide distillation(14 days)exceeded?		[✓]	
Mercury analysis(28 days) exceeded?		[✓]	
Other Metals analysis(180 days)exceeded?		[✓]	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

A.1.9.2 Is pH of aqueous samples for:

Metals Analysis ≤ 2?	[✓]		
Cyanide Analysis ≥ 12?	[✓]		

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

A.1.9.3 Is the cooler temperature ≤ 10 C°? [✓]

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[___]	___	✓
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[✓]	___	___
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]	✓	___

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]	___	___
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]	___	___
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[✓]	___	___
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[___]	___	___

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[✓]	___	___

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

	YES	NO	N/A
Mercury Analysis?	[✓]	___	___
Cyanide Analysis?	[✓]	___	___
ICP-AES(more than 2 point Calib.)?	[✓]	___	___
ICP-MS (more than 2 point calib.)?	[✓]	___	___

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

	YES	NO	N/A
A.1.12.1 Present and complete for every metal and cyanide?	[✓]	___	___
Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

	YES	NO	N/A
A.1.12.2 Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

	YES	NO	N/A
A.1.12.3 Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[✓]	___	___

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

	YES	NO	N/A
Metals - 90-110%R?	[√]	___	___
Hg - 80-120%R?	[√]	___	___
Cyanide - 85-115%R?	[√]	___	___

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [√] ___ ___

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? **(Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)**	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[✓]	___	___
For each cyanide run, was a CRQL standard analyzed?	[✓]	___	___

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
*** True value of the CRQL Standard**

	YES	NO	N/A
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.

A.1.14 Initial and Continuing Calibration Blanks - Form III

	YES	NO	N/A
A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___

Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by

	YES	NO	N/A
using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[√]	___	___

ACTION:
If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".

A.1.14.2 Circle with red pencil on each Form III all Calib. Blank values that are:

≥ MDL but ≤ CRQL

> CRQL

A.1.14.2.1 When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	√	[___]	___

ACTION:
If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.

A.1.14.2.2 When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[√]	___

ACTION:
If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".

A.1.14.2.3 Is any Calibration Blank value below the negative CRQL?	___	[√]	___

ACTION:
If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run.
2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:			
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J),but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL?	✓	[___]	___

ACTION:
If yes, change sample result ≥ MDL

	YES	NO	N/A
but ≤ CRQL to CRQL with a "U".			
..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.

..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).

..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".			
..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.

..1.16.3 **ICP-MS Method**

..1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
..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)

..1.17.1 Was Matrix Spike analysis performed: only ONe Sample

	YES	NO	N/A
For each matrix type?	[___]	___	✓
For each SDG?	[___]	___	✓
On one of the SDG samples?	[___]	___	✓
For each concentration range (i.e.,low, med., high)?	[___]	___	✓
For each analytical Method (ICP-AES,ICP-MS, Hg, CN)used?	[___]	___	✓
Was a spiked sample prepared and analyzed with the SDG samples?	[___]	___	✓

ACTION:
If no for any of the above, flag as estimated(J)all the positive data for which a spiked sample was not analyzed.

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

		YES	NO	N/A
..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.			
..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.			
..1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	___	[___]	✓
	(b) between 30-74%?	___	[___]	✓
	(c) between 126-150%?	___	[___]	✓
	(d) greater than 150%?	___	[___]	✓
	ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			
(**NOTE**:Replace "N" with "J", "R" as appropriate.)			
..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?	[___]	___	✓

		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.			
..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.			
..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.			
..1.18.4	**Aqueous**			
..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),

	YES	NO	N/A
is any RPD ≥ 35% but < 120%?	___	[___]	✓
is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R)and red-line the associated sample data ≥ CRQL.			
..1.18.5.2	When the sample and/or duplicate value <5xCRQL(substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL	___	[___]	✓

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

..1.19 **Field Duplicates**

Aqueous Field Duplicates only one sample in package

		YES	NO	N/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),

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:

> ± 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

.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.

.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.			
..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**

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".			
1.1.21	**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.			
1.1.21.1	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.			
1.1.21.2	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			
1.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[✓]	___	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
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.)			
1.22	**Total/Dissolved or Inorganic/Total Analytes**			
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.			
1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

		YES	NO	N/A
1.1.22.3	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.			
1.1.23	**Field Blank - Form I** **NOTE**: **Designate "Field Blank" as such on Form I**			
1.1.23.1	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.

1.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

	YES	NO	N/A
1.1.24.1 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.

1.1.24.2 **Method Detection Limits - Form IX**

	YES	NO	N/A
1.1.24.2.1 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
1.1.24.2.2	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.			
1.1.24.3	**Linear Ranges - Form XI**			
1.1.24.3.1	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.			
1.1.25	**ICP-MS Tune Analysis - Form XIV**			
1.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
1.1.25.2	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
).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".

ı.1.26 **ICP-MS Internal Standards - Form XV**

		YES	NO	N/A
ı.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
ı.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

:han the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

ı.1.27 **Percent Solids of Sediments**

ı.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [___] ___ ✓

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative – See EDS data validation report

:ase# _____ **Site:** _____ **Matrix: Soil** ____

:DG# _____ **Lab:** _____ **Water** ____

:ampling Team: _____ **Reviewer:** _____ **Other** _____

ı.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**.

ı.2.2 **Laboratory Qualifiers:**
The CLP laboratory applies a contractual qualifier on all

'orm 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 For 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.

1.2.3.1 **Data Case Description**:

1.2.3.2 **CSF Audit**:

A.2.3.3 **Technical Review:**

A.2.3.4 **Contract-Problem/Non-Compliance:**

HWSS Reviewer: _____ Date:_____
Signature

Contractor Reviewer: _____ Date:_____
Signature

Verified by: _____ Date:_____
Signature

CASE #

SDG #

Contract Laboratory Program
REGION II/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

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:

Summary of Resolution:

Signature Date: _____

FIELD DUPLICATES

Sample No. **Field Duplicate No.** **Sample Matrix:**

Lab 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									
Manganese									

					YES	NO	N/A		
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

Total/Dissolved Concentrations

Lab Code **Case No.** **SDG No.** **Sample Matrix: Water**

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

ECTION A (TO BE COMPLETED BY REGIONAL SENDING OFFICIAL)

nitiated By:

Name, Affiliation, Phone Number

_____

Case Number: _____
- OLM
- OLC
- ILM

)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)

Name 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#___

Site: _____ Lab Name: _____

Reviewer's Initials:_____ Number of Samples:_____

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														

CHAIN OF CUSTODY

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11

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Page 1 of 1

CompuChem
a division of Liberty Analytical Corp.

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

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

Client/Reporting Information

Company Name: Cham Hill
Address: 5700 Cleveland St. Ste 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Chelsea Bennet
Phone #: 757.671.6208
Sampler's Name: Kenji Butler / Juan Acaron

Project Information

Project Name: Virginia SCTO-10
Sampling Location: AOC-E #1
Turnaround time: 28-Day
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N
Are high concentrations expected? (Y) or N? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Trace VOC	VOC SIM	Low SVOC, SVOC SIM	Total Metals (AES/MS)	Cyanide	Diss. Metals (AES/MS)	TPH-GRO	TPH-DRO & ORO	CANS, Alkalinity	Sulfide	TOC	MEE	Ferrous Fe	pH Sample Info (Lab Use) Cyanide	Diss. Metals
0807072-11 1583210	VWA1-MW01-08C	7/23/08	1035	GW		DISS=		(X)	1583310					X	(X)*	X	(X)		X						>12	<2

*did not receive metals for VWA1-MW01-08C 7/24/08

Lab Use Only

Sample Unpacked By: Jennifer Dore
Sample Order Entry By: [illegible]
Samples Received in Good Condition? Y or (N)
If no, explain: see comments →

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

Comments

*rec'd VWA1-MW04-08C (1) Dissolved Metal & (1) Total Metal ~~in error~~ (2) ~~bottle~~ VWA1-MW01-08C. Cooler.

Sample Custody

Relinquished by: Chelsea Bennet	Date/Time: 7/23/08 1330	Received by: Jennifer Dore	Date/Time: 7/24/08 900
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?		Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N — Cooler Temp: 1.6 °C

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

White & Yellow copy to lab • Pink copy for customer

SUPPORT DOCUMENTATION

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract: _____

Lab Code: LIBRTY Case No.: _____ NRAS No.: _____ SDG NO.: 15977

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	-47.336	J	-25.008	J	200.000	U			-36.524	J	P
Calcium	-28.230	J	5000.000	U	5000.000	U			-10.994	J	P
Iron	-20.397	J	-24.896	J	100.000	U			100.000	U	P
Magnesium	-36.282	J	-37.523	J	5000.000	U			-37.868	J	P
Mercury	0.200	U	0.200	U	0.200	U	0.200	U	0.200	U	CV
Potassium	5000.000	U	5000.000	U	5000.000	U			4.669	J	P
Sodium	5000.000	U	5000.000	U	5000.000	U			5000.000	U	P

US EPA - CLP

8-IN

ICP-AES and ICP-MS SERIAL DILUTIONS

EPA SAMPLE NO.

VWAI-MW01L

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15977

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	200.00	U	1000.00	U			P
Calcium	87891.04		84469.05		4		P
Iron	100.00	U	500.00	U			P
Magnesium	53244.25		50496.30		5		P
Potassium	810.02	J	645.54	J	20	E	P
Sodium	115617.50		106935.70		8		P

US EPA - CLP

3-IN
BLANKS

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: NRAS No.: SDG NO.: 15977

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank ug/L	C	M
Antimony	2.000	U	2.000	U	2.000	U	2.000	U	0.056	J	MS
Arsenic	1.000	U	1.000	U	1.000	U	1.000	U	0.063	J	MS
Barium	10.000	U	10.000	U	10.000	U	10.000	U	10.000	U	MS
Beryllium	1.000	U	1.000	U	1.000	U	1.000	U	0.046	J	MS
Cadmium	1.000	U	1.000	U	1.000	U	1.000	U	0.061	J	MS
Chromium	-0.160	J	-0.147	J	2.000	U	2.000	U	2.000	U	MS
Cobalt	1.000	U	1.000	U	1.000	U	1.000	U	0.052	J	MS
Copper	2.000	U	2.000	U	2.000	U	2.000	U	0.045	J	MS
Lead	1.000	U	1.000	U	1.000	U	1.000	U	1.000	U	MS
Manganese	1.000	U	1.000	U	1.000	U	1.000	U	0.033	J	MS
Nickel	1.000	U	1.000	U	1.000	U	1.000	U	0.063	J	MS
Selenium	5.000	U	5.000	U	5.000	U	5.000	U	0.050	J	MS
Silver	1.000	U	0.013	J	1.000	U	1.000	U	0.042	J	MS
Thallium	0.005	J	1.000	U	1.000	U	1.000	U	0.059	J	MS
Vanadium	5.000	U	-0.031	J	5.000	U	5.000	U	0.060	J	MS
Zinc	-0.382	J	-0.260	J	-0.309	J	-0.300	J	-0.236	J	MS

Soil Sampling – November 2011

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/10/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-SB22-1620-1111
Lab ID: K2257-01

Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 8:40

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
EPA 300.0 -- Ion Chromotography							**E300IC_S**
Nitrogen, Nitrate (As N)	3.6	~~B~~	2.9	mg/Kg	1	11/08/2011 8:37	62814
Sulfate	90	~~BJ~~	110	mg/Kg	1	11/08/2011 8:37	62814
Lloyd-Kahn TOC -- TOTAL ORGANIC CARBON by Combustion							**LK_TOC_S**
Organic Carbon, Total	2300		90	mg/Kg	1	11/08/2011 14:26	62830
SW846 9045C -- Soil and Waste pH							**SW9045_S**
pH	7.5		1.0	S.U.	1	11/08/2011 16:46	R62815

EPA 300.0
OV for MDL only.
12/22/11 mjz

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/10/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-SB22-2832-1111
Lab ID: K2257-02

Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 9:20

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
EPA 300.0 -- Ion Chromotography							**E300IC_S**
Nitrogen, Nitrate (As N)	9.8	B	2.9	mg/Kg	1	11/08/2011 9:13	62814
Sulfate	55	BJ	110	mg/Kg	1	11/08/2011 9:13	62814
Lloyd-Kahn TOC -- TOTAL ORGANIC CARBON by Combustion							**LK_TOC_S**
Organic Carbon, Total	7500		97	mg/Kg	1	11/08/2011 15:55	62830
SW846 9045C -- Soil and Waste pH							**SW9045_S**
pH	7.6		1.0	S.U.	1	11/08/2011 16:48	R62815

EPA 300.0
DV for MBL only.
11/22/11 MJZ

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/10/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-SB23-1620-1111
Lab ID: K2257-03

Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 10:20

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
EPA 300.0 -- Ion Chromotography							**E300IC_S**
Nitrogen, Nitrate (As N)	1.1	~~BJ~~ V MBL	2.9	mg/Kg	1	11/08/2011 8:58	62814
Sulfate	1700	~~B~~	110	mg/Kg	1	11/08/2011 8:58	62814
Lloyd-Kahn TOC -- TOTAL ORGANIC CARBON by Combustion							**LK_TOC_S**
Organic Carbon, Total	13000		93	mg/Kg	1	11/08/2011 15:16	62830
SW846 9045C -- Soil and Waste pH							**SW9045_S**
pH	7.9		1.0	S.U.	1	11/08/2011 16:51	R62815

EPA 300.0
OV for MBL only
12/22/11 MJZ

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits .
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/10/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-SB23-2832-1111
Lab ID: K2257-04

Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 10:55

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
EPA 300.0 -- Ion Chromotography							**E300IC_S**
Nitrogen, Nitrate (As N)	0.50	~~BJ~~ U, MBL	2.9	mg/Kg	1	11/08/2011 9:24	62814
Sulfate	66	~~BJ~~	110	mg/Kg	1	11/08/2011 9:24	62814
Lloyd-Kahn TOC -- TOTAL ORGANIC CARBON by Combustion							**LK_TOC_S**
Organic Carbon, Total	11000		85	mg/Kg	1	11/08/2011 15:34	62830
SW846 9045C -- Soil and Waste pH							**SW9045_S**
pH	7.9		1.0	S.U.	1	11/08/2011 16:53	R62815

EPA 300.0
OV 5- MBL only
12/22/11 MJC

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

CLIENT: CH2M-Hill, Inc.
Work Order: K2257
Project: CTO-0083 Vieques AOC E Soils

ANALYTICAL QC SUMMARY REPORT

E300IC_S
EPA 300.0 -- Ion Chromotography

Sample ID: **MB-62807** SampType: **MBLK** TestCode: **E300IC_S** Prep Date: **11/08/11 7:19** Run ID: **IC1_111108B**
Client ID: **MB-62807** Batch ID: **62814** Units: **mg/Kg** Analysis Date: **11/08/11 8:25** SeqNo: **1639298**

Analyte	Result	LOD	LOQ	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	0.2975	0.12	2.6	0	0	0	0	0	0			J
Sulfate	3.174	0.42	100	0	0	0	0	0	0			J

Sample ID: **MB-62814** SampType: **MBLK** TestCode: **E300IC_S** Prep Date: **11/08/11 7:19** Run ID: **IC1_111108B**
Client ID: **MB-62814** Batch ID: **62814** Units: **mg/Kg** Analysis Date: **11/08/11 8:01** SeqNo: **1639296**

Analyte	Result	LOD	LOQ	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	0.1298	0.12	2.6									J
Sulfate	1.799	0.42	100									J

Sample ID: **LCS-62814** SampType: **LCS** TestCode: **E300IC_S** Prep Date: **11/08/11 7:19** Run ID: **IC1_111108B**
Client ID: **LCS-62814** Batch ID: **62814** Units: **mg/Kg** Analysis Date: **11/08/11 8:13** SeqNo: **1639297**

Analyte	Result	LOD	LOQ	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	19.21	0.12	2.6	20.00	0	96.1	90	110	0			B
Sulfate	824.9	0.42	100	800.0	0	103	90	110	0			B

Sample ID: **LCSD-62814** SampType: **LCSD** TestCode: **E300IC_S** Prep Date: Run ID: **IC1_111108B**
Client ID: **LCSD-62814** Batch ID: **62814** Units: **mg/Kg** Analysis Date: **11/08/11 11:22** SeqNo: **1639295**

Analyte	Result	LOD	LOQ	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	19.33	0.12	2.6	20.00	0	96.6	90	110	19.21	0.59	20	B
Sulfate	825.6	0.42	100	800.0	0	103	90	110	824.9	0.0868	20	B

NO_3: 0.2975 × 5 = 1.4875 mg/kg (AL)
SO_4: 3.174 × 5 = 15.87 mg/kg (AL)

11/10/11 m.r.

DataQual

Environmental Services, LLC

CH2M HILL
15010 Conference Center Dr.
Suite 200
Chantilly, VA 20151

December 12, 2011
SDG# K2257, Spectrum Analytical, Inc.
Vieques Island, Puerto Rico- CTO-083

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # K2257. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Methods (8260B-Rev 2, August 2008- SOP #HW-24 and 8270D-Rev 4, August 2008-SOP #HW-22), and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the fuels in this SDG (SW-846 method 8015D for gasoline range organics (GRO), extractable total petroleum hydrocarbon (TPH) or oil range organics (ORO)). Substitute worksheets were utilized and Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualifications is provided.

Sample ID	Lab ID	Matrix	VOA	VOA TCLP	SVOA	SVOA TCLP	DRO/ORO*	GRO
VWAE-SB22-1620-1111	K2257-01	soil	X	X	X	X	X	X
VWAE-SB22-2832-1111	K2257-02	soil	X	X	X	X	X	X
VWAE-SB23-1620-1111	K2257-03	soil	X	X	X	X	X	X
VWAE-SB23-2832-1111	K2257-04	soil	X	X	X	X	X	X
VWAE-SB23P-2832-1111	K2257-05	soil	X		X		X	X
VWAE-EB01-110111	K2257-06	water	X			X	X	X
VWAE-TB01-110111	K2257-07	soil	X					X
VWAE-SB22-1620-1111 MS	K2257-01MS	soil	X		X		X	X
VWAE-SB22-1620-1111 MSD	K2257-01MSD	soil	X		X		X	X

**Please note that DRO is noted as Extractable Total Petroleum Hydrocarbon (ETPH) on the results forms.*

The following quality control samples were provided with this SDG: sample VWAE-TB01-110111-trip blank; sample VWAE-EB01-110111-equipment blank; and sample VWAE-SB23P-2832-1111-field duplicate of sample VWAE-SB23-2832-1111.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- GC/MS Tuning *
- GC Performance *

5830 Amberway Drive • St. Louis, MO 63128 • 314-330-1327 • Fax 314-849-6264

- ICP MS Tuning NA
- Initial/Continuing Calibrations *
- ICSA/ICSAB Standards NA
- RL Standards NA
- Blanks *
- Internal Standards *
- Surrogate Recoveries
- Laboratory Control Samples *
- Matrix Spike Recoveries
- Matrix Duplicate RPDs NA
- Serial Dilutions NA
- Field Duplicates
- Identification/Quantitation
- Reporting Limits *
- Tentatively Identified Compounds NA

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

Overall Evaluation of Data/Potential Usability Issues

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

VOA

Due to non-compliant recoveries in the matrix spike and matrix spike duplicate, qualifications were added to the associated sample.

Three samples required a dilution to obtain results within the calibration range.

VOA-TCLP

No qualifications to the data were required.

SVOA

Four samples required a dilution to obtain results within the calibration range.

SVOA-TCLP

Non-compliant surrogates were exhibited in three samples that resulted in qualifications to the data.

One sample required a dilution to obtain results within the calibration range.

DRO/ORO

The field duplicate pair exhibited a RPD >30% for DRO. This compound was qualified as estimated in both samples.

GRO

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

The %solids determination worksheets were requested from the laboratory. Calculation verification was requested for the GRO fraction and the DRO/ORO fraction. All requested items were received from the laboratory in a timely manner. A copy of all e-mail correspondence is included in the worksheets section of this report.

Technical Holding Times

According to chain of custody records, sampling was performed on 11/01/11 and samples were received at the laboratory 11/02/11. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Surrogates

SVOA-TCLP

Three samples exhibited non-compliant surrogate recoveries as listed in the table below, qualifications were applied as stated. According to case narrative samples were not re-analyzed due to apparent matrix interference during extraction process.

Sample ID	Non-compliant Surrogate	% Rec	QC Limit	Qualifier	Q Code
VWAE-SB22-2832-1111	2-fluorobiphenyl terphenyl-d14	13 9	50-110 50-135	J/R	SSL
VWAE-SB23-1620-1111	2-fluorobiphenyl terphenyl-d14	12 12	50-110 50-135	J/UJ	
VWAE-SB23-2832-1111	2-fluorobiphenyl terphenyl-d14	15 11	50-110 50-135	J/UJ	

Matrix Spike

VOA

The matrix spike and matrix spike duplicate associated with sample VWAE-SB22-1620-1111exhibited low recoveries for xylene (total) with 82% and 75% recoveries (QC limits 83-125%); therefore the non-detect result in the associated sample was qualified as estimated (UJ), qualifier code: MSL.

Field Duplicates

DRO/ORO

The field duplicate pair of samples VWAE-SB23-2832-11 and VWAE-SB23P-2832-11 exhibited a RPD >30% (49%) for the compound DRO (noted as ETPH on form 1s). This compound was qualified as estimated J with a qualifier code of FD in the field duplicate pair only.

Identification/Quantitation

VOA

A dilution was required for samples VWAE-SB23-2832-1111, VWAE-SB23P-2832-1111 and VWAE-SB22-2832-1111 to obtain results within the calibration range; therefore, the E-flagged results in the initial analyses were excluded in favor of the corresponding D-flagged results in the dilution analysis (qualifier code: DL).

SVOA

A dilution was required for samples VWAE-SB23-1620-1111, VWAE-SB23-2832-1111, VWAE-SB23P-2832-1111 and VWAE-SB22-2832-1111 to obtain results within the calibration range; therefore, the E-flagged results in the initial analyses were excluded in favor of the corresponding D-flagged results in the dilution analysis (qualifier code: DL).

SVOA-TCLP

A dilution was required for sample VWAE-23-1620-1111 to obtain results within the calibration range; therefore, the E-flagged results in the initial analyses were excluded in favor of the corresponding D-flagged results in the dilution analysis (qualifier code: DL).

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Jacqueline Cleveland

Jacqueline Cleveland
Vice President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag	Q Code
VWAE-SB22-1620-1111	xylene (total)	-	UJ	MSL
VWAE-SB23-2832-1111, VWAE-SB23P-2832-1111, VWAE-SB22-2832-1111	all E-flagged compounds	+	exclude	DL
VWAE-SB23-2832-1111DL, VWAE-SB23P-2832-1111DL, VWAE-SB22-2832-1111DL	all results except D-flagged compounds	+/-	exclude	DL

VOA-TCLP

Sample ID	Compound	Results	Q flag	Q Code
No qualifications				

SVOA

Sample ID	Compound	Results	Q flag	Q Code
VWAE-SB23-1620-1111, VWAE-SB23-2832-1111, VWAE-SB23P-2832-1111, VWAE-SB22-2832-1111	all E-flagged compounds	+	exclude	DL
VWAE-23-1620-1111DL, VWAE-SB23-2832-1111DL, VWAE-SB23P-2832-1111DL, VWAE-SB22-2832-1111DL	all results except D-flagged compounds	+/-	exclude	DL

SVOA-TCLP

Sample ID	Compound	Results	Q flag	Q Code
VWAE-SB22-2832-1111	all results	+/-	J/R	SSL
VWAE-SB23-1620-1111, VWAE-SB23-2832-1111	all results	+/-	J/UJ	SSL
VWAE-23-1620-1111	all E-flagged compounds	+	exclude	DL
VWAE-23-1620-1111DL	all results except D-flagged compounds	+/-	exclude	DL

DRO/ORO

Sample ID	Compound	Results	Q flag	Q Code
VWAE-SB23-2832-11 and VWAE-SB23P-2832-11	DRO (ETPH)	+	J	FD

GRO

Sample ID	Analyte	Results	Q flag	Q Code
no qualifications were required				

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the RL (2X sample RL for common laboratory contaminants) when the blank value is less than the RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
U*	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is qualified as non-detect U at the reported concentration.
RL**	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is changed to the RL and qualified as non-detect U.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the RL* or at the reported concentration**, when the ICB/CCB/PB result is less or greater than the RL.

Glossary of Qualification Flags and Abbreviations, continued

R -	Sample result is greater than the RL and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the RL.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the RL.
J/UJ -	Sample result is less than 10X RL when blank result is below the negative RL.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.
Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the RL* or at the reported concentration**, when the FB result is less or greater than the RL.
R -	Sample result is greater than the RL and less than the FB value when the FB value is greater than the RL.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the RL.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

General Abbreviations

LOD	level of detection
LOQ	level of quantitation
RL	reporting limit (equivalent to the LOD)
PQL	practical quantitation limit
IDL	instrument detection limit
MDL	method detection limit
+	positive result
-	non-detect result

QUALIFIER CODE REFERENCE

Qualifier	Description
TN	Tune
BSL	Blank Spike/LCS - High Recovery
BSH	Blank Spike/LCS - Low Recovery
BD	Blank Spike/Blank Spike Duplicate (LCS/LCSD) Precision
BRL	Below Reporting Limit
ISL	Internal Standard - Low Recovery
ISH	Internal Standard - High Recovery
MSL	Matrix Spike and/or Matrix Spike Duplicate - Low Recovery
MSH	Matrix Spike and/or Matrix Spike Duplicate - High Recovery
MI	Matrix interference obscuring the raw data
MDP	Matrix Spike/Matrix Spike Duplicate Precision
2S	Second Source - Bad reproducibility between tandem detectors
SSL	Spiked Surrogate - Low Recovery
SSH	Spiked Surrogate - High Recovery
SD	Serial Dilution Reproducibility
ICL	Initial Calibration - Low Relative Response Factors (RRF)
ICH	Initial Calibration - High Relative Response Factors (RRF)
ICB	Initial Calibration - Bad Linearity or Curve Function
CCL	Continuing Calibration - Low Recovery or %Difference
CCH	Continuing Calibration - High Recovery or %Difference
LD	Lab Duplicate Reproducibility
HT	Holding Time
PD	Pesticide Degradation
2C	Second Column - Poor Dual Column Reproducibility
LR	Concentration Exceeds Linear Range
MBL, EBL, FBL or TBL	Blank Contamination
RE	Redundant Result - due to Re-analysis or Re-extraction
DL	Redundant Result - due to Dilution
FD	Field Duplicate
OT	Other - explained in data validation report
%SOL	High moisture content

1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB22-1620-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-01D

Sample wt/vol: 8.40 (g/mL) G Lab File ID: V8A7411.D

Level: (TRACE/LOW/MED) LOW Date Received: 11/02/2011

% Moisture: not dec. 10 Date Analyzed: 11/07/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/KG	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	1.3	U	0.41	1.3	3.3
107-06-2	1,2-Dichloroethane	1.3	U	0.36	1.3	3.3
71-43-2	Benzene	1.3	U	0.41	1.3	3.3
1330-20-7	Xylene (Total)	1.3	U	0.31	1.3	3.3

MSL

120711

1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB22-2832-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-02C

Sample wt/vol: 7.80 (g/mL) G Lab File ID: V1M4324.D

Level: (TRACE/LOW/MED) MED Date Received: 11/02/2011

% Moisture: not dec. 11 Date Analyzed: 11/09/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100.00 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/KG	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	150	J	25	84	210
107-06-2	1,2-Dichloroethane	84	U	21	84	210
71-43-2	Benzene	99	J	17	84	210
1330-20-7	Xylene (Total)	22000		11	84	210 Exclude, DL

111
120711

SW846

1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB22-2832-1
111DL

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-02CDL

Sample wt/vol: 7.80 (g/mL) G Lab File ID: V1M4365.D

Level: (TRACE/LOW/MED) MED Date Received: 11/02/2011

% Moisture: not dec. 11 Date Analyzed: 11/10/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 5.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100.00 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/KG	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	420	U	130	420	1000 exclude DL
107-06-2	1,2-Dichloroethane	420	U	100	420	1000
71-43-2	Benzene	420	U	84	420	1000
1330-20-7	Xylene (Total)	23000	D	55	420	1000

MM 120711

1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23-1620-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-03C

Sample wt/vol: 6.80 (g/mL) G Lab File ID: V1M4321.D

Level: (TRACE/LOW/MED) MED Date Received: 11/02/2011

% Moisture: not dec. 8.9 Date Analyzed: 11/09/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100.00 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/KG	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	90	U	27	90	230
107-06-2	1,2-Dichloroethane	90	U	23	90	230
71-43-2	Benzene	90	U	18	90	230
1330-20-7	Xylene (Total)	100	J	12	90	230

111
12/07/11

1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23-2832-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-04C

Sample wt/vol: 5.90 (g/mL) G Lab File ID: V1M4290.D

Level: (TRACE/LOW/MED) MED Date Received: 11/02/2011

% Moisture: not dec. 12 Date Analyzed: 11/08/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100.00 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/KG	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	290		33	110	270
107-06-2	1,2-Dichloroethane	110	U	27	110	270
71-43-2	Benzene	1400		22	110	270
1330-20-7	Xylene (Total)	110000	~~E~~	14	110	270 Include DL

MM 120711

1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23-2832-1
111DL

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-04CDL

Sample wt/vol: 5.90 (g/mL) G Lab File ID: V1M4322.D

Level: (TRACE/LOW/MED) MED Date Received: 11/02/2011

% Moisture: not dec. 12 Date Analyzed: 11/09/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 50.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100.00 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/KG	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	5500	U	1600	5500	4000
107-06-2	1,2-Dichloroethane	5500	U	1400	5500	4000
71-43-2	Benzene	5500	U	1100	5500	4000
1330-20-7	Xylene (Total)	110000	D	710	5500	4000

excluded

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SW846

1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23P-2832-1111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-05C

Sample wt/vol: 5.20 (g/mL) G Lab File ID: V1M4291.D

Level: (TRACE/LOW/MED) MED Date Received: 11/02/2011

% Moisture: not dec. 11 Date Analyzed: 11/08/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100.00 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/KG	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	370		36	120	300
107-06-2	1,2-Dichloroethane	120	U	30	120	300
71-43-2	Benzene	2200		24	120	300
1330-20-7	Xylene (Total)	160000	E	16	120	300 exclude DL

WM 12/07/11

1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23P-2832-1111DL

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-05CDL

Sample wt/vol: 5.20 (g/mL) G Lab File ID: V1M4323.D

Level: (TRACE/LOW/MED) MED Date Received: 11/02/2011

% Moisture: not dec. 11 Date Analyzed: 11/09/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 50.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100.00 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/KG	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	6100	U	1800	6100	5000
107-06-2	1,2-Dichloroethane	6100	U	1500	6100	5000
71-43-2	Benzene	6100	U	1200	6100	5000
1330-20-7	Xylene (Total)	150000	U	790	6100	5000

excludes

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1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-EB01-110111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: K2257-06B

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V1M4259.D

Level: (TRACE/LOW/MED) LOW Date Received: 11/02/2011

% Moisture: not dec. Date Analyzed: 11/07/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	0.50	U	0.24	0.50	5.0
107-06-2	1,2-Dichloroethane	0.50	U	0.41	0.50	5.0
71-43-2	Benzene	0.50	U	0.33	0.50	5.0
1330-20-7	Xylene (Total)	1.0	U	0.36	1.0	5.0

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1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-TB01-110111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-07A

Sample wt/vol: 5.00 (g/mL) G Lab File ID: V8A7444.D

Level: (TRACE/LOW/MED) LOW Date Received: 11/02/2011

% Moisture: not dec. Date Analyzed: 11/08/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/KG	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	2.0	U	0.61	2.0	5.0
107-06-2	1,2-Dichloroethane	2.0	U	0.54	2.0	5.0
71-43-2	Benzene	2.0	U	0.61	2.0	5.0
1330-20-7	Xylene (Total)	2.9	J	0.47	2.0	5.0

WM 12/07/11

1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-TB01-110111 ME

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-07B

Sample wt/vol: 5.00 (g/mL) G Lab File ID: V1M4382.D

Level: (TRACE/LOW/MED) MED Date Received: 11/02/2011

% Moisture: not dec. Date Analyzed: 11/11/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: 5000 (uL) Soil Aliquot Volume: 100.00 (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/KG	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	100	U	30	100	250
107-06-2	1,2-Dichloroethane	100	U	25	100	250
71-43-2	Benzene	100	U	20	100	250
1330-20-7	Xylene (Total)	100	U	13	100	250

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1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB22-1620-1
111MS

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-01DMS

Sample wt/vol: 8.40 (g/mL) G Lab File ID: V8A7462.D

Level: (TRACE/LOW/MED) LOW Date Received: 11/02/2011

% Moisture: not dec. 10 Date Analyzed: 11/10/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/KG	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	31		0.41	1.3	3.3
107-06-2	1,2-Dichloroethane	31		0.36	1.3	3.3
71-43-2	Benzene	30		0.41	1.3	3.3
1330-20-7	Xylene (Total)	82		0.31	1.3	3.3

WM 120711

1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB22-1620-1
111MSD

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-01DMSD

Sample wt/vol: 9.50 (g/mL) G Lab File ID: V8A7463.D

Level: (TRACE/LOW/MED) LOW Date Received: 11/02/2011

% Moisture: not dec. 10 Date Analyzed: 11/10/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 10.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/KG	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	25		0.36	1.2	2.9
107-06-2	1,2-Dichloroethane	24		0.32	1.2	2.9
71-43-2	Benzene	25		0.36	1.2	2.9
1330-20-7	Xylene (Total)	66		0.28	1.2	2.9

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1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB22-1620-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257SPLP

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: K2257-01C

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V1M4378.D

Level: (TRACE/LOW/MED) LOW Date Received: 11/02/2011

% Moisture: not dec. Date Analyzed: 11/11/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	0.50	U	0.24	0.50	5.0
107-06-2	1,2-Dichloroethane	0.50	U	0.41	0.50	5.0
71-43-2	Benzene	0.50	U	0.33	0.50	5.0
1330-20-7	Xylene (Total)	1.0	U	0.36	1.0	5.0

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1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB22-2832-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257SPLP

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: K2257-02D

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V1M4379.D

Level: (TRACE/LOW/MED) LOW Date Received: 11/02/2011

% Moisture: not dec. Date Analyzed: 11/11/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	0.50	U	0.24	0.50	5.0
107-06-2	1,2-Dichloroethane	0.50	U	0.41	0.50	5.0
71-43-2	Benzene	0.50	U	0.33	0.50	5.0
1330-20-7	Xylene (Total)	72		0.36	1.0	5.0

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1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23-1620-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257SPLP

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: K2257-03D

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V1M4380.D

Level: (TRACE/LOW/MED) LOW Date Received: 11/02/2011

% Moisture: not dec. Date Analyzed: 11/11/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	0.50	U	0.24	0.50	5.0
107-06-2	1,2-Dichloroethane	0.50	U	0.41	0.50	5.0
71-43-2	Benzene	0.50	U	0.33	0.50	5.0
1330-20-7	Xylene (Total)	3.1	J	0.36	1.0	5.0

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1A - FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23-2832-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257SPLP

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: K2257-04D

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V1M4381.D

Level: (TRACE/LOW/MED) LOW Date Received: 11/02/2011

% Moisture: not dec. Date Analyzed: 11/11/2011

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 5.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
1634-04-4	Methyl tert-butyl ether	2.5	U	1.2	2.5	25
107-06-2	1,2-Dichloroethane	2.5	U	2.1	2.5	25
71-43-2	Benzene	2.5	U	1.7	2.5	25
1330-20-7	Xylene (Total)	580		1.8	5.0	25

1F - FORM I SV-SIM

SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB22-1620-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-01A

Sample wt/vol: 30.4 (g/mL) G Lab File ID: S5B3238.D

Extraction: (Type) SONC

% Moisture: 10 Decanted: (Y/N) N Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/08/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/09/2011

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION: µG/KG	Q	DL	LOD	LOQ
91-20-3	Naphthalene	3.6	U	1.1	3.6	3.6
91-57-6	2-Methylnaphthalene	3.6	U	1.1	3.6	3.6

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1F - FORM I SV-SIM

SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB22-2832-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-02A

Sample wt/vol: 30.1 (g/mL) G Lab File ID: S5B3241.D

Extraction: (Type) SONC

% Moisture: 11 Decanted: (Y/N) N Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/08/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/09/2011

GPC Cleanup:(Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION: µG/KG	Q	DL	LOD	LOQ
91-20-3	Naphthalene	3500	E	1.1	3.7	3.7
91-57-6	2-Methylnaphthalene	5900	E	1.1	3.7	3.7

Include DL

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1F - FORM I SV-SIM

SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB22-2832-1
111DL

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-02ADL

Sample wt/vol: 30.1 (g/mL) G Lab File ID: S5B3252.D

Extraction: (Type) SONC

% Moisture: 11 Decanted: (Y/N) N Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/08/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/10/2011

GPC Cleanup:(Y/N) N pH: Dilution Factor: 50.0

CAS NO.	COMPOUND	CONCENTRATION: µG/KG	Q	DL	LOD	LOQ
91-20-3	Naphthalene	1700	D	56	180	180
91-57-6	2-Methylnaphthalene	3100	D	56	180	180

12/07/11

1F - FORM I SV-SIM

SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23-1620-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-03A

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S5B3242.D

Extraction: (Type) SONC

% Moisture: 8.9 Decanted: (Y/N) N Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/08/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/09/2011

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION: µG/KG	Q	DL	LOD	LOQ
91-20-3	Naphthalene	5600	E	1.1	3.6	3.6
91-57-6	2-Methylnaphthalene	8300	E	1.1	3.6	3.6

12/07/11

1F - FORM I SV-SIM

SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23-1620-1
111DL

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-03ADL

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S5B3253.D

Extraction: (Type) SONC

% Moisture: 8.9 Decanted: (Y/N) N Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/08/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/10/2011

GPC Cleanup:(Y/N) N pH: Dilution Factor: 100.0

CAS NO.	COMPOUND	CONCENTRATION: µG/KG	Q	DL	LOD	LOQ
91-20-3	Naphthalene	7900	D	110	360	360
91-57-6	2-Methylnaphthalene	14000	D	110	360	360

12/07/11

1F - FORM I SV-SIM

SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23-2832-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-04A

Sample wt/vol: 30.2 (g/mL) G Lab File ID: S5B3243.D

Extraction: (Type) SONC

% Moisture: 12 Decanted: (Y/N) N Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/08/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/09/2011

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION: µG/KG	Q	DL	LOD	LOQ
91-20-3	Naphthalene	3300	E	1.1	3.7	3.7
91-57-6	2-Methylnaphthalene	4800	E	1.1	3.7	3.7

exclude DL

12/07/11

1F - FORM I SV-SIM

SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23-2832-1
111DL

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-04ADL

Sample wt/vol: 30.2 (g/mL) G Lab File ID: S5B3254.D

Extraction: (Type) SONC

% Moisture: 12 Decanted: (Y/N) N Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/08/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/10/2011

GPC Cleanup: (Y/N) N pH: Dilution Factor: 50.0

CAS NO.	COMPOUND	CONCENTRATION: µG/KG	Q	DL	LOD	LOQ
91-20-3	Naphthalene	3000	D	56	190	190
91-57-6	2-Methylnaphthalene	4200	D	56	190	190

MM 12/07/11

1F - FORM I SV-SIM

SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23P-2832-1111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-05A

Sample wt/vol: 30.1 (g/mL) G Lab File ID: S5B3244.D

Extraction: (Type) SONC

% Moisture: 11 Decanted: (Y/N) N Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/08/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/09/2011

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION: µG/KG	Q	DL	LOD	LOQ
91-20-3	Naphthalene	3800	E	1.1	3.7	3.7
91-57-6	2-Methylnaphthalene	5500	E	1.1	3.7	3.7

Exclude

12/07/11

1F - FORM I SV-SIM

SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23P-2832-1111DL

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-05ADL

Sample wt/vol: 30.1 (g/mL) G Lab File ID: S5B3255.D

Extraction: (Type) SONC

% Moisture: 11 Decanted: (Y/N) N Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/08/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/10/2011

GPC Cleanup: (Y/N) N pH: Dilution Factor: 50.0

CAS NO.	COMPOUND	CONCENTRATION: µG/KG	Q	DL	LOD	LOQ
91-20-3	Naphthalene	3100	D	56	190	190
91-57-6	2-Methylnaphthalene	4500	D	56	190	190

WM 12/07/11

1F - FORM I SV-SIM

SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB22-1620-1
111MS

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-01AMS

Sample wt/vol: 30.5 (g/mL) G Lab File ID: S5B3239.D

Extraction: (Type) SONC

% Moisture: 10 Decanted: (Y/N) N Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/08/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/09/2011

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION: µG/KG	Q	DL	LOD	LOQ
91-20-3	Naphthalene	67		1.1	3.6	3.6
91-57-6	2-Methylnaphthalene	71		1.1	3.6	3.6

WM 120711

1F - FORM I SV-SIM

SEMIVOLATILE SIM ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB22-1620-1
111MSD

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: K2257-01AMSD

Sample wt/vol: 30.4 (g/mL) G Lab File ID: S5B3240.D

Extraction: (Type) SONC

% Moisture: 10 Decanted: (Y/N) N Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/08/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/09/2011

GPC Cleanup:(Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION: µG/KG	Q	DL	LOD	LOQ
91-20-3	Naphthalene	61		1.1	3.6	3.6
91-57-6	2-Methylnaphthalene	64		1.1	3.6	3.6

12/07/11

1D - FORM I SV-1

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB22-1620-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: K2257-01B

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S6A6244.D

Level: (LOW/MED) LOW Extraction: (Type) SEPF

% Moisture: Decanted: (Y/N) Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/07/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/08/2011

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
91-20-3	Naphthalene	2.0	U	0.96	2.0	2.0
91-57-6	2-Methylnaphthalene	2.0	U	0.94	2.0	2.0

MM
120711

1D - FORM I SV-1

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB22-2832-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: K2257-02A

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S6A6245.D

Level: (LOW/MED) LOW Extraction: (Type) SEPF

% Moisture: Decanted: (Y/N) Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/07/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/08/2011

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ	
91-20-3	Naphthalene	49		0.96	2.0	2.0	J SSL
91-57-6	2-Methylnaphthalene	30		0.94	2.0	2.0	J SSL

MM 120711

1D - FORM I SV-1

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23-1620-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: K2257-03A

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S6A6246.D

Level: (LOW/MED) LOW Extraction: (Type) SEPF

% Moisture: Decanted: (Y/N) Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/07/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/08/2011

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
91-20-3	Naphthalene	92	~~E~~	0.96	2.0	2.0
91-57-6	2-Methylnaphthalene	71		0.94	2.0	2.0

Include DL J SSL

120711

1D - FORM I SV-1

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23-1620-1
111DL

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: K2257-03ADL

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S6A6253.D

Level: (LOW/MED) LOW Extraction: (Type) SEPF

% Moisture: Decanted: (Y/N) Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/07/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/09/2011

GPC Cleanup: (Y/N) N pH: Dilution Factor: 2.0

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
91-20-3	Naphthalene	89	D	1.9	4.0	4.0
91-57-6	2-Methylnaphthalene	71	D	1.9	4.0	4.0 Exclude DL

WA 12/07/11

1D - FORM I SV-1

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-SB23-2832-1
111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: K2257-04A

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S6A6247.D

Level: (LOW/MED) LOW Extraction: (Type) SEPF

% Moisture: Decanted: (Y/N) Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/07/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/08/2011

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
91-20-3	Naphthalene	46		0.96	2.0	2.0 J SSL
91-57-6	2-Methylnaphthalene	23		0.94	2.0	2.0 J SSL

VM 12/2/11

1D - FORM I SV-1

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VWAE-EB01-110111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: K2257-06A

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S6A6243.D

Level: (LOW/MED) LOW Extraction: (Type) SEPF

% Moisture: Decanted: (Y/N) Date Received: 11/02/2011

Concentrated Extract Volume: 1000 (uL) Date Extracted: 11/07/2011

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 11/08/2011

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
91-20-3	Naphthalene	2.0	U	0.96	2.0	2.0
91-57-6	2-Methylnaphthalene	2.0	U	0.94	2.0	2.0

WM 12/07/11

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/12/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-SB22-1620-1111
Lab ID: K2257-01

Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 8:40

Analyses	Result	Qual	LOD	LOQ	Units	DF	Date Analyzed	Batch ID
SW846 8015D TPH -- TOTAL PETROLEUM HYDROCARBONS (TPH) BY GC-FID							TPH_S	
Extractable Total Petroleum Hydrocarbon	16		7.8 ^	7.8	mg/Kg	1	11/09/2011 12:41	62825
Oil Range Organics	25		13 ^	13	mg/Kg	1	11/09/2011 12:41	62825
Surrogate: ortho-Terphenyl	74.0			50-150	%REC	1	11/09/2011 12:41	62825

JC 12811

Qualifiers:
ND - Not Detected at the Limit of Detection
J - Analyte detected below Limit of Quantitation
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
^ Qualified to Limit of Detection (LOD)
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
LOQ - Limit of Quantitation
LOD - Limit of Detection

m11.11.08.A

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/12/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-SB22-2832-1111
Lab ID: K2257-02

Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 9:20

Analyses	Result	Qual	LOD	LOQ	Units	DF	Date Analyzed	Batch ID
SW846 8015D TPH -- TOTAL PETROLEUM HYDROCARBONS (TPH) BY GC-FID							TPH_S	
Extractable Total Petroleum Hydrocarbon	2100		77 ^	77	mg/Kg	10	11/09/2011 18:23	62825
Oil Range Organics	2200		130 ^	130	mg/Kg	10	11/09/2011 18:23	62825
Surrogate: ortho-Terphenyl	78.0			50-150	%REC	10	11/09/2011 18:23	62825

JC 12811

Qualifiers:
ND - Not Detected at the Limit of Detection
J - Analyte detected below Limit of Quantitation
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
^ Qualified to Limit of Detection (LOD)
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
LOQ - Limit of Quantitation
LOD - Limit of Detection

m11.11.08.A

045

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/12/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-SB23-1620-1111
Lab ID: K2257-03

Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 10:20

Analyses	Result	Qual	LOD	LOQ	Units	DF	Date Analyzed	Batch ID
SW846 8015D TPH – TOTAL PETROLEUM HYDROCARBONS (TPH) BY GC-FID							TPH_S	
Extractable Total Petroleum Hydrocarbon	1600		77 ^	77	mg/Kg	10	11/09/2011 18:48	62825
Oil Range Organics	1700		130 ^	130	mg/Kg	10	11/09/2011 18:48	62825
Surrogate: ortho-Terphenyl	72.1			50-150	%REC	10	11/09/2011 18:48	62825

JC 12811

Qualifiers:
ND - Not Detected at the Limit of Detection
J - Analyte detected below Limit of Quantitation
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
^ Qualified to Limit of Detection (LOD)
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
LOQ - Limit of Quantitation
LOD - Limit of Detection

m11.11.08.A

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/12/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-SB23-2832-1111
Lab ID: K2257-04

Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 10:55

Analyses	Result	Qual	LOD	LOQ	Units	DF	Date Analyzed	Batch ID
SW846 8015D TPH -- TOTAL PETROLEUM HYDROCARBONS (TPH) BY GC-FID							TPH_S	
Extractable Total Petroleum Hydrocarbon	2800	J B	79 ^	79	mg/Kg	10	11/09/2011 19:14	62825
Oil Range Organics	2700		140 ^	140	mg/Kg	10	11/09/2011 19:14	62825
Surrogate: ortho-Terphenyl	73.9			50-150	%REC	10	11/09/2011 19:14	62825

12811

Qualifiers:
ND - Not Detected at the Limit of Detection
J - Analyte detected below Limit of Quantitation
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
^ Qualified to Limit of Detection (LOD)
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
LOQ - Limit of Quantitation
LOD - Limit of Detection

m11.11.08.A

047

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/12/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-SB23P-2832-1111
Lab ID: K2257-05

Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 11:00

Analyses	Result	Qual	LOD	LOQ	Units	DF	Date Analyzed	Batch ID
SW846 8015D TPH -- TOTAL PETROLEUM HYDROCARBONS (TPH) BY GC-FID					TPH_S			
Extractable Total Petroleum Hydrocarbon	1700	J FD	78 ^	78	mg/Kg	10	11/09/2011 19:39	62825
Oil Range Organics	2000		130 ^	130	mg/Kg	10	11/09/2011 19:39	62825
Surrogate: ortho-Terphenyl	66.8			50-150	%REC	10	11/09/2011 19:39	62825

JC 12811

Qualifiers:
ND - Not Detected at the Limit of Detection
J - Analyte detected below Limit of Quantitation
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
^ Qualified to Limit of Detection (LOD)
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
LOQ - Limit of Quantitation
LOD - Limit of Detection

m11.11.08.A

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/12/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-EB01-110111
Lab ID: K2257-06

Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 9:55

Analyses	Result	Qual	LOD	LOQ	Units	DF	Date Analyzed	Batch ID
SW846 8015D TPH -- TOTAL PETROLEUM HYDROCARBONS (TPH) BY GC-FID					TPH_W			
Extractable Total Petroleum Hydrocarbon	ND		0.35 ^	0.35	mg/L	1	11/11/2011 9:27	62727
Oil Range Organics	ND		0.35 ^	0.35	mg/L	1	11/11/2011 9:27	62727
Surrogate: ortho-Terphenyl	80.2			50-150	%REC	1	11/11/2011 9:27	62727

JAC 1/28/11

Qualifiers:
ND - Not Detected at the Limit of Detection
J - Analyte detected below Limit of Quantitation
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
^ Qualified to Limit of Detection (LOD)
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
LOQ - Limit of Quantitation
LOD - Limit of Detection

m11.11.08.A

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/12/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-SB22-1620-1111
Lab ID: K2257-01
Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 8:40

Analyses	Result	Qual	LOD	LOQ	Units	DF	Date Analyzed	Batch ID
SW846 8015D GRO -- GASOLINE RANGE ORGANIC (GRO) BY GC-FID						**GRO_S**		
Gasoline Range Organics	ND		2900 ^	2900	ug/Kg	1	11/08/2011 13:49	62822
Surrogate: Bromofluorobenzene	106			79-118	%REC	1	11/08/2011 13:49	62822

YAC 12711

Qualifiers:
ND - Not Detected at the Limit of Detection
J - Analyte detected below Limit of Quantitation
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
^ Qualified to Limit of Detection (LOD)
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
LOQ - Limit of Quantitation
LOD - Limit of Detection

m11.11.08.A

050

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/12/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-SB22-2832-1111
Lab ID: K2257-02
Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 9:20

Analyses	Result	Qual	LOD	LOQ	Units	DF	Date Analyzed	Batch ID
SW846 8015D GRO -- GASOLINE RANGE ORGANIC (GRO) BY GC-FID					**GRO_S**			
Gasoline Range Organics	1800000		85000 ^	85000	ug/Kg	25	11/08/2011 14:16	62822
Surrogate: Bromofluorobenzene	98.2			79-118	%REC	25	11/08/2011 14:16	62822

JC 12711

Qualifiers:
ND - Not Detected at the Limit of Detection
J - Analyte detected below Limit of Quantitation
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
^ Qualified to Limit of Detection (LOD)
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
LOQ - Limit of Quantitation
LOD - Limit of Detection

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/12/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-SB23-1620-1111
Lab ID: K2257-03

Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 10:20

Analyses	Result	Qual	LOD	LOQ	Units	DF	Date Analyzed	Batch ID
SW846 8015D GRO -- GASOLINE RANGE ORGANIC (GRO) BY GC-FID						GRO_S		
Gasoline Range Organics	1500000		50000 ^	50000	ug/Kg	16	11/08/2011 14:45	62822
Surrogate: Bromofluorobenzene	114			79-118	%REC	16	11/08/2011 14:45	62822

JAC 12/11

Qualifiers:
ND - Not Detected at the Limit of Detection
J - Analyte detected below Limit of Quantitation
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
^ Qualified to Limit of Detection (LOD)
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
LOQ - Limit of Quantitation
LOD - Limit of Detection

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/12/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-SB23-2832-1111
Lab ID: K2257-04

Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 10:55

Analyses	Result	Qual	LOD	LOQ	Units	DF	Date Analyzed	Batch ID
SW846 8015D GRO -- GASOLINE RANGE ORGANIC (GRO) BY GC-FID					GRO_S			
Gasoline Range Organics	950000		61000 ^	61000	ug/Kg	20	11/08/2011 15:15	62822
Surrogate: Bromofluorobenzene	100			79-118	%REC	20	11/08/2011 15:15	62822

JAC 12711

Qualifiers:
ND - Not Detected at the Limit of Detection
J - Analyte detected below Limit of Quantitation
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
^ Qualified to Limit of Detection (LOD)
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
LOQ - Limit of Quantitation
LOD - Limit of Detection

m11.11.08.A

053

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/12/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-SB23P-2832-1111
Lab ID: K2257-05

Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 11:00

Analyses	Result	Qual	LOD	LOQ	Units	DF	Date Analyzed	Batch ID
SW846 8015D GRO – GASOLINE RANGE ORGANIC (GRO) BY GC-FID					GRO_S			
Gasoline Range Organics	890000		63000 ^	63000	ug/Kg	20	11/08/2011 15:48	62822
Surrogate: Bromofluorobenzene	98.8			79-118	%REC	20	11/08/2011 15:48	62822

JAC 12711

Qualifiers:
ND - Not Detected at the Limit of Detection
J - Analyte detected below Limit of Quantitation
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
^ Qualified to Limit of Detection (LOD)
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
LOQ - Limit of Quantitation
LOD - Limit of Detection

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/12/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-EB01-110111
Lab ID: K2257-06

Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 9:55

Analyses	Result	Qual	LOD	LOQ	Units	DF	Date Analyzed	Batch ID
SW846 8015D GRO -- GASOLINE RANGE ORGANIC (GRO) BY GC-FID					GRO_W			
Gasoline Range Organics	ND		100 ^	100	ug/L	1	11/08/2011 17:24	62823
Surrogate: Bromofluorobenzene	94.2			87-112	%REC	1	11/08/2011 17:24	62823

JAC 12/11

Qualifiers:
ND - Not Detected at the Limit of Detection
J - Analyte detected below Limit of Quantitation
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
^ Qualified to Limit of Detection (LOD)
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
LOQ - Limit of Quantitation
LOD - Limit of Detection

m11.11.08.A

055

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

11/12/2011

Client: CH2M-Hill, Inc.
Client Sample ID: VWAE-TB01-110111
Lab ID: K2257-07

Project: CTO-0083 Vieques AOC E Soils
Collection Date: 11/01/11 0:00

Analyses	Result	Qual	LOD	LOQ	Units	DF	Date Analyzed	Batch ID
SW846 8015D GRO -- GASOLINE RANGE ORGANIC (GRO) BY GC-FID					GRO_S			
Gasoline Range Organics	ND		2400 ^	2400	ug/Kg	1	11/08/2011 17:54	62822
Surrogate: Bromofluorobenzene	114			79-118	%REC	1	11/08/2011 17:54	62822

JAC 12/11

Qualifiers:
ND - Not Detected at the Limit of Detection
J - Analyte detected below Limit of Quantitation
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
^ Qualified to Limit of Detection (LOD)
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
LOQ - Limit of Quantitation
LOD - Limit of Detection

m11.11.08.A

056

MITKEM LABORATORIES

A Division of SPECTRUM ANALYTICAL INC. Featuring HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:

TAT- Indicate Date Needed: _____

- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 30 days unless otherwise instructed.

Report To: Hilary Ott
Hilary.ott@ch2m.com

Project Mgr.: Stephen Brand

Invoice To: Navy CLEAN 1000 CTO-083

P.O. No.: 933562 RQN: _____

Project No.: 392485, F1, FK
Site Name: AOC E
Location: Vieques State: PR
Sampler(s): Charlotte Cisneros, Kenji Butler

1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8=$NaHSO_4$ 9=MeOH 10=None 11= _____

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= _____ X2= _____ X3= _____

G=Grab C=Composite

List preservative code below:

Notes:

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other _____

State specific reporting standards: _____

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	8260C	8270D-SIM/8015M	8015M	1312, 8260C	1312, 8270	9045C	Lloyd Kahn	EPA 300.0	Notes
	VWAE-SB22-1620-1111	11/1/11	0840	G/C	SO	4	2	0	0	X	X	X	X	X	X	X	X	8oz jars composite,
	VWAE-SB22-2832-1111	11/1/11	0920	G/C	SO	4	2	0	0	X	X	X	X	X	X	X	X	all else grab
	VWAE-SB23-1620-1111	11/1/11	1020	G/C	SO	4	2	0	0	X	X	X	X	X	X	X	X	
	VWAE-SB23-2832-1111	11/1/11	1055	G/C	SO	4	2	0	0	X	X	X	X	X	X	X	X	
	VWAE-SB23P-2832-1111	11/1/11	1100	G/C	SO	4	1	0	0	X	X	X						Note: Sample ID- VWAE-SB23P-2832-1111
	VWAE-SB22-1620-1111-MS	11/1/11	0840	G/C	SO	4	1	0	0	X	X	X						Run QA/QC
	VWAE-SB22-1620-1111-SD	11/1/11	0840	G/C	SO	4	1	0	0	X	X	X						Run QA/QC
	VWAE-E801-1101 11	11/1/11	0955	G	SO	4	4	0	0	X	X	X						Note: VOAs are HCl preserved
	VWAE-TB01-1101 11	11/1/11	NA	G	SO	6	0	0	0	X		X						

☐ E-mail to _____
EDD Format _____

Relinquished by:	Received by:	Date:	Time:
Charlotte Cisneros / CH2M HILL	[signature]	11/2/11	8:40

Condition upon receipt: ☑ Iced ☐ Ambient ☐ °C 2°

175 Metro Center Boulevard • Warwick, RI 02886-1755 • 401-732-3400 • Fax 401-732-3499 • www.mitkem.com

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

Received By:

Page 01 of 01

Reviewed By: [illegible]

Log-in Date 11/02/2011

Work Order: K2257 | Client Name: CH2M Hill Inc.

Project Name/Event: CTO-0083 Vieques AOC E Soils

Remarks: (1/2) Please see associated sample/extract transfer logbook pages submitted with this data package.

		Lab Sample ID	Preservation (pH) HNO3	H2SO4	HCl	NaOH	H3PO4	VOA Matrix	Soil HeadSpace or Air Bubble > or equal to 1/4"
1. Custody Seal(s)	Present / Absent	K2257-01						F/M	
	Intact / Broken	K2257-02						F/M	
2. Custody Seal Nos.	N/A	K2257-03						F/M	
3. Traffic Reports/ Chain of Custody Records (TR/COCs) or Packing Lists	Present / Absent	K2257-04						F/M	
		K2257-05						F/M	
		K2257-06						H	
		K2257-07						F/M	
4. Airbill	AirBill / Sticker Present / Absent								
5. Airbill No.	FedEx 8763 4392 8873								
6. Sample Tags	Present / Absent								
Sample Tag Numbers	Listed / Not Listed on Chain-of-Custody								
7. Sample Condition	Intact / Broken / Leaking								
8. Cooler Temperature Indicator Bottle	Present / Absent								
9. Cooler Temperature	2 °C								
10. Does information on TR/COCs and sample tags agree?	Yes / No								
11. Date Received at Laboratory	11/02/2011								
12. Time Received	08:40								

Sample Transfer

Fraction (1) TVOA/VOA	Fraction (2) SVOA/PEST/ARO
Area #	Area #
By	By
On	On

IR Temp Gun ID:MT-1

CoolantCondition: ICE

Preservative Name/Lot No:

VOA Matrix Key:

US = Unpreserved Soil	A= Air
UA = Unpreserved Aqueous	H = HCl
M = MeOH	E = Encore
N = NaHSO4	F = Freeze

See Sample Condition Notification/Corrective Action Form Yes / No

Rad OK Yes / No

WO: K2257 / 010000455 / CWO0501 615

Sample Condition Form 6

YES NO N/A

I. PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: K2257 LAB: Spectrum Analytical

SITE NAME: Vieques CTO-83

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".

Sampled 11/1/11 Analy 11/7-11/11
Recd 11/2/11 Temp 2°C

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

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

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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. lab [✓] ___ ___

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? [ ] ___ [✓]

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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. [✓] ___

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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.

[ ] [✓] ___

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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? ✓ ___ ___

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.

3B - FORM III VOA-2

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

Matrix Spike - EPA Sample No.: VWAE-SB22-1620-1111 Level: (LOW/MED) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS %REC	#	QC. LIMITS REC.
Methyl tert-butyl ether	33.2350	0.0000	30.7287	92		75-126
1,2-Dichloroethane	33.2350	0.0000	30.5600	92		70-135
Benzene	33.2350	0.0000	30.0376	90		75-125
Xylene (Total)	99.7051	0.0000	81.5559	~~82~~	*	83-125

J/UJ

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD %REC	#	%RPD	#	QC LIMITS RPD	QC LIMITS REC.
Methyl tert-butyl ether	29.3868	24.7008	84		10		0-40	75-126
1,2-Dichloroethane	29.3868	24.0717	82		12		0-40	70-135
Benzene	29.3868	25.2929	86		5		0-40	75-125
Xylene (Total)	88.1603	65.7004	75	*	9		0-40	83-125

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 4 outside limits

Spike Recovery: 2 out of 8 outside limits

COMMENTS:

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.

	YES	NO	N/A
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			

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
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.		✓	

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.

VWAE-EB01-11011 MO⊕
VWAE-TB01-11011 MO⊕
med

VWAE-TB01-1101 xylene 2.9J (noqual)
low

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.

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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.

No TICs

11.0 Tentatively Identified Compounds (TIC) (CLP Form I/TIC Equivalent)

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.

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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

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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)

078

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%, (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.

079

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

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.

VWAE-SB23-2832-1111
VWAE-SB23P-2832-1111
no qual, per attached sheet

Dilutions — VWAE-SB23-2832-1111
VWAE-SB23P-2832-1111
VWAE-SB22-2832-1111

FIELD DUPLICATE SAMPLE SUMMARY

Sample ID: VWAE-SB23-2832-1111
Duplicate Sample ID: VWAE-SB23P-2832-1111

Water: RPD>100%
Soil: RPD>100%

Compound	Sample Conc.	Dup. Sample Conc.	%RPD
MTBE	290	370	24
benzene	1400	2200	44
xylene	110000	150000	31
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

COMMENTS: No qualifications required

* one of the results below the LOD

LOD Verification

Laboratory: Spectrum Analytical

Sample ID: VWAE-SB22-1620-1111
Compound: MTBE
Reported LOD: 1.3 ug/Kg

Compound	Blank LOD	Sample LOD	% Moisture	Sample Size	Calculated LOD
acetone	2	1.3	10	8.4	1.3

Initial Calibration Date: 11/6/2011

RRF and %RSD Calculations:

Compound Name: MTBE
Lab Value: 0.5020

Area of Compound	672829
Area of Internal STD	670031
Conc. of Internal STD	50
Conc. of Compound	100
Calculated RRF	0.502

Compound Name: benzene
Lab Value: 10.60

RRF of STD 1	0.9320
RRF of STD 2	1.2510
RRF of STD 3	1.1830
RRF of STD 4	1.1130
RRF of STD 5	1.1320
Calculated % RSD	10.60

Continuing Calibration File ID: 11/8/2011

RRF and %D Calculations:

Compound Name: 1,2-dichloroethane
Lab Value: 0.284

Area of Compound	177188
Area of Internal STD	624380
Conc. of Internal STD	50
Conc. of Compound	50
Calculated RRF	0.284

Compound Name: xylene (total)
Lab Value: 18.4

Average RRF	0.676
Calibration Check RRF	0.801
Calculated % D	-18.5

REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client : CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC E Soils

Laboratory Workorder / SDG #: K2257

SW846 8260C, VOC by GC-MS

I. SAMPLE RECEIPT

No exceptions or unusual conditions were encountered unless a Sample Condition Notification Form, or other record of communication is included with the Sample Receipt Documentation.

II. HOLDING TIMES

A. Sample Preparation:

All samples were prepared within the method-specified holding times.

B. Sample Analysis:

All samples were analyzed within the method-specified holding times.

III. METHODS

Samples were analyzed following procedures in laboratory test code: SW846 8260C

IV. PREPARATION

Aqueous Samples were prepared following procedures in laboratory test code: SW5030
Soil Samples were prepared following procedures in laboratory test code: SW5035
Soil Samples were prepared following procedures in laboratory test

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code: SW5030

V. INSTRUMENTATION

The following instrumentation was used

Instrument Code: V1
Instrument Type: GCMS-VOA
Description: HP5890 II / HP5972
Manufacturer: Hewlett-Packard
Model: 5890 / 5972
GC Column used: 30 m X 0.25 mm ID [1.40 um thickness] DB-624 capillary column.

Instrument Code: V10
Instrument Type: GCMS-VOA
Description: HP7890A
Manufacturer: Agilent
Model: 7890A / 5975C
GC Column used: 30 m X 0.25 mm ID [1.40 um thickness] DB-624 capillary column.

VI. ANALYSIS

A. Calibration:

Calibrations met the method/SOP acceptance criteria.

B. Blanks:

All method blanks were within the acceptance criteria.

C. Surrogates:

Surrogate standard percent recoveries were within the QC limits.

D. Spikes:

1. Laboratory Control Spikes (LCS):

   Percent recoveries for lab control samples were within the QC limits.

2. Matrix Spike / Matrix Spike Duplicate (MS/MSD):

Matrix spikes were performed on samples: VWAE-SB22-1620-1111 (K2257-01DMS) and VWAE-SB22-1620-1111 (K2257-01DMSD).

Percent recoveries were within the QC limits with the following exceptions:

VWAE-SB22-1620-1111 (K2257-01DMS), recovery is below criteria for Xylene (Total) at 82% with criteria of (83-125).

VWAE-SB22-1620-1111 (K2257-01DMSD), recovery is below criteria for Xylene (Total) at 75% with criteria of (83-125).

Replicate RPDs were within the QC limits.

E. Internal Standards:

Internal standard peak areas were within the QC limits.

F. Dilutions:

The following samples were analyzed at dilution:

VWAE-SB22-2832-1111 (K2257-02CDL) : Dilution Factor: 5
VWAE-SB23-2832-1111 (K2257-04CDL) : Dilution Factor: 50
VWAE-SB23P-2832-1111 (K2257-05CDL) : Dilution Factor: 50

G. Samples:

No other unusual occurrences were noted during sample analysis.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Spectrum RI, both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Signed: Agnes R Huntley

Date: 11/14/11

YES NO N/A

I. PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: K2251 TCLP LAB: Spectrum Analytical

SITE NAME: Vieques CTO-083

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".

Sampled 11/1/11 Analy 11/11/11
Recd 11/2/11 Temp 2°C

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

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.

[ ] [✓] ___

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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)

No MS/MSD

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? [ ] ___ ✓

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

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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.

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	

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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

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.

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.

[ ] [✓] ___

	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.

no qual

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.

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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.

No TICs

11.0 Tentatively Identified Compounds (TIC) (CLP Form I/TIC Equivalent)

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

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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%, (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.

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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

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.

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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.

REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client : CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC E Soils

Laboratory Workorder / SDG #: K2257

SW846 8260C, VOC by GC-MS

I. SAMPLE RECEIPT

No exceptions or unusual conditions were encountered unless a Sample Condition Notification Form, or other record of communication is included with the Sample Receipt Documentation.

II. HOLDING TIMES

A. Sample Preparation:

All samples were prepared within the method-specified holding times.

B. Sample Analysis:

All samples were analyzed within the method-specified holding times.

III. METHODS

Samples were analyzed following procedures in laboratory test code: SW846 8260C

IV. PREPARATION

Aqueous Samples were prepared following procedures in laboratory test code: SW5030
Soil Samples were prepared following procedures in laboratory test code: SW5035
Soil Samples were prepared following procedures in laboratory test

code: SW5030

V. INSTRUMENTATION

The following instrumentation was used

Instrument Code: V1
Instrument Type: GCMS-VOA
Description: HP5890 II / HP5972
Manufacturer: Hewlett-Packard
Model: 5890 / 5972
GC Column used: 30 m X 0.25 mm ID [1.40 um thickness] DB-624 capillary column.

Instrument Code: V10
Instrument Type: GCMS-VOA
Description: HP7890A
Manufacturer: Agilent
Model: 7890A / 5975C
GC Column used: 30 m X 0.25 mm ID [1.40 um thickness] DB-624 capillary column.

VI. ANALYSIS

A. Calibration:

Calibrations met the method/SOP acceptance criteria.

B. Blanks:

All method blanks were within the acceptance criteria.

C. Surrogates:

Surrogate standard percent recoveries were within the QC limits.

D. Spikes:

1. **Laboratory Control Spikes (LCS):**

   Percent recoveries for lab control samples were within the QC limits.

2. **Matrix Spike / Matrix Spike Duplicate (MS/MSD):**

No client-requested MS/MSD analyses were included in this SDG.

E. Internal Standards:

Internal standard peak areas were within the QC limits.

F. Dilutions:

The following samples were analyzed or re-analyzed at dilution:

VWAE-SB23-2832-1111 (K2257-04D-SPLP) : Dilution Factor: 5

G. Samples:

No other unusual occurrences were noted during sample analysis.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Spectrum RI, both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Signed:

Date: 11/14/11

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: K2257 LAB: Spectrum Analy

SITE NAME: Vieques GTO-083

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".

Temp 2°C

Sampled 11/1/11 Extr 11/8/11
Recd 11/2/11 Analy 11/9-10/11

2.0 Holding Times

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

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

YES NO N/A

40 days of the date of extraction.

Table of Holding Time Violations

(See Traffic Report)

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

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

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

	YES	NO	N/A
3.0 Surrogate Recovery (Form II/Equivalent)			
3.1 Have the semi volatile surrogate recoveries been listed on CLP Surrogate Recovery forms (Form II) for each of the following matrices:			
a. Low Water	[ ]	___	___
b. Low/Med Soil	[✓]	___	___
3.2 If so, are all the samples listed on the appropriate Surrogate Recovery Summary forms for each matrix:			
a. Low Water	[ ]	___	___
b. Low/Med Soil	[✓]	___	___
ACTION: If CLP deliverables are unavailable, document the effect(s) in data assessments. In some cases the lab may have to be contacted to obtain the data necessary to complete the validation.			
3.3 Were outliers marked correctly with an asterisk?	[✓]	___	___
ACTION: Circle all outliers in red.			
3.4 Were two or more base neutral OR acid surrogate recoveries out of specification for any sample or method blank (Reviewer should use lab in house recovery limits. Use surrogate recovery limits from USEPA National Functional Guidlines January 2005 page 130, if in house limits are not available. See Method 8000B-43 or 80000C-24).	[ ]	[✓]	___
Note: Examine lab in house limits for reasonableness.			
If yes, were samples re-analyzed?	[ ]	___	[✓]

only one surr - limited cmpd list - surr out due to dilution - no qual

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2M - FORM II SV-SIM2

SOIL SEMIVOLATILE SIM DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

	CLIENT SAMPLE NO.	SDMC17 (BEP)	#		TOT OUT
01	MB-62824	128			0
02	LCS-62824	129			0
03	VWAE-SB22-1620-1111	103			0
04	VWAE-SB22-1620-1111MS	102			0
05	VWAE-SB22-1620-1111MSD	81			0
06	VWAE-SB22-2832-1111	81			0
07	VWAE-SB23-1620-1111	83			0
08	VWAE-SB23-2832-1111	74			0
09	VWAE-SB23P-2832-1111	92			0
10	VWAE-SB22-2832-1111DL	0	D		1
11	VWAE-SB23-1620-1111DL	0	D		1
12	VWAE-SB23-2832-1111DL	0	D		1
13	VWAE-SB23P-2832-1111DL	0	D		1

	QC LIMITS
SDMC17 (BEP) = Benzo(e)pyrene-d12	(32-153)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D DMC diluted out

	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

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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 [ ] ___ ___

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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

____ out of ____

Solids

0 out of 4

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 2

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

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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 9.2 above. If the lab does not generate their own standard spectra, make a note in the data assessment narrative. If spectra are missing, reject all positive data.

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

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

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

	YES	NO	N/A

10.0 Tentatively Identified Compounds (TIC)

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

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

No TICs

	YES	NO	N/A
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 #.

	YES	NO	N/A
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

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

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

11.0 Compound Quantitation and Reported Detection Limits

11.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?	___	14	___

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

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

YES NO N/A

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

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

12.0 Standards Data (GC/MS)

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

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

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

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

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

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

YES NO N/A

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

ACTION: Circle all outliers in red.

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

1. "R" all non-detects;

2. "J" all positive results.

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

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

CALIBRATION CHECK COMPOUNDS

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

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YES NO N/A

Benzo(a)pyrene

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

ACTION: Circle all outliers in red.

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

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

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

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

ACTION: Circle Errors in red.

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

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

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

ACTION: If DDT percent breakdown exceeds 20%:

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

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

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

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).		✓	

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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
All attached sheet — no qual				

(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.

8F - FORM VIII SV-SIM2

SEMIVOLATILE SIM INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

EPA Sample No.(SSTD0.4##) SSTD0015F Date Analyzed: 11/09/2011

Lab File ID (Standard): S5B3221.D Time Analyzed: 12:53

Instrument ID: S5 GC Column: Rxi-5sil MS ID: 0.25 (mm)

		IS4 (PHN) AREA #	RT #	IS5 (CRY) AREA #	RT #	IS6 (PRY) AREA #	RT #
	12 HOUR STD	486992	8.298	488997	10.912	378076	12.263
	UPPER LIMIT	973984	8.798	977994	11.412	756152	12.763
	LOWER LIMIT	243496	7.798	244499	10.412	189038	11.763
	SAMPLE NO.						
01	MB-62824	715118	8.294	686764	10.907	599893	12.253
02	LCS-62824	682775	8.294	647290	10.907	590335	12.248
03	VWAE-SB22-16 20-1111	626384	8.293	544754	10.902	499863	12.248
04	VWAE-SB22-16 20-1111MS	594263	8.294	507805	10.907	470639	12.248
05	VWAE-SB22-16 20-1111MSD	588890	8.294	510983	10.907	488623	12.253
06	VWAE-SB22-28 32-1111	458420	8.303	473974	10.941	462575	12.311
07	VWAE-SB23-16 20-1111	469413	8.319	225319 *	10.964	188811 *	12.344
08	VWAE-SB23-28 32-1111	407679	8.312	458401	10.946	432941	12.306
09	VWAE-SB23P-2 832-1111	375585	8.312	479030	10.946	503700	12.311

IS4 (PHN) = Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = 200% of internal standard area

AREA LOWER LIMIT = 50% of internal standard area

RT UPPER LIMIT = +0.50 minutes of internal standard RT

RT LOWER LIMIT = -0.50 minutes of internal standard RT

limited target list -- ISTD are not assoc w/ target compds - no qual

Column used to flag values outside contract required QC limits with an asterisk.

	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?	✓		

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.

VWAE-SB23-2832-1111
" SB23P "
} No qual, See attached sheet

Dilutions → VWAE-SB22-2832-1111
SB23-1620
SB23-2832
SB23P-2832

DataQual **SVOA**

FIELD DUPLICATE SAMPLE SUMMARY

Sample ID: VWAE-SB23-2832-1111
Duplicate Sample ID: VWAE-SB23P-2832-1111

Water: RPD>100%
Soil: RPD>100%

Compound	Sample Conc.	Dup. Sample Conc.	%RPD
naphthalene	3000	3100	3
2-methylnaphthalene	4200	4500	7
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

* one or both values below LOD

COMMENTS: No qualifications required.

Initial Calibration Date: 11/9/2011

RRF and %RSD Calculations:

Compound Name: naphthalene
Lab Value: 0.751

Area of Compound	898955
Area of Internal STD	599068
Conc. of Internal STD	5
Conc. of Compound	10
Calculated RRF	0.750

Compound Name: 2-methylnaphthalene
Lab Value: 16.0

RRF of STD 1	0.553
RRF of STD 2	0.769
RRF of STD 3	0.72
RRF of STD 4	0.612
RRF of STD 5	0.539
Calculated % RSD	16.0

Continuing Calibration File ID: 11/10/2011

RRF and %D Calculations:

Compound Name: 2-methylnaphthalene
Lab Value: 0.683

Area of Compound	53843
Area of Internal STD	394218
Conc. of Internal STD	5
Conc. of Compound	1
Calculated RRF	0.683

Compound Name: naphthalene
Lab Value: 80.00

Average RRF	0.886
Calibration Check RRF	0.957
Calculated % D	-8.01

LOD Verification

Laboratory: Test America -Savanah

Sample ID: VWAE-SB22-1620-1111
Compound: 2-methylnaphthalene
Reported LOD: 3.6 ug/Kg

Compound	Blank LOD	Sample LOD	% Moisture	Sample Size	Calculated LOD
2-methylnaphthalene	3.3	3.6	10	30.4	3.6

REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client : CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC E Soils

Laboratory Workorder / SDG #: K2257

SW846 8270D SIM, SVOA by GC-MS

I. SAMPLE RECEIPT

No exceptions or unusual conditions were encountered unless a Sample Condition Notification Form, or other record of communication is included with the Sample Receipt Documentation.

II. HOLDING TIMES

A. Sample Preparation:

All samples were prepared within the method-specified holding times.

B. Sample Analysis:

All samples were analyzed within the method-specified holding times.

III. METHODS

Samples were analyzed following procedures in laboratory test code: SW846 8270D SIM

IV. PREPARATION

Soil Samples were prepared following procedures in laboratory test code: SW3550

V. INSTRUMENTATION

The following instrumentation was used

Instrument Code: S5
Instrument Type: GCMS-SEMI
Description: HP7890A / CTC LEAP
Manufacturer: Agilent
Model: 7890A / CTC LEAP
GC Column used: 30 m X 0.25 mm ID [0.25 um thickness] Rxi-5sil MS capillary column.

VI. ANALYSIS

A. Calibration:

Calibrations met the method/SOP acceptance criteria.

B. Blanks:

All method blanks were within the acceptance criteria.

C. Surrogates:

Surrogate standard percent recoveries were within the QC limits with the following exceptions. Please note that the acceptance criteria allow one surrogate recovery outside of the QC limits per fraction.

VWAE-SB22-2832-1111 (K2257-02ADL) Surrogate outside of QC limit due to dilution, recovery is below criteria for Benzo(e)pyrene-d12 at 0% with criteria of (32-153).

VWAE-SB23-1620-1111 (K2257-03ADL) Surrogate outside of QC limit due to dilution, recovery is below criteria for Benzo(e)pyrene-d12 at 0% with criteria of (32-153).

VWAE-SB23-2832-1111 (K2257-04ADL) Surrogate outside of QC limit due to dilution, recovery is below criteria for Benzo(e)pyrene-d12 at 0% with criteria of (32-153).

VWAE-SB23P-2832-1111 (K2257-05ADL) Surrogate outside of QC limit due to dilution, recovery is below criteria for Benzo(e)pyrene-d12 at 0% with criteria of (32-153).

D. Spikes:

1. Laboratory Control Spikes (LCS):

   Percent recoveries for lab control samples were within the QC limits.

2. Matrix Spike / Matrix Spike Duplicate (MS/MSD):

   Matrix spikes were performed on samples: VWAE-SB22-1620-1111 (K2257-01AMS) and VWAE-SB22-1620-1111 (K2257-01AMSD).

   Percent recoveries were within the QC limits.

   Replicate RPDs were within the QC limits.

E. Internal Standards:

Internal standard peak areas were within the QC limits with the following exceptions:

VWAE-SB23-1620-1111 (K2257-03A), Peak area is outside QC Limits for Chrysene-d12 and Perylene-d12.

Sample VWAE-SB23-1620-1111 (K2257-03A) was re-analyzed at dilution with internal standard area counts within QC criteria.

F. Dilutions:

The following samples were analyzed at dilution:

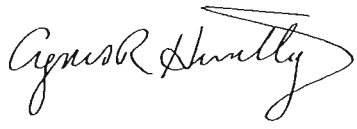
VWAE-SB22-2832-1111 (K2257-02ADL) : Dilution Factor: 50
VWAE-SB23-1620-1111 (K2257-03ADL) : Dilution Factor: 100
VWAE-SB23-2832-1111 (K2257-04ADL) : Dilution Factor: 50
VWAE-SB23P-2832-1111 (K2257-05ADL) : Dilution Factor: 50

G. Samples:

No other unusual occurrences were noted during sample analysis.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Spectrum RI, both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as

verified by the following signature.

Signed: 

Date: 11/14/11

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: K2257 TCLP LAB: Spectrum Analytical

SITE NAME: Vieques CTO-083

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".

Temp 2°C

Sampled 11/1/11 Anal 11/8-9/11
Recd Extr 11/7/11

2.0 Holding Times

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

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

YES NO N/A

40 days of the date of extraction.

Table of Holding Time Violations

(See Traffic Report)

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

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

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

	YES	NO	N/A
3.0 Surrogate Recovery (Form II/Equivalent)			
3.1 Have the semi volatile surrogate recoveries been listed on CLP Surrogate Recovery forms (Form II) for each of the following matrices:			
a. Low Water	[✓]	___	___
b. Low/Med Soil	[ ]	___	___
3.2 If so, are all the samples listed on the appropriate Surrogate Recovery Summary forms for each matrix:			
a. Low Water	[✓]	___	___
b. Low/Med Soil	[ ]	___	___
ACTION: If CLP deliverables are unavailable, document the effect(s) in data assessments. In some cases the lab may have to be contacted to obtain the data necessary to complete the validation.			
3.3 Were outliers marked correctly with an asterisk?	[✓]	___	___
ACTION: Circle all outliers in red.			
3.4 Were two or more base neutral OR acid surrogate recoveries out of specification for any sample or method blank (Reviewer should use lab in house recovery limits. Use surrogate recovery limits from USEPA National Functional Guidlines January 2005 page 130, if in house limits are not available. See Method 8000B-43 or 80000C-24).	[✓]	___	___
Note: Examine lab in house limits for reasonableness.			
If yes, were samples re-analyzed?	[ ]	[✓]	___

According to case narrative lab thought this was due to matrix effect

2H - FORM II SV-2

WATER SEMIVOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2257 Mod. Ref No.: SDG No.: SK2257

	EPA SAMPLE NO.	SDMC1 (NBZ) #	SDMC2 (FBP) #	SDMC3 (TPH) #						TOT OUT
01	MB-62791	80	78	84						0
02	LCS-62791	75	77	83						0
03	MB-62793	85	79	68						0
04	LCS-62804	78	76	74						0
05	LCSD-62804	79	77	75						0
06	VWAE-EB01-110111	82	80	79						0
07	VWAE-SB22-1620-1111	82	71	38 *	na					1
08	VWAE-SB22-2832-1111	56	13 *	9 *	JK					2
09	VWAE-SB23-1620-1111	54	12 *	12 *	JNJ					2
10	VWAE-SB23-2832-1111	58	15 *	11 *	JNJ					2
11	VWAE-SB23-1620-1111DL	53	11 D	10 D						2

			QC LIMITS
SDMC1	(NBZ)	= Nitrobenzene-d5	(40-110)
SDMC2	(FBP)	= 2-Fluorobiphenyl	(50-110)
SDMC3	(TPH)	= Terphenyl-d14	(50-135)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D DMC diluted out

som111 10.27.A

	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

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YES NO N/A

effect in data assessments.

4.0 Matrix Spikes (Form III/Equivalent)

NO MS/MSD

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 [ ] ___ ✓

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YES NO N/A

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

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

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

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

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

Water	Solids
____ out of ____	____ out of ____

YES NO N/A

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

Water Solids

____ out of ____ ____ out of ____

ACTION: Circle all outliers with red pencil.

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

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

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

5.0 Blanks (Form IV/Equivalent)

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

5.2 Frequency of Analysis:

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

5.3 Has a method blank been analyzed either after

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

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

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

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

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

6.0 Contamination

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

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

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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).

VWAE-EB01-110111 MOB

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)?	[ ]	✓	___

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	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			

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	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.

	YES	NO	N/A
9.7 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	✓		
9.8 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% (of the most abundant ion) also present in the sample mass spectrum?	✓		
9.9 Do the relative intensities of the characteristic ions in the sample agree within ± 30% of the corresponding relative intensities in the reference spectrum?	✓		

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

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

	YES	NO	N/A

10.0 Tentatively Identified Compounds (TIC)

10.1 If Tentatively Identified Compounds were required for this project, are all Form Is, Part B present; and do listed TICs include scan number or retention time, estimated concentration and "JN" qualifier? No TIC

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).

	YES	NO	N/A
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 #.

	YES	NO	N/A
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

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	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?	[✓]	___	___

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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? [✓] ___ ___

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YES NO N/A

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

ACTION: Circle all outliers in red.

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

1. "R" all non-detects;

2. "J" all positive results.

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

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

CALIBRATION CHECK COMPOUNDS

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

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YES NO N/A

Benzo(a)pyrene

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

ACTION: Circle all outliers in red.

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

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

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

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

ACTION: Circle Errors in red.

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

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

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

ACTION: If DDT percent breakdown exceeds 20%:

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

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

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

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

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

_____

_____

_____

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

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

YES NO N/A

ACTION: Circle errors in red.

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

15.0 Internal Standards (Form VIII)

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

ACTION: List each outlying internal standard below.

Sample ID	IS #	Area	LowerLimit	Upper Limit

(Attach additional sheets if necessary.)

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

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

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

YES NO N/A

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

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

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

16.0 Laboratory Control Samples (LCS)

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

no MS/MSD

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

no MS/MSD

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

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

17.0 Field Duplicates

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

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.

Dilutions → VWAE-SB23-1620-1111

Initial Calibration Date: 11/8/2011

RRF and %RSD Calculations:

Compound Name: naphthalene
Lab Value: 0.964

Area of Compound	566636
Area of Internal STD	293989
Conc. of Internal STD	40
Conc. of Compound	80
Calculated RRF	0.964

Compound Name: 2-methylnaphthalene
Lab Value: 9.5

RRF of STD 1	0.927
RRF of STD 2	0.757
RRF of STD 3	0.742
RRF of STD 4	0.722
RRF of STD 5	0.758
RRF of STD 6	0.782
Calculated % RSD	9.5

Continuing Calibration File ID: 11/9/2011

RRF and %D Calculations:

Compound Name: 2-methylnaphthalene
Lab Value: 0.757

Area of Compound	113856
Area of Internal STD	240734
Conc. of Internal STD	40
Conc. of Compound	25
Calculated RRF	0.757

Compound Name: naphthalene
Lab Value: 0.5

Average RRF	0.986
Calibration Check RRF	0.991
Calculated % D	-0.5

SAMPLE CALCULATION

Sample ID: VWAE-SB22-2832-1111
Standard ID: 11/8/2011
Compound: naphthalene
Concnetration: 49 ug/L

	Water (ug/L)	Soil (ug/Kg)
Area of Compound	386233	
Area of Internal STD	322691	
Conc. of Internal (ng)	40	2
RRF of Compound	0.986	
Final Volume	1000	1000
Dilution Factor	1	1
GPC Factor	NA	1
Injection Volume	1	1
Weight of Sample	NA	
Initial Volume of Sample	1000	
% Moisture	NA	
Concentration	48.56	#DIV/0!

	RT of Internal STD	RT of Compound	RRT
Sample	5.329	5.347	1.003
Standard	5.335	5.346	1.002

REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client : CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC E Soils

Laboratory Workorder / SDG #: K2257

SW846 8270D, SVOA by GC-MS

I. SAMPLE RECEIPT

No exceptions or unusual conditions were encountered unless a Sample Condition Notification Form, or other record of communication is included with the Sample Receipt Documentation.

II. HOLDING TIMES

A. Sample Preparation:

All samples were prepared within the method-specified holding times.

B. Sample Analysis:

All samples were analyzed within the method-specified holding times.

III. METHODS

Samples were analyzed following procedures in laboratory test code: SW846 8270D

IV. PREPARATION

Aqueous Samples were prepared following procedures in laboratory test code: SW3510

V. INSTRUMENTATION

The following instrumentation was used

Instrument Code: S6
Instrument Type: GCMS-Semi
Description: HP7890A
Manufacturer: Agilent
Model: 7890A/5973
GC Column used: 30 m X 0.25 mm ID [0.25 um thickness] Rxi-5sil MS capillary column.

VI. ANALYSIS

A. Calibration:

Calibrations met the method/SOP acceptance criteria.

B. Blanks:

All method blanks were within the acceptance criteria.

C. Surrogates:

Surrogate standard percent recoveries were within the QC limits with the following exceptions. Please note that the acceptance criteria allow one surrogate recovery outside of the QC limits per fraction.

VWAE-SB22-1620-1111 (K2257-01B-SPLP), recovery is below criteria for Terphenyl-d14 at 38% with criteria of (50-135).

VWAE-SB22-2832-1111 (K2257-02A-SPLP), recovery is below criteria for 2-Fluorobiphenyl at 13% with criteria of (50-110) and Terphenyl-d14 at 9% with criteria of (50-135).

VWAE-SB23-1620-1111 (K2257-03ADL-SPLP) Surrogate outside of QC limit due to dilution, recovery is below criteria for 2-Fluorobiphenyl at 11% with criteria of (50-110) and Terphenyl-d14 at 10% with criteria of (50-135).

VWAE-SB23-1620-1111 (K2257-03A-SPLP), recovery is below criteria for 2-Fluorobiphenyl at 12% with criteria of (50-110) and Terphenyl-d14 at 12% with criteria of (50-135).

VWAE-SB23-2832-1111 (K2257-04A-SPLP), recovery is below criteria for 2-Fluorobiphenyl at 15% with criteria of (50-110) and

Terphenyl-d14 at 11% with criteria of (50-135).

Please note that samples VWAE-SB22-2832-1111 (K2257-02A-SPLP), VWAE-SB23-1620-1111 (K2257-03A-SPLP) and VWAE-SB23-2832-1111 (K2257-04A-SPLP) and two base neutral surrogates outside of QC limits. The analyst had notes that these three samples had severe emulsions and were difficult to filter. The method blank and laboratory control samples has acceptable surrogate recoveries. As this is apparent matrix interference, the laboratory did not re-extract these samples.

Please note only Nitrobenzene-d5 recovery should be used for evaluation since the only compounds reported for these samples are Naphthalene and 2-Methylnaphthalene.

D. Spikes:

1. Laboratory Control Spikes (LCS):

   Percent recoveries for lab control samples were within the QC limits.

2. Matrix Spike / Matrix Spike Duplicate (MS/MSD):

   No client-requested MS/MSD analyses were included in this SDG.

E. Internal Standards:

Internal standard peak areas were within the QC limits.

F. Dilutions:

The following sample was analyzed at dilution:

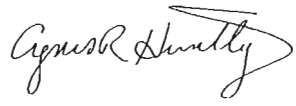
VWAE-SB23-1620-1111 (K2257-03ADL-SPLP) : Dilution Factor: 2

G. Samples:

No other unusual occurrences were noted during sample analysis.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Spectrum RI, both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as

verified by the following signature.

Signed: 

Date: 11/14/11

This SDG contains DRO results SW-846 method 8015D. Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Holding Times

Sampling Date: 11/1/11
Received Date: 11/2/11
Preparation Date: 11/4-8/11
Analysis Dates: 11/9/11(soil) & 11/11/11 (H2O)

7-day water or 14 day soil sample holding time was applied based on SW-846 recommendation, cooler temps *were/were not* acceptable. Appropriate preservation *was/was not* used.

All sample extraction and analysis holding time requirements ***were/were not*** met for all samples in this SDG. Qualifications needed: NONE

Calibrations

____6_____-point calibration curves were analyzed for both the target and the surrogate compound on the __1___ instrument(s) used to analyze these samples. The CFs and %RSD's were calculated and ***did/did not*** meet criteria for both the target the surrogate compound. Continuing calibration standards *were/were not* analyzed per the method. All %Ds ***were/were not*** within QC limits in all CCVs. These samples were analyzed on __1__instrument(s) and __1___ sequence(s). Qualifications needed:

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- **Sample weight, volume or dilution factor must be taken into consideration when applying criteria.**
- Apply the same data validation guidelines to any associated method, trip, rinse and field blanks and all associated samples.
- Qualification/Action codes:
  - U - The blank contamination concentration is ≤ RL or > RL and sample result is < RL. Result is qualified as U at the RL.
  - U - The blank contamination concentration is >RL and sample result >RL but < blank contamination concentration. Result is qualified as U at reported concentration.
  - NA The sample is greater than the RL when the blank contamination concentration is < RL or the sample result is greater than the blank contamination concentration when the blank contamination concentration is >RL.

Please note: the LOD = RL for this project.

Blank Contamination and Qualification Summaries

Blank ID	Compound	Concentration	LOD
no contamination noted			

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

Sample ID	Compound	Q Flag
no qualifications were required		

Surrogate Recoveries Summary

All surrogate recoveries ***were/were not*** acceptable in these samples. Qualifications needed: NONE

Matrix Spike/Matrix Spike Duplicate Summary

The MS/MSD pair submitted in this SDG exhibited acceptable/unacceptable recoveries and RPDs. LCS recoveries *were/were not* acceptable. Qualifications needed.

Field Duplicate Sample Summary

Sample ID: VWAE-SB23-2832-1111 Duplicate Sample ID: VWAE-SB23P-2832-1111

Compound	Sample Conc.	Duplicate Conc.	RPD
DRO	2800	1700	49%
ORO	2700	2000	30%

Comments: Flag DRO as estimated in both samples (>30% RPD).

Sample Result Verification

Specific Comments:

The samples required manual integration for the target compounds due to the nature of the compounds (multi-component). Positive results were reported in the field soil samples Raw data and quantitation calculations were verified.

Reviewer HCleveland Date: 12-8-11 Results received 12/12/11 JAC

TPH/ORO

TPP - DP

K2257-01A (page 49 of 92)

28) DRO TPH area $\frac{11768751 \checkmark}{11672875 \checkmark} \times \frac{40}{0.930} = 433.64$ on col

IS area

(RF from pg 12 of 92)

$433.64 \times \frac{1 mL}{30.1 g \times 0.895}$ = 16.09 $\frac{ug}{g}$ ($\frac{mg}{kg}$)

~~Percent solids~~

(26.94g) dry wt

Initial Calibration Date: 5/20/11 on instrument F1
RRF and %RSD Calculations:
Compound Name: dro C10 TO C28 in Level 3
Lab Value: 0.9230

Area of Compound	173750855
Conc. of Compound	500
Area of Internal Standard	15053093
Conc. of Internal Standard	40
Calculated RF	0.9234

Compound Name: DRO (C10-C28)
Lab Value: 2.03

RF of STD 1	0.9650
RF of STD 2	0.9180
RF of STD 3	0.9234
RF of STD 4	0.9450
RF of STD 5	0.9040
RF of STD 6	0.9350
RF of STD 7	
Calculated % RSD	2.31

*DIFFERENCE IS DUE TO ROUNDING OF
RESPONSE FACTORS TO 3 SD BY THE LAB.
NO IMPACT ON RESULTS.

Continuing Calibration File ID: TPH F CCAL L5 100 PPM, 11/9/11, 1743
RRF and %D Calculations: FILE ID 111109A.B\F1H7071.D
Compound Name: ORO - C29 TO C40
Lab Value: 0.890

Area of Compound	478930419
Conc. of Compound	1400
Area of Internal Standard	15370106
Conc. of Internal Standard	40
Calculated RF	0.8903

Compound Name: ORO
Lab Value: 3.9

Average RF	0.9260
Calibration Check RF	0.8900
Calculated % D	3.9

SAMPLE CALCULATION

Sample ID: VWAE-SB22-2832-1111
Standard ID: ICAL, 5/20/11, F1
Compound: DRO
Concentration: 2100 mg/Kg

	Water (mg/L)	Soil (mg/Kg)
Area of Compound		2002095047
RF of Compound		0.930
Area of Internal Standard		14961216
Conc. Of Internal Standard		40
Final Volume		1
Dilution Factor		10
GPC Factor	NA	1
Injection Volume		1
Weight of Sample	NA	30
Initial Volume of Sample		NA
% Solids Factor	NA	0.89221
Concentration	#DIV/0!	2150.337

REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client : CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC E Soils

Laboratory Workorder / SDG #: K2257

SW846 8015D TPH, Total Petroleum Hydrocarbons (TPH) by GC-FID

I. SAMPLE RECEIPT

No exceptions or unusual conditions were encountered unless a Sample Condition Notification Form, or other record of communication is included with the Sample Receipt Documentation.

II. HOLDING TIMES

A. Sample Preparation:

All samples were prepared within the method-specified holding times.

B. Sample Analysis:

All samples were analyzed within the method-specified holding times.

III. METHODS

Samples were analyzed following procedures in laboratory test code: SW846 8015D TPH

IV. PREPARATION

Aqueous Samples were prepared following procedures in laboratory test code: SW3510
Soil Samples were prepared following procedures in laboratory test code: SW3550

V. INSTRUMENTATION

The following instrumentation was used

Instrument Code: F1
Instrument Type: GC-FID
Description: HP6890
Manufacturer: Hewlett-Packard
Model: 6890
GC Column used: 30 m X 0.32 mm ID [0.25 um thickness] Rtx-5MS capillary column.

VI. ANALYSIS

A. Calibration:

Calibrations met the method/SOP acceptance criteria.

B. Blanks:

All method blanks were within the acceptance criteria.

The following analytes were detected below the reporting limit in method blanks associated with these samples:

MB-62727 in batch 62727, Detected above the Method Detection Limit but below the Reporting Limit for Extractable Total Petroleum Hydrocarbon.

MB-62825 in batch 62825, Detected above the Method Detection Limit but below the Reporting Limit for Extractable Total Petroleum Hydrocarbon.

C. Surrogates:

Surrogate standard percent recovery was within the QC limits.

D. Spikes:

1. Laboratory Control Spikes (LCS):

   Percent recoverys for lab control samples was within the QC limits.

2. Matrix Spike / Matrix Spike Duplicate (MS/MSD):

Matrix spikes were performed on samples: VWAE-SB22-1620-1111 (K2257-01AMS) and VWAE-SB22-1620-1111 (K2257-01AMSD).

Percent recovery was within the QC limits.

Percent RPD were within the QC limits.

E. Dilutions:

The following samples were analyzed at dilution:

VWAE-SB22-2832-1111 (K2257-02A) : Dilution Factor: 10
VWAE-SB23-1620-1111 (K2257-03A) : Dilution Factor: 10
VWAE-SB23-2832-1111 (K2257-04A) : Dilution Factor: 10
VWAE-SB23P-2832-1111 (K2257-05A) : Dilution Factor: 10

F. Samples:

No other unusual occurrences were noted during sample analysis.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Spectrum RI, both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Signed: Agnes R Huntley

Date: 11/14/11

Jacqueline Cleveland

From: Edward Lawler [Warwick] [elawler@mitkem.com]
Sent: Friday, December 09, 2011 3:22 PM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com; DataQual Environmental Services, LLC; Hillary.Ott@CH2M.com
Subject: RE: Vieques AOC E Questions

Hi Jackie—

Here is the explanation (as I understand it).

That sample was extracted using a 30.5g aliquot, while the RLs were set using an assumed 30.0g aliquot. So the calculation goes like this:

7 * 10 * 30.0 / 30.5 * 0.8922056 = 77.1710 = 77 rounded.

(RL) * (dilution) * (30g "assumed" aliquot) / (actual soil aliquot) * (percent solids)

For the DRO for this sample, the numbers go like this:
5758.512 * 10 / 30.5 * 0.8922056 = 2116.14 = 2100 rounded.

(on-column GC result) * (dilution factor) / (actual soil aliquot) * (percent solids).

Hope this helps.

Let me know if you need anything else.

--Ed

From: Jacqueline Cleveland [mailto:cleve137@charter.net]
Sent: Friday, December 09, 2011 3:23 PM
To: Edward Lawler [Warwick]
Cc: Michael.Zamboni@CH2M.com; 'DataQual Environmental Services, LLC'; Hillary.Ott@CH2M.com
Subject: RE: Vieques AOC E Questions

Hi Ed,

That is what I expected, but it still rounds to 78 not to 77...will you verify? I don't think I am missing anything, but maybe I am. Two of the soil samples seem to be rounding incorrectly.

Jackie

From: Edward Lawler [Warwick] [mailto:elawler@mitkem.com]
Sent: Friday, December 09, 2011 9:36 AM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com; DataQual Environmental Services, LLC; Hillary.Ott@CH2M.com
Subject: RE: Vieques AOC E Questions

Hi Jackie—

The LIMS does these calculations, but it uses the full value (unrounded) of each component of the calculation, and rounds the final value as the last step. For example, the %moisture for this sample is 10.77944, so the percent solids is 89.22056.

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--Ed

From: Jacqueline Cleveland [mailto:cleve137@charter.net]
Sent: Thursday, December 08, 2011 7:23 PM
To: Edward Lawler [Warwick]
Cc: Michael.Zamboni@CH2M.com; 'DataQual Environmental Services, LLC'; Hillary.Ott@CH2M.com
Subject: RE: Vieques AOC E Questions
Importance: High

Hi Ed,

Would you verify the adjusted LOD/LOQ values for the DRO/ORO package. The values for a couple of the samples look like they were rounded down when they should have been rounded up...it may be just the way your LIMS systems does rounding. I just need to double check. For example-for sample VWAE-SB22-2832-1111 (K2257-02) the uncorrected LOQ for DRO is 7 – so taking the DL and %solids into consideration, I calculated as follows: (7*10)/0.892 = 78 and you reported 77. I am having the same issue for the GRO samples (adding the sample size into the mix as well). Thanks for checking on this too!

Jackie

From: Edward Lawler [Warwick] [mailto:elawler@mitkem.com]
Sent: Thursday, December 08, 2011 3:38 PM
To: Jacqueline Cleveland
Subject: RE: Vieques AOC E Questions

Hi Jackie—

Here are answers to a couple of your questions...

Two of the attached files are our percent moisture/solids data—as a report and as the original Excel file.

The other PDF file is our VOA analysis soil prep logbook pages. This includes the actual soil weights for both the GRO analysis (first page of the PDF file, page 38 of the logbook) as well as the 8260 analyses.

I'll get the example calculations probably tomorrow.

--Ed

From: Jacqueline Cleveland [mailto:cleve137@charter.net]
Sent: Thursday, December 08, 2011 4:33 PM
To: Edward Lawler [Warwick]
Cc: Michael.Zamboni@CH2M.com; 'DataQual Environmental Services, LLC'; Hillary.Ott@CH2M.com
Subject: RE: Vieques AOC E Questions

Thank you Ed! I appreciate your quick response.

Jackie

From: Edward Lawler [Warwick] [mailto:elawler@mitkem.com]
Sent: Thursday, December 08, 2011 2:24 PM
To: Jacqueline Cleveland

Cc: Michael.Zamboni@CH2M.com; DataQual Environmental Services, LLC; Hillary.Ott@CH2M.com
Subject: RE: Vieques AOC E Questions

Hi Jackie—

I'll try to get this information to you tomorrow (Friday). Hopefully that will allow you sufficient time to get it done by COB Monday.

I can say the data for all soils for GRO and TPH/ORO are reported on a dry weight corrected basis. Other than that, I've got to get into the report to get you more information.

We have another similar report we are just about to finalize—I'll be sure we include that type of info in this report.

-_Ed

From: Jacqueline Cleveland [mailto:cleve137@charter.net]
Sent: Thursday, December 08, 2011 2:53 PM
To: Edward Lawler [Warwick]
Cc: Michael.Zamboni@CH2M.com; 'DataQual Environmental Services, LLC'; Hillary.Ott@CH2M.com
Subject: Vieques AOC E Questions
Importance: High

Mr. Lawler,

Hello! I would like to request a few things for the CH2M Vieques data packages for TPH (DRO/ORO) & GRO for Lab work order number K2257.

First, please provide calculation examples for a soil sample for both the GRO and the TPH (DRO/ORO) data packages. I was unable to reproduce reported results. Secondly, are the %solids values present in the data packages anywhere? I am not seeing them on the report forms but I believe the results are being reported on a dry weight basis. Please direct me to the values used for %solids. Thirdly, in the GRO package the injection log notes only volumes for these soil samples. Please provide something that indicates the exact amount of soil used for each sample.

I am trying to complete this validation report by the end of the day on Monday, at the latest. Please let me know if I can expect a response from you in time to make that possible. Thank you so much for your help!

Jackie

Jacqueline Cleveland
Vice-President
DataQual, ES, LLC
636-352-9391
cleve137@charter.net

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This SDG contains GRO results SW-846 method 8015D. Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Sampling Date: 11/1/11
Received Date:
Preparation Date: NA
Analysis Dates: 11/8/11

Holding Times

14-day water or soil analysis holding time was applied based on SAP, cooler temps *were/were not* acceptable.
Appropriate preservation *was/was not* used.

All sample extraction and analysis holding time requirements *were/were not* met for all samples in this SDG. Qualifications needed:

Calibrations

_____5____-point calibration curves were analyzed for both the target and the surrogate compound on the __1 (V4)_ instrument(s) used to analyze these samples. The CFs and %RSD's were calculated and ***did/did not*** meet criteria for both the target and the surrogate compound. Continuing calibration standards ***were/were not*** analyzed per the method. All %Ds ***were/were not*** within QC limits in all CCVs. These samples were analyzed on __1__instrument(s) and __1___ sequence(s). Qualifications needed: **None** based on calibration criteria.

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- **Sample weight, volume or dilution factor must be taken into consideration when applying criteria.**
- Apply the same data validation guidelines to any associated method, trip, rinse and field blanks and all associated samples.
- Qualification/Action codes:
  - U - The blank contamination concentration is ≤ RL or > RL and sample result is < RL. Result is qualified as U at the RL.
  - U - The blank contamination concentration is >RL and sample result >RL but < blank contamination concentration. Result is qualified as U at reported concentration.
  - NA The sample is greater than the RL when the blank contamination concentration is < RL or the sample result is greater than the blank contamination concentration when the blank contamination concentration is >RL.

Please note: the LOD = RL for this project.

Blank Contamination and Qualification Summaries

Blank ID	Compound	Concentration	LOD
No contamination noted.			

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

Sample ID	Compound	Q Flag
No qualifications were required		

Surrogate Recoveries Summary

All surrogate recoveries *were/were not* acceptable in these samples. Qualifications needed: **NONE**

Matrix Spike/Matrix Spike Duplicate Summary

The MS/MSD pair submitted in this SDG exhibited acceptable/unacceptable recoveries and RPD. LCS recoveries *were/were not* acceptable. Qualifications needed: **NONE**

Field Duplicate Sample Summary

Sample ID: VWAE-SB23-2832-1111 Duplicate Sample ID: VWAE-SB23P-2832-1111

Compound	Sample Conc.	Duplicate Conc.	RPD
GRO	950000	890000	6.5%

Comments:

Sample Result Verification

Specific Comments:

Raw data was verified. *The samples required manual integration for the surrogate compound & target compound. Positive results were reported in the field samples and the submitted field QC blanks (rinse & trip) were clean.* Raw data and quantitation calculations were verified. See the following pages.

Reviewer JACleveland Date: 12-12-11

REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client : CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC E Soils

Laboratory Workorder / SDG #: K2257

SW846 8015D GRO, Gasoline Range Organic (GRO) by GC-FID

I. SAMPLE RECEIPT

No exceptions or unusual conditions were encountered unless a Sample Condition Notification Form, or other record of communication is included with the Sample Receipt Documentation.

II. HOLDING TIMES

A. Sample Preparation:

All samples were prepared within the method-specified holding times.

B. Sample Analysis:

All samples were analyzed within the method-specified holding times.

III. METHODS

Samples were analyzed following procedures in laboratory test code: SW846 8015D GRO

IV. PREPARATION

Aqueous Samples were prepared following procedures in laboratory test code: SW5030
Soil Samples were prepared following procedures in laboratory test code: SW5035

F. Dilutions:

The following samples were analyzed at dilution:

VWAE-SB22-2832-1111 (K2257-02E) : Dilution Factor: 250
VWAE-SB23-1620-1111 (K2257-03E) : Dilution Factor: 16
VWAE-SB23-2832-1111 (K2257-04E) : Dilution Factor: 20
VWAE-SB23P-2832-1111 (K2257-05E) : Dilution Factor: 20

G. Samples:

No other unusual occurrences were noted during sample analysis.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Spectrum RI, both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Signed: Agnes R Huntley

Date: 11/14/11

Initial Calibration Date: 5/17/2011 on instrument V4
RRF and %RSD Calculations:

Compound Name: gro in level 4
Lab Value: 46920.0000

Area of Compound	93849135
Conc. of Compound	2000
Calculated RF	46924.5675

Compound Name: GRO
Lab Value: 18.17

RF of STD 1	46700
RF of STD 2	47870
RF of STD 3	46940
RF of STD 4	46920
RF of STD 5	67910
RF of STD 6	
RF of STD 7	
Calculated % RSD	18.17

Continuing Calibration File ID: V4D6417.D
RRF and %D Calculations: 5 ML, VSTD0504K

Compound Name: GRO
Lab Value: 48578.000

Area of Compound	24288775
Conc. of Compound	500
Calculated RF	48577.5500

Compound Name: GRO
Lab Value: 5.2

Average RF	51268.0000
Calibration Check RF	48578.0000
Calculated % D	5.2

VWAE-SB22-2832-1111

K2257-02

GRO 1800000 ug/kg

% Solids - 89.229 % [6]

% moisture - 10.78 % [4]

dilution factor - 25 [3]

sample wt - 4.5g [5]

Adjusted volume : 5mL * [(0.1078)(4.5)] mL [1]

Purge volume: 5mL

100mL extract to 5mL [2]

area 53000119

~~RF~~ 51270

$$\frac{53000119 \text{ area}}{51270 \text{ area}/\text{ug/L}} = 1033.745257 \text{ ug/L} * 0.005\text{L} \quad [1]$$

$$= \frac{5.1687 \text{ ug}}{0.1 \text{ mL}} \; [2] = 51.687 \text{ ug/mL} * 25 \; [3] = 1292 \text{ ug/mL}$$

$$\frac{(1292 \text{ ug/mL})(5\text{mL} + [(0.1078)(4.5)]\text{mL})}{(4.5\text{g})(.89229)} \; [4] \; [5] \; [5] \; [6] = 1765 \text{ ug/g}$$

$$1765 \text{ ug/g} \left(\frac{1000\text{g}}{1\text{kg}}\right) = 1{,}765{,}000 \text{ ug/kg}$$

Rounded to 2 sig figs = 1800000 ug/kg

Appendix D
Cost Estimate for Alternatives

Alternative 1 - No Action

(Accuracy Range: +50% / -30%)

Site: AOC E, Former Naval Ammunition Support Detachment (NASD) Base Year: 2012
Location: Vieques, Puerto Rico Date: Jan. 2012
Phase: Feasibility Study (FS)
Alternative Description: No action to monitor the groundwater conditions; with periodic five-year reviews for 30 years

Description	Quantity	Unit	$/Unit	Total Cost	Notes
(1) CONSTRUCTION COST	1	LS	$0	$0	NA
(2) DESIGN&CM&PM	1	LS	$0	$0	NA
(3) ANNUAL O&M COST					
Annual O&M Cost	1	LS	$0	$0	NA
O&M Subtotal Cost (NPV)				**$0**	
(4) PERIODIC COST					
4.1 Community Involvement and Notification	16	HR	$125	$2,000	EPA 5-year review process
4.2 Document Review and Analysis	30	HR	$125	$3,750	EPA 5-year review process
4.3 Interviews	20	HR	$125	$2,500	EPA 5-year review process
4.4 Site Inspection	40	HR	$125	$5,000	EPA 5-year review process (2-people, 1-day; including travel)
4.5 Five-Year-Review Report Prepara	100	HR	$125	$12,500	EPA 5-year review process
4.6 Airfare and Lodging	1	LS	$1,800	$1,800	2-person 1 night
4.7 Project Management	1	LS	$4,133	$4,133	15%
Five-Year-Review Periodic Cost				**$32,000**	

Year	Periodic Cost	Discount Factor	NPV Cost	
0	$ -	1.00	$ -	Year 2012
5	$ 32,000	0.91	$ 29,126	5-year review report
10	$ 32,000	0.74	$ 23,811	5-year review report
15	$ 32,000	0.60	$ 19,100	5-year review report
20	$ 32,000	0.47	$ 14,888	5-year review report
25	$ 32,000	0.38	$ 12,004	5-year review report
30	$ 32,000	0.29	$ 9,314	5-year review report
Total Periodic Cost (NPV)			**$ 109,000**	

(5)TOTAL PROJECT COST (NPV in 2012 $)	**$109,000**	Based on OMB discount rate of 4% for 30 years

Note:
This estimate has been developed and provided as an Order of Magnitude Estimate (ROM)/Budgetary Estimate and as such is suitable for the purpose of budget development and/or planning only. This estimate is offered as an opinion of cost to perform the work and is not an offer to contract for construction services, procure and/or provide such services.

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Alternative 2 - Groundwater Monitoring and ICs

(Accuracy Range: +50% / -30%)

Site: AOC E, Former Naval Ammunition Support Detachment (NASD) — Base Year: 2012
Location: Vieques, Puerto Rico — Date: July, 2012 (revision)
Phase: Feasibility Study (FS)
Alternative Description:

- Annual monitoring of three source area monitoring wells (MW-01, MW-04, and MW-05) for persulfate and pH (estimated to be for 3 years) until persulfate concentrations naturally attenuate to 500 mg/L or below;
- Annual performance sampling of 8 site monitoring wells (MW-1 through MW-8) for COCs for 3 years after persulfate concentrations are at or below 500 mg/L to verify no rebound;
- Five-Year Review for 10 years.
- If the persulfate concentration is still above 500 mg/L after 3 years, proceed to Contingency Plan CP-1 (See sheet CP-1).
- If COC rebound is observed at the end of 3 years of annual performance sampling, proceed to the Contingency Plan CP-2 (See sheet CP-2).

Description	Quantity	Unit	$/Unit	Total Cost	Notes
(1) WORK PLANNING AND IC					
1.1 Preparation of UFP SAP	1	LS	$30,000	$30,000	Estimate
1.2 Deed and boundary survey	1	LS	$6,000	$6,000	Estimate
1.3 Prepare deed recordation document	1	LS	$8,000	$8,000	Estimate
Subtotal 1				$44,000	
CONTINGENCY	20%			$8,800	EPA July 2000 guidance
SUBTOTAL - CONSTRUCTION COST				**$53,000**	
(2) DESIGN&CM&PM					
2.1 Project Management	8%		$53,000	$4,240	EPA July 2000 guidance page 5-13
2.2 Remedial Design	15%			$0	NA
2.3 Construction Management	10%			$0	NA
2.4 General&Administration (G&A)	9.2%			$0	NA
2.5 Pollution Liability Insurance	2%			$0	NA
2.6 Payment & Performance Bond	2.5%			$0	NA
2.7 Fee	8%		$53,000	$4,240	market price
2.8 Tax	7%		$53,000	$3,710	Puerto Rico tax
Subtotal 2				**$13,000**	
Total Capital Cost				**$66,000**	
(3) GW MONITORING COST					
3a. PERSULFATE PERSISTENCE MONITORING COST (first 3 years)					Year 1 - Year 3
3.1 Annual groundwater sampling and gauging (labor)	40	hrs	$100	$4,000	sampling up to 4 existing wells; Groundwater level measurement of 8 wells; 2-people sampling team (first 3 years); 1 day working 1 day travel
3.2 Sampling equipment	2	Days	$500	$1,000	Equipment rental (pump, generator, YSI Multiparameter probe and disposables)
3.3 Travel by air	1	LS	$1,500	$1,500	2 people
3.4 Lodging Per Diem	2	Days	$103	$206	2 people, 1 night
3.5 Meal Per Diem	4	Days	$57	$228	2 people, 1work day and 1 travel day
3.6 Car rental and fuel	2	Days	$150	$300	1 car for 2 people
3.7 Groundwater analytical cost	1	LS	$200	$200	4 wells for persulfate and pH; $15/sample by CHEMets field test kit for persulfate; $10 pH /sample, plus some contingency field analyses
3.8 Monitoring report	1	LS	$10,000	$10,000	Estimate
Subtotal 3a				$17,434	
CONTINGENCY	20%			$3,487	
Annual Persulfate Persistence Monitoring Costs				$21,000	Year 1 - Year 3
GW Monitoring Subtotal Cost (NPV)				**$59,000**	discount rate of 4% for Year 1 - Year 3
3b. ISCO PERFORMANCE MONITORING COST (Assumes additional 3 Years)					Year 4 - Year 6
3.9 Annual groundwater sampling and gauging (labor)	60	hrs	$100	$6,000	sampling of 8 existing wells; Groundwater level measurement; 2-person sampling team; 2 days of sampling and 1 day travel
3.10 Sampling equipment	3	Days	$500	$1,500	Equipment rental (pump, generator, YSI Multiparameter probe and disposables, including shipment)
3.11 Travel by air	1	LS	$1,500	$1,500	2 persons
3.12 Lodging Per Diem	4	Days	$103	$412	2 person 2 nights
3.13 Meal Per Diem	6	Days	$57	$342	2 person 3 work days including 1 travel day
3.14 Car rental and fuel	3	Days	$150	$450	2 persons, 3 days;1 car for 2 people

Alternative 2 - Groundwater Monitoring and ICs

(Accuracy Range: +50% / -30%)

Site: AOC E, Former Naval Ammunition Support Detachment (NASD) — Base Year: 2012
Location: Vieques, Puerto Rico — Date: July, 2012 (revision)
Phase: Feasibility Study (FS)
Alternative Description:

- Annual monitoring of three source area monitoring wells (MW-01, MW-04, and MW-05) for persulfate and pH (estimated to be for 3 years) until persulfate concentrations naturally attenuate to 500 mg/L or below;
- Annual performance sampling of 8 site monitoring wells (MW-1 through MW-8) for COCs for 3 years after persulfate concentrations are at or below 500 mg/L to verify no rebound;
- Five-Year Review for 10 years.
- If the persulfate concentration is still above 500 mg/L after 3 years, proceed to Contingency Plan CP-1 (See sheet CP-1).
- If COC rebound is observed at the end of 3 years of annual performance sampling, proceed to the Contingency Plan CP-2 (See sheet CP-2).

Description	Quantity	Unit	$/Unit	Total Cost	Notes
3.15 Groundwater analytical cost	11	EA	$275	$3,025	sampling of 8 existing wells for 4 VOCs and 2 SVOCs (including 1 FD, 1 EB, 1 TB; assuming 1 MS/MSD non billable) equal to 11 samples /event; $75/VOC; $200/SVOC
3.16 Monitoring report	1	LS	$15,000	$15,000	Estimate for 1 annual report
Subtotal 3b				$28,229	
CONTINGENCY	20%			$5,646	
Annual ISCO Performance Monitoring Cost				$34,000	Year 4 - Year 6
ISCO Performance Monitoring Cost (NPV)				**$84,000**	discount rate of 4% for Year 4 to Year 6
Total GW Monitoring Cost (NPV)				**$143,000**	Year 1 - Year 6
(4) FIVE-YEAR-REVIEW PERODIC COST					
4.1 Community Involvement and Notification	16	HR	$125	$2,000	EPA 5-year review process
4.2 Document Review and Analysis	30	HR	$125	$3,750	EPA 5-year review process
4.3 Interviews	20	HR	$125	$2,500	EPA 5-year review process
4.4 Site Inspection	40	HR	$125	$5,000	EPA 5-year review process (2-people, 1-day; including travel)
4.5 Five-Year-Review Report Preparation	100	HR	$125	$12,500	EPA 5-year review process
4.6 Airfare and Lodging	1	LS	$1,800	$1,800	2-people 1 night
4.7 Project Management	1	LS	$4,133	$4,133	15%
Five-Year-Review Periodic Cost				**$32,000**	

	Year	Periodic Cost	Discount Factor	NPV Cost	
	0	$ -	1.00	$ -	Year 2012
	5	$ 32,000	0.82	$ 26,302	5-year review report
	10	$ 32,000	0.74	$ 23,811	5-year review report
Five-Year-Review Periodic Cost (NPV)				**$ 51,000**	
Total Periodic Cost (NPV)				**$ 194,000**	
(5) TOTAL PROJECT COST (NPV in 2012 $)				**$260,000**	Based on discount of 4%

Note:

This estimate has been developed and provided as an Order of Magnitude Estimate (ROM)/Budgetary Estimate and as such is suitable for the purpose of budget development and/or planning only. This estimate is offered as an opinion of cost to perform the work and is not an offer to contract for construction services, procure and/or provide such services.

Total Duration of Remediation Time (years):	6	without CPs / With CP-1
Total Duration of Remediation Time (years):	9	with CP2

Contingency Plan CP-1 - ISCO Injection Using Catalyzed Hydrogen Peroxide Propagations (CHP)

(Accuracy Range: +50% / -30%)

Site: AOC E, Former Naval Ammunition Support Detachment (NASD) Base Year: 2012
Location: Vieques, Puerto Rico Date: July, 2012 (revision)
Phase: Feasibility Study (FS)
Alternative Description:
- Implemented as a contingency plan to address residual persulfate;
- Inject CHP into 3 wells (MW-01, MW-04, and MW-05) to address residual persulfate;
- Injection of 8% H2O2 with catalyst and stablizer;
- Annual post-injection performance sampling of 8 site wells for site-specific COCs and persulfate for 3 years;
- Maintain ICs (deed notations) that restrict groundwater use until the RAO is met.

Description	Quantity	Unit	$/Unit	Total Cost	Notes
(1) IC	1	LS	$0	$0	Maintain existing IC (already in place)
(2) CHP INJECTION					
2.1 Mobilization & demobilization of equipment, site restoration	1	LS	$15,000	$15,000	Vendor quote - Nov. 2011
2.2 Preparing planning documents and pre-mobilization activities (Implementation Plan, HASP, AHAs)	1	LS	$2,400	$2,400	Vendor quote - Nov. 2011
2.3 29% Hydrogen Peroxide (shipped to site)	800	gallons	$11.93	$9,544	Vendor quote unit price - Nov. 2011
2.4 Catalyst and stablizer	610	lb	$4.00	$2,440	Vendor quote unit price - Nov. 2011
2.5 Mixing Equipment and Waste	4	days	$3,400	$13,600	Vendor quote unit price - Nov. 2011
2.6 Travel by air	3	EA	$750	$2,250	2 subcontractor person-injection team; 1 person for oversight (total 3 people)
2.7 Injection Labor	4	DAY	$1,600	$6,400	4 days injection (mob/demob and travel included elsewhere) for 2 people
2.8 Oversight Labor	60	Hrs	$100	$6,000	4 days injection plus 2 days mob/demob and travel for 1 person
2.9 Lodging Per Diem	15	DAY	$103	$1,545	5 nights for 3 people
2.10 Meal Per Diem	18	DAY	$57	$1,026	6 days for 3 people
2.11 Car rental and fuel	12	DAY	$150	$1,800	1 car for ISCO vendor, 1 for oversight person
2.12 ISCO Vendor Field Report	1	LS	$1,200	$1,200	Vendor quote unit price - Nov. 2011
Subtotal 2				$63,300	
SUBTOTAL (1+2)				**$64,000**	
CONTINGENCY	20%		$64,000	$13,000	EPA July 2000 guidance
SUBTOTAL - CONSTRUCTION COST				**$77,000**	
(3) DESIGN&CM&PM					
3.1 Project Management	8%		$77,000	$6,160	EPA July 2000 guidance page 5-13
3.2 Remedial Design	15%		$77,000	$11,550	EPA July 2000 guidance page 5-13
3.3 Construction Management	10%		$77,000	$7,700	EPA July 2000 guidance page 5-13
3.4 General&Administration (G&A)	9.2%		$77,000	$7,084	RSMeans 5% to 15%
3.5 Pollution Liability Insurance	2%		$77,000	$1,540	market price
3.6 Payment & Performance Bond	2.5%		$77,000	$1,925	market price
3.7 Fee	8%		$84,084	$6,727	
3.8 Tax	7%		$77,000	$5,390	Puerto Rico tax
TOTAL - Design &CM&PM				**$49,000**	
TOTAL Capital Cost				**$126,000**	

Contingency Plan CP-1 - ISCO Injection Using Catalyzed Hydrogen Peroxide Propagations (CHP)

(Accuracy Range: +50% / -30%)

Site: AOC E, Former Naval Ammunition Support Detachment (NASD) | Base Year: 2012
Location: Vieques, Puerto Rico | Date: July, 2012 (revision)
Phase: Feasibility Study (FS)
Alternative Description:
- Implemented as a contingency plan to address residual persulfate;
- Inject CHP into 3 wells (MW-01, MW-04, and MW-05) to address residual persulfate;
- Injection of 8% H2O2 with catalyst and stablizer;
- Annual post-injection performance sampling of 8 site wells for site-specific COCs and persulfate for 3 years;
- Maintain ICs (deed notations) that restrict groundwater use until the RAO is met.

Description	Quantity	Unit	$/Unit	Total Cost	Notes
(4) POST-INJECTION GW MONITORING COST					3 annual events (Year 4- Year 6)
4.1 Annual groundwater sampling and gauging (labor)	60	hrs	$100	$6,000	sampling of 8 existing wells; Groundwater level measurement; 2-person sampling team; 2 days of sampling and 1 day travel
4.2 Sampling equipment	3	Days	$500	$1,500	Equipment rental (pump, generator, YSI Multiparameter probe and disposables, including shipment)
4.3 Travel by air	1	LS	$1,500	$1,500	2 persons
4.4 Lodging Per Diem	4	Days	$103	$412	2 person 2 nights
4.5 Meal Per Diem	6	Days	$57	$342	2 person 3 work days including 1 travel day
4.6 Car rental and fuel	3	Days	$150	$450	2 persons, 3 days;1 car for 2 people
4.7 Groundwater analytical cost	11	EA	$290	$3,190	sampling of 8 existing wells for 4 VOCs and 2 SVOCs (including 1 FD, 1 EB, 1 TB; assuming 1 MS/MSD non billable) equal to 11 samples /event; $75/VOC; $200/SVOC; $15/sample by CHEMets field test kit for persulfate
4.8 Monitoring and ISCO application report	1	LS	$15,000	$15,000	
Annual GW Monitoring Cost				$28,394	
CONTINGENCY	20%			$5,679	
Annual GW Monitoring Periodic Cost				**$35,000**	Year 4 -Year 6
GW Monitoring Periodic Cost (NPV)				**$87,000**	discount rate of 4% for Year 4 -year 6
(5) TOTAL PROJECT COST (NPV in 2012 $)				**$213,000**	

Note:

5-year-review cost included in Alt-2

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Contingency Plan CP-2 - ISCO Injection Using Persulfate

(Accuracy Range: +50% / -30%)

Site: AOC E, Former Naval Ammunition Support Detachment (NASD) — Base Year: 2012
Location: Vieques, Puerto Rico — Date: July, 2012 (revision)
Phase: Feasibility Study (FS)
Alternative Description:
- Implemented as a contingency plan to address COC rebound;
- Inject H2O2 activated persulfate into 3 wells (MW-01, MW-04, and MW-05) to address COC rebound;
- Injection of 5% persulfate (lower concentration than pilot study) and 12% H2O2;
- Annual post-injection performance sampling of 8 site wells for site-specific COCs and persulfate for 3 years;
- Maintain ICs (deed notations) that restrict groundwater use until the RAO is met.

Description	Quantity	Unit	$/Unit	Total Cost	Notes
(1) IC	1	LS	$0	$0	Maintain existing IC (already in place)
(2) Persulfate Injection					
2.1 Mobilization & demobilization of equipment	1	LS	$15,000	$15,000	Estimate
2.2 Preparing planning documents and pre-mobilization activities (Implementation Plan, HASP, AHAs)	1	EACH	$2,400	$2,400	Vendor quote - Nov. 2011
2.3 Klozur persulfate Oxidant (including shipping to site)	850	lb	$2.45	$2,083	2008 vendor estimated quantity reduced by 50% due to reduced treatment area; unit price added $1/lb for transport
2.4 29% Hydrogen Peroxide (shipped to site)	225	gallons	$11.93	$2,684	Persulfate requires 1:5 molar ratio of H2O2 for activation (600lb 100% H2O2 or 225 gallons 29%H2O2); vendor quote
2.5 Mixing Equipment and Waste Management	4	days	$3,400	$13,600	Vendor quote unit price - Nov. 2011
2.6 Travel by air	3	EA	$700	$2,100	2 subcontractor person-injection team; 1 person for oversight (total 3 people)
2.7 Injection Labor	5	DAY	$1,600	$8,000	5 days injection (mob/demob and travel included elsewhere) for 2 people
2.7 Oversight Labor	70	Hrs	$100	$7,000	5 days injection plus 2 days mob/demob and travel for 1 person
2.9 Lodging Per Diem	18	DAY	$103	$1,854	6 nights for 3 people
2.10 Meal Per Diem for full work days	21	DAY	$57	$1,197	7 days for 3 people
2.11 Car rental and fuel	14	DAY	$150	$2,100	1 car for ISCO vendor, 1 for oversight person
2.12 Field Reporting	1	LS	$1,200	$1,200	Estimate
Subtotal 2				$59,300	
SUBTOTAL (1+2)				**$60,000**	
CONTINGENCY	20%		$60,000	$12,000	EPA July 2000 guidance
SUBTOTAL - CONSTRUCTION COST				**$72,000**	
(3) DESIGN&CM&PM					
3.1 Project Management	8%		$72,000	$5,760	EPA July 2000 guidance page 5-13
3.2 Remedial Design	15%		$72,000	$10,800	EPA July 2000 guidance page 5-13
3.3 Construction Management	10%		$72,000	$7,200	EPA July 2000 guidance page 5-13
3.4 General&Administration (G&A)	9.2%		$72,000	$6,624	RSMeans 5% to 15%
3.5 Pollution Liability Insurance	2%		$72,000	$1,440	market price
3.6 Payment & Performance Bond	2.5%		$72,000	$1,800	market price
3.7 Fee	8%		$78,624	$6,290	
3.8 Tax	7%		$72,000	$5,040	Puerto Rico tax
TOTAL - Design &CM&PM				**$45,000**	
TOTAL Capital Cost				**$117,000**	

Contingency Plan CP-2 - ISCO Injection Using Persulfate

(Accuracy Range: +50% / -30%)

Site: AOC E, Former Naval Ammunition Support Detachment (NASD) — Base Year: 2012
Location: Vieques, Puerto Rico — Date: July, 2012 (revision)
Phase: Feasibility Study (FS)
Alternative Description:
- Implemented as a contingency plan to address COC rebound;
- Inject H2O2 activated persulfate into 3 wells (MW-01, MW-04, and MW-05) to address COC rebound;
- Injection of 5% persulfate (lower concentration than pilot study) and 12% H2O2;
- Annual post-injection performance sampling of 8 site wells for site-specific COCs and persulfate for 3 years;
- Maintain ICs (deed notations) that restrict groundwater use until the RAO is met.

Description	Quantity	Unit	$/Unit	Total Cost	Notes
(4) POST-INJECTION GW MONITORING COST					3 annual events (Year 7- Year 9)
4.1 Annual groundwater sampling and gauging (labor)	60	hrs	$100	$6,000	sampling of 8 existing wells; Groundwater level measurement; 2-person sampling team; 2 days of sampling and 1 day travel
4.2 Sampling equipment	3	Days	$500	$1,500	Equipment rental (pump, generator, YSI Multiparameter probe and disposables, including shipment)
4.3 Travel by air	1	LS	$1,500	$1,500	2 persons
4.4 Lodging Per Diem	4	Days	$103	$412	2 person 2 nights
4.5 Meal Per Diem	6	Days	$57	$342	2 person 3 work days including 1 travel day
4.6 Car rental and fuel	3	Days	$150	$450	2 persons, 3 days;1 car for 2 people
4.7 Groundwater analytical cost	11	EA	$290	$3,190	sampling of 8 existing wells for 4 VOCs and 2 SVOCs (including 1 FD, 1 EB, 1 TB; assuming 1 MS/MSD non billable) equal to 11 samples /event; $75/VOC; $200/SVOC; $15/sample by CHEMets field test kit for persulfate
4.8 Monitoring and ISCO application report	1	LS	$15,000	$15,000	
Annual GW Monitoring Cost				$28,394	
CONTINGENCY	20%			$5,679	
Annual GW Monitoring Periodic Cost				**$35,000**	Year 7 - Year 9
GW Monitoring Periodic Cost (NPV)				**$77,000**	discount rate of 4% for Year 7 - Year 9
(5) TOTAL PROJECT COST (NPV in 2012 $)				**$194,000**	

Note:

5-year-review cost included in Alt-2

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Appendix E
Sustainability Analysis Summary

APPENDIX E

Sustainability Analysis for AOC E

1.1 Introduction

This appendix presents the approach taken and results obtained from a sustainability analysis performed for groundwater at AOC E, Former Naval Ammunition Support Detachment (NASD), Vieques, Puerto Rico. AOC E is the site of a former 500-gallon underground storage tank (UST), which was in service between about 1970 and 1996 to store used oil generated from vehicle maintenance activities within the main operational area (i.e., Public Works) of the Former NASD. In 1996, the UST was removed and replaced with a 500-gallon aboveground storage tank (AST) that, in turn, was removed in 2001. AOC E occupies less than about a tenth of an acre. The property that contains AOC E was transferred to the Municipality of Vieques (MOV) in April 2001. On March 14, 2005, Vieques was placed on the National Priority List (NPL), which required all subsequent environmental restoration activities for Navy Installation Restoration (IR) sites on Vieques be conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) unless and until removed from CERCLA authority.

The Final Remedial Investigation (RI) Report was issued in July 2008. A pilot study was implemented between January 2010 and December 2011, consisting of denitrification-based bioremediation (DBB) for unsaturated zone soil to address potential soil to groundwater leaching, and in-situ chemical oxidation (ISCO) for groundwater remediation. Based on the findings of pilot study, two groundwater remedial alternatives including contingency plans were developed in the Focused Feasibility Study (FS) Report to address elevated residual persulfate and/or potential contaminants rebound.

1.2 Methodology

This sustainability analysis was performed using SiteWise™, a tool developed jointly by Battelle, U.S. Navy, and U.S. Army Corps of Engineers (USACE). This analysis evaluates the environmental "footprint" of each remedial alternative considered in terms of five metrics, comprising:

1. Greenhouse gases (GHGs) reported as carbon dioxide equivalents (CO_2e), consisting of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O);
2. Energy usage (expressed as British Thermal Unit [BTU]);
3. Water consumption (gallons)
4. Air emissions of criteria pollutants consisting of oxides of nitrogen (NOx) and sulfur (SOx), and particulate matter (PM); and
5. Accident risk (risk of injury and risk of fatality).

SiteWise™ uses footprint factors taken out of various emission factors from governmental or non-governmental research sources to determine the environmental footprint of each activity.

The assessment is carried out using a spreadsheet-based building block approach, where each remedial alternative is first broken down into modules that mimic the remedial phases in most remedial actions, including remedial investigation (RI), remedial action construction (RAC), remedial action operation (RAO), and long-term monitoring (LTM). To estimate the sustainability footprint for each remedial alternative under consideration, only those elements of remedial construction and long-term monitoring considered to posses important sustainability elements were included in the assessment for AOC E. Activities involving deed and boundary survey for the land use control (LUC) and injection of chemicals for contingency plans are evaluated in the RAC module. Since the RI activities have been completed, and none of the alternatives evaluated for AOC E contains typical annual operation and maintenance activities involved for conventional remedial systems, the RAO module is not used. Instead, any site inspection activities associated with periodic five-year review site visits and groundwater monitoring activities are evaluated in the LTM module. Once broken down into various modules, the footprint of each module is individually calculated. The different footprints are then combined to estimate the overall footprint of the remedial alternative. A low environmental footprint indicates low deleterious impacts to environmental and social metrics, which collectively make up the SiteWise™ sustainability metrics. Conversely, a high environmental footprint indicates high deleterious impacts associated with the SiteWise™ metrics. The major conclusions of this sustainability analysis are incorporated into the short-term effectiveness criteria evaluation of the Focused FS Report. The following subsection presents the assumptions and major conclusions of sustainability analysis.

1.3 Assumptions, Results, and Conclusions

At the highest level, groundwater alternatives identified in the Focused FS Report consist of:

- Alternative 1—No Action
- Alternative 2— Groundwater Monitoring and Institutional Controls

Although contingency plans are likely not required, two contingency plans are included for Alternative 2 to address the potential for elevated residual persulfate to persist and for the COCs to rebound to levels above remediation goals. They are:

- Contingency Plan 1 (CP-1) – ISCO Injection Using Catalyzed Hydrogen Peroxide (CHP) to address persistent elevated residual persulfate
- Contingency Plan 1 (CP-2) – ISCO Injection Using Persulfate to address rebound of COCs to levels above remediation goals

Therefore, the Focused FS (and, therefore, the sustainability analysis) evaluated the following four scenarios:

- Alternative 1—No Action
- Alternative 2— Groundwater Monitoring and Institutional Controls
- Alternative 2 with CP-1— Groundwater Monitoring and Institutional Controls with CHP Injection
- Alternative 2 with CP-2— Groundwater Monitoring and Institutional Controls with Persulfate Injection

Assumptions:

The following assumptions are used for the SiteWise™ tool evaluation of the aforementioned alternatives:

- Remedial Construction: transportation of personnel (road and air); transportation and injection of materials (oxidants).
  - Remedial construction is not applicable for *Alternative 1* since no action is taken.
  - Remedial construction for *Alternative 2* involves deed and boundary survey (assuming 2 persons 1 day).
  - Remedial construction for *Alternative 2 with CP-1* involves deed and boundary survey (assuming 2 persons for 1 day); injection of chemicals (assuming approximately 3,800 lbs of 29% hydrogen peroxide, 610 lbs of conditioning agent and stabilizer); and injection of approximately 1,200 gallons of injectate (assuming 3 persons for 4 days).
  - Remedial construction for *Alternative 2 with CP-2* involves deed and boundary survey (assuming 2 persons for 1 day); injection of chemicals (assuming approximately 3,500 lbs of 17.5% hydrogen peroxide and 800 lbs of persulfate oxidant); and injection of approximately 2,600 gallons of injectate (assuming 3 persons for 5 days).
- Long-term Monitoring: transportation of personnel for five-year-review site visit; annual groundwater monitoring up to 3 years for residual persulfate; annual performance groundwater COC sampling for 3 years.
  - Long-term Monitoring for *Alternative 1* involves transportation of personnel for five-year-review site visits for 30 years (assumes 6 visits; 2 persons for 1 day each visit).
  - Long-term Monitoring for *Alternative 2* involves transportation of personnel for one five-year-review site visit (2 persons for 1 day); annual groundwater monitoring up to 3 years for residual persulfate (assumes 2 persons for 2 days each event; total 3 events); annual perfomrance groundwater COC sampling for 3 years (assumes 2 persons for 3 days each event; total 3 events).
  - Long-term Monitoring for *Alternative 2 with CP-1* involves transportation of personnel for one five-year-review site visit (2 persons for 1 day); annual groundwater monitoring up to 3 years for residual persulfate (assumes 2 persons for 2 days each event; total 3 events); annual performance groundwater COC sampling for 3 years (assumes 2 persons for 3 days each event; total 4 events); transportation of personnel for five-year-review site visits for 10 years (assumes 2 visits; 2 persons for 1 day each visit).
  - Long-term Monitoring for *Alternative 2 with CP-2* involves transportation of personnel for one five-year-review site visit (2 persons for 1-day); annual groundwater monitoring up to 3 years for residual persulfate (assumes 2 persons for 2 days each event; total 3 events); annual performance groundwater COC sampling for 3 years (assumes 2 persons for 3 days each event; total 4 events);transportation of personnel for five-year-review site visits for 10 years (assumes 2 visits; 2 persons for 1 day each visit).

Results and Conclusions:

A comparative analysis for the groundwater alternatives is summarized in **Figure E-1**. The environmental footprint is in the order (lowest to highest): Alternative 1 < Alternative 2 < Alternative 2 with CP-2 < Alternative 2 with CP-1.

The water impact and accident risk for "Alternative 2 with CP-2" are slightly higher than that of "Alternative 2 with CP-1," while the GHGs, energy consumption and air emissions for "Alternative 2 with CP-2" are slightly lower than that of "Alternative 2 with CP-1." Overall, the environmental footprint for "Alternative 2 with CP-1" is slightly higher than that of "Alternative 2 with CP-2."

It should be noted that while this analysis compares the environmental footprints of two alternatives (with four scenarios), the four scenarios provide different end-points of remedial performance. The sustainability analysis is provided simply to show the environmental footprint of the alternatives, but is not used to help select the alternative. Therefore, a comparison of the results of the alternatives needs to be made in the context of the benefits (e.g., ARAR compliance, contaminant reduction, cost effectiveness, and etc.) of each of the alternatives.

Table E-1 presents the quantitative environmental footprint metrics evaluated for each scenario. The environmental footprint for each scenario is discussed below.

Alternative 1 – No Action had the lowest footprint among all of the alternatives considered (**Table E-1**). Even though this alternative has the lowest environmental footprint and potential accident risk, this alternative is not protective of the human health and environment. As shown on **Figure E-2,** the environmental footprint and potential accident are primarily driven by personnel transportation during the site inspections for the five-year reviews.

Alternative 2– Groundwater Monitoring and Institutional Controls produced the second highest footprint (**Table E-1**). As shown on **Figure E-3,** the impact was primarily driven by the personnel travel activities during the groundwater monitoring. The potential accident risk for this alternative is the second lowest.

Alternative 2 with CP-1 produced the highest footprint (**Table E-1**). As shown on **Figure E-4,** the emissions and energy consumption were driven by both the personnel transportation and equipment use during the CHP injection of the remedial construction phase, as well as personnel transportation during the groundwater sampling and 5-year review site inspection of remedial action operation period. This alternative has the second highest water consumption due to injection of CHP. Personnel travel and equipment usage during the injection efforts were major factors for accident risk that results in the potential for fatality and injury. The potential accident risk for this scenario is the second highest.

Alternative 2 with CP-2 produced the second highest footprint (**Table E-1**). As shown on **Figure E-5,** the emissions and energy consumption were driven by both the personnel transportation and equipment use during the persulfate injection of the remedial construction phase, as well as personnel transportation during the groundwater sampling and 5-year review site inspection of remedial action operation period. This alternative has the highest water consumption due to injection of persulfate at lower concentration level (assuming 5 percent). Personnel travel and equipment usage during the injection efforts were major factors for accident risk that results in the potential for fatality and injury. The potential accident risk for this scenario is the highest.

TABLE E-1
Sustainability Analysis Metrics Quantified for Groundwater Alternatives
AOC E FS Report
Former Naval Ammunition Support Detachment (NASD)
Vieques, Puerto Rico

Remedial Alternatives	GHG Emissions (metric ton)	Total Energy Used (MMBTU)	Water Consumption (gallons)	NOx Emissions (metric ton)	SOx Emissions (metric ton)	PM10 Emissions (metric ton)	Accident Risk Fatality	Accident Risk Injury
Alternative 1	10.07	1.18E+02	0.00E+00	2.41E+01	5.04E+00	1.15E+00	5.64E-06	1.47E-04
Alternative 2	15.52	1.81E+02	0.00E+00	3.65E+01	7.91E+00	2.12E+00	1.22E-05	4.90E-04
Alternative 2 with CP-1	21.86	2.65E+02	1.20E+03	4.25E+01	9.11E+00	2.34E+00	1.75E-05	1.14E-03
Alternative 2 with CP-2	20.85	2.48E+02	2.60E+03	4.25E+01	9.11E+00	2.34E+00	1.91E-05	1.25E-03

FIGURE E-1
Comparative Analysis of Sustainability Metrics – Groundwater Alternatives
AOC E FS Report
Former Naval Ammunition Support Detachment (NASD)
Vieques, Puerto Rico

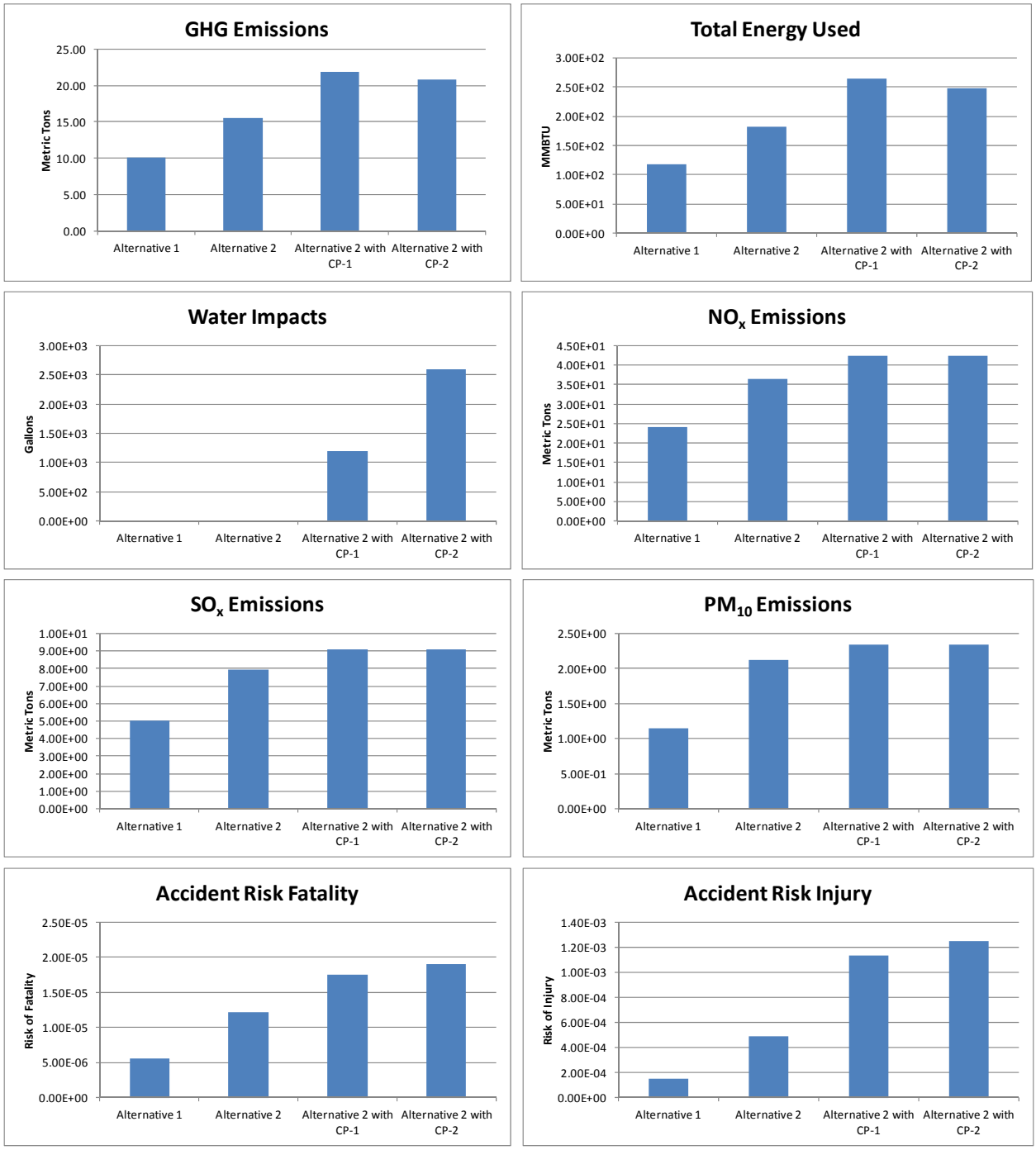


FIGURE E-2
Environmental Footprint Summary – Alternative 1
AOC E FS Report
Former Naval Ammunition Support Detachment (NASD)
Vieques, Puerto Rico

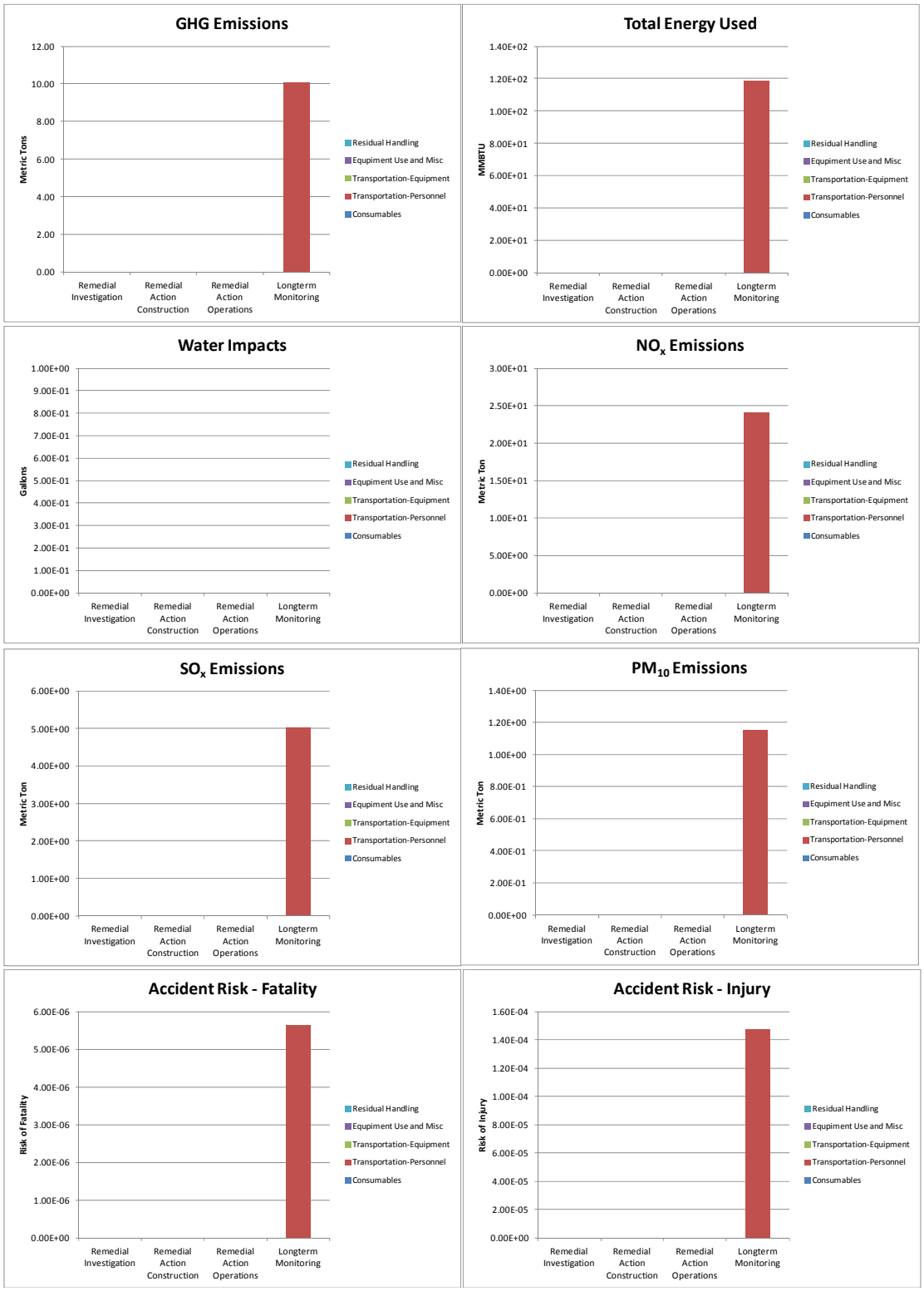


FIGURE E-3
Environmental Footprint Summary – Alternative 2
AOC E FS Report
Former Naval Ammunition Support Detachment (NASD)
Vieques, Puerto Rico

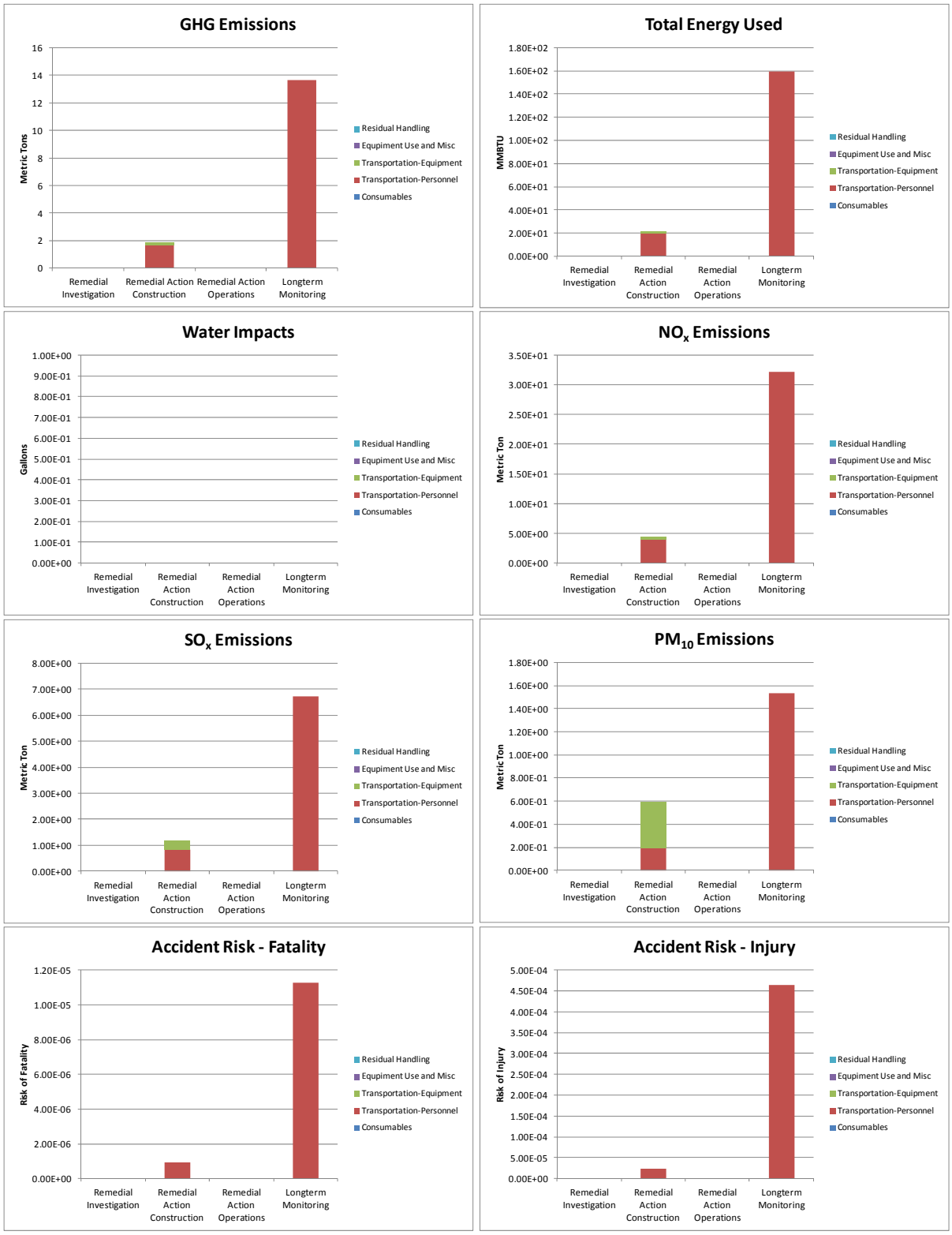


FIGURE E-4
Environmental Footprint Summary – Alternative 2 with CP-1
AOC E FS Report
Former Naval Ammunition Support Detachment (NASD)
Vieques, Puerto Rico

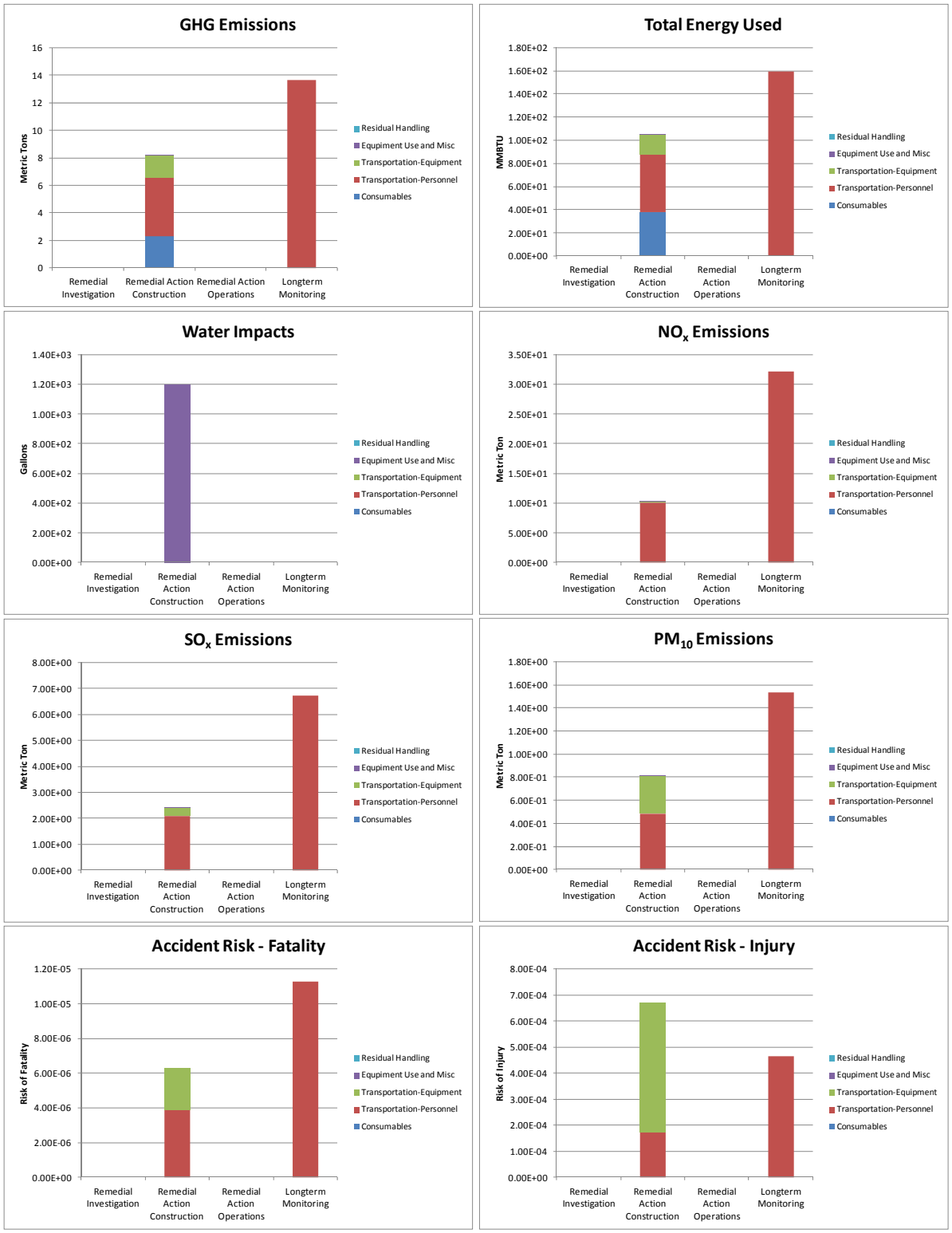
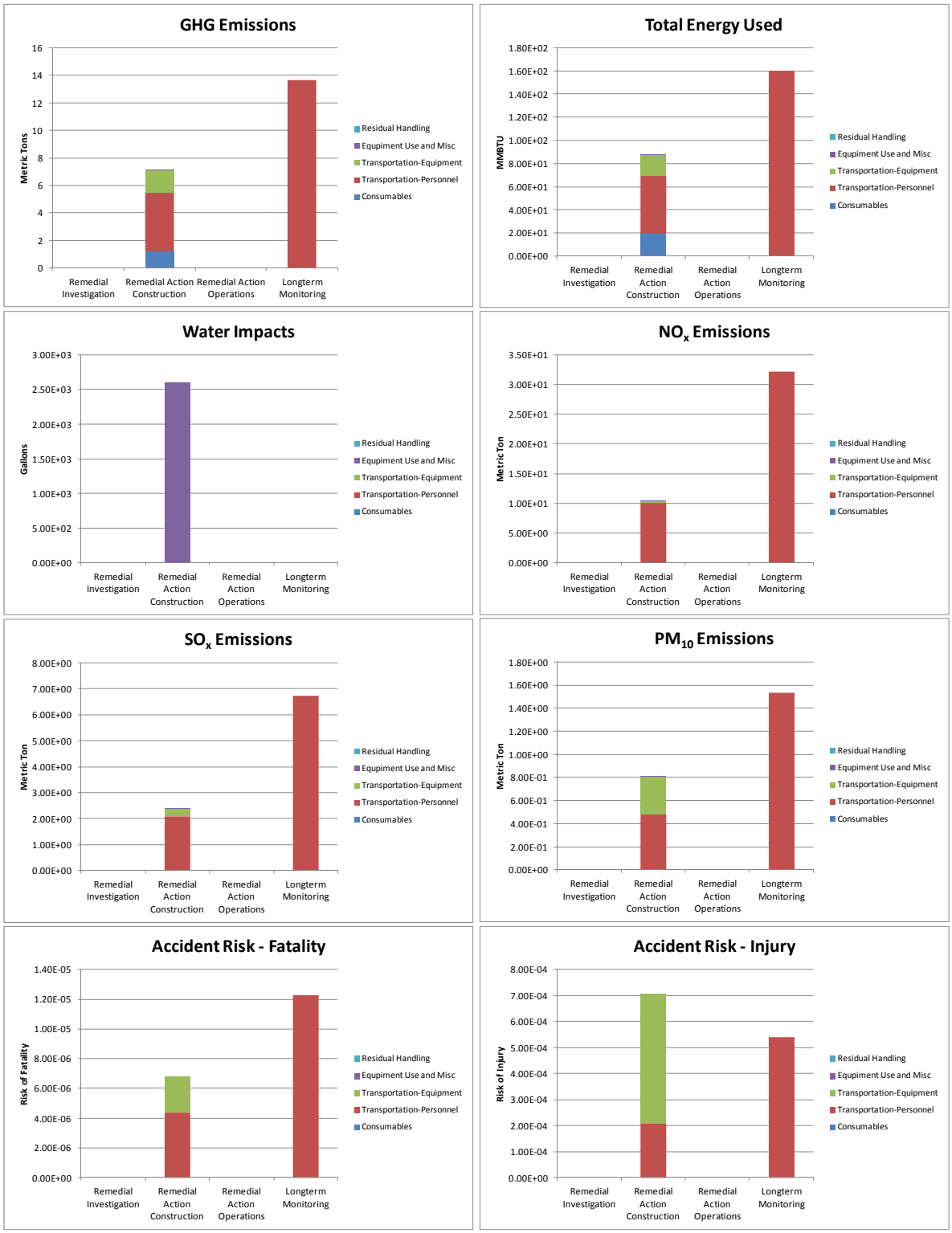


FIGURE E-5
Environmental Footprint Summary – Alternative 2 with CP-2
AOC E FS Report
Former Naval Ammunition Support Detachment (NASD)
Vieques, Puerto Rico



SiteWise™ Tool Input Sheets (Attached)

SITE INFORMATION	
Name	Vieques, PR
Date	7/18/2012 (rev)
Site	AOC E
Remedial Alternative Name	Alternative 1

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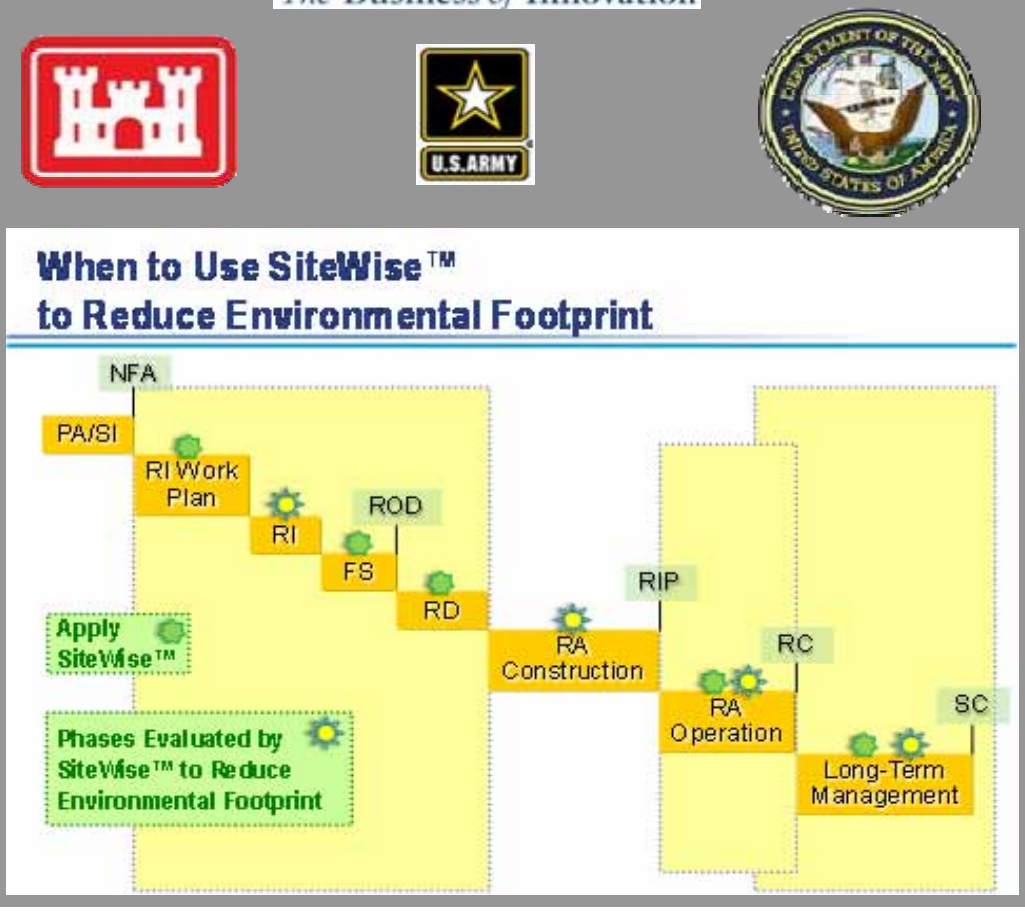

This worksheet allows the user to define material production, transportation, equipment use, and residual handling variables for the remedial alternative

Yellow cells	require the user to choose an input from a drop down menu
White cells	require the user to type in a value

MATERIAL PRODUCTION

WELL MATERIALS	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6
Input number of wells						
Input depth of wells (ft)						
Choose well diameter (in) from drop down menu	1/2	1/2	1/2	1/2	1/2	1/2
Choose material type from drop down menu	PVC	PVC	PVC	PVC	PVC	PVC
Choose specific material schedule from drop down menu	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC

TREATMENT CHEMICALS & MATERIALS	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
Input number of injection points						
Choose material type from drop down menu	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide
Input amount of material injected at each point (pounds dry mass)						
Input number of injections per injection point						

GAC	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
Input amount of GAC used (lbs)						
Choose material type from drop down menu	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC

CONSTRUCTION MATERIALS	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6
Choose material type from drop down menu	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner
Input area of material (ft^2)						
Input depth of material (ft)						

WELL DECOMMISSIONING	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6
Input number of wells						
Input depth of wells (ft)						
Input well diameter (in)	1	1	1	1	1	1
Choose material from drop down menu	Soil	Soil	Soil	Soil	Soil	Soil

TRANSPORTATION

5-year review; 30 years

PERSONNEL TRANSPORTATION - ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Choose vehicle type from drop down menu*	Other	Cars	Cars	Cars	Cars	Cars
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input distance traveled per trip (miles)	20					
Input number of trips taken	6					
Input number of travelers	2					
Input estimated vehicular fuel economy (mi/gal) (Input only if known for the vehicle selected, otherwise a default will be used by the tool)	15					

*For vehicle type 'Other' please enter values in Table 2b in the Look Up Table tab.

PERSONNEL TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)	18,000					
Input number of travelers	2					
Input number of flights taken	1					

PERSONNEL TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Choose vehicle type from drop down menu	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail
Input distance traveled (miles)						
Input number of trips taken						
Input number of travelers						

EQUIPMENT TRANSPORTATION - ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input distance traveled (miles)						
Input weight of equipment transported (tons)						

EQUIPMENT TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)						
Input weight of equipment transported (tons)						

EQUIPMENT TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)						
Input weight of load (tons)						

EQUIPMENT TRANSPORTATION - WATER	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (mile)						
Input weight of load (tons)						

EQUIPMENT USE

EARTHWORK	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd^3)						
Will the material be transported off-site? (Input Yes or No)	No	No	No	No	No	No

DRILLING	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6
Input number of drilling locations						
Choose drilling method from drop down menu	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push
Input total volume of drill cuttings (yd^3)						
Input depth of wells (ft)						
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

For each pump, select only one of the three methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused pump columns or unused methods

PUMP OPERATION	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1

Method 1 - ELECTRICAL USAGE IS KNOWN						
Input pump electrical usage (KWh)	0	0	0	0	0	0
Method 2 - PUMP HEAD IS KNOWN						
Input flow rate (gpm)	0	0	0	0	0	0
Input total head (ft)	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0
Pump efficiency times motor efficiency (default already present, user override possible)	0.51	0.51	0.51	0.51	0.51	0.51
Input specific gravity (default already present, user override possible)	1	1	1	1	1	1
Method 3 - NAME PLATE SPECIFICATIONS ARE KNOWN						
Input pump horsepower (hp)	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0
Input pump load (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Input pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Region						
Choose region from drop down menu (scroll right to see figure)	AKGD	AKGD	AKGD	AKGD	AKGD	AKGD

DIESEL AND GASOLINE PUMPS	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1
Input estimated operating hours (hrs)						
Input estimated fuel consumption rate (gal/hr) (input only if known for the pump selected, otherwise a default will be used by the tool)						

For each type of equipment, select only one of the methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused equipment columns or unused methods

BLOWER, COMPRESSOR, MIXER, AND OTHER EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose type of equipment from drop down	Blower	Blower	Blower	Blower	Blower	Blower
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - NAME PLATE SPECIFICATIONS ARE KNOWN						
Input equipment horsepower (hp)	0	0	0	0	0	0
Input number of hours equipment operating	0	0	0	0	0	0
Input equipment load factor (default already present, user override possible)	0	0	0	0	0	0
Input equipment load factor (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Input motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Method 2 - ELECTRICAL USAGE IS KNOWN						
Input additional electrical usage, if known (KWh)	0	0	0	0	0	0
Region						
Choose region from drop down menu (scroll right to see figure)	AKGD	AKGD	AKGD	AKGD	AKGD	AKGD

GENERATORS	Generator 1	Generator 2	Generator 3	Generator 4	Generator 5	Generator 6
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Choose horsepower range from drop down menu	3 to 6	3 to 6	3 to 6	3 to 6	3 to 6	3 to 6
Input operating hours (hr)						

AGRICULTURAL EQUIPMENT	Tillage Tractor 1	Tillage Tractor 2	Tillage Tractor 3	Tillage Tractor 4	Tillage Tractor 5	Tillage Tractor 6
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input fuel consumption						
Choose soil condition from drop down menu	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil
Choose soil type from drop down menu	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil
Input time spent per shift (hrs)						
Input acres or miles (mi)						

CAPPING EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose equipment type from drop down menu	Roller	Roller	Roller	Roller	Roller	Roller
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input fuel consumption						
Input time available (work days)						

MIXING EQUIPMENT	Mixer 1	Mixer 2	Mixer 3	Mixer 4	Mixer 5	Mixer 6
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input volume (yd³)						
Input production rate (yd³/hr)						
Input estimated fuel consumption rate (gal/hr) (input only if known for the mixer selected, otherwise a default will be used by the tool)						

RESIDUAL HANDLING

RESIDUE DISPOSAL/RECYCLING	Soil Residue	Residual Water	Material Residue	Other Residuals	Other Residuals	Other Residuals
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Input weight of the waste transported to landfill or recycling per trip (tons)						
Choose vehicle type from drop down menu	On-road truck	On-road truck	On-road truck	On-road truck	On-road truck	On-road truck
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input total number of trips						
Input number of miles per trip						

LANDFILL OPERATIONS	Operation 1	Operation 2	Operation 3	Operation 4	Operation 5	Operation 6
Input tons of soil or waste to be incinerated (user must input emission factors in the Look Up Table, Table 7a)						

THERMAL/CATALYTIC OXIDIZERS*	Oxidizer 1	Oxidizer 2	Oxidizer 3	Oxidizer 4	Oxidizer 5	Oxidizer 6
Choose oxidizer type from drop down menu	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer
Choose fuel type from drop down menu	natural gas	Propane	natural gas	natural gas	natural gas	natural gas
Input waste gas flow rate (scfm)						
Input time running (hours)						
Input waste gas inlet temperature (F)						
Input contaminant concentration (ppmV)						

*(Electric blowers are included in the analysis)

WATER CONSUMPTION	Treatment System 1	Treatment System 2	Treatment System 3	Treatment System 4	Treatment System 5	Treatment System 6
Input water disposed/collected during treatment (gal)						
Input water disposed/collected during site preparation (gal)						
Input water disposed/collected during sampling (gal)						
Input water disposed/collected during site demobilization (gal)						

LANDFILL METHANE EMISSIONS	Landfill 1	Landfill 2	Landfill 3	Landfill 4	Landfill 5	Landfill 6
Input landfill methane emissions (metric ton)						

OTHER KNOWN ONSITE ACTIVITIES	Entire Site
Input energy usage (MMBTU)	
Water consumption (gallon)	
Input CO_2 emission (metric ton)	
Input N_2O emission (metric ton CO_2 e)	
Input CH_4 emissions (metric ton CO_2 e)	
Input NOx emission (metric ton)	
Input SOx emission (metric ton)	
Input PM_{10} emission (metric ton)	
Input fatality risk	
Input injury risk	

SITE INFORMATION	
Name	Vieques, PR
Date	7/18/2012 (rev)
Site	AOC E
Remedial Alternative Name	Alternative 2

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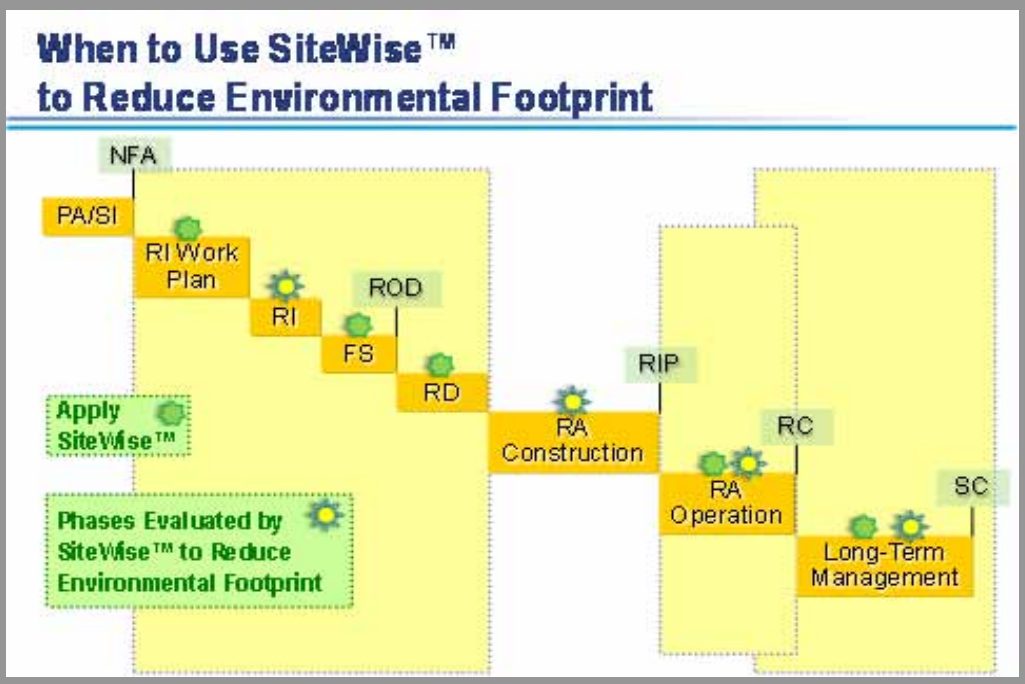

This worksheet allows the user to define material production, transportation, equipment use, and residual handling variables for the remedial alternative

Yellow cells	require the user to choose an input from a drop down menu
White cells	require the user to type in a value

MATERIAL PRODUCTION

WELL MATERIALS	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6
Input number of wells						
Input depth of wells (ft)						
Choose well diameter (in) from drop down menu	1/2	1/2	1/2	1/2	1/2	1/2
Choose material type from drop down menu	PVC	PVC	PVC	PVC	PVC	PVC
Choose specific material schedule from drop down menu	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC

TREATMENT CHEMICALS & MATERIALS	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
Input number of injection points						
Choose material type from drop down menu	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide
Input amount of material injected at each point (pounds dry mass)						
Input number of injections per injection point						

GAC	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
Input weight of GAC used (lbs)						
Choose material type from drop down menu	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC

CONSTRUCTION MATERIALS	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6
Choose material type from drop down menu	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner
Input area of material (ft^2)						
Input depth of material (ft)						

WELL DECOMMISSIONING	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6
Input number of wells						
Input depth of wells (ft)						
Input well diameter (in)	1	1	1	1	1	1
Choose material from drop down menu	Soil	Soil	Soil	Soil	Soil	Soil

TRANSPORTATION

Establishing LUC
Deed Survey (1 day)

PERSONNEL TRANSPORTATION - ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Choose vehicle type from drop down menu*	Light truck	Light truck	Heavy Duty	Cars	Cars	Cars
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input distance traveled per trip (miles)	20					
Input number of trips taken	1					
Input number of travelers	2					
Input estimated vehicular fuel economy (mi/gal) (Input only if known for the vehicle selected, otherwise a default will be used by the tool)	15					

*For vehicle type 'Other' please enter values in Table 2b in the Look Up Table tab.

PERSONNEL TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)	3,000					
Input number of travelers	2					
Input number of flights taken	1					

PERSONNEL TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Choose vehicle type from drop down menu	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail
Input distance traveled (miles)						
Input number of trips taken						
Input number of travelers						

EQUIPMENT TRANSPORTATION - ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Choose fuel used from drop down menu	Gasoline	Gasoline	Diesel	Gasoline	Gasoline	Gasoline
Input distance traveled (miles)						
Input weight of equipment transported (tons)						

EQUIPMENT TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)						
Input weight of equipment transported (tons)						

EQUIPMENT TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)						
Input weight of load (tons)						

EQUIPMENT TRANSPORTATION - WATER	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (mile)			100			
Input weight of load (tons)			40			

EQUIPMENT USE

EARTHWORK	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose earthwork equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd^3)						
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
DRILLING	**Event 1**	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**
Input number of drilling locations						
Choose drilling method from drop down menu	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push
Input time spent drilling at each location (hr)						
Input depth of wells (ft)						
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

For each pump, select only one of the three methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused pump columns or unused methods

PUMP OPERATION	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6
Choose method from drop down	Method 2	Method 1	Method 1	Method 1	Method 1	Method 1

Method 1 - ELECTRICAL USAGE IS KNOWN						
Input pump electrical usage (KWh)	0	0	0	0	0	0
Method 2 - PUMP HEAD IS KNOWN						
Input flow rate (gpm)	0	0	0	0	0	0
Input total head (ft)	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0
Pump efficiency times motor efficiency (default already present, user override possible)	0.51	0.51	0.51	0.51	0.51	0.51
Input specific gravity (default already present, user override possible)	1	1	1	1	1	1
Method 3 - NAME PLATE SPECIFICATIONS ARE KNOWN						
Input pump horsepower (hp)	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0
Input pump load (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Input pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Region						
Choose region from drop down menu (scroll right to see figure)	AKGD	AKGD	AKGD	AKGD	AKGD	AKGD

DIESEL AND GASOLINE PUMPS	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1
Equipment operating hours (hrs)						
Input estimated fuel consumption rate (gal/hr) (Input only if known for the pump selected, otherwise a default will be used by the tool)						

For each type of equipment, select only one of the methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused equipment columns or unused methods

BLOWER, COMPRESSOR, MIXER, AND OTHER EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose type of equipment from drop down	Blower	Blower	Blower	Blower	Blower	Blower
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - NAME PLATE SPECIFICATIONS ARE KNOWN						
Input equipment horsepower (hp)	0	0	0	0	0	0
Input number of equipments operating	0	0	0	0	0	0
Input operating time for each equipment (hrs)	0	0	0	0	0	0
Input equipment load (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Input motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Method 2 - ELECTRICAL USAGE IS KNOWN						
Input equipment electrical usage, if known (KWh)	0	0	0	0	0	0
Region						
Choose region from drop down menu (scroll right to see figure)	SRSO	AKGD	AKGD	AKGD	AKGD	AKGD

GENERATORS	Generator 1	Generator 2	Generator 3	Generator 4	Generator 5	Generator 6
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Choose horsepower range from drop down menu	3 to 6	3 to 6	3 to 6	3 to 6	3 to 6	3 to 6
Input operating hours (hr)						

AGRICULTURAL EQUIPMENT	Tillage Tractor 1	Tillage Tractor 2	Tillage Tractor 3	Tillage Tractor 4	Tillage Tractor 5	Tillage Tractor 6
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input area to till (acre)						
Choose soil condition from drop down menu	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil
Choose soil type from drop down menu	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil
Input time available (work days)						
Input depth of tillage (in)						

CAPPING EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose stabilization equipment type from drop down menu	Roller	Roller	Roller	Roller	Roller	Roller
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input area (ft^2)						
Input time available (work days)						

MIXING EQUIPMENT	Mixer 1	Mixer 2	Mixer 3	Mixer 4	Mixer 5	Mixer 6
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input volume (yd^3)						
Input production rate (yd^3/hr)						
Input estimated fuel consumption rate (gal/hr) (Input only if known for the mixer selected, otherwise a default will be used by the tool)						

RESIDUAL HANDLING

RESIDUE DISPOSAL/RECYCLING	Soil Residue	Residual Water	Material Residue	Other Residuals	Other Residuals	Other Residuals
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Input weight of the waste transported to landfill or recycling per trip (tons)						
Choose vehicle type from drop down menu	On-road truck	On-road truck	On-road truck	On-road truck	On-road truck	On-road truck
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input total number of trips						
Input number of miles per trip						

LANDFILL OPERATIONS	Operation 1	Operation 2	Operation 3	Operation 4	Operation 5	Operation 6
Input tons of soil or waste to be incinerated (user must input emission factors in the Look Up Table, Table 7a)						

THERMAL/CATALYTIC OXIDIZERS*	Oxidizer 1	Oxidizer 2	Oxidizer 3	Oxidizer 4	Oxidizer 5	Oxidizer 6
Choose oxidizer type from drop down menu	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer
Choose fuel type from drop down menu	natural gas	Propane	natural gas	natural gas	natural gas	natural gas
Input waste gas flow rate (scfm)						
Input time running (hours)						
Input waste gas inlet temperature (F)						
Input contaminant concentration (ppmV)						

*(Electric blowers are included in the analysis)

WATER CONSUMPTION	Treatment System 1	Treatment System 2	Treatment System 3	Treatment System 4	Treatment System 5	Treatment System 6
Input water disposed/collected during treatment (gal)						
Input water disposed/collected during site preparation (gal)						
Input water disposed/collected during sampling (gal)						
Input water disposed/collected during site demobilization (gal)						

LANDFILL METHANE EMISSIONS	Landfill 1	Landfill 2	Landfill 3	Landfill 4	Landfill 5	Landfill 6
Input landfill methane emissions (metric tons)						

OTHER KNOWN ONSITE ACTIVITIES	Entire Site
Input energy usage (MMBTU)	
Water consumption (gallon)	
Input CO_2 emission (metric ton)	
Input N_2O emission (metric ton CO_2 e)	
Input CH_4 emissions (metric ton CO_2 e)	
Input NOx emission (metric ton)	
Input SOx emission (metric ton)	
Input PM_{10} emission (metric ton)	
Input fatality risk	
Input injury risk	

This worksheet allows the user to define material production, transportation, equipment use, and residual handling variables for the remedial alternative

Yellow cells	require the user to choose an input from a drop down menu
White cells	require the user to type in a value

MATERIAL PRODUCTION

WELL MATERIALS	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6
Input number of wells						
Input depth of wells (ft)						
Choose well diameter (in) from drop down menu	1/2	1/2	1/2	1/2	1/2	1/2
Choose material type from drop down menu	PVC	PVC	PVC	PVC	PVC	PVC
Choose specific material schedule from drop down menu	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC

TREATMENT CHEMICALS & MATERIALS	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
Input number of injection events						
Choose material type from drop down menu	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide
Input amount of material injected at each point (pounds dry mass)						
Input number of injection sub-events per injection event						

GAC	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
Input amount of GAC used (lbs)						
Choose material type from drop down menu	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC

CONSTRUCTION MATERIALS	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6
Choose material type from drop down menu	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner
Input area of material (ft^2)						
Input depth of material (ft)						

WELL DECOMMISSIONING	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6
Input number of wells						
Input depth of wells (ft)						
Input well diameter (in)	1	1	1	1	1	1
Choose material from drop down menu	Soil	Soil	Soil	Soil	Soil	Soil

TRANSPORTATION

Persulfate GW Monitorir ISCO Performance Samplii 5-year-review (2)

(Annual for 3 years; 2 days; 2 (Annual for 3 years; 3 days; 20 mpd)

PERSONNEL TRANSPORTATION - ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Choose vehicle type from drop down menu*	Other	Cars	Cars	Cars	Cars	Cars
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input distance traveled per trip (miles)	40	60	40			
Input number of trips taken	3	3	2			
Input number of travelers	2	2	2			
Input estimated vehicular fuel economy (mi/gal) (Input only if known for the vehicle selected, otherwise a default will be used by the tool)	15	15	15			

*For vehicle type 'Other' please enter values in Table 2b in the Look Up Table tab.

PERSONNEL TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)	9,000	9,000	6,000			
Input number of travelers	2	2	2			
Input number of flights taken	1	1	1			

PERSONNEL TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Choose vehicle type from drop down menu	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail
Input distance traveled (miles)						
Input number of trips taken						
Input number of travelers						

EQUIPMENT TRANSPORTATION - ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input distance traveled (miles)						
Input weight of equipment transported (tons)						

EQUIPMENT TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)						
Input weight of equipment transported (tons)						

EQUIPMENT TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)						
Input weight of load (tons)						

EQUIPMENT TRANSPORTATION - WATER	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (mile)						
Input weight of load (tons)						

EQUIPMENT USE

EARTHWORK	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose earthwork equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd^3)						
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No

DRILLING	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6
Input number of drilling locations						
Choose drilling method from drop down menu	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push
Input time spent drilling at each location (hr)						
Input depth of wells (ft)						
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

For each pump, select only one of the three methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused pump columns or unused methods

PUMP OPERATION	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1

Method 1 - ELECTRICAL USAGE IS KNOWN						
Input pump electrical usage (KWh)	0	0	0	0	0	0
Method 2 - PUMP HEAD IS KNOWN						
Input flow rate (gpm)	0	0	0	0	0	0
Input total head (ft)	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0
Pump efficiency times motor efficiency (default already present, user override possible)	0.51	0.51	0.51	0.51	0.51	0.51
Input specific gravity (default already present, user override possible)	1	1	1	1	1	1
Method 3 - NAME PLATE SPECIFICATIONS ARE KNOWN						
Input pump horsepower (hp)	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0
Input pump load (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Input pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Region						
Choose region from drop down menu (scroll right to see figure)	SRSO	AKGD	AKGD	AKGD	AKGD	AKGD

DIESEL AND GASOLINE PUMPS	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1
Equipment operating hours (hrs)						
Input estimated fuel consumption rate (gal/hr) (Input only if known for the pump selected, otherwise a default will be used by the tool)						

For each type of equipment, select only one of the methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused equipment columns or unused methods

BLOWER, COMPRESSOR, MIXER, AND OTHER EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose type of equipment from drop down	Blower	Blower	Blower	Blower	Blower	Blower
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - NAME PLATE SPECIFICATIONS ARE KNOWN						
Input equipment horsepower (hp)	0	0	0	0	0	0
Input number of equipments operating	0	0	0	0	0	0
Input operating time for each equipment (hrs)	0	0	0	0	0	0
Input equipment load (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Input motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Method 2 - ELECTRICAL USAGE IS KNOWN						
Input equipment electrical usage, if known (KWh)	0	0	0	0	0	0
Region						
Choose region from drop down menu (scroll right to see figure)	AKGD	AKGD	AKGD	AKGD	AKGD	AKGD

GENERATORS	Generator 1	Generator 2	Generator 3	Generator 4	Generator 5	Generator 6
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Choose horsepower range from drop down menu	3 to 6	3 to 6	3 to 6	3 to 6	3 to 6	3 to 6
Input operating hours (hr)						

AGRICULTURAL EQUIPMENT	Tillage Tractor 1	Tillage Tractor 2	Tillage Tractor 3	Tillage Tractor 4	Tillage Tractor 5	Tillage Tractor 6
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input area to till (acre)						
Choose soil condition from drop down menu	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil
Choose soil type from drop down menu	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil
Input time available (work days)						
Input depth of tillage (in)						

CAPPING EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose stabilization equipment type from drop down menu	Roller	Roller	Roller	Roller	Roller	Roller
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input area (ft^2)						
Input time available (work days)						

MIXING EQUIPMENT	Mixer 1	Mixer 2	Mixer 3	Mixer 4	Mixer 5	Mixer 6
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input volume (yd^3)						
Input production rate (yd^3/hr)						
Input estimated fuel consumption rate (gal/hr) (Input only if known for the mixer selected, otherwise a default will be used by the tool)						

RESIDUAL HANDLING

RESIDUE DISPOSAL/RECYCLING	Soil Residue	Residual Water	Material Residue	Other Residuals	Other Residuals	Other Residuals
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Input weight of the waste transported to landfill or recycling per trip (tons)						
Choose vehicle type from drop down menu	On-road truck	On-road truck	On-road truck	On-road truck	On-road truck	On-road truck
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input total number of trips						
Input number of miles per trip						

LANDFILL OPERATIONS	Operation 1	Operation 2	Operation 3	Operation 4	Operation 5	Operation 6
Input tons of soil or waste to be incinerated (user must input emission factors in the Look Up Table, Table 7a)						

THERMAL/CATALYTIC OXIDIZERS*	Oxidizer 1	Oxidizer 2	Oxidizer 3	Oxidizer 4	Oxidizer 5	Oxidizer 6
Choose oxidizer type from drop down menu	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer
Choose fuel type from drop down menu	natural gas	Propane	natural gas	natural gas	natural gas	natural gas
Input waste gas flow rate (scfm)						
Input time running (hours)						
Input waste gas inlet temperature (F)						
Input contaminant concentration (ppmV)						

*(Electric blowers are included in the analysis)

WATER CONSUMPTION	Treatment System 1	Treatment System 2	Treatment System 3	Treatment System 4	Treatment System 5	Treatment System 6
Input water disposed/collected during treatment (gal)						
Input water disposed/collected during site preparation (gal)						
Input water disposed/collected during sampling (gal)						
Input water disposed/collected during site demobilization (gal)						

LANDFILL METHANE EMISSIONS	Landfill 1	Landfill 2	Landfill 3	Landfill 4	Landfill 5	Landfill 6
Input landfill methane emissions (metric ton)						

OTHER KNOWN ONSITE ACTIVITIES	Entire Site
Input energy usage (MMBTU)	
Water consumption (gallon)	
Input CO_2 emission (metric ton)	
Input N_2O emission (metric ton CO_2 e)	
Input CH_4 emissions (metric ton CO_2 e)	
Input NOx emission (metric ton)	
Input SOx emission (metric ton)	
Input PM_{10} emission (metric ton)	
Input fatality risk	
Input injury risk	

SITE INFORMATION	
Name	Vieques, PR
Date	7/18/2012 (rev)
Site	AOC E
Remedial Alternative Name	Alternative 2 with CP-1

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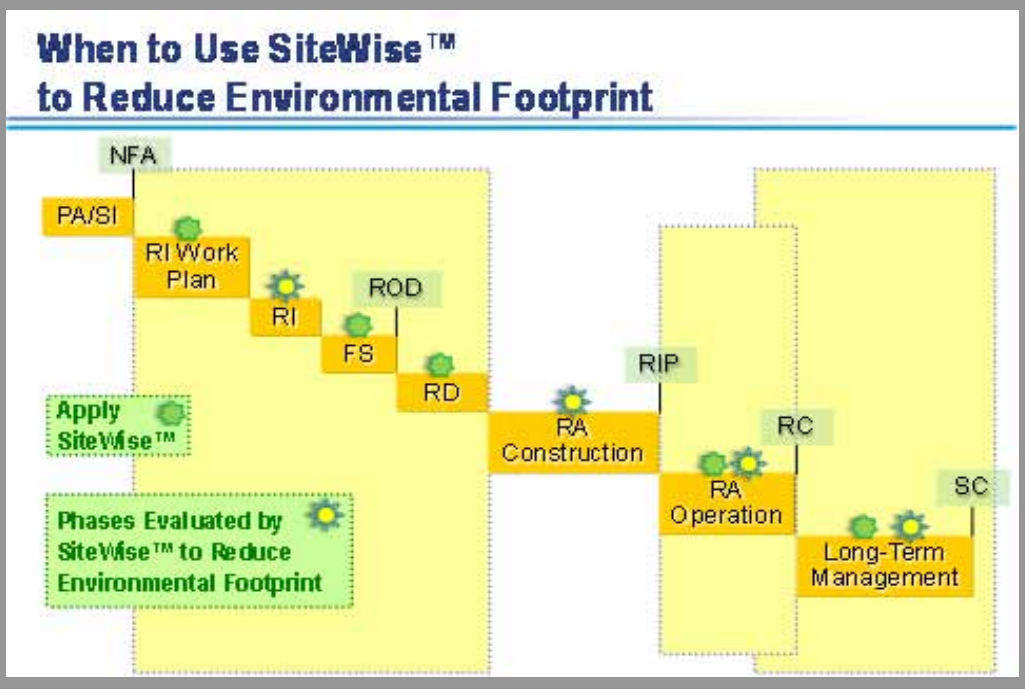

This worksheet allows the user to define material production, transportation, equipment use, and residual handling variables for the remedial alternative

Yellow cells	require the user to choose an input from a drop down menu
White cells	require the user to type in a value

MATERIAL PRODUCTION

WELL MATERIALS	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6
Input number of wells						
Input depth of wells (ft)						
Choose well diameter (in) from drop down menu	1/2	1/2	1/2	1/2	1/2	1/2
Choose material type from drop down menu	PVC	PVC	PVC	PVC	PVC	PVC
Choose specific material schedule from drop down menu	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC

TREATMENT CHEMICALS & MATERIALS	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
Input number of injection points		3				
Choose material type from drop down menu	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide
Input amount of material injected at each point (pounds dry mass)		1267				
Input number of injections per injection point		1				

GAC	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
Input weight of GAC used (lbs)						
Choose material type from drop down menu	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC

CONSTRUCTION MATERIALS	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6
Choose material type from drop down menu	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner
Input area of material (ft^2)						
Input depth of material (ft)						

WELL DECOMMISSIONING	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6
Input number of wells						
Input depth of wells (ft)						
Input well diameter (in)	1	1	1	1	1	1
Choose material from drop down menu	Soil	Soil	Soil	Soil	Soil	Soil

TRANSPORTATION

	Establishing LUC Deed Survey (1 day)	CHP Injection (3-person 4-day)				
PERSONNEL TRANSPORTATION - ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Choose vehicle type from drop down menu*	Other	Cars	Cars	Cars	Cars	Cars
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input distance traveled per trip (miles)	20	80				
Input number of trips taken	1	1				
Input number of travelers	2	3				
Input estimated vehicular fuel economy (mi/gal) (Input only if known for the vehicle selected, otherwise a default will be used by the tool)	15	15				

*For vehicle type 'Other' please enter values in Table 2b in the Look Up Table tab.

PERSONNEL TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)	3,000	3,000				
Input number of travelers	2	3				
Input number of flights taken	1	1				

PERSONNEL TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Choose vehicle type from drop down menu	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail
Input distance traveled (miles)						
Input number of trips taken						
Input number of travelers						

		CHP materials (4400 lbs)				
EQUIPMENT TRANSPORTATION - ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input distance traveled (miles)		1,000				
Input weight of equipment transported (tons)		2.2				

EQUIPMENT TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)						
Input weight of equipment transported (tons)						

EQUIPMENT TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)						
Input weight of load (tons)						

EQUIPMENT TRANSPORTATION - WATER	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (mile)		1500				
Input weight of load (tons)		2.2				

EQUIPMENT USE

EARTHWORK	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose earthwork equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd^3)						
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
DRILLING	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6
Input number of drilling locations						
Choose drilling method from drop down menu	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push
Input time spent drilling at each location (hr)						
Input depth of wells (ft)						
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

For each pump, select only one of the three methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused pump columns or unused methods

		Injection pump				
PUMP OPERATION	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6
Choose method from drop down	Method 2	Method 3	Method 1	Method 1	Method 1	Method 1

Method 1 - ELECTRICAL USAGE IS KNOWN						
Input pump electrical usage (KWh)	0	0	0	0	0	0
Method 2 - PUMP HEAD IS KNOWN						
Input flow rate (gpm)	0	0	0	0	0	0
Input total head (ft)	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0
Pump efficiency times motor efficiency (default already present, user override possible)	0.51	0.51	0.51	0.51	0.51	0.51
Input specific gravity (default already present, user override possible)	1	1	1	1	1	1
Method 3 - NAME PLATE SPECIFICATIONS ARE KNOWN						
Input pump horsepower (hp)	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0
Input pump load (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Input pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Region						
Choose region from drop down menu (scroll right to see figure)	AKGD	AKGD	AKGD	AKGD	AKGD	AKGD

Ininjeciton pump

DIESEL AND GASOLINE PUMPS	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1
Equipment operating hours (hrs)		40				
Input estimated fuel consumption rate (gal/hr) (Input only if known for the pump selected, otherwise a default will be used by the tool)						

For each type of equipment, select only one of the methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused equipment columns or unused methods

BLOWER, COMPRESSOR, MIXER, AND OTHER EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose type of equipment from drop down	Blower	Blower	Blower	Blower	Blower	Blower
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - NAME PLATE SPECIFICATIONS ARE KNOWN						
Input equipment horsepower (hp)	0	0	0	0	0	0
Input number of equipments operating	0	0	0	0	0	0
Input operating time for each equipment (hrs)	0	0	0	0	0	0
Input equipment load (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Input motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Method 2 - ELECTRICAL USAGE IS KNOWN						
Input equipment electrical usage, if known (KWh)	0	0	0	0	0	0
Region						
Choose region from drop down menu (scroll right to see figure)	AKGD	AKGD	AKGD	AKGD	AKGD	AKGD

GENERATORS	Generator 1	Generator 2	Generator 3	Generator 4	Generator 5	Generator 6
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Choose horsepower range from drop down menu	3 to 6	3 to 6	3 to 6	3 to 6	3 to 6	3 to 6
Input operating hours (hr)						

AGRICULTURAL EQUIPMENT	Tillage Tractor 1	Tillage Tractor 2	Tillage Tractor 3	Tillage Tractor 4	Tillage Tractor 5	Tillage Tractor 6
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input area to till (acre)						
Choose soil condition from drop down menu	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil
Choose soil type from drop down menu	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil
Input time available (work days)						
Input depth of tillage (in)						

CAPPING EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose stabilization equipment type from drop down menu	Roller	Roller	Roller	Roller	Roller	Roller
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input area (ft^2)						
Input time available (work days)						

MIXING EQUIPMENT	Mixer 1	Mixer 2	Mixer 3	Mixer 4	Mixer 5	Mixer 6
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input volume (yd^3)						
Input production rate (yd^3/hr)						
Input estimated fuel consumption rate (gal/hr) (Input only if known for the mixer selected, otherwise a default will be used by the tool)						

RESIDUAL HANDLING

RESIDUE DISPOSAL/RECYCLING	Soil Residue	Residual Water	Material Residue	Other Residuals	Other Residuals	Other Residuals
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Input weight of the waste transported to landfill or recycling per trip (tons)						
Choose vehicle type from drop down menu	On-road truck	On-road truck	On-road truck	On-road truck	On-road truck	On-road truck
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input total number of trips						
Input number of miles per trip						

LANDFILL OPERATIONS	Operation 1	Operation 2	Operation 3	Operation 4	Operation 5	Operation 6
Input tons of soil or waste to be incinerated (user must input emission factors in the Look Up Table, Table 7a)						

THERMAL/CATALYTIC OXIDIZERS*	Oxidizer 1	Oxidizer 2	Oxidizer 3	Oxidizer 4	Oxidizer 5	Oxidizer 6
Choose oxidizer type from drop down menu	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer
Choose fuel type from drop down menu	natural gas	Propane	natural gas	natural gas	natural gas	natural gas
Input waste gas flow rate (scfm)						
Input time running (hours)						
Input waste gas inlet temperature (F)						
Input contaminant concentration (ppmV)						

*(Electric blowers are included in the analysis)

WATER CONSUMPTION	Treatment System 1	Treatment System 2	Treatment System 3	Treatment System 4	Treatment System 5	Treatment System 6
Input water disposed/collected during treatment (gal)		1200				
Input water disposed/collected during site preparation (gal)						
Input water disposed/collected during sampling (gal)						
Input water disposed/collected during site demobilization (gal)						

LANDFILL METHANE EMISSIONS	Landfill 1	Landfill 2	Landfill 3	Landfill 4	Landfill 5	Landfill 6
Input landfill methane emissions (metric tons)						

OTHER KNOWN ONSITE ACTIVITIES	Entire Site
Input energy usage (MMBTU)	
Water consumption (gallon)	
Input CO_2 emission (metric ton)	
Input N_2O emission (metric ton CO_2 e)	
Input CH_4 emissions (metric ton CO_2 e)	
Input NOx emission (metric ton)	
Input SOx emission (metric ton)	
Input PM_{10} emission (metric ton)	
Input fatality risk	
Input injury risk	

This worksheet allows the user to define material production, transportation, equipment use, and residual handling variables for the remedial alternative

Yellow cells	require the user to choose an input from a drop down menu
White cells	require the user to type in a value

MATERIAL PRODUCTION

WELL MATERIALS	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6
Input number of wells						
Input depth of wells (ft)						
Choose well diameter (in) from drop down menu	1/2	1/2	1/2	1/2	1/2	1/2
Choose material type from drop down menu	PVC	PVC	PVC	PVC	PVC	PVC
Choose specific material schedule from drop down menu	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC

TREATMENT CHEMICALS & MATERIALS	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
Input number of injection points						
Choose material type from drop down menu	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide
Input amount of material injected at each point (pounds dry mass)						
Input number of injections per injection point						

GAC	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
Input amount of GAC used (lbs)						
Choose material type from drop down menu	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC

CONSTRUCTION MATERIALS	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6
Choose material type from drop down menu	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner
Input area of material (ft^2)						
Input depth of material (ft)						

WELL DECOMMISSIONING	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6
Input number of wells						
Input depth of wells (ft)						
Input well diameter (in)	1	1	1	1	1	1
Choose material from drop down menu	Soil	Soil	Soil	Soil	Soil	Soil

TRANSPORTATION

	Annual GW Monitoring (3 years; 2 days; 20 mpd)	Confirmation GW Sampling (3 year annually; 3 days; 20 mpd)	5-year-review (2)			
PERSONNEL TRANSPORTATION - ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Choose vehicle type from drop down menu*	Other	Cars	Cars	Cars	Cars	Cars
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input distance traveled per trip (miles)	40	60	40			
Input number of trips taken	3	3	2			
Input number of travelers	2	2	2			
Input estimated vehicular fuel economy (mi/gal) (Input only if known for the vehicle selected, otherwise a default will be used by the tool)	15	15	15			

*For vehicle type 'Other' please enter values in Table 2b in the Look Up Table tab.

PERSONNEL TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)	9,000	9,000	6,000			
Input number of travelers	2	2	2			
Input number of flights taken	1	1	1			

PERSONNEL TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Choose vehicle type from drop down menu	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail
Input distance traveled (miles)						
Input number of trips taken						
Input number of travelers						

EQUIPMENT TRANSPORTATION - ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input distance traveled (miles)						
Input weight of equipment transported (tons)						

EQUIPMENT TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)						
Input weight of equipment transported (tons)						

EQUIPMENT TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)						
Input weight of load (tons)						

EQUIPMENT TRANSPORTATION - WATER	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (mile)						
Input weight of load (tons)						

EQUIPMENT USE

EARTHWORK	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose earthwork equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd^3)						
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
DRILLING	**Event 1**	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**
Input number of drilling locations						
Choose drilling method from drop down menu	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push
Input time spent drilling at each location (hr)						
Input depth of wells (ft)						
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

For each pump, select only one of the three methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused pump columns or unused methods

PUMP OPERATION	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1

Method 1 - ELECTRICAL USAGE IS KNOWN						
Input pump electrical usage (KWh)	0	0	0	0	0	0
Method 2 - PUMP HEAD IS KNOWN						
Input flow rate (gpm)	0	0	0	0	0	0
Input total head (ft)	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0
Pump efficiency times motor efficiency (default already present, user override possible)	0.51	0.51	0.51	0.51	0.51	0.51
Input specific gravity (default already present, user override possible)	1	1	1	1	1	1
Method 3 - NAME PLATE SPECIFICATIONS ARE KNOWN						
Input pump horsepower (hp)	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0
Input pump load (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Input pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Region						
Choose region from drop down menu (scroll right to see figure)	AKGD	AKGD	AKGD	AKGD	AKGD	AKGD

DIESEL AND GASOLINE PUMPS	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1
Equipment operating hours (hrs)						
Input estimated fuel consumption rate (gal/hr) (Input only if known for the pump selected, otherwise a default will be used by the tool)						

For each type of equipment, select only one of the methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused equipment columns or unused methods

BLOWER, COMPRESSOR, MIXER, AND OTHER EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose type of equipment from drop down	Blower	Blower	Blower	Blower	Blower	Blower
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - NAME PLATE SPECIFICATIONS ARE KNOWN						
Input equipment horsepower (hp)	0	0	0	0	0	0
Input number of equipments operating	0	0	0	0	0	0
Input operating time for each equipment (hrs)	0	0	0	0	0	0
Input equipment load (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Input motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Method 2 - ELECTRICAL USAGE IS KNOWN						
Input equipment electrical usage, if known (KWh)	0	0	0	0	0	0
Region						
Choose region from drop down menu (scroll right to see figure)	AKGD	AKGD	AKGD	AKGD	AKGD	AKGD

GENERATORS	Generator 1	Generator 2	Generator 3	Generator 4	Generator 5	Generator 6
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Choose horsepower range from drop down menu	3 to 6	3 to 6	3 to 6	3 to 6	3 to 6	3 to 6
Input operating hours (hr)						

AGRICULTURAL EQUIPMENT	Tillage Tractor 1	Tillage Tractor 2	Tillage Tractor 3	Tillage Tractor 4	Tillage Tractor 5	Tillage Tractor 6
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input area to till (acre)						
Choose soil condition from drop down menu	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil
Choose soil type from drop down menu	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil
Input time available (work days)						
Input depth of tillage (in)						

CAPPING EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose stabilization equipment type from drop down menu	Roller	Roller	Roller	Roller	Roller	Roller
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input area (ft^2)						
Input time available (work days)						

MIXING EQUIPMENT	Mixer 1	Mixer 2	Mixer 3	Mixer 4	Mixer 5	Mixer 6
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input volume (yd^3)						
Input production rate (yd^3/hr)						
Input estimated fuel consumption rate (gal/hr) (Input only if known for the mixer selected, otherwise a default will be used by the tool)						

RESIDUAL HANDLING

RESIDUE DISPOSAL/RECYCLING	Soil Residue	Residual Water	Material Residue	Other Residuals	Other Residuals	Other Residuals
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Input weight of the waste transported to landfill or recycling per trip (tons)						
Choose vehicle type from drop down menu	On-road truck	On-road truck	On-road truck	On-road truck	On-road truck	On-road truck
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input total number of trips						
Input number of miles per trip						

LANDFILL OPERATIONS	Operation 1	Operation 2	Operation 3	Operation 4	Operation 5	Operation 6
Input tons of soil or waste to be incinerated (user must input emission factors in the Look Up Table, Table 7a)						

THERMAL/CATALYTIC OXIDIZERS*	Oxidizer 1	Oxidizer 2	Oxidizer 3	Oxidizer 4	Oxidizer 5	Oxidizer 6
Choose oxidizer type from drop down menu	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer
Choose fuel type from drop down menu	natural gas	Propane	natural gas	natural gas	natural gas	natural gas
Input waste gas flow rate (scfm)						
Input time running (hours)						
Input waste gas inlet temperature (F)						
Input contaminant concentration (ppmV)						

*(Electric blowers are included in the analysis)

WATER CONSUMPTION	Treatment System 1	Treatment System 2	Treatment System 3	Treatment System 4	Treatment System 5	Treatment System 6
Input water disposed/collected during treatment (gal)						
Input water disposed/collected during site preparation (gal)						
Input water disposed/collected during sampling (gal)						
Input water disposed/collected during site demobilization (gal)						

LANDFILL METHANE EMISSIONS	Landfill 1	Landfill 2	Landfill 3	Landfill 4	Landfill 5	Landfill 6
Input landfill methane emissions (metric ton)						

OTHER KNOWN ONSITE ACTIVITIES	Entire Site
Input energy usage (MMBTU)	
Water consumption (gallon)	
Input CO_2 emission (metric ton)	
Input N_2O emission (metric ton CO_2 e)	
Input CH_4 emissions (metric ton CO_2 e)	
Input NOx emission (metric ton)	
Input SOx emission (metric ton)	
Input PM_{10} emission (metric ton)	
Input fatality risk	
Input injury risk	

SITE INFORMATION	
Name	Vieques, PR
Date	7/18/2012
Site	AOC E
Remedial Alternative Name	Alternative 2 with CP-2

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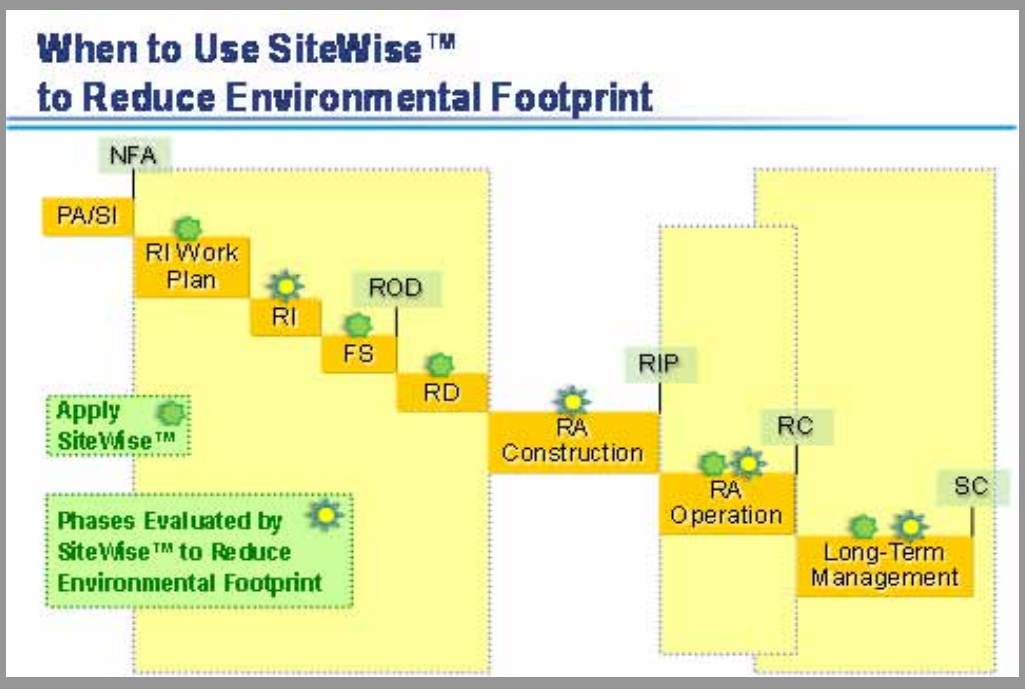

This worksheet allows the user to define material production, transportation, equipment use, and residual handling variables for the remedial alternative

Yellow cells	require the user to choose an input from a drop down menu
White cells	require the user to type in a value

MATERIAL PRODUCTION

WELL MATERIALS	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6
Input number of wells						
Input depth of wells (ft)						
Choose well diameter (in) from drop down menu	1/2	1/2	1/2	1/2	1/2	1/2
Choose material type from drop down menu	PVC	PVC	PVC	PVC	PVC	PVC
Choose specific material schedule from drop down menu	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC

TREATMENT CHEMICALS & MATERIALS	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
Input number of injection points		3				
Choose material type from drop down menu	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide
Input amount of material injected at each point (pounds dry mass)		667				
Input number of injections per injection point		1				

GAC	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
Input weight of GAC used (lbs)						
Choose material type from drop down menu	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC

CONSTRUCTION MATERIALS	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6
Choose material type from drop down menu	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner
Input area of material (ft^2)						
Input depth of material (ft)						

WELL DECOMMISSIONING	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6
Input number of wells						
Input depth of wells (ft)						
Input well diameter (in)	1	1	1	1	1	1
Choose material from drop down menu	Soil	Soil	Soil	Soil	Soil	Soil

TRANSPORTATION

	Establishing LUC Deed Survey (1 day)	Persulfate Injection (3-person 5-day)				
PERSONNEL TRANSPORTATION - ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Choose vehicle type from drop down menu*	Other	Cars	Cars	Cars	Cars	Cars
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input distance traveled per trip (miles)	20	100				
Input number of trips taken	1	1				
Input number of travelers	2	3				
Input estimated vehicular fuel economy (mi/gal) (Input only if known for the vehicle selected, otherwise a default will be used by the tool)	15	15				

*For vehicle type 'Other' please enter values in Table 2b in the Look Up Table tab.

PERSONNEL TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)	3,000	3,000				
Input number of travelers	2	3				
Input number of flights taken	1	1				

PERSONNEL TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Choose vehicle type from drop down menu	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail
Input distance traveled (miles)						
Input number of trips taken						
Input number of travelers						

		Oxidant material (4300 lb)				
EQUIPMENT TRANSPORTATION - ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input distance traveled (miles)		1,000				
Input weight of equipment transported (tons)		2.2				

EQUIPMENT TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)						
Input weight of equipment transported (tons)						

EQUIPMENT TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)						
Input weight of load (tons)						

EQUIPMENT TRANSPORTATION - WATER	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (mile)		1500				
Input weight of load (tons)		2.2				

EQUIPMENT USE

EARTHWORK	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose earthwork equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd^3)						
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
DRILLING	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6
Input number of drilling locations						
Choose drilling method from drop down menu	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push
Input time spent drilling at each location (hr)						
Input depth of wells (ft)						
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

For each pump, select only one of the three methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused pump columns or unused methods

PUMP OPERATION	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6
Choose method from drop down	Method 2	Method 1	Method 1	Method 1	Method 1	Method 1

Method 1 - ELECTRICAL USAGE IS KNOWN						
Input pump electrical usage (KWh)	0	0	0	0	0	0
Method 2 - PUMP HEAD IS KNOWN						
Input flow rate (gpm)	0	0	0	0	0	0
Input total head (ft)	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0
Pump efficiency times motor efficiency (default already present, user override possible)	0.51	0.51	0.51	0.51	0.51	0.51
Input specific gravity (default already present, user override possible)	1	1	1	1	1	1
Method 3 - NAME PLATE SPECIFICATIONS ARE KNOWN						
Input pump horsepower (hp)	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0
Input pump load (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Input pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Region						
Choose region from drop down menu (scroll right to see figure)	AKGD	AKGD	AKGD	AKGD	AKGD	AKGD
		Injection pump				
DIESEL AND GASOLINE PUMPS	**Pump 1**	**Pump 2**	**Pump 3**	**Pump 4**	**Pump 5**	**Pump 6**
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1
Equipment operating hours (hrs)		60				
Input estimated fuel consumption rate (gal/hr) (Input only if known for the pump selected, otherwise a default will be used by the tool)						

For each type of equipment, select only one of the methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused equipment columns or unused methods

BLOWER, COMPRESSOR, MIXER, AND OTHER EQUIPMENT	**Equipment 1**	**Equipment 2**	**Equipment 3**	**Equipment 4**	**Equipment 5**	**Equipment 6**
Choose type of equipment from drop down	Blower	Blower	Blower	Blower	Blower	Blower
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - NAME PLATE SPECIFICATIONS ARE KNOWN						
Input equipment horsepower (hp)	0	0	0	0	0	0
Input number of equipments operating	0	0	0	0	0	0
Input operating time for each equipment (hrs)	0	0	0	0	0	0
Input equipment load (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Input motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Method 2 - ELECTRICAL USAGE IS KNOWN						
Input equipment electrical usage, if known (KWh)	0	0	0	0	0	0
Region						
Choose region from drop down menu (scroll right to see figure)	AKGD	AKGD	AKGD	AKGD	AKGD	AKGD

GENERATORS	**Generator 1**	**Generator 2**	**Generator 3**	**Generator 4**	**Generator 5**	**Generator 6**
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Choose horsepower range from drop down menu	3 to 6	3 to 6	3 to 6	3 to 6	3 to 6	3 to 6
Input operating hours (hr)						

AGRICULTURAL EQUIPMENT	**Tillage Tractor 1**	**Tillage Tractor 2**	**Tillage Tractor 3**	**Tillage Tractor 4**	**Tillage Tractor 5**	**Tillage Tractor 6**
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input area to till (acre)						
Choose soil condition from drop down menu	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil
Choose soil type from drop down menu	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil
Input time available (work days)						
Input depth of tillage (in)						

CAPPING EQUIPMENT	**Equipment 1**	**Equipment 2**	**Equipment 3**	**Equipment 4**	**Equipment 5**	**Equipment 6**
Choose stabilization equipment type from drop down menu	Roller	Roller	Roller	Roller	Roller	Roller
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input area (ft^2)						
Input time available (work days)						

MIXING EQUIPMENT	**Mixer 1**	**Mixer 2**	**Mixer 3**	**Mixer 4**	**Mixer 5**	**Mixer 6**
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input volume (yd^3)						
Input production rate (yd^3/hr)						
Input estimated fuel consumption rate (gal/hr) (Input only if known for the mixer selected, otherwise a default will be used by the tool)						

RESIDUAL HANDLING

RESIDUE DISPOSAL/RECYCLING	**Soil Residue**	**Residual Water**	**Material Residue**	**Other Residuals**	**Other Residuals**	**Other Residuals**
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Input weight of the waste transported to landfill or recycling per trip (tons)						
Choose vehicle type from drop down menu	On-road truck	On-road truck	On-road truck	On-road truck	On-road truck	On-road truck
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input total number of trips						
Input number of miles per trip						

LANDFILL OPERATIONS	**Operation 1**	**Operation 2**	**Operation 3**	**Operation 4**	**Operation 5**	**Operation 6**
Input tons of soil or waste to be incinerated (user must input emission factors in the Look Up Table, Table 7a)						

THERMAL/CATALYTIC OXIDIZERS*	**Oxidizer 1**	**Oxidizer 2**	**Oxidizer 3**	**Oxidizer 4**	**Oxidizer 5**	**Oxidizer 6**
Choose oxidizer type from drop down menu	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer
Choose fuel type from drop down menu	natural gas	Propane	natural gas	natural gas	natural gas	natural gas
Input waste gas flow rate (scfm)						
Input time running (hours)						
Input waste gas inlet temperature (F)						
Input contaminant concentration (ppmV)						

*(Electric blowers are included in the analysis)

WATER CONSUMPTION	Treatment System 1	Treatment System 2	Treatment System 3	Treatment System 4	Treatment System 5	Treatment System 6
Input water disposed/collected during treatment (gal)		2600				
Input water disposed/collected during site preparation (gal)						
Input water disposed/collected during sampling (gal)						
Input water disposed/collected during site demobilization (gal)						

dust control (19 acre area)

LANDFILL METHANE EMISSIONS	Landfill 1	Landfill 2	Landfill 3	Landfill 4	Landfill 5	Landfill 6
Input landfill methane emissions (metric tons)						

OTHER KNOWN ONSITE ACTIVITIES	Entire Site
Input energy usage (MMBTU)	
Water consumption (gallon)	
Input CO_2 emission (metric ton)	
Input N_2O emission (metric ton CO_2 e)	
Input CH_4 emissions (metric ton CO_2 e)	
Input NOx emission (metric ton)	
Input SOx emission (metric ton)	
Input PM_{10} emission (metric ton)	
Input fatality risk	
Input injury risk	

This worksheet allows the user to define material production, transportation, equipment use, and residual handling variables for the remedial alternative

Yellow cells	require the user to choose an input from a drop down menu
White cells	require the user to type in a value

MATERIAL PRODUCTION

WELL MATERIALS	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6
Input number of wells						
Input depth of wells (ft)						
Choose well diameter (in) from drop down menu	1/2	1/2	1/2	1/2	1/2	1/2
Choose material type from drop down menu	PVC	PVC	PVC	PVC	PVC	PVC
Choose specific material schedule from drop down menu	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC	Schedule 40 PVC

TREATMENT CHEMICALS & MATERIALS	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
Input number of injection events						
Choose material type from drop down menu	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide
Input amount of material injected at each point (pounds dry mass)						
Input number of injection per injection event						

GAC	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
Input amount of GAC used (lbs)						
Choose material type from drop down menu	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC

CONSTRUCTION MATERIALS	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6
Choose material type from drop down menu	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner
Input area of material (ft^2)						
Input depth of material (ft)						

WELL DECOMMISSIONING	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6
Input number of wells						
Input depth of wells (ft)						
Input well diameter (in)	1	1	1	1	1	1
Choose material from drop down menu	Soil	Soil	Soil	Soil	Soil	Soil

TRANSPORTATION

	Annual GW Monitoring (3 years; 2 days; 20 mpd)	Confirmation GW Sampling (3 year anually; 3 days; 20 mpd)	5-year-review (2)			
PERSONNEL TRANSPORTATION - ROAD	**Trip 1**	**Trip 2**	**Trip 3**	**Trip 4**	**Trip 5**	**Trip 6**
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Choose vehicle type from drop down menu*	Other	Cars	Cars	Cars	Cars	Cars
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input distance traveled per trip (miles)	40	60	40			
Input number of trips taken	3	4	2			
Input number of travelers	2	2	2			
Input estimated vehicular fuel economy (mi/gal) (Input only if known for the vehicle selected, otherwise a default will be used by the tool)	15	15	15			

*For vehicle type 'Other' please enter values in Table 2b in the Look Up Table tab.

PERSONNEL TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)	9,000	9,000	6,000			
Input number of travelers	2	2	2			
Input number of flights taken	1	1	1			

PERSONNEL TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Choose vehicle type from drop down menu	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail
Input distance traveled (miles)						
Input number of trips taken						
Input number of travelers						

EQUIPMENT TRANSPORTATION - ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input distance traveled (miles)						
Input weight of equipment transported (tons)						

EQUIPMENT TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)						
Input weight of equipment transported (tons)						

EQUIPMENT TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (miles)						
Input weight of load (tons)						

EQUIPMENT TRANSPORTATION - WATER	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6
Input distance traveled (mile)						
Input weight of load (tons)						

EQUIPMENT USE

EARTHWORK	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose earthwork equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd^3)						
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
DRILLING	**Event 1**	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**
Input number of drilling locations						
Choose drilling method from drop down menu	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push
Input time spent drilling at each location (hr)						
Input depth of wells (ft)						
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

For each pump, select only one of the three methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused pump columns or unused methods

PUMP OPERATION	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1

Method 1 - ELECTRICAL USAGE IS KNOWN						
Input pump electrical usage (KWh)	0	0	0	0	0	0
Method 2 - PUMP HEAD IS KNOWN						
Input flow rate (gpm)	0	0	0	0	0	0
Input total head (ft)	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0
Pump efficiency times motor efficiency (default already present, user override possible)	0.51	0.51	0.51	0.51	0.51	0.51
Input specific gravity (default already present, user override possible)	1	1	1	1	1	1
Method 3 - NAME PLATE SPECIFICATIONS ARE KNOWN						
Input pump horsepower (hp)	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0
Input pump load (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Input pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Region						
Choose region from drop down menu (scroll right to see figure)	AKGD	AKGD	AKGD	AKGD	AKGD	AKGD

DIESEL AND GASOLINE PUMPS	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1
Equipment operating hours (hrs)						
Input estimated fuel consumption rate (gal/hr) (Input only if known for the pump selected, otherwise a default will be used by the tool)						

For each type of equipment, select only one of the methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused equipment columns or unused methods

BLOWER, COMPRESSOR, MIXER, AND OTHER EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose type of equipment from drop down	Blower	Blower	Blower	Blower	Blower	Blower
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - NAME PLATE SPECIFICATIONS ARE KNOWN						
Input equipment horsepower (hp)	0	0	0	0	0	0
Input number of equipments operating	0	0	0	0	0	0
Input operating time for each equipment (hrs)	0	0	0	0	0	0
Input equipment load (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Input motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85
Method 2 - ELECTRICAL USAGE IS KNOWN						
Input equipment electrical usage, if known (KWh)	0	0	0	0	0	0
Region						
Choose region from drop down menu (scroll right to see figure)	AKGD	AKGD	AKGD	AKGD	AKGD	AKGD

GENERATORS	Generator 1	Generator 2	Generator 3	Generator 4	Generator 5	Generator 6
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Choose horsepower range from drop down menu	3 to 6	3 to 6	3 to 6	3 to 6	3 to 6	3 to 6
Input operating hours (hr)						

AGRICULTURAL EQUIPMENT	Tillage Tractor 1	Tillage Tractor 2	Tillage Tractor 3	Tillage Tractor 4	Tillage Tractor 5	Tillage Tractor 6
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input area to till (acre)						
Choose soil condition from drop down menu	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil
Choose soil type from drop down menu	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil
Input time available (work days)						
Input depth of tillage (in)						

CAPPING EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
Choose stabilization equipment type from drop down menu	Roller	Roller	Roller	Roller	Roller	Roller
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input area (ft^2)						
Input time available (work days)						

MIXING EQUIPMENT	Mixer 1	Mixer 2	Mixer 3	Mixer 4	Mixer 5	Mixer 6
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input volume (yd^3)						
Input production rate (yd^3/hr)						
Input estimated fuel consumption rate (gal/hr) (Input only if known for the mixer selected, otherwise a default will be used by the tool)						

RESIDUAL HANDLING

RESIDUE DISPOSAL/RECYCLING	Soil Residue	Residual Water	Material Residue	Other Residuals	Other Residuals	Other Residuals
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No
Input weight of the waste transported to landfill or recycling per trip (tons)						
Choose vehicle type from drop down menu	On-road truck	On-road truck	On-road truck	On-road truck	On-road truck	On-road truck
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input total number of trips						
Input number of miles per trip						

LANDFILL OPERATIONS	Operation 1	Operation 2	Operation 3	Operation 4	Operation 5	Operation 6
Input tons of soil or waste to be incinerated (user must input emission factors in the Look Up Table, Table 7a)						

THERMAL/CATALYTIC OXIDIZERS*	Oxidizer 1	Oxidizer 2	Oxidizer 3	Oxidizer 4	Oxidizer 5	Oxidizer 6
Choose oxidizer type from drop down menu	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer
Choose fuel type from drop down menu	natural gas	Propane	natural gas	natural gas	natural gas	natural gas
Input waste gas flow rate (scfm)						
Input time running (hours)						
Input waste gas inlet temperature (F)						
Input contaminant concentration (ppmV)						

*(Electric blowers are included in the analysis)

WATER CONSUMPTION	Treatment System 1	Treatment System 2	Treatment System 3	Treatment System 4	Treatment System 5	Treatment System 6
Input water disposed/collected during treatment (gal)						
Input water disposed/collected during site preparation (gal)						
Input water disposed/collected during sampling (gal)						
Input water disposed/collected during site demobilization (gal)						

LANDFILL METHANE EMISSIONS	Landfill 1	Landfill 2	Landfill 3	Landfill 4	Landfill 5	Landfill 6
Input landfill methane emissions (metric ton)						

OTHER KNOWN ONSITE ACTIVITIES	Entire Site
Input energy usage (MMBTU)	
Water consumption (gallon)	
Input CO_2 emission (metric ton)	
Input N_2O emission (metric ton CO_2 e)	
Input CH_4 emissions (metric ton CO_2 e)	
Input NOx emission (metric ton)	
Input SOx emission (metric ton)	
Input PM_{10} emission (metric ton)	
Input fatality risk	
Input injury risk	

Appendix F
Technology Screening Summary

APPENDIX F

Technology Screening Summary for AOC E

F.1 Description of Remedial Technologies and General Response Actions

The technology types and process options available for remediation of groundwater were screened. The purpose of this step is to identify the technologies that may be applicable for remediation of the groundwater at AOC E.

Based on the site-specific conditions presented in the Final RI Report (CH2M HILL, 2008a) and ISCO Pilot Study Technical Memorandum (CH2M HILL, 2011), the remedial technologies were evaluated using a screening process for applicability to the AOC E site. This technology screening evaluated presumptive technologies relative to groundwater extraction and ex-situ treatment, and other technologies that are likely to provide improved performance, reduced cost, or both (USEPA, 1996).

This appendix provides a general overview and evaluation of the remediation technologies for chemical of concerns (COCs) in groundwater. In order to meet the RAOs, a combination of several technologies and/or response actions may be necessary.

No Action

No Action means that nothing is done to the site. It is typically retained as a remedial alternative to provide a baseline option to which other alternatives can be compared. No Action does not control, contain, or remediate potential contaminant sources or exposure.

Institutional Controls (ICs)

Institutional controls (ICs) are measures used for land use control (LUC), site access restrictions, limitation or prevention of exposure. ICs potentially applicable at the site include administrative restrictions such as LUC and deed notations for ground water use restrictions and access restrictions access restrictions (security fences/signs). Security fences already in place at the site. ICs alone do not control, contain, or remediate potential contaminant sources or reduce the mobility, volume, or toxicity of the contamination; rather, they reduce the potential for contact through control of exposure pathways. The Navy uses a Web-based management tool, LUC Tracker, as part of the Naval Installation Restoration Information System (NIRIS). Several ICs could be implemented at the site at a reasonable cost. However, ICs alone will not meet all of the RAOs for the site. ICs are retained for consideration as a component to be combined with other possible actions.

Long-term Monitoring (LTM)

The long-term monitoring is applicable for groundwater at SMWU 4. Groundwater LTM would include periodic performance monitoring to evaluate whether residual oxidant persulfate concentration has decreased to level (less than 500 mg/L), which would not interfere the analysis of COCs in the groundwater samples; to assess whether COC concentrations meet PRG; and to monitor potential COC rebound. Standard sampling procedures for groundwater have been established, so this is a readily implementable technology.

Vertical Barrier

A vertical barrier is a containment technology, including slurry walls, sheet piling, vibrating barrier walls, which involves physically and/or chemically creating subsurface barriers to contain/prevent contaminated groundwater flow. Containment of contaminated groundwater can be effective for isolating source areas with high off-site migration potential, but is generally not effective for low concentration dissolved-phase contaminants, localized groundwater impact area at AOC E This technology is not retained because it is not cost effective for the low concentration of COCs in groundwater at AOC E, with low groundwater velocity.

Removal

Removal would involve excavation of impacted solids and fluids using standard construction equipment (I.e. backhoes, bulldozers, and front-end loaders). The source area soil at AOC E has been removed up to 16 ft bgs in 1996 during the UST removal; Excavation up to 40 ft bgs or deeper to remove saturated zone soil and groundwater is technically challenging and not cost effective. This technology is not retained.

In-situ Chemical Oxidation (ISCO)

ISCO includes injection of oxidizing agents (persulfate, peroxide, permanganate, or ozone) to promote abiotic in situ oxidation of chlorinated organic compounds and petroleum hydrocarbons. This technology is effective on most chlorinated solvents, polyaromatic hydrocarbons, and petroleum products. Permanganate is not effective on benzene; ozone not easy to handle and not cost effective. ISCO using activated persulfate was successfully demonstrated at AOC E via pilot study to treat site COCs. Therefore, this technology is retained for further evaluation.

In-Situ Chemical Reduction (ISCR)

ISCR involves aqueous injection of reducing agents (zero-valent iron, hydrogen) to promote abiotic in situ reduction of chlorinated organic compounds, and is most suitable as a permeable treatment barrier for the migration of impacted CVOC groundwater. It is not compatible for site COCs. In addition, there is considerable uncertainty regarding the fundamental design parameters for field application, and the technology is not likely cost effective. This technology is not retained.

In-well Air Stripping (Circulating Wells)

By this technology, groundwater is aerated, lifted within a well bore, and re-infiltrates into different strata of the formation, thereby creating groundwater circulation. Target compounds are halogenated VOCs, SVOCs, and fuels. Variations of the technology may allow for its effectiveness against some nonhalogenated VOCs, SVOCs, pesticides, and inorganics. In general, in-well air strippers are more effective at sites containing high concentrations of dissolved contaminants with high Henry's law constants. This technology is not retained because it is not suitable for AOC E with low concentrations; extensive system capital investment required; and power not readily available at the site.

Air Sparging/Air Stripping

Air is injected into saturated matrices to remove contaminants through volatilization. This technology, often coupled with soil vapor extraction (SVE), may also be used at lower air flow rates to promote biodegradation of petroleum VOCs. Target compounds are VOCs, fuels, and some SVOCs. This technology is not retained because it is not suitable for AOC E with low concentrations; installation of additional SVE wells required; extensive system capital investment required; and power not readily available at the site. **Multiphase phase extraction (MPE)**

MPE is a technology that uses a high vacuum system to remove liquid (i.e., NAPL, contaminated groundwater) and soil vapor. It removes contaminants from above and below the water table. Once above ground, the extracted vapors, liquid-phase organics, and/or groundwater are separated and treated. Systems may be designed to recover only product, mixed product and water, or separate streams of product and water. Target compounds are VOCs and fuels (e.g., LNAPLs). MPE pilot test performed in 2002 already removed the LNAPL. This technology is not retained because LNAPL is not currently present in the site wells to warrant the application of MPE; extensive system capital investment is required; and power is not readily available at the site.

Enhanced Aerobic Bioremediation

The rate of bioremediation of organic compounds by microbes is enhanced by increasing the concentration of electron acceptors and nutrients in groundwater, surface water, and leachate. Oxygen is the main electron acceptor for aerobic bioremediation. Target compounds for enhanced biodegradation processes are nonhalogenated VOCs, nonhalogenated SVOCs, and fuels. Pesticides also should have limited treatability. Although this technology may be used as a polishing step (ORC socks) after ISCO treatment, there is no need for

placement of ORC socks due to the proven success of ISCO by pilot study. This technology is not retained due to the success of multiple rounds of ISCO injection to reduce COC concentrations below PRGs.

Enhanced Anaerobic Bioremediation

Enhanced Anaerobic Bioremediation includes subsurface delivery of electron donors (e.g., hydrogen, acetate, methanol, commercially available substrates, etc.) via Permeable Reactive Barriers or direct application within the target zone to stimulate anaerobic biodegradation of chlorinated compounds and perchlorate by reductive dechlorination. There is considerable uncertainty on rate and extent of biodegradation that can be achieved. Site-specific pilot-scale testing would be required. Nitrate serves as an alternative electron acceptor under anoxic conditions. Nitrate enhancement has primarily been used to remediate ground water contaminated by BTEX. As with any technology relying on advective flow for reagent delivery to the treatment zone, there are significant constraints in low permeability media. This technology is not retained because it is not quite effective for low concentration COCs at AOC E.

Monitored Natural Attenuation (MNA)

MNA is typically coupled with monitoring to achieve PRGs at the point of exposure. MNA consists of the reduction in mass or concentration of contaminants over time and distance from the source area. Short-and/or long-term routine monitoring is implemented to record site conditions, concentration levels, and natural attenuation parameters. Natural subsurface processes such as dilution, volatilization, biodegradation, adsorption, and chemical reactions with subsurface materials reduce concentrations to or toward acceptable levels. The most significant costs associated with natural attenuation are most often due to monitoring requirements. As described in the pilot study Technical Memorandum (CH2M HILL, 2008b), this technology is not retained because long remediation time (> 15 years) is required to meet the PRGs, with uncertainty to meet PRGS within a reasonable time frame.

Ex Situ Chemical Oxidation

Oxidizing agents (e.g., UV Oxidation) are used to destroy organic contaminants in an ex situ reactor. Potential oxidizing agents are UV radiation, ozone, and/or hydrogen peroxide/ferrous iron, or permanganate. Oxidizing agents are added to water for oxidation of cyanide, heavy metals, unsaturated organics, sulfides, phenolics, pesticides, aldehydes, and aromatic hydrocarbons to less toxic oxidation states. This technology is not retained because it is not suitable for 1,2-DCA; extensive system capital investment is required; and power is not readily available at the site.

Ion Exchange

Ion exchange removes ions from the aqueous phase by the exchange of cations or anions between the contaminants and the exchange medium. Ion exchange materials may consist of resins made from synthetic organic materials that contain ionic functional groups to which exchangeable ions are attached. They also may be inorganic and natural polymeric materials. After the resin capacity has been exhausted, resins often can be regenerated for re-use. This technology has long been used in industry and is commercially available. High concentrations of anions in sea water would make selective removal of low concentrations (low ppb level) of COCs at the AOC E challenging and potentially technically impractical. In addition, this technology would require a power supply. Potential for equipment vandalism/theft at the AOC E would make long-term O&M challenging. The O&M cost is relatively high because of pre-treatment requirements, discharge requirements, resin utilization, regenerant used, and exchange efficiency. This technology is not retained because it is not cost effective for the low concentration COCs in AOC E groundwater.

Separation

Separation processes seek to detach contaminants from their medium by processes: ultrafiltration/microfiltration, reverse osmosis, and electrodialysis. Target compounds are VOCs, SVOCs, pesticides, suspended particles. Use of these processes for groundwater treatment is limited due to high pretreatment requirements, fouling of membranes, and unsuitable membrane pore size for perchlorate removal. This technology is considered innovative but has limited usefulness for groundwater treatment. Potential for equipment vandalism/theft at the

AOC E would make long-term O&M challenging. This technology is not retained because of limited usefulness for low concentration COCs in groundwater at AOC E.

Liquid-Phase Carbon Adsorption

Liquid phase carbon adsorption is a technology in which groundwater is pumped through one or more vessels containing activated carbon to which dissolved organic contaminants adsorb. When the concentration of contaminants in the effluent from the bed exceeds a certain level, the carbon can be regenerated in place, removed and regenerated at an off-site facility, or removed and disposed. The two most common reactor configurations for carbon adsorption systems are the fixed bed and the pulsed or moving bed. The technology is well proven, and is frequently part of remedial designs. The duration of granular activated carbon (GAC) is usually short-term; however, if concentrations are low enough, the duration may be long-term. The duration of O&M is dependent on contaminant type, concentration, and volume; regulatory cleanup requirements; and metal concentrations. Carbon adsorption systems can be deployed rapidly, and contaminant removal efficiencies are high. This technology is typically applicable for ex-situ treatment of high flow but low concentrations of COCs water, which would require pretreatment to remove suspended solids and silica and disposal of spent carbon. Other anions in brackish groundwater (nitrate and sulfate) will reduce the ability of GAC to remove perchlorate. In addition, limited power availability and potential for equipment vandalism/theft would make long-term O&M challenging. This technology is not retained because it is not cost effective for ex-situ treatment of impacted brackish groundwater with low COC concentrations at the AOC E.

Biological Reactors

In a biological reactor, organics in water are oxidized through the use of a mixed culture of organisms in anaerobic conditions. Bioreactors (fluidized bed, packed bed) contain contaminants and electron donors to stimulate anaerobic biodegradation of chlorinated compounds by reductive dechlorination. This technology needs sufficient organic substrate to sustain organisms. It is a proven technology for chlorinated VOCs and perchlorate with relatively high concentrations (ppm level). In addition, limited power availability and potential for equipment vandalism/theft would make long-term O&M challenging. This technology is not retained because it is not cost effective for the low concentrations of COCs in groundwater at AOC E.

Phytoremediation

Phytoremediation involves mechanisms such as uptake, phytodegradation, phytoaccumulation by some plant species, and rapid rhizodegradation. This technology has received high public acceptance at other sites; no secondary waste production if phytoremediation is engineered to enhance rhizodegradation. However, because the depth to groundwater at AOC E is approximately 40 feet bgs and maximum root depths of tress on the island are typically within 15 feet bgs, this technology is not retained for further evaluation.

F.2 Summary of Technology Screening

Certain technologies and/or process options are not appropriate for implementation at AOC E because of impracticality, site conditions, cost (relative to benefit or anticipated performance), access, or COC characteristics, and were excluded from further consideration. Although a variety of physical and biological ex-situ technologies exist for contaminated groundwater treatment, such as ion exchange, granular activated carbon, reverse osmosis, nanofiltration/ultrafiltration, electrodialysis, and bio-reactors, these technologies are either cost prohibitive (relative to the benefit or anticipated performance) or considered not amenable to the site due to the limited power availability and potential for equipment vandalism/theft.

Based on the screening of potential technologies, the following technologies and response actions are retained for incorporation into remedial alternatives evaluation for AOC E:

- No Action
- Institutional Controls
- Long-term Monitoring
- In-situ Chemical Oxidation Using Persulfate (demonstrated by pilot study)

In addition, using Catalyzed Hydrogen Peroxide Propagations (CHP) to address persulfate persistence is based on findings of eight treatment studies performed by persulfate manufacturer FMC. The treatments included electrolysis, enzyme catalase, hydrogen peroxide addition, pH adjustment to 6.8 followed by hydrogen peroxide addition, pH adjustment to 3.4 followed by hydrogen peroxide addition, iron EDTA addition, iron EDTA addition followed by UV-irradation, and iron EDTA addition followed by thermal treatment. As documented in the ISCO Groundwater Pilot Study Technical Memorandum (CH2M HILL, 2011) (included in Appendix B of the FFS Report), "Of the eight treatments conducted to assess how best to decrease the residual persulfate concentrations, using hydrogen peroxide (H_2O_2) as an activator was the most feasible".

The above technologies and response actions have been grouped in order to present a range of alternatives including contingency plans that can be compared against NCP criteria and compliance with site-specific RAOs.

Appendix G
Final Response to USEPA and PREQB Comments

Final Responses to EPA Comments on the
Draft Focused Feasibility Study Report for AOC E (OU-02)
Former Naval Ammunition Support Detachment

Vieques, Puerto Rico

General Comments

1. It is unclear why only two alternatives (one with two contingencies) are proposed. No other potential remedial options were evaluated and compared prior to the selection of these two alternatives. A comprehensive evaluation of additional alternative remedies should be discussed in the FFS Report prior to the selection of the technology. For example, a previous multi-phase extraction (MPE) pilot study was reported to be successful with the qualification that operation period for the MPE system may have been too short. It is unclear why that technology was not included for further testing or considered as a part of the possible remedy. While it is understood that since the in situ chemical oxidation (ISCO) injections performed in March and June 2010 using alkaline-activated sodium persulfate as part of the pilot study to address groundwater contamination decreased chemicals of concern (COC) concentrations in groundwater to below the pilot study preliminary remediation goals (PRGs), and has resulted in residual persulfate which would most likely either preclude the use of other technologies or render them much more expensive since the persulfate has already been administered, adequate development of application technologies is still warranted. Residual persulfate is not considered to be problematic as long as it is not migrating into areas that can potentially represent an exposure pathway. Note that the use of hydrogen peroxide may present handling health and safety issues, and based on experiments conducted at EPA's Kerr Environmental Research Center, found to be a poor catalyst. In addition, has the Navy ruled out some kind of interference in the ground water samples by using an alternate method such as ferrous ammonium sulfate? And what about monitored natural attenuation? Please provide documentation of the factors considered and the evaluation process used to select the remedial actions included in the FFS Report ensuring that the process described is adequate to meet the requirements of Section 4.1.2.1 (Development and Screening of Alternatives) of the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA/540/G-89/004), dated October 1988 (RI/FS Guidance).

Navy Response:

The Navy has prepared a technology screening table (Table 4-3) for Section 4.6 and included a narrative summary of technology screening (see newly created Appendix F). Based on this, the following has been added at the end of Section 4.6:

"The alternatives evaluated in the Section 5 of the FFS were developed based on the demonstrated success of the ISCO technology at AOC E. Table 4-3 summarizes the results of the technology screening process. A narrative description of technologies and summary of technology screening for AOC E is included in Appendix F. Based on the screening of potential technologies and pilot study findings, the following technologies are retained for developing remedial alternatives in Section 5:

- No Action
- Institutional Controls
- Groundwater Monitoring
- ISCO"

With respect to the part of the comment regarding MPE, MPE pilot study was performed in 2002 because there was free product present. This technology is not considered a viable technology for the groundwater conditions just before or after the pilot study, with relatively low to non-detect COC

concentrations and no presence of recoverable free product. With respect to using Catalyzed Hydrogen Peroxide Propagations (CHP) to address persulfate persistence, the alternative was included based on findings of eight treatment studies performed by the persulfate manufacturer, FMC. This information has been added to the FFS to demonstrate that various technologies were evaluated. The following has been inserted after the second sentence of the first paragraph under Section 5.2.1 Contingency Plan 1 (CP-1): "The treatments included electrolysis, enzyme catalase, hydrogen peroxide addition, pH adjustment to 6.8 followed by hydrogen peroxide addition, pH adjustment to 3.4 followed by hydrogen peroxide addition, iron EDTA addition, iron EDTA addition followed by UV-irradiation, and iron EDTA addition followed by thermal treatment. As documented in the ISCO Groundwater Pilot Study Technical Memorandum (CH2M HILL, 2011), which is included in Appendix B, of the eight treatments conducted to assess how best to decrease the residual persulfate concentrations, using hydrogen peroxide (H_2O_2) as an activator was the most feasible."

Please note that because the area of groundwater contamination at AOC E was small, the Navy was able to implement the ISCO pilot study full-scale, and the results indicate the residual concentrations of the contaminants of concern (COCs) in the wells at the location of the former tank and waste oil drain line are below cleanup levels. Under these circumstances, no further remedial action at the site is likely necessary. In fact, the feasibility study was prepared solely to address two contingencies – one in which the COC levels rebound above cleanup levels and one in which it becomes desirable to accelerate the natural degradation of residual persulfate. Because the COC concentrations are likely already below cleanup levels site-wide and because the Navy has demonstrated a technology that can reduce already low levels of COCs to even lower levels (i.e., to below cleanup levels), the Navy feels that it is appropriate to focus the evaluation of alternatives, as presented in Sections 5 and 6 of the focused feasibility study (FFS).

2. Based on the information available, two injections were used, but the second injection may not have even been necessary to lower the contaminant levels based upon the elevated residual levels of perchlorate still present at the site. It was previously recommended that given the complexity and likely costs of the proposed ISCO Pilot Study activities, consideration should be given to a more scaled down study without the potential for such lingering impacts (e.g., significantly high residual persulfate levels), which appear to be occurring. In support of these recommendations, a more comprehensive evaluation of remedial options should be performed and documented to provide credence to the proposed contingency of further injecting persulfate should COCs rebound. While "no action" is included in the FFS Report, additional options are not presented outside of the actions already performed as part of the ISCO Pilot Study and the supporting potential contingencies evaluated to be implemented on as as-need basis. Revise the FFS Report to include a more comprehensive evaluation of additional remedial options as part of the detailed assessment such that additional alternatives are presented and eliminated based on the overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, reduction of toxicity, mobility, and volume through treatment, short-term effectiveness, implementability, and cost in order to more fully support the selection of ISCO as the remedial alternative.

Navy Response:

Please see the response to General Comment #1.

3. The FFS Report does not include a conceptual site model (CSM) discussion which would connect each complete exposure pathway with the established COCs, and ultimately to the proposed remedial alternatives to ensure that each complete pathway is adequately addressed by the remedial alternatives presented. Revise the FFS Report to include a comprehensive CSM discussion which addresses all complete exposure pathways.

Navy Response:

The Human Health Risk Assessment (HHRA) Summary contained in the Final RI Report for AOC E dated July 2008 (CH2M HILL, 2008) included a human health CSM, which described each complete exposure pathway with the established groundwater COCs. A summary of this information has been added to the FFS, with reference to the RI for additional detail. The second paragraph of Section 2.4 in the FFS Report was revised to read:

"A complete human health risk assessment (HHRA) and an ecological risk assessment (ERA) were included in the RI Report (CH2M HILL, 2008a). The complete HHRA, contained in the Appendix N of the RI Report (CH2M HILL, 2008a), evaluated the soil data collected during the 2002 RI and the 2005 Supplemental RI. Potential current and future receptors were evaluated in the HHRA. The only current potential receptor type at AOC E is maintenance workers, who may conduct grounds maintenance. As shown in the human health conceptual site model (CSM) for potential human receptors (Figure 2-5), future receptors evaluated in the HHRA consisted of future maintenance workers, industrial workers, construction workers, recreational users (adult, youth, and child), and residents (adult and child). EPA's target range for excess lifetime cancer risk (ELCR) associated with CERCLA sites is 1-in-10,000 (1x10-4) to 1-in-1,000,000 (1x10-6). Similarly, the target non-cancer hazard index (HI) is 1 or less. The potential risks based on the direct contact exposure pathways to contaminants detected in soil were within the USEPA acceptable range and, therefore, no soil COCs requiring remediation from a risk-based perspective were identified. Based on the HHRA estimates, unacceptable risks only exist for future residents (adult and child), associated with ingestion and dermal contact from potable use of groundwater, and inhalation of bathroom air from tap water use. The HHRA identified five site-related groundwater COCs that contributed to the unacceptable HHRA estimates: 1,2 DCA, 2-methylnaphthalene, MTBE, naphthalene, and xylenes. Additional groundwater samples collected and analyzed in 2008 indicated the COC concentrations had generally declined. However, the concentration of benzene was observed above its MCL in monitoring well MW-05; therefore, benzene was added to the site COC list. Table 2-1 summarizes the potential receptors and exposure scenarios evaluated in the HHRA and presents the resulting risk and hazard estimates and site-related COCs identified for site groundwater."

4. The PRGs presented in the FFS are unsupported. It is unclear why the values proposed in the Pilot Study have not been fully incorporated into the FFS. Further, the basis for the allowable persulfate values are not risk based. For example, the PRG for naphthalene, 100 micrograms per liter (µg/L), is based on EPA's health-advisory life-time value for naphthalene (2011 Edition of the Drinking Water Standards and Health Advisories Table, EPA 820-R-11-002), which is inconsistent with the rationale provided for the other COC PRGs in Table 4-2, which is risk based. Similarly, persulfate levels are to be monitored until they are below 500 milligrams per liter (mg/L), which is considered essentially non-reactive. This value is also not risk based. Revise the proposed PRGs for naphthalene and persulfate to be supported by a risk based analysis, or provide the technical rationale for why the determination of risk based values is unnecessary for naphthalene and persulfate.

Navy Response:

Persulfate is not a COC. It has no federal or Puerto Rico enforceable standard, such as an MCL, or risk-based screening level. Therefore, persulfate does not have a PRG. This information has been added to Section 4.4.

The *2011 Edition of the Drinking Water Standards and Health Advisories* (issued by the USEPA Office of Water) indicates that the cancer classification of naphthalene is "**I - inadequate information to assess carcinogenic potential.**" The Lifetime Health Advisory (HA) Level of 100 µg/L for naphthalene is defined as the concentration of naphthalene in drinking water that is not expected to cause any adverse

noncarcinogenic effects for a lifetime of exposure. In the updated *2012 Edition of the Drinking Water Standards and Health Advisories*, the HA Level of 100 μg/L for naphthalene is unchanged.

The Record of Decision (ROD) entries contained in the USEPA CERCLIS Public Access Database were searched for naphthalene cleanup goals in EPA Region 2. For the nine Superfund Sites where quantitative cleanup goals were available for naphthalene, goals ranged from 10 to 300 μg/L (see table below). A PRG of 10 μg/L was selected for three sites in New York, as stipulated in the NYSDEC Groundwater Standards, based on aesthetic impacts on surface waters. A PRG of 300 μg/L was selected for two sites in NJ as a result of the NJ Groundwater Quality Standard, based on a non-carcinogenic endpoint HI of 1 with an uncertainty factor (UF) of 10 for "Group C" carcinogens to provide sufficient protection from possible carcinogenic effects. Additionally, naphthalene does not have a groundwater standard (SG) in the Puerto Rico Water Quality Standards (PRWQS).

EPA ID	Site Name	Naphthalene Cleanup Goal in GW (ppb)	Basis
NYD980535652	APPLIED ENVIRONMENTAL SERVICES	10	NYSDEC Groundwater Standards
NYD010968014	CARROLL & DUBIES SEWAGE DISPOSAL	10	NYSDEC Groundwater Standards
NY4571924451	GRIFFISS AIR FORCE BASE (11 AREAS)	10	NYSDEC Groundwater Standards
NYD980664361	NIAGARA MOHAWK POWER CORP. (SARATOGA SPRINGS PLANT)	13	Cleanup level for groundwater protection (1995 ROD)
NJD001502517	CIBA-GEIGY CORP.	15	NA
NJD002168748	DAYCO CORP./L.E CARPENTER CO.	30	NJ Groundwater Quality Standard,Interim
NYD002920312	HOOKER CHEMICAL & PLASTICS CORP./RUCO	50	Minimum ARAR-based Groundwater Cleanup
NJ0001900281	FEDERAL CREOSOTE	300	NJ Groundwater Quality Standard
NJD063160667	GLOBAL SANITARY LANDFILL	300	NJ Groundwater Quality Standard

The May 2012 USEPA Regional Screening Level (RSL) Table provides carcinogenic inhalation toxicity values for naphthalene, with a tap water RSL of 0.14 μg/L corresponding to 1x10-6 excess lifetime cancer risk (ELCR) (or 14 μg/L corresponding to 1x10-4 ELCR). USEPA's target range for ELCR is 1x10-4 to 1x10-6. The 2012 RSL table also identifies a tap water RSL of 6.1 μg/L for non-carcinogenic endpoints, based on an HI of 1 (for cumulative exposures via ingestion/dermal/inhalation).

Puerto Rico regulations require groundwater such as that at AOC E be considered potable (i.e., groundwater is classified as Class SG - groundwater intended for use as source of drinking water supply and agricultural uses including irrigation, based on Puerto Rico Water Quality Standards [PRWQS] published in March, 2010). However, it should be noted that it is unlikely that site groundwater would be used as a source of potable water in the future since drinking water is supplied to Vieques from the mainland of Puerto Rico and groundwater investigations and pilot studies conducted at AOC E indicate the water-bearing unit is not productive enough to be used as a potable source. The saturated unconsolidated material at AOC E is clay-rich and has low permeability, as evidenced by the low hydraulic conductivity measured in MW-04 in 2002 (0.2 feet per day, or 7.06 x 10-5 centimeters per second [cm/sec]). The MPE pilot study in 2002 suggested a groundwater yield of about 0.216 gpm, which is not sufficient for normal potable use.

Based on the above information, the HI-based PRG of 6.1 μg/L, especially considering it is within the USEPA's acceptable ELCR range, is used as the PRG for naphthalene. This value and the pertinent information above have been added to Section 4.4.

5. Sufficient process and performance monitoring has not been proposed for Alternative 2 – Groundwater Monitoring and Institutional Controls (ICs) Contingency Plan 1 (CP-1) ISCO injection using Catalyzed Hydrogen Peroxide Propagations (CHP) and Contingency Plan 2 (CP-2) ISCO Injection using persulfate. Based on Section

6.1 (Process and Performance Monitoring) of the Technical and Regulatory Guidance for In Situ Chemical Oxidation of Contaminated Soil and Groundwater, dated January 2005 (ISCO Guidance), "Process and performance monitoring is usually completed on a more frequent schedule than post-treatment and closure monitoring." Section 6.1 of the ISCO Guidance also states that, "Comprehensive post-injection sampling should be completed at least three months after the last injection." However, process and performance monitoring are not discussed in the FFS Report and are not specifically included in the cost estimate, making it unclear if the remedy includes process and performance monitoring. Based on Section 6.2 (Post-Treatment and Closure Monitoring) of the ISCO Guidance, post-treatment and closure monitoring should continue quarterly for at least one year following completion of treatment and oxidant activity to ensure no rebound occurs; with it being noted that most states require annual monitoring for three years to conclude that the contamination will remain below target levels over the long term. Revise the FS to include process and performance monitoring in addition to the groundwater monitoring already planned at AOC E and ensure the rebound assessment period include monitoring for a minimum of three years.

Navy Response:

The Navy feels that it is more appropriate to base future performance monitoring on actual observations made during the multiple post-injection monitoring events conducted at AOC E than on non-site-specific recommendations in a guidance document. Note also that the FFS Report already includes performance monitoring in the assumptions and associated cost estimates. As described in Section 5.2, the performance monitoring assumed quarterly sampling of eight site monitoring wells for COCs/persulfate for 1 year. In addition, the last paragraph before Section 5.2.1 states: "The actual monitoring frequency, duration, numbers of monitoring wells, and parameters will be included in the long-term monitoring (LTM) work plan that will be prepared following signature of the ROD. The frequency, duration, and parameters provided above are for the cost-estimating purposes of this Focused FS." This LTM work plan will be subject to regulatory review and approval.

However, considering the relatively slow groundwater velocity, the groundwater sampling program presented in the FFS has been revised to include annual monitoring for 3 years. Please note this revision will not substantially affect the cost or the ultimate conclusion of the preferred alternative.

Based on the above, the following changes have been made in the FFS Report:

Page 5-2 second bullet has been revised to read: "Annual confirmation sampling of up to eight site monitoring wells (MW-01 through MW-08) for COCs for 3 years after persulfate concentrations are at or below 500 mg/L."

Page 5-3 first bullet has been revised to read: "Annual sampling of up to eight site wells (MW-01 through MW-08) for site COCs would be performed for 3 years after persulfate concentrations are at or below 500 mg/L to verify no rebound. If COC rebound above PRGs is observed at or before the end of 3 years of confirmation sampling, proceed to Contingency Plan CP-2."

Page 5-3 seventh bullet has been revised to read: "Annual sampling of up to eight site wells (MW-01 through MW-08) for site COCs and persulfate would be performed for 3 years."

The cost estimate table has been revised accordingly.

6. The presentation and discussion of short-term effectiveness for each alternative for soil and groundwater should include an estimate of the time the specific remedy would take to achieve remedial action objectives (RAOs). As a result, the timeframe to achieve RAOs is unclear and a comparison of alternatives based on short-term effectiveness cannot be conducted. Revise the short-term effectiveness Section 6.3.5 to provide a timeframe to achieve RAOs for the remedial actions discussed. Additionally, the data collected in support of the pilot study should be used to support this assessment.

Navy Response:

The short-term effectiveness discussions in Section 6.2.1, 6.2.2, 6.3.5 have been revised as requested.

7. The assessment of long-term effectiveness and permanence in the FFS Report is also inconsistent with the National Contingency Plan (NCP). The analysis to be conducted as part of the assessment of this criterion is to focus on any residual risk remaining at the site after the completion of the remedial action. The assessment is to include consideration of the degree of threat posed by the hazardous substances remaining at the site and the adequacy and reliability of any controls (e.g., engineering or institutional controls) used to manage the hazardous substances remaining at the site. The criterion is founded in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) mandates to select remedies that are protective of human health and the environment; that utilize permanent solutions and alternative treatment technologies or resource recovery technologies; and that maintain protection over time. Revise the long-term effectiveness Section 6.3.3 to provide a timeframe to achieve RAOs for the remedial actions discussed.

Navy Response:

The long-term effectiveness discussions in Section 6.2.1, 6.2.2, 6.3.3 have been revised as requested.

8. Currently it is unclear if future groundwater monitoring will include metals.

The *Critical Analysis of the Field-Scale Application of In Situ Chemical Oxidation for the Remediation of Contaminated Groundwater,* dated April 2008 concludes in the executive summary that, "Increases in chromium and manganese concentrations have persisted in the ISCO treatment zone, sometimes as long as three or more years. However, only two of 242 sites noted increases in metals concentrations off-site, and these abated once active ISCO remediation ceased. Microbial populations are not adversely impacted by ISCO. Permeability reductions may occur when using ISCO, but are relatively rare." Further, Section 6.8 (Discussion of the Impact of ISCO on Metals Mobility) states that, "ISCO may cause increases in aqueous phase metals concentrations due to changes in aquifer geochemistry and/or impurities in the oxidants delivered (section 4.7). Among the 23 case studies that measured metals concentrations, slightly over half reported increases above background levels for some metals. The duration and magnitude of increase in metals concentrations is highly site-specific, and depends upon the geochemical properties of the oxidant and the subsurface media being treated. The relative severity of the metals increase is also site-specific, and depends on the regulatory context and proximity of the ISCO TTZ [target treatment zone] to receptors. Only two case studies reported metals concentrations exceeding regulatory standards outside the treatment zone, and these exceedances abated once ISCO activities ceased. Metals mobility is something that should be considered when implementing ISCO, but based upon data available is not an issue that should preclude the use of ISCO in most situations."

Based on potential for metals to be present in groundwater form the ISCO injections, it appears that the FFS should be revised to indicate that future groundwater monitoring for metals will occur.

Navy Response:

As noted in the response to General Comment #5, the groundwater monitoring parameters proposed in the FFS Report are for cost evaluation purposes. The parameters to be sampled and frequency will be included in the LTM work plan, which will be subject to regulatory review and approval and will be prepared upon completion of the ROD. Inclusion of metals in the FS cost estimate would not significantly alter the cost and would not alter the ultimate conclusion on the preferred alternative.

Specific Comments

1. Section 2, Site Characterization Summary, Page 2-1: This section indicates that the detailed information presented in the Final Remedial Investigation Report, Area of Concern E (AOC E), Former Naval Ammunitions Support Detachment, Vieques, Puerto Rico (RI Report) and the Final In-Situ Remediation Pilot Studies (AOC E and AOC I Sites) Sampling and Analysis Plan, Former Naval Ammunition Support Detachment, Vieques, Puerto Rico (Pilot Study SAP) is not presented in the FFS Report; however, the information regarding the Human Health Risk Assessment (HHRA) is not sufficient to support the conclusions in the FFS Report. Revise Section 2 to include additional details from the HHRA such as the evaluation of the soil data and the identification of the site COCs.

   Navy Response:

   Table 2-1 has been updated to include a summary of the exposure scenarios (potential receptors, exposure media, exposure pathways) evaluated in the AOC E HHRA and the risk estimates based on the results of the HHRA. Additionally, the following sentence has been added to the end of the second paragraph of Section 2.4:

   "Table 2-1 summarizes the potential receptors and exposure scenarios evaluated in the HHRA and presents the resulting risk and hazard estimates and site-related COCs identified for site groundwater."

2. Appendix D (Cost Estimates for Remedial Alternatives): This appendix lacks sufficient detail. For example:

   a. The monitoring wells to be sampling during each sampling event have not been specified. As such, it is unclear if the proposed number of monitoring wells to be sampled during each event is sufficient.

      Navy Response:

      Appendix D includes notes regarding sampling all eight site monitoring wells. Please note that the number of wells, sampling frequency, and analytical parameters assumed in Appendix D are for cost-estimating purposes only. The actual number of wells to be sampled, sampling frequency, and analytical parameters will be provided in the post-ROD LTM work plan that will be subject to regulatory agency review and approval. This information has been added to Appendix D.

   b. Justification for the number of monitoring wells to be sampled has not been provided.

      Navy Response:

      Please see the response to Specific Comment 2a above.

   Ensure that the cost estimates will be revised to justify the proposed monitoring networks, or specify that the final determination of the monitoring well network will be made as part of the design process.

   Navy Response:

   Please see the response to Specific Comment 2a above.

3. Table 4-2: FS Preliminary Remediation Goals for both methyl t-butyl ether and naphthalene are listed as "[b]ased on the cancer risk of 10-5 and the November 2011 EPA Regional Screening Level." Please note that the National Contingency Plan states in 40 CFR 300.430(e)(3)(A)(2), "[t]he 10-6 risk level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective..." Please revise the table to include concentrations of 12 μg/l for methyl t-butyl ether and 0.14 μg/l for naphthalene as the appropriate PRGs or provide an explanation why the 10-6 risk level cannot be achieved.

Navy Response:

EPA's acceptable target range for excess lifetime cancer risk (ELCR) associated with CERCLA sites is 1-in-10,000 ($1x10^{-4}$) to 1-in-1,000,000 ($1x10^{-6}$). Similarly, the target non-cancer hazard index (HI) is 1 or less. The acceptable risk level as defined in the RAO is: cumulative risk level for the carcinogenic COCs within range of 1×10^{-4} to 1×10^{-6}; Hazard Index of individual non-carcinogenic COCs not greater than 1. Therefore, the PRG proposed for MTBE in Table 4-2 is appropriate. Please refer to response to General Comment #4 for revised risk-based naphthalene PRG of 6.1 μg/L.

Final Responses To PREQB Comments on the
Draft Focused Feasibility Study Report, Area of Concern (AOC) E
Former Naval Ammunition Support Detachment
Vieques, Puerto Rico,

Dated April 2012

General Comments

1. The nature of the site soils, a sandy clay and silty/clayey sand is generally consistent with the estimated horizontal groundwater velocity of 1 foot per year. The slow groundwater movement is generally not consistent with the relatively short, 2 to 3 year, groundwater monitoring programs presented in the FFS. Please provide options for monitoring programs of 5 and 10 years or present a technical rationale for a 2 or 3 year monitoring program that includes consideration of groundwater velocity.

Navy Response:

Please see the response to EPA General Comment #5.

PREQB Evaluation of Response:

General Comment #1 requested adjustment in the monitoring program from a one year period to a longer term due to an estimated groundwater velocity of 1 foot per year. The basis for the comment is that a slow groundwater velocity would render a short duration monitoring program ineffective. In response, the Navy has acknowledged the slow groundwater velocity and has adjusted the monitoring program to a three year period. Please provide a technical rationale based on hydrogeology and groundwater flow velocities why a three year monitoring program is conceptually adequate to monitor the post treatment period.

Navy Response:

The rationale of proposed additional 3 years of post-ISCO performance sampling was based on EPA-recommended performance sampling of a minimum of three years for rebound assessment (See EPA General Comment #3). If there was no active treatment (such as monitored natural attenuation), the groundwater velocity would be a crucial factor to determine the required LTM period. However, for the case of AOC E with active ISCO treatment, it should be noted that the primary reason for longer period of post-ISCO performance sampling is not primarily associated with the slow groundwater velocity, because the ISCO injection is targeted to treat the entire affected groundwater area, which is localized around MW-01, MW-01, and MW-05. The injectate will be delivered to the groundwater such that it covers the entire affected groundwater area as was done during the pilot study.

Please also note that the last paragraph before Section 5.2.1 states: “The actual monitoring frequency, duration, numbers of monitoring wells, and parameters will be included in the long-term monitoring (LTM) work plan that will be prepared following signature of the ROD. The frequency, duration, and parameters provided above are for the cost-estimating purposes of this Focused FS.” This LTM work plan will be subject to regulatory review and approval. Further, the duration will ultimately be based on the observations made during the LTM.

Page-Specific Comments

1. Page 3-1, Section 3.1 DBB Soil Pilot Study Summary:
   a. Conclusions of the pilot study indicate there is not a definitive concentration decrease between baseline and post-injection results. In fact, there is a dramatic increase in concentration, in some cases up to three to four orders of magnitude. While the DBB technology appears applicable to the limited area of soil impact, the conclusion that soil leaching to groundwater is not a concern is not fully supported by the limited soil assessment (four samples). Please provide further justification for not addressing soil contamination in the remedial options presented in this focused feasibility study. Alternatively, propose further soil to groundwater leaching evaluation as a pilot-scale program in Alternative 2, CP-1 or CP-2. The additional pilot-scale leaching evaluation should provide a basis for the number of soil samples that are needed to assess leachability based upon the estimated volume of impacted vadose zone soil.

      Navy Response:

      The data should not be interpreted as a concentration increase. This is most likely due to the natural heterogeneity of subsurface conditions and that the samples represent unique, physically distinct samples from slightly different depths and locations. The distinct post-DBB boring locations are in the vicinity of the pre-DBB boring locations, but they could not have been the same soil, since it was removed via the pre-injection soil sample. What is most important to consider, as shown on Figure 3-2 of the FFS Report, regardless of the reason the pre- and post-pilot study soil data vary, both sets of data show the soil Synthetic Precipitation Leaching Procedure (SPLP) concentrations are significantly below the Soil Project Action Levels (PALs) established for protection of soil to groundwater leaching (Pilot Study SAP, CH2MHILL, 2010).

      PREQB Evaluation of Response:

      As discussed during the August ERP Technical Subcommittee meeting, this comment requested further technical information as to why the DBB technology is applicable since the data presented in the draft FFS did not appear to support the conclusion provided. The Navy responded that due to heterogeneity the results are not indicative of the efficacy of the technology. As previously discussed and agreed, the navy will remove references to the specific pilot study data and provide a streamlined version of the efficacy of the DBB technology to the site contaminants.

      Navy Response:

      As noted during the August 2012 ERP Technical Subcommittee meeting, the innate heterogeneity of soil tends to cloud interpretation of the pre- and post-DBB soil data. What is most important is that both the pre- and post-DBB soil data suggest leaching is not a concern at the site. Therefore, to help avoid potential confusion, Table 3-1 and the discussion on comparison of pre-and post-DBB soil concentration data have been removed from the report. In addition, the first bullet on Page 3-2 of Section 3-1 has been deleted.

   b. Please indicate if soil samples were collected using 5035 sampling methodology during pre and post treatment events.

      Navy Response:

      The following text has been added after the fifth sentence of the fourth paragraph in Section 3.1:

      "The 2008 pre treatment samples were collected and analyzed using EPA CLP SOM01. Because of concentrations too high for the low level analysis, some samples were analyzed using the low concentration procedure (very similar to the 5035 method) and some were analyzed using the medium level procedure (very similar to the 5030 method). The post treatment soil samples were analyzed following method SW-846-5035 unless the concentrations were too high, in which they were analyzed by method 5030."

2. Section 3.2 ISCO Groundwater Pilot Study Summary: Please provide the technical rationale why elevated persulfate concentrations prohibit analysis of COCs in groundwater.

Navy Response:

Elevated persulfate concentrations do not prohibit analysis of COCs in groundwater. To help avoid this interpretation, the second sentence of fifth paragraph in Section 3.2 has been revised to read:

"Studies by the persulfate vendor, FMC Corporation (FMC), suggest persulfate is no longer reactive at concentrations below about 500 mg/L. However, studies by EPA suggest persulfate may be reactive at concentrations lower than 500 mg/L. For this reason, and at the request of EPA persulfate researcher Scott Huling, the Navy agreed to add ascorbic acid to all sample containers containing residual persulfate to sequester the persulfate and prevent it from continuing to react with contaminants (if present) in the sample container. However, because residual persulfate concentrations considerably higher than 500 mg/L were persistent at AOC E and because the Pilot Study SAP (CH2M HILL, 2010) indicated groundwater samples would be collected for analysis by the contracted laboratory once residual persulfate was consumed, select groundwater samples were sent to the persulfate manufacturer, FMC, for evaluation. "

3. Page 4-2, Section 4.2 Remedial Action Objective: Please specify the acceptable risk level for COCs that do not have a drinking water standard as part of the RAO statement.

Navy Response:

The RAO on Page 4-2 has been revised to read:

"Prevent exposure to COCs in groundwater at concentrations above drinking water standards or, in the absence of a drinking water standard, above USEPA's acceptable risk range (cumulative excess lifetime cancer risk of 1 x 10-4 to 1 x 10-6) and target Hazard Index (1)."

4. Section 5.2 Alternative 2 – Groundwater Monitoring and Institutional Controls:

   a. To assess potential impacts further downgradient of the release area, please add an additional downgradient monitoring well (MW-02, 07 or 08) to the long-term persulfate monitoring program.

   Navy Response:

   Please see the paragraph immediately preceding Section 5.2.1. The number of wells included in the FS is for cost estimating purposes only. The actual number and locations of wells will be included in the post-ROD LTM work plan, which will be subject to regulatory review and approval.

   b. Page 5-2: Please provide the technical basis that demonstrates that one year of groundwater monitoring post treatment is adequate given the low groundwater flow velocity of 1 foot per year.

   Navy Response:

   Please see the response to EPA General Comment #5.

5. Table 4-1a: Naphthalene has recently been identified as being carcinogenic through the inhalation pathway. Please clarify how the remediation goal (RG) is protective of inhalation exposures, as the human health risk assessment only addressed noncarcinogenic effects for naphthalene. It would be helpful if the cancer risks associated with groundwater routes of exposure are calculated for a groundwater naphthalene concentration of 100 ug/L as a means of demonstrating that this RG is within the target cancer risk range of 1E-06 to 1E-04.

Navy Response:

Please see the response to EPA General Comment #4.

PREQB Evaluation of Response:

PREQB prefers that a value of 1.4 ug/L be used as the preliminary remediation goal for naphthalene for consistency with the selected target cancer risk level for other chemicals of concern; however, PREQB will defer to EPA on this issue. Note that Puerto Rico's Water Quality Standards classify all groundwater as potable without qualification unless there is a legal restriction on groundwater use, such as for the National Wildlife Refuge. Therefore, groundwater at AOC E is considered potable. Please ensure that the response is consistent with our regulation and does not include a discussion of whether groundwater is considered suitable as a potable source, especially considering that a former drinking water well is located in the vicinity of AOC E and there is residential development occurring in the vicinity.

Navy Response:

The second last paragraph of Response to EPA Comment # 4 has been revised as follows: "Puerto Rico regulations require groundwater such as that at AOC E be considered potable (i.e., groundwater is classified as Class SG - groundwater intended for use as source of drinking water supply and agricultural uses including irrigation, based on Puerto Rico Water Quality Standards [PRWQS] published in March, 2010). However, it should be noted that it is unlikely that site groundwater would be used as a source of potable water in the future since drinking water is supplied to Vieques from the mainland of Puerto Rico and groundwater investigations and pilot studies conducted at AOC E indicate the water-bearing unit is not productive enough to be used as a potable source. The saturated unconsolidated material at AOC E is clay-rich and has low permeability, as evidenced by the low hydraulic conductivity measured in MW-04 in 2002 (0.2 feet per day, or 7.06×10^{-5} centimeters per second [cm/sec]). The MPE pilot study in 2002 suggested a groundwater yield of about 0.216 gpm, which is not sufficient for normal potable use."

6. Table 4-1b: Puerto Rico Water Quality Standards apply to all chemicals with SG standards. Please revise the citation for consistency with this ARAR.

Navy Response:

Table 4-1b Citation column has been revised to read "Puerto Rico Water Quality Standards apply to all chemicals with SG standards."

7. Figure 2-2: Include the location and depth profile for the former UST on the cross section. The depth profile will assist in the conceptual understanding of release mechanisms and extent of vadose zone soil impact.

Navy Response:

Figure 2-2 has been updated as requested.

8. Figures 3-3 through 3-5: Please clarify why elevated COC concentrations detected subsequent to the second ISBO injection are identified on Figures 3-3 but not included on Figures 3-4 or 3-5. For example, Figure 3-3 shows that naphthalene was detected at an elevated concentration of 590 ug/L at MW-4 on 1/27/2011 yet this data is not presented on Figure 3-4; benzene was detected at 40 ug/L in MW-1 on 1/27/2011 yet this data is not presented on Figure 3-5. Please ensure that all data is included on the trend analysis figures or include a footnote on the trend analysis figures to clarify why only select data is presented.

Navy Response:

Figure 3-3 was updated by adding yellow highlights to the MW-01 text box for Benzene and Naphthalene. Figures 3-4, 3-5, and 3-6 were updated using data from Figure 3-3.