#### Final

## In-Situ Remediation Pilot Study Report Area of Concern I (AOC I)

# Atlantic Fleet Weapons Training Area – Vieques Former Naval Ammunition Support Detachment Vieques, Puerto Rico

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### **Acronyms and Abbreviations**

μg/L micrograms per liter

AOC area of concern

AST aboveground storage tank

bgs below ground surface

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act

CLEAN Comprehensive Long-term Environmental Action—Navy

COC constituent of concern

DO dissolved oxygen
DOI Department of Interior

EBS Environmental Baseline Study
EISB enhanced in-situ Bioremediation

ELCR excess lifetime cancer risk
EQB Environmental Quality Board
ERA Ecological Risk Assessment

ERP Environmental Restoration Program

FFA Federal Facilities Agreement

ft/day feet per day ft/ft feet per foot

gpm gallons per minute

HHRA Human Health Risk Assessment

HI hazard index

IR Installation Restoration
ISCO in-situ chemical oxidation

mg/L milligram per liter
MOV Municipality of Viegues

mV millivolt

NASD Naval Ammunition Support Detachment NAVFAC Naval Facilities Engineering Command

Navy Department of the Navy

ORC oxygen releasing compound ORP oxygen reduction potential

PA Preliminary Assessment
PRG preliminary remediation goal

RI Remedial Investigation

SAP Sampling and Analysis Plan

SI Site Inspection

USEPA United States Environmental Protection Agency

USFWS United States Fish and Wildlife Service

VOC volatile organic compound

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### Introduction

This Pilot Study Report summarizes the activities performed and data obtained during the In-situ Chemical Oxidation (ISCO) and Enhanced In-situ Bioremediation (EISB) Pilot Study conducted at Area of Concern (AOC) I, located at the Former Naval Ammunition Support Detachment (NASD), Vieques, Puerto Rico (**Figures 1, 2,** and **3**). AOC I is approximately 1 acre in size and was a former asphalt plant that operated from the 1960s through 1988. The Municipality of Vieques (MOV) owns the land within which AOC I is located.

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

A Remedial Investigation (RI) conducted at AOC I identified six constituents of concern (COCs) within groundwater: benzene, bis(2-ethylhexyl)phthalate, 1,2-dichloroethane, 1,2-dichloropropane, 2-methylnapthalene, and naphthalene (CH2M HILL, 2008a). No COCs were identified in soil. Prior to the In-situ Remediation Pilot Study, COC concentrations in groundwater were limited to a relatively small area, demonstrated a declining trend over multiple years, and were relatively low. Evaluation of the RI and post-RI groundwater data indicated that although already low, certain COC concentrations could require more than a decade to decrease to acceptable levels. Therefore, a Pilot Study was implemented to determine if accelerated achievement of acceptable COC concentrations was possible.

The Pilot Study was implemented in a two-step systematic approach (ISCO directly followed by EISB) to initially oxidize organics and then increase the intrinsic biodegradation rate to reduce the attenuation time needed to achieve acceptable COC concentrations in groundwater. The baseline monitoring and ISCO injection were initiated in March 2010, followed by a post-injection monitoring event, application of EISB, and then three additional post-injection performance monitoring events, with the last monitoring event completed in November 2012.

The pertinent planning documents that set the framework for the implementation of the Pilot Study comprise 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 (CH2M HILL, 2010a), hereafter referred to as the Pilot Study Sampling and Analysis Plan (SAP), and the Technical Memorandum entitled Proposed Pilot Study of In-Situ Remediation at Vieques AOC I (CH2M HILL, 2008b). Results from the baseline monitoring, ISCO injection event, and the first performance monitoring event were documented in the report entitled: Status Report, Area of Concern I, In-Situ Remediation Pilot Study (CH2M HILL, 2011). Pertinent information from the Status Report is included in this Pilot Study Report.

#### 1.1 Pilot Study Objectives and Goals

The objectives of the Pilot Study were to:

- Determine if the groundwater Pilot Study technologies could reduce the groundwater COC concentrations to acceptable levels.
- Determine if the Pilot Study technologies could reduce the groundwater cleanup timeframe (relative to that predicted by natural attenuation alone).

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The Pilot Study approach consisted of an ISCO injection of sodium persulfate (sodium hydroxide alkaline activated Klozur) into four existing 2-inch-diameter monitoring wells (MW-02, MW-03, MW-04, and MW-07, as shown in **Figure 4**), followed by EISB by placing oxygen releasing compound (ORC) "socks" into the same monitoring wells and into one additional downgradient monitoring well (MW-05). Periodic groundwater monitoring (COC, geochemical, and microbial, as applicable) during March 2010 (pre-injection [a.k.a., baseline]), November 2010, and November 2011 were planned to evaluate the effectiveness of the Pilot Study technologies. Although the data collected during the planned Pilot Study performance monitoring period indicated COC concentrations had decreased to acceptable levels, the ERP Technical Subcommittee concurred during the February 2012 meeting to collect two additional rounds of samples to ensure rebound did not occur and that no further action is warranted (CH2M HILL, 2012). These two sampling events occurred in May and November 2012.

The following Pilot Study Preliminary Remediation Goals (PRGs) were developed based upon the USEPA Maximum Contaminant Levels (MCLs), or other standards for constituents without MCLs.

COCs	Pilot Study PRGs	Source of PRGs
Benzene	5 μg/L	MCL
Bis (2-ethylhexyl) phthalate	6 μg/L	MCL
1,2-Dichloroethane	3.8 μg/L	PRWQS for Groundwater-SG, lower than MCL of 5 $\mu g/L$
1,2-Dichloropropane	5 μg/L	MCL
2-Methylnaphthalene	27 μg/L	HI of 1: not a potential carcinogen, based on the December 2012 EPA Regional Screening Level
Naphthalene	6.1 μg/L*	$\mbox{\rm HI}$ based, (using December 2012 RSL for tap water for non-carcinogenic endpoints).

 $\mu$ g/L = micrograms per liter; HI = hazard index; MCL = maximum contaminant level; PRWQS = Puerto Rico Water Quality Standards \* A Pilot Study PRG of 1.4  $\mu$ g/L was originally selected solely to represent a conservative screening value to evaluate the technical implementability and effectiveness of the proposed Pilot Study technology. The value of 6.1  $\mu$ g/L is hazard index based, using the December 2012 RSL for tap water for non-carcinogenic endpoints, and is more appropriate to use as 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  $\mu$ g/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  $\mu$ g/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  $\mu$ g/L. A PRG of 10  $\mu$ g/L was selected for three sites in New York, as stipulated in the NYSDEC Groundwater Standards, 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).

The May 2013 USEPA Regional Screening Level (RSL) Table provides carcinogenic inhalation toxicity values for naphthalene, with a tap water RSL of 0.14  $\mu$ g/L corresponding to a 1x10-6 excess lifetime cancer risk (ELCR) (or 14  $\mu$ g/L corresponding to 1x10-4 ELCR). USEPA's target range for ELCR is 1x10-4 to 1x10-6. The 2013 RSL table also identifies a tap water RSL of 6.1  $\mu$ g/L for non-carcinogenic endpoints, based on an HI of 1 (for cumulative exposures via ingestion/dermal/inhalation).

Based on the above information, the HI-based PRG of  $6.1\,\mu\text{g/L}$ , especially considering it is within the USEPA's acceptable ELCR range, is used as the PRG for naphthalene.

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#### 1.2 Site Background

Vieques is located in the Caribbean Sea approximately 7 miles southeast of the eastern tip of the island of Puerto Rico (**Figure 1**). Vieques is the largest offshore island of the Commonwealth of Puerto Rico. It is approximately 20 miles long and 4.5 miles wide, and has an area of approximately 33,088 acres (51 square miles).

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 on April 30, 2001, in accordance with Presidential Directive to the Secretary of Defense of January 30, 2000, when the land was transferred to the DOI, MOV, and the Puerto Rico Conservation Trust. The property that contains AOC I was transferred to the MOV.

On February 11, 2005, the Atlantic Fleet Weapons Training Area – Vieques was placed on the National Priorities List (NPL), which required all subsequent environmental restoration activities for Navy Installation Restoration (IR) sites on Vieques to be conducted under CERCLA. On September 7, 2007, the Navy, DOI, USEPA, and PREQB executed a Federal Facility Agreement (FFA) that establishes the procedural framework and schedule for implementing the CERCLA response actions for Vieques.

AOC I is a former asphalt plant, located approximately 900 feet south of Mosquito Pier, adjacent to an active rock quarry within the former NASD and current MOV property. The asphalt plant was in operation from the 1960s through 1988. The former asphalt plant comprised a large concrete pad, asphalt mixing drum, earthen ramp, two concrete-paved containment areas, and an area where two diesel fuel aboveground storage tanks (ASTs) were located (Figure 3).

The AOC I area occupies approximately 1 acre, but the asphalt plant itself occupied a considerably smaller area. The topography of the site is relatively flat; stormwater at and in the immediate vicinity of the former asphalt plant was observed to pond at the site during a rain event rather than run off. At the northern, eastern, and southern margins of the site, the topography slopes downward to Route 200 (to the north), the quarry (to the south), and a drainage ditch for the quarry (to the east). Currently there is no continuous human presence or use of the site other than potentially as a passageway for trucks to/from the rock quarry from Route 200. The area that includes the site is fenced to discourage trespassing. Ecological habitat at the former asphalt plant is minimal, consisting primarily of scrub grass, brush, and small trees growing in and around the former asphalt plant structures and through the gravel-covered terrain. No federally-protected species or preferred habitats were observed at AOC I, nor are any cultural resources present at the site.

### 1.3 Previous Investigations

Previous environmental investigations conducted at AOC I prior to the implementation of the Pilot Study comprise:

- An Environmental Baseline Survey (EBS) was conducted in 2000 to disclose relevant information regarding the environmental condition of the site prior to property transfer of the former NASD (ERM, 2000). A reconnaissance of AOC I was conducted that identified two concrete-bermed containment areas with sumps. Three surface soil samples were collected. The EBS concluded that AOC I should be further investigated under the IR Program.
- An Expanded Preliminary Assessment (PA)/Site Inspection (SI) was conducted at AOC I in 2000 that
  consisted of an ecological survey and soil sampling from 26 co-located surface soil and subsurface soil
  samples to determine whether a release had occurred. The Expanded PA/SI recommended the site be
  investigated further in an RI to delineate the extent of surface soil impacts at the site and conduct a risk
  assessment (CH2M HILL, 2002).

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- RI activities were conducted in 2004, 2005, and 2006 that included surface soil sampling at 18 locations, subsurface soil sampling at 7 locations, and installing and sampling 9 monitoring wells (CH2M HILL, 2005; 2008a). The baseline Human Health Risk Assessment (HHRA) identified six COCs in groundwater. No human health COCs were identified in soil because the potential risks associated with the chemical constituents detected in soil were within acceptable limits (CH2M HILL, 2008a). Additionally, the soil concentrations of the six groundwater COCs were also lower than the concentrations that would likely need to be present to pose a leaching-to-groundwater concern. The Ecological Risk Assessment (ERA) concluded there were no unacceptable risk for ecological receptors at AOC I (CH2M HILL, 2008a).
- To help determine the appropriate path forward for the site, a post-RI round of groundwater samples was collected in July 2008 since 2 years had elapsed since the last RI sampling event.

#### 1.4 Conceptual Site Model

The surficial material at the site comprises gravel fill interspersed with silty clay and sand. Beneath the thin veneer of fill, the soil zone at the site is relatively thin (generally 2 to 9 feet thick) and consists of well-graded gravel with sand of the Qa geologic unit (Quaternary or Holocene alluvium). Andesite bedrock lies below the soil, generally weathered at its surface. **Figure 5** shows a geologic cross section through the site.

The upper portion of the bedrock is unsaturated. Depth to groundwater typically ranges from 14 to 22 feet below ground surface (bgs), with seasonal fluctuation up to approximately 9 feet. The directions and rates of groundwater movement in the andesite bedrock are confined by the size, frequency, and orientation of fractures and by the hydraulic gradient and, therefore, can be quite variable on the small-scale. However, the general direction of groundwater flow at AOC I for all eight rounds of water level measurements is northwest toward the Vieques Passage.

The hydraulic conductivity measured in 2004 and 2006 ranged from 0.1 foot per day (ft/day) to 8.6 ft/day (CH2M HILL, 2008b). The northern area of the site (represented by well MW-06) has the lowest hydraulic conductivity of 0.1 ft/day, while average hydraulic conductivity in southern and central portion of the site (represented by wells MW01 through MW-05) is 4.1 ft/day. The horizontal hydraulic gradient in the southern and central portion of AOC I ranges from approximately flat (November 2012) to approximately 0.005 feet per foot (ft/ft) (November 2011), but increases to a range of approximately 0.015 ft/ft (November 2012) to 0.032 ft/ft (November 2011) in the northern portion of AOC I. Based on the above information, a relatively low groundwater velocity ranging from 3 to 16 feet per year is suggested, with higher seepage velocity observed in the southern and central portion of the AOC I (CH2M HILL, 2010a).

The conceptual site model of AOC I is presented in **Figure 6**, which shows the historical features and potential contaminant migration routes. Based on the historical activities and extent of contamination identified during the RI and related investigations, releases occurred during past asphalt plant operations, likely in the form of minor drips and spills. The primary route of contaminant migration was likely vertical leaching through soil and bedrock to groundwater and subsequent transport with groundwater flow through fractures in the bedrock. However, the data show the extent of contamination was generally limited to the immediate vicinity of the former asphalt plant. Further, the pre-Pilot Study contaminant levels present in environmental media were relatively low with respect to human health-based and ecological-based screening values. No unacceptable human health or ecological risks were identified in soil at the site. However, COCs were identified in groundwater; COC concentrations in groundwater prior to the ISCO/EISB Pilot Study (i.e., from 2004 through 2008) are presented in **Figure 7**. Concentrations exceeding PRGs were limited to the area of MW-04, MW-05, and MW-07, which is the area immediately underlying the main operational activities of the former asphalt plant. However, data from the last sampling event prior to the start of the pilot study show the area of exceedance was limited to MW-07.

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## **Pilot Study Field Activities**

A summary of the Pilot Study field activities completed to date at AOC I is provided in **Table 1**. Site monitoring/injection wells are shown in **Figure 4**. The basis for the pilot study field activities can be found in the Pilot Study SAP (CH2M HILL, 2010a). The Vieques Technical Subcommittee, comprising representatives of the Navy, USEPA, and EQB, concurred on the wells to include in the Pilot Study based on historical data and Pilot Study objectives. Wells MW-01, MW-06, MW-08, and MW-09 were excluded from contaminant analysis during the Pilot Study because they were either upgradient of (MW-01) or far downgradient from (MW-06, MW-08, and MW-09) the area of contamination. These wells had been installed during the RI for the purposes of nature and extent determination but were not relevant to the Pilot Study. Due to the small size of the groundwater plume and slow groundwater velocity rates (3 to 16 ft/yr), MW-02, MW-03, MW-04, MW-05, and MW-07 were determined by the Technical Subcommittee as the appropriate wells to be used for monitoring contaminant concentrations during the Pilot Study.

#### 2.1 Baseline Monitoring

Groundwater elevations were measured from nine AOC I monitoring wells on March 15, 2010 (**Table 2**). Groundwater samples were collected from five monitoring wells (MW-02, MW-03, MW-04, MW-05, and MW-07) between March 18 and 22, 2010. Low-flow sampling techniques were used to purge and collect groundwater samples. Field readings (including turbidity) conducted during sampling were recorded on well purging forms, which are provided in **Appendix A**. Stabilized field parameters are listed in **Table 3**. Persulfate concentrations measured with a field test kit at time of sampling are provided in **Table 4**. Persulfate concentrations were measured to provide a pre-injection baseline. All sampling activities were conducted in accordance with the Pilot Study SAP.

#### 2.2 In-Situ Chemical Oxidation Injection

During the Pilot Study design, the oxidant (persulfate) demand was estimated based on: a) the historical groundwater geochemical data and water quality parameters (showing the anaerobic nature of the subsurface and likelihood of reduced iron and manganese exerting a demand on persulfate), b) the stoichiometric demand based on the historical COC concentrations, and c) professional judgment from numerous persulfate applications. Due to the very low COC concentrations and lack of NAPL at AOC I, the stoichiometric demand, as is common, was negligible.

ISCO injection activities were conducted from March 27 to 31, 2010 by ORIN Remediation Technologies, Inc. of McFarland, Wisconsin in accordance with the Pilot Study SAP. Approximately 835 pounds of sodium persulfate and 800 pounds of sodium hydroxide as an activator were mixed into a 5 percent by weight solution, and injected into MW-02, MW-03, MW-04, and MW-07 (for a total of approximately 2,033 gallons). A summary of the amount of solution injected into each monitoring well and field parameters recorded from the various monitoring wells are provided in **Appendix B**.

Approximately 500 gallons of mixed persulfate/NaOH solution (approximately 209 pounds persulfate and 19 gallons 25 percent NaOH solution with water to make 500 gallons mixture) were injected into each well (MW-02, MW-03, MW-04, and MW-07). These quantities are approximate as a few injections were done simultaneously and in one instance the flow rate was estimated because it was too low for flow meters to measure accurately (less than 1 gallons per minute [gpm]). The injection pressures ranged from 0 to 30 pounds per square inch (psi), only once briefly reaching the maximum of 30 psi. When the pressure reached 30 psi, the injection rate was lowered to decrease the pressure, which was maintained below 30 psi. The flow rates ranged from approximately 0.8 to 3.9 gpm.

No mounding was observed in the surrounding monitoring wells, nor was persulfate detected in wells that were not used as injection wells. This indicates that the injections influenced the local vicinity around each well as designed, and the oxidant solution did not migrate outside the COC-impacted area. Although

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fractures in the bedrock at AOC I may have provided preferential pathways for contaminant migration, the ISCO injections would have followed those same pathways since the injections were intentionally performed at very low pressures to avoid creating additional preferential flow pathways. Monitoring during injection was performed and showed no mounding in surrounding wells.

#### 2.3 Persulfate Monitoring

The AOC I monitoring wells to be sampled during the first post-injection performance monitoring event were tested for residual persulfate approximately 2 months before sampling. The purpose was to confirm the persulfate had been consumed sufficiently so that it would not potentially react with the COCs between the time the samples were collected and the time they were analyzed at the laboratory. The residual sodium persulfate concentrations in AOC I monitoring wells measured on August 24-27, 2010, as shown in **Table 4**, ranged from non-detect to 105 milligram per liter (mg/L) (MW-07). In a September 20, 2010 Technical Memorandum (CH2M HILL, 2010b), included in **Appendix C**, the Navy suggested groundwater containing less than 500 mg/L persulfate be sampled using the procedure set forth in the SAP. This proposal was based on a Technical Memorandum by FMC supporting such a limit (FMC, 2010), also included in **Appendix C**. Per an e-mail from USEPA's Scott Huling, also included in **Appendix C**, USEPA preferred to have the samples preserved with ascorbic acid (USEPA, 2010). The Vieques Technical Subcommittee agreed on the sampling approach in an October 4, 2010 conference call (CH2M HILL, 2010c). The procedure agreed upon was that for AOC I groundwater samples containing residual persulfate, the residual persulfate would be neutralized using ascorbic acid (instead of hydrochloric acid) before placing these on ice for shipment to the laboratory for analysis. Persulfate monitoring was conducted in accordance with the SAP (CH2M HILL, 2010a).

#### 2.4 First Post-injection Performance Monitoring Event

The first post-injection performance monitoring event was conducted from November 1 to 4, 2010. Groundwater elevations measured from each monitoring well are summarized in **Table 2** and presented in **Figure 8**. Groundwater flow was discussed in Section 1.4 and is further discussed in Section 3. Low-flow sampling techniques were used to purge and collect groundwater samples. Field readings (including turbidity) conducted during sampling were recorded on well purging forms, which are provided in **Appendix A**. Stabilized field parameters are listed in **Table 3**. Persulfate concentrations measured in groundwater using field test kits are presented in **Table 4**. The persulfate was measured after field parameters stabilized, immediately prior to collecting samples.

For informational purposes, groundwater collected from the five monitoring wells was processed with three different approaches in the field. One set of samples was collected in ascorbic acid-preserved vials, as concurred upon by the Technical Subcommittee (CH2M HILL, 2010c); a second set was collected in unpreserved vials; and a third set was collected in hydrochloric acid-preserved vials (i.e., in accordance with the SAP). **Table 4** shows the persulfate concentrations measured in wells at the time of sample collection. **Table 5** shows the results of the three analyses (with identification of the preservative method for each) for each well. Of note is that the volatile organic compounds (VOCs) concentrations for each well were essentially the same among the samples preserved with hydrochloric acid, ascorbic acid, and unpreserved. For example, benzene concentrations in samples from well MW-07, which had a measured persulfate concentration between 14 and 21 mg/L, were 9.5  $\mu$ g/L (unpreserved), 9.5  $\mu$ g/L (ascorbic acid), and 9.4  $\mu$ g/L (HCl). Therefore, at the concentrations observed at this site and given the water geochemistry, it does not appear to make a difference for VOC groundwater results how or if the samples were preserved.

#### 2.5 Enhanced In-Situ Bioremediation

Following the post-injection groundwater sampling event in November 2010, ten 2-inch diameter ORC socks (strung together) were placed down each of monitoring wells MW-02, MW-03, MW-04, MW-05 and MW-07 in accordance with the Pilot Study SAP. The ORC sock suspension lines were attached to a fitting on the underside of each well cap, allowing the ORC socks to remain suspended and submerged in groundwater

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within the screen zone when the well cap was in place. The ORC socks were removed in July 2011 according to the schedule in the Pilot Study SAP.

#### 2.6 Second Post-injection Performance Monitoring Event

The second post-injection performance monitoring event was conducted from November 9 to 10, 2011. Groundwater elevations measured from each monitoring well are summarized in **Table 2** and presented in **Figure 9**. Low-flow sampling techniques were used to purge and collect groundwater samples. Field readings (including turbidity) conducted during sampling were recorded on well purging forms, which are provided in **Appendix A**. Stabilized field parameters are listed in **Table 3**. Persulfate concentrations measured in groundwater using field test kits are presented in **Table 4**. Persulfate was measured after field parameters stabilized, immediately prior to collecting samples.

The results of the analyses for each well are presented in **Table 5** and are discussed in Section 3.

#### 2.7 Third Post-injection Performance Monitoring Event

After the first two post-injection sampling events scheduled in the SAP were conducted, the data were presented to the Vieques Environmental Technical Subcommittee with a recommendation to prepare a no further action proposed plan and record of decision. However, to ensure contaminant rebound was not observed, the Technical Subcommittee agreed to perform two additional sampling events for a subset of the AOC I monitoring wells (i.e., MW-04, MW-05, and MW-07). This agreement was reached in the February 22, 2012 Technical Subcommittee meeting. The third post-injection performance monitoring event was conducted from May 22 to 23, 2012. Groundwater elevations measured from each monitoring well are summarized in **Table 2** and presented in **Figure 10**. Low-flow sampling techniques were used to purge and collect groundwater samples. Field readings (including turbidity) conducted during sampling were recorded on well purging forms, which are provided in **Appendix A**. Stabilized field parameters are listed in **Table 3**. Persulfate concentrations measured in groundwater using field test kits are presented in **Table 4**. Persulfate was measured immediately prior to collecting samples.

#### 2.8 Fourth Post-injection Performance Monitoring Event

The fourth post-injection performance monitoring event was conducted from November 28 to 29, 2012. Groundwater elevations measured from each monitoring well are summarized in **Table 2** and presented in **Figure 11**. Low-flow sampling techniques were used to purge and collect groundwater samples. Field readings (including turbidity) conducted during sampling were recorded on well purging forms provided in **Appendix A**. Stabilized field parameters are listed in **Table 3**. Persulfate concentrations measured in groundwater using field test kits are presented in **Table 4**. Persulfate was measured immediately prior to collecting samples.

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### **Groundwater Monitoring Results**

This section summarizes the results of the groundwater monitoring activities during the baseline and post-injection performance monitoring events. The groundwater elevations measured at each of the monitoring wells prior to each sampling event are tabulated in **Table 2** and are shown in **Figures 8** through **11**. While the groundwater elevation fluctuated by as much as 9 feet, the groundwater flow direction stayed consistently to the northwest. The south and central portion of the site, where area of contamination was localized, has a relatively flat gradient. As discussed in section 3.2, there is no correlation between groundwater elevation and COC concentrations in groundwater. Field parameters and detected analytical concentrations are provided in **Tables 3** and **5**, respectively. The groundwater data were validated in accordance with the Pilot Study SAP. Concentration trends of benzene and naphthalene are shown in **Figures 12** through **15**, and are discussed below. Concentrations of the other COCs had already decreased to below PRGs prior to the start of the pilot test, as shown in **Table 5**. Analytical data and data validation reports for all Pilot Study sampling efforts are provided in **Appendix D**.

#### 3.1 Geochemical Parameters

Groundwater temperature remained consistent during the four sampling events (between 28 and 30 degrees Celcius), which is conducive for both ISCO and EISB (**Table 3**). The pH remained relatively neutral; however, one monitoring well (MW-07) exhibited elevated pH values from November 2011 to November 2012, potentially due to low residual sodium hydroxide base used to activate the sodium persulfate during ISCO. The pH showed a decreasing trend over the time period from November 2011 to 2012. While elevated pH is not ideal for EISB, the pH range in the other four wells supplied with ORC socks is optimal for EISB.

The specific conductivity increased between the first and second monitoring events at four monitoring wells (MW-02, MW-03, MW-04, and MW-07) before decreasing through the third and fourth events. This trend is likely a result of the residual sodium from the sodium persulfate oxidant and sodium hydroxide catalyst injected into these monitoring wells (sodium persulfate was not injected into well MW-05). The overall low dissolved oxygen (DO) concentrations suggest reducing conditions occur naturally in the aquifer. However, the DO readings of 6.59 mg/L in MW-02 in November 2010 and readings of 11.15 mg/L and 5.44 mg/L in 2011 and 2012, respectively, in MW-07 in 2012 may be the result of localized oxidizing conditions induced during ISCO or residual oxygen released during EISB. Oxygen reduction potential (ORP) concentrations ranged from -70.6 to 113 millivolts (mV) during the baseline sampling in March 2010, showed increasing trends in each individual well over the next few sampling events, and were between -232.8 and 25.4 mV (lower than initial values) in November 2012. The initial increases in ORP are indicative of the oxidant's effect on groundwater.

Dissolved iron and manganese were analyzed to confirm the presence of an oxidative environment post-injection, which would tend to decrease dissolved iron and manganese. As shown in **Table 5**, this is what was observed; iron and manganese concentrations declined at the injection wells (MW-02, MW-03, MW-04, and MW-07) following the ISCO injection, indicative of the desired oxidative conditions. Several wells also showed increases of these metals toward the end of the study, indicating a return to normal geochemical conditions.

#### 3.2 COC Concentration Trends

Based on the baseline groundwater monitoring event, benzene and naphthalene were identified as the key COCs (**Figure 7**). 1,2-dichloroethane, 1,2-dichloropropane, bis(2-ethyhexyl)phthalate, and 2-methylnapthalene were either not detected or were detected at concentrations below the Pilot Study PRGs during baseline sampling and all subsequent monitoring events.

Benzene was detected above the Pilot Study PRG (Figures 7, 12, and 13) at only one monitoring well (MW-07) following the injection. Although the concentration demonstrate a decrease from 14 micrograms per

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liter ( $\mu$ g/L) during baseline sampling to 0.82  $\mu$ g/L during November 2012 sampling, the change in concentration may be due to natural degradation as well as ISCO influence. Benzene concentrations have decreased steadily since the baseline sampling event, with no evidence of rebound in the 2012 sampling events.

Like benzene, naphthalene (**Figures 7, 14, and 15**) was detected above the Pilot Study PRG in only one monitoring well (MW-07) following the injection. Also like benzene, naphthalene concentrations in MW-07 decreased to be below the Pilot Study PRG and showed no evidence of rebound.

As stated in Section 1.1, the objectives of the Pilot Study implemented at AOC I were to: (1) determine if the groundwater Pilot Study technologies could reduce COC concentrations to acceptable levels and (2) determine if the Pilot Study technologies could reduce the groundwater cleanup timeframe (relative to that predicted by natural attenuation alone). The associated project quality objective (PQO), as documented in Worksheet 11 of the Pilot Study SAP (CH2M HILL, 2010a), was to collect data sufficient for determining whether unacceptable risk associated with potential potable groundwater use at the site was mitigated (i.e., all COC concentrations below Pilot Study PRGs) and, therefore, no further action was warranted.

As noted previously, the concentrations of all groundwater COCs in all wells (except benzene and naphthalene in well MW07) had declined to below Pilot Study PRGs before the Pilot Study baseline sampling (i.e., between 2004 and 2010). For MW07, **Table 6** summarizes the percent reduction of benzene and naphthalene in monitoring well MW-07 prior to and during the Pilot Study implementation. The table also includes 2-methylnaphthalene because it helps demonstrate the potential affect on COC concentration decline by natural processes and the Pilot Study technologies. As shown in the table, the concentrations of these three COCs declined between 74 percent and 79 percent over the 5 ½ years prior to the Pilot Study (i.e., under the influence of natural attenuation processes alone). During the 2 ½-year Pilot Study, the same COCs declined by about 95 percent.

In addition to the above, natural attenuation modeling (see Attachment C of the Pilot Study SAP [CH2M HILL, 2010a]) indicated it would take approximately 7 years for benzene and 14 years for naphthalene to decline from levels measured at AOC I in 2008 to the Pilot Study PRGs under the influence of natural attenuation processes alone. As shown in **Figures 12 and 14**, the Pilot Study PRGs for both of these two COCs were achieved in about 4 years (i.e., 2008 to 2012).

The information above indicates the decreases in COC concentrations were attributable to both natural processes and Pilot Study technologies, with the Pilot Study technologies likely accelerating the decline to below the PRGs. Regardless of the relative contribution of natural processes and Pilot Study technologies, the monitoring conducted before and during the Pilot Study indicated all COCs at the site declined to below the PRGs without rebound.

#### 3.3 Residual Human Health Risk

Although the COC concentrations decreased to below Pilot Study PRGs (in most cases before the pilot study was initiated), human health risk calculations were performed using the most recent COC concentrations (i.e., from May and November 2012) to ensure residual COC concentrations do not pose an unacceptable risk under an unrestricted use scenario. As shown in **Table 5**, only three of the six COCs were detected in 2012. Based on maximum detected concentrations in 2012 and comparison to the USEPA Regional Screening Levels for tap water (November 2012), the total excess lifetime cancer risk (ELCR) is  $3x10^{-5}$  and the maximum target organ-specific hazard index (HI) is 0.5 (**Table 7**). Both the ELCR and HI are within USEPA-acceptable risk levels.

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### **Conclusions and Path Forward**

In summary, the conclusions for the In-situ Pilot Study are as follows:

- The groundwater Pilot Study technologies (potentially coupled with natural processes) achieved the Pilot Study goals by reducing the groundwater COC concentrations to acceptable levels within 26-months (from March 2010 to May 2012), a rate faster than predicted by natural attenuation alone.
- The Pilot Study results are applicable to the site as a whole since the area of contamination was small enough to apply the Pilot Study site-wide.
- Only monitoring well MW-07 showed COC exceedances at the start of the Pilot Study, and only for two COCs: benzene and naphthalene.
  - Benzene concentrations decreased from 59.3  $\mu$ g/L in September 2004 to 0.82  $\mu$ g/L in November 2012 (from 14  $\mu$ g/L to 0.82  $\mu$ g/L during the Pilot Study). Benzene concentrations declined naturally by 76 percent prior to the Pilot Study and by 94 percent following the ISCO injection and EISB application; overall concentrations declined by 99 percent. Benzene fell below its PRG of 5  $\mu$ g/L between November 2011 and May 2012 and no rebound was observed.
  - Naphthalene concentrations decreased from 96 μg/L in January 2006 to being undetected in November 2012(from 21 μg/L to non-detect during the Pilot Study). Naphthalene concentrations declined naturally by 74 percent prior to the Pilot Study and by 95 percent following the ISCO injection and EISB application; overall concentrations declined by 99 percent. Naphthalene fell below its PRG of 6.1 μg/L between November 2011 and May 2012 and no rebound was observed.
- 1,2-Dichloroethane concentrations decreased from 1.6 μg/L (January 2006) to below detection (July 2008). 1,2-Dichloroethane has not been detected since 2006.
- 1,2-Dichloropropane concentrations decreased from 0.33μg/L (September 2004) to below detection (January 2006). 1,2-Dichloropropane has not been detected since 2004.
- 2-Methylnaphthalene concentrations decreased from 110  $\mu$ g/L (January 2006) to 1.1  $\mu$ g/L (November 2012). 2-Methylnaphthalene concentrations fell below the PRG of 27  $\mu$ g/L between January 2006 and July 2008, prior to the start of the pilot test.
- Bis(2-Ethylhexyl)phthalate concentrations decreased from 9.6  $\mu$ g/L (September 2004) to below detection (May 2012). Bis(2-Ethylhexyl)phthalate concentrations fell below the PRG of 6  $\mu$ g/L between September 2004 and July 2008, prior to the start of the pilot test.

Before implementing the Pilot Study, groundwater COC concentrations were trending down due to natural attenuation and a likely overall decrease in residual adsorbed COC mass in the fine-grained matrix. Implementing ISCO and EISB likely accelerated the rate of mass dissolved concentration decreases, and no rebound has been observed. In addition, residual risk under a potable use scenario is acceptable because the ELCR and HI based on the current concentrations of all COCs are within USEPA-acceptable risk levels.

Because there are no soil COCs, because the Pilot Study PRGs were achieved site-wide and no rebound was observed, and because residual risks are within acceptable levels under a potable use scenario, no further action is warranted for AOC I. A no further action proposed plan and record of decision will be prepared for AOC I based on information presented in the RI and this Pilot Study report.

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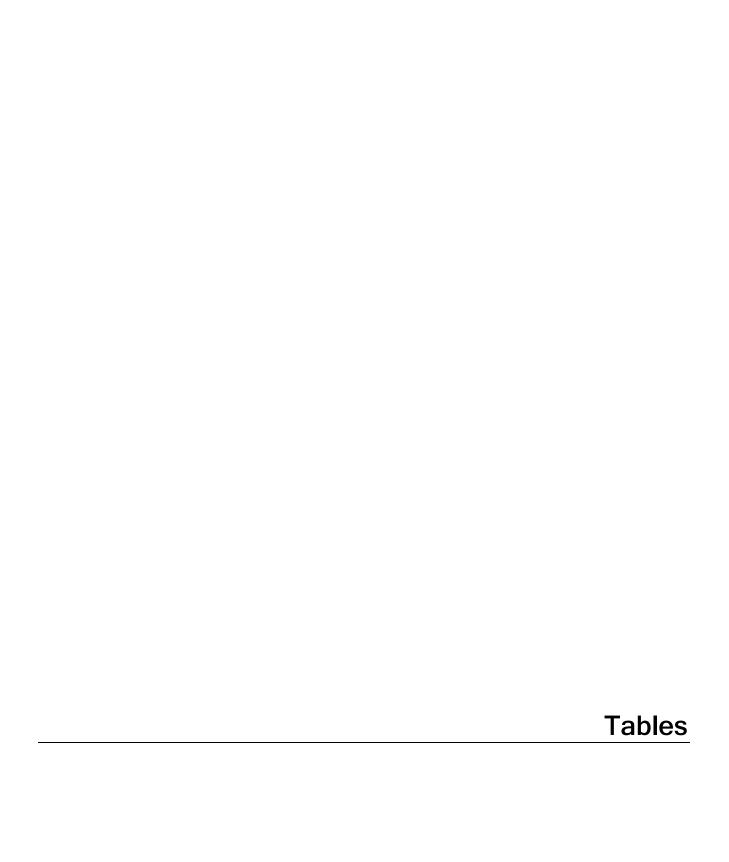


TABLE 1
Pilot Study Approach
AOC I In-Situ Remediation Pilot Study Report
Former Naval Ammunition Support Detachment
Vieques, Puerto Rico

Date	Specific Activity	Comments
March 18-22, 2010	Baseline Groundwater Sampling Event	Purged and sampled 5 monitoring wells (MW-02, MW-03, MW-04, MW-05, and MW-07).
March 27-31, 2010	ISCO Injection Event	Injected 835 pounds of sodium persulfate with 800 lbs of sodium hydroxide (total of approximately 2,033 gallons) across four existing monitoring wells (MW-02, MW-03, MW-04, and MW-07).
August 24-27, 2010	Measured persulfate concentrations in wells	Performed in preparation for sampling in accordance with SAP. Residual sodium persulfate was detected in some wells; worked with EPA/EQB between September and October 2010 to modify the sampling approach to account for residual persulfate (use of ascorbic acid as preservative).
November 1-4, 2010	First Performance Groundwater Sampling Event	Collected site-wide water-level measurements. Purged and sampled 5 monitoring wells (MW-02, MW-03, MW-04, MW-05, and MW-07).
November 4, 2010	EISB (ORC sock placement)	Installed 2-inch diameter ORC socks in the screen zone of monitoring wells MW-02, MW-03, MW-04, MW-05, and MW-07.
July 27, 2011	ORC sock removal	ORC sock removal from monitoring wells MW-02, MW-03, MW-04, MW-05 and MW-07.
November 9-10, 2011	Second Performance Groundwater Sampling Event	Collected site-wide water-level measurements. Purged and sampled 5 monitoring wells (MW-02, MW-03, MW-04, MW-05, and MW-07).
May 22-23, 2012	Third Performance Groundwater Sampling Event	Collected site-wide water-level measurements. Purged and sampled 3 monitoring wells (MW-04, MW-05, and MW-07).
November 27-28, 2012	Fourth Performance Groundwater Sampling Event	Collected site-wide water-level measurements. Purged and sampled 3 monitoring wells (MW-04, MW-05, and MW-07).

TABLE 2 Groundwater Elevations AOC I In-Situ remediation Pilot Study Report Former Naval Ammunition Support Detachment Vieques, Puerto Rico

	Top of		Septe	mber 22, 2004	2004 January 10, 2006		March 17, 2006		March 15, 2010		November 1, 2010		November 9, 2011		May	y 22, 2012	Novemb	per 27, 2012
	Casing	Screen Interval	•		Depth to		Depth to		Depth to		Depth to		Depth to		Depth to	Groundwater	Depth to	Groundwater
Monitoring	Elevation	Depth	Water (ft BTOC)	Groundwater Elev.	(ft BTOC)	Groundwater Elev.	Water (ft BTOC)	Groundwater Elev.	Water (ft BTOC)	Groundwater Elev.	Water (ft BTOC)	Groundwater Elev.	Water (ft BTOC)	Groundwater Elev.	Water (ft BTOC)	Elev.	Water (ft BTOC)	Elev.
Well ID	(ft amsl)	, , , , ,	,	, ,	,	` '	,	` '	, ,	, ,	,	` '	,	` '	, ,	(ft amsl)	, ,	(ft amsl)
MW-01	35.27	0.45 to -9.55	17.68	17.59	17.57	17.70	22.18	13.09	24.93	10.34	20.82	14.45	16.46	18.81	18.32	16.95	25.50	9.77
MW-02	34.54	-0.36 to -10.36	17.28	17.26	16.97	17.57	21.44	13.10	24.20	10.34	20.08	14.46	15.80	18.74	17.65	16.89	24.78	9.76
MW-03	34.77	5.58 to -4.42	17.54	17.23	17.23	17.54	21.75	13.02	24.35	10.42	20.45	14.32	16.10	18.67	17.90	16.87	25.02	9.75
MW-04	34.96	2.81 to -7.19	17.95	17.01	17.53	17.43	22.14	12.82	24.62	10.34	20.60	14.36	16.35	18.61	18.14	16.82	25.19	9.77
MW-05	34.82	0.22 to -9.78	18.26	16.56	17.84	16.98	22.26	12.56	24.21	10.61	20.65	14.17	16.57	18.25	18.09	16.73	24.96	9.86
MW-06	34.75	-0.25 to -10.25	25.04	9.71	20.65	14.10	25.04	9.71	24.65	10.10	22.14	12.61	19.33	15.42	19.96	14.79	26.25	8.50
MW-07	35.16	-0.27 to -10.27	18.14	17.02	17.73	17.43	22.14	13.02	24.85	10.31	20.85	14.31	16.64	18.52	18.28	16.88	25.33	9.83
MW-08	33.81	0.81 to -9.19	NI	NI	19.69	14.12	24.01	9.80	23.55	10.26	21.24	12.57	18.36	15.45	19.00	14.81	25.26	8.55
MW-09	35.1	0.10 to -9.90	NI	NI	18.55	16.55	23.39	11.71	23.61	11.49	21.31	13.79	17.53	17.57	18.68	16.42	25.11	9.99

#### Notes:

ft BTOC = feet below top of casing ft amsl = feet above mean sea level

NI- Not yet installed

MWs-02, 03, 04, and 07 had ISCO applied in them March 27-31, 2010. The previously mentioned wells and MW-05 received EISB treatment November 4, 2010 to July 27, 2011.

TABLE 3

Stablized Field Parameters

AOC I In-Situ Remediation Pilot Study Report

Former Naval Ammunition Support Detachment

Vieques, Puerto Rico

					1			1					1										
	Monitoring Well		MW-02			MW-03				MW-04					MV	V-05					MW-07		
Field Parameter	Date	3/18/2010	11/3/2010	11/10/2011	3/19/2010	11/4/2010	11/9/2011	3/19/2010	11/2/2010	11/10/2011	5/23/2012	11/28/2012	3/18/2010	11/2/2010	11/8/2011	11/9/2011	5/22/2012	11/28/2012	3/22/2010	11/4/2010	11/9/2011	5/23/2012	11/29/2012
Temperature (°C)		29.72	29.34	28.50	29.68	29.35	28.40	29.82	29.44	29.20	29.04	29.00	29.56	29.24	28.90	27.60	29.87	28.60	28.93	29.80	28.00	29.40	29.10
Specific Conductance (mS/cm)		1.099	1.620	1.084	1.275	1.779	1.161	1.289	1.843	1.393	1.489	1.420	1.431	1.358	1.348	1.258	1.311	1.040	1.374	9.861	8.230	4.796	3.700
Dissolved Oxygen (mg/L)		0.13	6.59	2.20	0.26	0.37	0.31	0.17	0.28	1.08	2.30	0.27	0.28	0.21	1.05	0.55	0.23	0.44	0.51	0.35	11.15	5.44	2.01
Oxidation-Reduction Potential (mV)		113.0	172.1	25.4	-49.4	-8.7	-163.7	30.8	106.9	-85.1	-116.3	-232.8	-7.0	12.5	52.9	-4.0	45.6	-100.1	-70.6	89.9	48.6	-41.7	-42.4
рН		6.69	6.60	6.96	6.76	7.28	6.90	6.77	6.86	7.07	6.96	6.54	6.74	6.73	6.69	6.71	7.01	6.36	6.72	7.38	12.26	11.12	10.00
Turbidity (NTU)		2.02	1.11	6.31	10.2	7.87	10.08	6.09	11.9	11.5	1.37	2.0	3.49	4.16	23.8	19.2	4.43	3.0	10.9	4.32	22.7	19.6	11.1

#### Notes:

°C - degrees centigrade

mS/cm - millisiemens per centimeter

mg/L - milligrams per liter

mV - millivolts

NTU - Nephelometric Turbidity Unit

NM - not measured

MWs-02, 03, 04, and 07 had ISCO applied in them March 27-31, 2010. These wells and MW-05 received EISB treatment November 4, 2010 to July 27, 2011.

TABLE 4
Persulfate Concentration
AOC I In-Situ Remediation Pilot Study Report
Former Naval Ammunition Support Detachment
Viegues, Puerto Rico

	Persulfate Concentration (PPM)													
Monitoring Well ID	March 18-22, 2010	August 24-27, 2010	November 1-4, 2010	Novmeber 9-10, 2011	May 22-23, 2012	November 28-29, 2012								
MW-01	nm	0	nm	nm	nm	nm								
MW-02	0	14	14	0.7	nm	nm								
MW-03	0	2.1	0-0.7	0	nm	nm								
MW-04	0	1.4	0-0.7	0.7	0	0								
MW-05	0	0	0	0	0	0								
MW-07	0	105	14-21	1.4	1.4	0								
MW-08	nm	0	nm	nm	nm	nm								
MW-09	nm	0	nm	nm	nm	nm								
nm- Not measu	ıred													

#### Notes:

MWs-02, 03, 04, and 07 had ISCO applied in them March 27-31, 2010. These wells and MW-05 received EISB treatment November 4, 2010 to July 27, 2011. Persulfate monitoring was conducted in accordance with the SAP (CH2M HILL, 2010a).

TABLE 5

AOC I In-Situ Remediation Pilot Study Report Former Naval Ammunition Support Detachment Vieques, Puerto Rico

Station ID			1	MW01						MW02			
Sample ID	GW PRGs	NDAIGW01-R01	WAI-GW01-06A	WAI-GW01P-06A	VWAI-MW01-08C	NDAIFD01P-R01	NDAIGW02-R01	VWAI-MW02-08C	VWAI-MW02-0310	VWAI-MW02-1110	VWAI-MW02-1110A	VWAI-MW02-1110H	VWAI-MW02-1111
Sample Date	GWFRGS	09/23/04	01/10/06	01/10/06	07/23/08	09/21/04	09/21/04	07/24/08	03/18/10	11/03/10	11/03/10	11/03/10	11/10/11
Preservative Method		HCI	HCI	HCI	HCI	HCI	HCI	HCI	HCI	Unpreserved	Ascorbic Acid	HCI	HCI
Chemical Name													
Volatile Organic Compounds (UG/L)													
1.2-Dichloroethane	3.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	1 U	1 U	1 U	1 U
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatile Organic Compounds (UG/L)													
2-Methylnaphthalene	27	5 UJ	5 U	5 U	0.093 U	5.2 U	5.2 U	0.1 U	1 U	1 U	NA	NA	2 U
bis(2-Ethylhexyl)phthalate	6	10 UJ	5 U	5 U	4.7 U	10.4 U	10.4 U	5 U	5 U	5 U	NA	NA	2 U
Naphthalene	6.1	5 UJ	5 U	5 U	0.093 U	5.2 U	5.2 U	0.1 U	1 U	1 U	NA	NA	2 U
Dissolved Metals (UG/L)													
Iron, Dissolved		83.3 J	100 U	100 U	100 U	33.4 J	32.5 J	100 U	200 U	100 U	NA	NA	50 U
Manganese, Dissolved		37.9	10.9 J	11.5 J	4 R	865	859	1,050 R	1,500	70.7 J	NA	NA	155 J
Wet Chemistry (MG/L)													
Nitrate		NA	0.66	0.615	NA	NA	NA	NA	0.74 B	11 B	NA	NA	3.9
Persulfate (field test kit)		NA	NA	NA	NA	NA	NA	NA	0	14	14	14	0.7
Sulfate		NA	22.2	22.4	NA	NA	NA	NA	8.2 B	90	NA	NA	59
Total organic carbon (TOC)		NA	2.74 J	8.58	NA	NA	NA	NA	3.6 J	4.4 J	NA	NA	5.4 J

#### Bold indicates detections

Bold indicates detections

Bolded shading indicates detected exceedance.

10-0.7 indicates an estimated value of persulfate that was less than 0.7 mg/L .

NA - Not analyzed

B - Analyte also detected in an associated method blank (unvalidated data).

J - Estimated (validated data).

J - Below reporting limit (unvalidated data).

B - Unreliable Result
 U - Nondetect or not detected at significantly greater than that in an associated blank.
 UJ - Nondetect. Estimated reporting limit.

MG/L - Milligrams per liter UG/L - Micrograms per liter

TABLE 5

AOC I In-Situ Remediation Pilot Study Report Former Naval Ammunition Support Detachment Vieques, Puerto Rico

Station ID					MW03			
Sample ID	NDAIGW03-R01	VWAI-MW03-08C	VWAI-MW03-0310	VWAI-MW03P-0310	VWAI-MW03-1110	VWAI-MW03-1110A	VWAI-MW03-1110H	VWAI-MW03-1111
Sample Date	09/21/04	07/24/08	03/19/10	03/19/10	11/04/10	11/04/10	11/04/10	11/09/11
Preservative Method	HCI	HCI	HCI	HCI	Unpreserved	Ascorbic Acid	HCI	HCI
Chemical Name								
Volatile Organic Compounds (UG/L)								
1,2-Dichloroethane	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	5 U	5 U	1 U	1 U	1 U	1 U
Benzene	0.62	0.14 J	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatile Organic Compounds (UG/L)								
2-Methylnaphthalene	5 U	1.3	1 U	1 U	1 U	NA	NA	2 U
bis(2-Ethylhexyl)phthalate	10 U	5 U	5 U	5 U	5 U	NA	NA	2 U
Naphthalene	5 U	0.71 J	1 U	1 U	1 U	NA	NA	2 U
Dissolved Metals (UG/L)								
Iron, Dissolved	99.8 J	321	578	NA	100 U	NA	NA	113 J
Manganese, Dissolved	1,290	1,450 R	1,850	NA	589 J	NA	NA	1,350 J
Wet Chemistry (MG/L)								
Nitrate	NA	NA	0.023 BJ	NA	0.042 U	NA	NA	0.042 U
Persulfate (field test kit)	NA	NA	0	0	0-0.7 <sup>1</sup>	0-0.7 <sup>1</sup>	0-0.7 <sup>1</sup>	0
Sulfate	NA	NA	5.9 B	NA	200	NA	NA	42
Total organic carbon (TOC)	NA	NA	4.5 J	NA	6.6 J	NA	NA	6 J

#### Bold indicates detections

Bold indicates detections

Bolded shading indicates detected exceedance.

10-0.7 indicates an estimated value of persulfate that was less than 0.7 mg/L .

NA - Not analyzed

B - Analyte also detected in an associated method blank (unvalidated data).

J - Estimated (validated data).

J - Below reporting limit (unvalidated data).

B - Unreliable Result
 U - Nondetect or not detected at significantly greater than that in an associated blank.
 UJ - Nondetect. Estimated reporting limit.

MG/L - Milligrams per liter UG/L - Micrograms per liter

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TABLE 5

AOC I In-Situ Remediation Pilot Study Report Former Naval Ammunition Support Detachment Vieques, Puerto Rico

Station ID						MW04				
Sample ID	NDAIGW04-R01	WAI-GW04-06A	VWAI-MW04-08C	VWAI-MW04-0310	VWAI-MW04-1110	VWAI-MW04-1110A	VWAI-MW04-1110H	VWAI-MW04-1111	VWAI-MW04-0512	VWAI-MW04-1112
Sample Date	09/23/04	01/10/06	07/23/08	03/19/10	11/02/10	11/02/10	11/02/10	11/10/11	05/23/12	11/28/12
Preservative Method	HCI	HCI	HCI	HCI	Unpreserved	Ascorbic Acid	HCI	HCI	Ascorbic Acid	Ascorbic Acid
Chemical Name										
Volatile Organic Compounds (UG/L)										
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	33.7	4.6	5	5 U	4.3 J	4 J	4.6 J	1.1 J	2.6 J	2.2 J
Semivolatile Organic Compounds (UG/L)										
2-Methylnaphthalene	41.4	3.8 J	0.47	1 U	1 U	NA	NA	2 U	2 U	2 U
bis(2-Ethylhexyl)phthalate	10 U	5 U	5 U	5 U	1.4 J	NA	NA	2 U	2 U	2 U
Naphthalene	46.2	5.5	1.1	1 U	1.4	NA	NA	1.2	2.2	1.6 J
Dissolved Metals (UG/L)										
Iron, Dissolved	17 J	117	100 U	65.5 J	100 U	NA	NA	50 U	50 UJ	34.3 J
Manganese, Dissolved	1,920	1,960	1,670 R	2,130	1,340 J	NA	NA	789 J	712 J	1,140 J
Wet Chemistry (MG/L)										
Nitrate	NA	0.05 U	0.05 U	0.078 BJ	0.042 U	NA	NA	0.32	0.022 J	0.042 U
Persulfate (field test kit)	NA	NA	NA	0	0-0.7 <sup>1</sup>	0-0.7 <sup>1</sup>	0-0.7 <sup>1</sup>	0.7	0	0
Sulfate	NA	10.2	10.8	14 B	110	NA	NA	100	71	75
Total organic carbon (TOC)	NA	3.79 J	2.31 B	10 U	7.1 J	NA	NA	7.5 J	5.6 J	4.9 J

#### Bold indicates detections

Bold indicates detections

Bolded shading indicates detected exceedance.

10-0.7 indicates an estimated value of persulfate that was less than 0.7 mg/L .

NA - Not analyzed

B - Analyte also detected in an associated method blank (unvalidated data).

J - Estimated (validated data).

J - Below reporting limit (unvalidated data).

B - Unreliable Result
 U - Nondetect or not detected at significantly greater than that in an associated blank.
 UJ - Nondetect. Estimated reporting limit.

MG/L - Milligrams per liter UG/L - Micrograms per liter

3 of 6

TABLE 5

AOC I In-Situ Remediation Pilot Study Report Former Naval Ammunition Support Detachment Vieques, Puerto Rico

Station ID							MW05								MW06	
Sample ID	NDAIGW05-R01	VWAI-MW05-08C	VWAI-MW05P-08C	VWAI-MW05-0310	VWAI-MW05-1110	VWAI-MW05-1110A	VWAI-MW05-1110H	VWAI-MW05-1111	VWAI-MW05P-1111	VWAI-MW05B-1111	VWAI-MW05BP-1111	VWAI-MW05-0512	VWAI-MW05-1112	NDAIGW06-R01	WAI-GW06-06A	VWAI-MW06-08C
Sample Date	09/22/04	07/21/08	07/21/08	03/18/10	11/02/10	11/02/10	11/02/10	11/08/11	11/08/11	11/09/11	11/09/11	05/22/12	11/28/12	09/22/04	01/10/06	07/27/08
Preservative Method	HCI	HCI	HCI	HCI	Unpreserved	Ascorbic Acid	HCI	HCI	HCI	HCI	HCI	Ascorbic Acid	Ascorbic Acid	HCI	HCI	HCI
Chemical Name																
Volatile Organic Compounds (UG/L)																
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U	5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	5 U	1 U	1 U	1 U	NA	NA	1 U	1 U	1 U	1 U	0.5 U	0.5 UJ	0.5 U
Benzene	0.66	0.5 U	0.5 U	5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatile Organic Compounds (UG/L)																
2-Methylnaphthalene	9.5	7.5	5.4	3	20	NA	NA	11	11	NA	NA	11	11	5 U	5.4 U	0.1 U
bis(2-Ethylhexyl)phthalate	9.6 J	5 U	5 U	1.4 J	5 U	NA	NA	2 U	2 U	NA	NA	2 UJ	2 U	10 U	5.4 U	5.1 U
Naphthalene	5 U	0.33 J	0.26 J	1 U	1.7	NA	NA	2 U	2 U	NA	NA	1.3 J	2 U	5 U	5.4 U	0.1 U
Dissolved Metals (UG/L)																
Iron, Dissolved	77.3 J	100 U	100 U	318	311 J	NA	NA	54.2 J	NA	NA	NA	107 J	248 J	68.9 J	100 U	100 U
Manganese, Dissolved	1,090	1,050 R	1,310 R	1,300	1,300 J	NA	NA	1,280 J	NA	NA	NA	1,230 J	1,450 J	44.9	12.1 J	7.6 R
Wet Chemistry (MG/L)																
Nitrate	NA	0.05 U	0.05 U	0.012 BJ	0.042 U	NA	NA	0.017 J	NA	NA	NA	0.0094 J	0.042 U	NA	1.86	NA
Persulfate (field test kit)	NA	NA	NA	0	0	0	0	0	0	0	0	0	0	NA	NA	NA
Sulfate	NA	5 U	5 U	0.18 BJ	0.19 J	NA	NA	0.62 J	NA	NA	NA	0.34 J	1.7 U	NA	52	NA
Total organic carbon (TOC)	NA	6.27	6.19	8.5 J	7.3 J	NA	NA	7.6 J	NA	NA	NA	7 J	7.6 J	NA	9.87	NA

#### Bold indicates detections

Bold indicates detections

Bolded shading indicates detected exceedance.

10-0.7 indicates an estimated value of persulfate that was less than 0.7 mg/L .

NA - Not analyzed

B - Analyte also detected in an associated method blank (unvalidated data).

J - Estimated (validated data).

J - Below reporting limit (unvalidated data).

B - Unreliable Result
 U - Nondetect or not detected at significantly greater than that in an associated blank.
 UJ - Nondetect. Estimated reporting limit.

MG/L - Milligrams per liter UG/L - Micrograms per liter

TABLE 5

AOC I In-Situ Remediation Pilot Study Report Former Naval Ammunition Support Detachment Vieques, Puerto Rico

Station ID								MW07						
Sample ID	NDAIGW07-R01	WAI-GW07-06A	VWAI-MW07-08C	VWAI-MW07-0310	VWAI-MW07-1110	VWAI-MW07-1110A	VWAI-MW07-1110H	VWAI-MW07P-1110	VWAI-MW07P-1110A	VWAI-MW07-1111	VWAI-MW07-0512	VWAI-MW07P-0512	VWAI-MW07-1112	VWAI-MW07P-1112
Sample Date	09/24/04	01/10/06	07/22/08	03/22/10	11/04/10	11/04/10	11/04/10	11/04/10	11/04/10	11/09/11	05/23/12	05/23/12	11/29/12	11/29/12
Preservative Method	HCI	HCI	HCI	HCI	Unpreserved	Ascorbic Acid	HCI	Unpreserved	Ascorbic Acid	HCI	Ascorbic Acid	AscorbicAcid	AscorbicAcid	Ascorbic Acid
Chemical Name														
Volatile Organic Compounds (UG/L)														
1,2-Dichloroethane	0.5 U	1.6	2.5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.33 J	0.5 U	2.5 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	59.3	28	24	14	9.5	9.5	9.4	10	9.5	5.3	2.9 J	2.8 J	0.82 J	0.5 UJ
Semivolatile Organic Compounds (UG/L)														
2-Methylnaphthalene	82.1	110	22 J	17	7.7	NA	NA	9.9	NA	7	3.4	3.3	2 UJ	1.1 J
bis(2-Ethylhexyl)phthalate	10 U	5 U	4.2 J	5 U	5 U	NA	NA	5 U	NA	1.3 J	2 U	2 U	2 U	2 U
Naphthalene	81.4	96	34 J	21	7.9	NA	NA	10	NA	12	3.3	3.2	2 U	2 U
Dissolved Metals (UG/L)														
Iron, Dissolved	188 J	1,470	1,030	1,510	51.1 J	NA	NA	NA	NA	50 U	50 UJ	NA	50 UJ	NA
Manganese, Dissolved	1,240	1,760	1,680 R	1,700	222 J	NA	NA	NA	NA	15 UJ	15 J	NA	15 UJ	NA
Wet Chemistry (MG/L)														
Nitrate	NA	0.05 U	0.05 U	0.02 BJ	0.042 U	NA	NA	NA	NA	0.014 J	0.042 U	NA	0.074 J	NA
Persulfate (field test kit)	NA	NA	NA	0	14-21	14-21	14-21	14-21	14-21	1.4	1.4	1.4	0	0
Sulfate	NA	2.37 J	5 U	0.56 BJ	4,500	NA	NA	NA	NA	1,600	1,600	NA	1,400 J	NA
Total organic carbon (TOC)	NA	7.28	4.49 B	6 J	21	NA	NA	NA	NA	77	21	NA	22	NA

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 U - Nondetect or not detected at significantly greater than that in an associated blank.
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MG/L - Milligrams per liter UG/L - Micrograms per liter

TABLE 5

AOC I In-Situ Remediation Pilot Study Report Former Naval Ammunition Support Detachment Vieques, Puerto Rico

Station ID	M	W08	MW09			
Sample ID	WAI-GW08-06A	VWAI-MW08-08C	WAI-GW09-06A	VWAI-MW09-08C		
Sample Date	01/10/06	07/20/08	01/11/06	07/22/08		
Preservative Method	HCI	HCI	HCI	HCI		
Chemical Name						
Volatile Organic Compounds (UG/L)						
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U		
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U		
Benzene	0.5 U	0.5 U	0.5 U	0.5 U		
Semivolatile Organic Compounds (UG/L)						
2-Methylnaphthalene	5 U	0.1 UJ	5 U	0.095 U		
bis(2-Ethylhexyl)phthalate	5 UJ	5 U	5 U	4.8 U		
Naphthalene	5 U	0.1 UJ	5 U	0.095 U		
Dissolved Metals (UG/L)						
Iron, Dissolved	241	100 U	100 U	100 U		
Manganese, Dissolved	126	148 R	279	220 R		
Wet Chemistry (MG/L)						
Nitrate	0.77	NA	0.05 U	NA		
Persulfate (field test kit)	NA	NA NA	NA	NA NA		
Sulfate	17.8	NA NA	1.85 J	NA NA		
Total organic carbon (TOC)	7.14	NA NA	8.1	NA NA		

#### Bold indicates detections

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Bolded shading indicates detected exceedance.

10-0.7 indicates an estimated value of persulfate that was less than 0.7 mg/L .

NA - Not analyzed

B - Analyte also detected in an associated method blank (unvalidated data).

J - Estimated (validated data).

J - Below reporting limit (unvalidated data).

B - Unreliable Result
 U - Nondetect or not detected at significantly greater than that in an associated blank.
 UJ - Nondetect. Estimated reporting limit.

MG/L - Milligrams per liter UG/L - Micrograms per liter

6 of 6

TABLE 6
Pilot Study Data Evaluation at MW-07

AOC I In-Situ Remediation Pilot Study Report Former Naval Ammunition Support Detachment

Vieques, Puerto Rico

		Prior to Pilot Study			During Pilot Study			Overall		
COCs	Pilot Study PRG	September 2004 (ug/L)	March 2010 (ug/L)	Percent COC Reduction	March 2010 (ug/L)	November 2012 (ug/L)	Percent COC Reduction <sup>a</sup>	Septembe r 2004 (ug/L)	November 2012 (ug/L)	Percent COC Reduction <sup>a</sup>
Benzene	5	59.3	14	76%	14	0.8	94%	59.3	0.8	99%
2-Methylnaphthalene	27	82.1	17.0	79%	17.0	1.1	94%	82.1	1.1	99%
Naphthalene	6.1	81.4	21	74%	21	2U	95%	81.4	2U	99%

Notes:

<sup>&</sup>lt;sup>a</sup> for non-detects, half the reporting limit was used in the percent COC reduction calculation

TABLE 7 **Human Health Risk Calculations, 2012 Sampling Events** 

AOC I In-Situ Remediation Pilot Test Report Former Naval Ammunition Support Detachment Viegues, Puerto Rico

CAS Number	Chemical	Maximum Concentration	Qual	Units	Location of Maximum	Data	EPC	Statistic	ELCR	HQ	Target Organs
71-43-2	Benzene	2.9		ug/L	VWAI-MW07	5/23/2012	2.9	Max	7.40E-06	1.00E-01	Blood, Immune
91-57-6	2-Methylnaphthalene	11		ug/L	VWAI-MW05	11/28/2012	11	Max		4.00E-01	Lungs
91-20-3	Naphthalene	3.3		ug/L	VWAI-MW07	5/23/2012	3.3	Max	2.40E-05	5.00E-01	Decreased Body Weight

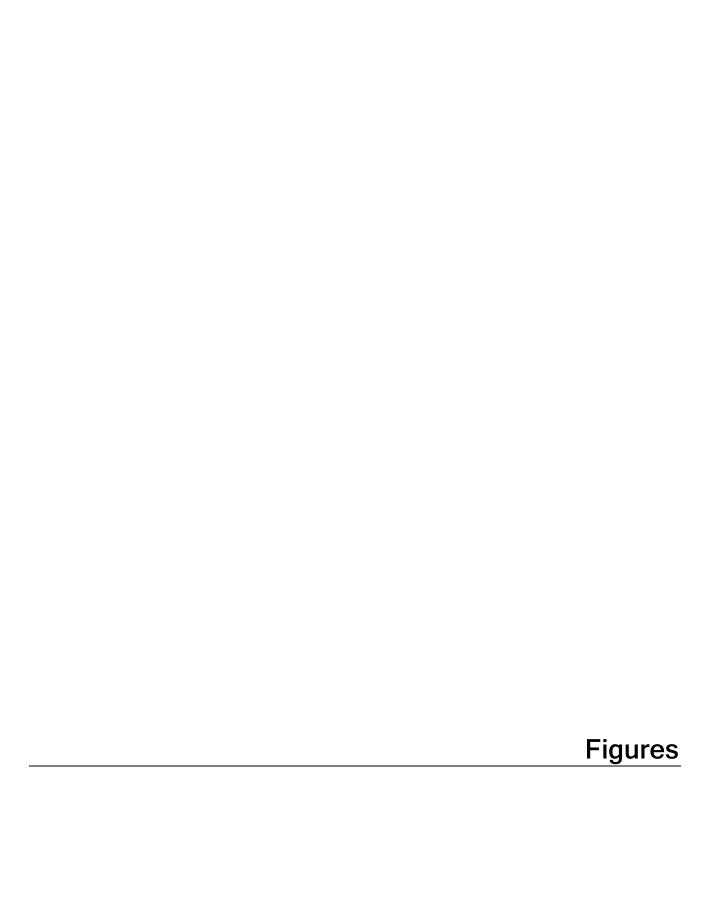
Total = 3.00E-05

Total Blood HI Across All Media = 1.00E-01

Total Immune System HI Across All Media = 1.00E-01

Total Lungs HI Across All Media = 4.00E-01

Total Body Weight HI Across All Media = 5.00E-01





British Virgin Islands

**CH2M**HILL



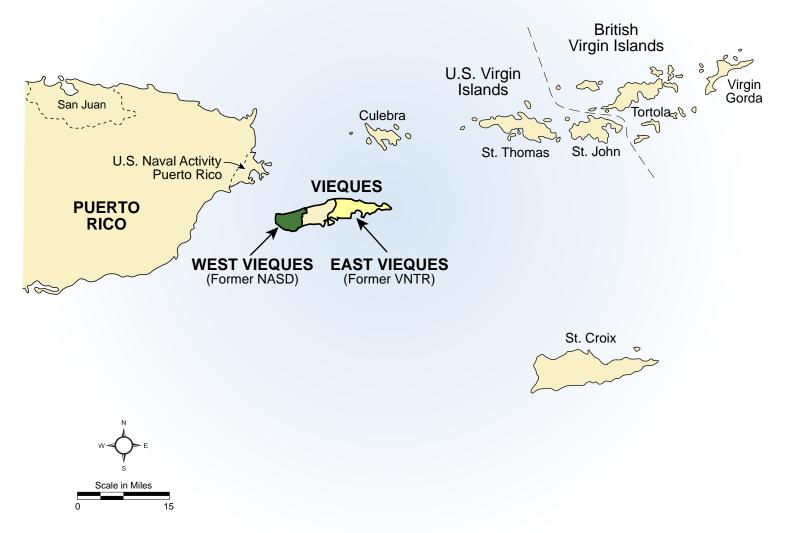


FIGURE 1
Regional Location Map
AOC I In-Situ Remediation Pilot Study Report
Former Naval Ammunition Support Detachment,
Vieques, Puerto Rico



FIGURE 2

AOC I Site Location Map

AOC I In-Situ Remediation Pilot Study Report

Former Naval Ammunition Support Detachment
Vieques, Puerto Rico

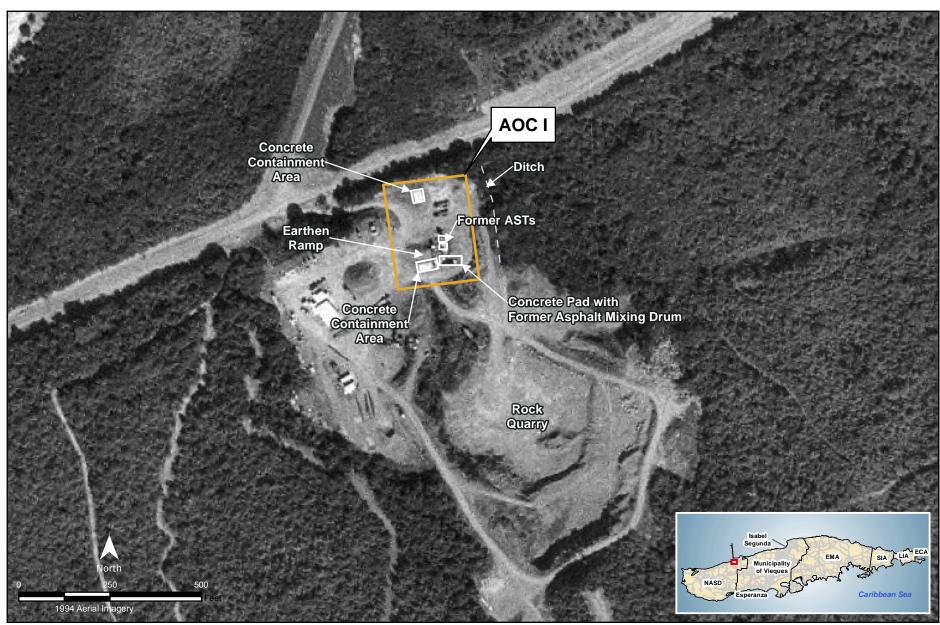
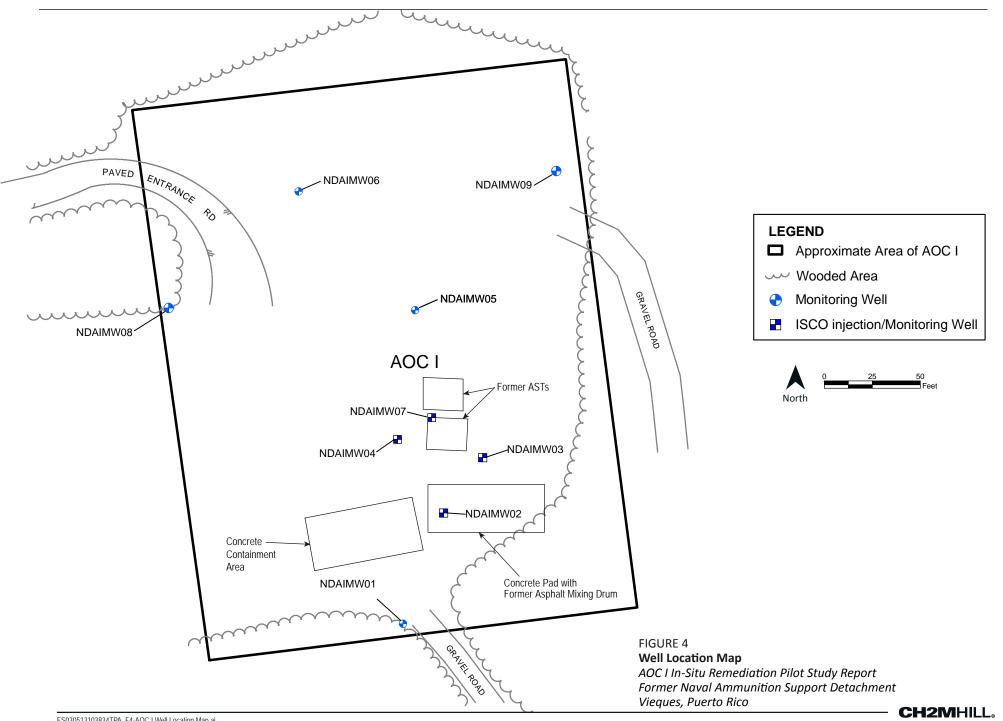
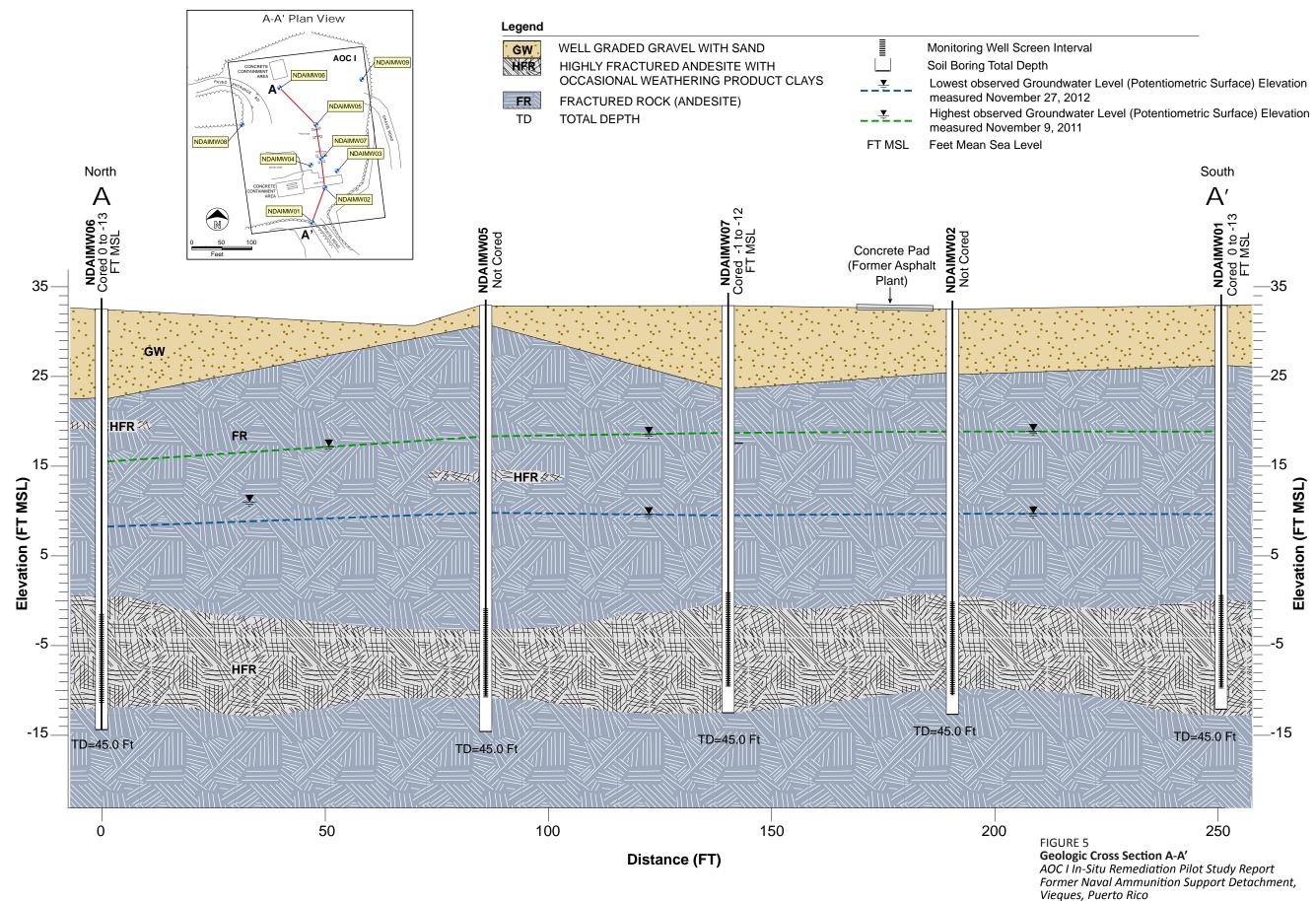
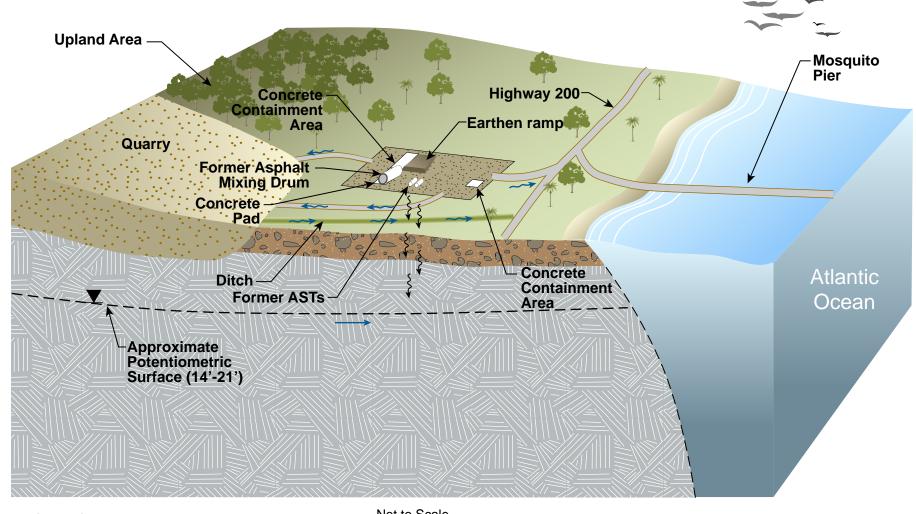


FIGURE 3
1994 Aerial Photograph of AOC I
AOC I In-Situ Remediation Pilot Study Report
Former Naval Ammunition Support Detachment,
Vieques, Puerto Rico







#### Legend



Gravel with Sand, Silt, and Clay



Fractured Andesite



Surface water flow direction



Direction of groundwater flow



Infiltration and leaching

#### Not to Scale



#### FIGURE 6

#### **AOC I Conceptual Site Model**

AOC I In-Situ Remediation Pilot Study Report Former Naval Ammunition Support Detachment Vieques, Puerto Rico



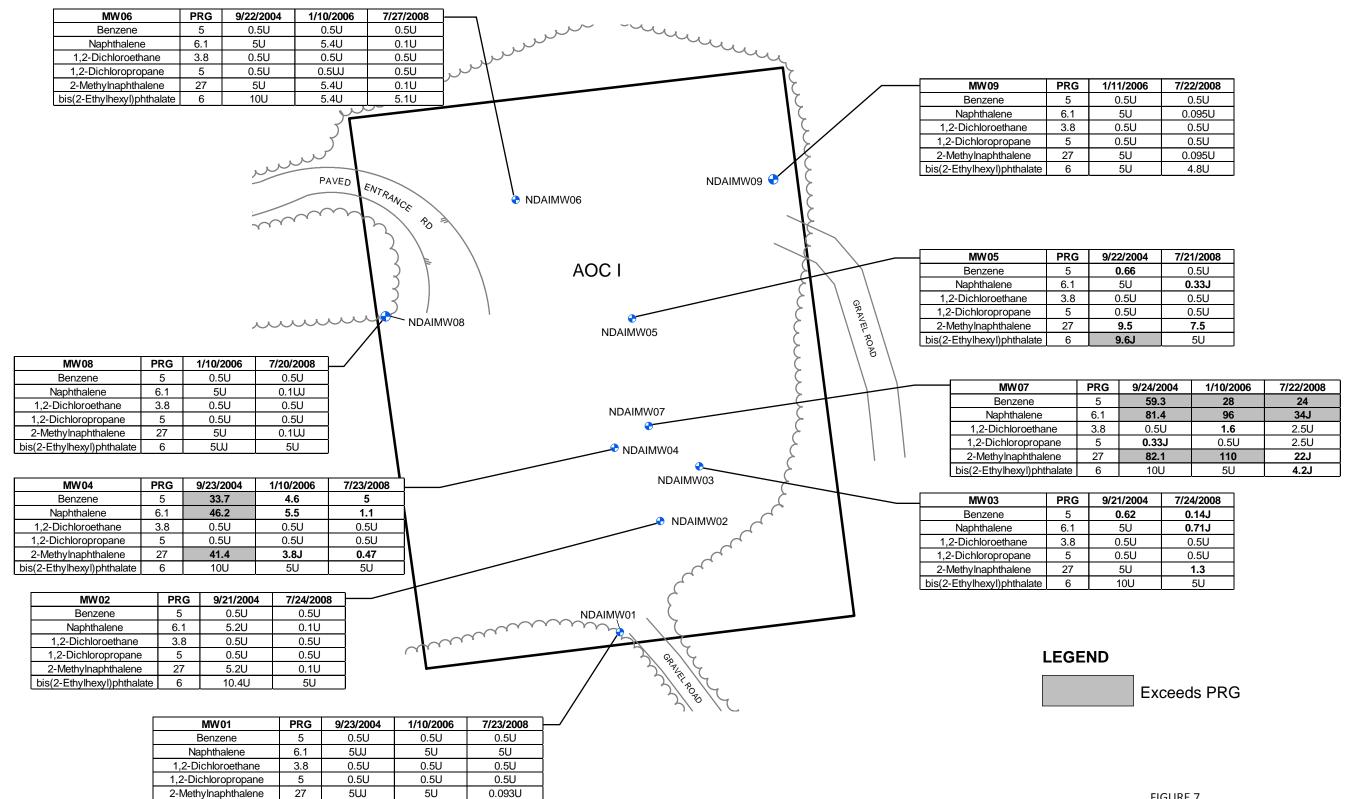


FIGURE 7

AOC I Pre-Pilot Study Groundwater

Analytical Results for COCs

AOC I In-Situ Remediation Pilot Study Report

Former Naval Ammunition Support Detachment

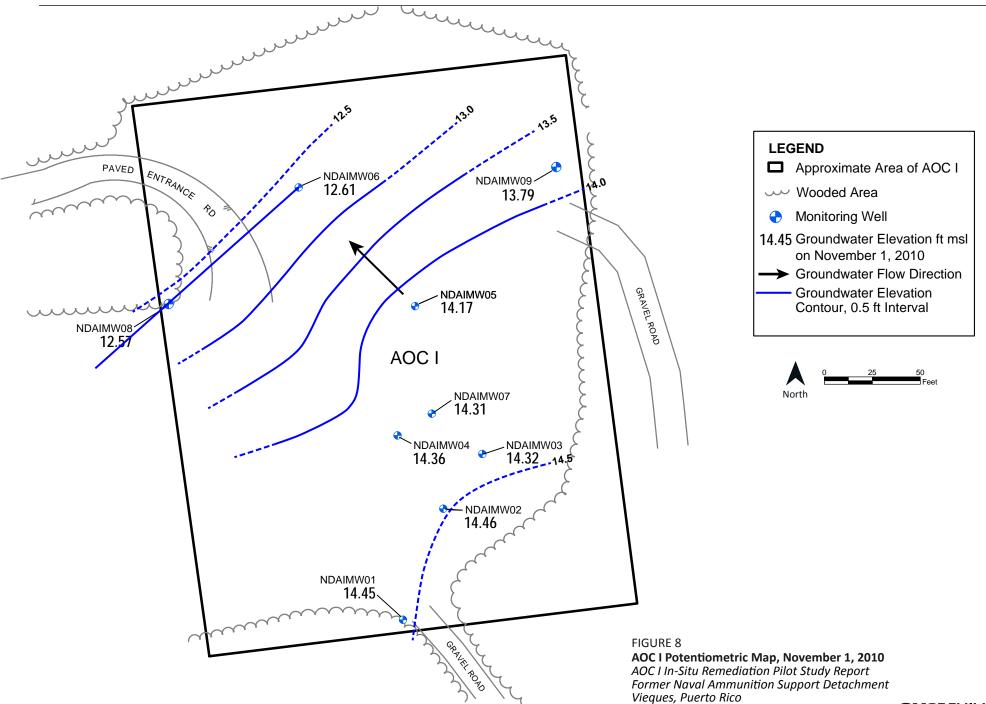
Viegues, Puerto Rico

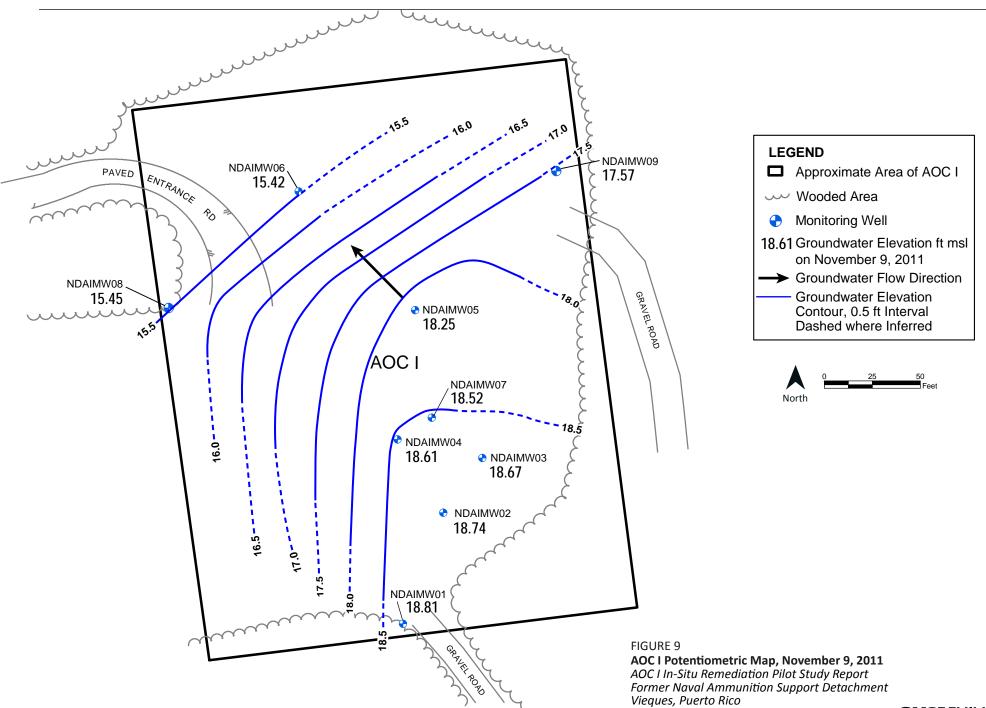
bis(2-Ethylhexyl)phthalate

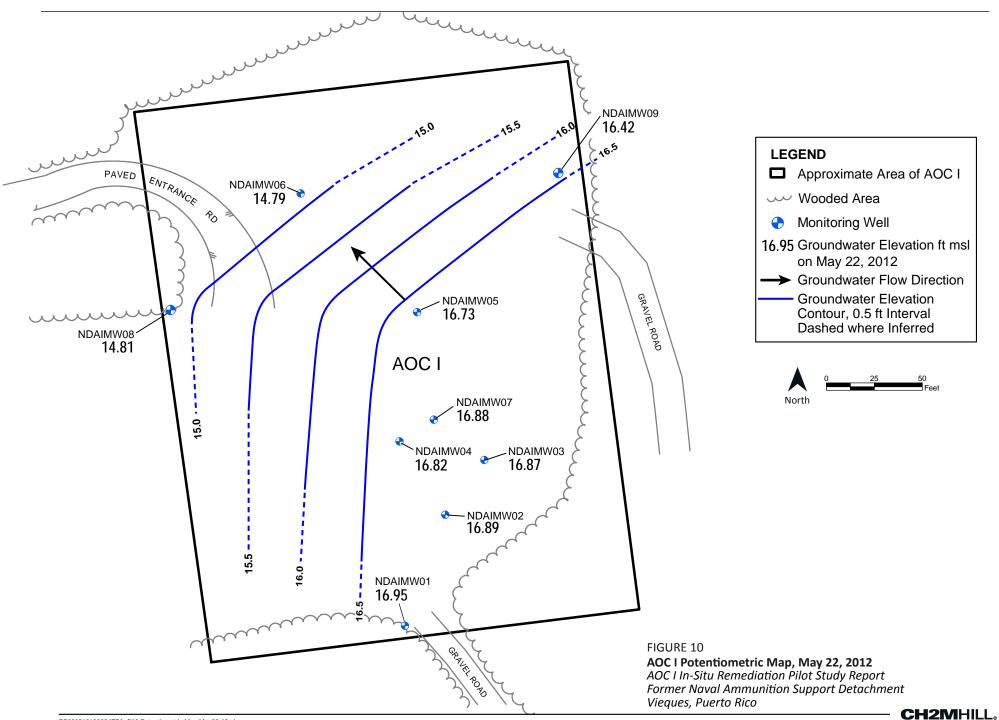
10UJ

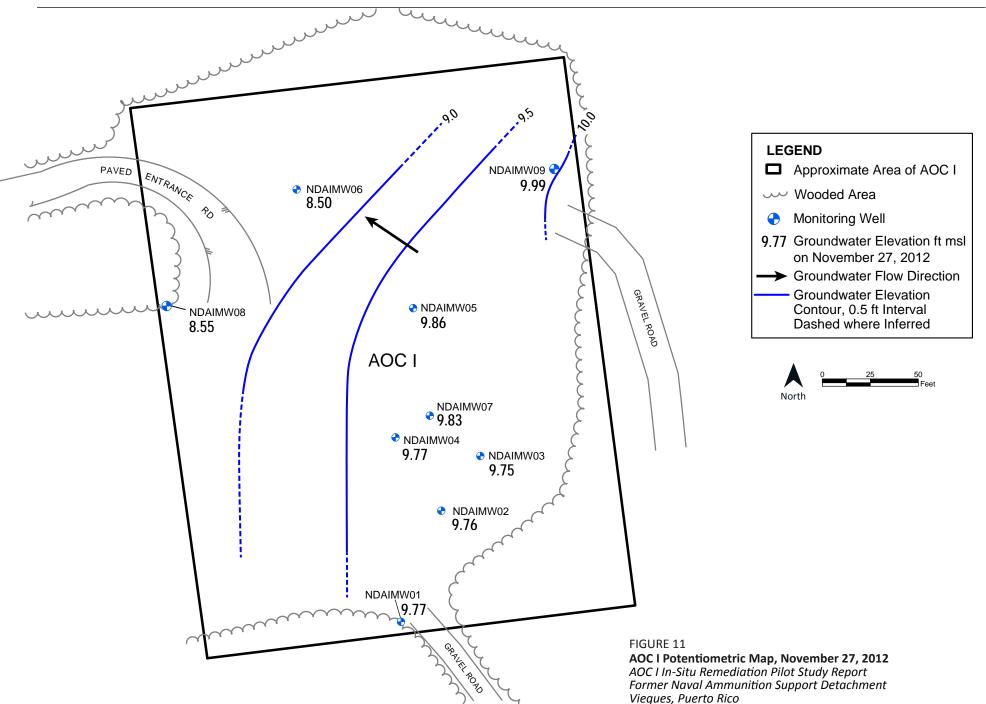
5U

4.7U









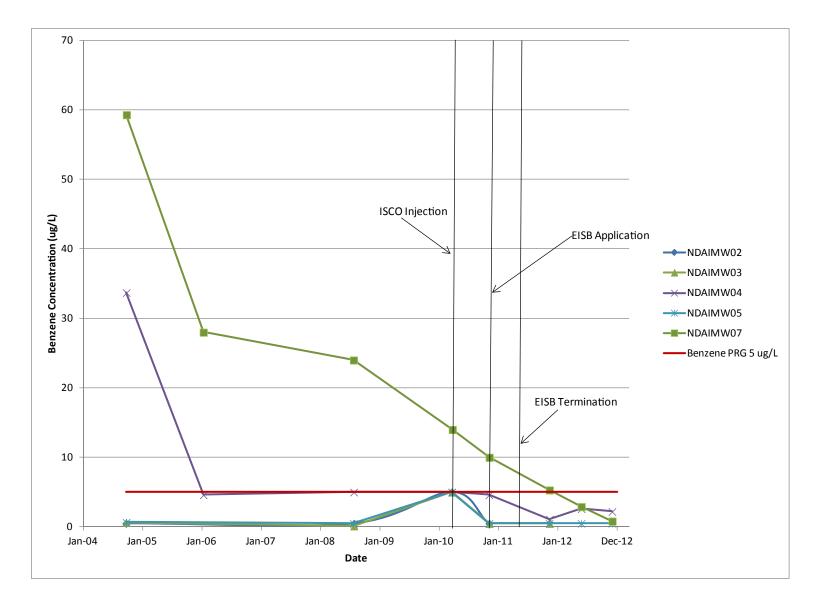


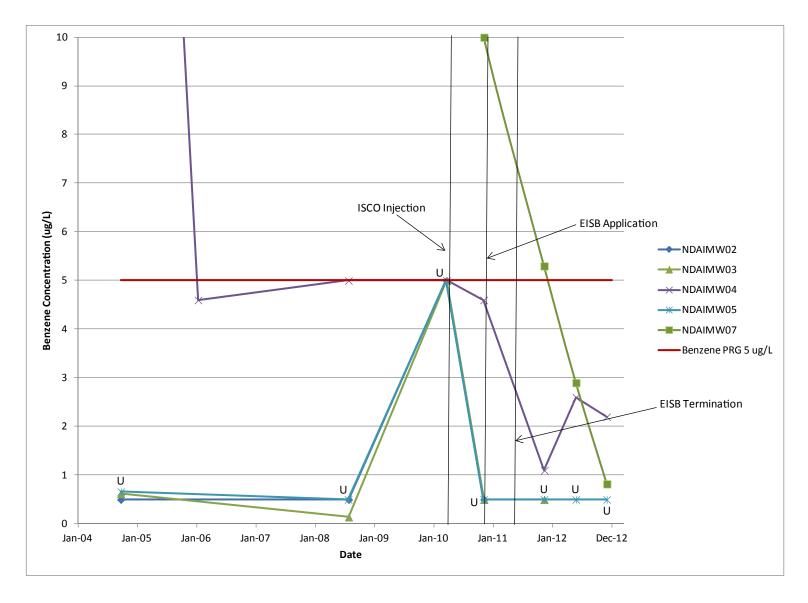
FIGURE 12

Benzene Concentration Over Time

AOC I In-Situ Remediation Pilot Study Report

Former Naval Ammunition Support Detachment

Vieques, Puerto Rico



U values are the limit of detection, actual concentration is less than or equal to that value.

FIGURE 13 **Details of Benzene Concentration over Time**AOC I In-Situ Remediation Pilot Study Report

Former Naval Ammunition Support Detachment
Vieques, Puerto Rico



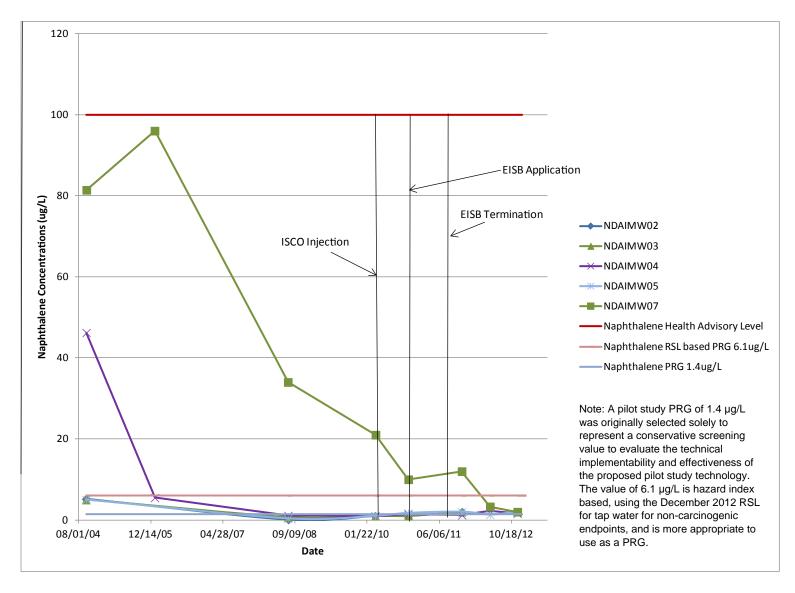
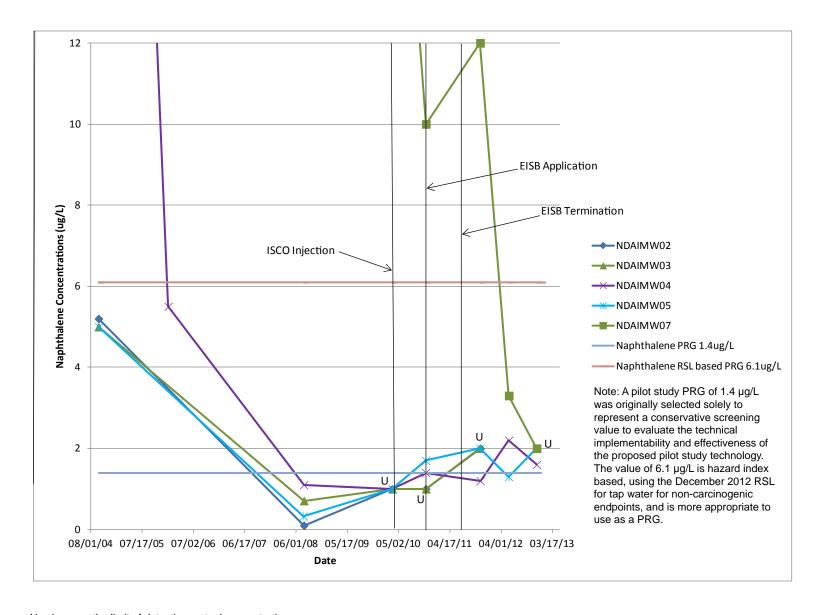


FIGURE 14

Naphthalene Concentration over Time

AOC I In-Situ Remediation Pilot Study Report

Former Naval Ammunition Support Detachment
Vieques, Puerto Rico

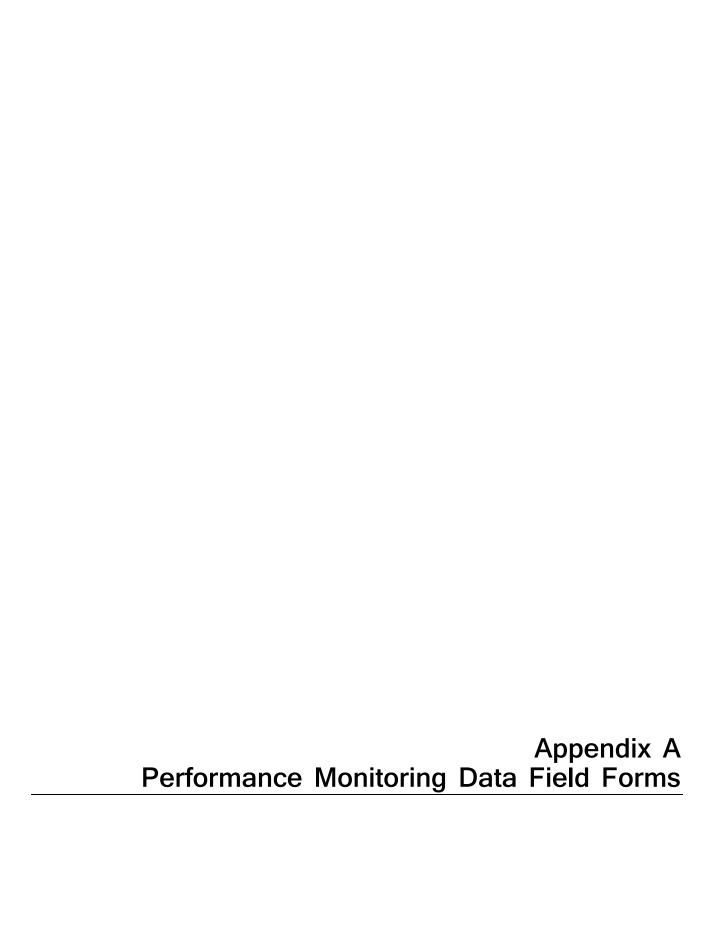


U values are the limit of detection, actual concentration is less than or equal to that value.

FIGURE 15

Details of Naphthalene Concentration over Time
AOC I In-Situ Remediation Pilot Study Report
Former Naval Ammunition Support Detachment
Viegues, Puerto Rico







WELL NUMBER

392485.FI.FK

VWAI-MW02

SHEET 1

OF 3

					GRU	UND	VVAI	EK	DAIVI	PLING	DAI	A SHEET
PROJECT:	In-Situ Remed							LOCATION	ON : AOC	4		DATE: S/17/10
Weather:	partly	cious	4,6	82.04	11-92	4		Sample	Team:		niralu	
		غرب سره	Description of	27.0.27						M. 2	ambon	1
Total Dept	7.5		FT.(BTOC									2/19/1/2 0 251
Depth to V		Service and a resident	FT.(BTOC	-				Date an	d Time (	On Well:	1	3/19/10 0 152
		2164			IN.					and Time:		03/18/10 089
	ume in Well	400			7.0	IA/2)^2*0	.004329			te and Time	e:	3/18/10 10:19 3/18/10 10:00
Pump Dep		40.5	FT.(BTOC						d Time (		100	7101-1010
No. of Street,	rice/Equip:			nsoon P						eadings:	50	Oppn
Measuring	Device/Equip	ment:	Oil/Wate	r Interfa	ce Probe			Total P	urge Vo	lume:	5,5	GAL.
					SAME	PLE INF	200000000000000000000000000000000000000		1700			
Sample ID	VHAT	- MWO	2 - 0310	0		Paramet	ters Colle	eced for:	VOLA	JUC, fil	HFILM	10), SOS, NO,
Sample Da	ate/Time: 03	18-10	094	0		-			100			
Field Dup:	YESNO ID:	NIA				Paramet	ters Colle	eced for:		N/A		
A STEEL STATE OF THE STATE OF T	Date/Time:	AIM				2			(NS/MS	(O) V	ocs, s	VOCS
	YES NO	_				Sample	Appeara	nce:	_	R, colon		0 4/5-1
Nere sam	ples filtered?	ES NO				Field Te	st Kit De	tails:	OW-	1cp	150/19	18 C/F=1
fYES, W	nich samples?	Firt	eren M	EIALS						' '		
Lance of					FIEL	DPAR	AMETE	RS				7
Time	Purged Vol. (gais)	Depth to Water (ft)	Flow Rate (m⊔/mln)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
0840	~0.50	24.27	250	29 02	1110	0.58	70		6 73	214.7	364	eloudy , white
0845	N1.25	24.27		2923	_	0.57	3.5	0 24	6 72	193.3	121	Elega i Milita
0850	~150	24 27	250	2930	1141	-	2.6	0 20	6-11	1892	43.0	
0855	~2.00	24 27	250	19.45		0.55	20	015	670	171.4	194	clear
2900	~2.5	24.27	250	2952	1113	0.55	2.5	019	6.10	155.2	118	Oliva:
0905	N2:15	24.27	250	29 54		0.55	2.0	0.15	6.70		8.25	
0910	~3.0	24.27	250	29.59		0.54	2.1	0.16	6 70	138.1	6 15	
0915	v3 3	24.27	250	29.50	1105	0.54	2.0	0.15	6.10	129.9	4.50	
0920	×3.6	24 27	250	29.50	1101	0.54	2.2	0.17	649		3.63	
4925	~40	24.28	250	29.01	1099	0.54	1.7	6.13	669		3.40	
0930	~4.5	24 28	250	29:77	1099	0.54	15		6.69		2.79	
0935	24.75		250			0.54	1.8	0.13	6.69	113.0	2.02	
	Sample	coiler	TION B	REINS							-	
1006	FOO V	UMPIN		NP	- 5.	gall	CO					
1014	dint	br	9,100			0		FT		t		
								P.E.				
		-										
									1		100	
								DE at				
				Mi				100				



PROJECT NUMBER 392485.FI.FK WELL NUMBER

VWAI-MW02

SHEET 2

OFOT	I- 01. 5	HENES BO					-					DATE:
ROJECT:	In-Situ Remed	liation Pilo	t Study			2212		LOCATIO	ON : AOC	:-1		DATE: )/
				_	FIEL	- 1						
Time	Purged Vol. (gais)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comment
							-					
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	PROJECT NUMBER	WELL NUMBER	
OHIOTEUM:	392485.FI.FK	VWAI-MW02	SHEET 3 OF 3
CH2MHILL	GROUNDWA	ATER SAMPLING DA	ATA SHEET
PROJECT: In-Situ Remediation Pilot Study		LOCATION : AOC-I	DATE: O 11810
Like the second	NOTES (CONTI	NUED)	
SOP(s) used (refer to SOPs in back of th	is log)? (5-)		
Were all requirements of the SAP, PIs an	•		
Explanation of exceptions to SAP, PI's a considered in the decision:	The state of the s	r what conditions, who authorized e	exception, anything
No ex (iphora	apper quibbia bon	\ <u>\</u>	
V	A ( )		
	1/2		
	PHOTO L	.OG	
Photo Compass Number Direction Time Descr	iption		
1/2 facing 5 0843 (pic	rvie double) Set up	at AOC I	
3/12 Facing N 0844 (pic	ture double) set up	at AOC I	
The latest the second s			
h			
1/1/			

Date:

Donto

Signature:

1				PROJECT		.FI.FK		WELL NU		I-MW03	3	SHEET	1 OF 3
-	CH2	MHI	LL		GRO	UND	WAT	ER S	SAM	PLING	DAT	A SHE	
PROJECT:	In-Situ Remed	lation Pilo	t Study					LOCATIO	ON: AOC	-1		DATES	5/19/10
Weather:	PORTLY CIC	wy, I	DIMAN	, 1~8	30 1	1-93"		Sample	Team:	D	. WHITH	ue	, ,
		3								M	. Zamb	ani	
Total Depti	n:	39	FT.(BTO	C) Measur	ed , s	5	10-201	.\					
Depth to W	/ater: (-)	14.41	FT.(BTOC	C) Measur	ed (24	d Sh	Textue	Date an	d Time	On Well:	(	3/19/10	07.35
Water Colu	ımn(h): (=)	4.59	FT.	0	IN. O	13.19		Pump S	Start Date	and Time		3/14/10	1:07
Water Volu	ime în Well		GAL (3.14	1593*h(ir	n)*(wellDl	A/2)^2*0	.004329	Pump F	inish Da	te and Tim	e:	3/14/10	09:97
Pump Dep	th:	34	FT.(BTO	C) Measur	ed			Date an	d Time	Off Well:	Ų	5/14/10	09:35
Purge Dev	ice/Equip:		SS Mo	onsoon P	ump			Air Mon	itoring R	eadings:	A/->	0,0	oun
Measuring	Device/Equipr	ment:	Oil/Wate	er Interfac	e Probe			Total P	urge Vo	lume:	N	GAL.	1
			1		SAME	LE INF	ORMA	TION		-			
Sample ID	VWAI	- MWC	3-03	10		Paramet	ers Colle	eced for:	_ 40	C>,SVC	Cs, Fix	tereo (Fe	MA)
Sample Da	ate/Time: 0	3-19-10	_ (	910						L. NC3			
Field Dup(	YES/NO ID:	VWAT	L-MWC	3P-0	310	Paramet	ers Colle	eced for:					
FD Sample	Date/Time:	3/9/10	0	312		4					9		
	YES (NO)					Sample	Appeara	nce:	ole	al coil	orless		
Were samp	oles filtered?(Y	ESINO				Field Te	st Kit De	tails:	OPY	MR	O/F=	1	
fYES, Wh	ich samples?	FILL	ered	Metal	5					_	1		
			70.7		FIEL	DPAR	AMETE	ERS					
		Depth to			SpCond		3027	DO		ORP	Turbldity	17 1	
						Salinity	DO		pH				
Time	Purged Vol. (gals)	Water (ft)	Flow Rate (mL/min)	Temp., (°C)	(uS/cm) w/in 3%	(ppt)	(%)	(mg/L) w/m 10%	w/in 0.1	(mV)	(NTU)	Color/Odor	/ Comments
	I. C. Thirty Constitution of the second	(ft)	(mL/min)		(uS/cm) w/in 3%	(ppt)	3-20-5	(mg/L) w/in 10%		W/in 10mV	(NTU) w/in 10%	Color/Odor	
0680	(gals)	ay 66	(mL/min)	(°C)	w/in 3%	(ppt)	15.7	w/in 10%	Win 0.1	170.9	W/in 10%	Color/Odor	Comments
0825	(gals)	ay 66 24.66	(mL/min) 190	(°C) 29.27	W/m 3%	(ppt) 0.63 003	15.7	w/in 10%	6.79	170.9 -37.9	131	Color/Odor	
0825 0830	(gals)	24.66 24.66 24.66	(mL/min) 190 190	29.27 29.41	W/m 3% 1379 1281 1280	0,63 0.63 0.63	15.7	W/in 10%	6.79 6.80	70.9 -37.9 -49.1	131 78.1	Color/Odor	
0825 0830 0835	(gals) 0 ~0.10 ~0.75 ~1.00	ay. 66 2466 2466 2466 34.68	(mUmin)  90  190  190	(°C) 29.27 29.41 29.47	1281 1280 1271	0.63 0.63 0.63	(%) 66 47 5.5	0.36 0.42	6.79 6.79 6.80 6.78	170.9 -37.9 -49.1 -51.3	131 78.1 50.0	Color/Odos	
0825 0830 0835 0835	(gals)  0  ~0.10  ~0.75  ~1.00	(m) 24.66 24.66 24.68 24.68 24.69	(mL/min) 190 190 190 190	27.27 29.41 29.47 29.62	1281 1281 1280 1277 1275	0.63 0.63 0.63 0.65	(%) 15.7 66 47 5.5 38	0.50 0.36 0.42 0.29	6.79 6.79 6.80 6.78	170,9 -37.9 -491 -51.3 -52.4	131 78.1 50.0 35.0	Claddy	
0825 0830 0835 0835 0840 0845	(gals)  0  ~0.10  ~0.75  ~1.00  ~1.75  ~1.75	24 66 24 66 24 66 24 68 24 69 24 69	(mL/min)  190 190 190 190 190	29.47 29.47 29.47 29.62 29.76	1281 1280 1277 1275 1275	0.63 0.63 0.63 0.63 0.63	(%) 15.7 66 47 5.5 38 4.1	0.50 0.36 0.42 0.29 0.31	6.79 6.79 6.80 6.78 6.78	Win 10mV 170,9 -37.9 -491 -51.3 -52.4 -52.5	131 78.1 50.0 35.6	Claddy	
0825 0830 0835 0840 0845 0845	(gals)  0  ~0.10  ~0.75  ~1.00  ~1.75  ~1.90  ~2.00	2466 2466 2466 2468 2469 2469 2469	(mL/min)  190 190 190 190 190 190 190	29.47 29.47 29.47 29.62 29.70 29.63	1281 1281 1280 1277 1275 1275	0,63 0.63 0.63 0.63 0.63 0.63	(%) 15.7 66 47 5.5 3.8 4.1 43	win 10% 1.17 6.50 0.36 0.42 6.29 0.31 0.33	6.79 6.79 6.80 6.78 6.78 6.78	Win 10mV 170,9 -37.9 -49.1 -51.3 -52.4 -52.5 -52.9	131 78.1 50.0 35.0 26.6	Claddy	
0825 0830 0835 0835 0840 0845 0850	(gals)  0  ~0.10  ~0.75  ~1.00  ~1.75  ~1.90  ~2.00  ~2.40	(m) 24 66 24 66 24 66 24 69 24 69 24 69 24 69	(mL/min)  190 190 190 190 190 190 190	(°C) 29.27 29.47 29.47 29.62 29.76 29.63 29.74	1281 1281 1280 1277 1275 1275 1273	0,63 0.63 0.65 0.63 0.63 0.63 0.63	(%) 6 6 4 7 5.5 3.8 4.1 4 3 3.3	win 10% 1.17 0.50 0.36 0.42 0.29 0.31 0.33 0.25	6.79 6.79 6.80 6.78 6.78 6.77 6.77	Win 10mV 170,9 -37.9 -491 -51.3 -52.4 -52.5 -52.9 -51.2	131 78.1 50.0 35.6 26.6 18.6 14.9	Claddy	
0825 0830 0835 0835 0840 0845 0850 0855	(gals)  0  ~0.10  ~0.75  ~1.00  ~1.75  ~1.75  ~1.90  ~2.40  ~2.75	(m) 24 66 24 66 24 66 24 69 24 69 24 69 24 69 24 69	(mL/min) 190 190 190 190 190 190 190 190 190	29.27 29.47 29.47 29.47 29.62 29.62 29.74 29.72	1281 1280 1277 1275 1275 1274 1274	(ppl)  0.63  0.63  0.63  0.63  0.63  0.63  0.63	(%) 15.7 6 6 4 7 5.5 3.8 4.1 4 3 3.3 3.4	win 10%  0.50  0.36  0.42  0.29  0.31  0.33  0.25  6.26	6.79 6.79 6.80 6.78 6.78 6.77 6.77 6.77	Win 10mV 170,9 -37.9 -491 -51.3 -52.4 -52.5 -52.9 -51.2 -50.0	131 78.1 50.0 35.6 26.6 18.6 14.9	Claddy	
0825 0830 0835 0840 0845 0850 0855 0900	(gals)  0  ~0.10  ~0.75  ~1.00  ~1.75  ~1.90  ~2.00  ~2.40  ~2.75  ~3.00	(m) 24 66 24 66 24 66 24 69 24 69 24 69 24 69 24 69 24 69	(mL/min)  190 190 190 190 190 190 190 190 190 19	29.47 29.47 29.47 29.47 29.76 29.76 29.74 29.74 29.74	1281 1280 1271 1275 1275 1275 1274 1274 1274	0,63 0.63 0.63 0.63 0.63 0.63 0.63 0.63	(%) 15.7 6 6 4 7 5.5 3.8 4.1 4 3 3.3 3.4 3.4	win 10% 0.50 0.36 0.42 0.29 0.31 0.33 0.25 0.26	6.79 6.79 6.80 6.78 6.78 6.77 6.77 6.77	Win 10mV 170,9 -37.9 -491 -51.3 -52.4 -52.5 -52.9 -51.2	131 78.1 50.0 35.6 26.6 18.6 14.9	Claddy	
0825 0830 0835 0840 0845 0850 0855 0900 0905	(gals)  0  ~0.10  ~0.75  ~1.00  ~1.75  ~1.90  ~2.90  ~2.40  ~2.75  ~3.00	(m) 24 66 24 66 24 66 24 69 24 69 24 69 24 69 24 69	(mL/min)  190 190 190 190 190 190 190 190 190	29.47 29.47 29.47 29.47 29.62 29.76 29.72 29.72 29.72	1280 1280 1277 1275 1275 1275 1274 1274 1274 1275	0,63 0.63 0.65 0.63 0.63 0.63 0.63 0.63 0.63	(%) 15.7 6 6 4 7 5.5 3.8 4.1 4 3 3.3 3.4 703	win 10% 0.50 0.36 0.42 0.29 0.33 0.25 0.26 0.310	6.79 6.79 6.80 6.78 6.78 6.77 6.77 6.77	Win 10mV  170,9  -37.9  -49.1  -51.3  -52.4  -52.5  -52.9  -51.2  -50.0  -49.4	131 78.1 50.0 35.6 26.6 18.6 14.9 114	Clubby	
0825 0830 0835 0835 0845 0845 0855 0900 0905 0910	(gals)  ~0.10  ~0.75  ~1.00  ~1.75  ~1.90  ~2.40  ~2.75  ~3.00  (c) (()	(m) 24 66 24 66 24 66 24 69 24 69 24 69 24 69 24 69	(mL/min) 190 190 190 190 190 190 190 190 190	29.47 29.47 29.47 29.47 29.62 29.76 29.72 29.72 29.72	1281 1280 1271 1275 1275 1275 1274 1274 1274	0,63 0.63 0.65 0.63 0.63 0.63 0.63 0.63 0.63	(%) 15.7 6 6 4 7 5.5 3.8 4.1 4 3 3.3 3.4 3.4	win 10% 0.50 0.36 0.42 0.29 0.33 0.25 0.26 0.310	6.79 6.79 6.80 6.78 6.78 6.77 6.77 6.77	Win 10mV  170,9  -37.9  -49.1  -51.3  -52.4  -52.5  -52.9  -51.2  -50.0  -49.4	131 78.1 50.0 35.6 26.6 18.6 14.9 114	Claddy	
0825 0830 0835 0835 0840 0845 0850 0855 0900 0905 0910	(gals)  0  ~0.10  ~0.75  ~1.00  ~1.75  ~1.90  ~2.90  ~2.40  ~2.75  ~3.00  (o)(()  -1)(()	(m) 24 66 24 66 24 66 24 69 24 69 24 69 24 69 24 69	(mL/min)  190 190 190 190 190 190 190 190 190	29.47 29.47 29.47 29.47 29.62 29.76 29.72 29.72 29.72	1280 1280 1277 1275 1275 1275 1274 1274 1274 1275	0,63 0.63 0.65 0.63 0.63 0.63 0.63 0.63 0.63	(%) 15.7 6 6 4 7 5.5 3.8 4.1 4 3 3.3 3.4 703	win 10% 0.50 0.36 0.42 0.29 0.33 0.25 0.26 0.310	6.79 6.79 6.80 6.78 6.78 6.77 6.77 6.77	Win 10mV  170,9  -37.9  -49.1  -51.3  -52.4  -52.5  -52.9  -51.2  -50.0  -49.4	131 78.1 50.0 35.6 26.6 18.6 14.9 114	Clubby	
0825 0830 0835 0835 0840 0845 0845 0855 0900 0905 0910	(gals)  ~0.10  ~0.75  ~1.00  ~1.75  ~1.90  ~2.40  ~2.75  ~3.00  (c) (()	(m) 24 66 24 66 24 66 24 69 24 69 24 69 24 69 24 69	(mL/min) 190 190 190 190 190 190 190 190 190	29.47 29.47 29.47 29.47 29.62 29.76 29.72 29.72 29.72	1280 1280 1277 1275 1275 1275 1274 1274 1274 1275	0,63 0.63 0.65 0.63 0.63 0.63 0.63 0.63 0.63	(%) 15.7 6 6 4 7 5.5 3.8 4.1 4 3 3.3 3.4 703	win 10% 0.50 0.36 0.42 0.29 0.33 0.25 0.26 0.310	6.79 6.79 6.80 6.78 6.78 6.77 6.77 6.77	Win 10mV  170,9  -37.9  -49.1  -51.3  -52.4  -52.5  -52.9  -51.2  -50.0  -49.4	131 78.1 50.0 35.6 26.6 18.6 14.9 114	Clubby	
0825 0830 0835 0835 0840 0845 0850 0855 0900 0905 0910	(gals)  0  ~0.10  ~0.75  ~1.00  ~1.75  ~1.90  ~2.90  ~2.40  ~2.75  ~3.00  (o)(()  -1)(()	(m) 24 66 24 66 24 66 24 69 24 69 24 69 24 69 24 69	(mL/min)  190 190 190 190 190 190 190 190 190	29.47 29.47 29.47 29.47 29.62 29.76 29.72 29.72 29.72	1280 1280 1277 1275 1275 1275 1274 1274 1274 1275	0,63 0.63 0.65 0.63 0.63 0.63 0.63 0.63 0.63	(%) 15.7 6 6 4 7 5.5 3.8 4.1 4 3 3.3 3.4 703	win 10% 0.50 0.36 0.42 0.29 0.33 0.25 0.26 0.310	6.79 6.79 6.80 6.78 6.78 6.77 6.77 6.77	Win 10mV  170,9  -37.9  -49.1  -51.3  -52.4  -52.5  -52.9  -51.2  -50.0  -49.4	131 78.1 50.0 35.6 26.6 18.6 14.9 114	Clubby	
0825 0830 0835	(gals)  0  ~0.10  ~0.75  ~1.00  ~1.75  ~1.90  ~2.90  ~2.40  ~2.75  ~3.00  (o)(()  -1)(()	(m) 24 66 24 66 24 66 24 69 24 69 24 69 24 69 24 69	(mL/min)  190 190 190 190 190 190 190 190 190	29.47 29.47 29.47 29.47 29.62 29.76 29.72 29.72 29.72	1280 1280 1277 1275 1275 1275 1274 1274 1274 1275	0,63 0.63 0.65 0.63 0.63 0.63 0.63 0.63 0.63	(%) 15.7 6 6 4 7 5.5 3.8 4.1 4 3 3.3 3.4 703	win 10% 0.50 0.36 0.42 0.29 0.33 0.25 0.26 0.310	6.79 6.79 6.80 6.78 6.78 6.77 6.77 6.77	Win 10mV  170,9  -37.9  -49.1  -51.3  -52.4  -52.5  -52.9  -51.2  -50.0  -49.4	131 78.1 50.0 35.6 26.6 18.6 14.9 114	Clubby	
0825 0830 0835 0835 0840 0845 0850 0855 0900 0905 0910	(gals)  0  ~0.10  ~0.75  ~1.00  ~1.75  ~1.90  ~2.90  ~2.40  ~2.75  ~3.00  (o)(()  -1)(()	(m) 24 66 24 66 24 66 24 69 24 69 24 69 24 69 24 69	(mL/min)  190 190 190 190 190 190 190 190 190	29.47 29.47 29.47 29.47 29.62 29.76 29.72 29.72 29.72	1280 1280 1277 1275 1275 1275 1274 1274 1274 1275	0,63 0.63 0.65 0.63 0.63 0.63 0.63 0.63 0.63	(%) 15.7 6 6 4 7 5.5 3.8 4.1 4 3 3.3 3.4 703	win 10% 0.50 0.36 0.42 0.29 0.33 0.25 0.26 0.310	6.79 6.79 6.80 6.78 6.78 6.77 6.77	Win 10mV  170,9  -37.9  -49.1  -51.3  -52.4  -52.5  -52.9  -51.2  -50.0  -49.4	131 78.1 50.0 35.6 26.6 18.6 14.9 114	Clubby	
0825 0830 0835 0835 0840 0845 0850 0855 0900 0905 0910	(gals)  0  ~0.10  ~0.75  ~1.00  ~1.75  ~1.90  ~2.90  ~2.40  ~2.75  ~3.00  (o)(()  -1)(()	(m) 24 66 24 66 24 66 24 69 24 69 24 69 24 69 24 69	(mL/min)  190 190 190 190 190 190 190 190 190	29.47 29.47 29.47 29.47 29.62 29.76 29.72 29.72 29.72	1280 1280 1277 1275 1275 1275 1274 1274 1274 1275	0,63 0.63 0.65 0.63 0.63 0.63 0.63 0.63 0.63	(%) 15.7 6 6 4 7 5.5 3.8 4.1 4 3 3.3 3.4 703	win 10% 0.50 0.36 0.42 0.29 0.33 0.25 0.26 0.310	6.79 6.79 6.80 6.78 6.78 6.77 6.77	Win 10mV  170,9  -37.9  -49.1  -51.3  -52.4  -52.5  -52.9  -51.2  -50.0  -49.4	131 78.1 50.0 35.6 26.6 18.6 14.9 114	Clubby	
0825 0830 0835 0835 0840 0845 0850 0855 0900 0905 0910	(gals)  0  ~0.10  ~0.75  ~1.00  ~1.75  ~1.90  ~2.90  ~2.40  ~2.75  ~3.00  (o)(()  -1)(()	(m) 24 66 24 66 24 66 24 69 24 69 24 69 24 69 24 69	(mL/min)  190 190 190 190 190 190 190 190 190	29.47 29.47 29.47 29.47 29.62 29.76 29.72 29.72 29.72	1280 1280 1277 1275 1275 1275 1274 1274 1274 1275	0,63 0.63 0.65 0.63 0.63 0.63 0.63 0.63 0.63	(%) 15.7 6 6 4 7 5.5 3.8 4.1 4 3 3.3 3.4 703	win 10% 0.50 0.36 0.42 0.29 0.33 0.25 0.26 0.310	6.79 6.79 6.80 6.78 6.78 6.77 6.77	Win 10mV  170,9  -37.9  -49.1  -51.3  -52.4  -52.5  -52.9  -51.2  -50.0  -49.4	131 78.1 50.0 35.6 26.6 18.6 14.9 114	Clubby	
0825 0830 0835 0835 0840 0845 0845 0855 0900 0905 0910	(gals)  0  ~0.10  ~0.75  ~1.00  ~1.75  ~1.90  ~2.90  ~2.40  ~2.75  ~3.00  (o)(()  -1)(()	(m) 24 66 24 66 24 66 24 69 24 69 24 69 24 69 24 69	(mL/min)  190 190 190 190 190 190 190 190 190	29.47 29.47 29.47 29.47 29.62 29.76 29.72 29.72 29.72	1280 1280 1277 1275 1275 1275 1274 1274 1274 1275	0,63 0.63 0.65 0.63 0.63 0.63 0.63 0.63 0.63	(%) 15.7 6 6 4 7 5.5 3.8 4.1 4 3 3.3 3.4 703	win 10% 0.50 0.36 0.42 0.29 0.33 0.25 0.26 0.310	6.79 6.79 6.80 6.78 6.78 6.77 6.77	Win 10mV  170,9  -37.9  -49.1  -51.3  -52.4  -52.5  -52.9  -51.2  -50.0  -49.4	131 78.1 50.0 35.6 26.6 18.6 14.9 114	Clubby	



392485.FI.FK

WELL NUMBER

VWAI-MW03

SHEET 2 OF 3

Pursed Vol. Death to Flow Pate Terms SpCond Statisty DO DO ON ORP Turbidity	-	OTIZ			GROUNDWATER SAMPLING DATA SHEET								
Time Purged Vol. (gals) Depth to (gals) Water (ft) Piow Rate (ft) (mL/min) (rC) (mS/m (sals)	PROJECT:	In-Situ Remed	diation Pilo	t Study		-			LOCATIO	ON : AOC	2-1		DATE; 3/17/10
Time Purged Vol. (gals) Depth to (gals) Plane (tt) Plan	Vi	THE RES				FIEL	DPAR	AMET					111
	Time	Purged Vol. (gals)	Depth to Water (ft)		Temp., (°C)	SpCond (uS/cm)	Salinity	DO	DO (mg/L)	who D 1	(mV)	(NTU)	Color / Odor / Comments
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PR	OJECT NUMBER	WELL NUMBER	
CH2MHILL	392485.FI.FK	VWAI-MW03	SHEET 3 OF 3
CHZIVIHILL	GROUNDW	ATER SAMPLING DA	1/10/11
PROJECT : In-Situ Remediation Pilot Study		LOCATION : AOC-I	DATE 1919
	NOTES (CONT	INUED)	1 7
SOP(s) used (refer to SOPs in back of this lo	g)? D-1		
Were all requirements of the SAP, PIs and at		to Ves.	
Explanation of exceptions to SAP, Pl's and S considered in the decision:			xception, anything
DILL 24.45 BTOC IMPREMAN	y other droppin V	In D	
No exaptions. Guest	1011	N.Y.	
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Date:

Signature:

0	CH2MHILL
-	

392485.FI.FK

WELL NUMBER
VWAI-MW04

SHEET 1 OF 3

PROJECT:	In-Situ Remed							LOCATIO	ON: AOC		.,	DATE: S/IY/IV
Weather:	phostly	Sunny	11~90	of b	reeze	1. hom	in a	Sample	Team:		nitale	
		. I. Co								M. A	ambon	
Total Depti			FT.(BTOC						September 1	and the same of th	-7	lia Ali adrus
antice alla	Vater: (-)		FT.(BTOC					S. 1015	d Time (		100	119/10 09:45
	umn(h): (=)	-	FT.	-	IN.		others.			and Time:		3/19/10 1000
	ıme in Well	210				IA/2)^2*0	.004329			te and Time		3/9/10
ump Dep		38.35	FT.(BTOC						id Time (		0	3/19/10 11:55
	ice/Equip:		The Control of the Co	nsoon P		_		The state of the		eadings:	VU	O.Gppm
neasuring	Device/Equip	ment:	Oil/Wate	er Interfac				_	urge Vo	lume: (	_	GAL.
TOWN				-	SAME	PLE INF						
Sample ID			104 - 03			Paramet	ers Coll	eced for:	Indiana in the			(fexMn)
	ate/Time: 0:	All	A	llas	_	-				NC 3.	TOC	
	YESINO ID	-14	11			Paramet	ers Coll	eced for:	(FD)	NIA		
THE STATE OF THE STATE OF	Date/Time:	NIA		_					-	2.	_	
	YES (NO)					Sample			00	lar	CIL.	a AE-I
	ples filtered?		1	. ~		Field Te	st Kit De	tails:	UMS	P	ONLIN	e or -1
YES, Wh	ich samples?	MU	als (F	e/Mn)						6 3		
					FIEL	DPAR	AMET	ERS				
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mUmin)	Temp., (*C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DØ (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
1015	~0.10	24.760	200	27.44	1217	0.64	7.4	0.56	4.76	488	313	chopy, milkywin
1020	~0.50	24.74	200	29.48	1293	0.64	4.2		6.84	44.9	160	7 3
1025	~1.00	24.74	200	29.54	1281	0.64	3.9	0.30	6.84	45.5	104	
1030	~1.25	24.74	200	29.62	1291	0.64	3.7	0.28	6.82	40.3	81.60	
1035	~1.50	24.74	200	2965	1290	044	2.8	0.21	6.82	38.8	55.3	
1040	~2.00	24.74	200	29.73	1289	0.64	2.6	0.20	6.82	36.8	37.7	
1045	~2.00	24.74	200	29.70	1290	0.64	2.2	0.10	6.81	35.1	29.3	
1050	~ 2.25	24.74	200	29.65		0.64	2.0	House many	6.80	35.6	23.3	
1055	~2.50	24.74	200	29.53		0.64			6.79	32.7	16.7	clear coloriess
1100		11.7								35.3		
1105	~ 3.00	24.74								34.6		
1110	~ 3.25	100000000000000000000000000000000000000	A	1000	The second second second	And the second second	1740-1700-1	And the second				
	v3.50		1 - March 1 - 1	Committee Contract Committee Co.	and the second		The second second	THE RESERVE AND ADDRESS.	2010/01/01/01	31.6		
1115	TELL AA	24.74			1289	0.64	2.3	0.17	6.77	30.8	6.09	
1120	24.00		colle	tion.								
1120	Bean 5	San Allendary Control					15-07					
1120	Beain S	UNIT										
1120	Bean 5	San Allendary Control										
1120	Beain S	UNIT										
1120	Beain S	+02										
1120	Beain S	UNIT										



392485.FI.FK

WELL NUMBER

VWAI-MW04

SHEET 2 OF 3

OJECT:	In-Situ Remed	liation Pilo	t Study					LOCATIO	ON : AOC	)-l		DATE: 5/19/1
					FIEL	DPAR	AMET	ERS				11
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
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	1/1	/	1					0.50	1/10	11/1		

			PROJECT NUMBER  392485.FI.FK WELL NUMBER  VWAI-MW04 SHEET	3 OF :
-	CH2	MHI	GROUNDWATER SAMPLING DATA SHE	ET
ROJECT:	In-Situ Remed	ation Pilo	NOTES (CONTINUED)	/19/
OP(s) us	ed (refer to So	OPs in ba	eack of this log)?	
			IP, PIs and above mentioned SOP(s) met?	
	on of exception of in the decis		AP, PI's and SOP(s) including why, under what conditions, who authorized exception, anyth	ng
NO No	Ixay		STUC immeliable offir dropped purp	
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Number	Direction		Description	_
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Signature:	1	V	Date: 3/19/10	

	CH2MHILL
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392485.FI.FK

WELL NUMBER

VWAI-MW05

SHEET 1 OF 3

The second persons when	In-Situ Remed		- 10-10-10-10-10-10-10-10-10-10-10-10-10-1	2				LOCATI	ON: AOC	H		DATE:03-18-10	1
Weather:	parily	cloudy	1~8	5 or	11-97	2 cr		Sample	Team:	D wh	TAKER		
										_M. 7	ambon	1	
Total Depti	-		FT.(BTOC			21			in Shell	176070	_	110/10 1000	
			FT.(BTOC	() Measur	red (30)	Spr.			d Time		_	3/11/10 10:35	
Nater Colu	umn(h): (=)	A COLUMN TO A COLU			IN.					e and Time:		3/18/10 1044	
Nater Volu	ime in Well	The State of the S				IA/2)^2*0	.004329			te and Time	e: ,	03/18/10 1240	
Pump Dep		39.50	FT.(BTOC						d Time			03/18/10 128	
	ice/Equip:		demonstration.	nsoon P	100				1	leadings:	1275	0 Oppm	ļ
Measuring	Device/Equip	ment:	Oil/Wate	r Interfa	ce Probe		-	Total P	urge Vo	lume:	d.15	GAL.	
					SAME	LE INF	ORMA	TION					
Sample ID	VWA.	I-MW	05-03	10		Parame	ters Colle	ed for:	vec	s. Svocs	FIIT, M	utals, nitrale,	
Sample Da	ate/Time: _ 03	1/8/10	1220	3						vifato,	TOC		
ield Dup:	YES NO ID:					Parame	ters Colle	eced for:	(FD)	NIA			
D Sample	Date/Time:	N/A											
MS/MSD:	YES (NO)					Sample	Appeara	nce:	cleo	u, coic	riess	/	
Vere sam	oles filtered?	ES/NO				Field Te	st Kit De	tails:	PIS	VAPL	Omy/	LE DF=1	
fYES, Wh	ich samples?	ficter	200 14	chais					N. Park		71		
					FIEL	D PAR	AMET	ERS				1000	
		Depth to			SpCond			DO		ORP	Turbidity		
Time	Purged Vol. (gals)	Water (ft)	Flow Rate (mL/min)	Temp., (°C)	(uS/cm) w/in 3%	Salinity (ppt)	(%)	(mg/L) w/in 10%	pH w/in 0,1	(mV) w/in 10mV	(NTU) w/in 10%	Color / Odor / Comments	
incu			5-	1.0		711	1. 10		001				
1055	Ø	24.57	95	Vit			rando		M) Vr	-	o Sbu	)	
1100	Ø		1121	The second second	0	Mair	0.3		13 15	delip	and the second		
1105	~0.05	24.77	172		1425	0.71	31.5		-	-14.9	X	Not enough WATER	tun upp
1110	~0.10	24.85	Name of the last o	29.84	and the second		15.5	1.19	6.80	-15 C	45.1		L. Mast
105	~0.50	24 93		29 27		0.71	9.4	0.81		-18.2	35.3	have to turn desur pun	Speed
1120	~0 50	24.78	125	29.38	1.00				6.77	-18.0	25.5		
1125	×0.75	24.77	125		1429		7.8	069			18.1		
1130	~1.00	2477	125	29 39	1428			0.59		-10.1	12.8		
1135	-1.50	24.77			1428		6.2				651		f
1140	41.75	24.77			1429						613		
1145	~175	24.77		POLIND TO THE POST OF	1430					-5.5			
1185	. ~ 2.00	-			1431		5.1			-42			
1200	~2.00	24.77	-	-	143		46	034	1.75	-3.3	412		1
1205	~ 2.10	24:17			1430		4.0		4.75		4.00		1
1210	~2.50				1431		3.8		6.74		2.79		1
		24.77			1431				6.74		3.49		1
		ecilec		GW S				0 6 6	<i>U.,</i> .	-			1
1215													
1215		DVI											
		br J.	)—										



392485.FI.FK

WELL NUMBER

VWAI-MW05

SHEET 2 OF 3

-		GROUNDWATER SAMPLING DATA SHEET										
ROJECT:	In-Situ Remed	diation Pilo	t Study					LOCATIO	ON : AOC	74		DATE:3/11/10
					FIEL	D PAR	AMET					
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity F(ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
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392485.FI.FK

WELL NUMBER

VWAI-MW05

SHEET 3 OF 3

-	GROUNDWATER SAMPLING	DATA SHEET
PROJECT: In-Situ Remediation Pilot Study	LOCATION : AOC-I	DATE: 3/11/19
	NOTES (CONTINUED)	
SOP(s) used (refer to SOPs in back of this	log)? [3-]	
Vere all requirements of the SAP, Pls and	above mentioned SOP(s) met?	
xplanation of exceptions to SAP, Pl's and onsidered in the decision:	SOP(s) including why, under what conditions, who authorize	ed exception, anything
DTU 24.00 implicitly oxhi	sicopic iluno	
that Slovy Checkly prey	r stepping Who actual Bird dlauder & JEANIMIN by nis Shoull be acceptable 2 100ALY	nin Our pump
	Ar	
	PHOTO LOG	100
Photo Compass Time Descript	tion	
	1/2	

	CH2MHILL
PROJECT	In-Situ Remediation Pilot Stud

NUMBER

392485.FI.FK

WELL NUMBER

VWAI-MW07

SHEET 1

	In-Situ Remed	iation Pilot	Study					LOCATIO	N : AOC	4		DATE VAN
leather:	hum 60	hat . l	~ 800	F H	-92°C			Sample	Team:	D. Wn	ITAKLE	
		ly sin						Aleman Walle	300,000,000		mbon	i
tal Dept		45.20	~	) Measur	ed							
pth to V		40.76				*		Date an	d Time (	On Well:		7/22/10 7:25
ater Col		20.16			IN.			Pump S	tart Date	and Time:	-	1420 01/22/10
ater Volu	me in Well			1593*h(in	)*(w ellDl	A/2)^2*0	.004329	Pump F	inish Da	te and Time		03/22/10 1940
mp Dep	th:	40	FT.(BTOC	) Measur	ed			Date an	d Time (	Off Well:		3/22/10 1048
ge Dev	ice/Equip:		SS Mo	nso on P	ump			Air Mon	itoring R	eadings:	11-6	0.0ppm
asuring	Device/Equip	ment:	Oil/Wate	r Interfac	e Probe			Total P	urge Vo	lume: /	01.15	GAL.
					SAME	LE INF	ORMA	TION				
mple ID	12	NI-M	W07-0	1310		Paramet	ters Colle	eced for:	VO			metals, nitrata
ample Da	ate/Time: 03	122/10	0	750						sulfa	b, TO	C
eld Dup:	YERNO D	N	A			Paramet	ters Colle	eced for:	(FD)	NIA		
	e Date/Time:	MIN										
MSD:	YES NO					Sample	Appeara	nce:	1	ear,		
ere sam	ples filt ered?			,	20	Field Te	st Kit De	tails:	Oms	Pirs	clan	C-DF=1
res, W	nich samples?	_ MU	tals (	Felmn	)	6				. 1		
					FIEL	D PAR	AMETE	ERS				
	Purged Vol.	Depth to	Flow Rate	Temp.,	SpCond	Salinity	00	00	pH	ORP	Turbidity	2.7 12.7 12.7
Time	(gals)	Water (ft)	(mL/min)	(°C)	(uS/cm) w/in 3%	(ppt)	(%)	(mg/L) w/in 10%	win D 1	(mV) w/in 10mV	(NTU) w/in 10%	Color / Odor / Comments
756	0	25,41	70									-mi2
130		77,11	10									7 1 1
-	~ 0 10	15 45	70	21. 97	1378	0.09	78.7	7.23	1.77	-37.6	NIA -	+ not enough water
01	~ 0.10	25.45	70		1378		28.2	7.23	-	-37.4	NIA -	once enough water
101	-0.10	25.41	70	27.05	1380	0.69	22.8	1.81	6.72	-610	310	
804 811	~0.10	25.41 25.36	70 <b>S</b> 0	27.05 27.20	1380	0.69	22.8	1.81	6.72 U 71	-610 -68.5	310	turn up flewlate t
806	~0.10 ~0.16	25.41 25.36 <b>25.85</b>	70 50 150	27.05 27.20 27.49	1380	0.69	22.8	1.81	6.72	-610	310 288 246	
801 806 811 816 821	~0.10 ~0.10 ~0.15 ~0.20	25.41 25.36 <b>25.85</b> 25.51	70 <b>S</b> 0	27.05 27 20 27.49 27.74	1380 1384 1386	0.69	22.8 18.1 17.7	1.81	6.72 6.71 6.71	-610 -68.5 -69.7 -73.1	310	turn up flewlate t
801 806 811 816 821	~0.10 ~0.16 ~0.16 ~0.20 ~0.25	25.41 25.36 <b>25.85</b> 25.51 25.43	70 <b>5</b> 0 150 90	27.05 27.20 27.49 27.74 27.75	1380 1384 1386 1386	0.69	22.8 18.1 17.7 14.5	1.81	6.72 6.71 6.71 6.71	-610 -68.5 -69.7	310 288 246 178	turn up flewlate t
801 806 811 816 821	~0.10 ~0.16 ~0.15 ~0.20 ~0.25 ~0.60	25.41 25.36 25.85 25.51 25.43 25.40	70 50 150 90 90	27.05 27.49 27.49 27.74 27.95 28.12	1389 1384 1386 1386 1385	0.69	22.8 18.1 17.7 14.5 13.3 12.7	1.81 1.43 1.57 1.14 1.04 0.99	6.72 6.71 6.71 6.71 6.71	-610 -68.5 -69.7 -73.1 -76.9 -77.0	310 288 246 178 127 85.1	turn up flewlate t
801 804 811 816 821 124 836	~0.10 ~0.10 ~0.10 ~0.20 ~0.25 ~0.50 ~0.15	25.41 25.36 25.85 25.51 25.43 25.40 25.38	70 50 150 90 90	27.05 27.49 27.49 27.74 27.95 28.12	1389 1384 1386 1386 1385 1385	0.69	22.8 18.1 17.7 14.5 13.3 12.7	1.81 1.43 1.57 1.14 1.04 0.99 0.99	6.72 6.71 6.71 6.71 6.71 6.71	-610 -68.5 -69.7 -73.1 -76.9 -77.0	310 288 246 178 127 85.1 63.9	turn up flewlate t
801 806 816 816 821 126 836 841	~0.10 ~0.16 ~0.75 ~0.20 ~0.25 ~0.50 ~0.15 ~1.00	25.41 25.36 25.85 25.51 25.43 25.40	70 50 150 90 90 90 90 75	27.05 27.20 27.49 27.74 27.95 28.12 28.21	1380 1384 1386 1386 1385 1385 1385	0.69	22.8 18.1 17.7 14.5 13.3 127 12.4	1.81 1.43 1.59 1.14 1.09 0.99 0.99	6.72 6.71 6.71 6.71 6.71	-610 -68.5 -69.7 -73.1 -76.9 -77.0 -75.9	310 288 246 178 127 85.1 63.9	turn up flewlate t
801 804 811 816 821 24 836 846	~0.10 ~0.16 ~0.75 ~0.20 ~0.25 ~0.60 ~0.15 ~1.00	25.41 25.36 25.65 25.51 25.43 25.40 25.38 25.36	70 50 150 90 90 90 90 95 75	27.05 27.49 27.49 27.74 27.95 28.12 28.20	1380 1384 1386 1385 1385 1385 1385 1383	0.69 0.69 0.69 0.69 0.69 0.69	22.8 18.1 17.7 14.5 13.3 12.7 12.4 11.7 12.5	1.81 1.43 1.59 1.14 1.04 0.99 0.96 6.51	6.72  1. 11  1. 11  1. 11  1. 71  1. 71  1. 71  1. 71  1. 71  1. 71  1. 71	-610 -68.5 -69.7 -73.1 -76.9 -77.0 -75.9	310 288 246 178 127 85.1 63.9 57.4 50.2	turn up flewlate t
801 806 811 816 821 126 831 831 841 846	~0.10 ~0.16 ~0.20 ~0.25 ~0.50 ~0.15 ~1.00 ~1.10	25.41 25.36 25.45 25.43 25.40 25.38 25.36 25.34	70 50 150 90 90 90 90 75 75 75	27.05 27.20 21.49 27.74 21.95 28.12 28.20 28.11	1380 1384 1384 1385 1385 1385 1383 1383	0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69	22.8 18.1 17.7 14.5 13.3 12.7 12.4 11.7 12.5 11.0	1.81 1.43 1.59 1.14 1.04 0.99 0.96 6.51	6.72 6.71 6.71 6.71 6.71 6.71 6.71 6.71	-610 -68.5 -69.7 -73.1 -76.9 -77.0 -75.9 -76.9	310 288 246 178 127 85.1 63.9 57.4 50.2	turn up flewlate t
(01 806 811 816 721 726 731 836 741 846 851 850	~0.10 ~0.16 ~0.75 ~0.20 ~0.25 ~0.60 ~0.15 ~1.00	25.41 25.36 25.85 25.43 25.43 25.40 25.38 25.34 25.34	70 50 150 90 90 90 95 75 75 75	27.05 27.20 27.49 27.74 27.95 28.12 28.20 28.11 28.15	1380 1384 1384 1385 1385 1385 1385 1389 1380	0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69	22.8 18.1 17.7 14.5 13.3 12.7 12.4 11.7 12.5 11.0	1.81 1.43 1.59 1.14 1.09 0.99 0.90 6.51 0.87	6.72 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71	-610 -68.5 -69.7 -73.1 -76.9 -75.9 -78.7 -78.7 -71.7	310 288 246 178 127 85.1 63.9 57.4 50.2 30.0	turn up flewlate t
800 800 811 816 821 20 23 836 840 8851 8850	~0.10 ~0.16 ~0.75 ~0.20 ~0.25 ~0.50 ~0.15 ~1.00 ~1.10 ~1.25	25.41 25.36 25.85 25.43 25.43 25.40 25.38 25.36 25.34 25.34 25.34 25.35	70 50 150 90 90 90 95 75 75 75 75 75	27.05 27.40 27.49 27.74 27.95 28.12 28.20 28.11 28.25 28.28 28.41	1380 1384 1384 1385 1385 1385 1385 1389 1380 1380	0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69	22.8 18.1 17.7 14.5 13.3 12.7 12.4 11.7 12.5 11.0 11.0	1.81 1.45 1.39 1.14 0.99 0.96 6.51 0.81 0.81 0.91	6.72  0.71  0.71  0.71  0.71  0.71  0.71  0.71  0.71  0.71  0.71  0.71  0.71  0.71	-610 -68.5 -69.7 -73.1 -76.9 -75.9 -78.7 -78.7 -71.7	310 288 246 178 127 85.1 63.9 57.4 50.2 30.0 76.7 20.0	turn up flewlate t
801 804 811 816 821 124 831 831 844 846 1851 1850	~0.10 ~0.16 ~0.75 ~0.20 ~0.25 ~0.60 ~0.15 ~1.00 ~1.10 ~1.25 ~1.25	25.41 25.36 25.43 25.43 25.40 25.38 25.36 25.34 25.34 25.35 25.35 25.35	70 50 150 90 90 90 95 75 75 75 75 75	27.05 27.40 27.49 27.74 27.95 28.12 28.20 28.11 28.15 28.28 28.41 28.53	1380 1384 1384 1385 1385 1385 1385 1389 1380 1380	0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69	22.8 18.1 17.7 14.5 13.3 12.7 12.4 11.7 12.5 11.0 11.0	1.81 1.43 1.59 1.14 1.09 0.99 0.90 6.81 0.80 0.91 0.80	6.72 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71	-610 -68.5 -09.7 -73.1 -76.9 -78.7 -78.7 -77.7 -74.1 -74.1 -73.3	310 288 246 178 127 85.1 63.9 57.4 50.2 30.0 76.7 20.0 17.9	turn up flewlate t
801 804 811 816 821 124 836 841 846 1851 1851 1851 1851	~0.10 ~0.16 ~0.20 ~0.25 ~0.50 ~0.15 ~1.00 ~1.10 ~1.25 ~1.25	25.41 25.36 25.85 25.51 25.43 25.36 25.36 25.34 25.34 25.34 25.35 25.35 25.35	70 50 150 90 90 90 95 75 75 75 75 75	27.05 27.40 27.49 27.74 27.75 28.12 28.20 28.11 28.15 28.28 28.41 28.53 28.41	1380 1384 1384 1385 1385 1385 1383 1380 1381 1381	0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69	12.8 18.1 17.7 14.5 13.3 12.7 12.4 11.7 12.5 11.0 11.0 11.7 10.9 10.9	1.81 1.43 1.39 1.14 0.99 0.99 0.81 0.80 0.91 0.81	6.72 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71	-610 -68.5 -09.7 -73.1 -76.9 -78.7 -78.7 -71.7 -74.1 -73.3 -15.4	310 288 246 178 127 85.1 63.9 57.4 50.2 30.0 14.7 20.0 17.9 16.1 15.9	turn up flewlate t
800 800 811 816 821 22 23 836 846 8851 8850 901 906	~0.10 ~0.16 ~0.20 ~0.25 ~0.50 ~0.15 ~1.00 ~1.10 ~1.25 ~1.25 ~1.25	25.41 25.36 25.43 25.43 25.40 25.38 25.36 25.34 25.34 25.35 25.35 25.35 25.35	70 50 150 90 90 90 95 75 75 75 75 75 75	27.05 27.40 27.49 27.79 27.75 28.12 28.20 28.11 28.25 28.26 28.41 28.53 28.63 28.63 28.63	1380 1384 1384 1385 1385 1385 1385 1380 1380 1381 1381	0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69	12.8 18.1 17.7 14.5 13.3 12.7 12.4 11.7 12.5 11.0 11.7 10.9 10.9 10.9	1.81 1.43 1.39 1.14 0.99 0.99 0.81 0.80 0.91 0.81	6.72 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.72 6.72 6.72	-610 -68.5 -09.7 -73.1 -76.9 -78.7 -78.7 -71.7 -74.1 -73.3 -15.4	310 288 246 178 127 85.1 63.9 57.4 50.2 30.0 14.7 20.0 17.9 16.1 15.9	turn up flewlate t
801 806 811 816 821 626 836 841 846 8851 8851 8850 8901 9906 9916 9916	~0.10 ~0.16 ~0.15 ~0.20 ~0.25 ~0.50 ~0.15 ~1.00 ~1.10 ~1.25 ~1.25 ~1.25 ~1.25 ~1.25	25.41 25.36 25.45 25.45 25.40 25.36 25.36 25.37 25.37 25.35 25.35 25.35 25.33 25.33	70 50 150 90 90 90 95 75 75 75 75 75 75	27.05 27.40 27.49 27.74 27.75 28.20 28.20 28.15 28.28 28.41 28.53 28.64	1380 1384 1384 1385 1385 1385 1385 1380 1380 1381 1380 1381 1380 1379	0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69	12.8 18.1 17.7 14.5 13.3 12.7 12.4 11.7 12.5 11.0 11.7 10.9 10.9 10.9 10.9 10.9 10.9	1.81 1.43 1.59 1.14 1.04 0.99 0.91 0.81 0.86 0.91 0.81 0.81 0.91	6.72 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.72 6.72 6.72 6.72	-610 -68.5 -68.5 -69.7 -73.1 -76.9 -78.9 -78.7 -71.7 -74.1 -74.1 -73.3 -15.4	310 288 246 178 127 86.1 63.9 57.4 50.2 30.0 16.7 20.0 17.9 16.1 15.9 15.1	turn op flowrate t
801 804 811 816 821 124 1831 1831 1846 1851 1850 1901 1916 1916 1916	~0.10 ~0.16 ~0.75 ~0.20 ~0.25 ~0.50 ~0.15 ~1.00 ~1.00 ~1.25 ~1.25 ~1.25 ~1.35 ~1.40	25.41 25.36 25.85 25.43 25.43 25.36 25.38 25.34 25.34 25.34 25.35 25.35 25.35 25.33 25.33 25.33	70 50 150 90 90 90 75 75 75 75 75 75 75	27.05 27.40 21.49 27.74 27.74 27.75 28.12 28.20 28.11 28.55 28.28 28.41 28.53 28.63	1380 1384 1384 1385 1385 1385 1385 1380 1380 1381 1380 1381 1380 1379	0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69	12.8 18.1 17.7 14.5 13.3 12.7 12.4 11.7 12.5 11.0 11.7 10.9	1.81 1.43 1.39 1.14 0.99 0.99 0.81 0.86 0.91 0.89 0.81 0.81 0.81 0.81	6.72 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.71 6.72 6.72 6.72 6.72	-610 -68.5 -09.7 -73.1 -76.9 -78.7 -78.7 -77.7 -74.1 -74.1 -74.3 -15.4 -10.3	310 288 246 178 127 85.1 43.9 57.4 50.2 30.0 14.7 20.0 17.9 16.1 15.9 15.1 15.9	turn op flowrate t



a state

Signature:

PROJECT NUMBER

392485.FI.FK

WELL NUMBER

VWAI-MW07

SHEET 2 OF 3

## **GROUNDWATER SAMPLING DATA SHEET**

ROJECT:	In-Situ Remed	liation Pilo	t Study					LOCATI	ON: AOC	3-1		DATE:
					FIEL	LD PAR	AMET	ERS				
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mUmin)	Temp., (*C)	SpCond (uS/cm) w/in 3%	∠Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
2941	~175	25.40	75	28.89	1374	0.68	69	0.53	672	-714	11.2	
0946	~1.85	2537	75	28.93	1374	0.08	6.6	0.51	6.72	-70.6	10.9	
09.50	Beg in	SAMP	i e cou	ection	v							
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	/											
1											124	
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Date: 03-22-10



WELL NUMBER

392485.FI.FK

VWAI-MW07

SHEET 3 OF 3

-			1	GROUNDWATER SAMPLING DATA SHEET							
PROJECT :	In-Situ Remedi	ation Pilo	t Study			L	OCATION : A	OC-I		DATE: 3/24/15	
				NO	OTES (C	ONTINUE				1	
SOP(s) use	ed (refer to SC	OPs In ba	ick of this log)	?							
			Pls and abo		ned SOP(s	met?					
Explanatio		ns to SA					t conditions	, who auth	norized exce	otlon, anything	
DIV	- M -	101/	2700	MALLA	11.	AL C	10 pain	1000			
1) [01	down Px	cless		1-31	70	1111	10	At V			
Olor		1111-5	, 0.0		/0	13.11	100	4/1.			
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				F	PHOT	O LO	3				
Photo Number	Compass Direction	Time	Description	1							
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Signature:	Date:
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392485.FI.FK

WELL NUMBER
VWAI-MW02

SHEET 1 OF 3

Weather: OVE	emediation Pile	t Study					LOCATI	ON AO	C-I		DATE 11/3/10
A STATE OF THE PARTY OF THE PAR	ECAST, I	70°F	HUMI	5			Sample	Team;	KEN		TER
	di p	TT IDEA			-				CHRI	S 28	29
Total Depth:		FT.(BTO					D		0-14-16		11/2 -201
Depth to Water: (-	A STATE OF THE PARTY OF THE PAR	FT.(BTO							On Well:		11/3 0805
Water Column(h): ( Water Volume in We		FT.	1503*6//		A/2\A2*f	004320			e and Time ate and Tim		11/3 0945
Pump Depth:	39.8	FT.(BTO			inuz j z c	.004323			Off Well:	u .	11/3 10:20
Purge Device/Equip			nsoon F						Readings:		0.0 884
Measuring Device/E				ce Probe		-		urge Vo	11.00	6.0	GAL.
				SAMO	LE INF	OPMA					
Sample ID: VWA	II - MuiA	2 - 111	0	SAMI				VOC	13 DIFF	Bace	ev.) Succ
Sample ID: VVVA Sample Date/Time:	7.00	092			rarame	iers Coll	eced for	-	PON/Mn	Nitt	
Field Dup: YES/NO	3	010			Parame	ters Coll	eced for:	F7 27 7	Corr PIN	Telle	THE PORPHIC INC
FD Sample Date/Tin		-			Latanie	idia Gull	uceu IUI.	11.11			
MS/MSD: (YES) NO					Sample	Appears	ince	0	LEAR		
Were samples filtere	7				Field Te				PM PERS	DUFATI	E @ 09:20
TYES, Which samp		- 120x	1/40			1 1 1 1 1 1 1	- Annual Control				2 Mg ASCORBIC
				FIEL	D PAR	AMET	FRS		1 10000		
	Depth to			SpCond			DO		ORP	Turbidity	
Time Purged (gals)	Ol. Water	Flow Rate (mL/min)	Temp., (°C)	(uS/cm) w/n 3%	Salinity (ppt)	(%)	(mg/L) win 10%	pH w/m 0.1	(mV) w/m 10mV	(NTU) with 10%	Color / Odor / Comments
0805	20.46	200	2831	2039	1.04	103.5	2.19	7.66	213.5		
0810	20.	200	28.76	2388	1.2Z	320,8	24,27	7.83	208.5		DO PROBE NOT U
CAUBE	me 31	KUP	451	AND	RE	STAR	- R	26€	202.2		
O34136				A A	Lower	2326	17.82	7.01	197.4	37.7	DO STILL INTELLI
0845	7038	240	26.82	2008	101	20670	14.00				po since respective
0845	20.38	240	28.96	1942	0.93	205.1	100	6.95	194.0		
0845 0850 0855		240	28.96		0.98		15:34	100000000000000000000000000000000000000	189.5	7.0	70 PPM PERSON
0845 0850 0855 0700 2-5	20.38 Ze38 Z6.40	240 240 240	28.96	1942	0.93	205.2 1623 130.6	15:34	6.95	189.5		70 FFM FEBER CONFIEM USENE
0845 0850 0855 0900 2-5 0905	20.38 Z#38 Z6.40 20.40	240 240 240 200	28.96 29.06 29.21 29.23	1942 1857 1720 1684	0.93	205.2 1623 130.6 118.0	15:34 12:86 9:74 8:97	6.95 6.85 6.74 6.67	189.5 186.4 183.4	2.32	70 PPM PERSON
0845 0850 0855 0700 2-5 0905 0910	20.38 20.40 20.40 20.40	240 240 240 200 240	28.96 29.06 29.21 29.23 29.28	1942 1857 1720 1684 1639	0.93 0.92 0.86 0.84 0.82	205.2 1623 1623 118.0 100.8	1534 1286 974 837 7.72	6.95 6.85 6.74 6.67 6.63	189.5 186.4 183.4 179.0	2.32	70 FFM FEBER CONFIEM USENE
0845 0850 0855 0900 2-5 0905 0910	20.38 28.48 26.40 20.40 20.40 20.40	240 240 240 200 240 240	28.96 29.21 29.23 29.23 29.28 29.36	1942 1857 1720 1684 1639 1622	0.93 0.92 0.86 0.84 0.82 0.81	205.2 1623 1623 118.0 100.8 94.7	15:34 12.86 9:74 8:97 7:72 7:18	6.95 6.85 6.74 6.67 6.63 6.61	189.5 186.4 183.4 179.0 177.8	2.32 1.63	GONFIEM VENER CONFIEM VENE CO ACRIM
0845 0850 0855 0900 2-5 0905 0910 0915 4 0920 3.5	20.38 28.48 26.40 20.40 20.40 20.40	240 240 240 260 240 240 240	28.96 29.21 29.23 29.23 29.28 29.36	1942 1857 1720 1684 1639 1622	0.93 0.92 0.86 0.84 0.82 0.81	205.2 1623 1623 118.0 100.8 94.7	15:34 12.86 9:74 8:97 7:72 7:18	6.95 6.85 6.74 6.67 6.63 6.61	189.5 186.4 183.4 179.0	2.32 1.63	70 FFM FEBER CONFIEM USENE



WELL NUMBER

392485.FI.FK

VWAI-MW02

SHEET 2 OF 3

		liation Pilo		30	FIEL	D PAR	AMET	LOCATIO				DATE: 1(/3/)
					riel	DPAK	MIVIE	LNJ				
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/m 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/m 0,1	ORP (mV) with 10mV	Turbidity (NTU) w/m 10%	Color / Odor / Commer
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14-11-1			-									
nature:	0	Pot.	24	0	,					13710		



392485.FI.FK

WELL NUMBER

VWAI-MW02

SHEET 3 OF 3

			GROUNDWATER SAI	
PROJECT:	In-Situ Remed	iation Pile	Study LOCATION: A NOTES (CONTINUED)	OC-I DATE:
SOR(e) us	ad (refer to S	OP: in h	ck of this log)? 8-1	
T. 100			, Pls and above mentioned SOP(s) met? VES	
Explanation		ns to SA	P, PI's and SOP(s) including why, under what conditions	s, who authorized exception, anything
No	EXCEPT	ONS		
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				/ COR
			PHOTO LOC	
			PHOTO LOG	
Photo Number	Compass Direction	Time	Description	
		-		

Signature: tests de l'all Date: 11/3/10



Inna	LET MORE	44144	Add NO
PRO	JECT	NUM	ABE

392485.FI.FK

VWAI-MW03

SHEET 1 OF 3

PROJECT	In-Situ Reme	diation Pile	ot Study					LOCATI	ON: AO	C-i		DATE 1/4/201
Weather:	Mostly	Clarity	, #1 S/A1	to do	rele or	two	-	Sample	Team:	K.B.	Hor	
Total Dept	th:	39.0	FT.(BTO	C) Measu	red		-					
STORY STORY	Vater: (-)		FT.(BTO					Date ar	nd Time	On Well:		11/4/201 0810
	umn(h): (=)			.,						e and Time		11/4/2010 0834
Season Person	ume in Well	_			•	1(A/2)/2*(	0.004329			ate and Tim		144/2010 1001
Pump Dep		34.0	FT.(BTO			11041				Off Well:	9.	11/4/2010 1120
-	/ice/Equip:			onsoon F						Readings:		
NAME OF STREET	Device/Equip	ment:		er Interfa		,	-		111111111111111111111111111111111111111	olume:	325	GAL
						PLE INF	ORMA	-	9		200	
Sample ID	VWAI-	MW03	-1110 8	1110	11/2/11/20/20		ALL PROPERTY.	and the second second	Vx,	SVOG.	FMehl	Nitrate/Suffete
Sample Da	ate/Time: /	1/4/2	010	0950	)				TOL			, ,
Field Dup:	YES ID:					Parame	ters Coll	eced for:	(FD)			
	e Date/Time:								-			
MS/MSD:	YES/NO					Sample	Appeara	ince:	CL	ent		
Were sam	ples filtered?	ESINO				Field Te	st Kit De	tails:	0-0	Zoom /	eallete	roding 1 1xD
If YES, WI	nich samples?	F	e/Mn			-				77		
					FIE	D PAR	AMET	ERS			-	
Time	Purged Vot. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (*C)	SpCond (uS/cm) w/m 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH with 0.1	ORP (mV) win 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
0839	0	20.12	200	28.40	1881	0.95	13.7	1.05	7.19	-4.7	74.9	Clocky/Lhite
0844	1/8	20.42	200	28.52	1862	244	149	1.10	7.19	-198	65.5	11
0849	1/4	20.42	200	29.69	1957	0.93	10.2	0.78	725	-20.5	55.8	
0854	42	20.92	200	28, 73	1854	9.43	10.0	0.77	7,23	- 20,6	46.5	Clar
0859	3/4	20.42	200	28.81	1991	0,92	8.9	0.70	7.26	-17.6	41.0	
0910	1.25	22.43	200	2920	1790	0,90	6.7	0.52	7,27	-124	23.2	
0915	1.5	22.93	200	2922	1793	0.90	5.7	0.44	7.29	-14.1	27.6	
0920	1.75	20.93	200	29.26	1782	0.89	5.5	0,42	7,28	-13.2	25.1	
0925	2.0	20.43	200	29,36	1776	0.84	5.1	0.39	7.27	-11.8	21.8	
2930	2.25	20.93	200	29.36	1777	0.89	5.0	0.38	7.27	-10.7	12.7	
0935	2.50	20.93	200			0.40	7.9	0.37	7,29	- 4.9	8.39	
2940	2.75	20,93	200	29.35	1771	0,40	4.8	0,37	7,28	- 8.7	7.87	
	Sodjia 1.	ersulfo	a vine	tolore	lack s	hrs 5.	tora (	-0.7	oun o	f Pearles	cot 1	XD, willy
	Ing Asc	to A	crol mi	160	1							
7									-			
		_					_					



392485.FI.FK

WELL NUMBER
VWAI-MW03

SHEET 2 OF 3

## **GROUNDWATER SAMPLING DATA SHEET**

	In-Situ Remed	nation FRO	Coludy					LOCATIO	JN AUC	-1		DATE: 1/4/20
- = 1	7				FIEL	D PAR	AMET	ERS			- 6	
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (*C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/m 10%	pH w/in 0.1	ORP (mV) with 10mV	Turbidity (NTU) w/m 10%	Color / Odor / Commen
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Signature:

Date: 1/4/20/0



392485.FI.FK

WELL NUMBER

VWAI-MW03

SHEET 3 OF 3

### GROUNDWATER SAMPLING DATA SHEET

				CITOCIAD	WATER OAM LIN	DAIA OILLI
PROJECT	In-Situ Remed	diation Pil	ot Study	***************************************	LOCATION AOC-I	DATE
				NOTES (CO	ONTINUED)	
			ack of this log)?			
				e mentioned SOP(s		
Explanati considere	on of exception of	ons to S/	AP, Pl's and SOF	P(s) including why, u	inder what conditions, who autho	rized exception, anything
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Photo Number	Compass Direction	Time	Description			
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My Date: 11/4/2010



392485.FI.FK

WELL NUMBER VWAI-MW04

SHEET 1 OF 3

PROJECT	In-Situ Remed	diation Pilo	Study					LOCATION	ON: AOC	2-1		DATE: //2/2019
Carrier County	5-4my, to			aid 80	3			Sample		K.B.		47-012
	-									C.R.	ed	
Total Dept			FT.(BTO	Shiring								
Depth to V	Vater: (-)	20.72	FT.(BTOC	C) Measu	red			Date an	d Time	On Well:		11/2/2010 0800
Water Coli	umn(h): (=)		FT.		IN.			20.30.40		a and Time		1/2/2010 0820
Water Vol	ume in Well	36.82	GAL (3.14	11593*h(i	n)*(wellD	IA/2)*2*0	.004329	Pump F	inish Da	ite and Tim	e:	1/2/2010 D935
Pump Dep	eth:	36.5	FT.(BTOC	) Measu	red			Date an	d Time	Off Well:		11/2/2010 1015
Purge Dev	ice/Equip:		SS Mo	nsoon P	ump					teadings:	2 (24	Oppa
Measuring	Device/Equip	ment:	Oil/Wate	r Interfa	ce Probe	1		Total P	urge Vo	lume: ^	2.5	GAL.
					SAMI	PLE INF	ORMA	TION		_		
Sample ID	VWAI	-MWD4	-1110	0 11	10 A	Paramet	ters Coll	eced for:	VOCS	, suoc,	MATH	and (FeaMa)
A STATE OF THE PARTY OF THE PAR		12/2010		1410						NCz.	TOL	
	YES NO ID:	_				Paramet	ters Coll	eced for:	-			
DISH STEEL STEEL ST	a Date/Time:	_							_	_		
MS/MSD:	YES (NO					Sample	Appeara	ince:	(	eur		
ACTOR AND THE PARTY OF THE PART	ples filtered?	ES/NO				Field Te	st Kit De	tails			7 01/	on Penalfula
	nich samples?	20	Margas	ese								
					FIE	D PAR	AMET	ERS	The state of			
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/m 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
0825	0	20.79	240	2841	1961	0.98	20.4	1,53	1.02	177.6	107	Clarkylahole
0830	0.25	20.74	240	24.23	1940	0.48	148	1.12	7.00	159.0	68.2	//
0835	0.50	2079	240	29.27	1932	0.47	11.0	0.83	6.99	145.0	48.6	
0840	0.75	10.79	240	29.41	1892	0.95	6.5	0.50	6.92	110.7	26 9	Clew
0845	1-00	20,70	240	29.94	1866	094	5.0	0.38	6.91	1063	19-6	
0850	1.25	20.79	240	29,43	1859	2.93	4.6	0.34	6.88	1069	162	
0855	1.50	20,74	240	29,43	1849	0.42	9.0	9.30	6.87	107.2	15.4	
0900	1.85	20.79	240	29.44	1844	242	3.9	029	6.87	107,1	13.1	
0405	2.10	20,74	240	29,44	1843	0,42	3.7	9.28	6.86	106-9	11.9	
-	Sodien Pe	talfole	visal	chemel	kit :	shows b	duson	000	2.700	in sati-	Berist	te is promotor
	Ing Asco	1/4 qu	16111	be add	Wto.	Legeon	ole V	WAI-	nwdy	-ILIPA		
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392485.FI.FK

WELL NUMBER

VWAI-MW04

SHEET 2 OF 3

## **GROUNDWATER SAMPLING DATA SHEET**

UECI	In-Situ Remed	fiation Pilo	t Study					LOCATIO	ON : AOC	2-1		DATE: /1/2/2010
					FIEL	D PAR	AMET	ERS				
ime	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comment
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Signature:

ate: 11/2/2014



392485.FI.FK

WELL NUMBER

VWAI-MW04

SHEET 3 OF 3

-			GROUNDWATER SAMPLING DATA SHEET
PROJECT: In-	-Situ Remed	iation Pil	
			NOTES (CONTINUED)
SOP(s) used	(refer to St	OPs in b	ack of this log)?
			P, PIs and above mentioned SOP(s) met? 1/25
xplanation	of exceptio	ns to SA	RP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything
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Date: 11/2/20/0



392485.FI.FK

WELL NUMBER

VWAI-MW05

SHEET 1 OF 3

	n-Situ Remed	fiation Pilo	t Study					LOCATI	ON : AO	2-1		DATE /1/2/10
ther:	SUNNY	1, 85	PF	HUMI	D			Sample	Team:	CHRI	STOPITE	REED
										KEN.	LI BU	TLER
Depth:		44.6	FT.(BTO	C) Measu	red							
h to Wa	iter: (-)	20.65	FT.(BTO	C) Measu	red			Date ar	nd Time	On Well:		11/2, 0815
r Colun	nn(h): (=)		FT.		IN.			Pump S	Start Date	e and Time	:	11/2 0815
r Volun	ne in Well		GAL (3.14	41593*h(i	n)*(wellD	IA/2)^2*0	.004329	Pump F	inish Da	ite and Tim	e:	11/2 0920
p Depti	13	39.6	FT.(BTO	C) Measu	red			Date ar	d Time	Off Well;		11/2, 0920
e Devic	e/Equip:		SS Me	onsoon P	ump			Air Mar	itoring F	Readings:		0.0 994
suring D	evice/Equip	ment:	Oil/Wate	er Interfa	ce Probe			Total P	urge Vo	lume:	4.0	GAL.
					SAME	LE INF	ORMA	TION			- 7	
ple ID:	VWAI -	MWO	5-1	110		Paramet	ters Coll	eced for	VOC	SVOC	IRON	MA SULFATE
	a/Time:	11/2/		0920					- 3 - 5	RATE.	TOC	
No. of the last	ES/NO ID:		NO			Paramet	ters Coll	eced for:	(FD)	-		
	Date/Time:		-									
Table of	ES/NO	NO				Sample	Appeara	ince:	cu	AR		
sample	es filtered y					Field Te	st Kit De	tails:	_		wow	
	ch samples?	12	1 40	MN								
					FIEL	D PAR	AMET	FRS				
						DIAN	AME II				E //3	
пе	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (*C)	SpCond (uS/cm) w/m 3%	Salinity (ppt)	DO (%)	(mg/L) w/in 10%	pH w/in 0.1	(mV) w/in 10mV	Turbidity (NTU) w/m 10%	Color / Odor / Comments
5	0.25	23.10	300	28.90	1328	0.65	5.0	0.58	6.70	116.0	60.4	SLIGHT PETED OF
20	050	22.76	250	28,92	1340	0.66	5.0	0.39	672	510	50.2	
25	0.75	22.45	250	28.95	1359	0.67	5.0	0.38	6.74	42.3	37.6	
30	1.0	21.81	200	29.02	1366	0.68	4.3	6.33	6.73	32-1	25.0	
35	1.25	21.25	200	28.98	1365	0.68	4.0	0.31	6.73	38.2	18.1	
40	1.50	21.32	250	28,97	1364	6,68	4.7	0.36	6.73	34.1	12.2	
45	1.75	21-32	250	29.04	1363	0.68	4.4	0.34	6.73	32.6	8.78	0.0 PM PEDE
	2.0	21,32	250	29.15	1362	0.67	4.2	0.33	6.73	29.8	4.21	
50	2.25	21.32	250	29.19	1360	0.67	3,6	0.30	6.72	20.0	5.36	
55		21.32	250	29.20	1359	0.67	3.2	0.25	6.72	19.9	4.22	
	2.50		-	29.22	1358	0.67	3.1	0,23	6.72	18.7	4.16	
55	2.50		250	1987 11 11 11		Total Control	100 Inc.	1 76	1.72	15 2		
55		21.32	250		1357	0,67	30	0,60	4.17	1226		
55	2.75	21.32	250	29.22						12.5		O.OPAM PERSUL
55	3.25	21.32	250	29.22								USE 10 Mg AA
55	2.75 3.25 3.50	21.32	250	29.22								USE 10 Mg AA
55	2.75 3.25 3.50	21.32	250	29.22								USE 10 Mg AA
55	2.75 3.25 3.50	21.32	250	29.22								USE 10 Mg AA
55	2.75 3.25 3.50	21.32	250	29.22								USE 10 Mg AA
55	2.75 3.25 3.50	21.32	250	29.22								0.0 PPM PERSULU USE 1.0 Mg AA
55 10 15 10	2.75 3.25 3.50	21.32	250	29.22								O.O.PAM PERSULU USE 1.0 Mg AA



PROJECT NUMBER 392485.FI.FK WELL NUMBER
VWAI-MW05

SHEET 2 OF 3

DJECT :	In-Situ Remed	liation Pilo	t Study					LOCATION	ON : AOC	:-1		DATE: // /2/
					FIEL	D PAR	AMET	ERS				
Γime	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) win 3%	Salinity (ppt)	DO (%)	(mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/m 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Commer
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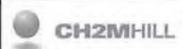
392485.FI.FK

WELL NUMBER

VWAI-MW05

SHEET 3 OF 3

PROJECT: In-	Situ Remed	iation Pile		OCATION : AOC-I	DATE: 11/2/10
			NOTES (CONTINUE	D)	
SOP(s) used	(refer to S	OPs in b	ack of this log)? B-/		
Were all requ	irements o	f the SA	P, PIs and above mentioned SOP(s) met?	YES	
Explanation of considered in			P, PI's and SOP(s) including why, under what	conditions, who authorize	ed exception, anything
NO E	XCEPT	7015			
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392485.FI.FK

WELL NUMBER

VWAI-MW07

SHEET 1 OF 3

Weather: _	PARTLY	diation Pilo	V 83		Cure D	_		LOCATION: AOC-I DATE: 11/4/10							
								Sample Team: CHEIS KEED KEED							
2		100				-				168771	oun	ER			
Fotal Depth	-		FT.(BTOC												
	ater: (1960					18				On Weil:		11/4 0800			
	mn(h): (=)				IN.			- 1		e and Time:		11/4 0855			
Nater Volum	and the second	1- 7			7 A	IA/2)^2*0	.004329			ate and Time	e:	11/4 //05			
Pump Depti		40 2 FT.(BTOC) Measured						Date and Time Off Well: 11/4 /200							
Purge Devic		-	100000000000	nsoon P	2012 100		Air Monitoring Readings:								
Measuring I	Device/Equip	ment:	Oil/Wate	r Interfa	ce Probe	Probe Total Purge Volume: 4.5 GAL.									
					SAME	LE INF	ORMA	TION	1,50						
Sample ID:	VWAI	- MW	07-1	110		Paramet	ers Colle	eced for	VOC	(3 DIF	F FR	ESEEV.) SWC.			
Sample Dat	te/Time:	11/4	, 10	20					Fic	T. IROW	/Mr	MIRATE /SULFA			
Field Dup	YESINO ID:	WWAI	-MWO	79-1	110	Paramet	ers Coll	eced for:	(FD)	Svoc	VOC				
D Sample	Date/Time:	11/4	, 102	5						_ '	4	NON PRES, ASCO			
MS/MSD: Y	YES NO					Sample	Appeara	ince:	_ (	LEAR					
Vere samp	les filtered	YESMO				Field Te	st Kit De	tails.	14-	21 PPM	Pee:	WIFATE @ 10			
YES, Whi	ch samples?	F	ct. 11	Con /	MA				6	PRESER	VE W	12.5 Mg. ASCOD			
					FIEL	D PAR	AMET	ERS							
	Purged Vol. Depth to		F1 F1-1	+200	SpCond	Salinity	DO	DO		ORP	Turbidity				
Time	(gals)	Water (ft)	(mUmin)	Temp., (°C)	(uS/cm) w/in 3%	(ppt)	(%)	(mg/L) w/in 10%	pH w/in 0.1	(mV) w/in 10mV	(NTU) Wiln 10%	Color / Odor / Comments			
0855		24.22	100	29.13	10507	5.71	9.9	0.73	8.27	141.2	118	Depusound			
0900		25.90	75	22 1	10578	5.93	8.2	0.61	8.21	134.7	100	Exceedure 0 3			
		20.70	1)	67.04		5.96	0,0			1	100	CICCONO O S			
		75 90	an	10 -A	103 44		74		15 775		1.7 1				
0905		25.98	90	19.04	10574		7.9	0.58	8.10	131.2	313				
0905		26.24	100	29.36	10488	5.99	5.9	0.47	7.79	124.4	31.3				
0905	1	26.24	100	29.43	10488	5.82	5.8	0.47	7.79	124.4	31.3	Dr. L. Perudan			
0905 0910 0915 0920		26.24 26.42 26.15	100	29.43 29.59	10488 10365 10248	5.82 5.74	5.8	0.47	7.79 7.73 7.61	124.4	31.3 21.0 12.8	Drw - Bech ARCE			
0905 0910 0915 0920 0925		26.24 26.42 26.15 26.0	100 100 100	29.43 29.59 29.55	10488 10365 10248 10237	5.82 5.74 5.74	5.8 5.1 5.2	0.43	7.79 7.73 7.61 7.58	124.4 122.5 117.4 115.4	31.3 21.0 12.8 10.2				
0905 0910 0915 0920 0925 0930		26.24 26.42 26.15 26.0 25.85	100 100 100 100	29.43 29.59 29.55 29.49	10488 10365 10248 10237 10232	5.82 5.74 5.74 5.74 5.73	5.8 5.1 5.2 5.3	0.47 0.43 0.38 0.39 0.39	7.79 7.73 7.61 7.58 7.52	124.4 122.5 117.4 115.4 112.1	31.3 21.0 12.8 10.2 6.31				
0905 0910 0915 0920 0925 0930		26 24 26 42 26 15 26 0 25.85 25.64	100 100 100 100 100	29.43 29.59 29.55 29.49 29.42	10488 10365 10248 10237 10232 10161	5.82 5.74 5.74 5.74 5.73 5.69	5.8 5.1 5.2 5.3 5.3	0.47 0.43 0.38 0.39 0.39	7.79 7.73 7.61 7.58 7.52 7.51	124.4 122.5 117.4 115.4 112.1 108.8	31.3 21.0 12.8 10.2 6.31 5.22				
0905 0910 0915 0920 0925 0930 0935		26 24 26 42 26 15 26 0 25.85 25 64 25.55	100 100 100 100 100 100	29.43 29.58 29.55 29.49 29.42 29.46	10488 10365 10248 10237 10232 10161 10176	5.82 5.74 5.74 5.73 5.09 5.70	5.8 5.1 5.2 5.3 5.3	0.47 0.43 0.38 0.39 0.39 6.37	7.79 7.73 7.61 7.58 7.52 7.51 7.50	124.4 122.5 117.4 115.4 112.1 108.9 108.3	31.3 21.0 12.8 10.2 6.31 5.22 5.31				
0905 0910 0915 0920 0925 0930 0935 0940		26.24 26.42 26.15 26.0 25.85 25.64 25.55 25.31	100 100 100 100 100 100 100 100	29.43 29.59 29.55 29.49 29.42 29.45	10488 10365 10248 10237 10232 10161 10176	5.82 5.74 5.74 5.73 5.09 5.70 5.02	5.8 5.1 5.2 5.3 5.3 5.3	0.47 0.43 0.39 0.39 0.39 0.39 6.39	7.79 7.73 7.61 7.59 7.52 7.51 7.50 7.46	124.4 122.5 117.4 115.4 112.1 108.9 108.3 105.4	31.3 21.0 12.8 10.2 6.31 5.22 5.31 4.62				
0905 0910 0915 0920 0925 0930 0935 0945		26 24 26 42 26 15 26 0 25.85 25.64 25.55 25.32	100 100 100 100 100 100 100 100 100	29.43 29.58 29.55 29.49 29.40 29.45 29.45	10488 10365 10248 10237 10232 10161 1017 0 10091 10091	5.82 5.74 5.74 5.73 5.69 5.70 5.61	5.8 5.1 5.2 5.3 5.3 5.3 5.3 5.3	0.47 0.43 0.38 0.39 0.39 0.39 6.39 0.39	7.79 7.73 7.61 7.52 7.52 7.50 7.46 7.45	124.4 122.5 117.4 115.4 112.1 108.9 108.3 105.4 103.8	31.3 21.0 12.8 10.2 6.31 5.22 5.31 4.62 4.43				
0905 0910 0915 0920 0925 0930 0935 0940 0945		26 24 26 42 26 15 26 0 25.85 25 64 25.55 25.32 25.28	100 100 100 100 100 100 100 100 100	29.43 29.58 29.55 29.49 29.45 29.45 29.45 29.45	10488 10365 10248 10237 10232 10161 10176 10092 10031 9780	5.82 5.74 5.74 5.73 5.69 5.70 5.61 5.61 5.58	5.8 5.1 5.2 5.3 5.3 5.3 5.3 5.3 5.2	0.47 0.43 0.39 0.39 0.39 6.37 0.38 0.38	7.79 7.73 7.61 7.59 7.52 7.51 7.50 7.45 7.45 7.48	124.4 122.5 117.4 115.4 112.1 108.8 108.3 105.4 103.8 101.5	31.3 21.0 12.8 10.2 6.31 5.22 5.31 4.62 4.43 4.42	. 7 MM PERSONE			
0905 0910 0915 0920 0925 0930 0935 0940 0945 0955		26.24 26.42 26.15 26.0 25.85 25.64 25.55 25.31 25.29 25.15	100 100 100 100 100 100 100 100	29.43 29.58 29.55 29.49 29.46 29.45 29.45 29.77 29.77	10488 10365 10248 10237 10232 10161 10176 10092 10031 9780	5.89 5.82 5.74 5.74 5.73 5.69 5.70 5.61 5.61 5.58 5.50	5.8 5.1 5.2 5.3 5.3 5.3 5.3 5.3 5.2 5.1 5.0	0.47 0.43 0.39 0.39 0.39 6.37 0.39 0.39	7.79 7.73 7.61 7.58 7.52 7.50 7.46 7.45 7.48 7.46	124.4 122.5 117.4 115.4 112.1 108.8 108.3 105.4 103.8 101.5 98.0	31.3 21.0 12.8 10.2 6.31 5.22 5.31 4.62 4.43 4.42 4.36	7 FRIM PERSULF			
0905 0910 0915 0920 0925 0930 0935 0940 0945 0955 i000		26 24 26 42 26 15 26 0 25.85 25.55 25.32 25.15 25.14 25.08	100 100 100 100 100 100 100 100 100	29.43 29.58 29.55 29.49 29.45 29.45 29.45 29.77 29.77 29.77	10488 10365 10248 10237 10237 10161 10176 10091 10031 1980 9944 9902	5.89 5.82 5.74 5.74 5.73 5.67 5.70 5.61 5.58 5.58 5.58	5.8 5.1 5.2 5.3 5.3 5.3 5.3 5.2 5.1 5.0 4.8	0.47 0.43 0.39 0.39 0.39 6.37 0.39 0.37 0.37	7.79 7.73 7.61 7.52 7.52 7.50 7.50 7.46 7.45 7.46 7.46 7.46	124.4 122.5 117.4 115.4 112.1 108.8 108.3 105.4 103.8 101.5 98.0 95.5	31.3 21.0 12.9 10.2 6.31 5.22 5.31 4.62 4.43 4.43 4.30	. 7 MM PERSOLF			
0905 0910 0915 0920 0925 0930 0935 0945 0935 0935 1000		26.24 26.42 26.15 26.0 25.85 25.64 25.55 25.32 25.32 25.15 25.08 25.08	100 100 100 100 100 100 100 100 100 100	29.43 29.58 29.55 29.49 29.45 29.45 29.45 29.77 29.77 29.77 29.77	10488 10365 10248 10237 10232 10161 10092 10091 10091 10091 10031 9780 9940 9902	5.82 5.74 5.74 5.73 5.69 5.70 5.61 5.61 5.58 5.58 5.53 5.52	5.8 5.1 5.2 5.3 5.3 5.3 5.3 5.3 5.2 5.1 5.0 4.8	0.47 0.43 0.39 0.39 0.39 6.37 0.39 0.39 0.39 0.35 0.35	7.79 7.73 7.61 7.52 7.51 7.50 7.45 7.45 7.45 7.46 7.41 7.40	124.4 122.5 117.4 115.4 112.1 108.8 108.3 105.4 103.8 101.5 98.0 95.5 93.9	31.3 21.0 12.8 10.2 6.31 5.22 5.31 4.62 4.43 4.30 4.50 4.61	. 7 MM PERSOLF			
0905 0910 0915 0920 0925 0930 0935 0940 0945 0955 i000	4.5	26.24 26.42 26.15 26.0 25.85 25.64 25.55 25.32 25.32 25.15 25.08 25.08	100 100 100 100 100 100 100 100 100 100	29.43 29.55 29.55 29.49 29.45 29.45 29.77 29.77 29.77 29.78 29.81 29.80	10488 10365 10248 10237 10232 10161 10092 10091 10091 10091 10031 9780 9940 9902	5.89 5.82 5.74 5.74 5.70 5.70 5.61 5.58 5.58 5.53 5.53 5.52 5.51	5.8 5.1 5.2 5.3 5.3 5.3 5.3 5.3 5.1 5.0 4.8 4.8 4.6	0.47 0.43 0.39 0.39 0.39 6.37 0.39 0.37 0.35 0.35	7.79 7.73 7.61 7.52 7.51 7.50 7.45 7.45 7.45 7.46 7.41 7.40	124.4 122.5 117.4 115.4 112.1 108.8 108.3 105.2 103.8 101.5 98.0 95.5 93.9 87.9	31.3 21.0 12.8 10.2 6.31 5.22 5.31 4.62 4.43 4.30 4.50 4.61	. 7 MM PERSOLF			



392485.FI.FK

WELL NUMBER

VWAI-MW07

SHEET 2 OF 3

	In-Situ Remed	nation rijo	Colucy	LOCATION : AOC-I DATE: 11 /4/1									
					FIEL	D PAR	AMET	ERS					
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0,1	ORP (mV) w/in 10mV	Turbidity (NTU) w/m 10%	Color / Odor / Comme	
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WELL NUMBER

VWAI-MW07

SHEET 3 OF 3

PROJECT: In-Situ Remediation Pilot Study  NOTES (CONTINUED)  SOP(s) used (refer to SOPs in back of this log)?  Were all requirements of the SAP, Pls and above mentioned SOP(s) met?  Explanation of exceptions to SAP, Pl's and SOP(s) including why, under what conditions, who authorized exconsidered in the decision:  PLAW DOWN WAS GREATER THAN 0.3' (NITIALIX, BUTO RECHARGE AFTER 20 MINUTES OF PURBLING	
SOP(s) used (refer to SOPs in back of this log)? B-/ Were all requirements of the SAP, PIs and above mentioned SOP(s) met? NO  Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exconsidered in the decision:	
Were all requirements of the SAP, PIs and above mentioned SOP(s) met?  Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exconsidered in the decision:	
Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exconsidered in the decision:	
considered in the decision:	
DRAWDOWN WAS GREATER THAN 0.3' (NITIALLY, BE TO RECHARGE AFTER 20 MINUTES OF PURBING	UT BEOAN
TO PECHARGE AFTER 20 MINUTES OF PURBING	
	)
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PHOTO LOG	
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Signature: Chartee Street Date: 11/4/10



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WELL NUMBER

VWAI-MW02

SHEET 1 OF 2

PROJECT.	In-Situ Reme	diation Pile	ot Study					LOCATI	ON AO	C-I		DATE: 11/10/11
Weather	Rothy Cha	A, hum	il, mi	180'	,			Sample	Team:	K.B.H.	-/VBO	
Total Depti	hi	45.25	FT.(BTOC	) Measu	red							
Depth to W	/ater; (-)	15.75	FT (BTO	) Measu	red			Date ar	nd Time	On Well:		1/19/11 0755
Water Colu	umn(h) (=)	29.50	FT.		IN.			Pump 5	Stan Dat	e and Time	3	11/10/11 0820
Water Volu	ime in Well		GAL (3.14	1593*h(i	n)*(wellD	IA/2)^2*0	.004329	Pump F	inish Da	ate and Tim	e:	h/10/11 1100
Pump Dep	th:	40.25	FT (BTO	) Measu	red			Date an	nd Time	Off Well		1/19/11 11/0
Purge Dev	ice/Equip:	Mo	Isom Pu	p				Air Mor	itoring F	Readings		O ppin
Measuring	Device/Equip	ment:	451 Pro	E Some	s, LaM	otte 20	220e	Total P	urge Vo	lume:	40	GAL
					SAMI	PLE INF	ORMA	TION				
Sample ID						Parame	ters Coll	eced for	Vals	SVX.	TPH (DR	0,6RD,ORD)
Sample Da	ite/Time: 1	1/10/11	9950	)								ate, nitests To
Field Dup	YES (O) ID	NA				Parame	ters Colle	eced for			,	-
	Date/Time											
MS/MSD	(ES) NO					Sample	Appeara	nce:	Clear			
Were sam	ples filtered	ES NO				Field Te	st Kit De	tails.	0.7	myLS	edin F	Persulficite
If YES, WE	nich samples?	F	/My							1	,	
					FIE	D PAR	AMET	ERS				
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Satinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH win 0 t	ORP (mV) w/m 10mV	Turbidity (NTU) W/is 10%	Color / Odor / Comments
0821	0,1	15.86	200	28.0	1945	0.48	20.0%	20.98	11.82	80.7	36.4	Cladywhite
0830	9.3	15.86	200	25.1	1687	_	148.7			38.0	71-2	1
2835	2.5	15.87	200	28.3	1751		168.5	13.01		8.4	54.0	
0840	0.7	15.87	200	28.5	794	100000		8.50		-22.2	50.3	
0845	1	15.87	200	24.6	825		113.1		8.11	-31.7	511	
0850	12	15.87	200	28.6	941	0.46	63.7	4.86	7.87	-424	165	C'achy white
2855	1.5	15.87	200	28.6	977	0.48	53.P	4.08	7.35	-36.6	22.3	1
0900	1.7	15.87	200	286	1008	0,49		3.46	7.31	-24.7	20.1	Clearal pauxuli
0905										18.7		City Bropherson
2912	11		200	28.7	1045	0.51	26.7	2.66	7.14	-10.8	11.5	
	2-3		200							-4.7	9.69	
	2.5									2.1	8.45	
0925					1		-			12.4	14.5	
0930										20.3	769	
0935										22.3	7.45	
0940	120		200							23.5	-	
0945	3.6									25.4		
£						Can	_					
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VWAI-MW02

## GROUNDWATER SAMPLING DATA SHEET

PROJECT In-Situ Remediation Pilot Study	LOCATION AOC-I	DATE 11/10/11
	NOTES (CONTINUED)	7.7
SOP(s) used (refer to SOPs in back of this lo	og)? [3-]	
Were all requirements of the SAP, PIs and a		
	SOP(s) including why, under what conditions, who authorize	ed exception, anything
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	EME	

Date: 11/12/11



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I. NUMBER

VWAI-MW053

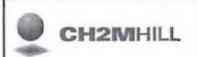
SHEET 1 OF

## **GROUNDWATER SAMPLING DATA SHEET**

PROJECT:	In-Situ Remed	diation Pilo	t Study					LOCATIO	OA : NC	:-1		DATE: 1/9/11
Weather:	Overlast,	SomeRin	Harid	Hin	300			Sample	Team:	K. Buth	r/VBO	77.
										C. Vera	/TPA	
Total Depth	n:	39.86	FT.(BTOC	) Measu	red							
Depth to W			FT.(BTOC	) Measu	red			Date an	d Time	On Well:		1/4/11 1005
Water Colu	umn(h): (=)	31.48	FT.		IN.			Pump S	Start Date	and Time		1/9/11 1020
Water Volu	ime in Well					(A/2)^2*0	0.004329	Pump F	inish Da	te and Tim	e:	1/4/11 1150
Pump Depl	th:		FT.(BTOC		red			Date an	d Time	Off Well:		1/9/11 1155
Purge Dev	ice/Equip:	Monso	oon Pru					Air Mon	itoring R	leadings:		D.Dpp
Measuring	Device/Equip	ment:	1/51 P	ofenin !	Plus/	La Motte		Total P	urge Vo	lume:	1.6	GAL.
					SAME	LE INF	ORMA	TION				
Sample ID	VWAI-	MWO	3-1111	VWAI-M	103 -111/A	Paramet	ers Colle	eced for	VOCs,	SVOG, T	PHIGRO	DRO ORO)
	ite/Time: il		11/5	5					Filter	FEDMIN	Sitate	Mitate, Toc
	YES/10 ID:					Paramet	ers Coll	eced for		NA		
FD Sample	Date/Time:	11/1	N .			_						
MS/MSD:	YES/NO					Sample	Appeara	nce:		ear		
Were samp	ples filtered?	-	KB a	28 5 7		Field Te	st Kit De	tails:	04,	11 500	Iva Pe	allide
If YES, WH	nich samples?	一样	te	7 MN					-			
		352			FIEL	D PAR	AMETE	ERS				
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp.,	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/m 10mV	Turbidity (NTU) win 10%	Color / Odor / Comments
7930	9	16,30	150	21.3	862	042	384	5.08	9.36	30.6	-	
1035	0.1	16.34		27.8	1166	0.58		1.29	7.10	-108.9	48.8	Clear
1040	22	16.39	150	28.1	1176	0.58	45	0.74	6.47	-128.1	40.5	Clear,
1245	0.7	16.39	150	287	11.75	2.58	7.0	254	6.95	-135.9	24.0	Clear
1050	0.5	16.39	150	285	1176	0.58	155		6.94	-145.5	18.7	
1055	0.6	16.40	150	284	1/12	0.58	49		6.92	-151.5	15.7	
1100	0.8	16.42	150	28.01	1167	0.58	44	0.34	6.91	-155.1	12.3	
1105	1.0	16.42	150	29.4	1162	2.57	4.2	0.33	6.91	-160,7	10.86	
1110	1.2	1642	150	28.4	1161	0.57	4.0		6.90	- 163:7	10.08	
"												
			ETE		VICE.							
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Signature: 1

Date: 1/4/1



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WELL NUMBER VWAI-MW03

SHEET 2 OF 2

PROJECT:	In-Situ Remed	iation Pile		LOCATION : AOC-I	DATE: [1]/9/11
	BYRIT	REDIE		NOTES (CONTINUED)	and the
			ack of this log)? B-		
Were all re	equirements o	of the SA	P, Pls and above ment	tioned SOP(s) met?	
	on of exception of the decision of the decisio		P, PI's and SOP(s) inc	luding why, under what conditions, who authorize	ed exception, anything
		-			
		_			
				PHOTO LOG	
21.4	White !			111010100	
Photo Numbe	Compass Direction	Time	Description		
				4.	
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WELL NUMBER

VWAI-MW04

SHEET

DF 1.

#### **GROUNDWATER SAMPLING DATA SHEET**

Mostly 51	The state of the state of											11-10-11
	and are			Sample Team: D. Washaker								
beee									c	vera		
T.	41.02	FT (BTOC	) Measur	ed								
later: (-)	16.34	FT.(BTOC	) Measur	ed			Date an	nd Time	On Well		11-10-11	0745
imn(h); (=)		FT.		IN.			Pump 5	Start Date	e and Time		11-10-11	0800
me in Well		GAL (3.14	1593*h(i	n)*(wellDl	A/2)^2*0	.004329	Pump F	inish Da	ate and Tim	e:	11-10-11	1000
th.	36.00	FT (BTOC	) Measur	ed			Date ar	nd Time	Off Well		11-10-11	1010
ce/Equip	Mons	-	~				Air Mon	itoring F	Readings.		0.)pp~	~
Device/Equip	ment:	451 Prof.	Series	/			Total P	urge Vo	lume:		GAL	
				SAMP	LE INF	ORMA	TION	377				
VWAI	- MHO	I-nu			Paramet	ters Coll	eced for	vcc	SVOCS	, TP4 (	480/ DE0	1000
			130						The second second			
YES NO ID		-			Paramet	ters Colle	aced for		/	-		
Date/Time	/											
YES (NO)					Sample	Appeara	nce:	ch	ear , color	1865	iligue pue	/batines per
oles filtered	YESINO				Field Te	st Kit De	tails	0	7 ppm on	the ch	unets	
ich samples?	Fee	5 MN						Se	NUM PER	SULFATE	Test Knt	
				FIEL	D PAR	AMET	ERS	7 7 7	1,100			
	Denth to			SpCond			00		ORP	Turbidity		
Purged Vol. (gals)	Water	Flow Rate (mL/min)	Temp., (°C)	(uS/cm)	Salinity (ppt)	DO (%)	(mg/L)	pH win 0.1	(mV)	(NTU)	Color / Odo	or / Comments
									THIN ISE WAY			
0.10	16:42	250	28.6	1154	0.57	48.8	3.76	10.19	-19.1	61.4		
0.25	16.41	150	-	-	-	-	-	-	-	-	ADJUST	PUMP SPAR
0.50	16.52	300	29.1	1187						31.3		
0.75	16.47	150	28.9	1276				-	-79.0	24.7		
1.10	16.42	200	29.1			100000000000000000000000000000000000000		100000000000000000000000000000000000000		20.6		
1.70	16.44	200					1					
2.00	14.43	200	29.2	1362						15.8		
2.10	1643	200								17.1		
2.90												
											_	
	1											
4.00	16.43	299	24.2	1393	0.69	14.1	1.08	7.07	-85.1	11.5		-
										-		
	-	-			1.0	11/10/	11					
	-		-	Dated	OR/							
	1	-	-								<i>y</i> *	
	-	-									-	
			-	8								
	vwax  vwax  vwax  vwax  vee/Equip  Device/Equip  Device/Equip  Device/Equip  vee/Ime  vee/Ime	VWAI - MWO!	VWAI - MNOY - IIII					Pump   Pump	Purpod Vol.   Purpod Vol.			

Signature: (Astronomical Signature)

Date: 11/10/1



Signature:

PROJECT NUMBER

392485.FI.FK

WELL NUMBER

VWAI-WW04

SHEET

ROJECT In-Situ Remediation Pilot Study	LOCATION AOC-I	DATE: 11-10-1
	NOTES (CONTINUED)	
OP(s) used (refer to SOPs in back of this	log)? B-1	
Vere all requirements of the SAP, PIs and	above mentioned SOP(s) met? UES	
explanation of exceptions to SAP, Pl's and considered in the decision:	SOP(s) including why, under what conditions, who authorized	l exception, anything
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VWAI-MW05

SHEET 1

OF T

# **GROUNDWATER SAMPLING DATA SHEET**

Sample Team:   D.   Mark   C.													
Total Depth:	ROJECT : I		Total Control						LOCATI	ON : AOC	MA	71	
Depth to Water: (-)  Water Column(h): (-)  Water Volume in Well  Gal. (3.141593*h(in)*(wellDIA/2)*2*0.004325*Pump Finish Date and Time:  Water Volume in Well  Gal. (3.141593*h(in)*(wellDIA/2)*2*0.004325*Pump Finish Date and Time:  JOS II V  Pump Depth: Date and Time:  JOS II V  JOS III V  JOS III V  JOS III V  SAMPLE INFORMATION  Sample Date/Time: II-02*-III Phara-Hub5*-IMA Parameters Colleced for: 1005, 54005, TPH (6.20, DR0, 6.04)  Sample Date/Time: II-02*-III Phara-Hub5*-IMA Parameters Colleced for: 1005, 54005, TPH (6.20, DR0, 6.04)  MS/MSD: YES NO  Were samples filtered? YES NO  If YES, Which samples? Iron   MN  FIELD PARAMETERS  Time Purged Vol. (gals)  Purged Vol. (gals)	Veather: _	Cloud	y /u	MAN				4	Sample	Team:	D.W	hita	KEN/C-UENS
Water Column(h): (=) 20.01 FT.	3130		The second second						Date ar	nd Time	On Well:		10811/0815
Water Volume in Well   GAL (3.141593*h(in)*(wellDIA/2)*2*0.004325 Pump Finish Date and Time:   1081  19   108	Vater Colur		- 4		-				Pump S	Start Dat	e and Time		
Pump Depth: 39.6.FT.(BTOC) Measured Date and Time Off Well; Air Monitoring Readings: O.Open Measuring Device/Equipment: SI Professional Plus Total Purge Volume: \$75 GAL.    SAMPLE INFORMATION					41593*h(	in)*(wellD	(A/2)*2*(	0.004329	1				
Purge Device/Equip:   TONSOON PUMP   Air Monitoring Readings:   Total Purge Volume:   \$75   GAL.	ump Depth	r 3	39.66	FT.(BTO	C) Measu	ired			Date ar	nd Time	Off Well:		
Sample   Device/Equipment:   S   Professional Plus   Total Purge Volume:   \$.75   GAL.	urge Devic				-				Air Mor	itoring F	Readings		
Sample   D:   V NAI -   MWOS -			ment:	151			Plus		Total P	urge Vo	lume:	5.75	
Sample Date/Time: 1-03-11 0935 Field Dup: YES NO ID: YES NO ID: YES NO Sample Date/Time: 11-03-11 0940  MS/MSD: YES NO Sample Appearance: Field Test Kit Details: 11-03-11 (MS/mSD: YES, Which samples? 11-01-14-14-14-14-14-14-14-14-14-14-14-14-14				1		-	-	ORMA	TION	203	Sta-	100	10,123,203
Sample Date/Time: 1-03-11 0935 Field Dup: YES NO ID: YES NO ID: YES NO Sample Date/Time: 11-03-11 0940  MS/MSD: YES NO Sample Appearance: Field Test Kit Details: 11-03-11 (MS/mSD: YES, Which samples? 11-01-14-14-14-14-14-14-14-14-14-14-14-14-14	ample ID:	VNAI-	HWOS	- 111/	maz-141	NOS-184	Parame	ters Coll	eced for	VOC,	SVOCS T	PH (62	0,020,60RO)
FD Sample Date/Time:							_						The state of the s
FD Sample Date/Time: 11-08-11 0940 Sample Appearance: Clear, color less  Were samples filtered? YES NO Field Test Kit Details:	ield Dup: (	YES NO ID:	VMAT	-MNO	5P-111	1	Parame	ters Coll	eced for	(FD)	vocs s	vocs.	TPH (GRO)
Were samples filtered?YESNO   Field Test Kit Details:	D Sample	Date/Time:	11-08-	11 09	40								
FIELD PARAMETERS	IS/MSD: Y	ES NO					Sample	Appeara	ance:	cle	as, cold	orless	
FIELD PARAMETERS  Time Purged Vol. (gals) Depth to Water (ft) Flow Rate (mL/min) (°C) (uS/cm)	Vere sampl	les filtered?	YESINO				Field Te	st Kit De	etails:	9			
Time Purged Vol. (gals) Pepth to Water (ft) Plow Rate (mL/min) Plow (m/m) Plo	YES, Which	ch samples?	Iren /	MN									
Time Purged Vol. (gals) Water (ft) Prov Nate (mL/min) (°C) (uS/cm) (ppt) (%) (mg/L) (mg/L) (mV) (min 10% (nTU) (mV) (mIn 10% (nTU) (mV) (mIn 10% (mV) (mV) (mV) (mV) (mV) (mV) (mV) (mV)						FIEL	D PAR	AMET	ERS				
0850 1.50 17.00 200 28.5 1349 — 8.3 0.64 6.70 38.6 45.1 0855 1.75 17.00 200 28.6 1345 0.67 8.6 0.67 6.70 40.6 42.6 0900 2.00 17.03 200 28.7 1342 0.67 13.9 1.07 6.70 44.0 39.2 0905 2.25 17.03 200 28.7 1339 066 13.9 1.07 6.70 44.6 38.8 0910 2.65 17.03 200 28.7 1339 066 14.1 1.09 671 48.5 36.4 0915 3.00 17.02 200 29.1 1343 6.67 14.5 1.11 6.70 84.0 33.9 0920 3.10 1002 200 29.1 1351 0.67 14.3 1.10 6.70 83.7 25.6 0925 3.80 17.02 200 29.0 1382 0.67 14.3 1.09 6.70 52.0 22.7	Time	man the second s	Water	CONTRACTOR OF		(uS/cm)	and the same of th	198.000	(mg/L)		(mV)	(NTU)	Color / Odor / Comments
0855 1.75 17.00 200 28.6 1345 0.67 8.6 0.67 6.70 40.6 42.6 0900 2.00 17.03 200 28.7 1842 0.67 13.9 1.07 6.70 44.0 39.2 0905 2.25 17.03 200 28.7 1339 066 13.9 1.07 6.70 44.6 38.8 0910 2.65 17.03 200 28.7 1339 066 14.1 1.09 671 48.5 36.4 0915 3.00 17.02 200 29.1 1343 0.67 14.5 1.11 6.70 54.0 33.9 0920 3.10 1002 200 29.1 1351 0.67 14.3 1.10 6.70 53.7 25.6 0925 3.50 17.02 200 29.0 1352 0.67 14.3 1.09 6.70 52.0 22.7	0845	1.26	17.00	250	28.3	1341	-	7.8	0.61	6.71	38.1	47.6	
0900 2.00 17.03 200 28.7 13.9 1.07 6.70 44.0 39.2 0905 2.25 17.03 200 28.7 1339 066 13.9 1.07 6.70 44.6 38.8 0910 2.65 17.03 200 28.7 1339 066 14.1 1.09 671 48.5 36.4 0915 3.00 17.02 200 29.1 1343 6.67 14.5 1.11 6.70 84.0 33.9 0920 3.10 17.02 200 29.1 1351 0.67 14.3 1.10 6.70 83.7 25.6 0925 3.80 17.02 200 29.0 1382 0.67 14.3 1.09 6.70 52.0 22.7	0850	1.50	17.00	200	28.5	1349	-	8.3	0.64	6.70	38.40	45.1	
0905 2.25 17.03 200 21.7 1339 066 13.9 1.07 6.70 44.6 38.8 0910 2.65 17.03 200 28.7 1339 066 14.1 1.09 671 48.5 36.4 0915 3.00 17.02 200 29.1 1343 6.67 14.5 1.11 6.70 84.0 33.9 0920 3.10 17.02 200 29.1 1351 0.67 14.3 1.10 6.70 63.7 25.6 0925 3.80 17.02 200 29.0 1382 0.67 14.3 1.09 6.70 52.0 22.7	0855	1.75	17.00	200	28.6	1345	0.67	8.6	0.47	6.70	40.6	42.6	
0910 2.65 17.03 200 28.7 1339 066 14.1 1.09 671 48.5 36.4  0915 3.00 17.02 200 29.1 1343 6.67 14.5 1.11 6.70 84.0 33.9  0920 3.10 17.02 200 29.1 1351 0.67 14.3 1.10 6.70 83.7 25.6  0925 3.80 17.02 200 29.0 1382 0.67 14.3 1.09 6.70 52.0 22.7	0900	2.00	17.03	200	28.7	1342	0.67	13.9	1.07	6.70	44.0	39.2	
0915 3.00 17.02 200 29.1 1343 6.67 14.5 1.11 6.70 84.0 33.9 0920 3.10 17.02 200 29.1 1351 0.67 14.3 1.10 6.70 83.7 25.6 0925 3.80 17.02 200 29.0 1382 0.67 14.3 1.09 6.70 82.0 22.7	3905	2.25	17.03	200	25.7	1339	066	13.9	1.07	6.70	44.6	38.8	
0920 3.10 noz 200 29.1 1351 0.67 14.3 1.10 6.70 53.7 25.60 0925 3.50 17.02 200 29.0 1352 0.67 14.3 1.09 6.70 52.0 22.7	3910	2.65	17.03	200	28.7	1339	046	14.1	1.09	671	48.5	36.4	
0925 3.50 17.02 200 29.0 1352 0.67 14.3 1.09 6.70 52.0 22.7	2915	3.00	17.02	200	29.1	1343	6.67	14.5	1.11	6.70	54.0	33.9	
O ILO	0920	3.10	17.02	200	29.1	1351	0.67	14.3	140	6-70	53.7	25.60	
	0925	3.50	-		•								
0930 3.75 17.02 200 28.9 1348 0.67 13.7 1.05 6.69 52.9 23.8	0830	3.75	17.02	200	28.9	1348	0.67	13.7	1.05	6.69	52.9	23.8	
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Com mot "			1		Cont	11.							
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Signature: Date: 11-08-11



Signature:\_\_

PROJECT NUMBER

392485.FI.FK

VWAI-MW05

SHEET 2 OF 1

PROJECT : I	n-Situ Remed	iation Pilo	nt Study	LOCATION : AOC-I	DATE: 11-08-11
				NOTES (CONTINUED)	
SOP(s) use	d (refer to St	OPs in b	ack of this log)?	yes B-1	
	_		A STATE OF THE PARTY OF THE PAR	entioned SOP(s) met? 40	
	of exception in the decis		P, Pl's and SOP(s) in	ncluding why, under what conditions, who at	uthorized exception, anything
				re for sample ID YMA I	
				not completed because	
	COMPLET			for sodium prisurfate of	
					eserved viols
				ed lab and CHZM HILL en	
	they al	30 0	elieved this	, when later consulted Ph	4 , found did news
	to be	collec		collect temorrow after comple	
	50			preserved) and vocs last	
				ate somples as well for	VCCs (HCI pres) and
	VOC	.s (as	earbic acid	pres.)	
				PHOTO LOG	- ( 20/ - 4-1)
	Compass Direction	Time	Description		
				11-04	3."
				Osm 11.01	



392485.FI.FK

WELL NUMBER

VWAI-MW085

SHEET 1 OF 2

# **GROUNDWATER SAMPLING DATA SHEET**

PROJECT:	In-Situ Reme	diation Pile	ot Study				LOCATION : AOC-I DATE: 11/9/11						
Weather:	Overest	Some Ra	14 , H-1	rid 1	md 80	,		Sample Team: K. B. Her /VBO C. Vern / TPA					
Total Dept	h:	4466	FT.(BTOC	) Measu	red						-		
Depth to V	Vater. (-)	16,66	FT.(BTOC	C) Measu	red			Date an	nd Time	On Well:		11/9/11 0745	
Water Coli	umn(h): (=)	28.00	FT.		IN.			Pump S	Start Dat	e and Time	r:	1/4/11 0805	
Water Volu	ume in Well		GAL (3.14	11593*h(i	n)*(wellD	(A/2)^2*0	0.004329	Pump F	inish Da	ate and Tim	ie:	1/9/11 2910	
Pump Dep	th:		FT.(BTOC		red			Date an	nd Time	Off Well:		19/11 0920	
	rice/Equip:		15072 Pun					Air Mon	itoring F	Readings		Oppen	
Measuring	Device/Equip	ment: YS	I Prohasin	al Phylle	Matte	1020e		Total P	urge Vo	lume:	1,5	GAL.	
			SAME	ORMA	TION								
Sample Da Field Dup: FD Sample	e Date/Time:  YES/NO ID:  YES/NO ID:  YES/NO	VWAI	-MWOS	OO BP/vina		_	ters Coll	eced for	(FD)		1065 (As	whe Aud)	
	ples filtered? nich samples?	- 11				Field Te	st Kit De	etails:	O ms	IL Sodi-	. Pers. 11	'd_	
					FIEL	D PAR	AMET	ERS					
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/m 10%	Color / Odor / Comments	
0820	0.25	1691	200	27,8	12301	0.61	15.4	1.18	677	-7,4	-	B2:00	
0825	0.20	16.82	200	27.5	1213	063	10.7	9.83	6.72	-4.8	265	Clear no star	
2830	0.60	16.92	200	27.9	1270	0.63	8.1	2.61	6.71	-4,0	19.2		
0835	2.80	1686	150	27.8	127/	0.67	8.5	0.61	6.71	-4.1	25.6	B2-0.0pm	
0840	2.95	16.94	150	27.7	1265	0,63	7.3	8,57	6.71	- 4.1	20.3		
0895	1,05	16.81	150	27.6	1260	0.62	7,2	0.5%	6.71	-4.0	19.8	A / - /	
0850	1.15	16.8	150	27.6	1254	0,62	7.1	2.55	671	-4.1	21.4	Ongle Satinfestite	
0855	1.25	16.82	150	27,6	1258	2.62	7.1	0.55	6 7i	-4.0	19.2		
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						MA							
					/								
		_											

Signature:

Date: 11/9/1



392485.FI.FK

WELL NUMBER

VWAI-MW05

SHEET 2 OF 2

PROJECT:	In-Situ Remed	iation Pilo	ot Study		LOCATION : AOC-I	DATE: 11/4	1/11
				NOTES (CON	TINUED)		
SOP(s) us	ed (refer to S	OPs in b	ack of this log)?	BH			
Were all re	equirements of	of the SA	P, Pls and above m	nentioned SOP(s)	net? Yes		
Explanation		ns to SA				o authorized exception, anythi	ing
		10	disk in the	РНОТО	LOG		
Photo Numbe	Compass Direction	Time	Description				
		_					
				1			
				KAR			
/							
					_		



392485.FI.FK

WELL NUMBER

VWAI-MWQ47

SHEET 1 OF 2

	In-Situ Reme				- 60	48		Acres and the same	ON AOC			DATE: # - 69-11
Veather:	GVECCA S	+, fain	ing, h	UMI0	-80			Sample	Team:	D.	whita	KY
otal Dept			FT.(BTO									
		Carlo de Calabratica de	FT.(BTO	C) Measi	ired			Date ar	nd Time	On Well:		11.09.11 0745
Vater Coli	umn(h): (=)							1.0		e and Time		11.00.11 0911
Vater Volu	ume in Well	Sec. 2 5 5 7				IA/2)^2*(	0.004329	Pump f	inish Da	ite and Tim	e:	11.09.11 105C
ump Dep	th:	29.50	FT.(BTO	C) Measu	ured			Date an	nd Time	Off Well:		11-09-11 1100
urge Dev	rice/Equip:	Ma	asoon	Puly	)			Air Mor	itoring R	Readings:		O. Oppm
Measuring	Device/Equip	oment:	4SI Pr	of Su	es, La	46th A	02C e	Total P	urge Vo	lume:	1.25	GAL. (1.25)
					SAME	LE INF	ORMA	TION		PARTY.		
Sample ID	· VWA		C7-11			Parame	ters Coll	eced for	VOC	cs. SVO	Cs. GI	ec, Dro/cro,
Sample Da	ate/Time:	11.09	11 (	0920		_			nit	lates, S	ULFA	re, Fe/Mn, TOC
ield Dup:	YES NO ID					Parame	ters Coll	eced for	(FD)	MIR		
D Sample	e Date/Time:	NIA				_						
MS/MSD:	YES (NO)					Sample	Appeara	ance:	ele	ou polo	iless ,	trau fine suspens
Vere sam	ples filtered?	YES/NO				Field Te	st Kit De	etails:	1.0	1 ppm	Cheme	15
YES, W	nich samples?	Fe	domin						8	od IUNE P	eisufi	ate test nu
					FIEL	D PAR	AMET	ERS				
Time	Purged Vol.	Depth to Water	Flow Rate	Temp.,	SpCond (uS/cm)	Salinity	DO	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Color / Odor / Comments
Time	(gals)	(ft)	(mUmin)	(°C)	w/in 3%	(ppt)	(%)	w/in 10%	w/in 0.1	w/in 10mV	win 10%	Color / Color / Colliniania
0815	030	18.25	300	28.1	8798	4.88	2640	19.91	12.34	81.9	8J3	not reduce entre
3817	0.25	_	-	-	-	-	_	-	-	-	_	cut off pump to
0850	0.25	17.15	100	27.8	8 100	4.83	4229	3130	12.32	72.1	63.9	
0855	0.40	17.20	150	273	8640	4.79	1604	12.21	12.32	67.2	483	
0900	0.60	17.19	125	28.3	8512	8512	158.0	11.93	12.30	604	34.8	Sal: 4.71
1905	0.75	17.19	125	28.3	830	8-310	1010	12.28	12.24	80.4	1000	501: 4.57
0910	0.90	17.19	125	29.0	8280	8290	167.0		12.27	49.8		Sal: 4.57
0915	1.05	17.19	125	28.0	8230		146.2		12.26	48.6		501:4.55
09 20	1.25	17.19	125	-	2737	-	-	-	-	_	-	collect sample
				-						-	/	
				-	-			-				
						1	111					
		-	-		J.	1100	-					
				100	1			-				
		-		I - ASA	1							
			-	BINA	-			1				
			0	Bruv				_			_	
				BTW								
				STA								
			9	STIV								



392485.FI.FK

WELL NUMBER

VWAI-MWOA 7

SHEET

OF A

# **GROUNDWATER SAMPLING DATA SHEET**

ROJECT:	In-Situ Remed	iation Pil	ot Study LOCATION : AOC-I	DATE: 11/04/4
			NOTES (CONTINUED)	
OP(s) us	ed (refer to S	OPs in b	ack of this log)? B-/	
			P, PIs and above mentioned SOP(s) met? 495	
xplanatio	-	ns to SA	P, PI's and SOP(s) including why, under what conditions, who author	rized exception, anything
		_		
-		_		
			PHOTO LOG	
Photo	Compass Direction	Time	Description	
			n W	
			Opn	
			Om	
			Opn	

Signature: Swh

Date: 11/09/15



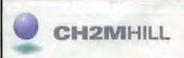
392485.FI.FK

WELL NUMBER

VWAI-MWO

SHEET 1 OF 3

PROJECT	: In-Situ Remed	diation Pilo	ot Study					LOCATI	ON : AO	C-1 -MWO	74	DATE: 5/23/12
Weather:	~ 75°F	SUMM	IV					Sample	Team:	D. Wh	taker	
										P. Mar	phy	
Total Dep	th:	40.55	FT.(BTO	C) Measu	red					M Dan	ins	
Depth to V	Nater: (-)	18.22	FT.(BTO	C) Measu	red			Date ar	nd Time	On Well:	05%	23/12 0720
Water Col	lumn(h): (=)	22.33	FT.	2	IN.			Pump S	Start Dat	te and Time	5/23	3/12 0730
Water Vol	lume in Well	3.64	GAL (3.14	11593*h(	n)*(wellD	IA/2)^2*(	0.00432	Pump F	inish D	ate and Tim	ie: (6/2	13/12 0340
Pump Dep	oth:	35.00	FT.(BTO	C) Measu	red			Date an	nd Time	Off Well:	0	5/23/12 0850
Purge De	vice/Equip:	Mons	an Rump	2				Air Mor	itoring F	Readings:		00100
Measuring	g Device/Equip	ment:	YSI 55	GMP5	HACK	12101	Tarbiel	Total P	urge Vo	olume:	3,50	GAL.
					SAME	LE INF	ORMA	TION				
Sample ID	: WWAT-	MUNICH	0512			Parame	ters Col	leded for	VO	(s.sva	s. FME	TALS (FELL MA)
	ate/Time:											wehen (TOC)
	YES NO ID:					Parame	ters Col	leded for		NIP	-	
	le Date/Time:											
	YES NO					Sample	Appear	ance:	clea	ar, colo	rless	
	ples filtered?	YESINO						Kit Detai				
	hich samples?		META	L (Fe	S MAN)					11		
						D PAR	AMET	ERS				
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
0135	0.65	18.33	250	28.72	1354	0.67	3.7	6.28	7.88	-169.9	5,17	
0740	0.90	18.32	CONTRACTOR OF THE PARTY OF THE		1406		4.0	1122300	0.00	-169.7		
0745	1.25	18.31	250		1429		3.0			-164-3	64 4	
0750	1.65	17.33	250	RESULTER	1442			12/12/14/25	12000	-151.6	3.57	
		10.311	250	23.96	1451	0.72	2.7	0.21	6.89	-138.0	2.62	
	1.90	18:34		ma 0-	Town.	0.72	- 0	0.22	1000	-130.7	19 19 19 19 19	
0155	2.45	18,34	250	28.99	1454	6.12	3.0	0 4 7	100	-120 - /	A 5 0 0	
0155 0800		17000 - DA	250		1454			0,17				
0155 0300 0805	2.45	18,34		29.01		0.73	2.3	0,17	6.82		1.79	
6155 0300 6805 0810	2.45	18.34	250	29.01	1464	0.73	2.3	0.17	6-82	-125.0	1.79	
0300 0800 0805 0810	2.45	18,34 18,35 18,35	250 250 250	29.01 29.03 27.07	1464	0.73 0.73 0.74	2.3 3.0 2.5	0.17	6-82	-125.0 -117.8 -113.9	1.79	Strong Hydrocurb
0155 0800 0805 0810	2.45 2.60 2.95 3.48 <sub>25</sub>	18,34 18,35 18,35 18,35	250 250 250	29.01 29.03 27.07	1464 1474 1483	0.73 0.73 0.74	2.3 3.0 2.5	0.17	6-88	-125.0 -117.8 -113.9	1.79	Strong Hydro care
0155 0800 0805 0810	2.45 2.60 2.95 3.48 <sub>25</sub>	18,34 18,35 18,35 18,35	250 250 250	29.01 29.03 27.07	1464 1474 1483	0.73 0.73 0.74	2.3 3.0 2.5	0.17	6-88	-125.0 -117.8 -113.9	1.79	Strong Hydro and
0155 0800 0805 0810	2.45 2.60 2.95 3.48 <sub>25</sub>	18,34 18,35 18,35 18,35	250 250 250	29.01 29.03 27.07	1464 1474 1483	0.73 0.73 0.74	2.3 3.0 2.5	0.17	6-88	-125.0 -117.8 -113.9	1.79	Strong Hydrocura
0155 0800 0805 0810	2.45 2.60 2.95 3.48 <sub>25</sub>	18,34 18,35 18,35 18,35	250 250 250	29.01 29.03 27.07	1464 1474 1483	0.73 0.73 0.74	2.3 3.0 2.5	0.17	6-88	-125.0 -117.8 -113.9	1.79	Strong Hydro are
0155 0800 0805 0810	2.45 2.60 2.95 3.48 <sub>25</sub>	18,34 18,35 18,35 18,35	250 250 250	29.01 29.03 27.07	1464 1474 1483	0.73 0.73 0.74	2.3 3.0 2.5	0.17	6-88	-125.0 -117.8 -113.9	1.79	Strong Hydrocurb
0155 0800 0805 0810	2.45 2.60 2.95 3.48 <sub>25</sub>	18,34 18,35 18,35 18,35	250 250 250	29.01 29.03 27.07	1464 1474 1483	0.73 0.73 0.74	2.3 3.0 2.5	0.17	6-82 6-88 6-89 6-96	-125.0 -117.8 -113.9	1.79	Strong Hydro and
0300 0800 0805 0810	2.45 2.60 2.95 3.48 <sub>25</sub>	18,34 18,35 18,35 18,35	250 250 250	29.01 29.03 27.07	1464 1474 1483	0.73 0.73 0.74	2.3 3.0 2.5	0.17	6-82 6-88 6-89 6-96	-125.0 -117.8 -113.9	1.79	Strong Hydro are
0300 0300 0305 0810 0815	2.45 2.60 2.95 3.48 <sub>25</sub>	18,34 18,35 18,35 18,35	250 250 250	29.01 29.03 27.07	1464 1474 1483	0.73 0.73 0.74	2.3 3.0 2.5	0.17	6-82 6-88 6-89 6-96	-125.0 -117.8 -113.9	1.79	Strong Hydro are
0155 0800 0805 0810	2.45 2.60 2.95 3.48 <sub>25</sub>	18,34 18,35 18,35 18,35	250 250 250	29.01 29.03 27.07	1464 1474 1483	0.73 0.73 0.74	2.3 3.0 2.5	0.17	6-82 6-88 6-89 6-96	-125.0 -117.8 -113.9	1.79	Strong Hydro and



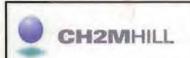
PROJECT NUMBER
392485.FI.FK

WELL NUMBER NO VWAI-MW87

HEET 2 OF

OJECT:	In-Situ Reme	diation Pilo	ot Study					LOCATIO	ON: AO	C-I		DATE
					FIEL	D PAR	AMET	ERS				/
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Commen
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	12										/	
			-							/		
		3 1 1 1 1 1								/		
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Signature:	Date:



392485.FI.FK

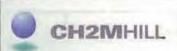
WELL NUMBER

VWAI-MW0#4

SHEE

SHEET 3 OF 3

			ot Study LOCATION : AOC-I	DATE: 05/23/12
			NOTES (CONTINUED)	
			ack of this log)? Yes (3)	
ere all r	equirements of	of the SA	P, PIs and above mentioned SOP(s) met? ye5	
planatio <i>nsidere</i>	on of exception of	ons to SA	P, PI's and SOP(s) including why, under what conditions, who auti	horized exception, anything
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			PHOTO LOG	
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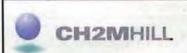
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WELL NUMBER

VWAI-MW05

SHEET

PROJECT	: In-Situ Remed	liation Pilo	t Study					LOCATI	ON: AO	C-I		DATE: 5/22/17
Weather	Sinny	humis	, hot					Sample	Team:	7)	a whit	aller
											oura Do	
Total Dep	oth:	44.140	FT.(BTO	C) Measu	red .						The second second	wephy
Depth to	Water: (-)	18.08	FT.(BTO	C) Measu	red			Date an	nd Time	On Well:		05/22/12 0930
Vater Co	olumn(h): (=)	26.52	FT.	2	HY.	, a. 16	1	Pump S	Start Dat	e and Time	e:	05/22/12 0947
Vater Vo	lume in Well	4.24	GAL (3.14	41593"h(i	n)*(well	A/2)^2	0.00432	Pump F	inish Da	ate and Tim	ie:	05/22/12 12.10
oump De	epth:	39.00	FT.(BTO	C) Measu	red			Date an	nd Time	Off Well:		05/22/12 1225
urge De	vice/Equip:		N Custo				122)	Air Mor	nitoring F	Readings:		0.0 ppm
<i>N</i> easurin	g Device/Equip	ment:	Sohnst	WLMET B	# 1180	8		Total P	urge Vo	olume:	1.85	
					SAMI	PLE INF	ORMA	TION				
amole I	D: VWAI-A	Milas-	0517					_	· vnr <	SVACS	FEMI	J, soy, NO3, TOC
	Date/Time: 05			<<		1 didino	1013 001	coca ioi	1000	, 3000.	4100	0, 300,10-3,110
	E YES ID:	The same of the sa		and said.		Parame	ters Col	leded for	(ED)	Li.	/A	8
	ole Date/Time:		9/A		-	arante	.010 001	oqua ioi	1,0)	-		
	ES NO		/4	1		Sample	Annear	ance.	-14	av sala	11055	
	mples filtered?	ESMIST	01.1					Kit Detai	C 16	av, colo	110-0	
	Which samples?		10-	METAL		reisulia	ne rest	MI Detai	13. 0.0	PPM		
, 1LG, V	mur samples		<i>I</i> ., .	10 11 15	per a sinch			-DC			-	
					FIE	D PAR	AMET	EKS				
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
1000	Les < 0.50	18.35	125	29.36	1309	0.65	8.0	0.60	6.95	54.3	-	
1005	40.50	18.36	125	29.32	1311	0.65	6.0	0.45		51.6	-	
1010	40.50	18.38	125	29.46	13 11	0.65	4.4	0.34	7.11	45.5	-	
1015	0.85	18.35	100	29.54	1313	0.65	4.3	0.32	7.34	44.1	10.0	
1020	1.20	18.30	100	29.92	1312	0.65	3.6	0.27	7.14	46.3	16.7	
1025	1.45	18.32	100	29.95		0.65	3.3	0.25	7.12	47.5	11.6	
1036	1.50	18.33	100	29.97	13/2	0.65	3.2	0.24		47.8	8.13	
1035	1.60	18.31	100	3011	1311	0.65	3.0	0.13	7.07	45-1	6.27	
1040	1.85	18.31	100	29,87	1311	0.65	2.9	0.23	7.01	45.6	4.43	hydrocarnenonce
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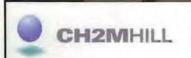
VWAI-MW05

SHEET 2 OF 3

## **GROUNDWATER SAMPLING DATA SHEET**

OJECT	: In-Situ Reme	diation Pile	A Study		Field	D D 4 F	A177	LOCATIO	JN : AUC	-1		DATE:
					FIEL	D PAR	AMET	ERS		1000		
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Commer
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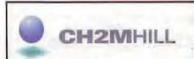
WELL NUMBER

VWAI-MW05

SHEET 3 OF 3

			NOTES (CONTINUED)	DATE: 05 724
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			ack of this log)?	
ere all r	equirements	of the SA	AP, PIs and above mentioned SOP(s) met?	
xpıanatı onsidere	on of exception	ons to SA	AP, PI's and SOP(s) including why, under what conditions, who author	ized exception, anything
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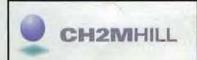
WELL NUMBER

VWAI-MW0/1

SHEET

OF 3

	In-Situ Reme	diation Pilo	t Study	00				LOCATI	ON: AO	C-I	10	DATE: VS/
Weather:	mostly su	nny, b	eezy, 7	5°F				Sample	Team:	DiaWh	itaker	
	,	7.1	3/								Danoi	Ť
Total Dept	h:	45.22	FT.(BTO	C) Measu	red	96				Pat M	lurphy	42.4
Depth to V	Vater: (-)	18.40	FT.(BTO	C) Measu	red (17.	60/in	th pump	Date ar	nd Time	On Well:	, )	05/23/12 0855
Water Col	umn(h): (=)	26.82	FT.	0	TN.	MD		Pump S	Start Da	te and Time	9:	05/23/12 0905
Water Vol						1A/2)^2*	0.004329	Pump F	inish D	ate and Tin	ne:	05/23/12 1/25
Pump Dep	oth: 40.0	0-45,00	FT.(BTO	C) Measu	red			Date ar	nd Time	Off Well:		05/23/12 1140
Purge Dev	rice/Equip:	Mansag	on puny		,			Air Mor	itoring I	Readings:		0-1
Measuring	Device/Equip	ment:	YS1 55	6 MPS	Hack	Turbid	imeter	Total P	urge Vo	olume:	1.85	GAL.
					SAME	LE INF	ORMA	TION				
Sample ID	VWAI-	MW07	-0512			Parame	ters Coll	eced for	VO	CS. 5V	OCS. F	EMN
Sample Da	ate/Time:	5/23/	12 10	50 fr	55 1					EM (SOL		AND
Field Dup:	YES NO ID	VWAI	- NWO	P-05	12	Parame	ters Coll	eced for		OC, SV		
	e Date/Time:		Property and the second	1055								
	YES / 10						Appeara		de	as, col	orcess	
Were sam	ples filtered?				1	Persulfa	ate Test	Kit Detai	s: /.	4 ppm		
If YES, W	nich samples?	F	Hetal	A (FE	MN					11		X
					FIEL	D PAR	AMET	ERS				***
Time	Purged Vol.	Depth to Water	Flow Rate (mL/min)	Temp.,	SpCond (uS/cm)	Salinity (ppt)	DO (%)	DO (mg/L)	pH w/in 0.1	ORP (mV)	Turbidity (NTU)	Color / Odor / Comments
		(ft)		44	w/in 3%	14 - 6	37	w/in 10%	-	w/in 10mV	w/in 10%	
0945	20.50	20.70	70	28.01	5780	3.11	144.4	11.09	11.48	-41.1	71.6	
	40.50	21.41	70	28.43	5655	3.04	127-1	11.49	11.46	+41.0	78.5	
0950		6015-41	1275	P. Property Co.	ALC: N		101/0/10/10					
0955	0.50	21.65		28-55			114-4	8,71	1),41	-41.3	67.5	
0955	0.50	21.65	60	28.65	5525	2.97	114.4	8.71	11.41	-41.3	67.5	
0955 09000 1005	0.50	22.01	60	28.65	5525 5473	2.97	114.4	8.71 8.59 9.39	11.41	-41.3 -36.4 -34.7	67.5 66.1 56.6	
0955 1000 1005 1010	0.50 0.60 0.70 0.75	21.65 22.01 22.35 22.80	60	28.65 28.69 28.72	5525 5473 5443	2.97	114.4	8.71 8.59 9.39 8.33	11.41 11.39 11.41 11.39	-41.3 -36.4 -34.7 -32.0	67.5 66.1 56.6 62.0	
0955 1000 1005 1010 1015	0.50 0.60 0.70 0.75 0.90	21.65 22.01 22.35 22.80 23.77	60 60 60	28.65 28.69 28.72 28.86	5525 5473 5443 5268	2.97 2.94 2.92 2.81	114.4 111.9 122.7 108.9	8.71 9.59 9.39 8.33 8.12	11.41 11.39 11.41 11.39 11.39	-41.3 -36.4 -34.7 -32.0 -31.6	67.5 66.1 56.6 62.0 47.1	
0955 1005 1015 1015	0.50 0.60 0.70 0.75 0.90 1.10	21.65 22.01 22.35 22.80 23.77 24.45	60 60 60 60	28.65 28.69 28.72 28.86 29.14	5525 5473 5473 5268 5159	2.97 2.94 2.92 2.81 2.75	114.4 111.9 122.7 108.9 108.4 92.1	8.71 9.59 9.39 8.33 8.12 6.89	11.41 11.39 11.41 11.39 11.39 11.35	-41.3 -36.4 -34.7 -32.0 -31.6 -30.7	67.5 66.1 56.6 62.0 47.1 37.1	
0955 1005 1005 1015 1025	0.50 0.60 0.70 0.75 0.90 1.10 1.25	21.65 22.01 22.35 20.80 23.77 24.45 25.05	60 60 60 60 60	28.65 28.69 28.72 28.86 29.14 29.02	5525 5473 5443 5268 5159 5029	2.97 2.94 2.92 2.81 2.75 2.68	114.4 111.9 122.7 108.9 108.4 92.1 87.8	8.71 9.59 9.39 8.33 8.12 6.89 6.64	1).41 11.39 11.41 11.39 11.35 11.31	-41.3 -36.4 -34.7 -32.0 -31.6 -30.7 -30./	67.5 66.1 56.6 62.0 47.1 37.1 31.2	
0955 1005 1005 1015 1025 1025 1025	0.50 0.60 0.70 0.75 0.90 1.10 1.25 1.40	21.65 22.01 22.35 22.80 23.77 24.45 25.05 25.85	60 60 60 60 60 60	28.65 28.69 28.72 28.86 29.14 29.02 29.12	5525 5473 5473 5268 5159 5029 4994	2.97 2.94 2.92 2.81 2.75 2.68 2.66	114.4 111.9 122.7 108.9 108.4 92.1 87.8 78.2	8.71 9.59 9.39 8.33 8.22 6.89 6.64 5.88	11.41 11.39 11.47 11.39 11.35 11.31 11.26	-41.3 -36.4 -34.7 -32.0 -31.6 -30.7 -30.1 -30.3	67.5 66.1 56.6 62.0 47.1 37.1 31.2 34.4	
0955 1005 1015 1015 1025 1025 1030	0.50 0.60 0.70 0.75 0.90 1.10 1.25 1.40	21.65 22.01 22.35 22.80 23.77 24.45 25.65 25.85 26.36	60 60 60 60 60 60 60	28.65 28.69 28.72 28.86 29.14 29.02 29.12 29.34	5525 5473 5443 5268 5159 5029 4994 4945	2.97 2.94 2.92 2.81 2.75 2.68 2.66 2.63	114.4 111.9 122.7 108.9 108.4 92.1 87.8 78.2	8.71 9.59 9.39 8.33 8.12 6.89 6.64 5.88 5.81	11.41 11.39 11.47 11.39 11.35 11.31 11.26 11.23 11.23	-41.3 -36.4 -34.7 -32.0 -31.6 -30.7 -30.1 -30.3 -33.6	67.5 66.1 56.6 62.0 47.1 37.1 31.2 34.4 32.9	Strong mydrocarb
0955 1000 1005 1010 1015 1020 1025 1035 1040	0.50 0.60 0.70 0.75 0.90 1.10 1.25 1.40 1.70	21-65 22-01 22-35 22-80 23-77 24-45 25-05 25-85 26-36 27-00	60 60 60 60 60 60 60	28.65 28.69 28.72 28.86 29.14 29.02 29.12 29.34 29.21	5525 5473 5443 5268 5159 5029 4994 4945 4843	2.97 2.94 2.92 2.81 2.75 2.68 2.66 2.63 2.57	114.4 111.9 122.7 108.9 108.4 92.1 87.8 78.2 77.0	8.71 9.59 9.39 8.33 8.12 6.89 6.64 5.88 5.81	11.41 11.39 11.39 11.35 11.35 11.36 11.36 11.36 11.36	-41.3 -36.4 -34.7 -32.0 -31.6 -30.7 -30.1 -30.3 -33.6 -37.6	67.5 66.1 56.6 62.0 47.1 37.1 31.2 34.4 32.9 22.3	Strong mydrocarb
0955 1005 1005 1015 1025 1025 1035 1040 1045	0.50 0.60 0.70 0.75 0.90 1.10 1.25 1.40 1.70 1.75	21-65 22.01 22.35 22.80 23.77 24.45 25.05 25.85 26.36 27.00 27.33	60 60 60 60 60 60 60 60	28.65 28.69 28.72 28.86 29.14 29.02 29.12 29.21 29.21	5525 5473 5443 5268 5159 5029 4994 4945 4843 4866	2.97 2.94 2.92 2.81 2.75 2.68 2.66 2.63 2.57 2.55	114.4 111.9 122.7 108.9 108.4 92.1 87.8 78.2 77.0 68.2 77.7	8.71 9.59 9.39 8.33 8.12 6.89 6.64 5.88 5.81 5.81 5.86	11.41 11.39 11.47 11.35 11.35 11.31 11.26 11.23 11.24 11.16	-41.3 -36.4 -34.7 -32.0 -31.6 -30.7 -30.1 -33.6 -37.6 -37.6	67.5 66.1 56.6 62.0 47.1 37.1 31.2 34.4 32.7 22.3 21.5	Strong mys rocash
0955 1000 1005 1010 1015 1020 1025 1035 1040	0.50 0.60 0.70 0.75 0.90 1.10 1.25 1.40 1.70	21-65 22-01 22-35 22-80 23-77 24-45 25-05 25-85 26-36 27-00	60 60 60 60 60 60 60	28.65 28.69 28.72 28.86 29.14 29.02 29.12 29.21 29.21	5525 5473 5443 5268 5159 5029 4994 4945 4843 4866	2.97 2.94 2.92 2.81 2.75 2.68 2.66 2.63 2.57 2.55	114.4 111.9 122.7 108.9 108.4 92.1 87.8 78.2 77.0 68.2 77.7	8.71 9.59 9.39 8.33 8.12 6.89 6.64 5.88 5.81 5.81 5.86	11.41 11.39 11.47 11.35 11.35 11.31 11.26 11.23 11.24 11.16	-41.3 -36.4 -34.7 -32.0 -31.6 -30.7 -30.1 -33.6 -37.6 -37.6	67.5 66.1 56.6 62.0 47.1 37.1 31.2 34.4 32.9 22.3	Stronk mydrocarb
0955 1005 1005 1015 1025 1025 1035 1040 1045	0.50 0.60 0.70 0.75 0.90 1.10 1.25 1.40 1.70 1.75	21-65 22.01 22.35 22.80 23.77 24.45 25.05 25.85 26.36 27.00 27.33	60 60 60 60 60 60 60 60	28.65 28.69 28.72 28.86 29.14 29.02 29.12 29.21 29.21	5525 5473 5443 5268 5159 5029 4994 4945 4843 4866	2.97 2.94 2.92 2.81 2.75 2.68 2.66 2.63 2.57 2.55	114.4 111.9 122.7 108.9 108.4 92.1 87.8 78.2 77.0 68.2 77.7	8.71 9.59 9.39 8.33 8.12 6.89 6.64 5.88 5.81 5.81 5.86	11.41 11.39 11.47 11.35 11.35 11.31 11.26 11.23 11.24 11.16	-41.3 -36.4 -34.7 -32.0 -31.6 -30.7 -30.1 -33.6 -37.6 -37.6	67.5 66.1 56.6 62.0 47.1 37.1 31.2 34.4 32.7 22.3 21.5	Strone mydrocarb
0955 1005 1005 1015 1025 1025 1035 1040 1045	0.50 0.60 0.70 0.75 0.90 1.10 1.25 1.40 1.70 1.75	21-65 22.01 22.35 22.80 23.77 24.45 25.05 25.85 26.36 27.00 27.33	60 60 60 60 60 60 60 60	28.65 28.69 28.72 28.86 29.14 29.02 29.12 29.21 29.21	5525 5473 5443 5268 5159 5029 4994 4945 4843 4866	2.97 2.94 2.92 2.81 2.75 2.68 2.66 2.63 2.57 2.55	114.4 111.9 122.7 108.9 108.4 92.1 87.8 78.2 77.0 68.2 77.7	8.71 9.59 9.39 8.33 8.12 6.89 6.64 5.88 5.81 5.81 5.86	11.41 11.39 11.47 11.35 11.35 11.31 11.26 11.23 11.24 11.16	-41.3 -36.4 -34.7 -32.0 -31.6 -30.7 -30.1 -33.6 -37.6 -37.6	67.5 66.1 56.6 62.0 47.1 37.1 31.2 34.4 32.7 22.3 21.5	Stronk mydrocarb
0955 1005 1005 1015 1025 1025 1035 1040 1045	0.50 0.60 0.70 0.75 0.90 1.10 1.25 1.40 1.70 1.75	21-65 22.01 22.35 22.80 23.77 24.45 25.05 25.85 26.36 27.00 27.33	60 60 60 60 60 60 60 60	28.65 28.69 28.72 28.86 29.14 29.02 29.12 29.21 29.21	5525 5473 5443 5268 5159 5029 4994 4945 4843 41866 4796	2.97 2.94 2.92 2.81 2.75 2.68 2.63 2.63 2.57 2.55	114.4 111.9 122.7 108.9 108.4 92.1 87.8 78.2 77.0 68.2 77.7	8.71 9.59 9.39 8.33 8.12 6.89 6.64 5.88 5.81 5.81 5.86	11.41 11.39 11.47 11.35 11.35 11.31 11.26 11.23 11.24 11.16	-41.3 -36.4 -34.7 -32.0 -31.6 -30.7 -30.1 -33.6 -37.6 -37.6	67.5 66.1 56.6 62.0 47.1 37.1 31.2 34.4 32.7 22.3 21.5	Strong myorocarb
0955 1005 1005 1015 1025 1025 1035 1040 1045	0.50 0.60 0.70 0.75 0.90 1.10 1.25 1.40 1.70 1.75	21-65 22.01 22.35 22.80 23.77 24.45 25.05 25.85 26.36 27.00 27.33	60 60 60 60 60 60 60 60	28.65 28.69 28.72 28.86 29.14 29.02 29.12 29.21 29.21	5525 5473 5443 5268 5159 5029 4994 4945 4843 4866	2.97 2.94 2.92 2.81 2.75 2.68 2.63 2.63 2.57 2.55	114.4 111.9 122.7 108.9 108.4 92.1 87.8 78.2 77.0 68.2 77.7	8.71 9.59 9.39 8.33 8.12 6.89 6.64 5.88 5.81 5.81 5.86	11.41 11.39 11.47 11.35 11.35 11.31 11.26 11.23 11.24 11.16	-41.3 -36.4 -34.7 -32.0 -31.6 -30.7 -30.1 -33.6 -37.6 -37.6	67.5 66.1 56.6 62.0 47.1 37.1 31.2 34.4 32.7 22.3 21.5	Strone mydrocarb
0955 1005 1005 1015 1025 1025 1035 1040 1045	0.50 0.60 0.70 0.75 0.90 1.10 1.25 1.40 1.70 1.75	21-65 22.01 22.35 22.80 23.77 24.45 25.05 25.85 26.36 27.00 27.33	60 60 60 60 60 60 60 60	28.65 28.69 28.72 28.86 29.14 29.02 29.12 29.21 29.21	5525 5473 5443 5268 5159 5029 4994 4945 4843 41866 4796	2.97 2.94 2.92 2.81 2.75 2.68 2.63 2.63 2.57 2.55	114.4 111.9 122.7 108.9 108.4 92.1 87.8 78.2 77.0 68.2 77.7	8.71 9.59 9.39 8.33 8.12 6.89 6.64 5.88 5.81 5.81 5.86	11.41 11.39 11.47 11.35 11.35 11.31 11.26 11.23 11.24 11.16	-41.3 -36.4 -34.7 -32.0 -31.6 -30.7 -30.1 -30.3 -33.6 -37.6 -37.6	67.5 66.1 56.6 62.0 47.1 37.1 31.2 34.4 32.7 22.3 21.5	Stronk mydrocart



Signature:

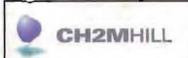
PROJECT NUMBER
392485.FI.FK

WELL NUMBER

VWAI-MW047

SHEET 2 OF 3

	FIELD PARAMETERS											
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color/Odor/Comment
											/	
										/		
									1			
								1				
							1					
						/						
					1/							
			y Tribal	50								
			d	1/								
			1		FEE							
		1			2.11							
		/										
	/											
	/											
1												



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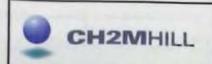
WELL NUMBER

VWAI-MW047

SHEET 3 OF 3

PROJECT:	In-Situ Remed	diation Pil	ot Study LOCATION : AOC-I DATE: ¢5/23/12
			NOTES (CONTINUED)
SOP(s) us	ed (refer to S	OPs in b	rack of this log)? کبای ا
Were all r	equirements	of the SA	P. Pls and above mentioned SOP(s) met? yes but few exaptions so below
	on of exception of		AP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything
than water proven S. Br. issue flav DC is DO str.	mell don 50mb or in mall. t eny flor and, who as best restrictor very law is consider open - pur	some some social	initial purpe of MWO7@ ADC I, sampling team was wable to mith 0.39% as stated in the SEP. Well is being pumped at less harge on well is insufficient to gtop I hunder draw draw of well ming team is insufficient to slow flow rate draw some it will use all pumping pressure. Sampling team notified the PM.  Led to consider as best as possible, will try and resolve draw-dam estible white adhering to the SEP. Note: Team is using a last separate about 45 minutes trying to resolve this issue.  But not oute within 101 of lost 3 readings, however had not not oute within 101 of lost a reading was taken when the water had not had to be turned up a little to resolve flow a lave to live to live to pulping the water pulping.
			PHOTO LOG
Photo	Commercia		
	Compass - Direction	Time	Description
	W	1000	Maria taking yst readings down in workbook
2	N		
L	N	1055	Pat collectines groundwater sample
			4.7
			On 05/13/12
210-1			
-			

Signature:	Waterfale	Date:	05/23/12	
COLUMN TO SERVICE AND ADDRESS OF THE PARTY O		2.675.000		



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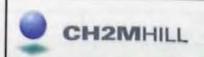
WELL NUMBER
VWAI-MW04

SHEET 1 OF 3

# **GROUNDWATER SAMPLING DATA SHEET**

PROJECT	In-Situ Remed	diation Pilo	t Study				- 1	OCATION	I: AOC-I			DATE 11/28/12
Weather:	Surray, Hy	mid, Hot								P. Murph	)	Unit III berly
									7	Hen		
	th:	41.05	FT (BTOC	) Measur	ed				_			
Depth to	Water: (-)	25.27	FT (BTOC	) Measur	ed		1	Date and	Time O	n Well:	10	1/20/12 0800
	lumn(h): (=)									and Time:		2812 0820
Water Vo	lume in Well	2.6	GAL (3.14	1593*h(ii	n)*(wellDl	A/2)^2*0.	004329	oump Fir	nish Date	and Time:	_11	129/12 0920
Pump De			FT.(BTOC		ed		1	Date and	Time O	ff Well;	1	1/28/12 0925
	vice/Equip:							Air Monit	oring Re	adings:	_	NIA
Measurin	g Device/Equip	ment	YSI	Turbid	mu ter			Total Pu	rge Vol	ume: _	4.5 G	AL.
					SAMP	LE INF	ORMA	TION				
Sample II	VWAI -/	nw04 -	1112			Paramete	ers Colle	ced for	VOG	5VOC	FME TAL	S, WCHEM (SCY, NO.)
Sample D	ate/Time:/	1/2/12	090	5						n (tuc)		
Field Dup	YESINO ID					Paramete	ers Colle	ced for			MS/M	OSD= VOG, SVOCS
D Samp	le Date/Time:		NA			-				AHM		
MS/MSD:	VESI NO					Sample	Appeara	nce:		st, Shalt	potela	n odr
Were sam	nples filtered?	YESINO				Persulfat	te Test K	Cit Detail	s:	0.0 pem		
YES, W	hich samples?	Fift	red Me	tels			-					
	AL FILL				FIEL	D PAR	AMETE	RS				
Time	Purged Vot. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH wfin 0.1	ORP (mV) win 10mV	Turbidity (NTU) w/m 10%	Color / Odor / Comments
825	0.1	25,50	350	28.6	1,30			1.10	7.41	-213.2	12.24	clear / rotten so
0830		25,50	350	29.0	1.38		9.4	0.70	7.01	-222.2	9.05	Hear
835	1.3	25.46	250	28.9	1.34		7.6	0.56	6.84	-218,8	12.27	Cleur
940	2.0	25.45	250	29.1	1.34	17-1	5.2	0.40	6.76	-225,1	8.75	Clene
0845	2.5	25,45	250	29.2	1.40		4.2	0.32	6.69	- 225,9	6.34	Clear
1850	3.0	25:45	250	24.2	1.41		3,4	0.20	6.65	-23216	3.47	Clear
	3,5	25.45	Name and Address of the Owner, where the Owner, which is the Owner, where the Owner, which is the Own	29.1	1.42		33	0.25	6.61	-235, 1	2.65	Clent
95%	4.0	25.45	NAME OF TAXABLE PARTY.	29,0	1.42		3.3	0.27	6.54	-232,8	1.47	Clear
1900	4.0										1	
					E							
	-										1	
		1										
			_	-					1		1111	
			_	1								
				~	1	1	0	1			17-7	
						1	1	1				
							1	R	1	-		
								1	1	1		
				145			-			-	1	
							100				1	1
									THE RESERVE TO SERVE THE PERSON NAMED IN COLUMN TWO IN COL			
												1

Date: 11/28/12



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WELL HUMBER

VWAI-MW05

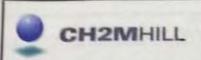
DUEDT 4

# **GROUNDWATER SAMPLING DATA SHEET**

and the same	In-Situ Reme							LOCATIO	N: AOC			KINSE/IN STAD
Weather:	Ran, Ho	Humid						Sample	Team:	P. Mur	phy	
	_									T Hori		
Total Dept		44.55							-			
	Nater: (-)							Date and	t Time C	in Well:	1	12/12 1015
	lumn(h): (=)									and Time:	L	128/12 1030
Water Vol	lume in Well	3,0	GAL (3.14	1593°h(i	n)*(wellD	A/2)*2*0	.004329	Pump Fi	nish Dat	e and Time		168/0 1135
Pump Dep		3200			red			Date and	d Time C	off Well:	1	1/22/12 1190
	vice/Equip:		7 Pump	/						eadings:		NIA
weasunng	g Device/Equip	oment:	YSI					Total Pi	irge Vol	ume: ~	3.5	GAL.
L					SAMP	LE INF	ORMA	TION				
Sample II	WWAT-	MW05-	1112			Paramet	ers Colle	iced for	VOCs	SVOCS	FM	als, water (se, so
Sample D	ate/Time: _//	128/12	1/2	5						n (tac)		
ield Dup	YES/NO D					Paramet	ers Colle	eced for	(FD)	NA		
	le Date/Time:	NIP								IA		
MS/MSD:	YES MO					Sample	7.7		Ck			
Were sam	ples filtered?	ESINO				Persulfa	te Test i	Cit Detail	5: 0	O ppm		
YES, W	hich samples	_FC	netals									
1991					FIEL	D PAR	AMETI	ERS				
Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (u5/cm) w/in 3%	Salinity (ppt)	DO (%)	DO (mg/L) w/in 10%	pH win 0.1	ORP (mV) with 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
1035	0.25°	25.46	200	28.3	1.07		17.3	1.36	6.38	-75.7	50.6	Clear
040	0,5	25.50	200	28,5	1.07		12.5	0.17	6.40	791.4	31.8	clar
045	0.75	25,50	200	28,9	1.06		4.5			-111.6	17.7	Claur
050	1.00	25.50	200	29.8	1.06		7.5	0.54	6.33	-132.7	13.8	Clear
055	1.25	25.50	200	28.6	1.05		7.4			-127.9	10.7	Clear
1100	1.50	25.50	200	28.7	1.04		6.6	0.51	6.30	-1148	8.17	Cleur
1105	1.75	25.50	240	28.7	1.64		6.5	0.49	636	-110,4	6.73	Clear
1110	2.00	25.50	200	28.7	1.04		6.1	0.47	6.36	-100.6	4.42	Clear
115	2.5	25,50	250	28.6	1.04		6.3	0,49	6.36	-102,3	4.0	Clear
1/20	3.0	25.50		28.6	1.04		5,9	-	Name and Address of the Owner, where	100.1	3,0	Clear
										LARL		
	-	Total In	DE									
					1				5 5	7		
						1						
								-				
											1	
				1	1				Marie .			
								III STATE OF THE PERSON NAMED IN	The same of	_		

Symen 24

Date: 11/28/12



PROJECT NUMBER 392485.FI.FK

VWAI-MW07

SHEET 1 OF 3

# GROUNDWATER SAMPLING DATA SHEET

PROJE	CT : In-Situ Ren	mediation P	liot Study						N : AOC-			DATE: 1/27/15	-
Weath	e ther	Sugar	1601	Secza	Lham	2		Sample '	Team:	PAlup	fy		-
		100							-	THIN			-
Total D	epth:	95,72	FT.(BTO	C) Measu	pred							11/29/12 07	30
	Water: (-)								d Time O		-	1/29/12 07	
	Column(h): (=		_		_				and Time:		WESTE 094		
	olume in Well					NA/2)*2*0						163/6- 1000	
	lepth:									off Well:	_	NIA	
	levice/Equip:			A STATE OF THE PARTY OF THE PAR						eadings:			
weasun	ng Device/Equ	upment:	1-75-1	Arbein					age von	une			
						LE INF			14.00			11 muras	
	ID: INHET - A					Paramet	ters Colle	iced for:	Vacs	SPES	1 Men	NEHEN	
	Date/Time:					-	210			(6) WE		Rel	
	p: (ESINO II	The second second				Paramel	ters Colle	oed for	(FU) 1/	10,310	-5		
	ple Date/Time		2 0%	20		-	Appeara		ch				
	YES ISO									O ppn			
	mples filtered' Vhich samples		10701	5		r eli Sulla	He Test A	or Detail	- 0	- pyer			4
125, V	vilion samples	1_17	UNIVE		-					Maria Contract			
	1		1		FIEL	D PAR	AMETE	KS					
Time	Purged Vol.	Depth to Water	Flow Mate		SpCond (uS/cm)	Salinity	DO	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Color / Odor / Com	ments
1 1110	(gals)	(ft)	(mL/min)	(,c)	win 3%	(ppt)	(2)	win 10%	with G.S.	witn 10mV	win 10%		
800	0.2	27,79	50	27.4	4.81		632	4.83	11.58	-60,1	6,52	Clear	
205	0.3	18.25	-	27,8	4.82			Name and Address of the Owner, where the Owner, which is the Owner, where the Owner, which is the Owner,	11.96		6.65	Clear	
210	0.4	28,69	104	27.9	4.70		51.0	3,44	11.52	-95.1	6.26	Ce.	
75	0.5	28,95		27,8	4.57		40.5	3,14	144	-100,6	Name and Address of the Owner, where	Clear	
20	0.6	24,20	-	27.9	4.53		40.7	3.15		-1042	5.95	044-	
825	0.7	29,50	30	27.4	4.50		345			-106.6	5.86	clear	
330	0.8	29,70	100	28.0	4.39		42.2	324	<b>SCHOOL-STOR</b>	-107.6	8.37	Cless	
35	0,9	30,20			4.24		38.0			-107.3	-	clear	
340	1,0	30,45		29,1	4.14				$\overline{}$			Cleur	
45	1.2	283/3			3,85							* How styp	11/1
	1.4	31.90		28.6	3.81		29.1	2,23	10.51	-99.1	18.1	120.41	Carp's
50	1.6	32.25		STATE OF THE PERSON NAMED IN	3,77					-95.7			
55	1.9	32.70		-	3.74					-91.5	13.2		
00	2.0	THE OWNER OF THE OWNER OF		29.1						-92.8			
December 1	200	33,30			_							100	
05	2 -	33.50	110	24,2	3,70		21,0	201	10,00	- 92,4	11.1		
December 1	2, 2								1000	1			
05	2, 2						-						
05	2.2	_				/	×				973		
05	2, 2	/					<b>**</b>	No.					
05	2,2					/W	2	B					
05	2, 2						2	M		2			

Date: 1/27/12

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WELL NUMBER

VWAI-MW07

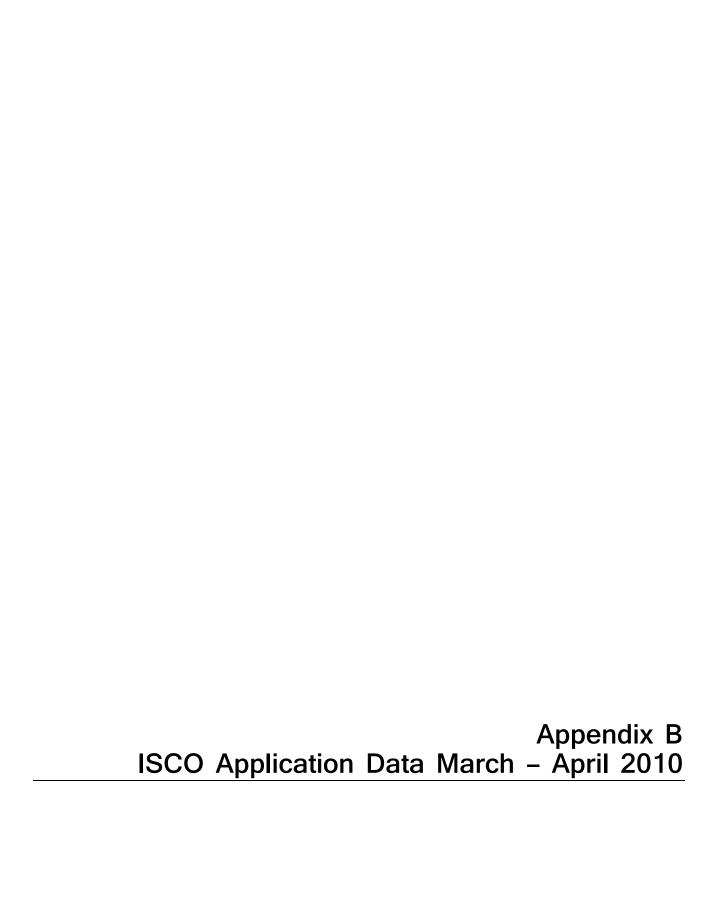
SHEET 3 OF 3

# **GROUNDWATER SAMPLING DATA SHEET**

			NOTES (CONTINUED)	
P(s)	sed (refer to	SOPs in	back of this log)? Yes	
			SAP, Pls and above mentioned SOP(s) met? Hes but with few exceptions	
xplanat	ion of excep	otions to S	SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anythin	na
onsider	ed in the de	cision:		3
W	hik star	ting t	he initial punc of MWO70 PCC I, sampling team was unable	to
			wn within 0.3 ft ors stated in scops well was pumped between	
			; flow rate hept changing due to pumping present changes from nell	
nen	ter drawn	down . h	vell and insulficent recharge to allow stoody flow rate and provent	
			town ired their best to present and minimize drow down and adhere	1
B			team staged consistent with previous round of sampling (May 2012	1
	To the last of			
			PHOTO LOG	
THE REAL PROPERTY.	Compass	Time	PHOTO LOG  Description	
THE REAL PROPERTY.	Compass Direction		Description	
nbe [		0901	Description  T. Harn recording GW parameters while purgues	
nbe [		0901	Description  T. Harn recording GW parameters while purgues	
nbe [		0901	Description	
nbe [		0901	Description  T. Harn recording GW parameters while purgues	
nbe [		0901	Description  T. Harn recording GW parameters while purgues	
THE REAL PROPERTY.		0901	Description  T. Harn recording GW parameters while purgues	
nbe [		0901	Description  T. Harn recording GW parameters while purgues	
nbe [		0901	Description  T. Harn recording GW parameters while purgues	

Signature:

\_ Date: \_ 11/29/15



	Vieques AOC I Field Parameters - Summary Sheet												
Time	Date	Well ID	Depth-To-Water (ft btoc)	ORP (mV)		Conductivity (mS/cm)	рН	Temperature (°C)	Turbidity (NTU) [optional]	Persulfate Concentration (mg/L)	Sulfate Test Kit (mg/L) [optional]	Notes	
Baseline M	onitoring Well S	ampling											
	3/15/2010	MW-01	24.93										
0935	3/18/2010	MW-02	24.16	113.0	0.13	1.099	6.69	29.72		0		Injection MW	
0905	3/19/2010	MW-03	24.41	-49.4	0.26	1.275	6.76	29.68		0		Injection MW	
1120	3/19/2010	MW-04	24.63	308.0	0.17	1.289	6.77	29.82		0		Injection MW	
1215	3/18/2010	MW-05	24.31	-7.0	0.28	1.431	6.74	29.56		0			
0946	3/22/2010	MW-06	25.04	-70.6	0.51	1.374	6.72	28.93		0			
	3/15/2010	MW-07	24.85			-						Injection MW	
	3/15/2010	MW-08	23.55										
	3/15/2010	MW-09	23.61			-							
DAY 1 - Pre	-Injection Monit	oring											
0834	3/27/2010	MW-01	25.69			1	-						
0831	3/27/2010	MW-02	24.97			-	-					Injection MW	
0827	3/27/2010	MW-03	25.25			1	-					Injection MW	
0821	3/27/2010	MW-04	25.41			-	-					Injection MW	
		MW-05				1	-						
0845	3/27/2010	MW-06	26.02			1	1						
0818	3/27/2010	MW-07	25.57			1	-					Injection MW	
		MW-08				-	-						
		MW-09				1	-						
DAY 1 - Mo	nitoring during I	njection											
0923	3/27/2010	MW-07	25.35			1	-					Injection MW	
1032	3/27/2010	MW-07	24.91									Injection MW	
1043	3/27/2010	MW-07	24.87									Injection MW	
DAY 2 - Mo	nitoring during I	njection											
0952	3/29/2010	MW-01	25.92										
0948	3/29/2010	MW-02	25.25									Injection MW	
0950	3/29/2010	MW-03	25.54									Injection MW	
	3/29/2010	MW-04										Well Injection Occurring	
0953	3/29/2010	MW-05	25.60										
0954	3/29/2010	MW-06	26.27										
0945	3/29/2010	MW-07	25.77			1	-					Injection MW	

AOC I Injection Field Sheets.xls; AOC I

	Vieques AOC I Field Parameters - Summary Sheet												
Time	Date	Well ID	Depth-To-Water (ft btoc)	ORP (mV)		Conductivity (mS/cm)	рН	Temperature (°C)	Turbidity (NTU) [optional]	Persulfate Concentration (mg/L)	Sulfate Test Kit (mg/L) [optional]	Notes	
0955	3/29/2010	MW-08	25.27			-							
0959	3/29/2010	MW-09	26.20										
1051	3/29/2010	MW-01	25.88										
1049	3/29/2010	MW-02	25.16			1.123	11.47	28.8				Injection MW	
1046	3/29/2010	MW-03	25.45									Injection MW	
	3/29/2010	MW-04										Well Injection Occurring	
1055	3/29/2010	MW-05	25.52										
1054	3/29/2010	MW-06	26.27										
1045	3/29/2010	MW-07	25.27			1.413	6.71	29.2				Injection MW	
1052	3/29/2010	MW-08	25.27										
1057	3/29/2010	MW-09	26.18										
1354	3/29/2010	MW-07	25.31			1.448	6.70	29.3	-			Injection MW	
					Vieque	s AOC I Fi	eld Para	meters - S	ummary	Sheet			
Time	Date	Well ID	Depth-To-Water (ft btoc)	ORP (mV)	DO (mg/L)	Conductivity (mS/cm)	рН	Temperature (°C)	Turbidity (NTU) [optional]	Persulfate Concentration (mg/L)	Sulfate Test Kit (mg/L) [optional]	Notes	
DAY 3 - Mo	nitoring during l	njection											
0749	3/30/2010	MW-01	25.94										
0754	3/30/2010	MW-02	25.58									Injection MW	
0756	3/30/2010	MW-03	25.77		1	1	-		1			Injection MW	
0752	3/30/2010	MW-04	25.77		1	-	-		-			Injection MW	
0733	3/30/2010	MW-05	25.63										
0738	3/30/2010	MW-06	26.40										
0746	3/30/2010	MW-07	25.73			1.363	6.68	28.5				Injection MW	
0743	3/30/2010	MW-08	25.39										
0741	3/30/2010	MW-09	26.30						-				
1012	3/30/2010	MW-01	25.90			1.317	7.05	29.1					
DAY 4 - Mo	nitoring during l	njection											
0649	3/31/2010	MW-01	26.03										

AOC I Injection Field Sheets.xls; AOC I

# ISCO Injection Field Observation Form Injection Well: MW02



Site: Viegues AOC-I

Project: In Situ Activated Alkaline Sodium Persulfate Injection

Contract: Navy CLEAN, CTO-83

66 66 167 233 150 383 86 469 31 500 Design Summary

Screen Interval = 31 - 41 ft bgs
Total Solution Volume = 514 gallons

(includes 20 gallons of chase water)

Persulfate Solution per Well = 475 gal Mass of Persulfate per Well = 209 lbs

Mass of NaOH per Well = 200 lbs (19 gal; 25% solution)

Persulfate concentration: 5 %; 50 g/L

Date	Start Time	Stop Time	Pressure range (psi)	Flowrate (gpm)	Total Time (min)	Total Volume (gallons)	Notes
3/27/2010	0853	0910	10	not registering	17	66	66 gal batch injected (200 gallon batch simultaneously into MWs 2, 3, and 4). Flow readings not accurate, will switch to injecting into individual wells.
3/29/2010	1304	1330	0	2.7	43		167 gal batch begin injecting; stop to refuel compressor
3/29/2010	1349	1356	0	3.0 - 3.2	50	233	167 gal batch injection complete
3/29/2010	1445		0	1.23			200 gal batch begin injecting; gravity fed
3/29/2010	1510	1539	< 0.5 - 4.5	3.6	104	383	150 gal of the 200 gallon batch injected, put other 50 gallons in MW-03
3/30/2010	0910	0934	0	3.6	128	469	86 gal batch begin injecting; 86 gal batch injection complete
3/30/2010	1016	1025	0	3.2	137	500+10	31 gal batch + 10 gal chase water; injection complete

Notes: When the pump head was fixed to the well head the flowrate was at less than 0.5 gpm and pressure was at 2 psi. At 1445 when the pump head was unscrewed from the well head and allowed to pour in under gravity feed, the flowrate was over 4 gpm and pressure ranged from 0 - 0.5 gpm.

#### **ISCO Injection Field Observation Form** Injection Well: MW03

Site: Vieques AOC-I

Project: In Situ Activated Alkaline Sodium Persulfate Injection

Contract: Navy CLEAN, CTO-83



#### Design Summary

Screen Interval = 24 - 34 ft bgs

Total Solution Volume = 514 gal
(includes 20 gallons of chase water)
Persulfate Solution per Well = 475 gal
Mass of Persulfate per Well = 209 lbs
Mass of NaOH per Well = 200 lbs (19 gal; 25% solution)

Persulfate concentration: 5 %; 50 g/L

Date	Start Time	Stop Time	Pressure range (psi)	Flowrate (gpm)	Total Time (min)	Total Volume (gallons)	Notes
3/27/2010	0853	0910	6	50	17	67	67 gal batch injected (200 gallon batch simultaneously into MWs 2, 3, and 4). Flow readings not accurate, will switch to injecting into individual wells.
3/29/2010	1549		0	4	-		50 gal batch begin injecting; gravity fed
3/29/2010	1605	1620	0	1.8	48	117	50 gal batch injection complete
3/30/2010	0810		0	1.4			Begin injecting
3/30/2010	0847		0	1.5			
3/30/2010	0910	0934	0	1.2	132	231	
3/30/2010	1016	1026	0	0.8	142	239	
3/30/2010	1027		0				
3/30/2010	1052	1153	0	1.3	228	338	Batch complete- turn off to mix new batch
3/30/2010	1242		0	1.1			
3/30/2010	1250		0	1.1			
3/30/2010	1320		0	1.1			
3/30/2010	1350		0	1.1			
3/30/2010	1420	1432	0	1.1		459	Batch complete- turn off to mix new batch
3/30/2010	1504	1541	0	1.1	407	500	Begin injecting last batch; Sodium persulfate injection complete
3/30/2010	1640	1650	0		417	510	10 gal chase water injected

#### ISCO Injection Field Observation Form Injection Well: MW04

Site: Vieques AOC-I

Project: In Situ Activated Alkaline Sodium Persulfate Injection

Navy CLEAN, CTO-83 Contract:



#### Design Summary

Screen Interval = 30 - 40 ft bgs Screen Interval = 30 - 40 ft bgs
Total Solution Volume = 514 gal
(includes 20 gallons of chase water)
Persulfate Solution per Well = 475 gal
Mass of Persulfate per Well = 209 lbs
Mass of NaOH per Well = 200 lbs (19 gal; 25% solution)
Persulfate concentration: 5 %; 50 g/L

Date	Start Time	Stop Time	Pressure range (psi)	Flowrate (gpm)	Total Time (min)	Total Volume (gallons)	Notes
3/27/2010	0856	0910	8	3.63	14	67	67 gal batch injected (200 gallon batch simultaneously into MWs 2, 3, and 4). Flow readings not accurate, will switch to injecting into individual wells.
3/27/2010	1014		13				200 gal batch begin injecting; inject under pressure
3/27/2010	1015		20	3.2			
3/27/2010	1026		23				
3/27/2010	1030		21	2.4			
3/27/2010	1049		21	2.4			
3/27/2010	1107	1127	21	2.4	87	267	200 gal batch injection complete
3/29/2010	1014		10	2			200 gal batch begin injecting
3/29/2010	1027		10	2			
3/29/2010	1111		10	2			
3/29/2010	1121	1136	10	2	169	467	200 gal batch injection complete; stop to mix new batch
3/29/2010	1224	1227	10	2	172	473	33 gal batch begin injecting; stop- injection well head blew off due to pressure- reaffix
3/29/2010	1233		10	2			
3/29/2010	1242	1246	8	2	185	500	Sodium persulfate injection complete
3/29/2010	1250	1255	10		190	510	10 gal chase water added
Notes:							

AOC I Injection Field Sheets.xls; Injection MW04

## **ISCO Injection Field Observation Form**

Injection Well: MW07

Site: Vieques AOC-I

Project: In Situ Activated Alkaline Sodium Persulfate Injection

Contract: Navy CLEAN, CTO-83



#### Design Summary

Screen Interval = 33 - 43 ft bgs Total Solution Volume = 514 gal (includes 20 gallons of chase water)

Persulfate Solution per Well = 475 gal

Mass of Persulfate per Well = 209 lbs
Mass of NaOH per Well = 200 lbs (19 gal; 25% solution)

Persulfate concentration: 5 %; 50 g/L

Date	Start Time	Stop Time	Pressure range (psi)	Flowrate (gpm)	Total Time (min)	Total Volume (gallons)	Notes
3/30/2010	1034	1035	0	0.4	1	0.4	tested flowrate when gravity fed- very low when put in 5 gal
3/30/2010	1044			1.5			141 gal batch injecting; inject under pressure
3/30/2010	1120	1153	18 - 21	0.9	70	62	
3/30/2010	1242		20	0.6			
3/30/2010	1250		24	0.6			
3/30/2010	1320		20	0.6			
3/30/2010	1350		16	0.6			
3/30/2010	1420	1432	15	0.6	180	141	
3/30/2010	1504		20				59 gal batch begin injecting
3/30/2010	1534		20	0.6			
3/30/2010	1545		20				
3/30/2010	1603		22				
3/30/2010	1627		22				
3/30/2010	1640	1641	21		277	200	59 gal batch injection complete
3/31/2010	0657		20	1.7			200 gal batch begin injecting
3/31/2010	0720		20	1.7			
3/31/2010	0750		24	1.7			
3/31/2010	0810		24	1.7			
3/31/2010	0840	0904	24	1.7	414	400	200 gal batch injection complete
3/31/2010	0932		22	1.7			100 gal batch begin injecting
3/31/2010	0950		30	1.7			
3/31/2010	1015		16	1.7			

Notes:

# **ISCO Injection Field Observation Form**

Injection Well: MW07

Site: Vieques AOC-I

Project: In Situ Activated Alkaline Sodium Persulfate Injection

Contract: Navy CLEAN, CTO-83



#### Design Summary

Screen Interval = 33 - 43 ft bgs

Total Solution Volume = 514 gal (includes 20 gallons of chase water) Persulfate Solution per Well = 475 gal

Mass of Persulfate per Well = 209 lbs
Mass of NaOH per Well = 200 lbs (19 gal; 25% solution)

Persulfate concentration: 5 %; 50 g/L

Date	Start Time	Stop Time	Pressure range (psi)	Flowrate (gpm)	Total Time (min)	Total Volume (gallons)	Notes
3/31/2010	1030		29	0.6			
3/31/2010	1100	1133	28	0.6	505	500	Sodium persulfate injection complete
3/31/2010	1150	1207			522	510	10 gal chase water added
Notes:		l	<u> </u>			<u> </u>	1
10100.							

Stephen Brand CH2M Hill 5700 Cleveland Street, Ste. 101 Virginia Beach, VA 23462

Subject: Summary of Remedial Chemical Injection Activities Performed at the Navy Clean Site in Vieques, Puerto Rico.

## Dear Stephen:

The following is a summary of the work completed by ORIN Remediation Technologies, LLC (ORIN) for CH2M Hill at the Navy Clean Site in Vieques, Puerto Rico.

On March 22, 2010 ORIN began preparation for injection activities by discussing site specific health and safety plans with ORIN, CH2M Hill, and JFA personnel. Potential chemical injection, island specific, and Geoprobe related safety hazards were discussed. The group evaluated ways to reduce the risks, and the best practices to maintain safety.

On Tuesday March 23, 2010 ORIN began sodium persulfate injection in AOC E. ORIN injected a 20% sodium persulfate solution into monitoring wells 1, 3, 4, and 5. Sodium persulfate injection in AOC E took place March 23-26, and on March 29, 2010.

ORIN injected on monitoring wells 3, 4, and 5 before beginning injection on MW-1. During injection on the first three monitoring wells, ORIN bailed MW-1 to check for sodium persulfate. The goal was to show influence on MW-1 from injection into the surrounding wells. On Thursday March 25, 2010 a field persulfate test indicated sodium persulfate concentrations of 4.2 to 5.6 ppm in MW-1. Injection on MW-1 began later that day.



Each of the four monitoring wells received 20 gallons of chase water following sodium persulfate injection. Injection rates, pressures, and volumes per well are included in table 1.

ORIN commenced calcium nitrate injection activities in AOC E on Monday, March 22, 2010. Immediately after starting the injection through Geoprobe rods, the treatment chemistry surfaced around the bore hole. After discussing how to proceed, CH2M Hill decided to have JFA install temporary injection points. Calcium nitrate injection resumed via installed temporary injection points Thursday March 25, 2010. Treatment chemistry was delivered by gravity feed, under zero PSI. The calcium nitrate injection was completed March 26, 2010. Following calcium nitrate injection, 20 gallons of chase water was injected into each injection point. Injection rates, pressures, and volumes per well are included in table 2.

ORIN began sodium persulfate injection in AOC I on Saturday March 27, 2010. The first 200 gallons of solution ORIN injected into MW- 2, 3, and 4 simultaneously. After the 200 gallon tank was gone, it was clear that ORINs flow meters were not correctly measuring the total gallons. To overcome this problem, ORIN began injecting on only one monitoring well at a time. Over the course of the following injection day, injection pressure in AOC-I monitoring wells steadily increased. After a successful attempt to gravity feed, ORIN began injecting with no seal on the monitoring well. Under this zero PSI, gravity feed system, injection rates increased. Following treatment chemistry injection, each monitoring well received 10 gallons of chase water. Injection in AOC I was completed Wednesday March 31, 2010. Injection rates, pressures, and volumes per well are included in table 3.

If you have any questions regarding this injection or any other project, please give us a call at (608) 838-6699 ext. 305.

Sincerely,

John Dinneen Field Technician ORIN Remediation Technologies, LLC.

# Navy Clean AOC E Sodium Persulfate Post Injection Summary Table 1

Injection Point	Date	Time On	Time Off	Injection Depth (feet)	Sodium Persulfate Concentration	Injection Pressure (psi)	Flow Rate (gpm)	Gallons Injected	Comments	Total Volume
MW-3	3/23/10	7:30	17:00	40-50	20%	10	.5-1	165		
MW-4	3/23/10	7:30	17:00	40-50	20%	8	.5-1	165		
				40 00	2070	O		100		
MW-5	3/23/10	7:30	17:00	40-50	20%	8	.5-1	70		
MW-3	3/24/10	7:35	10:45	40-50	20%	10	0.2	29		
		10:45	17:00	40-50	20%	20-30	0.8	236		
MW-4	3/24/10	7:35	10:45	40-50	20%	12	0.2	29		
		10:45	17:00	40-50	20%	25-30	0.8	284		
MW-5	3/24/10	7:35	11:03	40-50	20%	8	0.2	38		
		11:03	13:13	40-50	20%	8	3.5	392		500
MW-3	3/25/10	10:45	13:40	40-50	20%	14	0.5	85		515
MW-4	3/25/10	10:45	11:08	40-50	20%	28	1	15		493
MW-1	3/25/10	10:55	17:02	40-50	20%	18	<0.5	135		
MW-1	3/26/10	7:22	17:13	40-50	20%	18	0.2	200		
MW-1	3/29/10	7:25	9:05	40-50	20%	18	0.2	33		
		9:31	16:46	40-50	20%	18	0.25	100		
MW-1	3/30/10	7:24	9:10	40-50	20%	18	0.2	33		501

# Navy Clean AOC E Calcium Nitrate Post Injection Summary Table 2

Injection Point	Date	Time On	Time Off	Injection Depth (feet)	Calcium Nitrate Concentration	Injection Pressure (psi)	Flow Rate (gpm)	Gallons Injected	Comments
									Immediate short circuit
									around borehole. Injection
IP-7	3/22/10				5%			0	points instalation began.
IP-4	3/25/2010	14:40	15:22	16-26	5%	0	4.1	172	172
IP-6	3/25/2010	14:40	15:24	16-26	5%	0	2.5	110	110
0	0,20,2010	11.10	10.21	10 20	370	- U	2.0	110	
IP-7	3/25/2010	14:55	15:24	16-26	5%	0	0.75	23	
		15:24	16:50	16-26	5%	0	0.4	34	
IP-1	3/25/2010	15:33	16:24	16-26	5%	0	2	102	102
						_			
IP-2	3/25/2010	15:33	16:48	16-26	5%	0	1.36	102	102
IP-7	3/26/2010	7:43	8:07	16-26	5%	0	0.75	18	
		8:58	9:40	16-26	5%	0	0.64	27	102
IP-3	3/26/10	7:46	8:07	16-26	5%	0	1.5	31	
		8:53	9:40	16-26	5%	0	1.5	71	102
IP-5	3/26/10	7:51	7:53	16-26	5%	0	2	4	
0	0,20,10	8:04	8:07	16-26	5%	0	0.29	1	
		9:05	11:45	16-26	5%	0	0.57	97	102
					l .				

# Navy Clean AOC I Sodium Persulfate Post Injection Summary Table 3

Injection Point	Date	Time On	Time Off	Injection Depth (feet)	Sodium Persulfate Concentration	Injection Pressure (psi)	Flow Rate (gpm)	Gallons Injected	Comments
MW-2	3/27/10	8:53	9:10	33-43	5%	10	3.9	66	
MW-3	3/27/10	8:53	9:10	33-43	5%	6	3.9	67	
MW-4	3/27/10	8:53	9:10	33-43	5%	8	3.9	67	
		10:14	11:27	33-43	5%	23	2.8	200	
MW-4	3/29/10	10:14	11:34	33-43	5%	11	2.5	200	
		12:24	12:47	33-43	5%	10	1.4	33	500
MW-2	3/29/2010	13:04	13:58	33-43	5%	0	3.7	200	
		14:45	15:36	33-43	5%	0	3	150	
MW-3	3/29/10	15:49	16:20	33-43	5%	0	1.7	50	
MW-2	3/30/10	9:10	9:34	33-43	5%	0	3.6	86	
		10:16	10:26	33-43	5%	0	3.2	31	533
MW-3	3/30/10	8:10	9:34	33-43	5%	0	1.3	114	
		10:16	10:26	33-43	5%	0	0.8	8	
		10:27	10:52	33-43	5%	0	8.0	20	
		10:52	11:53	33-43	5%	0	1.3	79	
		12:42	14:32	33-43	5%	0	1.1	121	
		15:04	15:41	33-43	5%	0	1.1	41	500
MW-7	3/30/2010	10:44	11:53	33-43	5%	20	0.9	62	
		12:42	14:32	33-43	5%	20	2.9	79	
		15:04	16:41	33-43	5%	20	1.5	59	_
MW-7	3/31/2010	6:57	9:04	33-43	5%	20	1.2	200	_
		9:35	10:40	33-43	5%	20	1.7	100	500



# Technical Justification for Conducting First Post-Injection Sampling at AOC I Despite Low Residual Persulfate Concentrations

PREPARED FOR: Daniel Rodriguez/EPA

Wilmarie Rivera/PREQB Richard Henry/FWS

PREPARED BY: CH2M HILL, on behalf of the Navy

DATE: September 20, 2010

The purpose of this memorandum is to provide technical justification for conducting the first post-oxidant-injection groundwater sampling event at AOC I, in accordance with the original schedule (i.e., October 2010, approximately 7 months following injection), despite the presence of low levels of residual persulfate in several of the wells.

During the scoping for the *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), the team concurred that prior to conducting post-injection sampling, field testing for persulfate would be conducted to ensure oxidant is not collected in the samples. The first post-injection sampling event at AOC I is scheduled for October 2010, in accordance with the current Site Management Plan (SMP) schedule. In anticipation of this, on August 24, 2010, CH2M HILL collected groundwater samples for field analysis of persulfate in monitoring wells at AOC I. The following results were obtained:

Date	Well	Persulfate (ppm)
8/24/10	MW01	0
8/24/10	MW02	>70
8/24/10	MW03	49
8/24/10	MW04	>70
8/24/10	MW05	0
8/24/10	MW06	0
8/24/10	MW07	>70

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However, because the wells were not purged prior to collecting the samples, the wells showing positive persulfate results were re-sampled on August 27, 2010, following purging of approximately 1.5 to 2 well volumes. The following results were obtained:

Date	Well	Gallons Bailed	Well Volumes	Persulfate (ppm)
8/27/2010	MW02	6	1.5	14
8/27/2010	MW03	4.25	1.5	2.1
8/27/2010	MW04	5	1.5	1.4
8/27/2010	MW07	8.25	2	105

The above information was shared with FMC, Inc., the manufacturer of the sodium persulfate used as the oxidant at AOC I. As shown in the attached correspondence from FMC, concentrations of persulfate under 500 ppm are no longer reactive with contaminants. Thus, the persulfate remaining in groundwater, when below 500 ppm, will not alter the contaminant analytical results for groundwater samples. FMC stated that this finding is based on 10+ years of practice in the field, and that samples shipped to the laboratory should arrive with the same contaminant concentrations as when they left the field.

Furthermore, sodium persulfate was injected at a 20% by weight concentration in March 2010, and in August 2010 was detected at up to only 0.44 % by weight (105 ppm), evidence for considerable consumption or dilution in the subsurface.

Based on the above information, the Navy proposes that the groundwater sampling at AOC I in October 2010 proceed as planned. Following purging and prior to sampling, groundwater from each well will be field tested for persulfate to ensure the residual persulfate concentration is less than 500 ppm.

From: Julio Vazquez [Vazquez.Julio@epamail.epa.gov]

**Sent:** Tuesday, March 06, 2012 12:01 PM

To: Doerr, Brett/VBO

**Cc:** Angela Carpenter; Selcoe, Barrie/HOU; Hannah, Bill/VBO; Daniel Rodriguez;

daniel.r.hood@navy.mil; dan.waddill@navy.mil; Ballam, Dennis/VBO; Diana

Cutt; diane.wehner@noaa.gov; Felix Lopez@fws.gov;

fultoncom@fultoncom.com; jim@uxopro.com; Martin, John/GNV; Swenfurth,

John/TPA; Tomik, John/VBO; kevin.cloe@navy.mil;

KRutkowski@trcsolutions.com; madeline.rivera@navy.mil; Michael Sivak; Zamboni, Michael/WDC; Mindy Pensak; richard henry@fws.gov; Sergio Lopez;

Brand, Stephen/VBO; Struve, Susana/WDC; THall@TechLawInc.com; Garretson, Timothy/JAX; Wenk, Tim/VBO; Kappleman, William/WDC;

wilmarierivera@jca.pr.gov

**Subject:** Re: Vieques - February 2012 Draft Tech Sub Meeting Minutes; May 2012 Draft

Tech Sub Meeting Agenda; Consensus/Action Item Lists

#### Brett:

One of the items I was assigned to follow up for the subject meeting was the identification of the monitoring wells that should be sampled for the next two rounds for AOC I. After talking to Diana, she suggested we sample MW-04, MW-05 and MW-07, as they are the ones that had benzene concentrations initially exceeding criteria. Call me if you have any questions.

Julio F Vázquez, RPM U.S. EPA - Region 2 Special Projects Branch/ Federal Facilities Section New York



## Brand, Stephen/VBO

**Subject:** FW: First post-injection sampling event at west Vieques AOC I

From: Doerr, Brett/VBO

Sent: Thursday, September 30, 2010 9:16 AM

**To:** Swenfurth, John/TPA; Brand, Stephen/VBO; Hannah, Bill/VBO **Subject:** FW: First post-injection sampling event at west Viegues AOC I

From: Cutt.Diana@epamail.epa.gov [mailto:Cutt.Diana@epamail.epa.gov]

Sent: Thursday, September 30, 2010 10:09 AM

To: Doerr, Brett/VBO; Rodriguez.Daniel@epamail.epa.gov

Cc: WilmarieRivera@jca.qobierno.pr; Richard Henry@fws.gov; Sivak.Michael@epamail.epa.gov;

Pensak.Mindy@epamail.epa.gov; Diane.Wehner@noaa.gov; kevin.cloe@navy.mil; daniel.r.hood@navy.mil; Tomik,

John/VBO; madeline.rivera@navy.mil

**Subject:** RE: First post-injection sampling event at west Vieques AOC I

Just spoke to Scott Huling, EPA's in situ oxidation expert in Ada, OK. According to him, residual levels of persulfate even at the concentrations were are seeing at AOC I, can be a problem and continue to effect the contaminant concentrations in the sample. This has been the subject of much recent scrutiny and study by EPA. Although the assertation made by FMC is not necessarily a bad statement, it is leaving out such factors as: UV light, heat from the sun and a bigger issue - heating during analysis in the GS/MS headspace method. All of these factors can activate the persulfate in the sample container and effectively lower the containant concentrations (see Scott's note below).

### Scott's suggestions are:

- 1. wait to sample until no persulfate remains, or
- 2. add a preservative to the sample. He has successfully used ascorbic acid (4:1 acid:sample ratio).

Scott is available by phone or email to discuss further if need be. Thanks.

-Diana

Diana Cutt, P.G., Geologist EPA Region 2 ERRD/PSB/TST 290 Broadway NY, NY 10007 212-637-4311

Diana, attached is an abstract from a journal article that was submitted to a journal for publication. I believe Phil Block is generally correct in his letter, but there are conditions in which the persulfate residual in a ground water sample can be activated and can negatively impact the quality of the ground water sample that is not addressed in the memo. Specifically, one condition involves the method of analysis. The headspace method, used to analyze VOCs in different EPA methods, involves a heating step that will activate the persulfate. Even low concentrations of persulfate, i.e., < 500 mg/L, this will significantly impact the quality of the sample. Scott

Scott G. Huling, Ph.D., P.E. Environmental Engineer U.S. Environmental Protection Agency Robert S. Kerr Environmental Research Center P.O. Box 1198 (or, 919 Kerr Lab Drive) Ada, OK 74820

Phone: (580) 436-8610; Fax: (580) 436-8614

e-mail: Huling.Scott@epa.gov

website: http://www.epa.gov/ada/research.html



Environmental Industry Team Chemical Products Group 1735 Market St. Philadelphia, PA 19103

September 10, 2010

RE: Reactivity of Dilute Concentrations of Klozur® Persulfate

It is the experience of FMC over the past ten years that the minimum reactive concentration of sodium persulfate in groundwater is 0.5 g / L (500 ppm). Oxidative reaction rate is proportional to the concentration of the contaminant, the concentration of the oxidant and the concentration of the persulfate activator. At concentrations below this level, the effective reaction rate with contaminants of concern is essentially zero, and for all intents and purposes the oxidative reaction is complete. This is further impacted by the co-incident reduction in persulfate activator concentration.

Transportation of groundwater samples containing less than 500 ppm of persulfate should not occur further significant contaminant reduction in route to the laboratory, assuming the transportation time is not significant (less than a couple of days) and the sample is not exposed to a significant heat source. This can be further mitigated by shipment of the sample on ice.

Philip Block

Technology Manager - Remediation

**FMC** Corporation

# CH2MHILL TELEPHONE CONVERSATION RECORD

Call To: Diana Cutt/EPA Mike Zamboni/CH2M HILL Scott Huling/EPA Brett Doerr/CH2M HILL

Susanne Borchert/CH2M HILL

Phone No.: Date: October 04, 2010

Call From: Time:

Message

Taken By: Brett Doerr

**Subject:** Ascorbic acid additive to post-injection samples collected at AOC I

Based on a comment received from EPA regarding the proposal to move forward with the first post-injection sampling at AOC I despite the presence of low levels of residual persulfate in several wells, a conference call was held on Monday October 4, 2010 among the following:

Diana Cutt/EPA - Hydrogeology technical support for Vieques environmental restoration program

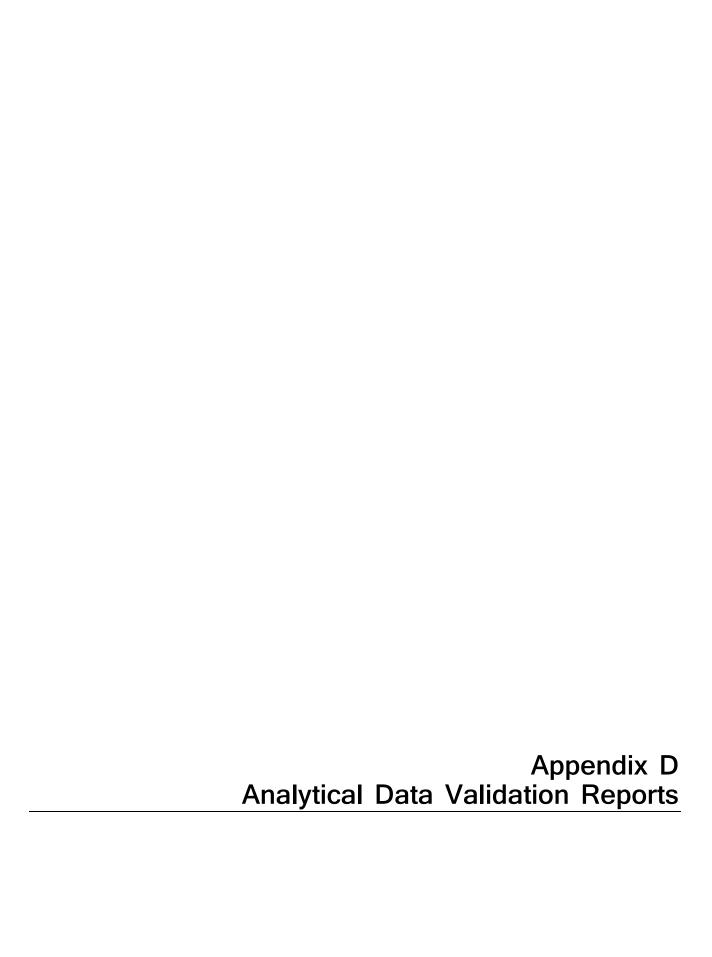
Scott Huling/EPA – research lead regarding in-situ chemical oxidation
Susanne Borchert/CH2M HILL – In-situ remediation technology expert
Mike Zamboni/CH2M HILL – Chemist for Vieques environmental restoration program
Brett Doerr/CH2M HILL – Vieques environmental restoration program lead

Based on research done by EPA, samples containing residual persulfate have shown decreases in VOC concentrations in the laboratory when analyzing VOCs using the GC method with the purge and trap process. EPA has found that adding sufficient ascorbic acid to the samples prevents the loss of VOCs because the persulfate preferentially oxidizes the ascorbic acid instead of the VOCs.

Therefore, the group concurred that sampling at AOC I should proceed as planned, with the sampling protocol modified to include the addition of ascorbic acid to the sample containers as a field preservative. Ascorbic acid will be added to the sample containers at a ratio of 4 moles of ascorbic acid (or greater) per mole of persulfate. Scott stated that having more than a 4:1 ratio of ascorbic acid:persulfate (at least up to 40:1 ratio per his research) does not negatively affect the VOC results. Persulfate measurements after purging and prior to sampling will be conducted to ensure sufficient ascorbic acid is added to each sample container for VOCs analysis.

Based on the above, CH2M HILL will proceed with the sampling event during the week of October 25, 2010. If anyone has any concerns or comments on the approach, please let us know by COB Friday October 8, 2010.

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# **DataQual**

## **Environmental Services, LLC**

CH2M HILL 3011 S.W. Williston Road Gainesville, FL 32608-3928

June 7, 2010 SDG# SJ0464, Mitkem Laboratories Vieques Island, Puerto Rico CTO-83 AOC E & AOC I

Dear Mr. Acaron,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # SJ0464. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Methods (8260B-Rev 2, January 2006- SOP #HW-24, 8270D-Rev 3 and October 2006-SOP #HW-22), and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the inorganic method in this SDG (SW-846 methods 6010B) or the organic methods used to assess the fuels (SW-846 8015G for gasoline and 8015\_TPH for diesel range organics). The Region II Standard Operating Procedure for the Evaluation of Metals Data for the CLP was used as applicable for the metals data. For the other fraction alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualifications is provided.

Sample ID	Lab ID	Matrix	VOA	SVOA	GRO	TPH	Fe, Mn
VWAE-MW03-0310	J0464-01	water	X	X	X	X	X
VWAE-EB01-031610	J0464-02	water	X	X	X	X	
VWAE-TB01-031610	J0464-03	water	X		X		
VWAE-MW05-0310	J0464-04	water	X	X	X	X	X
VWAE-MW04-0310	J0464-05	water	X	X	X	X	X
VWAE-MW4P-0310	J0464-06	water	X	X	X	X	
VWAE-EB01-031710	J0464-07	water	X	X	X	X	
VWAE-TB01-031710	J0464-08	water	X		X		
VWAE-MW01-0310	J0464-09	water	X	X	X	X	X
VWAI-MW02-0310	J0464-10	water	X	X			X
VWAI-MW05-0310	J0464-11	water	X	X			X
VWAI-EB01-031810	J0464-12	water	X	X			
VWAI-TB01-031810	J0464-13	water	X				
VWAI-MW03-0310	J0464-14	water	X	X			X
VWAI-MW03P-0310	J0464-15	water	X	X			
VWAI-MW4-0310	J0464-16	water	X	X			X
VWAI-EB01-031910	J0464-17	water	X	X			
VWAI-TB01-031910	J0464-18	water	X				
VWAI-EB01-032210	J0464-20	water	X	X			
VXAI-TB01-032210	J0464-21	water	X				
VWAI-MW07-0310	J0464-22	water	X	X			X
VWAE-MW03-0310MS	J0464-01MS	water	X	X	X	X	X
VWAE-MW03-0310MSD	J0464-01MSD	water	X	X	X	X	X
VWAI-MW02-0310MS	J0464-10MS	water		X			
VWAI-MW02-0310MSD	J0464-10MSD	water		X			

The following quality control samples were provided with this SDG: samples VWAE-TB01-031610, VWAE-TB01-031710, VWAI-TB01-031810, VWAI-TB01-031910 and VXAI-TB01-032210-trip blanks; samples VWAE-EB01-031610, VWAE-EB01-031710, VWAI-EB01-031810, VWAI-EB01-031910 and VWAI-EB01-032210-equipment blanks; sample VWAE-MW4P-0310-field duplicate of sample VWAE-MW4-0310; and sample VWAI-MW03P-0310-field duplicate of sample VWAI-MW03-0310.

The samples were evaluated based on the following criteria:

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

<sup>\* -</sup> 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

One sample required a dilution to obtain results within the calibration range.

## **SVOA**

No qualifications to the data were required.

## **GRO**

One of the associated rinse blanks exhibited contamination for GRO. One field sample required qualification.

## **TPH**

No qualifications to the data were required.

# Select Metals

The laboratory did not analyze a CRI standard for the analyte manganese as required. The analyte was flagged as estimated for reported concentrations <2X RL.

# Specific Evaluation of Data

### **Data Completeness**

The SDG was received complete and intact. Resubmissions were not required. Clarification of gasoline calculation was requested from the laboratory. A copy of the email correspondence is included in the validation worksheets section of this report.

## **Technical Holding Times**

According to chain of custody records, sampling was performed on 3/16-22/10 and samples were received at the laboratory 3/17-23/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

## **CRI Standards**

## Select Metals

The laboratory did not analyze a CRI standard for the analyte manganese. All positive results were above the action level of 2X the reporting limit. The reported non-detect result for manganese in sample VWAE-W03-0310 was qualified as estimated UJ with a qualifier code of OT.

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#### Blanks

#### **GRO**

One of the rinse blanks associated with samples in this SDG exhibited contamination for gasoline range organics. Specific information on the contamination is noted in the following table.

Blank ID	Compound	Concentration	Action Level	Q Flag
VWAE-EB01-031610	GRO	110 ug/L	blank level	U

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

Sample ID	Compound	Q Flag	Q Code
VWAE-MW03-0310	GRO	U	EBL

## Identification/Quantitation

## **VOA**

A dilution was required for sample VWAE-MW05-0310 to obtain results within the calibration range. Therefore, E-flagged compound results were not used in the initial analysis of this sample in favor of the corresponding D-flagged compound result in the dilution, 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

Vice President

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# **Summary of Data Qualifications**

# **VOA**

Sample ID	Compound	Results	Q flag	Q Code
VWAE-MW05-0310	all E-flagged results	+	R	DL
VWAE-MW05-0310DL	all compound except D-flagged	+/-	R	DL
	results			-

# **SVOA**

Sample ID	Compound	Results	Q flag	Q Code
No qualifications				

# **GRO**

Sample ID	Compound	Results	Q flag	Q Code
VWAE-MW03-0310	GRO	+	U	EBL

# **DRO**

Sample ID	Compound	Results	Q flag	Q Code
No qualifications				

# Select Metals

Sample ID	Analyte	Results	Q flag	Q Code
VWAE-MW03-0310	manganese		UJ	OT

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# Glossary of Qualification Flags and Abbreviations

### Qualification Flags (Q-Flags)

U ne	ot detected	above	the reported	sample	quantitation	limit
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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

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.

## **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.

<sup>\*</sup> 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.

# Glossary of Qualification Flags and Abbreviations, continued

- R Sample result is greater than the RL and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the RL.
- J Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the RL.
- J/UJ Sample result is less than 10X RL when blank result is below the negative RL.

## Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

- No Action The sample result is greater than the RL and greater than ten times (10X) the blank value.
- U The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the 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.

## **General Abbreviations**

RL	reporting limit
PQL	practical quantitation limit
IDL	instrument detection limit
MDL	method detection limit
CRDL	contract required detection limit
CRQL	contract required quantitation limit
+	positive result
- %	non-detect result

<sup>\*</sup> 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.

<sup>\*</sup> 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.

# 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
Ml	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
ССН	Continuing Calibration - High Recovery or %Difference
LD	Lab Duplicate Reproducibility
НТ	Holding Time
PD	Pesticide Degradation
2C	Second Column - Poor Dual Column Reproducibility
LR	Concentration Exceeds Linear Range
BL	Blank Contamination
RE	Redundant Result - due to Re-analysis or Re-extraction
DL	Redundant Result - due to Dilution
FD	Field Duplicate
ОТ	Other - explained in data validation report
%SOL	High moisture content

CLIENT SAMPLE NO. VWAE-MW03-0310

Lab Name: MITKEM LABORAT	TORIES		Contract:	
Lab Code: MITKEM	Case No.:	J0464	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER)	WATER		Lab Sample ID:	J0464-01A
Sample wt/vol: 5.0	0 (g/mL)	ML	Lab File ID:	V2L4989.D
Level: (TRACE/LOW/MED)	LOW		Date Received:	03/17/2010
% Moisture: not dec.			Date Analyzed:	03/22/2010
GC Column: DB-624	ID:	0.25 (r	nm) Dilution Factor:	1.0
Soil Extract Volume:		(1	L) Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0		(1	nL)	

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
1634-04-4	Methyl tert-butyl ether	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
1330-20-7	Xylene (Total)	5.0	U

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CLIENT SAMPLE NO. VWAE-EB01-031610

Lab Name: MITKEM LABOR	ATORIES			Contract:	
Lab Code: MITKEM	Case No.:	J0464		Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER	R) WATER			Lab Sample ID:	J0464-02A
Sample wt/vol: 5.	00 (g/mL)	ML		Lab File ID:	V2L4990.D
Level: (TRACE/LOW/MED)	LOW			Date Received:	03/17/2010
% Moisture: not dec.	8		· · · · · · · · · · · · · · · · · · ·	Date Analyzed:	03/22/2010
GC Column: DB-624	ID:	0.25	(mm)	Dilution Factor:	1.0
Soil Extract Volume:			(uL)	Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0			(mL)		

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
1634-04-4	Methyl tert-butyl ether	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
1330-20-7	Xylene (Total)	5.0	U

Moralo

CLIENT SAMPLE NO. VWAE-TB01-031610

Lab Name: MITKEM LABOR	ATORIES		Contract:	
Lab Code: MITKEM	Case No.:	J0464	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER	WATER	8	Lab Sample ID:	J0464-03A
Sample wt/vol: 5.	00 (g/mL)	ML	Lab File ID:	V2L4987.D
Level: (TRACE/LOW/MED)	LOW		Date Received:	03/17/2010
% Moisture: not dec.			Date Analyzed:	03/22/2010
GC Column: DB-624	ID:	0.25 (mm)	Dilution Factor:	1.0
Soil Extract Volume:		(uL)	Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0		(mL)		

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
1634-04-4	Methyl tert-butyl ether	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
1330-20-7	Xylene (Total)	5.0	U



CLIENT SAMPLE NO. VWAE-MW05-0310

Lab Name: MITKEM LABORATORIES Contract: Lab Code: MITKEM Case No.: J0464 Mod. Ref No.: SDG No.: SJ0464 Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: J0464-04A Lab File ID: Sample wt/vol: 5.00 (g/mL) ML V2L4991.D Level: (TRACE/LOW/MED) LOW Date Received: 03/18/2010 % Moisture: not dec. Date Analyzed: 03/22/2010 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 UNITS: (ug/L or ug/Kg) µG/L	Q
1634-04-4	Methyl tert-butyl ether	340	E
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	4.5	J
1330-20-7	Xylene (Total)	5.0	U

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CLIENT SAMPLE NO.
VWAE-MW05-0310DL

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J0464	Mod. Ref No.: SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-04ADL
Sample wt/vol: 5.00 (g/mL) ML	Lab File ID: V2L5281.D
Level: (TRACE/LOW/MED) LOW	Date Received: 03/18/2010
% Moisture: not dec.	Date Analyzed: 04/01/2010
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 UNITS: (ug/L or ug/Kg) µG/L	Q	
1634-04-4	Methyl tert-butyl ether	520	8	- 1 -
107-06-2	1,2-Dichloroethane	25	U	R, DL
71-43-2	Benzene	25	T .	1'
1330-20-7	Xylene (Total)	25	Ų.	V

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CLIENT	SAMPLE	NO.
VWAE-M	W04-031	0

Lab Name: MITKEM LABORATORIES	Contract:	
Lab Code: MITKEM Case No.: JO	Mod. Ref No.: SDG No.: SJ0464	
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-05A	
Sample wt/vol: 5.00 (g/mL) MI	Lab File ID: V2L5199.D	
Level: (TRACE/LOW/MED) LOW	Date Received: 03/18/2010	
% Moisture: not dec.	Date Analyzed: 03/30/2010	
GC Column: DB-624 ID: 0.	0.25 (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) µG/L	Q
1634-04-4	Methyl tert-butyl ether	130	
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
1330-20-7	Xylene (Total)	5.0	U

More

CLIENT SAMPLE NO.

VWAE-MW4P-0310

Lab Name: MITKEM LABOR	ATORIES		Contract:	
Lab Code: MITKEM	Case No.: <u>J0464</u>		Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER	WATER		Lab Sample ID:	J0464-06A
Sample wt/vol: 5.	00 (g/mL) ML		Lab File ID:	V2L4993.D
Level: (TRACE/LOW/MED)	LOM		Date Received:	03/18/2010
% Moisture: not dec.			Date Analyzed:	03/22/2010
GC Column: DB-624	ID: 0.25	(mm)	Dilution Factor:	1.0
Soil Extract Volume:		(uL)	Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0		(mL)		

CAS NO.	COMPOUND	(ug/L or ug/Kg) µg/L	Q
1634-04-4	Methyl tert-butyl ether	96	
107-06-2 1,2-Dichloroethane		5.0	U
71-43-2 Benzene		5.0	U
1330-20-7	Xylene (Total)	5.0	U

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CLIENT SAMPLE NO. VWAE-EB01-031710

Lab Name: MITKEM LABORATORIES		Contract:	
Lab Code: MITKEM Case No.: J0464		Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER		Lab Sample ID:	J0464-07A
Sample wt/vol:5.00 (g/mL) ML		Lab File ID:	V2L4994.D
Level: (TRACE/LOW/MED) LOW	) j	Date Received:	03/18/2010
% Moisture: not dec.	## ## ## ## ## ## ## ## ## ## ## ## ##	Date Analyzed:	03/22/2010
GC Column: DB-624 ID: 0.25	(mm)	Dilution Factor:	1.0
Soil Extract Volume:	(uL)	Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0	(mL)		

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
1634-04-4	Methyl tert-butyl ether	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
1330-20-7	Xylene (Total)	5.0	Ü

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CLIENT SAMPLE NO.
VWAE-TB01-031710

Lab Name: MITKEM LABOR	RATORIES		Contract:	
Lab Code: MITKEM	Case No.: J	0464	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATE	R) WATER		Lab Sample ID:	J0464-08A
Sample wt/vol: 5	.00 (g/mL) M	I,	Lab File ID:	V2L4995.D
Level: (TRACE/LOW/MED)	LOW		Date Received:	03/18/2010
% Moisture: not dec.		-11-21	Date Analyzed:	03/22/2010
GC Column: DB-624	ID: 0	.25 (mm)	Dilution Factor:	1.0
Soil Extract Volume:		(uL)	Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0		(mL)		

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
1634-04-4	Methyl tert-butyl ether	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
1330-20-7	Xylene (Total)	5.0	U

Morio

CLIENT SAMPLE NO.

VWAE-MW01-0310

Lab Name: MITKEM LABOR	ATORIES		Contract:	
Lab Code: MITKEM	Case No.:	J0464	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER	WATER	· ·	Lab Sample ID:	J0464-09A
Sample wt/vol: 5.	00 (g/mL)	ML	Lab File ID:	V2L4996.D
Level: (TRACE/LOW/MED)	LOW		Date Received:	03/18/2010
% Moisture: not dec.	2 <u></u>		Date Analyzed:	03/22/2010
GC Column: DB-624	ID:	0.25 (mm)	Dilution Factor:	1.0
Soil Extract Volume:		(uL)	Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0		(mL)		

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
1634-04-4	Methyl tert-butyl ether	120	
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	6.4	
1330-20-7	Xylene (Total)	5.0	U

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CLIENT SAMPLE NO. VWAI-MW02-0310

Lab Name: MITKEM LABOR	RATORIES		Contract:	
Lab Code: MITKEM	Case No.:	J0464	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATE	R) WATER		Lab Sample ID:	J0464-10A
Sample wt/vol: 5	.00 (g/mL)	ML	Lab File ID:	V2L4997.D
Level: (TRACE/LOW/MED)	LOW		Date Received:	03/19/2010
% Moisture: not dec.			Date Analyzed:	03/22/2010
GC Column: DB-624	ID:	0.25 (mm)	Dilution Factor:	1.0
Soil Extract Volume:		(uL)	Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0		(mL)		

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U

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CLIENT SAMPLE NO. VWAI-MW05-0310

Lab Name: MITKEM LABORATO	DRIES	Contract:	
Lab Code: MITKEM Ca	ase No.: <u>J0464</u>	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER)	WATER	Lab Sample ID:	J0464-11A
Sample wt/vol: 5.00	(g/mL) ML	Lab File ID:	V2L4998.D
Level: (TRACE/LOW/MED) LC	WC	Date Received:	03/19/2010
% Moisture: not dec.		Date Analyzed:	03/22/2010
GC Column: DB-624	ID: 0.25 (r	nm) Dilution Factor:	1.0
Soil Extract Volume:	(1	ıL) Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0	(n	nL)	

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U

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CLIENT SAMPLE NO.

VWAI-EB01-031810

Lab Name: MITKEM LABOR	ATORIES	Contract:	
Lab Code: MITKEM	Case No.: J0464	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER	) WATER	Lab Sample ID:	J0464-12A
Sample wt/vol: 5.	00 (g/mL) ML	Lab File ID:	V2L4999.D
Level: (TRACE/LOW/MED)	LOW	Date Received:	03/19/2010
% Moisture: not dec.		Date Analyzed:	03/22/2010
GC Column: DB-624	ID: 0.25	(mm) Dilution Factor:	1.0
Soil Extract Volume:		(uL) Soil Aliquot Volu	ume: (uL)
Purge Volume: 5.0		(mL)	

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U

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CLIENT SAMPLE NO. VWAI-TB01-031810

Lab Name: MITKEM LABORATORIES	Contract:	
Lab Code: MITKEM Case No.: J	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID:	J0464-13A
Sample wt/vol: 5.00 (g/mL) M	IL Lab File ID:	V2L4988.D
Level: (TRACE/LOW/MED) LOW	Date Received:	03/19/2010
% Moisture: not dec.	Date Analyzed:	03/22/2010
GC Column: DB-624 ID: 0	.25 (mm) Dilution Factor	1.0
Soil Extract Volume:	(uL) Soil Aliquot Vol	Lume: (uL)
Purge Volume: 5.0	(mL)	

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U

Morto

CLIENT SAMPLE NO. WVWAI-MW03-0310

Lab Name: MITKEM LABORATORIES		Contract:	
Lab Code: MITKEM Case No	.: J0464	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATE	3	Lab Sample ID:	J0464-14A
Sample wt/vol:5.00 (g/m	L) ML	Lab File ID:	V2L5000.D
Level: (TRACE/LOW/MED) LOW		Date Received:	03/20/2010
% Moisture: not dec.		Date Analyzed:	03/22/2010
GC Column: DB-624	D: 0.25 (mm)	Dilution Factor:	1.0
Soil Extract Volume:	(uL)	Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0	(mL)		

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U

CLIENT SAMPLE NO. VWAI-MW03P-0310

Lab Name: MITKEM LABORATO	RIES			Contract:	
Lab Code: MITKEM Ca	se No.:	J0464		Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER)	WATER	- 14		Lab Sample ID:	J0464-15A
Sample wt/vol: 5.00	(g/mL)	ML		Lab File ID:	V2L5001.D
Level: (TRACE/LOW/MED) LO	W			Date Received:	03/20/2010
% Moisture: not dec.				Date Analyzed:	03/22/2010
GC Column: DB-624	ID:	0.25	(mm)	Dilution Factor:	1.0
Soil Extract Volume:			(uL)	Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0			(mL)		

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U



CLIENT	SAMPLE	NO.
VWAI-M	W4-0310	

Lab Name: MITKEM LABOR	ATORIES		Contract:	
Lab Code: MITKEM	Case No.:	J0464	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER	WATER		Lab Sample ID:	J0464-16A
Sample wt/vol: 5.	00 (g/mL)	ML	Lab File ID:	V2L5002.D
Level: (TRACE/LOW/MED)	LOW	Ko.	Date Received:	03/20/2010
% Moisture: not dec.			Date Analyzed:	03/22/2010
GC Column: DB-624	ID:	0.25 (mm	) Dilution Factor:	1.0
Soil Extract Volume:		(uL	) Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0		(mL	)	

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U

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CLIENT SAMPLE NO. VWAI-EB01-031910

Lab Name: MITKEM LABOR	VATORIES		Contract:	
Lab Code: MITKEM	Case No.: J0464		Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER	R) WATER		Lab Sample ID:	J0464-17A
Sample wt/vol: 5.	.00 (g/mL) ML		Lab File ID:	V1L2328.D
Level: (TRACE/LOW/MED)	LOW		Date Received:	03/20/2010
% Moisture: not dec.			Date Analyzed:	04/02/2010
GC Column: DB-624	ID: 0.25	(mm)	Dilution Factor:	1.0
Soil Extract Volume:	300, 111-111-30	(uL)	Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0		(mL)		

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U.
78-87-5	1,2-Dichloropropane	5.0	U



CLIENT SAMPLE NO. VWAI-TB01-031910

Lab Name: MITKEM LABORATORIES Contract: SDG No.: SJ0464 Lab Code: MITKEM Case No.: J0464 Mod. Ref No.: Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: J0464-18A Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V2L5003.D Level: (TRACE/LOW/MED) LOW Date Received: 03/20/2010 Date Analyzed: 03/22/2010 % Moisture: not dec. ID: 0.25 (mm) Dilution Factor: 1.0 GC Column: DB-624 Soil Extract Volume: (uL) Soil Aliquot Volume: (uL) Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µg/L	Q
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U



CLIENT SAMPLE NO. VWAI-EB01-032210

Lab Name: MITKEM LABORATORIES Contract: SDG No.: SJ0464 Lab Code: MITKEM Case No.: J0464 Mod. Ref No.: Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: J0464-20A Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V1L2329.D Date Received: 03/20/2010 Level: (TRACE/LOW/MED) LOW Date Analyzed: 04/02/2010 % Moisture: not dec. ID: 0.25 (mm) Dilution Factor: 1.0 GC Column: DB-624 Soil Extract Volume: (uL) Soil Aliquot Volume: (uL) Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µg/L	Q
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U

CLIENT SAMPLE NO.

VXAI-TB01-032210

Lab Name: MITKEM LABORA	ATORIES		Contract:	
Lab Code: MITKEM	Case No.: J0464		Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER	) WATER		Lab Sample ID:	J0464-21A
Sample wt/vol: 5.	00 (g/mL) ML		Lab File ID:	V2L5291.D
Level: (TRACE/LOW/MED)	LOW		Date Received:	03/20/2010
% Moisture: not dec.			Date Analyzed:	04/01/2010
GC Column: DB-624	ID: 0.25	(mm)	Dilution Factor:	1.0
Soil Extract Volume:		(uL)	Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0		(mL)		

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U

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CLIENT	SAMPLE	NO
-	CONTRACTOR NOT TO BE	_

VWAI-MW07-0310

Lab Name: MITKEM LABORA	ATORIES		Contract:	
Lab Code: MITKEM	Case No.: JO	0464	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER	) WATER		Lab Sample ID:	J0464-22A
Sample wt/vol: 5.	00 (g/mL) MI		Lab File ID:	V1L2330.D
Level: (TRACE/LOW/MED)	LOW		Date Received:	03/23/2010
% Moisture: not dec.			Date Analyzed:	04/02/2010
GC Column: DB-624	ID: 0.	.25 (mm)	Dilution Factor:	1.0
Soil Extract Volume:		(uL)	Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0		(mL)		

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
107-06-2	1,2-Dichloroethane	5.0	U
71-43-2	Benzene	14	
78-87-5	1,2-Dichloropropane	5.0	U

CLIENT SAMPLE NO.

VWAE-MW03-0310MS

Lab Name: MITKEM LABORA	TORIES		Contract:	
Lab Code: MITKEM	Case No.: <u>J0464</u>		Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER)	WATER		Lab Sample ID:	J0464-01AMS
Sample wt/vol: 5.0	0 (g/mL) ML		Lab File ID:	V2L5004.D
Level: (TRACE/LOW/MED)	LOW		Date Received:	03/17/2010
% Moisture: not dec.			Date Analyzed:	03/22/2010
GC Column: DB-624	ID: 0.25	(mm)	Dilution Factor:	1.0
Soil Extract Volume:		(uL)	Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0		(mL)		

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µg/L	Q
1634-04-4	Methyl tert-butyl ether	54	
107-06-2	1,2-Dichloroethane	53	
71-43-2	Benzene	58	
1330-20-7	Xylene (Total)	170	

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CLIENT	SAMPLE	NO.
VWAE-M	W03-031	OMS

Lab Name: MITKEM LABOR	ATORIES		Contract:	
Lab Code: MITKEM	Case No.: J046	64	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER	) WATER		Lab Sample ID:	J0464-01AMSD
Sample wt/vol: 5.	00 (g/mL) ML		Lab File ID:	V2L5005.D
Level: (TRACE/LOW/MED)	LOW		Date Received:	03/17/2010
% Moisture: not dec.			Date Analyzed:	03/22/2010
GC Column: DB-624	ID: 0.25	5 (mm)	Dilution Factor:	1.0
Soil Extract Volume:		(uL)	Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0		(mL)		

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
1634-04-4	Methyl tert-butyl ether	49	
107-06-2	1,2-Dichloroethane	47	
71-43-2	Benzene	51	
1330-20-7	Xylene (Total)	150	

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CLIENT SAMPLE NO.

VWAE-MW03-0310

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J0464	Mod. Ref No.: SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-01E
Sample wt/vol: 1000 (g/mL) ML	Lab File ID: S3G3654.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 03/17/2010
Concentrated Extract Volume: 1000 (uL)	Date Extracted: 03/23/2010
Injection Volume:1.0 (uL) GPC Factor:1.00	Date Analyzed: 03/26/2010
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L Q
91-20-3 Naphthalene	1.0 U



91-57-6 2-Methylnaphthalene

CLIENT SAMPLE NO. VWAE-EB01-031610

Lab Name: MIT	KEM LABORATOR	IES	Contract:	7
Lab Code: MIT	KEM Cas	se No.: <u>J0464</u>	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/	SED/WATER)	WATER	Lab Sample ID:	J0464-02B
Sample wt/vol:	1000	(g/mL) <u>ML</u>	Lab File ID:	S3G3657.D
Level: (LOW/ME	D) LOW		Extraction: (Typ	pe) SEPF
% Moisture:	Deca	nted: (Y/N)	Date Received:	03/17/2010
Concentrated E	xtract Volume	: 1000 (uL)	Date Extracted:	03/23/2010
Injection Volum	me:(uL	) GPC Factor: 1.00	Date Analyzed:	03/26/2010
GPC Cleanup: (Y	/N) <u>N</u>	pH:	Dilution Factor:	1.0
CAS NO. C	OMPOUND		CONCENTRATIO (ug/L or ug/	
91-20-3 Na	phthalene	<del>,</del>		1.0 U
91-57-6 2-1	Methylnaphtha	lene		1 0 []

CLIENT	SAMPLE	NO.
VWAE-M	W05-031	0

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J0464	Mod. Ref No.: SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-04E
Sample wt/vol: 1000 (g/mL) ML	Lab File ID: S3G3661.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 03/18/2010
Concentrated Extract Volume: 1000 (uL)	Date Extracted: 03/24/2010
Injection Volume: 1.0 (uL) GPC Factor: 1.00	Date Analyzed: 03/26/2010
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L Q
91-20-3 Naphthalene	13
91-57-6 2-Methylnaphthalene	5.8



CLIENT	SAMPLE	NO.
VWAE-M	W04-031	0

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J0464	Mod. Ref No.: SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-05E
Sample wt/vol: 1000 (g/mL) ML	Lab File ID: S3G3662.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 03/18/2010
Concentrated Extract Volume: 1000 (uL)	Date Extracted: 03/24/2010
Injection Volume:1.0 (uL) GPC Factor:	Date Analyzed: 03/26/2010
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L Q
91-20-3 Naphthalene	1.0 U
01-57-6 2-Methylpanhthalene	1 0 11



CLIENT	SAMPLE	NO.
VWAE-M	W4P-031	0

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J0464	Mod. Ref No.: SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-06B
Sample wt/vol: 1000 (g/mL) ML	Lab File ID: S3G3663.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 03/18/2010
Concentrated Extract Volume: 1000 (uL	Date Extracted: 03/24/2010
Injection Volume:1.0 (uL) GPC Factor:1.00	Date Analyzed: 03/26/2010
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L Q
91-20-3 Naphthalene	1.0 U
91-57-6 2-Methylnaphthalene	1.0 [1]



CLIENT SAMPLE NO.
VWAE-EB01-031710

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J0464	Mod. Ref No.: SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-07B
Sample wt/vol:1000 (g/mL) ML	Lab File ID: S3G3664.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 03/18/2010
Concentrated Extract Volume: 1000 (uL)	Date Extracted: 03/24/2010
Injection Volume: 1.0 (uL) GPC Factor: 1.00	Date Analyzed: 03/26/2010
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L Q
91-20-3 Naphthalene	1.0 U
91-57-6 2-Methylnaphthalene	1.0 U

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CLIENT SAMPLE NO. VWAE-MW01-0310

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J0464	Mod. Ref No.: SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-09E
Sample wt/vol: 1000 (g/mL) ML	Lab File ID: S3G3665.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 03/18/2010
Concentrated Extract Volume: 1000 (uL)	Date Extracted: 03/24/2010
Injection Volume: 1.0 (uL) GPC Factor: 1.00	Date Analyzed: 03/26/2010
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L Q
91-20-3 Naphthalene	6.6
91-57-6 2-Methylnaphthalene	8.0



CLIENT SAMPLE NO. VWAI-MW02-0310

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Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J0464	Mod. Ref No.: SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-10E
Sample wt/vol: 1000 (g/mL) ML	Lab File ID: S3G3668.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 03/19/2010
Concentrated Extract Volume: 1000 (uL)	Date Extracted: 03/25/2010
Injection Volume: 1.0 (uL) GPC Factor: 1.00	Date Analyzed: 03/26/2010
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L Q
91-20-3 Naphthalene	1.0 U



91-57-6 2-Methylnaphthalene

117-81-7 Bis(2-ethylhexyl)phthalate

CLIENT	SAMPLE	NO.
VWAI-M	W05-031	0

Lab Name: MITKEM LABORATORIES		Contract:	
Lab Code: MITKEM Case No.:	J0464 M	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	I	Lab Sample ID:	J0464-11E
Sample wt/vol:1000 (g/mL)	ML I	Lab File ID:	\$3G3671.D
Level: (LOW/MED) LOW	E	Extraction: (Typ	e) SEPF
% Moisture: Decanted: (Y	(/N)	Date Received:	03/19/2010
Concentrated Extract Volume:	1000 (uL) D	Date Extracted:	03/25/2010
Injection Volume: 1.0 (uL) GPC Fac	ctor: 1.00 D	Date Analyzed:	03/27/2010
GPC Cleanup: (Y/N) N pH:		Dilution Factor:	1.0
CAS NO. COMPOUND		CONCENTRATION (ug/L or ug/l	
91-20-3 Naphthalene			1.0 U
91-57-6 2-Methylnaphthalene			3.0
117-81-7 Bis(2-ethylhexyl)phthal	Late		1.4 J



CLIENT SAMPLE NO.
VWAI-EB01-031810

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J0464	Mod. Ref No.: SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-12B
Sample wt/vol: 1000 (g/mL) ML	Lab File ID: S3G3672.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 03/19/2010
Concentrated Extract Volume: 1000 (uL)	Date Extracted: 03/25/2010
Injection Volume: 1.0 (uL) GPC Factor: 1.00	Date Analyzed: 03/27/2010
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0

CAS NO.	COMPOUND	(ug/L or ug/Kg)	ITS: μG/L	Q
91-20-3	Naphthalene		1.0	U
91-57-6	2-Methylnaphthalene		1.0	U
117-81-7	Bis(2-ethylhexyl)phthalate		5.0	U

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CLIENT SAMPLE NO. WVWAI-MW03-0310

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J0464	Mod. Ref No.: SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-14E
Sample wt/vol: 1000 (g/mL) ML	Lab File ID: S3G3737.D
Level: (LOW/MED) LOW	Extraction: (Type) CONT
% Moisture: Decanted: (Y/N)	Date Received: 03/20/2010
Concentrated Extract Volume: 1000 (uL	Date Extracted: 03/26/2010
Injection Volume: 1.0 (uL) GPC Factor: 1.00	Date Analyzed: 03/30/2010
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
91-20-3	Naphthalene	1.0	U
91-57-6	2-Methylnaphthalene	1.0	Ü
117-81-7	Bis(2-ethylhexyl)phthalate	5.0	U

CLIENT SAMPLE NO.

VWAI-MW03P-0310

1.0

1.0

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Lab Name: N	MITKEM LABORATORIES	Contract:	
Lab Code: M	MITKEM Case No.: J0464	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SO	IL/SED/WATER) WATER	Lab Sample ID:	J0464-15B
Sample wt/vo	ol: 1000 (g/mL) ML	Lab File ID:	S3G3738.D
Level: (LOW,	/MED) LOW	Extraction: (Typ	e) CONT
% Moisture:	Decanted: (Y/N)	Date Received:	03/20/2010
Concentrated	d Extract Volume: 1000 (uL	) Date Extracted:	03/26/2010
Injection Vo	olume: 1.0 (uL) GPC Factor: 1.00	Date Analyzed:	03/30/2010
GPC Cleanup:	(Y/N) N pH:	Dilution Factor:	1.0
CAS NO.	COMPOUND	CONCENTRATION (ug/L or ug/l	

M 040210

91-20-3 Naphthalene

91-57-6 2-Methylnaphthalene

117-81-7 Bis(2-ethylhexyl)phthalate

CLIENT SAMPLE NO. VWAI-MW4-0310

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J0464	Mod. Ref No.: SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-16E
Sample wt/vol: 1000 (g/mL) ML	Lab File ID: S3G3739.D
Level: (LOW/MED) LOW	Extraction: (Type) CONT
% Moisture: Decanted: (Y/N)	Date Received: 03/20/2010
Concentrated Extract Volume: 1000 (uL)	Date Extracted: 03/26/2010
Injection Volume:1.0 (uL) GPC Factor:1.00	Date Analyzed: 03/30/2010
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UN (ug/L or ug/Kg)		Q
91-20-3	Naphthalene		1.0	U
91-57-6	2-Methylnaphthalene		1.0	U
117-81-7	Bis(2-ethylhexyl)phthalate		5.0	U

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CLIENT SAMPLE NO. VWAI-EB01-031910

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J0464	Mod. Ref No.: SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-17B
Sample wt/vol: 1000 (g/mL) ML	Lab File ID: S3G3740.D
Level: (LOW/MED) LOW	Extraction: (Type) CONT
% Moisture: Decanted: (Y/N)	Date Received: 03/20/2010
Concentrated Extract Volume: 1000 (uL)	Date Extracted: 03/26/2010
Injection Volume: 1.0 (uL) GPC Factor: 1.00	Date Analyzed: 03/30/2010
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS	S: G/L	Q
91-20-3	Naphthalene	1	.0	U
91-57-6	2-Methylnaphthalene	1	.0	U
117-81-7	Bis(2-ethylhexyl)phthalate	5	.0	U.

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CLIENT SAMPLE NO. VWAI-EB01-032210

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J0464	Mod. Ref No.: SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-20B
Sample wt/vol:1000 (g/mL) ML	Lab File ID: S3G3741.D
Level: (LOW/MED) LOW	Extraction: (Type) CONT
% Moisture: Decanted: (Y/N)	Date Received: 03/23/2010
Concentrated Extract Volume: 1000	(uL) Date Extracted: 03/26/2010
Injection Volume: 1.0 (uL) GPC Factor: 1	.00 Date Analyzed: 03/30/2010
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0
	TOO MADE A MERCHANISMO

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
91-20-3	Naphthalene	1.0	U
91-57-6	2-Methylnaphthalene	1.0	U
117-81-7	Bis(2-ethylhexyl)phthalate	1.2	J

CLIENT	SAMPLE	NO.
VWAI-M	W07-031	0

Lab Name: N	MITKEM LABORATORIES	Contract:	
Lab Code: N	MITKEM Case No.: J0464	Mod. Ref No.:	SDG No.: SJ0464
Matrix: (SO	IL/SED/WATER) WATER	Lab Sample ID:	J0464-22E
Sample wt/vo	ol: 1000 (g/mL) ML	Lab File ID:	S3G3742.D
Level: (LOW,	/MED) LOW	Extraction: (Typ	ce) CONT
% Moisture:	Decanted: (Y/N)	Date Received:	03/23/2010
Concentrated	d Extract Volume: 1000 (uL)	Date Extracted:	03/26/2010
Injection Vo	olume: 1.0 (uL) GPC Factor: 1.00	Date Analyzed:	03/30/2010
GPC Cleanup:	:(Y/Y):	Dilution Factor:	1.0
CAS NO.	COMPOUND	CONCENTRATIO	
91-20-3	Naphthalene		21
91-57-6	2-Methylnaphthalene		17
117-81-7	Bis(2-ethylhexyl)phthalate		5.0 U



CLIENT SAMPLE NO.

VWAE-MW03-0310MS

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J0464	Mod. Ref No.: SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-01EMS
Sample wt/vol: 1000 (g/mL) ML	Lab File ID: S3G3655.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 03/17/2010
Concentrated Extract Volume: 1000 (uL)	Date Extracted: 03/23/2010
<pre>Injection Volume: 1.0 (uL) GPC Factor:</pre>	Date Analyzed: 03/26/2010
GPC Cleanup:(Y/N) N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L Q
91-20-3 Naphthalene	41

91-57-6 2-Methylnaphthalene

CLIENT	SAMPLE	NO.
VWAE-M D	W03-031	0MS

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J0464	Mod. Ref No.: SDG No.: SJ0464
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J0464-01EMSD
Sample wt/vol: 1000 (g/mL) ML	Lab File ID: S3G3656.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 03/17/2010
Concentrated Extract Volume: 1000 (uL)	Date Extracted: 03/23/2010
Injection Volume: 1.0 (uL) GPC Factor: 1.00	Date Analyzed: 03/26/2010
GPC Cleanup:(Y/N) N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L Q
91-20-3 Naphthalene	31
91-57-6 2-Methylnaphthalene	30



CLIENT SAMPLE NO.

VWAI-MW02-0310MS

IES	Contract:	
e No.: <u>J0464</u>	Mod. Ref No.:	SDG No.: SJ0464
ATER	Lab Sample ID:	J0464-10EMS
g/mL) ML	Lab File ID:	S3G3669.D
(6)	Extraction: (Typ	e) SEPF
nted: (Y/N)	Date Received:	03/19/2010
: 1000 (uL)	Date Extracted:	03/25/2010
GPC Factor: 1.00	Date Analyzed:	03/26/2010
pH:	Dilution Factor:	1.0
	MATER  g/mL) ML  nted: (Y/N)  : 1000 (uL)  GPC Factor: 1.00	Lab Sample ID:  g/mL) ML  Extraction: (Typented: (Y/N)  Date Received:  1000 (uL) Date Extracted:  GPC Factor: 1.00 Date Analyzed:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) µG/L	Q
91-20-3	Naphthalene	42	
91-57-6	2-Methylnaphthalene	41	***
117-81-7	Bis(2-ethylhexyl)phthalate	4 4	

World

Date: 01-Apr-10

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-MW03-0310

**Lab ID:** J0464-01

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/16/10 9:40

Analyses	Result	Qu	al	RL	Units	DF	Date Analyzed	Batch ID
SW846 8015 Gasoline Range Organic (GRO) by GC-FID								GRO_W
Gasoline Range Organics	55	u	EBL	50	ug/L	1	03/24/2010 11:42	50058
Surrogate: Bromofluorobenzene	98.1	20		87-112	%REC	1	03/24/2010 11:42	50058



DF - Dilution Factor

- R RPD outside accepted recovery limits
- E Value above quantitation range
- RL Reporting Limit

Date: 01-Apr-10

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-EB01-031610

Lab ID: J0464-02

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/16/10 12:15

Analyses	Result Qual	RL	Units	DF Date Analyzed	Batch ID
SW846 8015 Gasoline Range Organic (GRO) by	GC-FID				GRO_W
Gasoline Range Organics	110	50 (	ug/L	1 03/24/2010 13:29	50058
Surrogate: Bromofluorobenzene	91.3	87-112	%REC	1 03/24/2010 13:29	50058



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

Date: 01-Apr-10

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-TB01-031610

Lab ID: J0464-03

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/16/10 12:20

Analyses	Result Qual	RL	Units	DF Date Analyzed	Batch ID
SW846 8015 Gasoline Range Organic (GF	RO) by GC-FID				GRO_W
Gasoline Range Organics	ND	50	ug/L	1 03/24/2010 14:38	50058
Surrogate: Bromofluorobenzene	91.6	87-112	%REC	1 03/24/2010 14:38	50058



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

Date: 01-Apr-10

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-MW05-0310

Lab ID: J0464-04

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/17/10 6:50

Analyses	Result Qual	RL	Units	DF Date Analyzed	Batch ID
SW846 8015 Gasoline Range Organic (GRO) b	by GC-FID				GRO_W
Gasoline Range Organics	250	50	ug/L	1 03/24/2010 15:14	50058
Surrogate: Bromofluorobenzene	96.0	87-112	%REC	1 03/24/2010 15:14	50058



R - RPD outside accepted recovery limits

E - Value above quantitation range

Date: 01-Apr-10

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-MW04-0310

Lab ID: J0464-05

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/17/10 9:10

Analyses	Result Qual	RL	Units	DF Date Analyzed	Batch ID
SW846 8015 Gasoline Range Organic (GRO) by GC-FID	V.				GRO_W
Gasoline Range Organics	65	50	ug/L	1 03/24/2010 15:48	50058
Surrogate: Bromofluorobenzene	93.4	87-112	%REC	1 03/24/2010 15:48	50058



DF - Dilution Factor

B - Analyte detected in the associated Method Blank

R - RPD outside accepted recovery limits

E - Value above quantitation range

Date: 01-Apr-10

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-MW4P-0310

Lab ID: J0464-06

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/17/10 9:15

Analyses	Result Qual	RL Unit	ts DF Date Analyzed	Batch ID
SW846 8015 Gasoline Range Organic (GRO) by GC-FI	D			GRO_W
Gasoline Range Organics	60	50 ug/L	1 03/24/2010 16:23	50058
Surrogate: Bromofluorobenzene	97.0	87-112 %REG	1 03/24/2010 16:23	50058



DF - Dilution Factor

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

R - RPD outside accepted recovery limits

E - Value above quantitation range

Date: 01-Apr-10

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-EB01-031710

Lab ID: J0464-07

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/17/10 9:35

Analyses	Result Qual	RL	Units	DF Date Analyzed	Batch ID
SW846 8015 Gasoline Range Organic (GRO) by GC-FII					GRO_W
Gasoline Range Organics	ND	50	ug/L	1 03/24/2010 16:59	50058
Surrogate: Bromofluorobenzene	87.9	87-112	%REC	1 03/24/2010 16:59	50058



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

Date: 01-Apr-10

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-TB01-031710

Lab ID: J0464-08

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/17/10 9:40

Analyses	. Re	sult Qua	l RL	Units	DF Date Analyzed	Batch ID
SW846 8015 Gasoline Rang	e Organic (GRO) by GC-FID					GRO_W
Gasoline Range Organics		ND	50	ug/L	1 03/24/2010 17:34	50058
Surrogate: Bromofluorobenzene		93.7	87-112	%REC	1 03/24/2010 17:34	50058



DF - Dilution Factor

Date: 01-Apr-10

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-MW01-0310

Lab ID: J0464-09

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/17/10 12:15

Analyses	Result Qual	RL	Units	DF Date Analyzed	Batch ID
SW846 8015 Gasoline Range Organic (GRO) by GC-	FID				GRO_W
Gasoline Range Organics	150	50	ug/L	1 03/24/2010 18:08	50058
Surrogate: Bromofluorobenzene	87.6	87-112	%REC	1 03/24/2010 18:08	50058



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

Date: 13-Apr-10

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-MW03-0310

Lab ID: J0464-01

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/16/10 9:40

Analyses	Result Qual	RL	Units	DF Date Analyzed	Batch ID
SW846 8015B Total Petroleum Hydro	carbons (TPH) by GC-FID				TPH_W
Extractable Total Petroleum Hydrocarbon	ND	0.35	mg/L	1 03/23/2010 18:27	49996
Oil Range Organics	ND	0.35	mg/L	1 03/23/2010 18:27	49996
Surrogate: ortho-Terphenyl	76.7	50-150	%REC	1 03/23/2010 18:27	49996
Surrogate: 5a-Androstane	44.0	30-110	%REC	1 03/23/2010 18:27	49996



Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	R - RPD outside accepted recovery limits
	BAnalyte-detected-in-the-associated-Method-Blank-	E - Value above quantitation range
	DF - Dilution Factor	RL - Reporting Limit

Date: 13-Apr-10

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-EB01-031610

Lab ID: J0464-02

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/16/10 12:15

Analyses	Result Qual	RL	Units	DF Date Analyzed	Batch ID
SW846 8015B Total Petroleum Hydrocarbon	s (TPH) by GC-FID				TPH_W
Extractable Total Petroleum Hydrocarbon	ND	0.35	mg/L	1 03/23/2010 22:21	49996
Oil Range Organics	ND	0.35	mg/L	1 03/23/2010 22:21	49996
Surrogate: ortho-Terphenyl	78.7	50-150	%REC	1 03/23/2010 22:21	49996
Surrogate: 5a-Androstane	54.4	30-110	%REC	1 03/23/2010 22:21	49996



Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	R - RPD outside accepted recovery limits
P. 7 200	B - Analyte detected in the associated Method Blank	E - Value aboye quantitation range
	DF - Dilution Factor	RL - Reporting Limit

Date: 13-Apr-10

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-MW05-0310

Lab ID: J0464-04

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/17/10 6:50

Analyses	Result Qual	RL Un	nits	DF Date Analyzed	Batch ID
SW846 8015B Total Petroleum Hydrocarbo	ns (TPH) by GC-FID				TPH_W
Extractable Total Petroleum Hydrocarbon	1.3	0.35 mg/	/L	1 03/23/2010 23:00	49996
Oil Range Organics	ND	0.35 mg/	/L .	1 03/23/2010 23:00	49996
Surrogate: ortho-Terphenyl	64.3	50-150 %R	REC	1 03/23/2010 23:00	49996
Surrogate: 5a-Androstane	33.1	30-110 %R	REC	1 03/23/2010 23:00	49996



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

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-MW04-0310

Lab ID: J0464-05

Date: 13-Apr-10

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/17/10 9:10

Analyses	Result Qual	RL	Units	DF Date Analyzed	Batch ID
SW846 8015B Total Petroleum Hydrocarbo	ns (TPH) by GC-FID				TPH_W
Extractable Total Petroleum Hydrocarbon	1.6	0.35	mg/L	1 03/23/2010 23:39	49996
Oil Range Organics	0.54	0.35	mg/L	1 03/23/2010 23:39	49996
Surrogate: ortho-Terphenyl	72.0	50-150	%REC	1 03/23/2010 23:39	49996
Surrogate: 5a-Androstane	40.7	30-110	%REC	1 03/23/2010 23:39	49996



Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	Qualifiers: ND - Not Detected at the Reporting Limit  J - Analyte detected below quantitation limits  B - Analyte detected in the associated Method Blank	R - RPD outside accepted recovery limits
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	DF - Dilution Factor	RL - Reporting Limit

Date: 13-Apr-10

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-MW4P-0310

Lab ID: J0464-06

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/17/10 9:15

Analyses	Result Qual	RL	Units	DF Date Analyzed	Batch ID
SW846 8015B Total Petroleum Hydrocarbon	ns (TPH) by GC-FID				TPH_W
Extractable Total Petroleum Hydrocarbon	1.5	0.35	mg/L	1 03/24/2010 0:19	49996
Oil Range Organics	0.63	0.35	mg/L	1 03/24/2010 0:19	49996
Surrogate: ortho-Terphenyl	70.3	50-150	%REC	1 03/24/2010 0:19	49996
Surrogate: 5a-Androstane	32.4	30-110	%REC	1 03/24/2010 0:19	49996



Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	R - RPD outside accepted recovery limits
 	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	DF - Dilution Factor	RL - Reporting Limit

Date: 13-Apr-10

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-EB01-031710

Lab ID: J0464-07

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/17/10 9:35

Analyses	Result Qual	RL	Units	DF Date Analyzed	Batch ID
SW846 8015B Total Petroleum Hydrocarbo	ons (TPH) by GC-FID				TPH_W
Extractable Total Petroleum Hydrocarbon	ND	0.35	mg/L	1 03/24/2010 0:58	49996
Oil Range Organics	ND	0.35	mg/L	1 03/24/2010 0:58	49996
Surrogate: ortho-Terphenyl	78.1	50-150	%REC	1 03/24/2010 0:58	49996
Surrogate: 5a-Androstane	61.9	30-110	%REC	1 03/24/2010 0:58	49996



Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	R - RPD outside accepted recovery limits
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	DF - Dilution Factor	RL - Reporting Limit

Date: 13-Apr-10

Client: CH2M Hill, Inc.

Client Sample ID: VWAE-MW01-0310

Lab ID: J0464-09

Project: CTO-0083 Vieques AOC E and I

Collection Date: 03/17/10 12:15

Analyses	Result Qual	RL	Units	DF Date Analyzed	Batch ID
SW846 8015B Total Petroleum Hydrocarbo	ns (TPH) by GC-FID				TPH_W
Extractable Total Petroleum Hydrocarbon	3.5	0.35	mg/L	1 03/24/2010 1:37	49996
Oil Range Organics	0.87	0.35	mg/L	1 03/24/2010 1:37	49996
Surrogate: ortho-Terphenyl	79.3	50-150	%REC	1 03/24/2010 1:37	49996
Surrogate: 5a-Androstane	55.3	30-110	%REC	1 03/24/2010 1:37	49996



Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	R - RPD outside accepted recovery limits
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	DF - Dilution Factor	RL - Reporting Limit

#### 1A-IN

EPA SAMPLE NO.

5		4	INORGANIC ANAI	LYSIS DATA SE	HEET	VWAE-MW01-0310
Lab Name:	Mitkem Lab	oratories		Contract:	933562, N6	2
Lab Code:	MITKEM	Case No.:		NRAS No.:		SDG No.: SJ0464
Matrix (so:	il/water):	WATER		Lab Sample	ID: <u>J0464</u>	-09
Level (low,	/med): MED			Date Receiv	ed: 03/18	/2010
% Solids:	0.0					
×-	Concentrat	ion Units (u	ig/L or mg/kg	dry weight):	UG/L	

CAS No.	Analyte	Concentration	C	Q	M
7439-89-6	Iron	5860			P
7439-96-5	Manganese	2130			P

90310

mments:	0				
	*				
	**				
		,			

#### 1A-IN

EPA SAMPLE NO.

		INORGANIC	ANALYSIS	DATA	SHEET		VWAE-MW03-0310
Lab Name:	Mitkem Labor	atories	Cont	ract:	933562,	N62	

Lab Code: MITKEM Case No.: NRAS No.: SDG No.: SJ0464

Matrix (soil/water): WATER Lab Sample ID: J0464-01

Level (low/med): MED Date Received: 03/17/2010

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	С	Q	M	
7439-89-6	Iron	200	U		P	
7439-96-5	Manganese	50.0	Jan 1	UJ	Ρ.	OT

AL310

ments:	

#### 1A-IN

EPA SAMPLE NO.

	INORGANIC	ANALYSIS	DATA	SHEET
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VWAE-MW04-0310

Lan	Name:	MILLKem	Laboratories

Contract: 933562, N62

Lab Code: MITKEM Case No.:

NRAS No.: SDG No.: SJ0464

Matrix (soil/water): WATER

Lab Sample ID: J0464-05

Level (low/med): MED

Date Received: 03/18/2010

% Solids: 0.0

CAS No.	Analyte	Concentration	C	Q	M
7439-89-6	Iron	4730			P
7439-96-5	Manganese	4350			P



#### 1A-IN

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHE	INORGANIC	ANALYSIS	DATA	SHEE
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Contract: 933562, N62

VWAE-MW05-0310

Lab Name: Mitkem Laboratories

Lab Code: MITKEM Case No.:

NRAS No.: SDG No.: SJ0464

Matrix (soil/water): WATER

Lab Sample ID: J0464-04

Level (low/med): MED

Date Received: 03/18/2010

% Solids: 0.0

CAS No.	Analyte	Concentration	-C	Q	M
7439-89-6 Iron		4100			P
7439-96-5	Manganese	2040			P



nts:			
	71.77		

#### 1A-IN

EPA SAMPLE NO.

INORGANIC	ANALYSIS	DATA	SHEET
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SHEET VWAI-MW02-0310

Lab	Name:	Mitkem	Laboratories

Contract: 933562, N62

Matrix (soil/water): WATER

Lab Code: MITKEM Case No.:

NRAS No.: SDG No.: SJ0464

Lab Sample ID: J0464-10

Level (low/med): MED

Date Received: 03/19/2010

% Solids: 0.0

CAS No.	Analyte	Concentration	C	Q	M
7439-89-6	Iron	200	U		P
7439-96-5	Manganese	1500		3-6	P



#### 1A-IN

EPA SAMPLE NO.

INORGANIC	ANALYSIS	DATA	SHEET

VWAI-MW05-0310 Contract: 933562, N62

SDG No.: SJ0464 Lab Code: MITKEM Case No.: NRAS No.:

Matrix (soil/water): WATER Lab Sample ID: J0464-11

Level (low/med): MED Date Received: 03/19/2010

% Solids: 0.0

Lab Name: Mitkem Laboratories

CAS No.	Analyte	Concentration	С	Q	M
7439-89-6 Iron		318			P
7439-96-5	Manganese	1300			P



ments:		08
9-13-13-13-13-13-13-13-13-13-13-13-13-13-	HI	

#### 1A-IN

EPA SAMPLE NO.

INORGANIC	ANALYSIS	DATA	SHEET

VWAI-MW07-0310 Contract: 933562, N62

		110			
Lab Code:	MITKEM	Case No.:	NRAS No.:	SDG No.:	SJ0464

Lab Sample ID: J0464-22 Matrix (soil/water): WATER

Level (low/med): MED Date Received: 03/23/2010

% Solids: 0.0

Lab Name: Mitkem Laboratories

CAS No.	Analyte	Concentration	C	Q	M
7439-89-6	Iron	1510			P
7439-96-5	Manganese	1700			P



Comments:		
3 <del>7 - 1 - 11 - 11 - 11 - 11 - 1 - 1 - 1 - </del>	 	

#### 1A-IN

EPA SAMPLE NO.

	INORGANIC	ANALYSIS	DATA	SHEET
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CET VWAI-MW4-0310

Lab	Name:	Mitkem	Laboratorie	S

Contract: 933562, N62

Lab Code: MITKEM Case No.:

NRAS No.:

SDG No.: SJ0464

Matrix (soil/water): WATER

Lab Sample ID: J0464-16

Level (low/med): MED

Date Received: 03/20/2010

% Solids: 0.0

CAS No.	Analyte	Concentration	С	Q	M
7439-89-6	Iron	65.5	J		P
7439-96-5	Manganese	2130			P



		19

#### 1A-IN

EPA SAMPLE NO.

INORGANIC	ANALYSIS	DATA	SHEET

WVWAI-MW03-0310

Lab Name:	Mitkem Lab	ooratories	Contract: 9335	62, N62		
Lab Code:	MITKEM	Case No.:	NRAS No.:		SDG No.:	SJ0464
Matrix (so	il/water):	WATER	Lab Sample ID:	J0464-1	4	
Level (low,	/med): MED		Date Received:	03/20/2	010	

% Solids: 0.0

CAS No.	Analyte	Concentration	C	Q	M
7439-89-6	Iron	578			P
7439-96-51	Manganese	1850			P



Comments:				
	****	0.00		

#### **SDG** Narrative

Mitkem Laboratories, a Division of Spectrum Analytical, Inc. submits the enclosed data package in response to CH2M Hill's 1000-CTO-0083, Vieques project. Under this deliverable, analysis results are presented for twenty-two samples that were received at Mitkem from March 17 to March 23, 2010 and logged in under Mitkem Work Order Number J0464. The sample was analyzed per instructions in the chain of custody forms and instruction from client.

The analyses were performed according to EPA SW-846 methods, with this hardcopy report produced in a CLP-type format for Level 4 deliverable with the exception of gasoline range organics and total petroleum hydrocarbons. The analysis results for gasoline range organics and total petroleum hydrocarbons are presented in the standard Mitkem format with supporting raw data.

The following observation and/or deviations are observed for the following analyses:

#### 1. Total Volatile Analysis:

Soil samples were analyzed by Method 8260C for a select list of volatile organic compounds.

Surrogate recovery: recoveries were within the QC limits.

Lab control sample/lab control sample duplicate: spike recoveries were within the QC limits.

Matrix spike/matrix spike duplicate: duplicate matrix spikes were performed on sample VWAE-MW03-0310. Spike recovery and replicate RPD were within the QC limits

Sample analysis: due to the high concentration of target analytes, sample VWAE-MW05-0310 was re-analyzed at 5x dilution. No other unusual observation was made for the analysis.

#### 2. GRO Analysis:

Samples were analyzed for Gasoline Range Organics (GRO) by the purgable organics option of SW846 Method 8015. GRO includes all resolved and unresolved compounds eluting between the retention times of MTBE and naphthalene inclusive. The instrument is calibrated using an average response factor obtained from injections of a mixture of individual analytes. The lab control sample is spiked with gasoline product.

Surrogate recovery: spike recovery was within the OC limits.

Lab control sample/lab control sample duplicate: spike recovery was within the QC limits.

Matrix spike/matrix spike duplicate: duplicate matrix spikes were performed on sample VWAE-MW03-0310. Spike recovery and replicate RPD were within the QC limits

Sample analysis: no unusual observation was made for the analysis.

#### 3. Semivolatile Analysis:

The samples analyzed for naphthalene and 2-methylnaphthalene by Method 8270D.

Surrogate recovery: recoveries were within the QC limits.

Lab control sample/lab control sample duplicate: spike recoveries were within the QC limits.

Matrix spike/matrix spike duplicate: duplicate matrix spikes were performed on samples VWAE-MW03-0310 and VWAI-MW02-0310. Spike recoveries and replicate RPDs were within the QC limits for both samples.

Sample analysis: no unusual observation was made for the analysis.

#### 4. TPH Analysis:

The samples were analyzed for extractable Total Petroleum Hydrocarbons (TPH) by the extractable organics option of SW846 Method 8015. TPH includes all resolved and unresolved compounds eluting between the retention times of C9 and C36 inclusive. The instrument is calibrated using an average response factor obtained from injections of a mixture of individual n-alkanes. The lab control sample is spiked with diesel fuel product.

Surrogate recovery: spike recoveries were within the OC limits.

Lab control sample: spike recovery was within the QC limits.

Matrix spike/matrix spike duplicate: duplicate matrix spikes were performed on sample VWAE-MW03-0310. Spike recovery and replicate RPD were within the QC limits

Sample analysis: no unusual observation was made for the analysis.

#### 5. Metals Analysis:

Samples were analyzed for iron and manganese by SW-846 method 6010C.

Lab control sample: spike recoveries were within the QC limits.

Matrix spike: matrix spike was performed on sample VWAE-MW03-0310. Spike recoveries were within the QC limits.

Duplicate: duplicate analysis was performed on sample VWAE-MW03-0310. Replicate RPDs were within the QC limits.

Sample analysis: serial dilution was performed on sample VWAE-MW03-0310. Percent differences were within the QC limits. No unusual observations were made during sample analysis.

#### 6. Wet Chemistry Analyses:

Samples were analyzed for the anions nitrate, and sulfate by EPA Method 300.0 and total organic carbon by SM5310B.

Laboratory control sample: percent recoveries were within the QC limits.

Matrix spike/matrix spike duplicate: duplicate matrix spikes were performed on samples VWAE-MW03-0310, VWAE-MW03-0310, VWAI-MW02-0310 and VWAI-MW07-0310 for anions. Percent recoveries and percent RPDs were within the QC limits.

Matrix spike/matrix duplicate: matrix spike and matrix duplicate analyses were performed on sample VWAE-MW03-0310 total organic carbon. Spike recovery and percent RPD were within the QC limits.

Sample analysis: the diluted analysis for nitrate in sample VWAE-MW03-0310 was performed outside of the 48-hour hold time. The initial analysis was performed within hold time. Both the initial and diluted analysis have been reported for VWAE-MW03-0310. Nitrate and sulfate were detected in method blanks MB-49893, -49929, -49960, -49979 and -50060 below the reporting limit but above the method detection limit. Samples associated with these blanks also contained nitrate and/or sulfate, either at concentrations below the reporting limit, or more than 10X the method blank concentration, indicating no significant impact of laboratory background levels on sample results. Sample results associated with these blanks are qualified with the "B". No other unusual occurrences were noted during sample analysis.

#### 7. CENSUS and PLFA Analyses:

CENSUS and PLFA analyses were performed by MicorbialInsights of Rockford, TN. The entire MicorbialInsights report, including any notes on these analyses is enclosed.

All pages in this report have been numbered consecutively, starting with the title page and ending with a page saying only "Last Page of Data Report". The Columbia data report is paginated separately, following the "Last" page.

I certify that this data package is in compliance, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the laboratory manager or his designee, as verified by the following signature.

Agnes Huntley

CLP Project Manager

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	9005					Hzm				Soil Headspace o
<b>V</b> .	,				Pres	ervatio	n (pH)		VOA	Air Bubble ≥
	$\bigcirc$	Lab Samp	le ID	HNO <sub>3</sub>	H <sub>2</sub> SO	4 HCI	NaOH	H <sub>3</sub> PO <sub>4</sub>	Matrix	1/4"
1) Cooler Sealed	Yes No	J0464	14	22					H	
		1	15	8				¥2	4	
2) Custody Seal(s)	Present/ Absent		16	12					H	
2) Guotouj Gou (6)	Coolers Bottles		17						14	
		DU/11	18	<del>                                     </del>					tt	777
	Intact/ Broken	10464	10						1	
2) Custody Coal Number	r(a) —			1						7
Custody Seal Number	(5)		-	-						
				-				-		/
				-						/
	-					-		,	-/	
				-		-		10	/	
4) Chain-of-Custody	( Present Absent							11/		
	0 (-2	N-0411900					1/2	//		
5) Cooler Temperature	2 30									
IR Temp Gun ID	MH-1,						ケソ			
Coolant Condition	TO IG (OK)									
Sociality Socialities.	<del>4-0.4-0</del>				/	/	/		7.1	
C) Airbill(a)	Drogent (Abount			1	h /					
6) Airbill(s)	Present PAbsent			- <i>W</i>	4	/				(
Airbill Number(s)	2 6/5/ 0//2				11	1	-			
8656	8-6151-9163				//					
8658	-6151-9179			ļ,	/					
7) Samples Bottles	Intact Broken / Leaking		/	1						
		- 100	/				100			
8) Date Received	3/20/10		/							
0) 2410 (1000) (01	Intact Broken / Leaking  3/20/10  09:00	/								
O) Time Descined	09:00				_				_	
9) Time Received	01700				-					
					_					
Preservative Name/Lot N	lo.:					L				
			VOA	Matrix	350		10-"		۸	
100						serve			A = Ai	
				M = M		serve	Aque		H = H(	
1448	10.7			N = N		14			E = Er F = Fr	NAME OF THE PARTY
See Sample	e Condition Notification/Corre	ctive Action F	orm	and the same of th				-	-11	CCZC

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form.xls

Sample Condition Form

089

Descrived Dur. A.C.O.	Reviewed By	y: GN		Data	7/20/10	Mitke	m Ma	rk Ord	lar#	50464
Received By: AEO	The same of the sa	1. 410		Clien	-		ZM		ICI #.	Soil
Client Project: CTO	007 U12065			Cileri	-		n (pH)		100000000	Headspace
		Lab Samp	le ID	HNO-	H <sub>2</sub> SO <sub>4</sub>		T		VOA Matrix	Air Bubble 1/4"
		J0464	_	111103	112004	rioi	114011	1131 04	H	
Cooler Sealed	Yes No		1000		-				-	
		20467	21						H	
2) Custody Seal(s)	Present Absent	JOHL 4	22	12					H	
/	Coolers / Bottles									7
	Intact / Broken									
										7
3) Custody Seal Number	(s) N/A								/	/
5) Custody Sear Number	(3)						-		/	
			+	-					/	
			-						/	
			-	-				-/		
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4) Chain-of-Custody	Present LAbsent						ļ,	_		
	11.0									
5) Cooler Temperature	4°C									
IR Temp Gun ID	4°C MT-1									
Coolant Condition	ICED					1				
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C\ A:=b:II/a\	Present LAbsent		-			/.				
6) Airbill(s)			ļ	-	7/	1	0			
Airbill Number(s)	FEPEN			/	3/	257				
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7) Samples Bottles	Intact / Broken / Leaking		/							
648 64.0			1							
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	Condition Notification/Corre						De J O			

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USEPA Region II Date: January 2006 SW846 Method 8260B VOA SOP: HW-24, Rev. 2 YES NO N/A I. PACKAGE COMPLETENESS AND DELIVERABLES CASE NUMBER: SJ0464 LAB: Mitkem Labs SITE NAME: Viegues AOC E CTO-83 1.0 Data Completeness and Deliverables 1.1 Has all data been submitted in CLP deliverable format or CLP Forms Equivalent? If not, note the effect on review of the data in ACTION: 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? If not, note the effect on review of the data in ACTION: 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

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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 3/16-22/10 Analy 3/22-4/2/10
2.0 Holding Times Rec 3/17-23/10 Temp 2-5°C

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<sub>4</sub>, the maximum holding time is 14 days from sample collection. If

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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 q	ualifications					
	No	≻ 7 days	J	R					
	Yes	≤14 days	No q	ualifications					
	Yes	≻ 14 days	J	R					
Non Aqueous	No	≤ 14 days	J	R					
	Yes	≤ 14 days	No qu	ualifications					
	Yes/No	> 14 days	J	R					

.0 Surrogate Recovery	(CLP Form	II Equivale	ent)
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Surr	ogate	Recovery (CLP Form II Equivalent)	
3.1		the volatile surrogate recoveries been list overy forms for each of the following matrice:	
	a.	Water	14
	b.	Soil	
3.2		o, are all the samples listed on the appropriately forms for each matrix:	iate Surrogate
	a.	Water	<u> </u>
	b.	Soil	Ц
ACTIO	ON:	If large errors exist, deliverables are unavinformation is missing, document the effect	

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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 inhouse performance criteria (per SW-846, Method 8000C, sectiom 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 <sub>8</sub>	80-120	70-130
Dichloroethane-d <sub>4</sub>	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?

 $\Box$   $\angle$ 

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").
- 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?

r 1	1/

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.

Date: January 2006 USEPA Region II SW846 Method 8260B VOA SOP: HW-24, Rev. 2 YES NO N/A LCS consists of an aliquot of a clean (control) matrix Note: 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. note in the data assessment. 4.2 Were the Laboratory Control Samples analyzed at the required frequency for each of the following matrices: Α. 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	עט	
Lower Acceptance Limit ≤ %R	No Qual	lifications	

# 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?

1/\_

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

Soil/Solid

Section 9.5.

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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	W
b.	Waste	П — —

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

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.

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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 resuts in conjunction with other QC criteria to determine the need for some qualificatios.

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 well1 as specific analytes for all samples associated with the MS and MSD.

Note:

In those instances where it can be determed 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 Qu	alifications	

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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 (R) 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 <u>not</u> 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.

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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

forsurrogate, 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.

another blank. Field blanks must be qualified

NWAE-TB01-03-1610

VWAI-TB01-03-1810

NWAE-EBOI-03-1610

NWAE-EBOI-03-1710

V VWAE-TB01-03-1710

V VWAI-EBUI-05-1810

VVWAI-TB01-B-1910

VVXAI-TBOI-03-2210

V VIWAI-EBOI-05-1910

V VWAI-EBOI-03-2210

Tho o

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Table 5. Volatile Organic Analysis Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
	Detects	Not detected	No qualification
		< CRQL	Report CRQL value with a U
	< CRQL*	≥ CRQL	Use professional judgement
		< CRQL	Report CRQL value with a U
Method, Storage, Field,	age, > CRQL*	≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or quanity the data as unusable R
Trip, Instrument**		<pre></pre>	Use professional judgement
		< 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 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)

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YES NO N/A

been analyzed for every twelve hours of sample analysis per instrument?(see Table 4, SW-846, page 8260B-36)

1

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?

<u>\_\_\_\_\_\_</u>

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 wheather associated data should be accepted, qualified, or rejected.

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YES NO N/A

1	0	0	Target	Anal	ytes	CLP	Form	I Ec	uivalent

- 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?

USEPA Reg SW846 Met	gion II hod 8260B VOA	Date: January 2006 SOP: HW-24, Rev. 2
4		YES NO N/A
Reso	olution?	<u> </u>
Pea	shape?	<u> </u>
Full	L-scale graph (attenuation)?	<u> </u>
Othe	er:	
ACTION:	Use professional judgement to dete	ermine the acceptability of
	the lab-generated standard mass speatile compounds present for each sar	1
ACTION:	If any mass spectra are missing, and 3.2 above. If the lab does not gen spectra, make a note in the Data Amissing, contact the lab.	nerate their own standard
	the RRT of each reported compound windard RRT in the continuing calibrat	
rela	all ions present in the standard matrix in the intensity greater than 10% (of present in the sample mass spectrum)	f the most abundant ion)
in t	the relative intensities of the character sample agree within $\pm$ 30% of the tive intensities in the reference s	e corresponding/
ACTION:	Use professional judgement to deterace acceptability of data. If it is defined incorrect identifications were made should be rejected ("R"), flagged Presumptive evidence of the present compound) or changed to non detect calculated detection limit. In order	etermined that  de, all such data  ("N") -  nce of the  ted ("U") at the

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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.

MCS

- 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:

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<sub>2</sub> (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 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 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 <u>Standards Data (GC/MS)</u>

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 <u>GC/MS Initial Calibration (CLP Form VI Equivalent)</u>

Date: January 2006 SOP: HW-24, Rev. 2

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.

Date: January 2006 SOP: HW-24, Rev. 2

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 GC/MS Calibration Verification (CLP Form VII Equivalent)

Date: January 2006 SOP: HW-24, Rev. 2

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  $\leq$  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

Date: January 2006 SOP: HW-24, Rev. 2

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 D, 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 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 <u>Internal Standards (CLP Form VIII Equivalent)</u>

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)?

Date: January 2006 SOP: HW-24, Rev. 2

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.

(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 (Uvalues) "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.

Date: January 2006 SOP: HW-24, Rev. 2

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-MW4P-03-10 > All attached VWAE-MW4P-03-10 > Sheet, no quel

WVWAI-MW03P-0310> MOQ

Dilution - VWAE-MWOS-0310

DataQual VOA

**Initial Calibration Date:** 

3/29/2010

RRF and %RSD Calculations:

Compound Name:

 $\mathbf{MTBE}$ 

Lab Value:

0.752

Area of Compound	1606395
Area of Internal STD	534322
Conc. of Internal STD	50
Conc. of Compound	200
Calculated RRF	0.752

Compound Name:

benzene

Lab Value:

6.5

RRF of STD 1	0.979
RRF of STD 2	1.040
RRF of STD 3	1.065
RRF of STD 4	0.925
RRF of STD 5	1.087
Calculated % RSD	6.5

**Continuing Calibration File ID:** 

4/2/2010

RRF and %D Calculations:

Compound Name:

1,2-dichloroethane

Lab Value:

0.329

Area of Compound	180904
Area of Internal STD	549516
Conc. of Internal STD	50
Conc. of Compound	50
Calculated RRF	0.329

Compound Name:

xylene (total)

Lab Value:

2.9

Average RRF	0.599
Calibration Check RRF	0.582
Calculated % D	2.8

VOA DataQual

# FIELD DUPLICATE SAMPLE SUMMARY

Sample ID:

VWAE-MW04-0310

Duplicate Sample ID: VWAE-MW04P-0310

Water: RPD>75% Soil: RPD>100%

Compound	Sample Conc.	Dup. Sample Conc.	%RPD
MTBE	130	96	30
			#DIV/0!
-			#DIV/0!
			#DIV/0!
1			#DIV/0!

COMMENTS:

No qualifications

<sup>\*</sup> result below the CRQL

USEPA Region II  SW846 Method 8270D (Rev.4, January 1998)  Date: October, 2006  SOP HW-22 Rev.3			
			YES NO N/A
E	-	The concentration of this analyte exceeds th of the instrument.	e calibration range
A	-	Indicates a Tentatively Identified Compound adol-condensation product.	(TIC) is a suspected
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 DELIVERABLE	ES
CASE	NUMB	ER: SJ0464 LAB: Mit	kem Labe
SITE	NAME	ER: SJ0464 LAB: Mitter Viegnes AOCE CTO-83	
1.0	<u>Data</u>	Completeness and Deliverables	
	1.1	Has all data been submitted in CLP deliverable format?	le
	ACTI(	ON: If not, note the effect on review of the in the data assessment narrative.	e data
2.0	Cove	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?	

Date: October, 2006 USEPA Region II SOP HW-22 Rev.3 SW846 Method 8270D (Rev.4, January 1998) YES NO N/A SEMIVOLATILE ANALYSES II. Traffic Reports and Laboratory Narrative 1.1 Are the Traffic Report Forms present for all samples? If no, contact lab for replacement of missing ACTION: 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". If samples were not iced, or if the ice was ACTION: melted upon arrival at the laboratory and the cooler temperature was elevated (10°C), flag all positive results "J" and all non-detects Sampled 3/16-22/10 Extv 3/23-26/10 Rec 3/17-23/10 Analy 3/26-30/10 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

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days of the date of collection. Soil/sediment samples must be extracted within 14 days of collection. Extracts must be analyzed within

Date: October, 2006 SOP HW-22 Rev.3

YES NO N/A

40 days of the date of extraction.

#### Table of Holding Time Violations

Sample Sample Date Date Lab Date Date
ID Matrix Sampled Received Extracted 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).

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USEPA Reg SW846 Met	- · · ·	Date: October, 2006 SOP HW-22 Rev.3
		YES NO N/A
3.0	Surrogate Recovery (Form II/Equivalent)	
3.1	Have the semi volatile surrogate recoveries be listed on CLP Surrogate Recovery forms (Form for each of the following matrices:	
	a. Low Water	يا ا
	b. Low/Med Soil	
3.2	If so, are <u>all the samples listed</u> on the appropriate Surrogate Recovery Summary forms for each matrix:	
	a. Low Water	<u> </u>
	b. Low/Med Soil	<u> </u>
ACTI	ON: If CLP deliverables are unavailable, documents 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.	ome O
3.3	Were outliers marked correctly with an asteris	sk? [Y'
	ACTION: Circle all outliers in red.	
3.4	Were two or more base neutral <u>OR</u> acid surrogate recoveries out of specification for any sample method blank (Reviewer should use lab in house recovery limits. Use surrogate recovery limits from USEPA National Functional Guidlines Januar page 130, if in house limits are not available See Method 8000B-43 or 80000C-24).	e or e s ary 2005
1	Note: Examine lab in house limits for reas	sonableness.
	If yes, were samples re-analyzed?	

Date: October, 2006 SOP HW-22 Rev.3

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, for the affected fraction only (i.e. either base-neutral or acid 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. If recoveries are greater than the upper acceptance limit, do not qualify non-detects.

If any base-neutral  $\underline{\text{or}}$  acid surrogate has a recovery of < 10%:

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

Date: October, 2006 USEPA Region II SOP HW-22 Rev.3 SW846 Method 8270D (Rev.4, January 1998) YES NO N/Aeffect 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 Some projects may require the spiking of specific compounds Note: of interest. See Method 8270D-sec 8.4.2 for deciding on whether Note: 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 Low Solid c. Med Solid

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analytes.

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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

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.

$\nu$	

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	<u>Solids</u>	
DY 3		
<u> </u>	out of	

Date: October, 2006 USEPA Region II SOP HW-22 Rev.3 SW846 Method 8270D (Rev.4, January 1998) YES NO N/A 4.5 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits? Solids out of ACTION: Circle all outliers with red pencil. No action is taken on MS/MSD data alone. ACTION: 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

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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.

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 <u>not</u> used to qualify the data. Do not confuse them with the other QC blanks discussed below.

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).

VIWAI -EBOI -032210 his(2 en) pur 1.25 > Maqual

all other ac whis exhibited not

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YES NO N/A

#### Blank Action for Semivolatile Analyses

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
		< CRQL	Report CRQL value with a U
	> CRQL *	> 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

Date: October, 2006 USEPA Region II SW846 Method 8270D (Rev.4, January 1998) SOP HW-22 Rev. 3 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 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. GC/MS Instrument Performance Check (Form V/Equivalent) 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

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	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 samp analysis per instrument?	
ACTION: List date, time, instrument ID, and sam analyses for which no associated GC/MS tuning data are available.	ple
DATE TIME INSTRUMENT SAMPLE NUMBI	ERS
ACTION: If lab cannot provide missing data, rejective ("R") all data generated outside an acceptive 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?	<u>-</u>
8.5 Have the ion abundance criteria been met for each instrument used?	<u> </u>
ACTION: List all data which do not meet ion abur criteria (attach a separate sheet).	ndance

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Date: October, 2006 USEPA Region II SOP HW-22 Rev.3 SW846 Method 8270D (Rev.4, January 1998) YES NO N/A 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? Use professional judgement to determine ACTION: 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: Samples and/or fractions as appropriate b. Matrix spikes and matrix spike duplicates С. 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)?

USEPA SW846			I 270D (Rev.4, January 1998)	Date: SOP F			2006 3
					YES	NO	N/A
	ACTI	ON:	If data suggests that extract cleanup was performed, use professional judgement. note in the data assessment narrative.				
	9.3	spec syst	the Reconstructed Ion Chromatograms, mass tra for the identified compounds, and the em printouts (Quant Reports) included in le package for each of the following?	e data	l		
		a.	Samples and/or fractions as appropriate		W		
		b.	Matrix spikes and matrix spike duplicate (Mass spectra not required)	es	W	_	
		С.	Blanks		4		
i	ACTI	ON:	If any data are missing, take action specified in 3.2 above.				
!	9.4	Are Repo	the response factors shown in the Quant rt?		14	_	
!	9.5		hromatographic performance acceptable wit	ch .			
		Base.	line stability?		14		
		Reso	lution?		[]		
		Peak	shape?		<u> </u>	_	
		Full-	-scale graph (attenuation)?		M		
		Othe	r:				
_							

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

Date: October, 2006 SOP HW-22 Rev.3

YES NO N/A

each sample?

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

9.7 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?

9.8 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% (of the most abundant ion) also present in the sample mass spectrum?

9.9 Do the relative intensities of the characteristic ions in the sample agree within ± 30% of the corresponding relative intensities in the reference spectrum?

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

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

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l	A Regi 6 Meth		: 70D (Rev.4, J	January 199	8)		e: Oct HW-22		
							YES	NO	N/A
10.0	<u>Tent</u>	<u>ative</u>	y Identified	Compounds	(TIC)			4	-
	10.1	for and	this project, lo listed TICs	are all For s include so	mpounds were req rm Is, Part B pr can number or re n and "JN" quali	resent etenti	Lon	N	a
	NOTE:	:	lab was requi	ired to ider	to determine if ntify non target, page 8270D-21).	c anal	ytes		
	10.2	iden spec	-	nds and asso	tentatively ociated "best ma le package for e				<u> </u>
		a.	Samples and/c	or fractions	s as appropriate	<u> </u>			
		b.	Blanks						
	ACTIO	)N:	If any TIC da specified in		sing, take actio	'n			
	ACTIO	)N:	Add "JN" qual identified by	-	to analytes				
		as T		n another (	m one fraction l (e.g., an acid utral TIC)?	isted			
	ACTIO	)N:	i. Flag with	-	target compound :	liste	d		
				_	cted compounds as				
		spect	rum with a re	lative inte	reference mass ensity greater th n) also present :		e		

	A Region I 6 Method 8	I 270D (Rev.4, January 1998)		: Oct HW-22		
	<u> </u>			YES	NO	N/A
	samp	ole mass spectrum?				
		TIC and "best match" standard relative ion insities agree within ± 20%?	n			<u>L</u> /
	ACTION:	Use professional judgement to determine acceptability of TIC identifications. It is determined that an incorrect identification was made, change the identification to "unknown" or to some specific identification (example: "C3 substituted benzene") as appropriate and remove "JN". Also, when a compound is a found in any blank, but is a suspected artifact of a common laboratory contaminate result should be qualified as unusal "R."	f it less d not nant,			
11.0	Compound	Quantitation and Reported Detection Lim:	<u>its</u>			
	Form Veri quan	there any transcription/calculation error I results? Check at least two positive of that the correct internal standard, titation ion, and RRF were used to calculate I result. Were any errors found?	value		4	_
	NOTE:	Structural isomers with similar mass specification (i.e. per valley between the two peaks > 25%) show reported as isomeric pairs. The reviewed should check the raw data to ensure that such isomers were included in the quantitation (i.e., add the areas of the coeluting peaks to calculate the total concentration).	rcent uld be er t all	е		
	refle	the method detection limits adjusted to ect sample dilutions and, for soils, samp ture?	ole	4	/	

- 23 -

Date: October, 2006 SOP HW-22 Rev.3

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?

Date: October, 2006

SOP HW-22 Rev.3

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] < 15.0%)?

14

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

Date: October, 2006

SOP HW-22 Rev.3

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  $\geq$  15.0%, 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?

14

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?

USEPA Region 3 SW846 Method 8	II 3270D (Rev.4, January 1998)	Date: SOP H			2006 3
			YES	NO	N/A
pero	the pesticide compounds include DDT, was cent breakdown of DDT to DDD and DDE great 20%?				<u>L</u> /
ACTION:	If DDT percent breakdown exceeds 20%:				
	i. Qualify all positive results for DN with "J". If DDT was not detected DDD and DDE results are positive, qualify the quantitation limit for as unusable, "R".	, but			
	ii. Qualify all positive results for DI DDE as presumptively present at an approximate concentration "JN".		d		
14.0 GC/MS Ca	alibration Verification (Form VII/Equivale	ent)			
pres	the Calibration Verification Forms (Form sent and complete for all compounds of erest?	VII)			
anal	a calibration verification standard been yzed for every twelve hours of sample and instrument?	alysis			
ACTION:	List below all sample analyses that were within twelve hours of a calibration verification analysis for each instrumentused.				
ACTION:	If any forms are missing or no calibrativerification standard has been analyzed within twelve hours of every sample anal				

- 27 -

Date: October, 2006 SOP HW-22 Rev.3

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).



Date: October, 2006 USEPA Region II SOP HW-22 Rev.3 SW846 Method 8270D (Rev.4, January 1998) YES NO N/AACTION: 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? List each outlying internal standard below. ACTION: Sample ID Upper Limit IS # Area LowerLimit (Attach additional sheets if necessary.) Check Table 5, 8270D-41 for associated analytes. Note: If the internal standard area count is ACTION: i.

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

this internal standard.

with "J" all positive results and

outside the upper or lower limit, flag

non-detects (U values) quantitated with

Date: October, 2006 SOP HW-22 Rev.3

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?

4

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

#### 16.0 Laboratory Control Samples (LCS)

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

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

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

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

#### 17.0 Field Duplicates

17.1 Were any field duplicates submitted for semivolatile analysis?

Date: October, 2006 SOP HW-22 Rev.3

> N/A YES NO

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-MW04- 0310 / MO & VWAE-MW04P-0310 / MO &

WUWAI-MWBP-BID > MOR

#### Worksheets - GRO BY 8015

#### **DataQual**

This SDG contains Gasoline results SW-846 method 8015. 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: 3/16-22/10 Received Date: 3/17-3/23 14-day soil sample holding time and 7 day water sample holding time was

applied based on SW-846 recommendations

Preparation Date: 3/24 Analysis Dates: 3/24

COC documentation was present and in order. All sample extraction and analysis holding time requirements were met for these water and field QC blank samples.

#### **Calibrations**

A seven-point calibration curve was analyzed for both the target compound and the surrogate compound. %RSDs were calculated for the target fuel ranges as well as for individual hydrocarbons over the range of retention times of interest and the surrogate compounds. Continuing calibration standards were analyzed per the method. All %D values were within QC limits with the exception of one hydrocarbon. All average %Ds were within 20%. No qualifications were required. These samples were analyzed on one sequence.

#### 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:

NA

U - The blank contamination concentration is  $\leq$  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 is either is >RL but < blank contamination concentration. Result is qualified as U at reported

concentration.

J - The blank contamination concentration is >RL and sample result is <10X blank contamination level.

The sample is greater than the RL when the blank contamination concentration is < RL or the sample result is greater than 10X blank contamination concentration when the blank contamination concentration is >RL.

#### Blank Contamination and Qualification Summaries

Blank ID	Compound	Concentration	Action Level	Q Flag
VWAE-EB01-031610	GRO	110 ug/L	blank level	U

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

Sample ID	Compound	Q Flag
VWAE-MW03-0310	GRO	U

Vieques PR, AOC E CTO-83 SDG SJ0464 Page 1 of 2

#### Surrogate Recoveries Summary

All surrogate recoveries were acceptable. No qualifications were required.

#### Matrix Spike/Matrix Spike Duplicate Summary

The MS/MSD pair in this SDG exhibited acceptable recoveries and RPDs. The submitted LCS samples were acceptable. No qualifications were required.

Field Duplicate Sample Summary

Sample ID: VWAE-MW04-0310

Duplicate Sample ID:

VWAE-MW04P-0310

Compound	Sample Conc.	Duplicate Conc.	RPD
GRO	65	60	8%

**Comments:** 

30% RPD criteria, No qualifications were required.

Sample Result Verification

**Specific Comments:** 

Raw data was verified.

Reviewer JACUMIAND Date: 6410

Vieques PR, AOC E CTO-83 SDG SJ0464 Page 2 of 2 DataQual GRO

Initial Calibration Date:

11/18/2009

RF and %RSD Calculations:

Compound Name:

GRO, level 1 (2.5)

Lab Value:

8.449 X 10<sup>4</sup>

Area of Compound	2112328
Conc of Compd	3
Calculated RRF	844931

Compound Name:

GRO

Lab Value:

4.4

RRF of STD 1	84490
RRF of STD 2	76470
RRF of STD 3	77450
RRF of STD 4	76640
RRF of STD 5	75220
RRF of STD 6'	80320
Calculated % RSD	4.37

Continuing Calibration File ID: RF and %D Calculations:

CCV 3/23/10, 22:04

34159318

500

Kr and 70D Calculations.

Compound Name:

Concentration

GRO

Lab Value CF:

68319

Lab Value %D:

%D: 12.9
Area of compound

Calculated CF	68318.6
Average CF	78430

 Average CF
 78430

 Calibration Check CF
 68319

 Calculated % D
 12.9

→ 146

DataQual GRO

#### **SAMPLE CALCULATION**

Sample ID: Standard ID:

VWAE-MW01-0310 ICAL, 11/18/09

Compound:
Concentration

GRO

oncentration:	150 ug/L

	Water (mg/L)	Soil (mg/Kg)
Area of Compound	13291102	· •
CF of Compound	78430	
Final Volume	5	
Dilution Factor	1	-
GPC Factor	NA	
Injection Volume	1	
Weight of Sample	NA	-
Initial Volume of Sample	5	NA
% Solids Factor	NA	
Concentration	169.46	#DIV/0!

Final Conc = GRO Conc. - Surrogate Conc.= 169.46-17.51 = 151.95 ug/L

#### Jacqueline Cleveland

From:

Jacqueline Cleveland [cleve137@charter.net]

Sent:

Monday, June 07, 2010 1:56 PM

To:

'Edward Lawler [Mitkem]'

Cc:

'DataQual'; 'Juan.Acaron@CH2M.com'

Subject:

RE: Vieques CTO-83 GRO

Thanks so much Ed. I thought that might be it so I subtracted out the surrogate area then calculated the GRO result but I didn't check it for the after calculation concentrations!! Have a good day!

**From:** Edward Lawler [Mitkem] [mailto:elawler@mitkem.com]

Sent: Monday, June 07, 2010 1:20 PM

To: Jacqueline Cleveland

**Cc:** DataQual; Juan.Acaron@CH2M.com **Subject:** RE: Vieques CTO-83 GRO

Hi Jackie-

It is because of the surrogate. For GRO, the surrogate elutes within the retention time range for GRO, so we have to subtract the concentration of the surrogate from the GRO before we calculate the final value. In this case (J0464-09) it is 169.464 - 17.513 = 151.95, which rounds to 150.

Please let me know if you need more information, or have any additional questions.

Thanks.

--Ed

**From:** Jacqueline Cleveland [mailto:cleve137@charter.net]

**Sent:** Monday, June 07, 2010 2:00 PM

To: Edward Lawler [Mitkem]

Cc: 'DataQual'; Juan.Acaron@CH2M.com

Subject: Viegues CTO-83 GRO

Importance: High

Good Afternoon Ed,

I have what I hope is a very quick question! For Mitkem Work Order Number J0464 the GRO results on the Form 1s do not match my calculations or the raw data quant pages. For example: sample VWAE-MW01-0310 (J0464-09) Form 1 result is 150 ug/L but quant page (page 400 of data package) & my recalculation of the result say 169 ug/L. Please clarify the discrepancy with resubmissions and/or an explanation, as necessary! I planned to ship this DV report to the client today so if you are able to respond this afternoon that would be fantastic!

Jackie

Jacqueline Cleveland Vice-President DataQual, ES, LLC 636-352-9391 cleve137@charter.net



#### Worksheets - DRO BY 8015 TPH

#### **DataQual**

This SDG contains Diesel results SW-846 method 8015M. 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: 3/16-22/10 Received Date: 3/17-3/23 14-day soil sample holding time and 7 day water sample holding time was

applied based on SW-846 recommendations

Preparation Date: 3/22 Analysis Dates: 3/23-3/24

COC documentation was present and in order. All sample extraction and analysis holding time requirements were met for these water and field QC blank samples.

#### **Calibrations**

A seven-point calibration curve was analyzed for both the target compound and the surrogate compound. %RSDs were calculated for the target fuel ranges as well as for individual hydrocarbons over the range of retention times of interest and the surrogate compounds. Continuing calibration standards were analyzed per the method. All %D values were within QC limits with the exception of one hydrocarbon. All average %Ds were within 20%. No qualifications were required. These samples were analyzed on one sequence.

#### 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:
  - $\label{eq:contamination} U \qquad \qquad \text{The blank contamination concentration is} \leq RL \text{ or } > RL \text{ and sample result is} \leq RL.$

Result is qualified as U at the RL.

U - The blank contamination concentration is >RL and sample result is either is >RL but < blank contamination concentration. Result is qualified as U at reported

concentration.

J - The blank contamination concentration is >RL and sample result is <10X blank contamination level.

NA The sample is greater than the RL when the blank contamination concentration is

< RL or the sample result is greater than 10X blank contamination concentration when the blank contamination concentration is >RL.

#### Blank Contamination and Qualification Summaries

Blank ID	Compound	Concentration	Action Level	Q Flag
no contamination				

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

Sample ID		Compound	Q Flag

Vieques PR, AOC E CTO-83 SDG SJ0464 Page 1 of 2

#### **DataQual**

#### Worksheets - DRO BY 8015\_TPH

#### **Surrogate Recoveries Summary**

All surrogate recoveries were acceptable. No qualifications were required.

#### Matrix Spike/Matrix Spike Duplicate Summary

The MS/MSD pairs in this SDG exhibited acceptable recoveries and RPDs. The submitted LCS samples were acceptable. No qualifications were required.

Field Duplicate Sample Summary

Sample ID:

VWAE-MW04-0310

Duplicate Sample ID:

VWAE-MW04P-0310

Compound	Sample Conc.	Duplicate Conc.	RPD
ETPH	1.6	1.5	6%
ORO	0.54	0.63	15%

Comments:

30% RPD criteria, No qualifications were required.

#### Sample Result Verification

**Specific Comments:** 

Raw data was verified.

Reviewer Allwhard Date: 6410

Vieques PR, AOC E CTO-83 SDG SJ0464 Page 2 of 2

### DRO by SW-846 8015M

#### DataQual

**Initial Calibration Date:** 

1/20/2010

RRF and %RSD Calculations:

Compound Name:

triacontane

Lab Value:

1.1200

Area of Compound	5090095
Conc. of Compound	2.5
Area of Internal Standard	72747684
Conc. of Internal Standard	40
Calculated CF	1.1195

Compound Name:

TPH (C9..C28)

Lab Value:

6.52

CF of STD 1	1.1060
CF of STD 2	1.0570
CF of STD 3	1.1230
CF of STD 4	1.0850
CF of STD 5	0.9480
CF of STD 6	
CF of STD 7	
Calculated % RSD	6.51

**Continuing Calibration File ID:** 

3/24/10, 0454

RRF and %D Calculations:

Compound Name:

octane

Lab Value:

1

Area of Compound	38314083
Conc. of Compound	50
Area of Internal Standard	60758444
Conc. of Internal Standard	40
Calculated CF	0.5045

Compound Name:

TPH (C9..C28)

Lab Value:

3.4

Average CF	1.0640
Calibration Check CF	1.1000
Calculated % D	-3.4

DataQual DRO

#### **SAMPLE CALCULATION**

Sample ID: Standard ID: VWAE-MW05-0310 ICAL, 1/20/10

Compound: Concentration: DRO 1.3 mg/L

	Water (mg/L)	Soil (mg/Kg)
Area of Compound	2315375528	
CF of Compound	1.064	
Area of Internal Standard	68179633	
Concentration of Internal Standard	40	
Final Volume	1	
Dilution Factor	1	
GPC Factor	NA	
Injection Volume	1	
Weight of Sample	NA	
Initial Volume of Sample	1000	NA
% Solids Factor	NA	
Concentration	1.28	#DIV/0!

**USEPA Region 2** 

#### Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2 Revision 13

Appendix A.1

Sept. 2006

Site: Vilgnet PR

Case #:

SDG #: JØ464

Samples:

Soil

Water

Standard Operating Procedure

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program

Data Assessment and Contract Compliance Review

SOP:	HW-2 Revis	ion 13	Appendix A.1	Sept. 2006
				YES NO N/A
A.I.I	Contract Comp Present?	liance Screenin	g Report	
	ACTION:	If no, contact	t RSCC/PO.	
A.I.2	Record of Com	munication (fro	m RSCC)	
	Present?			[]
	ACTION:	If no, reques	t from the RSCC.	
A.1.3	Sampling Trip I	Report		
	Present a	and complete?		[]
	ACTION:	If no, contact	t RSCC/PO.	
A.I.4	Chain of Custo	dy/§ample Traff	ic Report	
	Present?			
	Legible?			
	Signature present?	of sample custo	dian	
	ACTION:	If no, contact RS	CC/WAM/PO.	
A.I.5	Cover Page			
	Present?			
	and the ve	ver Page properly erbatim signed by or the manager's	y the lab	
	on the Co	mple identification ver Page agree voice numbers on:		XICO. X
	(a) Traffic	Report Sheet?		
		$C_{0}$		$\checkmark$

Standard Operating Procedure

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program

Data Assessment and Contract Compliance Review

SOP:	HW-2	Revision 13	Appendix A.1	Sept. 2006
	(b) For	m l's?		YES NO N/A
	(5) 1 01	Is the number of samples on Page the same as the number samples on the Traffic Report and the Regional Record of (ROC) for the data Case?	er of rt sheet Communication	
		ACTION: If no for any of the above, proceeding the correct from the laboratory.	contact RSCC/PO	
A.1.6	SDG N	Narrative, DC-1 & DC-2 Form	<u>n</u>	
		Is the SDG Narrative present	t?	[]
		Is Sample Log-In Sheet(Form present and complete?	m DC-1)	
		Is Complete SDG Inventory Spresent and complete?	Sheet(Form DC-2)	
		ACTION: If no, write in the Contract-Pr Non-Compliance Section of Narrative.	oblems/ of the Data Review	
A.1.7	Form.	to XV		
A.1.7.		Are all the Form I through Fo labeled with:	rm XV	
		Laboratory Name?		
		Laboratory Code?		[]
		RAS/Non-RAS Case No.?		[]
		SDG No.?		

# Standard Operating Procedure USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW	1-2 Revision 13	Appendix A.1	Sept. 2006	
	Contract No.?		YES NO N/A	
A.1.7.2	ACTION: If no for any of the above, Contract Problem/Non-Co of the "Data Review Narra PO for corrected Form(s) After comparing values or against the raw data, do a transcription errors exceed reported values on the Fo	ompliance Section ative" and contact from the laboratory on Forms I-IX ony computation/ d 10% of the		
(a	) all analytes analyzed by ICP	-AES?	_ [4]_	
(b	) all analytes analyzed by ICP	-MS?	_ 🗀 💆	
(c	) Mercury?		_ 🗀	
. (d	) Cyanide?		_ []	
lf : ar	CTION: yes, prepare Telephone Record nd contact CLP PO/TOPO for the ata from the laboratory.			
Da ha	ata shall not be validated with ard/electronic copies of the a w data for samples and QC s	ssociated		
A.1.8.1	Digestion/Distillation Log			
,	gestion Log for ICP-AES rm XII)present?			
	gestion Log for ICP-MS rm XII) present?			
•	gestion Log for mercury orm XII) present?			
	stillation Log for cyanide orm XII) present?			
Are	e pH values for metals and			

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program
Data Assessment and Contract Compliance Review

SOP:	HW-2	Revision 13	Appendix A.1	Sept. 2006
				YES NO N/A
	•	e reported for each us sample?		
	•	·		<u> </u>
		rcent solids calculations t for soils/sediments?		
		eparation dates present on the preparation logs/bench sheet	s?	
	NOTE: Digestion and dilution	n/Distillation log must include weights, volons used to obtain the reported results.	lumes,	
A.1.8.	2 ls real-tim	s the analytical instrument ne printouts present for:		
	ICP-AE	S?		<u> </u>
	ICP-MS	5?		
	Mercur	y?		
	Cyanide	e?		
	and ins	laboratory bench sheets trument raw data printouts ary to support all sample s and QC operations:		
	Legible?			LA
	Properly	labeled?		<u> </u>
		eld samples, QC samples d QC samples present on:		
	Digestion	n/Distillation log?		<b>」</b>
	Instrume	nt Printouts?		口

### 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.

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-	2 Revision 13	Appendix A.1	Sept. 2006
			YES NO N/A
(Exami	hnical Holding Times: (Aquine sample Traffic Reports and digestic mine the holding time from the sample paration date.)	on/distillation logs to	
A.1.9.1	Cyanide distillation(14 day	/s)exceeded?	_ 🗀 🗸
	Mercury analysis(28 days)	exceeded?	_ [_]
	Other Metals analysis(180	days)exceeded?	[4_
If you	TION: es, reject (R) and red-line not I flag as estimated (J)results mple(s) was preserved prope	≥ MDL even	
a list whic be p the r (Sub from	Idition to qualifying the data, of all samples and analytes hexceeded the holding times must repared. Report for each sample number of days that were exceeded. tract the sample collection date the sample preparation date).		
A.1.9.2	Is pH of aqueous samples	for:	
Met	als Analysis ≤ 2?		
Суа	nide Analysis ≥ 12?		L L
If no	<b>FION</b> : of for any of the above, flag odetects as "R" and detects as "	J".	
A.1.9.3 <b>Is th</b> o	e cooler temperature ≤ 10 C	°?	LY
If co	<b>FION:</b> oler temperature is >10 °C , flag detects as "UJ" and detects as	J	
A.1.10 <u>Fina</u>	al Data Correctness - Form	I	

A.1.10.1 Are Form I's for all samples

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SOP:	HW-2	Revision 13	Aı	opendix A.1	Sept.	2006
					YES NO	<u>N/A</u>
	prese	nt and complete?				The state of the s
	Log a	<u>DN</u> : prepare Telephone Recond contact CLP PO/TOP ttal from the laboratory.				
A.1.10		Verify there are no calcu reported on Form I's. Cir		•		
		ls the calculation error le	ss than 10º	% of the correct result?	LY	
		Are results on Form I's re MG/KG for soils)?	eported in c	orrect units (ug/L for aqu	ueous and	<b>-</b>
		Are results on Form I'S r	eported by	correct significant figu	res?[/]	
		Are soil sample results o corrected for percent soli			[]	
		Are all "less than MDL" voy the CRQLs and coded	•	ted	[ <u>'</u> ] _	
	k	Are values less than the out greater than or equal IDLs flagged with "J"?			[	
		Are appropriate contractu ontrol and Method qualifi			[_]	
	-	ACTION: If no for any of the above prepare Telephone Reco CLP PO/TOPO for correc	rd Log, and			
A.1.10	8 9	Do EPA sample identifica and the corresponding lal sample identification num on the Cover Page, Form n the raw data?	boratory bers match		<u></u>	
	١	Nas a brief physical desc	cription			

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SOP: HW-2	Revision 13	Appendix A.1	Sept. 20	06
			YES NO	N/A
	of the samples before and digestion given on the For		[_] _	<i>_</i>
	Was any sample result ou mercury/cyanide calibration or the ICP-AES/ICP-MS li diluted and noted on the F	on range near range	[]	
	ACTION: If no for any of the above, the Contract-Problem/Nor Section of the Data Revie	n-Compliance		
A.1.11 <u>Initia</u>	al Calibration			
A.1.11.1	Is a record of at least 2 po (A blank and a standard)c present for ICP-AES analy	alibration	, V <sub>1</sub> -	_
	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 po (a blank & 4 standards)preser		[]	~
	Is a record of at least 4 po (a blank & 4 standards)presen		[]	
	ACTION: If incomplete or no initial of was performed, reject (R) the associated data (detection)	and red-line		
	Is one initial calibration sta at the CRQL level for cyan mercury?		[]	
	ACTION: If no, write in the Contract Non-Compliance Section of Review Narrative.			
A.1.11.2	Is the curve correlation coefficient $\geq$ 0.995 for:			

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			YES NO N	I/A
	Mercury Analysis?		[]	
	Cyanide Analysis?		[]	
	ICP-AES (more than 2 point Ca	alib.)?	[]	
	ICP-MS (more than 2 point c	alib.)?	r	
	ACTION:		l	
	If no, qualify the associate results > MDL as estimated non-detects as "UJ".  NOTE: The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e absorbance, peak area, peak height, e	"J" and		
A.1.12	Initial and Continuing Calibra	tion Verification-	Form IIA	
A.1.12.1	Present and complete for even metal and cyanide?	ery	[ <u> </u>	
	Present and complete for ICI and ICP-MS when both these were used for the same analy	methods	[]	_
	ACTION:  If no for any of the above,  Telephone Record Log and confor re-submittal from the la	ntact PO/TOPO		
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, in the Contract-Problem/Non- Section of the Data Review N	-Compliance		
A.1.12.3	Was an ICV or a mid-range st distilled and analyzed with of cyanide samples?		[]	<u>/</u>

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			YES	NO N/	'A
	Section of the Dat	the above, write roblem/Non-Compliance ta Review Narrative and MDL as estimated (J).			
A.1.12.2	Circle on each Form IIA that are outside the con	•			
	Are ICV/CCVs within co	ontrol limits for:	,	/	
	Metals - 90-110%	R?	$\lfloor V \rfloor$		—
	Hg - 80-120%R3	?	[]		
	Cyanide - 85-115%	R?	[]		
		s between a previous technically a uent technically acceptable CCV s			
÷	if the ICV/CCV %R is be Qualify only positive res between 111-125%(121 red-line only detects if the recovery is CN). Reject (R) and red-	all detects and non-detects, etween 75-89%(65-79% for Hg; 70 ults(≥ MDL) as "J" if the ICV/CCV -135% for Hg;116-130% for CN).  Is greater than 125% (135% for Hg line all associated results (hits an is less than 75%(65% for Hg;70%	%R is Reject (R) ; 130% for d non-	and	
	NOTE: For ICV that does not fall within qualify all samples reported from				
A.1.12.3	Was the distilled ICV or standard for cyanide wit limits (85-115%)?	•	[]		
	ACTION: If no, Qualify all cyanide	results ≥ MDL as "J".			

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A.1.13 CRQL Standard Analysis - Form IIB

A.1.13.1 For each ICP-AES run, was a CRI

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SOP: HW-	-2 Revision 13	Appendix A.1	Sept. 2006
,	RQL or MDL when MDL > CF andard analyzed? (Note:CRI is not requir Ca, Fe, Mg, Na and K.)  For each ICP-MS run, wa (CRQL or MDL when MDL > C analyzed for each mass/is for the analysis?  For each mercury run, wa standard analyzed?	s a CRI RQL) standard sotope used	yes NO N/A  1310  one target was iron other target is margan  []
	For each cyanide run, was standard analyzed?	s a CRQL	[]
ICF ICF Mei	ACTION:  If no for any of the above, this deficiency in the Cont Non-Compliance Section Narrative, inform CLP PO in the affected ranges (de and non-detects UJ.  e affected ranges are: 2-AES Analysis - *True Value ± rcury Analysis - *True Value ± rcury Analysis - *True Value ± ranide Analysis - *True Value ± ranide Analysis - *True Value ± rcury Analysis - *True Value ±	ract Problems/ of the Data Review and flag results tects <2xCRQL)as J  CRQL CRQL CRQL CRQL	Note- flag Mn UJ in Sample VMAE-MW03-0311 Au other results >> 2X RL.
A.1.13.2	Was a CRQL standard an ICV/ICB, before the final Conce every 20 analytical sthe analytical run for each	CCV/CCB and amples in	[] <u></u>
	ACTION: If no, write in the Contract Non-Compliance Section of "Data Review Narrative".		
A.1.13.3	Circle on each Form IIB al recoveries that are outside		·

acceptance windows.

## Standard Operating Procedure USEPA Region 2

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	Is the CRQL standard within control limits for:		<u>YES</u>	<u>no</u> <u>n</u>	<u>/A</u>
	Metals(ICP-AES/ICP-MS)- 70 - 130%	6?	[]		
	Mercury- 70 - 130%?		[]		
	Cyanide - 70 - 130%?		[]		
	ACTION:  If no, flag detects <2xCRQL as "J" an non-detects as "UJ" if the CRQL stan recovery is between 50-69%. Flag(J) detects <2xCRQL if the recovery is be 131% and ≤180%. If the recovery is be 150%, reject(R) and red-line non-detectects < 2xCRQL, and flag (J) detected the second red detects <2xCRQL and ICV/CCV. Reject and red detects <2xCRQL and flag (J)detects but < ICV/CCV if the recovery is > 18	dard only etween ess than ects and ets between ed-line only ≥ 2xCRQL			
	NOTE:  1. Qualify all field samples analyzed a previous technically acceptable a the CRQL standard and a subsequent analysis of the CRQL standard  2. Flag (J) or reject (R) only the fin sample results on Form I's when Sam raw data are within the affected ra and the CRQL standard is outside th acceptance windows.  3. The samples and the CRQL standard manalyzed in the same analytical run	analysis of acceptable all aple angle angl			
A.1.14 <u>Initi</u>	al and Continuing Calibration Blanks	<u>- Form III</u>			
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, whichev is more frequent?	er			
	Were the ICB & CCB values ≥ MDL be reported on Form III and flagged "J" by				

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	using MDLs from direct a Method "NP1")? (Check Form III agains		YES	<u>no</u> <u>n/a</u>
	ACTION: If no, inform CLP PO/TOI in the Contract-Problems Section of the "Data Revi	/Non-Compliance		
A.1.14.2	Circle with red pencil on eall Calib. Blank values that			
	≥ M	IDL but ≤ CRQL		
	> C	RQL		
A.1.14.2.1	When MDL < CRQL, is a value ≥ MDL but ≤ CRQL			
	ACTION:  If yes, change sample result ≤ CRQL to the CRQL  Do not qualify non-detect	with a "U".		
	hen MDL < CRQL, is any ( lue > CRQL?	Calib. Blank		[ <u>/</u> ]
	ACTION:  If yes, reject (R) and red I associated sample results but <icb blank="" ccb="" residetects=""> ICB/CCB blank &lt; 10xICB/CCB value. Charesults ≥ MDL but ≤ the C with a "U".</icb>	s > CRQL ult. Flag as "J" value but ange the sample		
	any Calibration Blank value low the negative CRQL?	е		[ <u></u>
	ACTION: If yes, flag (J) as estimate associated sample results <10xCRQL.			

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NOTE:

For ICB that does not meet the technical QC Criteria, apply the action to all samples

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 YES
 NO
 N/A

reported from the analytical run.

- 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?

		XIC 10310
[ <u>V</u> ]	 N. C.	WS, a
[]		
. 1		

#### ACTION:

If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

#### NOTE:

If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J), but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

 $\geq$  MDL but  $\leq$  CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value  $\geq$  MDL but  $\leq$  CRQL?

#### ACTION:

If yes, change sample result  $\geq$  MDL

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	but $\leq$ CRQL to CRQL with	a "U".	YES	<u>NO</u>	<u>N/A</u>
A.1.15.2.2	When the MDL $\leq$ CRQL, is Blank value greater than			[_	_1
	If yes, is the Prep. Blagreater than the value of Field Blank collected and the SDG samples?	of the associated		]	_1 _
	If yes, is the lowest contract analyte in the assoless than 10 times the PBlank value?	ciated samples		]	1
	ACTION:  If yes, reject (R) and results greater to than the Prep.Blank valued detects > Prep. Blank valued the sample result > Maint with CRQL-U.	han the CRQL but less e. Flag as "J" lue but <10xPrep.Blan	ık.		
	If the Prep. Blank value analyte value in the Fie qualify the sample resul Prep. Blank criteria.	ld Blank, do not	le		
	NOTE: Convert soil sample result to mg wet weight basis to compare with Prep. Blank result on Form III.				
A.1.15.2.3	Is the Prep. Blank conce below the negative CRQL?	ntration		[]	<del></del>
	ACTION: If yes, flag (J) all ass sample results less than Qualify non-detects as e	10xCRQL.			
A.1.15.2.4	When the MDL is greater CRQL, is the preparation concentration on Form II than two times the MDL?	blank		[	_]

ACTION:

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SOP: HW-2	Revision 13	Appendix A.1	Sept. 2006		
			YES	NO	N/A
	If yes, reject (R) and repositive sample results we raw data less than 10 times Preparation Blank value.	vith sample			
A.1.16	<pre>ICP-AES/ICP-MS Interferer NOTE:Not required for CN, Hg,</pre>	<del>-</del>	S) - Foi	cm IV	
A.1.16.1	Present and complete?		[]		
	Was ICS analyzed at the kand end of each analyticationce for every 20 analytic	al run, and	[]		
	Was ICS analyzed at the k the ICP-MS analytical run		[]		
	ACTION: If no, flag as estimated sample results.	(J) all			
A.1.16.2	ICP-AES Method				
A.1.16.2.1	TCSA Solution: For ICP-AES, are the ICSA values within the control of the true/established mean	limits $\pm$ of CRQL	[]	<u>.                                    </u>	
	If no for any of the above sample concentration of A or Mg in the same units (greater than or equal to concentration in the ICSA Form IV?	al, Ca, Fe, ug/L or MG/KG) its respective	[]		
	ACTION:  If yes, apply the following all samples analyzed between technically acceptable and ICS and a subsequent technically sis of the ICS in	een a previous alysis of the nically acceptable			
	Flag (J) as estimated only	sample results <u>&gt;</u> MDL			

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					YES	NO	N/A	
	(True value) If the IC	ue+CRQL). Do SA "Found" v ue-CRQL), fl	not qualify alue is less	is greater than non-detects. than ts as "UJ" and				
A.1.16.2	ICSAB with	ES, are all hin the cont	analyte resu rol limits o ed mean valu	f 80-120	[]	, 		
	sample comor Mg in greater th	ncentration the same uni nan or equal	above, is th of Al, Ca, F ts (ug/L or to its resp ICSAB Soluti	e, MG/KG) ective	[]		<u>~</u>	
	all sample technical ICS and a	es analyzed l ly acceptable subsequent	lowing actio between a pr e analysis o technically n the analyt	evious f the acceptable				
	sample resanalyte resanalyte res≤ 150%. If 50-79%, quand non-deall sample which the 50%. If the	sults > MDL : ecovery is g: the ICSAB : alify sample etects as "Uc e results (de ICSAB analyme ne recovery :	etects & non- te recovery :	e ICSAB 120% but ls within MDL as "J" R) and red-line -detects) for is less than %, reject (R)			·	
A.1.16.3	ICP-MS Me	thod						
A.1.16.3	values wi of the tr ACTION: If no, app	s, are the lathin the coue/established	ICSA "Found' ontrol limit ed mean valu owing action the analytic	ts of <u>+</u> CRQL ue? to all	[]			
	if the ICS (True valu If the ICS (True valu	A "Found" va e+CRQL). Do A "Found" va e-CRQL), fla	alue is great	non-detects. than lated sample				

detects as "J" and non-detects as "UJ".

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SOP: HW-2	Revision 13	Appendix A.1	Se	ept. 2	006
			YES	NO	<u>N/A</u>
A.1.16.3.3	ICSAB Solution For ICP-MS, are all in ICSAB within the 80-120% of the true/value, whichever is	control limits of established mean	[]		<u>/</u>
	ACTION:  If no, apply the fol samples reported from	lowing action to all m the analytical run:			
	$\leq$ 150%. If the ICSAB 50-79% flag (J) as esample results $\geq$ MDL those all sample determined the ICSAB analysis.	for which the ICSAB greater than 120% but recovery falls within stimated the associated. Reject (R) and red-line ects and non-detects for yte recovery is less than is above 150%, reject (R)			
A.1.17		ry: Pre-Digestion/Pre-Disti			
A.1.17.1	Was Matrix Spike anal	lysis performed:			
	For each matrix type	?	[]		
	For each SDG?				-
	On one of the SDG sar	mples?	[]		
	For each concentration (i.e., low, med., high	_	$[\underline{\checkmark}]$		
	For each analytical M (ICP-AES, ICP-MS, Hg,				
	Was a spiked sample panalyzed with the SDG		[]		
	ACTION:  If no for any of the estimated(J)all the properties for which a spiked satisfies analyzed.	positive data			

If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked

sample analysis.

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			YES	NO N	I/A
A.1.17.2	Was a field blank or PE sample for the spiked sample analysis			[]	
	ACTION:  If yes, flag (J) as estimated data of the associated SDG sawhich field blank or PE sample for the spiked sample analysis.	amples for .e was used			
A.1.17.3	Circle on each Form VA all sprecoveries that are outside to control limits (75-125%) that sample concentrations less that times the added spike concentrations	he have an four			
	Are all recoveries within the control limits when sample concentrations are less than 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	or			
	Are results outside the contr (75-125%) flagged with Lab Qua on Form I's and Form VA?		[]		<u>~</u>
	ACTION:  If no for any of the above, we the Contract - Problems/Non-Contract -	ompliance			
A.1.17.4	Aqueous				
	Are any spike recoveries:				
	(a) less than 30%?			[ <u>V</u> ]	
	(b) between 30-74%?			[]	
	(c) between 126-150%?			[ <u>V</u> ] .	
	(d) greater than 150%?			[]	
	ACTION:  If the matrix spike recovery 30%, reject (R) and red-line a aqueous data (detects & non-debetween 30-74%, qualify all a aqueous data > MDL as "J" and	ll associated etects). If ssociated			

Evaluation of Metals Data for the Contract Laboratory Program
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SOP: HW-2	Revision 13	Appendix A.1	Se	pt. 200	)6
		126-150%, flag (J) ". If greater than 150%, ine all associated data $\geq$ M	YES	<u>no</u> <u>n</u>	N/A
	(NOTE: Replace "N" with	"J", "R" as appropriate.)			
A.1.17.5	Soil/Sediment				
	Are any spike recove	ries:			,
	(a) less than 10%?			[]	
	(b) between 10-74%?			[]	
	(c) between 126-200%	?		[]	
	(d) greater than 200	%?		[]	<u> </u>
	ACTION: If yes for any of th as follows:	e above, proceed			
	if between 126-200%, data $\geq$ MDL as "J" If (R) and red-line all	and red-line all ects & non-detects);			
A.1.18	Lab Duplicates) - Fo	orm VI			
A.1.18.1	Was the lab duplicate	e analysis performed:	_		
	For each SDG?		[]		
	On one of the SDG sar	mples?			
	For each matrix type?	?	[]		
	For each concentration (low or med.)?	on range	[ ]		
	For each analytical N(ICP-AES/ICP-MS, Hg, CN				
	Was a lab duplicate panalyzed with the SDO	-	[]		

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SOP: HW-2	Revision 13	Appendix A.1	Se	ept. 2006
			YES	NO N/A
	ACTION:  If no for any of the estimated all the SDG (detects & non-detect duplicate analysis was	G sample results (cs) for which the lab		
	NOTE:  If more than one lab dupl were analyzed for an SDG, the associated samples baworst lab duplicate analyzed.	then qualify sed on the		
A.1.18.2	Was a Field Blank or for the Lab Duplicate			[]
	ACTION: If yes, flag as estimus SDG sample results (he for which Field Bland used for duplicate as	nits & non-detects) ak or PE sample was		
A.1.18.3	Circle on each Form V that are:	'I all values		
	RPD > 20%, or			
	Absolute Difference >	· CRQL		
	Are all values within limits (RPD $\leq$ 20% or difference $\leq$ $\pm$ CRQL)?		[]	
	If no, are all result control limits flagge (Lab Qualifier) on For all Form I's?	d with an "*"	[]	_ <
	ACTION: If no, write in the C Non-Compliance Sectio Review Narrative.			
	NOTE: The laboratory is not requreport on Form VI the RPD both values are non-detect	when		

# A.1.18.4 Aqueous

A.1.18.4.1 When sample and duplicate values are both  $\geq 5 \times CRQL$  (substitute MDL for CRQL when MDL > CRQL),

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SOP: HW-2	Revision 13	Appendix A.1		Sept. 2006
	is any RPD > 20% but is any RPD $\geq$ 100%?	ut < 100%?	YES	NO N/A
	ACTION:  If the RPD is > 20% flag (J) as estimat sample data ≥ CRQL. ≥ 100%, reject (R) associated sample decompositions.	ed the associated If the RPD is and red-line the		
A.1.18.4.2		MDL for CRQL when MDL >CRQL), ference between sample		
	> ± CRQL?			[]
	> ± 2xCRQL?			[]
	and non-detects as difference is > 2xC red-line all the as and detects ≥ MDL b NOTE:  1. Replace "*" with "J". 2. If one value is >CRQ1 calculate the absolute	<pre>ll the associated L but &lt; 5xCRQL as "J" "UJ". If the absolute RQL, reject (R) and sociated non-detects</pre>	CROL	
A.1.18.5	Soil/Sediment			
	When sample and dup are both $\geq$ 5xCRQL (see CRQL when MDL > CRQL),			,
	is any RPD ≥ 35% but	t < 120%?		
	is any RPD $\geq$ 120%?			[ <u> </u>
	ACTION:  If the RPD is ≥ 35%  (J) as estimated the			

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SOP: HW-2	Revision 13	Appendix A.1		Sept.	2006
	data ≥ CRQL. If t	he RPD is <u>&gt;</u> 120%, reject he associated sample	<u>YES</u>	<u>NO</u>	N/A
A.1.18.5.2	<5xCRQL(substitute	nd/or duplicate value  MDL for CRQL when MDL > CRQL), ifference between sample			
	$> \pm 2 \times CRQL$ ?			[]	
	> <u>+</u> 4 x CRQL			[]	

#### ACTION:

If the absolute difference is > 2 x CRQL, flag all the associated sample results  $\ge$  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  $\ge$  MDL but < 5xCRQL.

#### NOTE:

- 1. Replace "\*" with "J", "UJ" or "R" as appropriate.)
- If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

## A.1.19 Field Duplicates

#### Aqueous Field Duplicates

A.1.19.1 Was an aqueous Field Duplicate pair collected and analyzed?
(Check Sampling Trip Report)

#### ACTION:

If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

no Field dup submitted for this fraction

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	QC criteria stated in Sec	ations A 1 10 2 and A 1	YES	<u>NO</u>	<u>N/A</u>
	QC Criteria Stated in Sec	ccions A.I.19.2 and A.I	.19.3.		
	NOTE:  1. Do not transfer "*" from Fo 2. Do not calculate RPD when b 3. Substitute MDL for CRQL when 4. If one value is > CRQL and th non-detect, calculate the ab between the value > CRQL and this the criteria to qualify	ooth values are non-detects.  MDL > CRQL.  De other value is  DESOLUTE difference  The MDL, and use			
A.1.19.2	Circle all values on the for Field Duplicates that				
	RPD ≥ 20% or				
	Difference $> \pm$ CRQL				
	When sample and duplicate both $\geq 5 \times \text{CRQL}$ (substitute MD MDL > CRQL),				
	is any RPD ≥ 20%?			[]	<u></u>
	is any RPD ≥ 100%?			[]	
	ACTION:  If the RPD is >20% but < the associated sample and results > CRQL. If the RP and red-line only the ass Field Duplicate result >	d its Field Duplicate $PD$ is $\geq$ 100%, reject(R) sociated sample and its			
A.1.19.3	When the sample and/or du <5xCRQL (substitute MDL for is the absolute difference and duplicate:	r CRQL when MDL >CRQL),			
	> ± CRQL?		<u></u>	[]	
	> <u>+</u> 2 x CRQL?			[]	_
	ACTION: If the absolute differenc	e is > CRQL,			

If the absolute difference is > CRQL, flag detects  $\geq$  MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

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SOP: HW-2	Revision 1	3	Appendix	A.1		Sept.	2006	
	and results ≥ and its Field	MDL but <5xCF Duplicate.	QL of the	sample	YES	<u>NO</u>	<u>N/A</u>	
	Soil/Sedimen	t Field Dupli	cates					
A.1.19.4	Was a soil fiction of the collected and (Check Sampling	-	pair		[	]		
	ACTION: If yes, for eapair proceed a	ach soil Field as follows:	Duplicate	è				
	pair. Report of Field Duplicate respective For sample and its than 5xCRQL. Of absolute difference (sample or duplicate field D	dix A.4 for each on Appendix A. the results in the results in the results in the results and the rence when at the results of the results in results	4 all samp MG/KG from ate and re- lues are k report the least one xCRQL. Eva accordance	ple and its their eport RPD whooth greater evalue aluate the ce with the				
	2. Do not calcula 3. Substitute MDL 4. If one value is value is non-de absolute differ value > CRQL ar	er "*" from Form te RPD when both for CRQL when MD c >CRQL and the obtect, calculate tence between the d the MDL, and a qualify the res	values are L > CRQL. ther the					
A.1.19.5	Circle on each values that ha		all					
	RPD ≥ 35%, or When sample an are both ≥ 5xC CRQL when MDL >	d duplicate v	alues					
	is any RPD ≥ 3	5% but < 120%	?			[		
	is any RPD ≥ 1	20%?			******	[		

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ACTION:

If the RPD is  $\geq$  35% but < 120%,

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SOP: HW-2	Revision 13	Appendix A.1	Se	ept. 2006	
:	flag only the associated and its Field Duplicated CRQL as "J". If the reject (R) and red-liand its Field Duplicated	ate results at RPD is $\geq$ 120%, one only the sample	YES	NO N/A	
A.1.19.6	When the sample and/o <5xCRQL (substitute MD is the absolute diffe and Field Duplicate:	L for CRQL when MDL > CRQL),			
	$> \pm 2 \times CRQL$ ?				
	> <u>+</u> 4 x CRQL?			[_]	
	Sample and its Field but <5xCRQL as "J" an If the difference is red-line non-detects	erence is > 2xCRQL, flag Duplicate resuts \( \geq \) MDL ad non-detects as "UJ". >4xCRQL, reject(R) and and detects \( \geq \) MDL but and its Field Duplicate.			
A.1.20	Laboratory Control Sa	mple (LCS) - Form VII			
A.1.20.1	Was one LCS prepared	and analyzed for:			
	Each SDG?		[]		
	Each matrix type? .				
	Each batch samples di For each Method(ICP-Aused?	-			
	Was an LCS prepared a the samples?  ACTION:  If no for any of the Telephone Record Log CLP PO or TOPO for su LCS results. Flag (J) the data for which an analyzed.	above, prepare and contact bmittal of the as estimated all	[]		

If only one LCS was analyzed for

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13 Ap	pendix A.1	S	ept. 200	6	
	more than 20 samples, then the first 20 samples analyzed are not flagged(but all additional samples must be qualified (J).		YES	<u>no</u> n	<u>/A</u>	
A.1.20.2	Aqueous LCS					
	Circle on each Form VII the LO recoveries outside control lim					
	NOTE: 1.Use digested ICV as LCS for 2.Use distilled ICV as LCS fo	-				
	Is any LCS recovery:			/		
	Less than 50%?			[]		
	Between 50% and 79%?			[]		
	Between 121% and 150%?			[]		
	Greater than 150%?			[]		
	ACTION:  If the LCS recovery is less the reject (R) and red-line all assample data (detects & non-detected a recovery between 50-79%, flas "J" all non-detects as "UJ" recovery is between 121-150%, detects as "J". if the recover than 150%, reject (R) and red-	ssociated tects); for ag detects '. if the LCS flag only ry is greater				
A.1.20.3	Solid LCS					
	If an analyte's MDL is equal to greater than the true value of disregard the "Action" below for analyte even though the LCS is control limits.	ELCS, For that				
	Is the LCS "Found" value great than the Upper Control Limit reported on Form VII?	er .	<u> </u>	[] _	$\checkmark$	

ACTION:

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SOP: HW-2	Revision 13 A	ppendix A.1	Se	pt. 2006
	If yes, flag (J) all the assodetects > MDL as estimated (		YES	NO N/A
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?	er	_	[ <u> </u>
	ACTION:  If yes, flag detects as "J" a non-dectes as "UJ".	and		
A.1.21	ICP-AES/ICP-MS Serial Dilu NOTE: Serial dilution analysis is re when the initial concentration is e greater than 50 x MDL.	equired only		
A.1.21.1	Was a Serial Dilution analyst performed:	is		
	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	5?	[]	
	ACTION:  If no for any of the above, for as estimated (J) detects ≥ MI all the SDG samples for which ICP Serial Dilution Analysis not performed.	DL of the		
A.1.21.2	Was a Field Blank or PE sampl for the Serial Dilution Analy			[ <u>V</u> ] .
,	<pre>ACTION: If yes, flag as estimated (J)     MDL of all the SDG samples</pre>	detects		

A.1.21.3 Circle on Form VIII the Percent Differences

(%D) between sample results and its dilution results that are outside the control limits  $\pm$  10%

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SOP: HW-2	Revision 13	Appendix A.1	Se	ept. 2006
	when initial concer	ntrations $\geq$ 50 x MDLs.	<u>YES</u>	NO N/A
	Are results outside limits flagged with on Form VIII and al	n an "E"(Lab Qualifier)	[]	
	ACTION: If no, write in the Non-Compliance Sect Review Narrative.			
A.1.21.4	Are any %D values:			
	> 10%?			
	≥ 100%?			
	all associated sample if the %D is $\geq$ 10	Terence (%D) is  Flag (J) as estimated  bles whose <b>raw data</b> > MDL;  0%, reject (R) and red-line  bles with <b>raw data</b> > MDL.		
	(NOTE:Réplace "E" wit	th "J" or "R" as appropriate.)		
A.1.22	Total/Dissolved or	Inorganic/Total Analytes		
A.1.22.1	Were any analyses prodissolved as well as on the same sample (Were any analyses prinorganic as well as on the same sample (	ss total analytes s)? performed for us total analytes		[] <u>/</u> []
	of the total analyt	erences between anic)and total		•
		r inorganic)concentration tal concentration, and equal to 5xMDL.		
A.1.22.2	Is any dissolved (o concentration great total concentration	er than its		[ <u> </u>

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SOP: HW-2	Revision 13	Appendix A.1	Se	ept. 2006
			YES	NO N/A
A.1.22.3	Is any dissolved (or is concentration greater total concentration k	than its		[_] _
	and total concentration	oth dissolved/inorganic lons as estimated. If re than 50%, reject (R)		
A.1.23	Field Blank - Form I NOTE: Designate "Field	Blank" as such on Form I		
A.1.23.1	Was a Field/Rinsate E and analyzed with the		[]	
	If yes, is any Field, absolute value of an greater than its CRQI		_	[] <u>~</u>
	If yes, circle the Fi on Form I that is gre CRQL, (or 2 x MDL when MD	ater than the		
	Is any Field Blank va than CRQL also greate Preparation Blank val	r than the		[] <u>~</u>
	If yes, is the Field (> CRQL and > the pre already rejected due criteria?	p. blank value)	[]	

#### 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  $\geq$  MDL but  $\leq$  CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

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SOP: HW-2	Revision 13	Appendix A.1	S	ept. 2006	
		not qualify the sample Field Blank criteria.	<u>YES</u>	NO N/A	
	NOTE:  1. Field Blank result pr due to other criteria qualify field samples  2. Do not use Rinsate Bl soils to qualify wate	cannot be used to .			
A.1.24	Verification of Inst	crumental_Parameters - Form	a IX, XA,	XB, XI	
A.1.24.1	Is verification repo	ort present for:			
	Method Detection Lim	nits (Form IX-Annually)?	[]		_
	ICP-AES Interelement (Form XA & XB -Quart		[]		_
	<pre>ICP-AES &amp; ICP-MS Lin (Form XI-Quarterly)?</pre>		[]		_
	ACTION: If no, contact CLP P submittal from the 1				
A.1.24.2	Method Detection Limi	ts - Form IX			
A.1.24.2.1	Are MDLs present on	Form IX for:			
	All the analytes?				_
	All the instruments	used?	[]		_
	Digested and undiges			1.	
	samples and Calib.Bl	anks:	L J		_
	ICP-AES and ICP-MS w instruments are used				
	same analyte?	for the	[]		_
	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.

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Evaluation of Metals Data for the Contract Laboratory Program
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SOP: HW-2	Revision 13	Appendix A.1	Se	pt. 2006
A.1.24.2.2	Is MDL greater than the CR for any analyte?	δr	YES	NO N/A
	If yes, is the analyte concon Form I greater than 5 x the sample analyzed on the whose MDL exceeds CRQL?	MDL for	[]	
	ACTION:  If no, flag as estimated (a values less than five times the analyte whose MDL exceeds	s MDL for		
A.1.24.3	Linear Ranges - Form XI			
A.1.24.3.1	Was any sample result high the high linear range for I or ICP-MS?			
	Was any sample result higher the highest calibration states for mercury or cyanide?			[] <u> </u>
	If yes for any of the above the sample diluted to obtain result reported on Form I?		[]	<i>\sigma</i>
	<u>ACTION</u> : If no, flag (J) as estimate affected detects ( $\geq$ MDL) reon Form I.			
A.1.25	ICP-MS Tune Analysis - For	m XIV		
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?		[]	
	ACTION: If no, reject (R) and red-l sample data for which tunin performed.			
	Was the tuning solution and or scanned at least five ti consecutively?		[]	
	Were all the required isoto spanning the analytical ran present in the tuning solut	ge	[]	
	Was the mass resolution wit	hin		

Standard Operating Procedure

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program

Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13 Ap	pendix A.1		Sept. 2006	
			<u>YES</u>	NO N/A	
0.1 amu fo	or each isotope in the tuning solution?		[]		
	Was %RSD less than 5% for isotope of each analyte in tuning solution?		[]		7
	ACTION:  If no for any of the above all results > MDL associat  Tune as estimated "J", and associated with that Tune	ed with that all non-detects			
A.1.26	ICP-MS Internal Standards	- Form XV			
A.1.26.1	Were the Internal Standard to all the samples and all samples and calibration st (except the Tuning Solution	QC andards	[]		
	Were all the target analyte masses bracketed by the masses the five internal stands	sses	[]		
	ACTION:  If none of the Internal Standard to the samples, reject red-line all the associated (detects & non-detects). It standards were used but did the analyte masses, reject only the analyte results not the internal standard masses.	ct (R) and d sample data f internal d not cover all (R) and red-line of bracketed by			
A.1.26.2	Was the intensity of an Int Standard in each sample wit of the intensity of the sar Standard in the calibration	chin 60-125% ne Internal	[]		
	If no, was the original san two fold, Internal Standard sample re-analyzed?		[]		
	Was the %RI for the two fol within the acceptance limit		[]	_ <i>\rightarrow</i>	-
	ACTION:  If no for any of the above, as "J" and non-detects "UJ" analytes with atomic masse	of all the			
	atomic mass of the internal	standard lighter			

# **DataQual**

# SAMPLE CALCULATION

EPA SAMPLE ID:

VWAE-MW01-0310

COMPOUND:

Manganese

**CONCENTRATION:** %Solids –

2130 ug/L NA

Raw Data result: 2.1347 mg/L

2.1347 mg/L (1000 ug/lmg) = 2134.7 ug/L

### FIELD DUPLICATE SAMPLE SUMMARY

Note: All reported results are noted in the table below because the client requested that the MDL be used as reporting limit instead of the RL for this project. RPDs or absolute differences were calculated based on Region II guidelines: if results are >5X RL RPD is calculated, if results are <5X RL the absolute difference is calculated. Flags are applied to field duplicate pair only as follows: For RPD values - RPD  $\ge 35\%$  but <120% results are J, RPD >120%, results are R. For absolute difference values - >+/-2X RL results are J, >+/-4X RL results are R.

Sample ID:

none

Duplicate Sample ID:

Analyte	Sample Conc.	Duplicate Conc.	RPD or absolute difference
			0.000
			#DIV/0!

Comments:

No qualifications required.

Sample ID:

none

Duplicate Sample ID:

Analyte	Sample Conc.	Duplicate Conc.	RPD or absolute difference
			0.000
			0.000

Comments:

No qualifications required.

Egnely Cleveland

Reviewer

Date: 6,4,10

# **DataQual**

# **Environmental Services. LLC**

CH2M HILL 3011 S.W. Williston Road Gainesville, FL 32608-3928

December 27, 2010 SDG# SJ2254, Mitkem Laboratories Vieques Island, Puerto Rico

Dear Mr. Acaron,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # SJ2254. 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 metals in this SDG (SW-846 methods 6010C). The Region II Standard Operating Procedure for the Evaluation of Metals Data for the CLP was used as applicable for the metals data. 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	SVOA	Fe, Mn
VWAI-MW04-1110H	J2254-01A	water	X		
VWAI-MW04-1110	J2254-01F	water	X	X	X
VWAI-MW04-1110A	J2254-02A	water	X		
VWAI-MW05-1110H	J2254-03A	water	X		
VWAI-MW05-1110	J2254-03F	water	X	X	X
VWAI-MW05-1110A	J2254-04A	water	X		
VWAI-EB01-110210	J2254-05F	water	X	X	
VWAI-EB01-110210A	J2254-06A	water	X		
VWAI-TB01-110210	J2254-07A	water	X		
VWAI-MW02-1110H	J2254-08A	water	X		
VWAI-MW02-1110	J2254-08F	water	X	X	X
VWAI-MW02-1110A	J2254-09A	water	X		
VWAI-EB01-110310	J2254-10B	water	X	X	
VWAI-EB01-110310A	J2254-11A	water	X		
VWAI-TB01-110310	J2254-12A	water	Х		
VWAI-MW03-1110H	J2254-13A	water	Х		
VWAI-MW03-1110	J2254-13F	water	X	Х	X
VWAI-MW03-1110A	J2254-14A	water	X		
VWAI-MW07-1110H	J2254-15A	water	X		
VWAI-MW07-1110	J2254-15F	water	X	X	X
VWAI-MW07-1110A	J2254-16A	water	Х		
VWAI-MW07P-1110	J2254-17F	water	X	X	
VWAI-MW07P-1110A	J2254-18A	water	Х		
VWAI-EB01-110410	J2254-19F	water	X	X	
VWAI-EB01-1110A	J2254-20A	water	Х		
VWAI-TB01-110410	J2254-21A	water	Х		

Sample ID	Lab ID*	Matrix	VOA	SVOA	Fe, Mn
VWAI-MW02-1110 MS	J2254-08FMS	water	Х	Х	
VWAI-MW02-1110 MSD	J2254-08FMSD	water	Х	X	
VWAI-MW02-1110A MS	J2254-09AMS	water	Х		
VWAI-MW02-1110A MSD	J2254-09AMSD	water	Х		

<sup>\*</sup>Lab IDs listed were used for VOA samples as samples were analyzed with multiple preservatives (H: hydrochloric acid only, A; ascorbic acid only and no letter: ice only)

The following quality control samples were provided with this SDG: samples VWAI-TB01-110210, VWAI-TB01-110310 and VWAI-TB01-110410-trip blanks; samples VWAI-EB01-110210, VWAI-EB01-110210A, VWAI-EB01-110310, VWAI-EB01-110310A, VWAI-EB01-110410 and VWAI-EB01-1110A-equipment blanks; and sample VWAI-MW07P-1110-field duplicate of sample VWAI-MW07-1110.

The samples were evaluated based on the following criteria:

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

<sup>\* -</sup> 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.

# <u>VOA</u>

No qualifications to the data were required.

# **SVOA**

No qualifications to the data were required.

# **Select Filtered Metals**

Blank contamination was noted in one of the associated CCB samples. Qualifications were required.

The laboratory did not perform a matrix spike or a serial dilution in this SDG. These QC samples are required by Region II. Qualifications were required.

# **Specific Evaluation of Data**

### **Data Completeness**

The SDG was received complete and intact. Resubmissions were not required.

# **Technical Holding Times**

According to chain of custody records, sampling was performed on 11/2-4/10 and samples were received at the laboratory 11/3-5/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

#### Blanks

#### Select Filtered Metals

One associated blank exhibited contamination as noted in the following table. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
CCB 2	iron	44.3B ug/L	LOD	U at LOD

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

Sample ID	Analyte	Q Flag
VWAI-MW03-1110, VWAI-MW04-1110	iron	U at LOD

# **Matrix Spike**

#### Select Filtered Metals

The laboratory did not perform a matrix spike sample on a sample from this SDG. Region II required that all positive results be qualified as estimated J because of this. Therefore, the reported positive results for iron and manganese were qualified as estimated J with a qualifier code of OT.

#### **Serial Dilution**

#### Select Filtered Metals

The laboratory did not perform a serial dilution sample on a sample from this SDG. Region II required that all positive results be qualified as estimated J because of this. Therefore, the reported positive results for iron and manganese were qualified as estimated J with a qualifier code of OT.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Laura Maschhoff

President

Jacqueline Cleveland

Vice President

# **Summary of Data Qualifications**

# $\underline{VOA}$

Sample ID	Compound	Results	Q flag	Q Code
No qualifications				

# $\underline{\text{SVOA}}$

Sample ID	Compound	Results	Q flag	Q Code
No qualifications				

# Select Filtered Metals

Sample ID	Analyte	Results	Q flag	Q Code
VWAI-MW03-1110, VWAI-MW04-1110	iron	+B	U at LOD	MBL
all samples	iron, manganese	in fine.	J	OT

# 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.

[]\* 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.

#### **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.

<sup>\*</sup> 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.

# Glossary of Qualification Flags and Abbreviations, continued

- R Sample result is greater than the RL and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the RL.
- J Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the RL.
- J/UJ Sample result is less than 10X RL when blank result is below the negative RL.

# Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

- No Action The sample result is greater than the RL and greater than ten times (10X) the blank value.
- U The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the 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.

#### **General Abbreviations**

LOD level of detection

RL reporting limit (equivalent to the LOD)

PQL practical quantitation limit IDL instrument detection limit MDL method detection limit

positive resultnon-detect result

<sup>\*</sup> 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.

<sup>\*</sup> 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.

# 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
28	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
ССН	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

EPA SAMPLE NO.

VWAI-MW04-1110H

Lab Name:	MITKEM LABORA	TORIES			Contract:				## ## ## ## ## ## ## ## ## ## ## ## ##	
Lab Code:	MITKEM	Case No.:	J2254		Mod. Ref 1	No.:		SDG No.:	SJ225	4
Matrix: (SO	OIL/SED/WATER)	WATER			Lab Sample	e ID:	J2254-01	A		
Sample wt/	vol: 5.0	00 (g/mL)	ML		Lab File 1	ID:	V6H7446.1	D	(9):	
Level: (TRA	ACE/LOW/MED)	LOW			Date Reces	ived:	11/03/20	10		
% Moisture	: not dec.				Date Analy	yzed:	11/09/20	1.0.		
GC Column:	DB-624	ID:	0.25	(mm)	Dilution H	Factor:	1.0			
Soil Extra	ct Volume:			(uL)	Soil Aliqu	ot Vol	ume:			(uL
Purge Volum	ne: 5.0			(mL)						
CAS NO.	COMPOUND			CONC	ENTRATION:	Q	DL	LOD	LOQ	
107-06-2	1.2-Dichloro	ethane			0.50	U	0.41	0.50	5.0	

4.6

1.0

U



0.33

0.61

0.50

1.0

5.0

5.0

71-43-2 Benzene

EPA SAMPLE NO.

VWAI-MW04-1110

5.0

Lab Name: MITKEM LABORATORIES Contract: Lab Code: MITKEM Case No.: J2254 Mod. Ref No.: SDG No.: SJ2254 Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: J2254-01F Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V6H7328.D Level: (TRACE/LOW/MED) LOW Date Received: 11/03/2010 % Moisture: not dec. Date Analyzed: 11/04/2010 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) CONCENTRATION: CAS NO. COMPOUND LOQ Q DL LOD µG/L 107-06-2 1,2-Dichloroethane 0.50 5.0 0.50 U 0.41 71-43-2 Benzene 0.33 0.50 5.0

4.3

1.0

0.61

1.0

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		1000	

EPA SAMPLE NO.

VWAI-MW04-1110A

Lab Name:	MITKEM LABORA	ATORIES			Contract:					
Lab Code:	MITKEM	Case No.:	J2254		Mod. Ref 1	No.:	Ri-	SDG No.:	SJ225	4
Matrix: (S	SOIL/SED/WATER)	WATER		-	Lab Sample	e ID:	J2254-02	A		
Sample wt/	/vol: 5.0	00 (g/mL)	ML		Lab File	ID:	V6H7329.	D		
Level: (TF	RACE/LOW/MED)	LOW			Date Reces	ived:	11/03/20	10 .		
% Moisture	e: not dec.				Date Analy	yzed:	11/04/20	10		
GC Column:	DB-624	ID:	0.25	(mm)	Dilution H	Factor:	1.0			
Soil Extra	act Volume:			(uL)	Soil Aliqu	ot Vol	ume:			(uI
Purge Volu	me: 5.0			(mL)						
CAS NO.	COMPOUND		<del>0.08   1.0   6   0.0</del>	CONC	ENTRATION:	Q	DL	LOD	LOQ	
107-06-	2 1.2-Dichlore	nethane		1	0.50	17	0.41	0.50	5.0	-

4.0

1.0

U



0.33

0.61

0.50

1.0

5.0

5.0

71-43-2 Benzene

EPA SAMPLE NO.

VWAI-MW05-1110H

5.0

5.0

0.50

1.0

Lab Name: MITKEM LABORATORIES Contract: Lab Code: MITKEM Case No.: J2254 Mod. Ref No.: SDG No.: SJ2254 Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: J2254-03A ML Sample wt/vol: 5.00 (g/mL) Lab File ID: V6H7447.D Level: (TRACE/LOW/MED) LOW Date Received: 11/03/2010 % Moisture: not dec. Date Analyzed: 11/09/2010 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) CONCENTRATION: CAS NO. COMPOUND LOD LOO DL Q µG/L 107-06-2 1,2-Dichloroethane 0.50 0.41 0.50 5.0

0.50

U

1.0

0.33

0.61



71-43-2 Benzene

EPA SAMPLE NO.

VWAI-MW05-1110

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J2254	Mod. Ref No.: SDG No.: SJ2254
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J2254-03F
Sample wt/vol: 5.00 (g/mL) ML	Lab File ID: V6H7330.D
Level: (TRACE/LOW/MED) LOW	Date Received: 11/03/2010
% Moisture: not dec.	Date Analyzed: 11/04/2010
GC Column: DB-624 ID: 0.25	(mm) Dilution Factor: 1.0
Soil Extract Volume:	(uL) Soil Aliquot Volume: (uI
Purge Volume: 5.0	(mL)
CAS NO. COMPOUND	CONCENTRATION:  pg/L Q DL LOD LOQ
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



EPA SAMPLE NO.

VWAI-MW05-1110A

1.0

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J2254	Mod. Ref No.: SDG No.: SJ2254
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J2254-04A
Sample wt/vol: 5.00 (g/mL) ML	Lab File ID: V6H7331.D
Level: (TRACE/LOW/MED) LOW	Date Received: 11/03/2010
% Moisture: not dec.	Date Analyzed: 11/04/2010
GC Column: DB-624 ID: 0.25	(mm) Dilution Factor: 1.0
Soil Extract Volume:	(uL) Soil Aliquot Volume: (uI
Purge Volume: 5.0	(mL)
CAS NO. COMPOUND	CONCENTRATION:  Q DL LOD LOQ
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

1.0

0.61

EPA SAMPLE NO.

VWAI-EB01-110210

Lab Name:	Lab Name: MITKEM LABORATORIES			Contract:			·			*
Lab Code:	MITKEM Case No.:		J2254		Mod. Ref No.:			SDG No.:	SJ2254	1
Matrix: (SOIL/SED/WATER) WATER					Lab Sample	ID:	J2254-05F			
Sample wt/vol: 5.00 (g/mL) ML			ML		Lab File ID:		V6H7332.D			
Level: (TRACE/LOW/MED) LOW					Date Received: 11/03/2010					
% Moisture	: not dec.			9	Date Analy:	zed:	11/04/20	10		
GC Column:	DB-624	ID:	0.25	(mm)	Dilution Fa	actor:	1.0			
Soil Extract Volume:				(uL)	Soil Aliquot Volume: (u					
Purge Volume: 5.0			(mL)	(mL)						
CAS NO.	COMPOUND			CONC	ENTRATION:	Q	DL	LOD	LOQ	

0.50

0.50

1.0

U

U

0.41

0.33

0.61

0.50

0.50

1.0

5.0

5.0

5.0

MILTIO

107-06-2 1,2-Dichloroethane

78-87-5 1,2-Dichloropropane

71-43-2 Benzene

EPA SAMPLE NO.

VWAI-EB01-110210 A

5.0

5.0

5.0

0.50

0.50

1.0

Lab Name: MITKEM LABORATORIES Contract: Lab Code: MITKEM Case No.: J2254 Mod. Ref No.: SDG No.: SJ2254 Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: J2254-06A Sample wt/vol: 5.00 (g/mL) Lab File ID: V6H7333.D Level: (TRACE/LOW/MED) LOW Date Received: 11/03/2010 % Moisture: not dec. Da'te Analyzed: 11/04/2010 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) CONCENTRATION: CAS NO. COMPOUND Q DL LOD LOQ µG/L

0.50 U

0.50

1.0

0.41

0.33

0.61

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1	1/	V	1	111
V	V	1	V	llo

107-06-2 1,2-Dichloroethane

78-87-5 1,2-Dichloropropane

71-43-2 Benzene

EPA SAMPLE NO.

VWAI-TB01-110210

0.41

0.33

0.61

0.50

0.50

1.0

5.0

5.0

5.0

Lab Name: MITKEM LABORATORIES Contract: Lab Code: MITKEM Case No.: J2254 Mod. Ref No.: SDG No.: SJ2254 Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: J2254-07A Sample wt/vol: 5.00 (g/mL) Lab File ID: V6H7334.D Level: (TRACE/LOW/MED) LOW Date Received: 11/03/2010 % Moisture: not dec. Date Analyzed: 11/04/2010 GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0 (uL) Soil Aliquot Volume: Soil Extract Volume: (uL) Purge Volume: 5.0 (mL) CONCENTRATION: CAS NO. COMPOUND Q  $\mathsf{DL}$ LOD LOQ μG/L

0.50 U

U

0.50

1.0



107-06-2 1,2-Dichloroethane

78-87-5 1,2-Dichloropropane

71-43-2 Benzene

EPA SAMPLE NO.

VWAI-MW02-1110H

5.0

5.0

0.50

1.0

Lab Name: 1	MITKEM LABORATORIES	_/-		Contract:					
Lab Code: 1	MITKEM Case No	.: J2254		Mod. Ref 1	No.:		SDG No.:	SJ225	4
Matrix: (SO	IL/SED/WATER) WATE	₹		Lab Sample	e ID:	J2254-08	A		
Sample wt/v	ol: 5.00 (g/m	L) ML		Lab File	ID:	V6H7448.	D		
Level: (TRA	CE/LOW/MED) LOW			Date Rece	ived:	11/04/20	10		
% Moisture:	not dec.		113	Date Analy	zed:	11/09/20	10		
GC Column:	DB-624 I	D: 0.25	(mm)	Dilution I	Factor:	1.0			
Soil Extrac	t Volume:		(uL)	Soil Aliqu	ot Vol	ume:			(uI
Purge Volume	5.0		(mL)						
CAS NO.	COMPOUND		CONC	CENTRATION:	Q	DL	LOD	LOQ	
107-06-2	1,2-Dichloroethane			0.50	U	0.41	0.50	5.0	

0.50

1.0

U

0.33

0.61

MANIO

71-43-2 Benzene

EPA SAMPLE NO.

VWAI-MW02-1110

Lab Name:	MITKEM LABORATORIES			Contract:					
Lab Code:	MITKEM Case N	o.: <u>J2254</u>		Mod. Ref 1	No.:		SDG No.:	SJ2254	
Matrix: (SO	IL/SED/WATER) WATE	R		Lab Sample	e ID:	J2254-08	F		
Sample wt/v	ol: 5.00 (g/m	L) ML		Lab File	ID:	V6H7335.	D		
Level: (TRA	CE/LOW/MED) LOW			Date Recei	ived:	11/04/20	10		
% Moisture:	not dec.			Date Analy	yzed:	11/04/20	10		
GC Column:	DB-624	ID: 0.25	(mm)	Dilution H	Factor:	1.0			
Soil Extrac	t Volume:		(uL)	Soil Aliqu	ot Vol	ume:			(uI
Purge Volum	e: 5.0		(mL)						
CAS NO.	COMPOUND		CONC	CENTRATION:	Q	DL	LOD	LOQ	
107-06-2	1,2-Dichloroethane			0.50	U	0.41	0.50	5.0	1

0.50 U

1.0

0.33

0.61

0.50

1.0

5.0

Mario

019

SW846

71-43-2 Benzene

EPA SAMPLE NO.

VWAI-MW02-1110A

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J2254	Mod. Ref No.: SDG No.: SJ2254
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J2254-09A
Sample wt/vol: 5.00 (g/mL) ML	Lab File ID: V6H7336.D
Level: (TRACE/LOW/MED) LOW	Date Received: 11/04/2010
% Moisture: not dec.	Date Analyzed: 11/04/2010
GC Column: DB-624 ID: 0.25	(mm) Dilution Factor: 1.0
Soil Extract Volume:	(uL) Soil Aliquot Volume: (uI
Purge Volume: 5.0	(mL)
CAS NO. COMPOUND	CONCENTRATION:  pg/L  Q  DL  LOQ
107-06-2 1,2-Dichloroethane	0.50 U 0.41 0.50 5.0

0.50

U

U



0.50

1.0

0.33

0.61

5.0

5.0

71-43-2 Benzene

EPA SAMPLE NO.

VWAI-EB01-110310

Lab Name: MITKEM LABORATORIES Contract: Lab Code: MITKEM Case No.: J2254 Mod. Ref No.: SDG No.: SJ2254 Matrix: (SOIL/SED/WATER) WATER J2254-10B Lab Sample ID: Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V6H7337.D Level: (TRACE/LOW/MED) LOW Date Received: 11/04/2010 % Moisture: not dec. Date Analyzed: 11/04/2010 GC Column: DB-624 (mm) Dilution Factor: 1.0 ID: 0.25 Soil Extract Volume: (uL) Soil Aliquot Volume: (uL) Purge Volume: 5.0 (mL) CONCENTRATION: CAS NO. COMPOUND DL LOD LOQ µG/L

2-Dichloroethane	0.50	U	0.41	0.50	5.0
izene	0.50	U	0.33	0.50	5.0
2-Dichloropropane	1.0	U	0.61	1.0	5.0
1	zene	zene 0.50	zene 0.50 U	zene 0.50 U 0.33	zene 0.50 U 0.33 0.50

maio

EPA SAMPLE NO.

VWAI-EB01-110310 A

Lab Name: MITKEM	LABORATORIES			Contract:					
Lab Code: MITKEM	Case No.:	J2254		Mod. Ref No	o.:		SDG No.:	SJ2254	
Matrix: (SOIL/SED	/WATER) WATER			Lab Sample	ID:	J2254-11	A		
Sample wt/vol:	5.00 (g/mL)	ML		Lab File II	):	V6H7338.	D		
Level: (TRACE/LOW	/MED) LOW			Date Receiv	red:	11/04/20	10		
% Moisture: not d	ec.			Date Analy:	zed:	11/04/20	10		
GC Column: DB-62	4 ID:	0.25	(mm)	Dilution Fa	actor:	1.0	(90)		
Soil Extract Volum	me:		(uL)	Soil Alique	ot Vol	ume:			(u)
Purge Volume: 5.	)		(mL)						
CAS NO. COMP	DUND		CONC	ENTRATION:	Q	DL	LOD	LOQ	]

0.50

0.50

1.0

U

U

0.41

0.33

0.50

0.50

1.0

5.0

5.0

5.0

WITTO

107-06-2 1,2-Dichloroethane

78-87-5 1,2-Dichloropropane

71-43-2 Benzene

EPA SAMPLE NO.

VWAI-TB01-110310

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J2254	Mod. Ref No.: SDG No.: SJ2254
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J2254-12A
Sample wt/vol:5.00 (g/mL) ML	Lab File ID: V6H7327.D
Level: (TRACE/LOW/MED) LOW	Date Received: 11/04/2010
% Moisture: not dec.	Date Analyzed: 11/04/2010
GC Column: DB-624 ID: 0.25	(mm) Dilution Factor: 1.0
Soil Extract Volume:	(uL) Soil Aliquot Volume: (uI
Purge Volume: 5.0	(mL)
CAS NO. COMPOUND	CONCENTRATION: Q DL LOD LOQ
107-06-2 1,2-Dichloroethane	0.50 U 0.41 0.50 5.0

0.50

1.0

U

U

0.33

0.61

0.50

1.0

5.0

5.0



71-43-2 Benzene

EPA SAMPLE NO.

VWAI-MW03-1110H

5.0

5.0

0.50

1.0

Lab Name: MITKEM LABORATORIES Contract: Lab Code: MITKEM Case No.: J2254 Mod. Ref No.: SDG No.: SJ2254 Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: J2254-13A Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V6H7449.D Level: (TRACE/LOW/MED) LOW Date Received: 11/05/2010 % Moisture: not dec. Date Analyzed: 11/09/2010 GC Column: DB-624 0.25 (mm) Dilution Factor: 1.0 ID: Soil Extract Volume: (uL) Soil Aliquot Volume: (uL) Purge Volume: 5.0 (mL) CONCENTRATION: CAS NO. COMPOUND 0 DL LOD LOQ µG/L 107-06-2 1,2-Dichloroethane 0.50 0.50 0.41 5.0 U

0.50

1.0

0.33

0.61

MAID

71-43-2 Benzene

EPA SAMPLE NO.

VWAI-MW03-1110

Lab Name:	MITKEM LABORA	TORIES			Contract:			Olaco di Sala		
Lab Code:	MITKEM	Case No.:	J2254		Mod. Ref 1	No.:		SDG No.:	SJ225	1
Matrix: (S	OIL/SED/WATER)	WATER			Lab Sample	e ID:	J2254-13	F		
Sample wt/	vol: 5.0	00 (g/mL)	ML		Lab File 1	ΙŅ:	V6H7437.1	D		
Level: (TR	ACE/LOW/MED)	LOW			Date Recei	ived:	11/05/20	10		
% Moisture	: not dec.				Date Analy	/zed:	11/09/203	10		
GC Column:	DB-624	ID:	0.25	(mm)	Dilution H	Factor:	1.0			
Soil Extra	ct Volume:			(uL)	Soil Aliqu	ıot Vol	.ume:			(uL
Purge Volum	me: 5.0	2000		(mL)						
CAS NO.	COMPOUND			CONC	ENTRATION:	Q	DL	LOD	LOQ	
107-06-2	1.2-Dichloro	ethane		-	0.50	[]	0.41	0.50	5.0	

0.50

0.33

0.61

0.50

1.0

WINIO

71-43-2 Benzene

EPA SAMPLE NO.

VWAI-MW03-1110A

Lab Name:	MITKEM LABORATORIE			Contract:						
Lab Code:	MITKEM Case	No.:	J2254		Mod. Ref 1	No.:	\$	SDG No.:	SJ2254	
Matrix: (S	OIL/SED/WATER) WAT	TER			Lab Sample	e ID:	J2254-14	A		
Sample wt/	vol: 5.00 (g/	mL)	ML		Lab File 1	[D:	V6H7438.	D		
Level: (TR	ACE/LOW/MED) LOW				Date Recei	ived:	11/05/20	10	<u></u>	
% Moisture	: not dec.				Date Analy	yzed:	11/09/20	10		
GC Column:	DB-624	ID:	0.25	(mm)	Dilution F	Factor:	1.0			
Soil Extra	ct Volume:			(uL)	Soil Aliqu	ot Vol	ume:			(uI
Purge Volum	me: 5.0			(mL)						
CAS NO.	COMPOUND			CONC	ENTRATION:	Q	DL	LOD	LOQ	
107-06-2	1.2-Dichloroethan	e	-	74	0.50	IJ	0.41	0.50	5.0	7

0.50

WAND

71-43-2 Benzene

78-87-5 1,2-Dichloropropane

0.50

1.0

5.0

5.0

0.33

0.61

EPA SAMPLE NO.

VWAI-MW07-1110H

Lab Name:	MIIKEM LABORA.	IORIES			Contract:					
Lab Code:	MITKEM	Case No.:	J2254		Mod. Ref No	o.:		SDG No.:	SJ2254	
Matrix: (S	OIL/SED/WATER)	WATER			Lab Sample	ID:	J2254-15	A		
Sample wt/	vol: 5.00	0 (g/mL)	ML		Lab File II	):	V6H7450.	D		
Level: (TR	ACE/LOW/MED)	LOW			Date Receiv	red:	11/05/20	10		
% Moisture	: not dec.				Date Analya	zed:	11/09/20	10		
GC Column:	DB-624	ID:	0.25	(mm)	Dilution Fa	actor:	1.0			
Soil Extra	ct Volume:			(uL)	Soil Aliquo	ot Vol	ume:			(uI
Purge Volum	me: 5.0			(mL)						
CAS NO.	COMPOUND			CONC	ENTRATION:	Q	DL	LOD	LOQ	

9.4

1.0

MANIO

0.41

0.33

0.61

0.50

0.50

1.0

5.0

5.0

5.0

107-06-2 1,2-Dichloroethane

78-87-5 1,2-Dichloropropane

71-43-2 Benzene

EPA SAMPLE NO.

VWAI-MW07-1110

5.0

Lab Name: MITKEM LABORATORIES Contract: Lab Code: MITKEM Case No.: J2254 Mod. Ref No.: SDG No.: SJ2254 Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: J2254-15F Sample wt/vol: 5.00 (g/mL) Lab File ID: V6H7439.D Level: (TRACE/LOW/MED) LOW Date Received: 11/05/2010 Date Analyzed: 11/09/2010 % Moisture: not dec. 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) CONCENTRATION: CAS NO. LOD LOQ COMPOUND DL uG/L 107-06-2 1,2-Dichloroethane 0.50 U 0.50 5.0 0.41 71-43-2 Benzene 0.50 0.33 5.0 9.5

1.0

0.61

1.0



EPA SAMPLE NO.

VWAI-MW07-1110A

5.0

1.0

0.61

Lab Name: M	MITKEM LABORAT			Contract:						
Lab Code: M	IITKEM C	Case No.:	J2254		Mod. Ref N	No.:		SDG No.:	SJ2254	
Matrix: (SO)	IL/SED/WATER)	WATER			Lab Sample	e ID:	J2254-16	A		
Sample wt/vo	ol: 5.00	(g/mL)	ML		Lab File 1	ID:	V6H7440.	D		
Level: (TRACE/LOW/MED) LOW					Date Received: 11/05/203			10		
% Moisture: not dec.				Date Analyzed: 11/09/20			10			
GC Column:	DB-624	ID:	0.25	(mm)	Dilution Factor: 1.0					
Soil Extract	Volume:			(uL)	L) Soil Aliquot Volume:					(uI
Purge Volume	e: <u>5.0</u>			(mL)						
CAS NO.	COMPOUND			CONC	ENTRATION:	Q	DL	LOD	LOQ	
107-06-2	1,2-Dichloroe	thane			0.50	Ū	0.41	0.50	5.0	
71-43-2	Benzene				9.5	399	0.33	0.50	5.0	-9

1.0

EPA SAMPLE NO.

VWAI-MW07P-1110

Lab Name:	MITKEM LABORA	ATORIES			Contract:		<u>n 200</u>			
'Lab Code:	MITKEM	Case No.:	J2254		Mod. Ref N	o.:	<u> </u>	SDG No.:	SJ2254	3 3
Matrix: (S	OIL/SED/WATER	) WATER			Lab Sample	ID:	J2254-17	F		
Sample wt/	vol:5.0	00 (g/mL)	ML		Lab File I	D:	V6H7441.	D	_	
Level: (TR	ACE/LOW/MED)	LOM			Date Recei	ved:	11/05/20	10		
% Moisture	: not dec.				Date Analy	zed:	11/09/20	10		
GC Column:	DB-624	ID:	0.25	(mm)	Dilution F	actor	1.0			
Soil Extra	ct Volume:	: 1		(uL)	Soil Alique	ot Vol	Lume:			(uI
Purge Volum	me: 5.0			(mL)						
CAS NO.	COMPOUND			CONC	CENTRATION:	Q	DL	LOD	LOQ	

0.50

10

0.41

0.33

0.61

0.50

0.50

1.0

5.0

WATO

107-06-2 1,2-Dichloroethane

78-87-5 1,2-Dichloropropane

71-43-2 Benzene

EPA SAMPLE NO: VWAI-MW07P-1110A

(uL)

SDG No.: SJ2254

Lab Name: MITKEM LABORATORIES Contract:

Mod. Ref No.:

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: J2254-18A

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: V6H7442.D

Level: (TRACE/LOW/MED) LOW Date Received: 11/05/2010

Date Analyzed: 11/09/2010 % Moisture: not dec.

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume:

Purge Volume: 5.0 (mL)

Lab Code: MITKEM Case No.: J2254

CAS NO.	COMPOUND	CONCENTRATION: µG/L	Q	DL	LOD	LOQ
107-06-2	1,2-Dichloroethane	0.50	U	0.41	0.50	5.0
71-43-2	Benzene	9.5		0.33	0.50	5.0
78-87-5	1,2-Dichloropropane	1.0	U	0.61	1.0	5.0

12210

EPA SAMPLE NO.

VWAI-EB01-110410

5.0

Lab Name: MITKEM LABORATORIES Contract: Lab Code: MITKEM Case No.: J2254 Mod. Ref No.: SDG No.: SJ2254 Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: J2254-19F Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V6H7443.D Level: (TRACE/LOW/MED) LOW Date Received: 11/05/2010 % Moisture: not dec. Date Analyzed: 11/09/2010 ID: 0.25 GC Column: DB-624 (mm) Dilution Factor: 1.0 Soil Extract Volume: (uL) Soil Aliquot Volume: (uL) Purge Volume: 5.0 (mL) CONCENTRATION: CAS NO. COMPOUND DL LOD LOQ Q µG/L 107-06-2 1,2-Dichloroethane 0.50 0.41 0.50 5.0 71-43-2 Benzene 0.50 0.33 0.50 5.0

1.0

0.61

1.0

W2210

EPA SAMPLE NO.

VWAI-EB01-1110A

Lab Name: I	MIIKEM LABORA	TORIES			Contract:	**				
Lab Code: 1	MITKEM	Case No.:	J2254		Mod. Ref 1	No.:		SDG No.:	SJ2254	4
Matrix: (SO	IL/SED/WATER)	WATER			Lab Sample	e ID:	J2254-202	P		
Sample wt/v	ol: 5.0	0 (g/mL)	ML		Lab File	ID:	V6H7444.1	D		
Level: (TRA	CE/LOW/MED)	LOW .			Date Rece	ived:	11/05/20	10		
% Moisture:	not dec.				Date Analy	yzed:	11/09/203	10	-	
GC Column:	DB-624	ID:	0.25	(mm)	Dilution I	Factor:	1.0			É
Soil Extrac	t Volume:			(uL)	Soil Aliqu	uot Vol	ume:	2321		(uI
Purge Volume	e: 5.0			(mL)						
F	241			T						_
CAS NO.	COMPOUND			CONC	ENTRATION: pG/L	Q	DL	LOD	LOQ	
107-06-2	1,2-Dichloro	ethane			0.50	U	0.41	0.50	5.0	
71-43-2	Benzene				0.50	U	0.33	0.50	5.0	

1.0

0.61

1.0

1,2-Dichloropropane

EPA SAMPLE NO.

VWAI-TB01-110410

5.0

5.0

0.50

1.0

DAD Name. WITKEN DADORATORIES	
Lab Code: MITKEM Case No.: J2254	Mod. Ref No.: SDG No.: SJ2254
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J2254-21A
Sample wt/vol: 5.00 (g/mL) ML	Lab File ID: V6H7445.D
Level: (TRACE/LOW/MED) LOW	Date Received: 11/05/2010
% Moisture: not dec.	Date Analyzed: 11/09/2010
GC Column: DB-624 ID: 0.25	(mm) Dilution Factor: 1.0
Soil Extract Volume:	(uL) Soil Aliquot Volume: (u
Purge Volume: 5.0	(mL)
CAS NO. COMPOUND	CONCENTRATION:  pG/L  Q  DL  LOD  LOQ
107-06-2 1,2-Dichloroethane	0.50 U 0.41 0.50 5.0

0.50

1.0

U

0.33

0.61

W 170

71-43-2 Benzene

EPA SAMPLE NO.

VWAI-MW02-1110MS

5.0

1.0

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J2254	Mod. Ref No.: SDG No.: SJ2254
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J2254-08FMS
Sample wt/vol: 5.00 (g/mL) ML	Lab File ID: V6H7339.D
Level: (TRACE/LOW/MED) LOW	Date Received: 11/04/2010
% Moisture: not dec.	Date Analyzed: 11/04/2010
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	CENTRATION:  pg/L  Q  DL  LOD  LOQ
107-06-2 1,2-Dichloroethane	52 0.41 0.50 5.0
71-43-2 Benzene	49 0.33 0.50 5.0

53

0.61

EPA SAMPLE NO.

VWAI-MW02-1110MS D

Lab Name: MITKE	M LABORATORIES		Contract:		2			
Lab Code: MITKE	M Case No.: J	2254	Mod. Ref No	·:		SDG No.:	SJ2254	
Matrix: (SOIL/SE	CD/WATER) WATER		Lab Sample	ID:	J2254-081	FMSD		
Sample wt/vol:	5.00 (g/mL) M	L	Lab File II	):	V6H7340.	D		
Level: (TRACE/LO	W/MED) LOW		Date Receiv	red:	11/04/20	10		
% Moisture: not	dec.		Date Analyz	zed:	11/04/203	10		
GC Column: DB-6	iD: 0	.25 (mm)	Dilution Fa	ctor:	1.0			
Soil Extract Vol	ume:	(uL)	Soil Alique	ot Vol	ume:	-2007/90 2 12-		(u
Purge Volume: 5	.0	(mL)						
CAS NO. COM	IPOUND	CONC	ENTRATION:	Q	DL	LOD	LOQ	7
107-06-2 1,2-	Dichloroethane		52		0.41	0.50	5.0	

48

54

0.33

0.61

0.50

1.0

5.0

5.0

Mario

71-43-2 Benzene

EPA SAMPLE NO.

VWAI-MW02-1110AM S

Lab Name: MITKEM LABORATORIES Contract: Lab Code: MITKEM Case No.: J2254 Mod. Ref No.: SDG No.: SJ2254 Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: J2254-09AMS Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V6H7341.D Level: (TRACE/LOW/MED) LOW Date Received: 11/04/2010 % Moisture: not dec. Date Analyzed: 11/04/2010 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:	Q	DL	LOD	LOQ
107-06-2	1,2-Dichloroethane	51		0.41	0.50	5.0
71-43-2	Benzene	49		0.33	0.50	5.0
78-87-5	1,2-Dichloropropane	52		0.61	1.0	5.0

Mario

EPA SAMPLE NO.

VWAI-MW02-1110AM SD

Lab Name:	MITKEM LABORATO	DRIES			Contract:					
Lab Code:	MITKEM Ca	ase No.:	J2254		Mod. Ref No	o.:		SDG No.:	SJ2254	
Matrix: (SO	IL/SED/WATER)	WATER			Lab Sample	ID:	J2254-09	AMSD		
Sample wt/v	ol: 5.00	(g/mL)	ML		Lab File II	D:	V6H7342.	D		
Level: (TRA	CE/LOW/MED) LO	WC			Date Receiv	ved:	11/04/20	10	×	
% Moisture:	not dec.				Date Analy:	zed:	11/04/20	10	1170	
GC Column:	DB-624	ID:	0.25	(mm)	Dilution Fa	actor:	1.0			
Soil Extrac	t Volume:			(uL)	Soil Alique	ot Vol	ume:		(1	uΙ
Purge Volum	e: 5.0			(mL)						
CAS NO.	COMPOUND	<u> </u>	111-112-15-17	CONC	ENTRATION:	Q	DL	LOD	LOQ	

52

51

55

W 710

0.41

0.33

0.61

0.50

0.50

1.0

5.0

5.0

5.0

107-06-2

71-43-2

1,2-Dichloroethane

Benzene

CLIENT SAMPLE NO.

VWAI-MW04-1110

Lab Code: MITKEM Case No.: J2254 Mod. Ref N Matrix: (SOIL/SED/WATER) WATER Lab Sample			SDG No.:	C T2254		
Matrix: (SOTI/SED/WATER) WATER	TD.			302234		
MATER LAD Sample	10.	J2254-01E				
Sample wt/vol: 1000 (g/mL) ML Lab File I	D:	S3H0517.	)			
Level: (LOW/MED) LOW Extraction	: (Type	SEPF		22/		
% Moisture: Decanted: (Y/N) Date Recei	ved:	11/03/20	10			
Concentrated Extract Volume: 1000 (uL) Date Extra	cted:	11/05/20	10			
Injection Volume: (uL) GPC Factor: Date Analy	zed:	11/24/201	10			
GPC Cleanup: (Y/N) N pH: Dilution F	actor:	1.0	***			
CAS NO. COMPOUND CONCENTRATION: UG/L	Q	DL	LOD	LOQ		
91-20-3 Naphthalene 1.4		0.96	1.0	1.0		
91-57-6 2-Methylnaphthalene 1.0	U	0.94	1.0	1.0		
117-81-7 Bis(2-ethylhexyl)phthalate 1.4	J	1.3	5.0	5.0		



CLIENT SAMPLE NO.

VWAI-MW05-1110

Lab Name: MITKEM LABORATORIES	Contract:				
Lab Code: MITKEM Case No.: J2254	Mod. Ref No.: SDG No.: SJ2254				
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J2254-03E				
Sample wt/vol:1000 (g/mL) ML	Lab File ID: S3H0518.D				
Level: (LOW/MED) LOW	Extraction: (Type) SEPF				
% Moisture: Decanted: (Y/N)	Date Received: 11/03/2010				
Concentrated Extract Volume: 1000 (u	L) Date Extracted: 11/05/2010				
Injection Volume: 1.0 (uL) GPC Factor: 1.0	00 Date Analyzed: 11/24/2010				
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0				
CAS NO. COMPOUND	NCENTRATION: UG/L Q DL LOD LOQ				
91-20-3 Naphthalene	1.7 0.96 1.0 1.0				
91-57-6 2-Methylnaphthalene	20 0.94 . 1.0 1.0				
117-81-7 Bis(2-ethylbeyyl)nhthalate	5.0 [] 1.3 5.0 5.0				



CLIENT SAMPLE NO.

VWAI-EB01-110210

Lab Name: 1	TITKEM LABORATORIES		Contract:				
Lab Code: N	AITKEM Case No.	: J2254	Mod. Ref	No.:		SDG No.:	SJ2254
Matrix: (SO	IL/SED/WATER) WATER	2	Lab Sampl	e ID:	J2254-05	E	
Sample wt/v	ol: (g/mL	) ML	Lab File	ID:	S3H0519.	D	
Level: (LOW,	/MED) LOW		Extractio	n: (Typ	e) SEPF		
% Moisture:	Decanted:	(Y/N)	Date Rece	ived:	11/03/20	10	
Concentrate	d Extract Volume:	1000 (uL)	Date Extr	acted:	11/05/20	10	
Injection Vo	olume: 1.0 (uL) GPC	Factor: 1.00	Date Anal	yzed:	11/24/20	10	
GPC Cleanup	Hq (N\Y):	:	Dilution	Factor:	1.0	14	
CAS NO.	COMPOUND	CONC	CENTRATION: UG/L	Q	DL	LOD	LOQ
91-20-3	Naphthalene		1.0	U	0.96	1.0	1.0
91-57-6	2-Methylnaphthalene		1.0	U	0.94	1.0	1.0
117-81-7	Bis (2-ethylhexyl) pht	halate	5.0	[1	1 3	5.0	5.0



CLIENT SAMPLE NO.

VWAI-MW02-1110

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J2254	Mod. Ref No.: SDG No.: SJ2254
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J2254-08E
Sample wt/vol: 1000 (g/mL) ML	Lab File ID: S3H0520.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 11/04/2010
Concentrated Extract Volume: 1000	(uL) Date Extracted: 11/05/2010
Injection Volume:1.0 (uL) GPC Factor:1	.00 Date Analyzed: 11/24/2010
GPC Cleanup:(Y/N) N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	CONCENTRATION: UG/L Q DL LOD LOQ
91-20-3 Naphthalene	1.0 U 0.96 1.0 1.0
91-57-6 2-Methylnaphthalene	1.0 U 0.94 1.0 1.0
117-81-7 Bis(2-ethylhexyl)phthalate	5.0 U 1.3 5.0 5.0



CLIENT SAMPLE NO.

VWAI-EB01-110310

rap Name: L	MITKEM LABORATURIES		Contract:				
Lab Code: N	MITKEM Case No.: J2254		Mod. Ref	No.:		SDG No.:	SJ2254
Matrix: (SO	IL/SED/WATER) WATER		Lab Sampl	e ID:	J2254-10 <i>I</i>		
Sample wt/vo	ol:1000 (g/mL) ML		Lab File	ID:	S3H0523.	D	
Level: (LOW,	/MED) LOW	%: 	Extractio	n: (Typ	e) SEPF	H 181	
% Moisture:	Decanted: (Y/N)		Date Rece	ived:	11/04/201	10	
Concentrated	d Extract Volume: 1000	(uL)	Date Extr	acted:	11/05/201	10	
Injection Vo	olume: 1.0 (uL) GPC Factor:	1.00	Date Anal	yzed:	11/24/201		-33
GPC Cleanup	:Hq (N\Y):		Dilution	Factor:	1.0		_
CAS NO.	COMPOUND	CONC	ENTRATION:	Q	DL	LOD	LOQ
91-20-3	Naphthalene	1	1.0	Ū	0.96	1.0	1.0
91-57-6	2-Methylnaphthalene	1	1.0	U	0.94	1.0	1.0
	Bis(2-ethylhexyl)phthalate	$\neg$	5.0	U	1.3	5.0	5.0



CLIENT SAMPLE NO.

VWAI-MW03-1110

Lab Name: MITKEM LABORATORIES	Contract:
Lab Code: MITKEM Case No.: J2254	Mod. Ref No.: SDG No.: SJ2254
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: J2254-13E
Sample wt/vol:1000 (g/mL) ML	Lab File ID: S3H0524.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 11/05/2010
Concentrated Extract Volume: 1000	(uL) Date Extracted: 11/05/2010
Injection Volume: 1.0 (uL) GPC Factor:	1.00 Date Analyzed: 11/24/2010
GPC Cleanup:(Y/N) N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	CONCENTRATION: UG/L Q DL LOD LOQ
91-20-3 Naphthalene	1.0 U 0.96 1.0 1.0
91-57-6 2-Methylnaphthalene	1.0 U 0.94 1.0 1.0
117-81-7 Bis(2-ethylhexyl)phthalate	5.0 U 1.3 5.0 5.0

W/2210

CLIENT SAMPLE NO.

VWAI-MW07-1110

Lab Name: MIT	KEM LABORATORIES		Contract:					
Lab Code: MIT	KEM Case No.: J22	254	Mod. Ref N	10.:		SDG No.:	SJ2254	
Matrix: (SOIL/	SED/WATER) WATER		Lab Sample	e ID:	J2254-151	E		
Sample wt/vol:	1000 (g/mL) ML		Lab File 1	D:	S3H0525.	D		
Level: (LOW/ME	D) LOW		Extraction	ı: (Typ	e) SEPF	77711		
%, Moisture:	Decanted: (Y/N)		Date Recei	_ved:	11/05/20	10	100	
Concentrated E	Extract Volume: 1	000 (uL)	Date Extra	acted:	11/05/20	10		
Injection Volu	me: 1.0 (uL) GPC Facto:	r: <u>1.00</u>	Date Analy	zed:	11/24/20	10		
GPC Cleanup: (Y	/N) N pH:		Dilution H	Tactor:	1.0			
CAS NO.	COMPOUND	CONC	ENTRATION: UG/L	Q	DL	LOD	roð	
91-20-3 Na	phthalene		7.9		0.96	1.0	1.0	_
91-57-6 2-	Methylnaphthalene		7.7		0.94	1.0	1.0	7.11
117-81-7 Bi	s(2-ethylhexyl)phthalate	9	5.0	Ü	1.3	5.0	5.0	

MINIP

CLIENT SAMPLE NO.

VWAI-MW07P-1110

Lab Name: M	ITKEM LABORATORIES		Contract:				
Lab Code: M	IITKEM Case No.: J2254		Mod. Ref 1	No.:		SDG No.	: SJ2254
Matrix: (SOI	IL/SED/WATER) WATER		Lab Sample	e ID:	J2254-171	Ξ	
Sample wt/vo	ol: 1000 (g/mL) ML		Lab File	ID:	S3H0526.	)	
Level: (LOW/	'MED) LOW		Extraction	n: (Typ	e) SEPF		
% Moisture:	Decanted: (Y/N)		Date Rece	ived:	11/05/20	10	
Concentrated	d Extract Volume: 100	0 (uL)	Date Extra	acted:	11/05/20	10	
Injection Vo	olume: 1.0 (uL) GPC Factor:	1.00	Date Anal	yzed:	11/25/20	10	
GPC Cleanup:	(Y/N) N pH:		Dilution :	Factor:	1.0		
CAS NO.	COMPOUND	CONC	ENTRATION: UG/L	Q	DL	LOD	LOQ
91-20-3	Naphthalene		10		0.96	1.0	1.0
91-57-6	2-Methylnaphthalene		9.9		0.94	1.0	1.0
117-81-7	Bis(2-ethylhexyl)phthalate		5.0	[]	1.3	5.0	5.0

MARIO

046

CLIENT SAMPLE NO.

VWAI-EB01-110410

Lab Name: N	MITKEM LABORAT	ORIES		Contract:	٤.			
Lab Code: N	MITKEM C	ase No.:	J2254	Mod. Ref	No.:	o	SDG No.	: SJ2254
Matrix: (SO	IL/SED/WATER)	WATER		Lab Sampl	e ID:	J2254-19	E	
Sample wt/vo	ol: 1000	(g/mL)	ML	Lab File	ID:	S3H0527.	D	
Level: (LOW,	/MED) LOW			Extractio	n: (Typ	oe) <u>SEPF</u>		
% Moisture:	De	canted: (	Y/N)	Date Rece	eived:	11/05/20	10	
Concentrated	d Extract Volu	me:	1000 (u	L) Date Extr	acted:	11/05/20	10	
Injection Vo	olume:	aL) GPC Fa	actor: 1.0	00 Date Anal	yzed:	11/25/20	10	
GPC Cleanup	:(Y/N) N	pH:		Dilution	Factor:	1.0		
CAS NO.	COMPOUND		cc	NCENTRATION: UG/L	Q	DL	LOD	LOQ
91-20-3	Naphthalene		-	1.0	U	0.96	1.0	1.0
91-57-6	2-Methylnapht	halene		1.0	U	0.94	1.0	1.0
117-81-7	Bis/2-ethylhe	vullahth:	12+0	5.0	TT	1 3	5.0	5.0

W/10

CLIENT SAMPLE NO.

VWAI-MW02-1110MS

Lab Name: N	TITKEM LABORATORIES	Contract	:	72		
Lab Code: N	MITKEM Case No.: J2254	Mod. Ref	E No.:		SDG No.	: SJ2254
Matrix: (SO	IL/SED/WATER) WATER	Lab Samp	ole ID:	J2254-08	EMS	
Sample wt/vo	ol:1000 (g/mL) ML	Lab File	e ID:	S3H0521.	D	
Level: (LOW,	/MED) LOW	Extracti	ion: (Typ	oe) SEPF		
% Moisture:	Decanted: (Y/N)	Date Rec	ceived:	11/04/20	10	
Concentrated	d Extract Volume: 1000	(uL) Date Ext	racted:	11/05/20	10	
Injection Vo	olume:(uL) GPC Factor:	1.00 Date Ana	alyzed:	11/24/20	10	
GPC Cleanup	:(Y/N) N pH:	Dilution	Factor:	1.0		
CAS NO.	COMPOUND	CONCENTRATION UG/L	N: Q	DL	LOD	LOQ
91-20-3	Naphthalene	36		0.96	1.0	1.0
91-57-6	2-Methylnaphthalene	39		0.94	1.0	1.0
117-81-7	Bis(2-ethylhexyl)phthalate	45		1.3	5.0	5.0

MMO

CLIENT SAMPLE NO.

VWAI-MW02-1110MS D

Lab Name: 1	MITKEM LABORAT	ORIES		Contract:		VI		
Lab Code: 1	MITKEM C	ase No.: J225	4	Mod. Ref N	io.:	10-	SDG No.:	SJ2254
Matrix: (SO	IL/SED/WATER)	WATER		Lab Sample	ID:	J2254-08	EMSD	
Sample wt/v	ol: 1000	(g/mL) ML		Lab File I	D:	S3H0522.	D	
Level: (LOW	/MED) LOW			Extraction	: (Typ	e) SEPF		
% Moisture:	De	canted: (Y/N)		Date Recei	ved:	11/04/20	10	
Concentrate	d Extract Volu	me: 100	00 (uL)	Date Extra	cted:	11/05/20	10	
Injection V	olume:(	ıL) GPC Factor:	1.00	Date Analy	zed:	11/24/20	10	
GPC Cleanup	: (Y/N) N	pH:		Diluțion F	actor:	1.0		
CAS NO.	COMPOUND		CONC	CENTRATION: UG/L	Q	DL	LOD	LOQ
91-20-3	Naphthalene			33		0.96	1.0	1.0
91-57-6	2-Methylnapht	halene		35		0.94	1.0	1.0
117-01-7	Dic/2-othylbo	errillmhthalata		10		1 2	5.0	5.0

122110

U.S. EPA - CLP

1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET VWAI-MW02-1110

Lab Name: Mitkem Laboratories

Contract: 933562, N62

Lab Code: MITKEM Case No.:

SAS No.:

SDG No.: SJ2254

Matrix (soil/water): WATER

Lab Sample ID: J2254-08

Level (low/med): MED

Date Received: 11/04/2010

% Solids: 0.0 ...

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	С	Q	М	MDL	LOD	PQL
7439-89-6	Iron	100	U		P	31.0	100	200
7439-96-5	Manganese	70.7		J OT	P	10.0	10.0	50.0

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		538	

U.S. EPA - CLP

1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET VWAI-MW03-1110

Contract: 933562, N62

Lab Name: Mitkem Laboratories

SDG No.: SJ2254

Lab Code: MITKEM Case No.:

SAS No.:

Matrix (soil/water): WATER

Lab Sample ID: J2254-13

Level (low/med): MED

Date Received: 11/05/2010

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	С	Q	M	MDL	LOD	PQL
7439-89-6	Iron	100 -53-0	B	U MBL	P	31.0	100	200
7439-96-5	Manganese	589		JOT	P	10.0	10.0	50.0

	0	m	177	0	n	+	S	
•	$\cup$	11	ш	C	4.4		0	

U.S. EPA - CLP

1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET VWAI-MW05-1110

Contract: 933562, N62

Lab Name: Mitkem Laboratories

Lab Code: MITKEM Case No.:

SAS No.: SDG No.: SJ2254

Matrix (soil/water): WATER

Lab Sample ID: J2254-03

Level (low/med): MED

Date Received: 11/03/2010

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	С	Q	M	MDL	LOD	PQL
7439-89-6	Iron	311		J OT	P	31.0	100	200
7439-96-5	Manganese	1300		JOT	P	10.0	10.0	50.0



Comments:

SW846

U.S. EPA - CLP

1 .

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET VWAI-MW07-1110

Contract: 933562, N62

Lab Name: Mitkem Laboratories

SDG No.: SJ2254

Lab Code: MITKEM Case No.:

SAS No.:

Matrix (soil/water): WATER

Lab Sample ID: J2254-15

Level (low/med): MED

Date Received: 11/05/2010

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	С	Q	М	MDL	LOD	PQL
7439-89-6	Iron	51.1	B	JOT	Р	31.0	100	200
7439-96-5	Manganese	222		JOT	P	10.0	10.0	50.0



omm	en	t	S	:	

# REPORT NARRATIVE

Mitkem Laboratories, a Division of Spectrum Analytical, Inc.

Client: CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC E and I

Laboratory Workorder / SDG #: J2254

#### SW846 6010C

## 1. 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 6010C

#### IV. PREPARATION

Aqueous Samples were prepared following procedures in laboratory test code: ICP\_W\_PR(3005A)

#### V. INSTRUMENTATION

The following instrumentation was used to perform the analyses:

Instrument Code: OPTIMA2 Instrument Type: ICP

Description: Optima 3100 XL Manufacturer: Perkin-Elmer

Model: 3100 XL

# VI. ANALYSIS

# A. Calibration:

Calibrations met the method/SOP acceptance criteria.

#### B. Blanks:

All method blanks were within the acceptance criteria.

# C. Spikes:

1. Laboratory Control Spikes (LCS/LCSD):

Percent recoveries and RPD for lab control samples were within the QC limits.

2. Matrix spike (MS):

No client-requested MS analysis was included in this SDG.

D. Post Digestion/Distillation Spike (PDS):

No PDS was performed on any sample in this SDG.

E. Duplicate sample:

-No client requested duplicate analysis was included in this SDG.

F. Serial Dilution (SD):

No SD was performed on any sample in this SDG.

G. Samples:

No other unusual occurrences were noted during sample analysis.

No sample in this SDG required reanalysis.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Mitkem, 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: Mayro Hern

Date: 12/3/10



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.

A DIVISION OF SPECTRU			P	age _		of_	_L_		otherwise instructed.								
Report To:_	CH2M HILL		Invoice	То:	H2N	) HI	ILL				Site	Name	e:/	F)OLF		T.FK	
							_				Loc	ation:	Vie	ever		St	ate: <i>PR</i>
Project Mgr.	: Stephen Brund		P.O. No.				RQI	N:		_				•	,	Chris Reed	
	S2O <sub>3</sub> 2=HCl 3=H <sub>2</sub> HSO <sub>4</sub> 9= H <sub>3</sub> PO <sub>4</sub>								Н	3	List 6	preser	vative c	ode belov	V:	, No	ites:
	ng Water GW=Groun							ntain	ers:			GENERAL TRANSPORT	Analyses	THE RESERVE OF THE PARTY OF THE		QA/QC Rep	orting Level
O=Oil SW X1=	= Surface Water SO= X2=	=Soil SL=Sluc X3=	ge A=Air		1	Vials	of Amber Glass	of Clear Glass		70	3 6	3	,707.			□ Level I □ Level III	
	G=Grab C=0	Composite			100	OA	mbe	lear (	astic				>	5		Other	
Lab Id:	Sample Id:	Date:	Time:	Туре	Matrix	# of VOA Vials	# of A	# of C	# of Plastic	\$2101 NA	8210/100C	TOC	9716	d ToH		State specific rep	oorting standards:
01	VWAI-MW04-1110	11/2 /2010	0910	60	GW	7				2		3	2			Hold vocs u	V/HCI presontis
02	VWAI-MWO4-1110A	/	0910	60	GW	2					2					1 mg Ascorbic	Aid Used
05	VWAI-MWOS-1110	11/2/2010	09 20	610	GW	7				2		3	2				W/HCI presuntia
oy	VWAI-MWOS-1110A	11/2/2010	0920	60	GW	2					2					1 mg Ascorbic	
as	VWAI-EBOI- 110210	11/2/2010	1125	6	6W					2					1	<u> </u>	
06	VWAI-EBOI-110210A	11/2/2010	1125	6	6W	2					2					1 mg Ascorbic	Acid Wed
07	VWAI-TBOI-110210	11/2/2010	1100	G	6W	2				2	· E						
		•	*				1									All 8260X V ListI VOC	
☐ E-mail to					Re	lingu	ished	by:				$\rightarrow$ Re	eceived l	ý:		Date:	Time:
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Condition upon receipt: Liced Ambient CC

# CHAIN OF CUSTODY RECORD

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

A DIVISION OF SPECTRU	UM ANALYTICAL, INC. Featuring HANIBAL TE	CHNOLOGY			P	age_	_1_	_ of _		Control - Province - P							
Report To: CH2M HILL Invoice				ice To: CHRM HILL									392 101-	2.485.F. I	I .FK		
Project Mgr.: Stephen Brund  1=Na <sub>2</sub> S2O <sub>3</sub> 2=HCl 3=H <sub>2</sub> SO <sub>4</sub> 4=HNO <sub>3</sub> 5=NaOH				).:			RQI	N:			Loca	tion:\	Viego Kenji	Butler/	Chris Reed		
	2S2O <sub>3</sub> 2=HCl 3=H aHSO <sub>4</sub> 9=							CH <sub>3</sub> O	H		List	reservat	ive code	below:	No	tes:	
O=Oil SW	ng Water GW=Groun /= Surface Water SO X2= G=Grab C=	=Soil SL=Slud X3=	ge A=Air			# of VOA Vials	# of Amber Glass	of Clear Glass		١,	Sulfac/Nituse		ilyses;		QA/QC Rep  Level I  Level III  Other	oorting Level  Level II  Level IV	
Lab Id:	Sample Id:	Date:	Time:	P Type	Matrix	7.6	Wed Am	# of Cle	₩ of Plastic	15/17	SULTE	Filterd			State specific rep		
01	VWAI-MWOS-1110 VWAI-MWOS-1110 VWAI-EBOI-110210	11/2/2010	0910	6	GW GW		2 2		2	2	1	1			0.45 micron Fill		
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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:_	CH2MH;II		Invoice 7	To: <u>C</u>	HZM	Hil					Site	Nam	o:: 39248 e: AX-I			
Project Mgr.	: Steplan Benne		P.Ö. No.:	· 0			RQì	N:	-	<u> </u>	Loca	ition: pler(s	Viegues 6): Kenji Bu	tler	/ Chris Re	ate: PK
	S2O <sub>3</sub> 2=HCl 3=H <sub>2</sub> HSO <sub>4</sub> 9= <u>H<sub>2</sub> Po</u>						7=C	CH <sub>3</sub> O	H 	2			vative code below	/: 	No	ites:
O=Oil SW	ng Water GW=Groun  = Surface Water SO=  X2=  G=Grab C=G	=Soil SL=Slud	ge A=Air	Type	Matrix	# of VOA Vials	of Amber Glass	of Clear Glass	of Plastic	ELict 100 (Hu)	I VOC(UNDED)	I VOC (AA)	Analyses:		☐ Level I ☐ Level III ☐ Other	
Lab Id:	Sample Id:  VWAT-MW02-1110 MS		Time: 0925 0925	6	GW GW	7	0#	0#	0#	O Trid	XX	+51	X		H: Hold for	- Analysis
	WAT-MWO2-NOMSA WAT-MWO2-NOSD	11/3/2010	0925	6	GW GW	2		1			X	X			2mg At vse 2mg At vsec	rid .
	WAI-MWOZ-1110SDA WWAI-EBOI-110310 VWAI-TBOI-110310	11/3/2010	1110	6	GW GW	2					X	X			2mg Afrises	<i>X</i>
09	VWAI-MWOZ-1110A VWAI-EBOI-NO310A		1110	6	GW GW	2						X			2mg AAUSED 2mg AAUSED Vanceseard &A	1 A huve 7day HT
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TAT- Indicate Date Needed: \_

- · All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- · Samples disposed of after 30 days unless

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	S2O <sub>3</sub> 2=HCl 3=H <sub>2</sub> HSO <sub>4</sub> 9= <u>Unprese</u>					cid	7=0	CH <sub>3</sub> O	Н	9	-	reserva 4	tive co	de below:		No	otes:
O=Oil SW	ng Water GW=Grour = Surface Water SO= X2= G=Grab C=0	=Soil SL=Slud X3=	ge A=Air			# of VOA Vials	# of Amber Glass	of Clear Glass	of Plastic	List I fron	te/Withoute	FMetyl (Fe/My) B	alyses:			□ Level I □ Level III □ Other	
Lab ld:	Sample Id:	Date:	Time:	Туре	Matrix	A Jo#		# of C	#	200						State specific re	porting standards:
08	VWAI-MW02-1110		0925	6	6W		2		2	X	X	X				D. 45 micron F	the word on Felan
	VWAI-MWOZ-1110MS		0925	6	GW		2			X							
	WAI-MW02-1110SD VINAI-MW02-KB	11/3/2010	0925	G	GW		2			X							
10	VWAI-EBOI-110310	11/3/2010	1110	6	GW		2			X						.12	
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Special Handling:

TAT- Indicate Date Needed:

All TATs subject to laboratory approval.
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Report To: CH2M H.II Invoice					HZM	Hil		_		_			o.: 392485, :: AOC-I	FI.	FK	
													Viegves			
Project Mgr	: Stephen Brand			:		_	RQI	N:			Sam	pler(s	): Kenji Butle	r/c	hris Reed	
	2S2O <sub>3</sub> 2=HCl 3=H <sub>2</sub> aHSO <sub>4</sub> 9= <b>H<sub>3</sub> PO</b>								Н		List p	6	vative code below:		Note	<b>y</b>
O=Oil SW	ng Water GW=Groun /= Surface Water SO= X2= G=Grab C=C	=Soil SL=Sluc X3=	lge A=Air		]	A Vials	Glass	ar Glass		List 1 Voc (Hu)	VOC(cupie)	List I VOC (AA)	Analyses:		N	□ Level II □ Level IV
Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA	# of Amber	# of Clear	# of Plastic	List	List	List I	190		State specific repor	ting standards:
13	VWAI-MW03-1110	11/4/2010	0950	6	GW	7				$\Theta$	X		X		(4): Had for Ano	lyss
14	VWAI-MWO3-NIOA		0950	6	GW	2		ļ				X	8 Co		Im AA used	1.5
15	WAI-MW07-1110	11/4/2010	1020	6	6W	7				A	X		X		Imy AA used B. Hold for And	Vsis
16	VWAI-MW07-1110A		1020	6	GW	1						X			2.5 mg AA Vse	
17	VWAI-MWO7P-1110	11/4/2010	1025	6	GW	2					X				J	1
18	VWAI-MWOTP-11/04		1025	6	GW	2						X			2,5mg AA Us	d
19	VWAI-EBOI-110410	11/4/2010	1210	6	GW	2					X				<i></i>	MINIM
20	VWAZ-EBOJ-1104104		1210	6	6W	2						X	ns.		2.5 mg AA U	sed
21	VWAI-TBOI-110410		1205	6	6W	2					X				, , ,	
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Special Handling:	
- Indicate Date Needed:	

TAT- Indicate Date Needed:

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· Samples disposed of after 30 days unless otherwise instructed.

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Report To:_	CH2M Hill	Invoice	То:С	H2N	1 +1	111_				Site	Name: _		AOC-	I	<i>T.FK</i>	tate: PR	
Project Mgr.	: Stephen Brand		P.O. No			_	RQI	V:			Sam	pler(s):_		Kenji	But	s Her/Chris	Rued
1=Na <sub>2</sub> 8= Na	$S2O_3$ 2=HCl 3=H <sub>2</sub> HSO <sub>4</sub> 9= <i>Unprese</i>	SO <sub>4</sub> 4=HNO <sub>3</sub>	5=NaOH	6=Asc	orbic A	cid	7=0	CH <sub>3</sub> O	H	9	List	oreservat	ive co	de below		N.	otes:
O=Oil SW	ng Water GW=Groun = Surface Water SO=  X2=  G=Grab C=G	=Soil SL=Sludg	ge A=Air		· ×	70A Vials	# of Amber Glass	of Clear Glass	of Plastic	T SVOC	Cute/Mtrate	FMetal (Fe/Mn) BUY	llyses:			☐ Level II ☐ Level III ☐ Other	porting Level  □ Level II □ Level IV
Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA		# of C	#	X X	_						porting standards:
13	VWAI-MWO3-1110 VWAI-MVO7-1110	11/4/2010	1020	6-	6W		2		2	X	X						Filter windon Felm. Filter wondon Felm
	WWAI-MWOTP-1110		1025		GW.		2			X							
19	VW AI - EBOJ-110416	(1/4/2010	1210	6	GW		2		19	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \							
□ E-mail to			3		Re	lingu	ished	by:				Rece	ved by			Date:	Time:
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# Analysis Groups v. Analytical Methods for Navy CLEAN 1000-CTO-0083 Vieques AOC I First Post-Injection Event

PREPARED FOR:

Ed Lawler/Mitkem

PREPARED BY:

Zamboni, Michael/WDC

COPIES:

Jennifer Myers/WDC

Juan Acaron/GNV Angela Barch/ATL

DATE:

October 15, 2010

PROJECT NUMBER:

392485.FI.FK

For this sample collection effort, the field team will mark the chain-of-custody for each sample to be analyzed for one or more of the following analysis groups: List I VOC (HCl), List I VOC (unpres), List I VOC (AA), List I SVOC, FMETAL, and/or WCHEM. These analysis groups correspond to the following analytical methods:

List I VOC (HCI):

VOCs via SW-846 8260C (TCL from Worksheet 15-6 List I). LOQ = 5ug/L for all compounds. Preserved with HCl (holding time = 14 days). Note that this will likely be marked hold for analysis" and

we do not intend to analyze these samples at this time.

List I VOC (unpres):

VOCs via SW-846 8260C (TCL from Worksheet 15-6 List I). LOQ = 5ug/L for all compounds. Unpreserved (holding time = 7 days).

List I VOC (AA):

VOCs via SW-846 8260C (TCL from Worksheet 15-6 List I). LOQ =

5ug/L for all compounds. Preserved with 4:1 molar (AA:

persulfate) ascorbic acid (holding time = 7 days).

List I SVOC:

SVOCs via SW-846 8270D (TCL from Worksheet 15-7 List I). LOQ = 1ug/L for Naphthalene and 2-Methylnaphthalene and LOQ = 5ug/L

for bis(2-ethylhexyl)phthalate.

FMETAL:

Field-Filtered Iron and Manganese via SW-846 6010B.

WCHEM:

Sulfate and Nitrate via EPA 300.0

Total Organic Carbon (TOC) via SM5310B Quad

Note that the acronym "H" refers to "hold for analysis" and that we do not intend to analyze these samples at this time.

Please ensure that this memo is appended to each chain-of-custody record.

See Omas Par 115

# Edward Lawler [Mitkem]

From: Michael.Zamboni@CH2M.com

Sent: Friday, November 05, 2010 2:48 PM

To: Edward Lawler [Mitkem]

Cc: Michael.Zamboni@CH2M.com; Victoria.Brynildsen@CH2M.com; Stephen.Brand@CH2M.com; Brett.Doerr@CH2M.com

Subject: RE: Vleques, final COC and Login and...

...and please pull those samples off of hold! We think the HCl v. AA v. unpres comparison will be useful.

		Lab Samp			New !
COC Sample ID	Preservation	ID	Action	Rename (Client Sample ID) to:	ID?
VWAI-MW02-1110	HCI	J2254-08A	Analyze	VWAI-MW02-1110H	1
VWAI-MW03-1110	HCI	J2254-13A	Analyze	VWAI-MW03-1110H	1
VWAI-MW04-1110	HCI	J2254-01A	Analyze	VWAI-MW04-1110H	1
VWAI-MW05-1110	HCI	J2254-03A	Analyze	VWAI-MW05-1110H	1/
VWAI-MW07-1110	HCI	J2254-15A	Analyze	VWAI-MW07-1110H	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \

Thanks for your help, Ed. Please let me know if that table isn't legible for you and I'll resend it in Excel. Have a great weekend!

Thanks, Mike Z.

**From:** Edward Lawler [Mitkem] [mailto:elawler@mitkem.com]

Sent: Friday, November 05, 2010 1:50 PM

To: Zamboni, Michael/WDC; Brynildsen, Victoria/VBO

Subject: VIeques, final COC and Login and...

Hi Mike, Vickie-

Attached are the final COCs and Logins for all the samples received from the Vieques project.

The other file is what appears to be someone's To-Do list, which was written on the back side of one of the Technical Memorandum pages. I assume all these items have been accomplished, but just in case.....here it is again.

Have a great weekend!

--Ed

Edward A. Lawler
Deputy Director for Quality Services, Mitkem Laboratories
a Division of Spectrum Analytical Inc. featuring Hanibal Technology
401-732-3400 x315
401-732-3499 (fax)

This message is intended only for the use of the individual to whom it is addressed and may contain information that is privileged, confidential, and exempt from disclosure under applicable law. If the reader of this message is not the intended recipient, or the employee responsible for delivering the message to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify us immediately by telephone at 401-732-3400

# MITKEM LABORATORIES

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Received By:	Reviewed Viegos	By: 5/		Date:	11/3	Mitke		ork Ord	er #:	J2254
Client Project:	VIPPOS			Clien			·it			Soil
	l				Pres	ervatio	on (pH	)	VOA	Headspace o Air Bubble ≥
		Lab Sam		HNO <sub>3</sub>	H <sub>2</sub> SO.	HCI	NaOF	I H₃PO₄		<del> </del>
1) Cooler Sealed	(Yes INO	J2254	01	12					#141	-
			02						AA	
2) Custody Seal(s)	Present / Absent		03	22					#14	4
	Coolers / Bottles		OY						A	
	Intact / Broken		or						4/4	4
\		V	06	1					AA	
3) Custody Seal Number(	a taro	J2254	07	<b> </b>		<del> </del>	<del>                                     </del>		U	
o ouslouy sear number	3)		'							
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4) Chain-of-Custody	Present PAbsent							<u> </u>	/	
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5) Cooler Temperature	5 2				***************************************					w.x.oox.xooxxooxxooxxooxxo
IR Temp Gun ID	Mt-1 MI 7 The Ire									
Coolant Condition	Ice Ice									
						/	1			
6) Airbill(s)	Present / Absent									
Airbill Number(s)	Fodey									***************************************
9/ 27 -	2265-3298				-/	***************************************				
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7) Samples Bottles	Intact / Broken / Leaking	g	/							
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8) Date Received	11/3/		1—							
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Preservative Name/Lot No	).:									
		<u> </u>	VOA	Matrix	Key:			L	L	
	AA = A	Scarbe C Acid		US =	Unpre	serve	d Soil		A = Ai	г
		71-64		UA =		serve	d Aque		H = H	
***************************************				M = M					E = Er	
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See Sample Form ID: QAF.0006	Condition Notification/Cor	rective Action	ruiii	yes / N	U		Rad (	OK yes	:/no	
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# **MITKEM LABORATORIES**

	San	nple Conditio	n Forn	n				1		/
	1	***	$-\!\!\!/-$	T	***************************************		Page		of	
Received By:	Reviewed B	ly: Sr	<u> </u>	Date:		L	m Wo		ler#:	JZOSY
Client Project:	Viegoeo			Clien			4 1/7		1	Soil Headspace or
					1	1	n (pH)	T	VOA	Air Bubble ≥
		Lab Sam	<del></del>	HNO <sub>3</sub>	H <sub>2</sub> SO <sub>4</sub>	HCI	NaOH	H <sub>3</sub> PO <sub>4</sub>	-	1
1) Cooler Sealed	Yes / No	J2054	09	<u> </u>					HA	4
			09	<b>_</b>					AA	
2) Custody Seal(s)	Present \Absent		10						UA	-
	Coolers / Bottles	MM4001100011111111111111111111111111111	11						AA	
	Intact / Broken	J 2054	12			····			WA	
	1	*								
3) Custody Seal Number	(s) Tape			1						
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4) Chain-of-Custody	Present LAbsent				-	***************************************	. A			
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5) Cooler Temperature	350 4.00					Tu	V/			
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Coolant Condition	ref see the		-	1	Ta /	-				
C) ALLEUVA	(Day 1) (Day 1)			1-1	)/					
6) Airbill(s)	Present / Absent		-	-	$\mathscr{H}$					^
Airbill Number(s)	Feder Intz		-		/					
860	- 2265 - 3324 - 2265 - 3335			$\vdash$	/					
8627	- 2265 - 5555		+	-						
			1/							
7) Samples Bottles	(Intact / Broken / Leaking		/_							
	1.110		$\perp / \perp$							
8) Date Received	11/9/1		I							
	08:,57	/								
9) Time Received	08:37									
										* Particular Address
Preservative Name/Lot No	0.:									
			1	Matrix	-					
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AA = A		Bearing				serve	d Aque		H = H	- 1
		Acid		M = N	leOH aHSO	4			$E = E_1$ $F = F_1$	- 1
See Sample	Condition Notification/Corr	ective Action	Form	~~~~		<del>'1</del>			<u> </u>	CCAC
Form ID: QAF.0006							Rad C	K yes	s/no	

# MITKEM LABORATORIES

Sample Condition Form

Received Pv	H-	Inavious de	r. CAV	,	Tp.4	1	6.47(1				177101
Received By:	2001	Reviewed By	1. CAP		1					er#:	<i>T2254</i> Soil
Client Project: Vicy					Client			4-11		1	Headspace or
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4						T	T	n (pH)	T	VOA	Air Bubble ≥
			Lab Sam	1 . 2		H₂SO₄	HCI	NaOH	H <sub>3</sub> PO <sub>4</sub>		1/4"
1) Cooler Sealed	Yes / No		J2254		12					HINA	
				119						A/4	
2) Custody Seal(s)	Present A	bsent		11	cr					HluA	
	/ Coolers / B	ottles		16						AA	
	Intact / Brol	(en		()							
				18						AA	
2) 0	(s) factor	e D		19	<del>                                     </del>					<i>[</i> V ·	
3) Custody Seal Number	(s) 1 7 C	.ar		20						11	J. S.
	A-2-2-2-2-1114///////////////////////////	***************************************	<u> </u>							AA	
			J225Y	21							
	***************************************										
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4) Chain-of-Custody	Present JAI	osent	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,								1
•											
5) Cooler Temperature	1° [1 _M1- 	€F	***************************************							/	
•		- <i>İ</i>					***************************************		-/		
IR Temp Gun ID	Tien	· · · · · · · · · · · · · · · · · · ·		_					/-		
Coolant Condition	100-00	-19 8611						10/			
	and the second second second		***************************************				44	/			
6) Airbill(s)	Present Al	sent					1/2				
Airbill Number(s)	Fedo					7	7				,
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2677-	-2265-3 -2265-3	530			, i	//					
8001		d			4	/					***************************************
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					+						
7) Samples Bottles	Intact / Brok	en / Leaking		4							
	1	dia.		+/-							
8) Date Received	11/5/	(10)		$\mathcal{A}$							<b></b>
	11/51								*******************************		
9) Time Received	0	1:05					İ				
Preservative Name/Lot N	0.						,		de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la		The second secon
T TOSELVALIVE TVAITIE/EULTV	0,,			VOA	Matrix	 Kev:		1	1		
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	······································	AA = As Ac		1	UA = I	•				H = H(	- 1
		HC	( <b>4</b>		M = M	•		•		E = Er	псоге
					N = N	aHSO4	4		····	F = Fr	eeze
	Condition Not	ification/Corre	ective Action	Form	yes / n	Ò				,	
Form ID: QAF.0006								Kad (	K ves	: / no	

	USEPA Region II Date: August 2008 SW846 Method 8260B VOA SOP: HW-24, Rev. 2							
0 <u>00</u> 0	YES NO N/A							
I.	PACKAGE COMPLETENESS AND DELIVERABLES							
	NUMBER: J2254 LAB: Mittem							
SITE	NAME: VIOGULS CTO-83							
1.0	<u>Data Completeness and Deliverables</u>							
	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 - 6 VOA -							

Date: August 2008 SOP: HW-24, Rev. 2

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 11/2-4/10 Analy 11/4-9 2.0 Holding Times Rec 11/3-5 Temp 1-4°C

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<sub>4</sub>, the maximum holding time is 14 days from sample collection. If

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YES NO N/A

uncertain about preservation, contact the laboratory /sampling team to determine whether or not samples were preserved.

ACTION:

a.

Water

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 q	ualifications				
	No	≻ 7 days	J	R				
	Yes	≤14 days	No q	ualifications				
	Yes	≻ 14 days	J	R				
Non Aqueous	No	≤ 14 days	J	R				
	Yes	≤ 14 days	No q	ualifications				
	Yes/No	≻ 14 days	J	R				

3 0	Surrogate Re	COVERV	CTP For	n TT	Fauitalent \
3.0	Surrodate Ke	COVELV	CLF FOII	1 1 1	runt varent)

3.1	Have	the	volati	ile	surro	gate	rec	coveries	been	listed	on	Surrogate
	Reco	very	forms	for	each	of	the	followin	ng mat	trices:		
	2	Wate	~~								ر ف	
	a.	wate	3 T							_		

b. Soil

3.2 If so, are all the samples listed on the appropriate Surrogate

Recovery forms for each matrix:

b. Soil

If large errors exist, deliverables are unavailable or ACTION: 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 inhouse 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

	G 1	
DMC	Recovery Limits (%)Water	Recovery Limits Soil/Sediment
4-Bromofluorobenzene	80-120	70-130
Dibromofluoromethane	80-120	70-130
Toluene-d <sub>8</sub>	80-120	70-130
Dichloroethane-d4	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:

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



		ion II hod 8260B VOA	Date: August 2008 SOP: HW-24, Rev. 2 YES NO N/A						
Note:		LCS consists of an aliquot of a clesimilar to the sample matrix and of volume.	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 <u>Laboratory Control Sample</u> data call the lab for explanation /result note in the data assessment.							
4.2	lyzed at the required rices:								
	Α.	Water	<u> </u>						
	В.	Soil	T-7						
	C.	Med Soil	T-T						
Note	:	The LCS is spiked with the same and concentrations as the matrix spike 9.5). If different make note in da Matrix/LCS spiking standards should volatile organic compounds which are compounds being investigating. At spike should include 1,1-dichloroet chlorobenzene, toluene, and benzene	(SW-846 8000C, Section ata assessment. d be prepared from re representative of the a minimum, the matrix thene, trichloroethene,						
ACTI	ON:	If any MS/MD, MS/MSD or replicate of missing, take the action specified							
4.3		in house LCS recovery limits been og.7).	developed (Method 8000C,						
4.4		n house limits are not developed, as ts between 70 - 130% (Method 8000c S	, /						

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	A	ction
	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 Qual	ifications

# 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

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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	W	at	е	r

4\_\_\_

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.

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YES NO N/A

NOTE:

No qualification of data is necessary on MS and MSD data 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 <u>not</u> 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.



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YES NO N/A

7.2 Do any field/rinse blanks have positive volatile organic compound results?

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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.

VWAI-TB01-110410 MOD

EBO1-1110 A MOD

EB01-110410 MOD

TB01-110310 MOQ

EBOI - 110310A MOQ

EB01-110310 MOQ

TB01-110210 MOQ

EBOI - 110210A MOQ

EB01-110210 MOR

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Table 5. Volatile Organic Analysis Blank Contamination Criteria

Table 3. Volutile organic lineration of the contraction of the contrac				
Blank Type	Blank Result	Sample Result	Action for Samples	
	Detects	Not detected	No qualification	
		< CRQL	Report CRQL value with a U	
	< CRQL*	≥ CRQL	Use professional judgement	
		< CRQL	Report CRQL value with a U	
Method, Storage, Field,	> CRQL*	≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or qualify the data as unusable R	
Trip, Instrument**		<pre></pre>	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.  $\times$  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)

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	-		
USEPA	Region	II	
SW846	Method	8260B	VOP

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YES NO N/A

been analyzed for every twelve hours of sample analysis per instrument? (see Table 4, SW-846, page 8260B-36)

List date, time, instrument ID, and sample ACTION:

analyses for which no associated GC/MS GC/MS tuning data are

available.

If the laboratory/project officer cannot provide missing ACTION:

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?

111

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.

			ion II nod 8260B VOA	Date: Augu SOP: HW-24			
10.0	Targe	et Ana	alytes (CLP Form I Equivalent)				
	10.1	.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 approp	riate	<u></u>		
		b.	Matrix spikes and matrix spike dup	licates	<u> </u>		
		c.	Blanks		Ц		
		d.	Laboratory Control Samples				
	10.2	ident	, mass spece em printout for each o				
		a.	Samples and/or fractions as approp	riate			
		b.	Matrix spikes and matrix spike dup (Mass spectra not required)	licates			
		c.	Blanks		<u> </u>		
		d.	Laboratory Control Samples				
	ACTIO	ON:	If any data are missing, take acti specified in 3.2 above.	on			

Baseline stability?

respect to:

м\_\_\_

10.3 Is chromatographic performance acceptable with

USEPA Region II SW846 Method 8260B V	OA	Date: August 2008 SOP: HW-24, Rev. 2
		YES NO N/A
Resolution?		<u> </u>
Peak shape?		<u> </u>
Full-scale grap	h (attenuation)?	
Other:		
ACTION: Use profes the data.	sional judgement to det	ermine the acceptability of
100 m 100 m	erated standard mass sp nds present for each sa	
3.2 above. spectra, m	If the lab does not ge	take action specified in nerate their own standard Assessment. If spectra are sing spectra.
	ach reported compound w the continuing calibra	rithin 0.06 RRT units of the tion?
relative intens	esent in the standard m ity greater than 10% (o the sample mass spectr	f the most abundant ion)
in the sample a	intensities of the cha gree within ± 30% of th ities in the reference	e corresponding
acceptabil incorrect should be Presumptiv compound)	sional judgement to det ity of data. If it is d identifications were ma rejected ("R"), flagged e evidence of the prese or changed to non detect detection limit. In or	determined that ide, all such data id ("N") - ince of the ited ("U") at the

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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.

MCS

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:

  - 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

1 1

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?

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<sub>2</sub>(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)

Date: August 2008 SOP: HW-24, Rev. 2

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  $\geq$  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  $\leq$  30.0%. If %RSD values reported are >

30.0% document in the Data Assessment.

Date: August 2008 SOP: HW-24, Rev. 2

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 GC/MS Calibration Verification (CLP Form VII Equivalent)

- 26 VOA -

Date: August 2008 SOP: HW-24, Rev. 2

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  $\leq$  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

Date: August 2008 SOP: HW-24, Rev. 2

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? [1] \_\_\_ \_

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)?

Date: August 2008 SOP: HW-24, Rev. 2

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.
  - 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.

Date: August 2008 SOP: HW-24, Rev. 2

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.

DataQual VOA

# FIELD DUPLICATE SAMPLE SUMMARY

Sample ID: VWAI-MW07-1110 Duplicate Sample ID: VWAI-MW07-1110

Water: RPD>75% Soil: RPD>100%

Compound	Sample Conc.	Dup. Sample Conc.	%RPD
benzene	9.5	10	5
			#DIV/0!
		300	#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

<sup>\*</sup> one of the results below the CRQL

DataQual VOA

## FIELD DUPLICATE SAMPLE SUMMARY

Sample ID: VWAI-MW07-1110A Duplicate Sample ID: VWAI-MW07P-1110A

Water: RPD>75% Soil: RPD>100%

Compound	Sample Conc.	Dup. Sample Conc.	%RPD
benzene	9.5	9.5	0
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
	2773000		#DIV/0!
			#DIV/0!
***************************************			#DIV/0!
The state of the s			#DIV/0!

COMMENTS:

No qualifications

<sup>\*</sup> one of the results below the CRQL

### REPORT NARRATIVE

Mitkem Laboratories, a Division of Spectrum Analytical, Inc.

Client: CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC E and I

Laboratory Workorder / SDG #: J2254

### SW846 8260C

### 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.

Samples for volatile organics analyses were received with multiple preservations, including ice only, ice + ascorbic acid, and ice + hydrochloric acid.

Vials containing hydrochloric acid preservative were originally identified as "HOLD", but subsequently requested for analysis. Identifications for these samples had the letter "H" appended. Please note that the instructions to analyze these sample aliquots and append the letter "H" were not listed on the original chain of custody forms.

## II. HOLDING TIMES

All samples were analyzed within the holding times specified in the method, shortened by the analytical specification and instructions for this program.

### III. METHODS

Samples were analyzed following procedures in laboratory test code: SW846 8260C. A select list of volatile compounds were analyzed-for and reported.

#### IV. PREPARATION

Aqueous Samples were prepared following procedures in laboratory test code: SW5030B\_PR(METHOD).

## V. INSTRUMENTATION

The following instrumentation was used

Instrument Code: V6

Instrument Type: GCMS-VOA Description: HP6890 / HP5973 Manufacturer: Hewlett-Packard

Model: 6890 / 5973

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):

Duplicate matrix spikes were performed on samples: VWAI-MW02-1110 (J2254-08FMS/MSD) VWAI-MW02-1110A (J2254-09AMS/MSD).

Percent recoveries were within the QC limits.

### E. Internal Standards:

Internal standard peak areas were within the QC limits.

## F. Dilutions:

No sample in this SDG required analysis at dilution.

### 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 Mitkem, 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: Country Company

	사용 - 보호하게 하네트리아	on II od 8270D (Rev.4, January 1998)	Date: August, SOP HW-22 Rev.	
			YES NO	N/A
Ε	=	The concentration of this analyte exceeds the of the instrument.	e calibration r	ange
A	-	Indicates a Tentatively Identified Compound adol-condensation product.	(TIC) is a susp	ected
Χ, Υ, :	Z –	Laboratory defined flags. The data reviewer a qualifiers during validation so that the data understand their impact on the data.		se
I.		PACKAGE COMPLETENESS AND DELIVERABLE	ES	
ASE	NUMBI	Niegnes CTO-83	kem	
SITE	NAME	Viegnes CTO-83	103 <u>-</u> 35	
.0	Data	Completeness and Deliverables		
	1.1	Has all data been submitted in CLP deliverab format?	le	-
	ACTI(	ON: If not, note the effect on review of the in the data assessment narrative.	e data	
. 0	Cove	Letter, SDG Narrative		
	2.1	Is a laboratory narrative or cover letter present?	4_	
	2.2	Are case number and SDG number(s) contained in the narrative or cover letter?	14_	<u> (</u>
		- 6 -	. 09	7

USEPA	Region	II			
SW846	Method	8270D	(Rev. 4,	January	1998

> YES N/A NO

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".

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

2.0 Holding Times Sampled 11/2-4/10 EXTY 1115 Ple 11/3-5

Analy 11/24-25

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

USEPA Region II SW846 Method 8270D (Rev.4, January 1998)

Date: August, 2008 SOP HW-22 Rev.4

YES NO N/A

40 days of the date of extraction.

## Table of Holding Time Violations

			( S	See Traffic Rep	port)
Sample	Sample	Date	Date Lab	Date	Date
ID	Matrix	Sampled	Received	Extracted	Analyzed
				3 <del></del>	
	3 <del>-3-4×-0</del>	J		/	-
			A		
	1			8 <del></del>	-
	·		-	-	

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).

	USEPA Region II  SW846 Method 8270D (Rev.4, January 1998)  SOP H						2008
					YES	NO	N/A
3.0		Surro	ogate Recovery (Form II/Equivalent)				
	3.1	liste	the semi volatile surrogate recoveries ed on CLP Surrogate Recovery forms (Formeach of the following matrices:				
		a.	Low Water		4	_	
		b.	Low/Med Soil		$\Box$		
	3.2	appro	o, are <u>all the samples listed</u> on the opriate Surrogate Recovery Summary forms each matrix:	S		_	
		a.	Low Water		4	_	<del>orașe</del> .
		b.	Low/Med Soil		$\Box$		
	ACTIO	)N:	If CLP deliverables are unavailable, do the effect(s) in data assessments. In cases the lab may have to be contacted obtain the data necessary to complete validation.	some to	nt		
	3.3	Were	outliers marked correctly with an aster	risk?	1_1		$\underline{\nu}$
		ACTIO	ON: Circle all outliers in red.				
	3.4	recover method recover from page	two or more base neutral <u>OR</u> acid surrowneries out of specification for any same of blank (Reviewer should use lab in howery limits. Use surrogate recovery limits USEPA National Functional Guidlines Jan 130, if in house limits are not available thou 8000B-43 or 80000C-24).	ple or use its nuary		V	
		Note:	Examine lab in house limits for re	easona	ablenes	5S.	/
		If ye	es, were samples re-analyzed?				
			- 9 -		·, b	.;	100

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, for the affected fraction only (i.e. either base-neutral or acid compounds):

- 1. Flag all positive results as estimated ("J").
- Flag all non-detects as estimated detection limits ("UJ") when recoveries are less than the lower acceptance limit.
- If recoveries are greater than the upper acceptance limit, do not qualify non-detects.

If any base-neutral  $\underline{or}$  acid surrogate has a recovery of < 10%:

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

		-1					
200000000000000000000000000000000000000	A Reg 6 Met		I 270D (Rev.4, January 1998)		Date: Aug SOP HW-22		
					YES	NO	N/A
			effect in data assessments.				
4.0	Matr	ix Sp	ikes (Form III/Equivalent)				
	4.1	Matr Samp	the semivolatile Matrix Spike ix Spike Duplicate/or duplicate le recoveries been listed on the very Form (Form III)?	e unspiked		<i>,</i>	
	NOTE	:	Method 3500B/page 4 states the	e spiking co	ompounds:		
			Base/neutrals 1,2,4-Trichlorobenzene Acenaphthene 2,4-Dinitrotoluene Pyrene N-Nitroso-di-n-propylamine 1,4-Dichlorobenzene	Acids Pentachloro Phenol 2-Chlorophe 4-Chloro-3- 4-Nitropher	enol -methylph	enol	
	Note	:	Some projects may require the of interest.	spiking of	specific	COM	oounds
	Note	į	See Method 8270D-sec 8.4.2 for to prepare and analyze duplicate. spike/matrix spike duplicate. to contain target analytes, to matrix spike and a duplicate field sample. If samples are target analytes, laboratory stand matrix spike duplicate parameters.	ate samples  If samples hen laborate analysis of not expecte hould use a	or a mar s are expe ory may us an unspi ed to con	tix ecteo se on ked tain	ne
	4.2		matrix spikes analyzed at the uency for each of the following	F.,	,	,	
		a.	Low Water				·
		b.	Low Solid				-

Med Solid

c.

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.

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	 ***************************************

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	<u>Solids</u>
0 out of 36 W12/27	out of

		- April			
		jion I hod 8	I 270D (Rev.4, January 1998)	Date: August, 2008 SOP HW-22 Rev.4	3
				YES NO N/F	A
	4.5	How dupl	many RPD's for matrix spike and matr icate recoveries are outside QC limi	ix spike ts?	
		Wate	2		
	ACTI		Circle all outliers with red pencil	out of	
	ACTI	ON:	No action is taken on MS/MSD data and However, using informed professional judgement, the data reviewer may use matrix spike and matrix spike duplic results in conjunction with other Que to determine the need for some quals of the data.	lone. l e the cate C criteria	
	4.6		a Laboratory Control Sample (LCS) and ytical batch?	alyzed with each	
	NOTE	:	When the results of the matrix spike indicate a potential problem due to matrix itself, the LCS results are a verify that the laboratory can perform analysis in a clean matrix.	the sample used to	
5.0	Blan	ks (F	orm IV/Equivalent)		
	5.1	Is th	ne Method Blank Summary (Form IV) pre	esent?	
	5.2	Freq	uency of Analysis:		
		repo	a reagent/method blank analysis been rted per 20 samples of similar matrimentration level, and for each extractor?	x, or	•
	5.3	Has a	a method blank been analyzed either a	after	

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SW846	Method	8270D	(Rev. 4,	January	1998)

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.

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 <u>not</u> used to qualify the data. Do not confuse them with the other QC blanks discussed below.

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

poor spectra, instrument performa 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).

VWAI-EBO1-110210 MO€ LEBO1-110410 MO€ EBO1-110410 MO€

YES NO N/A

## Blank Action for Semivolatile Analyses

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
		< CRQL	Report CRQL value with a U
	> CRQL *	<pre>&gt; CRQL and &lt; blank contamination</pre>	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

USEPA Region II Date: SW846 Method 8270D (Rev.4, January 1998) SOP H							
,607-900 (100 (100 (100 (100 (100 (100 (100 (	WANTED BEING TO THE PARTY OF TH		b.	YES	NO	N/A	
		that exceeded the initial calibration range.					
	6.5	Does the instrument blank have positive result for target analytes and/or TICs?	ts.			<u> </u>	
	Note	: Use professional judgement to determine if carryover occurred and qualify analytaccordingly.	es				
7.0	GC/M	S Apparatus and Materials					
	7.1	Did the lab use the proper gas chromatographic column for analysis of semivolatiles by Methor 8270D? Check raw data, instrument logs or control the lab to determine what type of column was The method requires the use of 30 m $\times$ 0.25 mm (or 0.32 mm ID), silicone-coated, fused silicone-lapitlary column.	od ontac used n ID		<b>/</b>		
	ACTIO	ON: If the specified column, or equivalent, not used, document the effects in the datassessment. Use professional judgement determine the acceptability of the data.	ata to				
8.0	GC/M	S Instrument Performance Check (Form V/Equival	lent)	-			
	8.1	Are the GC/MS Instrument Performance Check Fo (Form V) present for decafluorotriphenylphosy (DFTPP)?		4		**************************************	
		The performance solution should also contain achlorophenol, 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 (base upon lab experience) and show no peak degradation tailing before samples are analyzed. (see	nce. De Sed	ı			

- 17 -

108

USEPA Region II		Date	e: Augi	ıst,	2008
SW846 Method 82	270D (Rev.4, January 1998)	SOP	HW-22	Rev.	. 4
			YES	NO	N/A
page	8270D-12).				
mass	the enhanced bar graph spectrum and /charge (m/z) listing for the DFTPP ided for each twelve hour shift?		4		************
been	an instrument performance check solution analyzed for every twelve hours of sampysis per instrument?		4	/	
ACTION:	List date, time, instrument ID, and sam analyses for which no associated GC/MS tuning data are available.	mple			
DATE	TIME INSTRUMENT SAMPLE NUME	BERS			
ACTION:	If lab cannot provide missing data, reg ("R") all data generated outside an acc twelve hour calibration interval.	-	ble		
	f mass assignment is in error, flag all ssociated sample data as unusable (R).				
8.4 Have m/z	the ion abundances been normalized to 198?		14		· 
	the ion abundance criteria been met for instrument used?	r	W		
ACTION:	List all data which do not meet ion about criteria (attach a separate sheet).	undan	ce		

USEPA Region II Date SW846 Method 8270D (Rev.4, January 1998) SOP I							
					YES	NO	N/A
	ACTIO	ON:	If ion abundance criteria are not met, action specified in section 3.2	take			
	8.6	betw	there any transcription/calculation erro een mass lists and Form Vs? (Check at le values but if errors are found, check mo	ast	***************************************	1	•——
	8.7		the appropriate number of significant res (two) been reported?				
	ACTIO	ON:	If large errors exist, call lab for explanation/resubmittal, make necessary corrections and document effect in data assessments.				
	8.8		the spectra of the mass calibration comp ptable?	ound			
	ACTIO	ON:	Use professional judgement to determine whether associated data should be acceptualified, or rejected.				
9.0	Targe	et An	<u>alytes</u>				
	9.1	pres	the Organic Analysis Data Sheets (Form I ent with required header information on , for each of the following:			,	
		a.	Samples and/or fractions as appropriate	<b>:</b>	Lí		**************************************
		b.	Matrix spikes and matrix spike duplicat	es	4		
		c.	Blanks		14		***************************************
	9.2	perf	any special cleanup, such as GPC, been ormed on all soil/sediment sample extrac section 7.2, page 8270D-14)?	cts	<u> </u>	MARKOTE SERVICE  <u> </u>	

USEPA Re SW846 Me		I 270D (Rev.4, January 1998)	Date: August, 2008 SOP HW-22 Rev.4
			YES NO N/A
ACT	ION:	If data suggests that extract cleanup w performed, use professional judgement. note in the data assessment narrative.	
9.3	spec syst	the Reconstructed Ion Chromatograms, mas tra for the identified compounds, and th em printouts (Quant Reports) included in le package for each of the following?	e data
	a.	Samples and/or fractions as appropriate	<u> </u>
	b.	Matrix spikes and matrix spike duplicat (Mass spectra not required)	es
	c.	Blanks	<u></u>
ACT	ION:	If any data are missing, take action specified in 3.2 above.	
9.4	Are Repo	the response factors shown in the Quant rt?	<u></u>
9.5		hromatographic performance acceptable wi ect to:	th
	Base	line stability?	<u> </u>
	Reso	lution?	m
	Peak	shape?	m — —
	Full	-scale graph (attenuation)?	TR
	Othe	r:	П — —
ACT	ION:	Use professional judgement to determine acceptability of the data.	the
9.6		the lab-generated standard mass spectra tified semivolatile compounds present fo	

USEPA	Region	II			
SW846	Method	8270D	(Rev.4,	January	1998)

YES NO N/A

each sample?

ACTION:

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

- 9.7 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?
- 1
- 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.

	A Regi 6 Meth			Rev.4, January 199	98)		: Augu HW-22		1
			***************************************				YES	NO	A/N
10.0	Tenta	ative]	Ly Ide	ntified Compounds	(TIC)				0
	10.1	for t	this p do lis	vely Identified Coroject, are all Forted TICs include smated concentration	orm Is, Part B pressen number or ret	esent tenti	; on	MT	104
	NOTE:	;	lab w	w sampling reports as required to ide to section 7.6.2	entify non target		ytes		
	10.2	ident spect	tified tra in	ss spectra for the compounds and ass cluded in the samp lowing:	sociated "best mat		<u></u>	**************************************	
		a.	Sampl	es and/or fraction	ns as appropriate				
		b.	Blank	S				***************************************	<u></u>
	ACTIC	: NC		y TIC data are mis fied in 3.2 above.	~	ז			
	ACTIC	: NC		JN" qualifier only ified by CAS #.	y to analytes				
	10.3	as T	IC com	rget compounds fro pounds in another isted as a base no	(e.g., an acid	isted	, and a second s		
	ACTIO	: NC	i.	Flag with "R" any as a TIC.	target compound :	liste	d		
				Make sure all reje properly reported			. •		
	10.4	spect	trum w	ons present in the with a relative int					

	Regi Meth	on II od 8270D (Rev.4, January 1998)	Date: SOP HW	-	The state of the s	
			)	ES.	NO	N/A
		sample mass spectrum?	Ĺ			~
		Do TIC and "best match" standard relation intensities agree within ± 20%?	tive ion	<u>. 1</u>		<u></u>
	ACTIO	N: Use professional judgement to detacceptability of TIC identification is determined that an incorrect identification was made, change identification to "unknown" or to specific identification (example substituted benzene") as approprise remove "JN". Also, when a composition of a name of the common laboratory of the result should be qualified as "R."	ions. If it the o some less : "C3 iate and und is not pected contaminant,			
11.0	Comp	ound Quantitation and Reported Detect	ion Limits			
		Are there any transcription/calculation Form I results? Check at least two poor Verify that the correct internal stand quantitation ion, and RRF were used to Form I result. Were any errors found?	sitive values dard, o calculate	•	4	/_
v	NOTE:	Structural isomers with similar abut insufficient GC resolution (valley between the two peaks > 2 reported as isomeric pairs. The should check the raw data to ensuch isomers were included in the quantitation (i.e., add the are coeluting peaks to calculate the concentration).	i.e. percent 5%) should be reviewer ure that all e as of the two			
E		Are the method detection limits adjus reflect sample dilutions and, for soi moisture?			_	
				i		114

> YES NO N/A

If errors are large, call lab for ACTION: 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?

If any calibration standard data are missing, ACTION: 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?

If any calibration forms or standard row data ACTION: 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

	Acid Fraction		
	4-Chloro-3-methylphenol		
	2,4-Dichlorophenol		
	2-Nitrophenol		
x	Phenol		
	Pentachlorophenol		
	2,4,6-Trichlorophenol		
	Y 100		

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?

		-	
	ate: Aug DP HW-22		
	YES	NO	N/A
13.6 If the pesticide compounds include DDT, was the percent breakdown of DDT to DDD and DDE greate: than 20%?			$\angle$
ACTION: If DDT percent breakdown exceeds 20%:			
i. Qualify all positive results for DDT with "J". If DDT was not detected, I DDD and DDE results are positive, qualify the quantitation limit for Di as unusable, "R".			
ii. Qualify all positive results for DDD DDE as presumptively present at an approximate concentration "JN".	and		
14.0 GC/MS Calibration Verification (Form VII/Equivalen	<u>t)</u>		
14.1 Are the Calibration Verification Forms (Form V present and complete for all compounds of interest?	II) 	/ —	s 3 <u></u> -
14.2 Has a calibration verification standard been analyzed for every twelve hours of sample anal per instrument?	ysis	<i>,</i>	8 1 <del></del> 5
ACTION: List below all sample analyses that were within twelve hours of a calibration verification analysis for each instrument used.	not		
	-		
ACTION: If any forms are missing or no calibratio verification standard has been analyzed within twelve hours of every sample analy			

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\_\_

14.6 Do any semivolatile compounds have a RRF < 0.05?

ACTION: Circle all outliers in red.

ACTION: If RRF < 0.05, qualify as unusable ("R") associated non-detects and "J" associated positive values.

14.7 Are there any transcription/calculation errors in the reporting of average response factors (RRF) or percent difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more).



YES NO N/A

ACTION: Compare the reported results for field

duplicates and calculate the relative percent

difference.

ACTION: Any gross variation between field duplicate

results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the

sampler.

				-				
	A Region I 6 Method 8		4, January 199	8)		: Augu HW-22		
						YES	NO	N/A
	ACTION:	Circle er	rors in red.					
	ACTION:	explanati	ns and documen	ll lab for , make any neces t effect(s) in t				
15.0	Internal	Standards	(Form VIII)					
	ever limi	y sample a	nd blank withi	eas (Form VIII) n the upper and each continuing			_	
	ACTION:	List each	outlying inte	rnal standard be	low.			
Samp.	le ID	IS #	Area	LowerLimit		Uppe.	r Lim	it
								<del>-</del>
		(Attacl	n additional sh	neets if necessar	cy.)			
	Note:	Check Tab	le 5, 8270D-41	for associated	analy	tes.		
	ACTION:	outs with non-	ide the upper "J" all posit	andard area coun or lower limit, ive results and ues) quantitated dard.	flag			

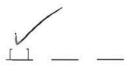
ii. Non-detects associated with IS > 100%

should not be qualified.

USEPA Region I SW846 Method 8	II 3270D (Rev.4, January 1998)	Date: August, 2008 SOP HW-22 Rev.4
·		YES NO N/A
	iii. If the IS area is below the lower (<50%), qualify all associated non-detects (U-values) "J". If extreme area counts are reported (<25%) or performance exhibits a major abrup off, flag all associated non-detections and the counts are reported (R).	- ly low if t drop
with	the retention times of all internal stan- nin 30 seconds of the associated calibrat ndard?	,
ACTION:	Professional judgement should be used to qualify data if the retention times difference than 30 seconds.	
16.0 <u>Laborato</u>	ry Control Samples (LCS)	
anal	e any LCS samples run in order to verify lytes which failed criteria for spike overy?	<u> </u>
same	the lab spike LCS sample spiked with the analytes and the same concentrations as rix spike?	the
anal	e the mean and standard deviation of all lytes within the QC acceptance ranges as wn in Table 6, 8270D-43?	
ACTION:	If the recovery of any analyte falls ou the designated range, the analytical re	

17.0 Field Duplicates

17.1 Were any field duplicates submitted for semivolatile analysis?



for that compound is suspect and should be

qualified "J" in the unspiked samples.

DataQual SVOA

# FIELD DUPLICATE SAMPLE SUMMARY

Sample ID: VWAI-MW07-1110
Duplicate Sample ID: VWAI-MW07-1110D

Water: RPD>50% Soil: RPD>75%

Compound	Sample Conc.	Dup. Sample Conc.	%RPD
napthalene	7.9	10	23
2-methylnapthalene	7.7	9.9	25
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

<sup>\*</sup> one or both values below CRQL

COMMENTS:

No qualifications required.

## REPORT NARRATIVE

Mitkem Laboratories, a Division of Spectrum Analytical, Inc.

Client: CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC E and I

Laboratory Workorder / SDG #: J2254

SW846 8270D

### 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. A select list of semivolatile compounds were analyzed-for and reported.

# IV. PREPARATION

Aqueous Samples were prepared following procedures in laboratory test code: BNA\_W\_PR(SEPF)

## V. INSTRUMENTATION

The following instrumentation was used

Instrument Code: S3

Instrument Type: GCMS-SEMI Description: HP6890 / HP5973 Manufacturer: Hewlett-Packard

Model: 6890 / 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.

### 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):

Duplicate matrix spikes were performed on sample: VWAI-MW02-1110 (J2254-08EMS/MSD)

Percent recoveries were within the QC limits.

#### G. Internal Standards:

Internal standard peak areas were within the QC limits.

#### H. Dilutions:

No sample in this SDG required analysis at dilution.

### H. 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 Mitkem, 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: 12/3/10 Date:

**USEPA** Region 2

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2 Revision 13

Appendix A.1

Sept. 2006

Site: Vugnes AOC E & I

Case #:

SDG #:

12254

Samples:

Soil

Water

Note-most CIP forms were not used-(receipt forms & some documentation forms).
Report forms were CIP format.

Standard Operating Procedure

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program

Data Assessment and Contract Compliance Review

_SOP:	HW-2 Revision	n 13	Appendix A.1	Sept. 2006
A.I.I	Contract Complia	ince Screening Re	eport .	YES NO N/A
	ACTION:	If no, contact RS	CC/PO.	<u> </u>
A.I.2	Record of Comm	unication (from R	SCC)	
	Present?			<u> </u>
	ACTION:	If no, request fro	m the RSCC.	
A.1.3	Sampling Trip Re	port		
	Present and	d complete?		[_]
	ACTION:	If no, contact RS	CC/PO.	
A.I.4	Chain of Custody	/Sample Traffic R	eport	
_	Present?			
A1	Legible?			
	Signature o present?	f sample custodiar	1 .	
	ACTION: If	no, contact RSCC.	/WAM/PO.	
A.I.5	Cover Page			
	Present?			
	and the ver	r Page properly fille batim signed by the the manager's de	e lab	
ù.	on the Cove	ple identification ner Page agree with n numbers on:		
	(a) Traffic F	Report Sheet?		

SOP: H	W-2 Revision 13	Appendix A.1	Sept. 2006
(b)	) Form I's?	i i	YES NO N/A
	Is the number of sample Page the same as the r samples on the Traffic I and the Regional Reco (ROC) for the data C	number of Report sheet rd of Communication	
	ACTION: If no for any of the above Telephone Record Log for re-submittal of the confrom the laboratory.	and contact RSCC/PO	
A.1.6 <b>S</b> I	DG Narrative, DC-1 & DC-2	Form	
	Is the SDG Narrative pr	esent?	
<u> </u>	Is Sample Log-In Sheet present and complete?	t(Form DC-1)	
	Is Complete SDG Inver present and complete?	tory Sheet(Form DC-2)	
	ACTION:  If no, write in the Contra  Non-Compliance Secondariative.	act-Problems/ ction of the Data Review	Receipt poperwork we Gusent & in order.
A.1.7 <u>Fo</u>	orm I to XV	1	
A.1.7.1	Are all the Form I through	gh Form XV	
	Laboratory Name?		<u>L</u>
	Laboratory Code?		
	RAS/Non-RAS Case No	0.?	[]
<u> </u>	SDG No.?		<u> </u>

USEPA Region 2

_SOP: HW-2	Revision 13	Appendix A.1	Sept. 2006
	Contract No.?		YES NO N/A
	ACTION:  If no for any of the above	note under	
	Contract Problem/Non-Co		
	of the "Data Review Narra		
A.1.7.2	PO for corrected Form(s) After comparing values or	•	
	against the raw data, do a	any computation/	
	transcription errors excee reported values on the Fo		
	·		
(a) a	all analytes analyzed by ICF	P-AES?	_ [
(b) a	all analytes analyzed by ICF	P-MS?	
(c) N	Mercury?		_ 🗀
(d) (	Cyanide?		_ 🗀 🗸
	ION:		
	s, prepare Telephone Reco contact CLP PO/TOPO for		
	from the laboratory.	i sorrodda	
A.1.8 Raw	<i>r</i> <u>Data</u> a shall not be validated wi	ithout the	
hard	d/electronic copies of the	associated	
raw	data for samples and QC	samples.	
A.1.8.1	Digestion/Distillation Log		
	estion Log for ICP-AES		
(Form	n XII)present?		
	estion Log for ICP-MS		
(10111	n XII) present?		
•	estion Log for mercury	2	
•	m XII) present?		
	illation Log for cyanide m XII) present?		
_	, ,		
Are	pH values for metals and		

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program
Data Assessment and Contract Compliance Review

SOP:	HW-2 Revision 13	Appendix A.1	Sept. 2006
			YES NO N/A
	cyanide reported for each aqueous sample?		1 1
	·		
	Are percent solids calculations present for soils/sediments?		
	Are preparation dates present on sample preparation logs/bench st		
	NOTE: Digestion/Distillation log must include weigh and dilutions used to obtain the reported res	ts, volumes, ults.	
A.1.8	.2 Is the analytical instrument real-time printouts present for		
	ICP-AES?		
	ICP-MS?		
•	Mercury?		
<u> </u>	Cyanide?		
	Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:	5	
	Legible?		
	Properly labeled?	1	
	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.

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-	-2 Revision 13	Appendix A.1	Sept. 2006	
			YES NO N/A	
(Exam deter	chnical Holding Times: (Aquaine sample Traffic Reports and digesting time from the sample paration date.)	on/distillation logs to		
A.1.9.1	Cyanide distillation(14 da	ys)exceeded?	_ 🗆 🗹	
	Mercury analysis(28 days	e) exceeded?	_ [_] _	
	Other Metals analysis(18	0 days)exceeded?	. [1]	
If y an if sa NC In a a lis whi	ction:  yes, reject (R) and red-line not define as estimated (J) results ample(s) was preserved proportion.  OTE:  addition to qualifying the data, st of all samples and analytes ich exceeded the holding times must prapared. Report for each sample number of days that were exceeded.	i ≥ MDL even		
(Su fror Attac	obtract the sample collection date in the sample preparation date). She this list to the data review rative.	£		
A.1.9.2	Is pH of aqueous sample	s for:		
Me	etals Analysis ≤ 2?			
Су	vanide Analysis ≥ 12?			
lf r	CTION: no for any of the above, flag n-detects as "R" and detects as	"J".		
A.1.9.3 <b>ls</b> t	he cooler temperature <= 10 (	C.S.		
If c	CTION: cooler temperature is >10 °C,fland n-detects as "UJ" and detects a			
A.1.10 <b>Fi</b> r	nal Data Correctness - Forr	n I		

A.1.10.1 Are Form I's for all samples

Standard Operating Procedure

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program

Data Assessment and Contract Compliance Review

_SOP: H	W-2 Revision 13	Appendix A	A.1 Sept.	2006
		3:	YES NO	N/A
р	resent and complete?			
I1 L	ACTION: fno, prepare Telephone og and contact CLP PC ubmittal from the labora	)/TOPO for		ž.
A.1.10.2		calculation and transcription I's. Circle on each Form I all		
	Is the calculation e	error less than 10% of the co	rrect result?	-
	Are results on Form MG/KG for soils)?	m I's reported in correct units	(ug/L for aqueous and	
	Are results on For	m I'S reported by correct s	ignificant figures? []	
<b>-</b>	Are soil sample re corrected for perce		[] _	
	by the CROLs and	11005	[	
	Are values less that but greater than or MDLs flagged with	equal to the Magael	B -	<u></u>
	Are appropriate co		ded led	
	ACTION: If no for any of the prepare Telephone CLP PO/TOPO for	e Record Log, and contact		
A.1.10.3	and the correspon	on numbers match	i <u>_</u> 1 _	1450 ————————————————————————————————————
_	. Was a brief physic	cal description		

_SOP: HW-2	Revision 13	Appendix A.1	Sept. 2006	
		-	YES NO N/A	
	of the samples before and a digestion given on the Form			
	Was any sample result outsi mercury/cyanide calibration or the ICP-AES/ICP-MS line diluted and noted on the For	range ear range		
	ACTION: If no for any of the above, no the Contract-Problem/Non-C Section of the Data Review	Compliance		
A.1.11 <u>Initia</u>	al Calibration			
A.1.11.1	Is a record of at least 2 point (A blank and a standard)calit present for ICP-AES analysi	ibration		
_	Is a record of at least 2 poin (a blank and a standard)calibrati present for ICP-MS analysis	ion		
	Is a record of at least 5 poin (a blank & 4 standards) present			
	Is a record of at least 4 poin (a blank & 4 standards) present f		[_]	
	ACTION: If incomplete or no initial cal was performed, reject (R) are the associated data (detects)	nd red-line		
	Is one initial calibration standat the CRQL level for cyanid mercury?	3		
	ACTION: If no, write in the Contract P Non-Compliance Section of Review Narrative.			
4.1.11.2	Is the curve correlation coefficient ≥ 0.995 for:			

SOP: HW-2	Revision 13	Appendix A.1	Sept. 2006	
	111111111111111111111111111111111111111		YES NO N/A	
	Mercury Analysis?			
	Cyanide Analysis?			
	ICP-AES (more than 2 po	int Calib.)?		
	ICP-MS (more than 2 po	int calib.)?		
	ACTION:  If no, qualify the ass results ≥ MDL as estime non-detects as "UJ".  NOTE:  The correlation coefficient so be calculated by the data valusing standard concentrations corresponding instrument respansorbance, peak area, peak here.	hall idator and the onse (e.g.	LJ	
A.1.12	Initial and Continuing C	alibration Verification-	- Form IIA	
A.1.12.1	Present and complete f metal and cyanide?	or every		
	Present and complete f and ICP-MS when both t were used for the same	hese methods	[]	
	ACTION:  If no for any of the a Telephone Record Log a for re-submittal from	ind contact PO/TOPO		
A.1.12.2	Was a Continuing Calib Verification performed 10 samples or every 2 whichever is more freq	l every hours		
	ACTION: If no for any of the a in the Contract-Proble Section of the Data Re	em/Non-Compliance		
A.1.12.3	Was an ICV or a mid-radistilled and analyzed of cyanide samples?		[]	

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SOP: HW-2	Revision 13	Appendix A.1	Sept. 2	006
			<u>YES NO</u>	<u>N/A</u>
	Section of the Dat	he above, write oblem/Non-Compliance a Review Narrative and MDL as estimated (J).		
A.1.12.2	Circle on each Form IIA that are outside the cont	•		
	Are ICV/CCVs within-cor	ntrol limits for:		
	Metals - 90-110%	R?	. []	
	Hg - 80-120%R?		[]	
	Cyanide - 85-115%	R?	[]	
	,	between a previous technically lent technically acceptable CCV	•	
	if the ICV/CCV %R is be Qualify only positive resi between 111-125%(121- red-line only detects if the recovery is CN). Reject (R) and red-	all detects and non-detects, etween 75-89%(65-79% for Hg; ults(≥ MDL) as "J" if the ICV/CC-135% for Hg;116-130% for CN greater than 125% (135% for He-line all associated results (hits gless than 75%(65% for Hg;70%)	V %R is ). Reject (R) and Hg; 130% for and non-	
	NOTE: For ICV that does not fall within qualify all samples reported from			
A.1.12.3	Was the distilled ICV or standard for cyanide with limits (85-115%)?	9	[]	
	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

SOP:	HW-2	Revision 13	Appendix A.1	Sept. 2006
	A CONTRACTOR OF THE PARTY OF TH	QL or MDL when MDL > CRQL dard analyzed? (Note:CRI is not required Ca, Fe, Mg, Na and K.)	OF: 600	YES NO N/A []
		For each ICP-MS run, was a (CRQL or MDL when MDL > CRQI analyzed for each mass/isoto for the analysis?	_) standard	[]
		For each mercury run, was a standard analyzed?	CRQL	[]
		For each cyanide run, was a standard analyzed?	CRQL	[]
	ICP-A ICP-N Merci	ACTION:  If no for any of the above, we this deficiency in the Contract Non-Compliance Section of Narrative, inform CLP PO are in the affected ranges (detect and non-detects UJ.  Affected ranges are: AES Analysis - *True Value ± C. AIS Analysis - *True Value ± C.	et Problems/ the Data Review and flag results ets <2xCRQL)as J  RQL RQL RQL RQL RQL	Mn-no CRI std mn- all results were > 2X LOD 7 10; no greats regured.
A.1.13	3.2	Was a CRQL standard analy ICV/ICB, before the final CC once every 20 analytical san the analytical run for each ar	V/CCB and oppose in	
		ACTION: If no, write in the Contract Properties of Non-Compliance Section of "Data Review Narrative".		
A.1.13	3.3	Circle on each Form IIB all precoveries that are outside the acceptance windows.		*

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SOP: HW-2	Revision 13	Appendix A.1	Sept. 200	)6
	Is the CRQL standard within of limits for:	control	<u>yes no 1</u>	N/A
	Metals(ICP-AES/ICP-MS)- 70	0 - 130%?		
	Mercury- 70 - 130%?		[]	
	Cyanide - 70 - 130%?		[]	
	ACTION:  If no, flag detects <2xCRQL a non-detects as "UJ" if the CRI recovery is between 50-69%. detects <2xCRQL if the recover 131% and ≤180%. If the recovery 150%, reject(R) and red-line redetects < 2xCRQL, and flag (2xCRQL and ICV/CCV. Reject detects <2xCRQL and flag (J) but < ICV/CCV if the recovery	QL standard Flag(J) only very is between very is less than non-detects and J) detects between ct and red-line only )detects ≥ 2xCRQL		
	NOTE:  1. Qualify all field samples a a previous technically acce the CRQL standard and a sub analysis of the CRQL standa  2. Flag (J) or reject (R) only sample results on Form I's raw data are within the aff and the CRQL standard is ou acceptance windows.  3. The samples and the CRQL standayzed in the same analyte	eptable analysis of osequent acceptable ard the final when Sample fected ranges atside the candard must be		
A.1.14 <u>Initia</u>	ıl 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 Blan			
•	analyzed after ICV?			MARIO CONTRACTOR CONTR
	Was a continuing Calibration analyzed after every CCV and 10 samples or every 2 hours, is more frequent?	d every		**************************************
	Were the ICB & CCB values reported on Form III and flagg			
		B24-		13.7

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	using MDLs from direct Method "NP1")? (Check Form III aga:		YES	<u>NO</u> N/	<u>—</u>
	ACTION: If no, inform CLP PO/ in the Contract-Proble Section of the "Data F				
A.1.14.2	Circle with red pencil all Calib. Blank values				
		≥ MDL but ≤ CRQL			
		> CRQL		***	
A.1.14.2.1	When MDL < CRQL, value ≥ MDL but ≤ CR		<u> </u>	[]	***************************************
	ACTION:  If yes, change sample but ≤ CRQL to the CRD not qualify non-de	RQL with a;"U".	Fi.	ag u e W04 03-	Note-all b Novo7 we assoc with
	/hen MDL < CRQL, is a llue > CRQL?	ny Calib. Blank		$\lfloor \sqrt{} \rfloor$	ccB sha
к Н	ACTION:  If yes, reject (R) and resolved sample resolved sample resolved sample resolved sample resolved sample resolved sample resolved sample resolved sample resolved sample s	sults > CRQL Result. Flag as "J" ank value but Change the sample		4	conta
	any Calibration Blank velow the negative CRQ		-	[_]	
	ACTION: If yes, flag (J) as estir associated sample re <10xCRQL.			ē	

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NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples U.S. EPA - CLP

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BLANKS

Lab Name: Mitkem Laboratories

Contract:

933562, N62470-08-D-1000, Proj 3924

Lab Code: MITKEM

187010-1-1000-1-1000

Case No.:

SAS No.:

SDG No .:

SJ2254

Preparation Blank Matrix (soil/water): WATER

dolon vit. Internetant

MB-55727

Method Blank ID:

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

OPTIMA2 101120A

	Initial Calibration Blank (ug/L	× 1	Co	onti	nuing Cali Blank (ug/		on		Preparation Blank	n	
Analyte		С	1	С	2	6	3	С		С	М
Iron	31.0	U	31.0	U	44.	3 B	31	. O U	31.000	U	P
Manganese	10.0	U	10.0	U	10.1	ט	10.	. 0 U	10.000	U	P

MW04 ~ Flag U@ LOD 02 03

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SOP: HW-	2 Revision 13	Appendix A.1	Se	pt. 2006	
			YES	NO N/A	
2. Fo app pre a s	corted from the analytical run. or CCBs that do not meet the technical Copy the action to all samples analyzed be evious technically acceptable analysis of ubsequent technically acceptable analysis in the analytical run.,	etween a f CCB and			
A.1.15	Preparation Blank - NOTE: The Preparation Blank is the same as the calibrat	for mercury			
A.1.15.1	Was one Preparation with and analyzed fo		/		
	Each Sample Delivery	Group (SDG)?	[]	_ =	
	Each batch of the SD digested/distilled?	G samples	$\left[ \frac{1}{2} \right]$		**
	Each matrix type?		[]		
J.	All instruments used and cyanide analyses		[]		
	¥				
	ACTION:  If no for any of the as estimated (J) all positive data <10xMD Preparation Blank wa	the associated L f¢r which the			
	NOTE:  If only one blank was analy than 20 samples, then the fanalyzed are not estimated (additional samples must be	irst 20 samples J),but all			
A.1.15.2	Circle with red penci all Prep. Blank value				
	$\geq$ MDL but $\leq$	CRQL, and			
	> CRQL			o <del>li</del>	
A.1.15.2.	1 When MDL < CRQL, is value $\geq$ MDL but $\leq$ CR		_	[	
	ACTION: If yes, change sampl	∤ e result ≥ MDL			

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$\sim SOP: HW-2$	Revision 13	Appendix A.1	Sep	t. 2006	
			YES	NO N/A	7
	If yes, reject (R) and reconstitute sample results with raw data less than 10 times. Preparation Blank value.	th sample			
A.1.16	<pre>ICP-AES/ICP-MS Interference NOTE:Not required for CN, Hg,</pre>		S) - Form	<u>IV</u>	
A.1.16.1	Present and complete?		[]		
	Was ICS analyzed at the beand end of each analytical once for every 20 analytic	run, and		and a supplemental	anger (vice and a
	Was ICS analyzed at the bethe ICP-MS analytical run?		[]	utana na sa	<u>/</u>
	ACTION: If no, flag as estimated sample results.	(J) all			
A.1.16.2	ICP-AES Method				
A.1.16.2.1	ICSA Solution: For ICP-AES, are the ICSA values within the control of the true/established mean	limits <u>+</u> of CRQL			
	If no for any of the above sample concentration of Al or Mg in the same units (ugreater than or equal to concentration in the ICSA Form IV?	l, Ca, Fe, ug/L or MG/KG) its respective	[]		<u> </u>
	ACTION: If yes, apply the following all samples analyzed between technically acceptable and ICS and a subsequent technically sis of the ICS in the	een a previous alysis of the nically acceptable			
	Flag (J) as estimated only s	sample results >MDT			

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YES NO N/A

for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".

#### A.1.16.2.3 ICSAB Solution

For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?

If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?

#### ACTION:

If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results  $\geq$  MDL for which the ICSAB analyte recovery is greater than 120% but  $\leq$  150%. If the ICSAB recovery falls within 50-79%, qualify sample results  $\geq$  MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

### A.1.16.3 ICP-MS Method

#### A.1.16.3.1 ICSA Solution:

For ICP-MS, are the ICSA "Found" analyte values within the control limits of  $\pm$ 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  $\geq$  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".

_SOP:	HW-2	Revision 13 Appendix	A.1	Se	pt. 2006	
				YES	NO N/A	
A.1.1	6.3.3	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?	:	[]		
	8	<pre>ACTION: ; If no, apply the following action to samples reported from the analytical</pre>				
		Flag (J) as estimated those associated sample results $\geq$ MDL for which the IC analyte recovery is greater than 120% $\leq$ 150%. If the ICSAB recovery falls w 50-79% flag (J) as estimated the associated sample results $\geq$ MDL. Reject (R) and those all sample detects and non-detect which the ICSAB analyte recovery is 150%. If the recovery is above 150%, rand red-line only detects ( $\geq$ MDL).	CSAB but within ociated red-line ects for less than		10	*1
\.1.1°	7	Spiked Sample Recovery: Pre-Digestion Note: Not required for Ca, Mg, K, and Na (both			The state of the s	
A.1.1	7.1	Was Matrix Spike analysis performed:			/	
		For each matrix type?		[]	<del>-</del> , -	
		For each SDG?		[]		
		On one of the SDG samples?		[]		
		For each concentration range (i.e., low, med., high)?		[]	<u> </u>	
		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.	No	MSE/C	n MSD was	
~		NOTE:  If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.	¥	Ja	ll + results	

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SOP: HW-2	Revision 13	Appendix A.1	Se	pt. 2006
			YES	NO N/A
A.1.17.2	Was a field blank or PE sam for the spiked sample analy	-	***************************************	
. *	ACTION: If yes, flag (J) as estimat data of the associated SDG which field blank or PE sam for the spiked sample analy	samples for ple was used		
A.1.17.3	Circle on each Form VA all recoveries that are outside control limits (75-125%) th sample concentrations less times the added spike conce	the at have than four		
	Are all recoveries within to control limits when sample concentrations are less that equal to four times the spiconcentrations?  NOTE:  Disregard the out of control spik recoveries for analytes whose concentrations are greater than dequal to four times the spike additional spik	n or ke e	[]	
	Are results outside the con (75-125%) flagged with Lab Q on Form I's and Form VA?		[]	
	ACTION:  If no for any of the above, the Contract - Problems/Non Section of the Data Review	-Compliance		
A.1.17.4	Aqueous			
	Are any spike recoveries:			
	(a) less than 30%?		anaharennegggeng	
	(b) between 30-74%?		ana anno anno anno anno anno anno anno	[]
	(c) between 126-150%?		-resignmentalisticitati	[_] \_
	(d) greater than 150%?		***************	
	ACTION:  If the matrix spike recover 30%, reject (R) and red-lires aqueous data (detects & non between 30-74%, qualify all aqueous data > MDL as "J" a	all associated		

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<u>SOP: HW-2</u>	Revision 13	Appendix_A.1	Se	pt. 200	6
			YES	NO N	<u>/A</u>
	as "UJ". If between 126-19 all data $\geq$ MDL as "J". If reject (R) and red-line as	greater than 150%,	L.		
	(NOTE: Replace "N" with "J",	"R" as appropriate.)			
A.1.17.5	Soil/Sediment				
	Are any spike recoveries:				
	(a) less than 10%?		***************************************	[]	<u></u>
	(b) between 10-74%?		NAMES AND ADDRESS OF THE PARTY		_
	(c) between 126-200%?		Manager	<b>{</b> ]	<del>-</del>
	(d) greater than 200%?			[]	#
	ACTION:  If yes for any of the aboras follows:	ve, proceed			V
	If the matrix spike recover than 10%, reject (R) and reassociated data (detects if between 10-74%, qualify data $\geq$ MDL as "J" and non-if between 126-200%, flag data $\geq$ MDL as "J" If great (R) and red-line all associated (NOTE:Replace "N" with "J" of	ed-line all & non-detects); all associated -detects as "UJ"; (J) all associated ter than 200%, reject ciated data > MDL.			
A.1.18	Lab Duplicates) - Form V	Ī			
A.1.18.1	Was the lab duplicate ana	lysis performed:			
	For each SDG?		[	)	<del>-</del>
	On one of the SDG samples	?	[]	***********	A
	For each matrix type?		[]	**************************************	
	For each concentration ra (low or med.)?	nge	[]	***************************************	
	For each analytical Metho (ICP-AES/ICP-MS, Hg, CN) Used		[]	and the second s	_
	Was a lab duplicate prepa analyzed with the SDG sam		[]	***************************************	

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SOP: HW-2 Revision 13 Appendix A.1 Sept. 2006 YES NO 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. If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis. A.1.18.2 Was a Field Blank or PE sample used for the Lab Duplicate analysis? ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis. A.1.18.3 Circle on each Form VI all values that are: RPD > 20%, or Absolute Difference > CRQL Are all values within control limits (RPD  $\leq$  20% or absolute difference  $\leq \pm CRQL$ )? 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

#### A.1.18.4 Aqueous

A.1.18.4.1 When sample and duplicate values are both  $\geq$  5xCRQL (substitute MDL for CRQL when MDL > CRQL),

both values are non-detects.

SOP: HW-2	Revision 13	Appendix A.1	S	ept. 200	) 6
			<u>YES</u>	<u>NO </u> 1	N/A/
	is any RPD > 20% but < 100%	ş? _		[]	
	is any RPD $\geq$ 100%?	-	naco de de deservoro	]	
	ACTION:  If the RPD is > 20% but < 1 flag (J) as estimated the a sample data > CRQL. If the > 100%, reject (R) and redassociated sample data > CR (NOTE:Replace "*" with "J" or "F	associated RPD is -line the RQL.			
A.1.18.4.2	When the sample and/or dup: <5xCRQL (substitute MDL for constitute absolute difference and duplicate values:	CRQL when MDL >CRQL),			/
~,	> ± CRQL?	-		[]	
	$> \pm 2xCRQL?$	-		[]	
	ACTION:  If the absolute difference flag as estimated all the a sample results ≥ MDL but < and non-detects as "UJ". It difference is > 2xCRQL, regred-line all the associated and detects ≥ MDL but < 5x0 NOTE:  1. Replace "*" with "J", "UJ" or 2. If one value is >CRQL and the calculate the absolute difference the MDL, and use this difference the same than the MDL, and use this difference the absolute difference the same than the MDL, and use this difference than the mDL than t	associated  5xCRQL as "J"  f the absolute ject (R) and d non-detects CRQL.  "R" as appropriate.) other value is non-detect, ence between the value > CRQ;			
A.1.18.5	Soil/Sediment				
A.1.18.5.1	When sample and duplicate are both $\geq$ 5xCRQL (substitut CRQL when MDL > CRQL),				
	is any RPD $\geq$ 35% but < 120	§ ?		[]	_/
	is any RPD ≥ 120%?			[]	
	ACTION:  If the RPD is $\geq$ 35% and < (J) as estimated the assoc				

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			<u>YES</u>	NO	N/A
		the RPD is $\geq$ 120%, reject the associated sample			
A.1.18.5.2	<5xCRQL(substitut	and/or duplicate value e MDL for CRQL when MDL > CRQL), difference between sample			,
	$> \pm 2 \times CRQL$ ?			[]	1
	> <u>+</u> 4 x CRQL			[]	<del></del>
	flag all the ass	difference is $> 2 \times CRQL$ , ociated sample results $\geq$ MDL "J" and non-detects as "UJ".			

#### NOTE:

1. Replace "\*" with "J", "UJ" or "R" as appropriate.)

and detects  $\geq$  MDL but <5xCRQL.

If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects

2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

### A.1.19 Field Duplicates

### Aqueous Field Duplicates

A.1.19.1 Was an aqueous Field Duplicate pair collected and analyzed?
(Check Sampling Trip Report)

#### ACTION:

If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

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SOP: HW-2	Revision 13	Appendix A.1		Sept. 200	6
			<u>YES</u>	NO N	<u>/A</u>
!	QC criteria stated in S	Sections A.1.19.2 and A.1.	19.3.		
<u>]</u>	1. Do not transfer "*" from 2. Do not calculate RPD when 3. Substitute MDL for CRQL wh 4. If one value is > CRQL and non-detect, calculate the between the value > CRQL a this the criteria to quali	both values are non-detects. en MDL > CRQL. the other value is absolute difference and the MDL, and use			
A.1.19.2	Circle all values on th for Field Duplicates th				
	RPD ≥ 20% or				
	Difference > $\pm$ CRQL				
	When sample and duplica both $\geq 5 \times CRQL$ (substitute MDL > CRQL),				/
	is any RPD $\geq$ 20%?			[]	
_	is any RPD $\geq$ 100%?		NAMES AND ASSOCIATION ASSOCIAT	[]	
		and its Field Duplicate RPD is $\geq$ 100%, reject(R) associated sample and its			
A.1.19.3	When the sample and/or <5xCRQL (substitute MDL is the absolute different and duplicate:	for CRQL when MDL >CRQL),			
	> ± CRQL?			[]	
	> <u>+</u> 2 x CRQL?			[]	_
		<b>;</b>			
	ACTION:  If the absolute different flag detects ≥ MDL but				
	and non-detects as "UJ"	'. If the difference			

is > 2xCRQL, reject (R) and red-line non-detects

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Evaluation of Metals Data for the Contract Laboratory Program

Data Assessment and Contract Compliance Review

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	and results $\geq$ MDL but $<$ 5 and its Field Duplicate.		<u>YES</u>	<u>NO</u>	N/A
	Soil/Sediment Field Du	plicates			
A.1.19.4	Was a soil field duplica collected and analyzed? (Check Sampling Trip Report		[]		_
	ACTION: If yes, for each soil Fi pair proceed as follows:				
•	Prepare Appendix A.4 for pair. Report on Appendix Field Duplicate results respective Form I's. Cal sample and its duplicate than 5xCRQL. Calculate a absolute difference when (sample or duplicate) is Field Duplicate analysis QC Criteria stated in Se	A.4 all sample and its in MG/KG from their culate and report RPD versions are both greated at least one value < 5xCRQL. Evaluate the in accordance with the	when er		
	NOTE: 1. Do not transfer "*" from F0 2. Do not calculate RPD when 1 3. Substitute MDL for CRQL when 4. If one value is > CRQL and the value is non-detect, calculabsolute difference between value > CRQL and the MDL, at the criteria to qualify the	both values are non-detects. n MDL > CRQL. he other ate the tke nd apply			
A.1.19.5	Circle on each Appendix values that have:	A.4 all			
	RPD $\geq$ 35%, or Difference When sample and duplicat are both $\geq$ 5xCRQL (substitute CRQL when MDL > CRQL),	te values			
	is any RPD $\geq$ 35% but < 1	.20%?		[]	J
	is any RPD ≥ 120%?			[]	
-	ACTION:	<b>∤</b>			
_	If the RPD is $\geq$ 35% but	< 120%,			

SOP: HW-2	Revision 13	Appendix A.l	Sept. 2006
	flag only the associated its Field Duplicated CRQL as "J". If the reject (R) and red-liand its Field Duplicated	ete results e RPD is ≥ 120%, ene only the sample	<u>YES NO N/A</u>
A.1.19.6	When the sample and/o <5xCRQL (substitute MD is the absolute diffe and Field Duplicate:	L for CRQL when MDL > CRQL),	
	$> \pm 2 \times CRQL$ ?		
	> <u>+</u> 4 x CRQL?		[_] /
-	Sample and its Field but <5xCRQL as "J" ar If the difference is red-line non-detects	erence is > 2xCRQL, flag Duplicate resuts > MDL ad non-detects as "UJ". >4xCRQL, reject(R) and and detects > MDL but e and its Field Duplicate.	
A.1.20	Laboratory Control Sa	ample (LCS) - Form VII	
A.1.20.1	Was one LCS prepared	and analyzed for:	
	Each SDG?		
	Each matrix type?		<u></u>
	Each batch samples di For each Method(ICP-Nused?	igested/distilled? AES,ICP-MS,Hg,CN)	
	Was an LCS prepared a the samples?  ACTION:  If no for any of the Telephone Record Log CLP PO or TOPO for so LCS results. Flag (J) the data for which an analyzed.	above, prepare and contact ubmittal of the as estimated all	
~~	NOTE: If only one LCS was analy	zed for	

Standard Operating Procedure

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Evaluation of Metals Data for the Contract Laboratory Program

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SOP: HW-2	Revision 13 Ap	pendix A.1	Sep	ot. 2006
	more than 20 samples, then the first 20 samples analyzed are not flagged (but all additional samples must be qualified (J).		<u>ES</u>	NO N/A
A.1.20.2	Aqueous LCS			
	Circle on each Form VII the Lorecoveries outside control lim			
	NOTE: 1.Use digested ICV as LCS for 2.Use distilled ICV as LCS for			
	Is any LCS recovery:			
	Less than 50%?			
	Between 50% and 79%?	****	annen sannaari	
	Between 121% and 150%?	*****	000000000	
	Greater than 150%?			[]
	ACTION:  If the LCS recovery is legs to reject (R) and red-line all as sample data (detects & non-deta recovery between 50-79%, flas "J" all non-detects as "UJ recovery is between 121-150%, detects as "J". if the recove than 150%, reject (R) and red	ssociated tects); for ag detects ". if the LCS flag only ry is greater		
A.1.20.3	Solid LCS			
	If an analyte's MDL is equal greater than the true value on disregard the "Action" below analyte even though the LCS is control limits.	f LCS, for that		
	Is the LCS "Found" value greathan the Upper Control Limit reported on Form VII?	ter —		

ACTION:

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SOP: HW-2	Revision 13 Ap	Appendix A.1	Sept. 2006		
	If yes, flag (J) all the associated $\geq$ MDL as estimated (J)		YES	NO N/A	
	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".		was and the same of the same o		
A.1.21	ICP-AES/ICP-MS Serial Dilut NOTE: Serial dilution analysis is req when the initial concentration is eq greater than 50 x MDL.	uired only			
A.1.21.1	Was a Serial Dilution analysis performed:	5			
	For each SDG?		[]	<u> </u>	
	On one of the SDG samples?		[]	<del>-</del>	
	For each matrix type?		[]		
	For each concentration range (low or med.)?		[]		
	Was a Serial Dilution sample analyzed with the SDG samples	?	[]	<u>_</u> _	
	ACTION:  If no for any of the above, f as estimated (J) detects ≥ MD all the SDG samples for which ICP Serial Dilution Analysis not performed.	L of the			
A.1.21.2	Was a Field Blank or PE sample for the Serial Dilution Analy		A0000000000000000000000000000000000000		
	ACTION:  If yes, flag as estimated (J)  ≥ MDL of all the SDG samples	detects			
A.1.21.3	Circle on Form VIII the Perce (%D) between sample results a				

results that are outside the control limits  $\pm$  10%

SOP: HW-2	Revision 13	Appendix A.1	Se	pt. 2006
	when initial concentration	ons > 50 x MDLs.	YES	NO N/A
	Are results outside the limits flagged with an "lon Form VIII and all Form	E"(Lab Qualifier)	[]	
	ACTION: If no, write in the Cont. Non-Compliance Section o Review Narrative.			
A.1.21.4	Are any %D values:			,
	> 10%?		*************	
	≥ 100%?		Statement and a second a second and a second a second and	
	ACTION:  If the Percent Difference greater than 10%, flag (all associated samples with the %D is > 100%, reall associated samp	J) as estimated he'se <b>raw data</b> > MDL; eject (R) and red-line		
_	(NOTE:Replace "E" with "J"	or "R" as appropriate.)		
A.1.22	Total/Dissolved or Inorg	anic/Total Analytes		
A.1.22.1	Were any analyses perform dissolved as well as total on the same sample(s)? Were any analyses perform inorganic as well as total on the same sample(s)?	al analytes med for		
	ACTION:  If yes, prepare a Form ( to compare the difference dissolved (or inorganic) analyte concentrations. difference on Appendix A of the total analyte onl the following conditions	es between and total Compute each .5 as a percent y when both of	Dis	solved analysis only
	<ul><li>(1) The dissolved(or ino is greater than total c</li><li>(2) greater than or equa</li></ul>	oncentration, and		
A.1.22.2	Is any dissolved (or ino concentration greater th total concentration by m	an its		[_] _

Standard Operating Procedure
USEPA Region 2
Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

✓SOP: HW-2	Revision 13 Ap	pendix A.1	Se	pt. 200	5
	-		YES	NO N	<u>/A</u>
A.1.22.3	Is any dissolved(or inorganic) concentration greater than its total concentration by more the	5	<del>y</del> jn	[]	
	ACTION:  If the percent difference is of than 20%, flag (J) both dissoland total concentrations as estimated the difference is more than 50 and red-line both the values.	lved/inorganic stimated. If			
A.1.23	Field Blank - Form I NOTE: Designate "Field Blank" as	such on Form I			•
A.1.23.1	Was a Field/Rinsate Bank colle and analyzed with the SDG samp		[]	_	$\underline{V}$
	If yes, is any Field/Rinsate Babsolute value of an analyte of greater than its CRQL(or 2xMDL	on Form I		[]	_
~	If yes, circle the Field Blank on Form I that is greater than CRQL, (or 2 x MDL when MDL > CRQL).				
	Is any Field Blank value Great than CRQL also greater than the Preparation Blank value?		<del>7</del>	[]	
	If yes, is the Field Blank val (> CRQL and > the prep. blank already rejected due to other criteria?	value)	[]	_	$\underline{\checkmark}$
	ACTION:  If the Field Blank value was reject all associated sample of the Field Blank results) greated CRQL but less than the Field BReject on Form I's the soil so whose raw values in ug/L in the printout are greater than the than the Field Blank value in "J" detects between the Field 10xField Blank value. If the but \( \le \) CRQL, replace it with CR	data (except er than the Blank value. ample results ne instrument CRQL but less ug/L, Flag as Blank value and sample result > MDL	r	w File blank wit Ja	Id QC submitter h metals
~	If the Field Blank value is le	ess than the			

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2 Revision 13

SOP: HW-2	Revision 13	Appendix A.1	Sept. 2006
	Prep.Blank value, do results due to the Fi	not qualify the sample ield Blank criteria.	YES NO N/A
	NOTE:  1. Field Blank result predue to other criteria qualify field samples.  2. Do not use Rinsate Blasoils to qualify water	cannot be used to	
A.1.24	Verification of Inst	rumental Parameters - Form	IX, XA, XB, XI
A.1.24.1	Is verification report	rt present for:	$\checkmark$
	Method Detection Limit	its (Form IX-Annually)?	( <u> </u>
	ICP-AES Interelement (Form XA & XB -Quarte		[
	<pre>ICP-AES &amp; ICP-MS Line (Form XI-Quarterly)?</pre>	ear Ranges	
,	ACTION: If no, contact CLP Posubmittal from the land		
A.1.24.2	Method Detection Limi	ts - Form IX	
A.1.24.2.1	Are MDLs present on	100	
	All the analytes?		
	All the instruments	used?	
	Digested and undiges samples and Calib.Bl		
	ICP-AES and ICP-MS winstruments are used same analyte?		
	<del>-</del>	and contact CLP l of the MDLs from rt to CLP PO and	

47 8

less than ½ CRQL.

USEPA Region 2

─SOP: HW-2	Revision 13	Appendix A.1	Se	ept. 2006
A.1.24.2.2	Is MDL greater than the C for any analyte?  If yes, is the analyte con on Form I greater than 5 the sample analyzed on th whose MDL exceeds CRQL?	centration x MDL for	<u>S</u> -	NO N/A
	ACTION: If no, flag as estimated values less than five tim the analyte whose MDL exc	es MDL for		
A.1.24.3	Linear Ranges - Form XI			
A.1.24.3.1	Was any sample result hig the high linear range for or ICP-MS?			[
	Was any sample result hig the highest calibration s for mercury or cyanide?		<del></del>	
	If yes for any of the abo the sample diluted to obt result reported on Form I	ain the	]	
A.1.25	ICP-MS Tune Analysis - F	orm XIV		
A.1.25.1	Was the ICP-MS instrument tuned prior to calibratio		]	
	ACTION: If no, reject (R) and red sample data for which tun performed.			
A.1.25.2	Was the tuning solution a or scanned at least five consecutively?		]	
	Were all the required iso spanning the analytical r present in the tuning sol	ange ,	]	
	Was the mass resolution w	rithin		

USEPA Region 2

<u> OP: HW-2</u> ر	Revision 13	Appendix A.l		Sept	. 2006
			<u>YES</u>	<u>NO</u>	N/A
0.1 amu fo	r each isotope in the tuning solution?		[]		
	Was %RSD less than 5% for isotope of each analyte tuning solution?		[]		_
	ACTION:  If no for any of the aboal results > MDL assoc  Tune as estimated "J",  associated with that Tu	iated with that and all non-detects			
A.1.26	ICP-MS Internal Standar	ds - Form XV			
A.1.26.1	Were the Internal Stand to all the samples and samples and calibration (except the Tuning Solu	all QC standards	[]		_
	Were all the target ana masses bracketed by the of the five internal st	masses	[]		
	ACTION:  If none of the Internal added to the samples, r red-line all the associ (detects & non-detects) standards were used but the analyte masses, rej only the analyte result the internal standard m	eject (R) and ated sample data . If internal did not cover all ect (R) and red-line s not bracketed by			
A.1.26.2	Was the intensity of an Standard in each sample of the intensity of the Standard in the calibra	within 60-125% same Internal	[]		
	If no, was the original two fold, Internal Stan sample re-analyzed?		[]		
	Was the %RI for the two within the acceptance l		[]		
	ACTION:  If no for any of the ab as "J" and non-detects analytes with atomic m	"UJ" of all the			
	atomic mass of the inte	rnal standard lighter			

OP: HW-2	Revision 13	Appendix A.2	Sept. 2006		
than the a	atomic mass	ernal standard, and the sof the internal standard heaffected internal standard.	avier		
A.1.27	Percent Sol	ids of Sediments			
A.1.27.1	Are percent	solids in sediment(s):			
	< 50%?		[] ~		
	non-detects	akify as estimated (J) all det s of a sample that has percent 50%(i.e.,moisture content greate	t. solids		
	20 1 1	the sample results previously flagged QC criteria.			
Inorgani	.c Data Re	view Narrative			
•					
Case#		Site:	Matrix: Soil		
SDG#	-	Lab:	Water		
Sampling T	!eam:	Reviewer:	Other		
Th			n red by the data validator and must		
J -		This flag indicates the resul	t qualified as <b>estimated</b>		
R and	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 of documented information and must not be used by the data user.				
<b>u</b> -		This data validation qualifier is applied to sample results $\geq$ MDL when associated blank is contaminated			
Fully	7 Usable Data	- The results that do not usable.	carry "J" or "red-line" are fully		
	oratory Qual: CLP laborato	<mark>ifiers:</mark> ry applies a contractual qual	lifier on all		

# SAMPLE CALCULATION

EPA SAMPLE ID: VWAI-MW02-1110

COMPOUND: Manganese
CONCENTRATION: 70.7 ug/L
%Solids – NA

Raw Data result: 0.0707 mg/L

0.0707 mg/L (1000 ug/lmg) = 70.7 ug/L

# FIELD DUPLICATE SAMPLE SUMMARY

Note: All reported results are noted in the table below because the client requested that the MDL be used as reporting limit instead of the RL for this project. RPDs or absolute differences were calculated based on Region II guidelines: if results are >5X RL RPD is calculated, if results are <5X RL the absolute difference is calculated. Flags are applied to field duplicate pair only as follows: For RPD values - RPD  $\ge$  35% but <120% results are J, RPD >120%, results are R. For absolute difference values - >+/-2X RL results are J, >+/-4X RL results are R.

Sample ID: none Duplicate Sample ID:

Analyte Sample Conc. Duplicate Conc. RPD or absolute difference
0.000
#DIV/0!

Comments: No qualifications required.

# **DataQual**

### **Environmental Services, LLC**

CH2M HILL 15010 Conference Center Dr. Suite 200 Chantilly, VA 20151

January 16, 2012 SDG# SK2359, Spectrum Analytical, Inc. Viegues Island, Puerto Rico- CTO-083, AOC-I

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # SK2359. 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, 8270D-Rev 4, August 2008-SOP #HW-22), and professional judgment. Region II has not developed a validation checklist SOP for the inorganic method in this SDG (SW-846 methods 6010C) or the organic methods used to assess the fuels (SW-846 8015G for gasoline and 8015D\_TPH for diesel range organics). The Region II Standard Operating Procedure for the Evaluation of Metals Data for the CLP was used as applicable for the metals data. For the other fraction alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualifications is provided.

Sample ID	Lab ID	Matrix	VOA	SVOA	GRO	DRO	Fe, Mn
VWAI-TB01-110811	K2359-01	water	X		X		
VWAI-MW05-1111	K2359-02	water		X	X	X	Χ
VWAI-MW05P-1111	K2359-03	water		X	X	X	1
VWAI-EB01-110811	K2359-04	water	X	X	X	X	
VWAI-MW05B-1111	K2359-05	water	X				
VWAI-MW05BP-1111	K2359-07	water	X				
VWAI-MW07-1111	K2359-09	water	X		X	X	X
VWA <u>I-M</u> W03-1111	K2359-11	water	X	X	X	X	X
VWAI-EB01-110911	K2359-13	water	X	X		X	
VWAI-TB01-110911	K2359-14	water	X		X		
VWAI-MW07-1111	K2359-15	water		X			
VWAI-TB01-111011	K2359-17	water	X		X		
VWAI-MW04-1111	K2359-18	water	X	X	X	X	X
VWAI-MW02-1111	K2359-20	water	X	X	X	X	X
VWAI-EB01-111011	K2359-22	water	X	X	X	X	
VWAI-MW02-1111 MS	K2359-20MS	water		X	X	X	
VWAI-MW02-1111 MSD	K2359-20MSD	water		X	X	X	

The following quality control samples were provided with this SDG: samples VWAI-TB01-110811, VWAI-TB01-110911 and VWAI-TB01-11011-trip blanks; samples VWAI-EB01-110811, VWAI-EB01-110911 and VWAI-EB01-11 1011-equipment

blanks; and sample VWAI-MW05BP-1111-field duplicate of sample VWAI-MW05B-1111; sample VWAI-MW05P-1111- field duplicate of sample VWAI-MW05-1111.

The samples were evaluated based on the following criteria:

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

<sup>\* -</sup> 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**

No qualifications to the data were required.

### **SVOA**

No qualifications to the data were required.

### **GRO**

No qualifications to the data were required.

### **TPH**

The field duplicate pair exhibited a non-compliant RPD (>20%) between the native sample and the field duplicate. The reported results were qualified as estimated J.

### **Select Filtered Metals**

The laboratory did not analyze a CRI standard for the analyte manganese as required. The analyte was flagged as estimated for reported concentrations <2X RL. This resulted in the qualification of only one non-detect result as estimated UJ.

The laboratory did not perform a matrix spike or a serial dilution in this SDG. These QC samples are required by Region II. Qualifications were required.

# **Specific Evaluation of Data**

### **Data Completeness**

The SDG was received complete and intact. Resubmissions were not required.

### **Technical Holding Times**

According to chain of custody records, sampling was performed on 11/8-10/11 and samples were received at the laboratory 11/9-12/11. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

#### **CRI Standards**

### Select Metals

The laboratory did not analyze a CRI standard for the analyte manganese. All positive results were above the action level of 2X the reporting limit. The reported non-detect result for manganese in sample VWAI-MW07-1111 was qualified as estimated UJ with a qualifier code of OT.

### **Matrix Spike**

### Select Filtered Metals

The laboratory did not perform a matrix spike sample on a sample from this SDG. Region II required that all positive results be qualified as estimated J because of this. Therefore, the reported positive results for iron and manganese were qualified as estimated J with a qualifier code of OT.

#### Serial Dilution

### Select Filtered Metals

The laboratory did not perform a serial dilution sample on a sample from this SDG. Region II required that all positive results be qualified as estimated J because of this. Therefore, the reported positive results for iron and manganese were qualified as estimated J with a qualifier code of OT.

### Field Duplicates

### **TPH**

The field duplicate pair of samples VWAI-MW05-1111 and VWAI-MW05P-1111 exhibited a RPD >20% (27%) for Oil Range Organics (ORO). The reported positive results for ORO in the two samples were qualified as estimated J with a qualifier code of FD.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Jacqueline Cleveland

acqueline Cleveland

Vice President

# **Summary of Data Qualifications**

# <u>VOA</u>

Sample ID	Compound	Results	Q flag	Q Code
No qualifications				

# **SVOA**

Sample ID	Compound	Results	Q flag	Q Code
No qualifications				

# <u>GRO</u>

Sample ID	Compound	Results	Q flag	Q Code
No qualifications				

# <u>TPH</u>

Sample ID	Compound	Results	Q flag	Q Code
VWAI-MW05-1111, VWAI-MW05P-1111	ORO	+	J	FD

# Select Filtered Metals

Sample ID	Analyte	Results	Q flag	Q Code
VWAI-MW07-1111	manganese	-	UJ	ОТ
all samples	iron, manganese	+	J	OT

### 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)

qualified as non-detect U.

### Organic Methods

NA

The sample result for the blank contaminant is greater than the LOQ (2X sample LOQ for common laboratory contaminants) when the blank value is less than the LOQ. The sample result for the blank contaminant is not qualified with any blank qualifiers.

LOQ

The sample result for the blank contaminant is less than the LOQ (2X sample LOQ for common laboratory contaminants) but greater than the MDL when the blank value is less than the LOQ. The sample result for the blank contaminant is changed to the LOQ and

### **Inorganic Methods**

### ICB/CCB/PB Action:

No Action - The sample result is greater than the LOQ 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 LOQ, result is reported as non-detect at the LOQ, when the ICB/CCB/PB result is less or greater than the LOO.

### Glossary of Qualification Flags and Abbreviations, continued

- R Sample result is greater than the LOQ and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the LOQ.
- 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 LOQ.
- J/UJ Sample result is less than 10X LOQ when blank result is below the negative LOQ.

### 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 LOQ 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 LOQ, result is reported as non-detect at the LOQ, when the FB result is less or greater than the LOO.
  - R Sample result is greater than the LOQ and less than the FB value when the FB value is greater than the LOQ.
  - J Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the LOQ.

### **General Abbreviations**

RL	reporting limit
MDL	method detection limit
IDL	instrument detection limit
LOD	Level of Detection
LOQ	Level of Quantitation
+	positive result
-	non-detect result

-0 1

# 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)
JCH	Initial Calibration - High Relative Response Factors (RRF)
JCB	Initial Calibration - Bad Linearity or Curve Function
CCL	Continuing Calibration - Low Recovery or %Difference
ССН	Continuing Calibration - High Recovery or %Difference
LD	Lab Duplicate Reproducibility
НТ	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
ОТ	Other - explained in data validation report
%SOL	High moisture content

CLIENT SAMPLE NO.
VWAI-TB01-110811

0.50

0.50

1.0

0.41

0.33

0.61

5.0

5.0

5.0

Lab Name:	SPECTRUM ANALIT.	ICAL, IN	IC.		Contract:					
Lab Code:	MITKEM Ca	se No.:	K2359		Mod. Ref No	o.:		SDG No.:	SK2359	}
Matrix: (SC	DIL/SED/WATER)	WATER			Lab Sample	ID:	K2359-01	.A		
Sample wt/v	701: 5.00	(g/mL)	ML		Lab File II	D:	V6I4038.	D		
Level: (TRA	ACE/LOW/MED) LOW	M			Date Recei	ved:	11/09/20	11		
% Moisture:	not dec.				Date Analy:	zed:	11/18/20	11		
GC Column:	DB-624	ID:	0.25	(mm)	Dilution Fa	actor:	1.0			
Soil Extrac	ct Volume:			(uL)	Soil Alique	ot Vol	ume:			(uL
Purge Volum	ne: 5.0			(mL)						
CAS NO.	COMPOUND			CONC	ENTRATION:	Q	DL	LOD	LOQ	

0.50

0.50

1.0

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1000	

107-06-2 1,2-Dichloroethane

78-87-5 1,2-Dichloropropane

71-43-2 Benzene

CLIENT SAMPLE NO. VWAI-EB01-110811

Lab Name: SPECTRUM ANALYTICAL, INC.		Contract:		
Lab Code: MITKEM Case No.: K2359		Mod. Ref No.:	SDG No.: SK2359	
Matrix: (SOIL/SED/WATER) WATER		Lab Sample ID:	K2359-04A	
Sample wt/vol: 5.00 (g/mL) ML		Lab File ID:	V6I4039.D	
Level: (TRACE/LOW/MED) LOW		Date Received:	11/09/2011	
% Moisture: not dec.		Date Analyzed:	11/18/2011	
GC Column: DB-624 ID: 0.25	(mm)	Dilution Factor:	1.0	
Soil Extract Volume:	(uL)	Soil Aliquot Vol	ume:	(uL
Purge Volume: 5.0	(mL)			
	CONC	PNTDATION.		7

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
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
78-87-5	1,2-Dichloropropane	1.0	U	0.61	1.0	5.0



CLIENT SAMPLE NO.
VWAI-MW05B-1111

Lab Name: SPECTRUM ANALYTICAL, INC.	Contract:
Lab Code: MITKEM Case No.: K2359	Mod. Ref No.: SDG No.: SK2359
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: K2359-05A
Sample wt/vol: 5.00 (g/mL) ML	Lab File ID: V8A7783.D
Level: (TRACE/LOW/MED) LOW	Date Received: 11/11/2011
% Moisture: not dec.	Date Analyzed: 11/18/2011
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
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
78-87-5	1,2-Dichloropropane	1.0	U	0.61	1.0	5.0

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CLIENT SAMPLE NO. VWAI-MW05BP-1111

Lab Name: SPECTRUM ANALY	TICAL, INC.		Contract:	
Lab Code: MITKEM C	Case No.: K2359		Mod. Ref No.:	SDG No.: SK2359
Matrix: (SOIL/SED/WATER)	WATER		Lab Sample ID:	K2359-07A
Sample wt/vol: 5.00	(g/mL) ML		Lab File ID:	V8A7784.D
Level: (TRACE/LOW/MED)	WO		Date Received:	11/11/2011
% Moisture: not dec.			Date Analyzed:	11/18/2011
GC Column: DB-624	ID: 0.25	(mm)	Dilution Factor:	1.0
Soil Extract Volume:		(uL)	Soil Aliquot Vol	ume: (uL)
Purge Volume: 5.0		(mL)		

CAS NO.	COMPOUND	CONCENTRATION:	0	DL	LOD	LOO
SCHOOL MENTER	1,2-Dichloroethane	UG/L 0.50	× 17	0.41	0.50	5.0
	Benzene	0.50	U	0.33	0.50	5.0
78-87-5	1,2-Dichloropropane	1.0	U	0.61	1.0	5.0



CLIENT SAMPLE NO. VWAI-MW07-1111

Lab Name: SPECTRUM ANALYTICAL, INC.	Contract:
Lab Code: MITKEM Case No.: K2	Mod. Ref No.: SDG No.: SK2359
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: K2359-09A
Sample wt/vol: 5.00 (g/mL) ML	Lab File ID: V6I3902.D
Level: (TRACE/LOW/MED) LOW	Date Received: 11/11/2011
% Moisture: not dec.	Date Analyzed: 11/15/2011
GC Column: DB-624 ID: 0.	5 (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
107-06-2	1,2-Dichloroethane	0.50	U	0.41	0.50	5.0
71-43-2	Benzene	5.3		0.33	0.50	5.0
78-87-5	1,2-Dichloropropane	1.0	U	0.61	1.0	5.0



CLIENT SAMPLE NO. VWAI-MW03-1111

Lab Name: SPECTRUM	ANALYTICAL, IN	IC.		Contract:		
Lab Code: MITKEM	Case No.:	K2359		Mod. Ref No.:	SDG No.: SK2359	
Matrix: (SOIL/SED/W	WATER) WATER			Lab Sample ID:	K2359-11A	
Sample wt/vol:	5.00 (g/mL)	ML	_	Lab File ID:	V6I3903.D	
Level: (TRACE/LOW/N	MED) LOW			Date Received:	11/09/2011	
% Moisture: not dec				Date Analyzed:	11/15/2011	
GC Column: DB-624	ID:	0.25	(mm)	Dilution Factor:	1.0	
Soil Extract Volume	·:		(uL)	Soil Aliquot Vol	ume:	(uL)
Purge Volume: 5.0			(mL)			

CAS NO.	COMPOUND	CONCENTRATION:	Q	DL	LOD	LOQ
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
78-87-5	1,2-Dichloropropane	1.0	U	0.61	1.0	5.0

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CLIENT SAMPLE NO. VWAI-EB01-110911

Lab Name: SPECTRUM ANALYT	CICAL, IN	C.		Contract:		
Lab Code: MITKEM Ca	ase No.:	K2359		Mod. Ref No.:	SDG No.: SK2359	
Matrix: (SOIL/SED/WATER)	WATER			Lab Sample ID:	K2359-13A	
Sample wt/vol: 5.00	(g/mL)	ML .		Lab File ID:	V6I3904.D	
Level: (TRACE/LOW/MED) LC	W			Date Received:	11/11/2011	
% Moisture: not dec.				Date Analyzed:	11/15/2011	
GC Column: DB-624	ID:	0.25	(mm)	Dilution Factor:	1.0	
Soil Extract Volume:			(uL)	Soil Aliquot Vol	ume:	(uL)
Purge Volume: 5.0			(mL)			

CAS NO.	COMPOUND	CONCENTRATION:	Q	DL	LOD	LOQ
107-06-2	1,2-Dichloroethane	0.50	U	0.41	0.50	5.0
71-43-2	Benzene	0.50	Ü	0.33	0.50	5.0
78-87-5	1,2-Dichloropropane	1.0	U	0.61	1.0	5.0

M10512

CLIENT SAMPLE NO.
VWAI-TB01-110911

Lab Name: SPECTRUM ANALYTICAL, INC.	Contract:
Lab Code: MITKEM Case No.: K2359	Mod. Ref No.: SDG No.: SK2359
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: K2359-14A
Sample wt/vol: 5.00 (g/mL) ML	Lab File ID: V6I3905.D
Level: (TRACE/LOW/MED) LOW	Date Received: 11/11/2011
% Moisture: not dec.	Date Analyzed: 11/15/2011
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:	0	DL	LOD	LOQ
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
78-87-5	1,2-Dichloropropane	1.0	U	0.61	1.0	5.0

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CLIENT SAMPLE NO. VWAI-TB01-111011

Lab Name: SPECTRUM ANALYTICAL, INC.	Contract:
Lab Code: MITKEM Case No.: K2359	Mod. Ref No.: SDG No.: SK2359
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: K2359-17A
Sample wt/vol: 5.00 (g/mL) ML	Lab File ID: V6I4040.D
Level: (TRACE/LOW/MED) LOW	Date Received: 11/12/2011
% Moisture: not dec.	Date Analyzed: 11/18/2011
GC Column: DB-624 ID: 0.25 (m	m) Dilution Factor: 1.0
Soil Extract Volume: (u	L) Soil Aliquot Volume: (uL
Purge Volume: 5.0 (m	L)
	NCENTRATION ·

		CONCENTRATION:	CONCENTRATION:			FEL - 1891 LINC
CAS NO. COMPOUND	COMPOUND	UG/L	Q	DL	LOD	LOQ
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
78-87-5	1,2-Dichloropropane	1.0	U	0.61	1.0	5.0

CLIENT SAMPLE NO. VWAI-MW04-1111

Lab Name:	SPECTRUM ANA	LYTICAL, IN	C.		Contract:		
Lab Code:	MITKEM	Case No.:	K2359		Mod. Ref No.:	SDG No.: SK2359	)
Matrix: (S	SOIL/SED/WATER	) WATER			Lab Sample ID:	K2359-18A	
Sample wt/	vol: 5.	00 (g/mL)	ML	×	Lab File ID:	V8A7785.D	
Level: (TR	ACE/LOW/MED)	LOW			Date Received:	11/12/2011	
% Moisture	: not dec.	-			Date Analyzed:	11/18/2011	
GC Column:	DB-624	ID:	0.25	(mm)	Dilution Factor:	1.0	
Soil Extra	ct Volume:			(uL)	Soil Aliquot Vol	ume:	(uL)
Purge Volu	me: 5.0			(mL)			

CAS NO.	COMPOUND	CONCENTRATION: UG/L	CONCENTRATION: UG/L Q		LOD	LOQ
107-06-2	1,2-Dichloroethane	0.50	U	0.41	0.50	5.0
71-43-2	Benzene	1.1	J	0.33	0.50	5.0
78-87-5	1,2-Dichloropropane	1.0	U	0.61	1.0	5.0

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CLIENT SAMPLE NO. VWAI-MW02-1111

Lab Name: SPECTRUM ANA	LYTICAL, INC.		Contract:	
Lab Code: MITKEM	Case No.: K2359		Mod. Ref No.:	SDG No.: SK2359
Matrix: (SOIL/SED/WATER	WATER		Lab Sample ID:	K2359-20A
Sample wt/vol: 5.	00 (g/mL) ML		Lab File ID:	V6I3906.D
Level: (TRACE/LOW/MED)	LOW		Date Received:	11/12/2011
% Moisture: not dec.			Date Analyzed:	11/15/2011
GC Column: DB-624	ID: 0.25	(mm)	Dilution Factor:	1.0
Soil Extract Volume:		(uL)	Soil Aliquot Vol	ume: (uL
Purge Volume: 5.0		(mL)		

CAS NO.		CONCENTRATION:	CONCENTRATION:			
	COMPOUND	UG/L	Q	DL	LOD	LOQ
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
78-87-5	1,2-Dichloropropane	1.0	U	0.61	1.0	5.0

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CLIENT SAMPLE NO. VWAI-EB01-111011

Lab Name: SPECTRUM ANALYTICAL, INC	J	Contract:		
Lab Code: MITKEM Case No.:	K2359	Mod. Ref No.:	SDG No.: SK2359	
Matrix: (SOIL/SED/WATER) WATER		Lab Sample ID:	K2359-22A	
Sample wt/vol: 5.00 (g/mL)	ML	Lab File ID:	V6I4041.D	
Level: (TRACE/LOW/MED) LOW		Date Received:	11/12/2011	
% Moisture: not dec.		Date Analyzed:	11/18/2011	
GC Column: DB-624 ID:	0.25 (mm)	Dilution Factor:	1.0	
Soil Extract Volume:	(uL)	Soil Aliquot Vol	ume: (	uL)
Purge Volume: 5.0	(mL)			
	CONC	ENTRATION:		

CAS NO.	COMPOUND	D UG/L		DL	LOD	LOQ	
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	
78-87-5	1,2-Dichloropropane	1.0	U	0.61	1.0	5.0	

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CLIENT SAMPLE NO. VWAI-MWQ5-1111

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:								
Lab Code: N	MITKEM Case No.: K2359		Mod. Ref	No.:	SDG No.: SK2359			
Matrix: (SO	IL/SED/WATER) WATER		Lab Sample	e ID:	K2359-021	E		
Sample wt/vo	ol: 1000 (g/mL) ML		Lab File	ID:	S3H7593.D			
Level: (LOW,	/MED) LOW		Extraction	n: (Typ	sepr			
% Moisture: Decanted: (Y/N)			Date Rece	ived:	11/09/2011			
Concentrate	d Extract Volume: 1000	(uL)	Date Extra	acted:	11/14/20	11		
Injection Vo	olume: 1.0 (uL) GPC Factor:	1.00	Date Anal	yzed:	12/02/20	11		
GPC Cleanup	:(Y/N) N pH:		Dilution 1	Factor:	1.0			
CAS NO.	COMPOUND	CONC	ENTRATION: UG/L	Q	DL	LOD	LOQ	
91-20-3	Naphthalene		2.0	U	0.96	2.0	1.0	
91-57-6	2-Methylnaphthalene		11		0.94	2.0	1.0	
117-81-7	Bis(2-ethylhexyl)phthalate		2.0	U	1.3	2.0	5.0	



CLIENT SAMPLE NO.
VWAI-MW05P-1111

Lab Name: S	SPECTRUM ANALYTICAL, INC.		Contract:					
Lab Code: M	IITKEM Case No.: K2359		Mod. Ref N	10.:	SDG No.: SK2359			
Matrix: (SO	IL/SED/WATER) WATER		Lab Sample	e ID:	K2359-03	В		
Sample wt/vo	ol: 1000 (g/mL) ML		Lab File I	D:	S3H7594.	D	4	
Level: (LOW,	MED) LOW		Extraction	: (Typ	e) SEPF			
% Moisture:	Decanted: (Y/N)		Date Recei	.ved:	11/09/20	11		
Concentrated	i Extract Volume: 1000	(uL)	Date Extra	cted:	11/14/20	11		
Injection Vo	olume: 1.0 (uL) GPC Factor:	1.00	Date Analy	zed:	12/02/20	11		
GPC Cleanup:	(Y/N) N pH:		Dilution F	actor:	1.0			
CAS NO.	COMPOUND	CONC	ENTRATION: UG/L	Q	DL	LOD	LOQ	
91-20-3	Naphthalene		2.0	U	0.96	2.0	1.0	
91-57-6	2-Methylnaphthalene		11		0.94	2.0	1.0	
117-81-7	Bis(2-ethylhexyl)phthalate		2.0	U	1.3	2.0	5.0	



CLIENT SAMPLE NO. VWAI-EB01-110811

Lab Name:	SPECTRUM ANALYTICAL, INC.		Contract:					
Lab Code:	MITKEM Case No.: K2359		Mod. Ref 1	No.:	SDG No.: SK2359			
Matrix: (SO	DIL/SED/WATER) WATER		Lab Sample	e ID:	K2359-04	В		
Sample wt/v	rol: 1000 (g/mL) ML		Lab File	ID:	S3H7595.	D .		
Level: (LOW	/MED) LOW		Extraction	n: (Typ	e) SEPF			
% Moisture:	Decanted: (Y/N)		Date Recei	Lved:	11/09/20	11		
Concentrate	d Extract Volume: 1000	(uL)	Date Extra	acted:	11/14/20	11		
Injection V	Tolume: 1.0 (uL) GPC Factor:	1.00	Date Analy	yzed:	12/02/20	11		
GPC Cleanup	:(Y/N) N pH:		Dilution H	Factor:	1.0			
CAS NO.	COMPOUND	CONCE	ENTRATION: UG/L	Q	DL	LOD	LOQ	
91-20-3	Naphthalene		2.0	U	0.96	2.0	1.0	
91-57-6	2-Methylnaphthalene		2.0	U	0.94	2.0	1.0	
117-81-7	Bis(2-ethylhexyl)phthalate		2.0	U	1.3	2.0	5.0	



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CLIENT SAMPLE NO.
VWAI-MW03-1111

Lab Name: Specikom ANALITICAL, INC. Cont.		ILIACL:							
Lab Code: 1	MITKEM Case No.: K2359	Мос	d. Ref N	0.:		SDG No.:	SK2359		
Matrix: (SO	IL/SED/WATER) WATER	Lak	Lab Sample ID:		K2359-11	K2359-11E			
Sample wt/v	ol:i000 (g/mL) ML	Lak	File I	D:	S3H7596.D				
Level: (LOW	/MED) LOW	Ext	raction	: (Typ	se) SEPF				
% Moisture:	Decanted: (Y/N)	Dat	te Recei	ved:	11/09/20	11			
Concentrate	d Extract Volume: 1000	(uL) Dat	e Extra	cted:	11/14/20	11			
Injection Vo	olume: 1.0 (uL) GPC Factor:	1.00 Dat	e Analy	zed:	12/02/20	11			
GPC Cleanup	:(Y/N) N pH:	Dil	ution F	actor:	1.0				
CAS NO.	COMPOUND	CONCENT	RATION:	Q	DL	LOD	LOQ		
91-20-3	Naphthalene		2.0	U	0.96	2.0	1.0		
	2-Methylnaphthalene		2.0	U	0.94	2.0	1.0		
117-81-7	Bis(2-ethylhexyl)phthalate		2.0	U	1.3	2.0	5.0		



Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

CLIENT SAMPLE NO. VWAI-MW07-1111

_							
Lab Code: N	MITKEM Case No.: K23	59	Mod. Ref N	No.:		SDG No.:	SK2359
Matrix: (SO	IL/SED/WATER) WATER		Lab Sample	e ID:	K2359-15	A	
Sample wt/vo	ol: 1000 (g/mL) ML		Lab File 1	D:	S3H7597.	D	
Level: (LOW,	MED) LOW		Extraction	n: (Typ	oe) SEPF		
% Moisture:	Decanted: (Y/N)		Date Recei	_ved:	11/11/20	11	
Concentrated	d Extract Volume: 10	000 (uL)	Date Extra	acted:	11/14/20	11	
Injection Vo	olume: 1.0 (uL) GPC Factor	: 1.00	Date Analy	zed:	12/03/20	11	
GPC Cleanup:	(Y/N) N pH:		Dilution H	actor:	1.0		
CAS NO.	COMPOUND	CONC	CENTRATION: UG/L	Q	DL	LOD	LOQ
91-20-3	Naphthalene		12		0.96	2.0	1.0
91-57-6	2-Methylnaphthalene		7.0		0.94	2.0	1.0
117-81-7	Bis(2-ethylhexyl)phthalate		1.3	J	1.3	2.0	5.0



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CLIENT SAMPLE NO.
VWAI-EB01-110911

Lab Name: S	SPECTRUM ANALYTICAL, INC.		Contract:				
Lab Code: N	MITKEM Case No.: K2359	)	Mod. Ref N	No.:		SDG No.:	SK2359
Matrix: (SO	IL/SED/WATER) WATER		Lab Sample	e ID:	K2359-16	A	
Sample wt/vo	ol: 1000 (g/mL) ML		Lab File 1	D:	S3H7598.	. ·	
Level: (LOW,	MED) LOW		Extraction	ı: (Typ	oe) SEPF		
% Moisture:	Decanted: (Y/N)	_	Date Recei	ved:	11/11/20	11	
Concentrated	d Extract Volume: 100	0 (uL)	Date Extra	acted:	11/14/20	11	
Injection Vo	plume: 1.0 (uL) GPC Factor:	1.00	Date Analy	zed:	12/03/20	1.1	
GPC Cleanup:	(Y/N) N pH:		Dilution H	Tactor:	1.0		
CAS NO.	COMPOUND	CONC	CENTRATION: UG/L	Q	DL	LOD	LOQ
91-20-3	Naphthalene		2.0	U	0.96	2.0	1.0
91-57-6	2-Methylnaphthalene		2.0	U	0.94	2.0	1.0
117-81-7	Bis(2-ethylhexyl)phthalate		2.0	U	1.3	2.0	5.0



CLIENT SAMPLE NO.

Lab Name: 5	SPECTRUM ANALYTICAL, INC.	Contract:
Lab Code: 1	MITKEM Case No.: K2359	Mod. Ref No.: SDG No.: SK2359
Matrix: (SO	IL/SED/WATER) WATER	Lab Sample ID: K2359-18E
Sample wt/v	ol: 1000 (g/mL) ML	Lab File ID: \$3H7599.D
Level: (LOW	/MED) LOW	Extraction: (Type) SEPF
% Moisture:	Decanted: (Y/N)	Date Received: 11/12/2011
Concentrate	d Extract Volume: 1000	(uL) Date Extracted: 11/14/2011
Injection Vo	olume: 1.0 (uL) GPC Factor:	1.00 Date Analyzed: 12/03/2011
GPC Cleanup	:(Y/N) N pH:	Dilution Factor: 1.0
CAS NO.	COMPOUND	CONCENTRATION: UG/L Q DL LOD LOQ
91-20-3	Naphthalene	1.2 0.96 2.0 1.0
91-57-6	2-Methylnaphthalene	2.0 U 0.94 2.0 1.0
117-81-7	Bis(2-ethylhexyl)phthalate	2.0 U 1.3 2.0 5.0



CLIENT SAMPLE NO. VWAI-MW02-1111

Contract:
Mod. Ref No.: SDG No.: SK2359
Lab Sample ID: K2359-20E
Lab File ID: S3H7600.D
Extraction: (Type) SEPF
Date Received: 11/12/2011
(uL) Date Extracted: 11/14/2011
1.00 Date Analyzed: 12/03/2011
Dilution Factor: 1.0
CONCENTRATION: UG/L Q DL LOD LOQ
2.0 U 0.96 2.0 1.0
2.0 U 0.94 2.0 1.0
2.0 U 1.3 2.0 5.0
1



CLIENT SAMPLE NO.
VWAI-EB01-111011

Lab Name: SPECTRUM ANALYTICAL, INC.	Contract:
Lab Code: MITKEM Case No.: K2359	Mod. Ref No.: SDG No.: SK2359
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: K2359-22E
Sample wt/vol: 1000 (g/mL) ML	Lab File ID: S3H7603.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 11/12/2011
Concentrated Extract Volume: 1000	0 (uL) Date Extracted: 11/14/2011
Injection Volume: 1.0 (uL) GPC Factor:	1.00 Date Analyzed: 12/03/2011
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 1.0
91-57-6 2-Methylnaphthalene	2.0 U 0.94 2.0 1.0
117-81-7 Bis(2-ethylhexyl)phthalate	2.0 U 1.3 2.0 5.0



CLIENT SAMPLE NO.
VWAI-MW02-1111MS

Lab Name: 5	PECIROM ANALITICAL, INC.		Contract		_		
Lab Code: M	Case No.: K2359		Mod. Ref N	0.:		SDG No.:	SK2359
Matrix: (SOI	L/SED/WATER) WATER		Lab Sample	ID:	K2359-201	EMS	
Sample wt/vo	ol: 1000 (g/mL) ML		Lab File I	D:	S3H7601.I	)	
Level: (LOW/	MED) LOW		Extraction	: (Тур	e) SEPF		
% Moisture:	Decanted: (Y/N)		Date Recei	ved:	11/12/20	11	
Concentrated	Extract Volume: 1000	(uL)	Date Extra	cted:	11/14/20	11.	
Injection Vo	olume: 1.0 (uL) GPC Factor:	1.00	Date Analy	zed:	1.2/03/20	Į j.	
GPC Cleanup:	(Y/N) N pH:		Dilution F	actor:	1.0		
CAS NO.	COMPOUND	CONC	ENTRATION: UG/L	Q	DL	TOD	TOÖ
91-20-3	Naphthalene		44		0.96	2.0	1.0
91-57-6	2-Methylnaphthalene		4.5		0.94	2.0	1.0
117-81-7	Bis(2-ethylhexyl)phthalate		60		1.3	2.0	5.0



CLIENT SAMPLE NO.
VWAI-MW02-1111MS
D

Lab Name: SPECTRUM ANALYTICAL, INC.	Contract:
Lab Code: MITKEM Case No.: K2359	Mod. Ref No.: SDG No.: SR2359
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: K2359-20EMSD
Sample wt/vol: 1000 (g/mL) ML	Lab File ID: S3H7602.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 11/12/2011
Concentrated Extract Volume: 1000 (	aL) Date Extracted: 11/14/2011
Injection Volume:1.0 (uL) GPC Factor:1.	00 Date Analyzed: 12/03/2011
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	ONCENTRATION: UG/L Q DL LOD LOQ
91-20-3 Naphthalene	43 0.96 2.0 1.0
91-57-6 2-Methylnaphthalene	45 0.94 2.0 1.0
117-81-7 Bis(2-ethylhexyl)phthalate	59 1.3 2.0 5.0



12/07/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-TB01-110811

Lab ID: K2359-01

Project: CTO-0083 Vieques AOC I

Collection Date: 11/08/11 9:30

Analyses		Result Qual	RL Units	DF Date Analyzed	Batch ID
SW846 8015D GRO – Gasoline R	ange Organic (GRO	) by GC-FID			GRO_W
Gasoline Range Organics	•	ND	100 ug/L	1 11/22/2011 10:21	63101
Surrogate: Bromofluorobenzene		99.1	87-112 %REC	1 11/22/2011 10:21	63101



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

12/07/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-MW05-1111

Lab ID: K2359-02

Project: CTO-0083 Vieques AOC 1

Collection Date: 11/08/11 9:35

Analyses	Result Qual	RL Units	DF Date Analyzed	Batch ID
SW846 8015D GRO Gasoline Range Orga	anic (GRO) by GC-FID			GRO_W
Gasoline Range Organics	ND	100 ug/L	1 11/22/2011 16:09	63101
Surrogate: Bromofluorobenzene	98.7	87-112 %REC	1 11/22/2011 16:09	63101



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

12/07/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-MW05P-1111

Lab ID: K2359-03

Project: CTO-0083 Vieques AOC I

Collection Date: 11/08/11 9:40

Analyses	Result Qual	RL Units	DF Date Analyzed	Batch ID
SW846 8015D GRO — Gasoline Range Orga	anic (GRO) by GC-FID			GRO_W
Gasoline Range Organics	ND	100 ug/L	1 11/22/2011 16:38	63101
Surrogate: Bromofluorobenzene	107	87-112 %REC	1 11/22/2011 16:38	63101



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

12/07/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-EB01-110811

Lab ID: K2359-04

Project: CTO-0083 Vieques AOC I

Collection Date: 11/08/11 11:30

Analyses	Result Qual	RL Units	DF Date Analyzed	Batch ID
SW846 8015D GRO Gasoline Range Org	anic (GRO) by GC-FID			GRO_W
Gasoline Range Organics	ND	100 ug/L	1 11/22/2011 10:51	63101
Surrogate: Bromofluorobenzene	102	87-112 %REC	1 11/22/2011 10:51	63101



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

12/07/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-MW07-1111

Lab ID: K2359-09

Project: CTO-0083 Vieques AOC I

Collection Date: 11/09/11 9:20

Analyses	Result Qual	RL Units	DF Date Analyzed	Batch ID
SW846 8015D GRO Gasoline Range Org	anic (GRO) by GC-FID			GRO_W
Gasoline Range Organics	800	400 ug/L	4 11/22/2011 15:39	63101
Surrogate: Bromofluorobenzene	109	87-112 %REC	4 11/22/2011 15:39	63101



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

12/07/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-MW03-1111

Lab ID: K2359-11

Project: CTO-0083 Vieques AOC I

Collection Date: 11/09/11 11:15

Analyses	Result Qual	RL Units	DF Date Analyzed	Batch ID
SW846 8015D GRO Gasoline Range Orga	anic (GRO) by GC-FID			GRO_W
Gasoline Range Organics	ND	100 ug/L	1 11/22/2011 17:08	63101
Surrogate: Bromofluorobenzene	111	87-112 %REC	1 11/22/2011 17:08	63101



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

037

RL - Reporting Limit

12/07/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-TB01-110911

Lab ID: K2359-14

Project: CTO-0083 Vieques AOC I

Collection Date: 11/09/11 7:00

Analyses	Result Qual	RL Units	DF Date Analyzed	Batch ID
SW846 8015D GRO Gasoline Range Org	anic (GRO) by GC-FID			GRO_W
Gasoline Range Organics	ND	100 ug/L	1 11/22/2011 12:08	63101
Surrogate: Bromofluorobenzene	93.3	87-112 %REC	1 11/22/2011 12:08	63101



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

12/07/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-TB01-111011

Lab ID: K2359-17

Project: CTO-0083 Vieques AOC I

Collection Date: 11/10/11 7:00

Analyses	Result Qual	RL Units	DF Date Analyzed	Batch ID
SW846 8015D GRO Gasoline Range Organic	c (GRO) by GC-FID		-	GRO_W
Gasoline Range Organics	ND	100 ug/L	1 11/22/2011 12:38	63101
Surrogate: Bromofluorobenzene	96.0	87-112 %REC	1 11/22/2011 12:38	63101



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

 $\boldsymbol{E}$  -  $\boldsymbol{Value}$  above quantitation range

RL - Reporting Limit

12/07/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-MW04-1111

Lab ID: K2359-18

Project: CTO-0083 Vieques AOC I

Collection Date: 11/10/11 9:20

Analyses	Result	Qual	RL	Units	DF Date Analyzed	Batch ID
SW846 8015D GRO Gasoline Range Org	anic (GRO) by GC-FID					GRO_W
Gasoline Range Organics	ND		100	ug/L	1 11/22/2011 15:09	63101
Surrogate: Bromofluorobenzene	104		87-112	%REC	1 11/22/2011 15:09	63101



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

12/07/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-MW02-1111

Lab ID: K2359-20

Project: CTO-0083 Vieques AOC I

Collection Date: 11/10/11 9:50

Analyses	Result Qual	RL Units	DF Date Analyzed	Batch ID
SW846 8015D GRO Gasoline Range Organic (			,	GRO_W
Gasoline Range Organics	ND	100 ug/L	1 11/22/2011 13:37	63101
Surrogate: Bromofluorobenzene	95.5	87-112 %REC	1 11/22/2011 13:37	63101



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

12/07/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-EB01-111011

Lab ID: K2359-22

Project: CTO-0083 Vieques AOC I

Collection Date: 11/10/11 11:05

Analyses	Result Qual	RL Units	DF Date Analyzed	Batch ID
SW846 8015D GRO Gasoline Range Orga	anic (GRO) by GC-FID			GRO_W
Gasoline Range Organics	ND	100 ug/L	1 11/22/2011 13:07	63101
Surrogate: Bromofluorobenzene	101	87-112 %REC	1 11/22/2011 13:07	63101



Qualifiers: ND - Not Detected at the Reporting Limit

 $\boldsymbol{J}$  - 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

12/06/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-MW05-1111 Project: CTO-0083 Vieques AOC I

Lab ID: K2359-02 Collection Date: 11/08/11 9:35

Analyses	Result Qual	LOD	LOQ Units	DF Date Analyzed	Batch ID
SW846 8015D TPH TOTAL PETROLEU	JM HYDROCARBONS (TPH	l) BY GC-F	ID TPH	I_W	
Extractable Total Petroleum Hydrocarbon	1.9	0.20 ^	0.20 mg/L	1 11/29/2011 16:04	63035
Oil Range Organics	0.54 👅 🏳	0.35 ^	0.35 mg/L	1 11/29/2011 16:04	63035
Surrogate: ortho-Terphenyl	76.6		50-150 %REC	1 11/29/2011 16:04	63035



Qualifiers:

ND - Not Detected at the Limit of Detection

J - Analyte detected below Limit of Quantitation

B - Analyte detected in the associated Method Blank

m11.11.28.A

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

12/06/2011

Client: CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC I Client Sample ID: VWAI-MW05P-1111

Collection Date: 11/08/11 9:40 Lab ID: K2359-03

Analyses	Result Q	ual		LOD	LOQ	Units	DF Date Analyzed	Batch ID
SW846 8015D TPH TOTAL PETROLEU	JM HYDROCARBO	ONS	S (TPH	) BY GC-F	ID .		TPH_W	
Extractable Total Petroleum Hydrocarbon	1.9			0.20 ^	0.20	mg/L	1 11/29/2011 16:24	63035
Oil Range Organics	0.71	J	FO	0.35 ^	0.35	mg/L	1 11/29/2011 16:24	63035
Surrogate: ortho-Terphenyl	69.6				50-150	%REC	1 11/29/2011 16:24	63035



Qualifiers: ND - Not Detected at the Limit of Detection

DF - Dilution Factor

m11.11.23.A

J - Analyte detected below Limit of Quantitation

B - Analyte detected in the associated Method Blank

^ 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

12/06/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-EB01-110811 Project: CTO-0083 Vieques AOC I

Lab IID: K2359-04 Collection Date: 11/08/11 11:30

Analyses	Result Qual	LOD	LOQ Units	DF Date Analyzed	Batch ID
SW846 8015D TPH TOTAL PETROLEU	M HYDROCARBONS (TI	PH) BY GC-FI	D TP	H_W	
Extractable Total Petroleum Hydrocarbon	ND	0.20 ^	0.20 mg/L	1 11/29/2011 16:44	63035
Oil Range Organics	ND	0.35 ^	0.35 mg/L	1 11/29/2011 16:44	63035
Surrogate: ortho-Terphenyl	94.6		50-150 %REC	1 11/29/2011 16:44	63035



Qualifiers:

ND - Not Detected at the Limit of Detection

 $\boldsymbol{J}$  - Analyte detected below Limit of Quantitation

B - Analyte detected in the associated Method Blank

m11.11.23.A

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

045

LOD - Limit of Detection

12/06/2011

Client: CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC I Client Sample ID: VWAI-MW03-1111

Collection Date: 11/09/11 11:15 Lab ID: K2359-11

Analyses	Result Qual	LOD	LOQ Units	DF Date Analyzed	Batch ID
SW846 8015D TPH TOTAL PETROLEU	M HYDROCARBONS (TI	PH) BY GC-F	ID	TPH_W	
Extractable Total Petroleum Hydrocarbon	0.49	0.20 ^	0.20 mg/L	1 11/29/2011 17:04	63035
Oil Range Organics	ND	0.35 ^	0.35 mg/L	1 11/29/2011 17:04	63035
Surrogate: ortho-Terphenyl	78.7		50-150 %REC	1 11/29/2011 17:04	63035



Qualifiers:

ND - Not Detected at the Limit of Detection

J - Analyte detected below Limit of Quantitation

B - Analyte detected in the associated Method Blank

^ Qualified to Limit of Detection (LOD)

DF - Dilution Factor

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

12/06/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-MW07-1111 Project: CTO-0083 Vieques AOC I

Lab ID: K2359-15 Collection Date: 11/09/11 9:20

Analyses	Result Qual	LOD	LOQ Units	DF Date Analyzed	Batch ID
SW846 8015D TPH TOTAL PETROLEU	M HYDROCARBONS (TI	PH) BY GC-F	ID TPI	1_W	
Extractable Total Petroleum Hydrocarbon	1.7	0.20 ^	0.20 mg/L	1 11/29/2011 18:04	63035
Oil Range Organics	ND	0.35 ^	0.35 mg/L	1 11/29/2011 18:04	63035
Surrogate: ortho-Terphenyl	69.5		50-150 %REC	1 11/29/2011 18:04	63035



Qualifiers:

ND - Not Detected at the Limit of Detection

^ Qualified to Limit of Detection (LOD)

J - Analyte detected below Limit of Quantitation

B - Analyte detected in the associated Method Blank

m11.11.23.A

DF - Dilution Factor

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

LOQ - Limit of Quantitation

047

LOD - Limit of Detection

12/06/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-EB01-110911 Project: CTO-0083 Viegues AOC I

Lab ID: K2359-16 Collection Date: 11/09/11 11:20

Analyses	Result Qual	LOD	LOQ Units	DF Date Analyzed	Batch ID
SW846 8015D TPH TOTAL PETROLEU	JM HYDROCARBONS (TI	PH) BY GC-F	ID TF	PH_W	
Extractable Total Petroleum Hydrocarbon	ND	0.20 ^	0.20 mg/L	1 11/29/2011 18:24	63035
Oil Range Organics	ND	0.35 ^	0.35 mg/L	1 11/29/2011 18:24	63035
Surrogate: ortho-Terphenyl	99.4		50-150 %REC	1 11/29/2011 18:24	63035



Qualifiers: ND - Not Detected

ND - Not Detected at the Limit of Detection

J - Analyte detected below Limit of Quantitation

B - Analyte detected in the associated Method Blank

m11.11.23.A DF - Dilution Factor

^ Qualified to Limit of Detection (LOD)

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

12/06/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-MW04-1111

Lab ID: K2359-18

Project: CTO-0083 Vieques AOC I

Collection Date: 11/10/11 9:20

Analyses	Result Qual	LOD	LOQ Units	DF Date Analyzed	Batch ID
SW846 8015D TPH TOTAL PETROLEU	JM HYDROCARBONS (T	PH) BY GC-F	ID TI	PH_W	
Extractable Total Petroleum Hydrocarbon	0.48	0.20 ^	0.20 mg/L	1 11/29/2011 18:44	63035
Oil Range Organics	ND	0.35 ^	0.35 mg/L	1 11/29/2011 18:44	63035
Surrogate: ortho-Terphenyl	94.5		50-150 %REC	1 11/29/2011 18:44	63035



Qualifiers:

ND - Not Detected at the Limit of Detection

J - Analyte detected below Limit of Quantitation

B - Analyte detected in the associated Method Blank

m11.11.23.A 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

049

LOQ Limit of Quantitation

LOD - Limit of Detection

12/06/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-MW02-1111 Project: CTO-0083 Vieques AOC I

Lab ID: K2359-20 Collection Date: 11/10/11 9:50

Analyses	Result Qual	LOD	LOQ Unit	DF Date Analyzed	Batch ID
SW846 8015D TPH TOTAL PETROLEU	M HYDROCARBONS (TI	PH) BY GC-F	ID	TPH_W	
Extractable Total Petroleum Hydrocarbon	ND	0.20 ^	0.20 mg/L	1 11/29/2011 19:04	63035
Oil Range Organics	ND	0.35 ^	0.35 mg/L	1 11/29/2011 19:04	63035
Surrogate: ortho-Terphenyl	94.0		50-150 %REC	1 11/29/2011 19:04	63035



Qualifiers: ND - Not Detected at the Limit of Detection

mJ1.11.23.A

 $\boldsymbol{J}$  - 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

050

LOD - Limit of Detection

12/06/2011

Client: CH2M-Hill, Inc.

Client Sample ID: VWAI-EB01-111011

Lab ID: K2359-22

Project: CTO-0083 Vieques AOC I

Collection Date: 11/10/11 11:05

Analyses	Result Qual	LOD	LOQ Units	DF Date Analyzed	Batch ID
SW846 8015D TPH TOTAL PETROLEU	M HYDROCARBONS (TI	PH) BY GC-F	ID -	TPH_W	
Extractable Total Petroleum Hydrocarbon	ND	0.20 ^	0.20 mg/L	1 11/29/2011 20:04	63035
Oil Range Organics	ND	0.35 ^	0.35 mg/L	1 11/29/2011 20:04	63035
Surrogate: ortho-Terphenyl	99.1		50-150 %REC	1 11/29/2011 20:04	63035



Qualifiers:

ND - Not Detected at the Limit of Detection

J - Analyte detected below Limit of Quantitation

B - Analyte detected in the associated Method Blank

m11.11.23.A 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

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET VWAI-MW02-1111

Lab Name: Spectrum Analytical, Inc. Contract: 933562, N62

Lab Code: MITKEM Case No.:

SAS No.:

SDG No.: SK2359

Matrix (soil/water): WATER

Lab Sample ID: K2359-20

Level (low/med): MED

Date Received: 11/12/2011

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	С	Q	M	MDL	LOD	PQL
7439-89-6	Iron	50	U		P	31.0	50.0	200
7439-96-5	Manganese	155		JOT	P	10.0	15.0	50.0

Comments:	
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EPA SAMPLE NO.

INORGANIC	ANALYSIS	DATA	SHEET
INORGANIC	WMWTIOIO	DAIA	OUPPI

Contract: 933562, N62

VWAI-MW03-1111

Lab Code: MITKEM Case No.:

Lab Name: Spectrum Analytical, Inc.

SAS No.:

SDG No.: SK2359

Matrix (soil/water): WATER

Lab Sample ID: K2359-11

Level (low/med): MED

Date Received: 11/09/2011

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C		Q	M	MDL	LOD	PQL
7439-89-6	Iron	113	B	5	OT	P	31.0	50.0	200
7439-96-5	Manganese	1350		J	OT	P	10.0	15.0	50.0

Commen	ts	:
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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET VWAI-MW04-11111

Lab Name: Spectrum Analytical, Inc. Contract: 933562, N62

Lab Code: MITKEM Case No.:

SAS No.:

SDG No.: SK2359

Matrix (soil/water): WATER

Lab Sample ID: K2359-18

Level (low/med): MED

Date Received: 11/12/2011

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	С	Q		М	MDL	LOD	PQL
7439-89-6	Iron	50	U			P	31.0	50.0	200
7439-96-5	Manganese	789		J	OT	P	10.0	15.0	50.0

Comments:	
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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET VWAI-MW05-1111

Lab Name: Spectrum Analytical, Inc. Contract: 933562, N62

Lab Code: MITKEM Case No.:

SAS No.:

SDG No.: SK2359

Matrix (soil/water): WATER

Lab Sample ID: K2359-02

Level (low/med): MED

Date Received: 11/09/2011

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C		Q	М	MDL	LOD	PQL
7439-89-6	Iron	54.2	B	1	OT	P	31.0	50.0	200
7439-96-5	Manganese	1280		J	OT	P	10.0	15.0	50.0



Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET VWAI-MW07-1111

Lab Name: Spectrum Analytical, Inc. Contract: 933562, N62

SDG No.: SK2359

Lab Code: MITKEM Case No.:

SAS No.:

Lab Sample ID: K2359-09

Matrix (soil/water): WATER

Level (low/med): MED

Date Received: 11/11/2011

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	М	MDL	LOD	PQL
7439-89-6	Iron	50	U		P	31.0	50.0	200
7439-96-5	Manganese	15	B	TO UN	Р	10.0	15.0	50.0

Comments:

	MITKEM LABORATORIES ADVISON OF SPECTRUM ANALYTICAL.	MITKEM  LABORATORIES  A Dresson of SPECTRUM ANALYTICAL, INC. Featuring HANTBAL TECHNOLOGY		CHAIN OF CUSTODY RECORD	JE (	CUS Page_	ST	OD	YR	EC	OR	$\Omega$	TAT- All Min. Sam	Indicated TATs  24-houndples displayed to the tenton to th	Special Handli TAT- Indicate Date Needed: All TATs subject to labe Min. 24-hour notification need Samples disposed of after 30 otherwise instructed.	Special Handling: AT-Indicate Date Needed: All TATs subject to laboratory app Min. 24-hour notification needed for rush Samples disposed of after 30 days unless otherwise instructed.	Special Handling: AT-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:	_	O chza.com	Invoice To:	.0.					Proj	Project No.:		342485. FT FK	11	ار			
		MChaps. CANDON CONS								Site	Site Name:		ACC I					
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	Project Mgr.:	Spoken Brans		P.O. No.:			R	RON:		- Sam	Sampler(s):		الطبابا ر	म् जारक	, , , ,	Divinitalier 1 C. Veren		
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	1=Na 8= N8	1=Na <sub>2</sub> S2O <sub>3</sub> 2=HCl 3=H <sub>2</sub> SO <sub>4</sub> 8= NaHSO <sub>4</sub> 9= H <sub>3</sub> PC <sub>4</sub>	SO <sub>4</sub> 4=HNO <sub>3</sub>	5=NaOH	6=Ascorbic Acid	rbic Aci 11=	1	7=CH3OH		7	List preservative code below: $\frac{7}{2}$	/ tive co	/ ode be		T	N <sub>o</sub>	Notes:	15
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Condition upon receipt: A Iced Ambient M °C\_

MITKEM  LABORATORIES  A DPINSON OF SPECTRUM ANALYTICAL, INC. Featuring HANIBAL TECHNOLOGY	CHAIN OF CUSTODY RECORD	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: Stepten. Bicand @ Chilin.com	Invoice To:	Project No.: 392485.FT.FK
		Site Name: ACC I
		Location: WECUES State: PR
		Sampler(s): Divination (C. Vera-
Project Mgr.: Stephen to Cond	P.O. No.: RQN:	
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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.	392485. F.S. FIC	ACCI VERUES	VIRGUES State: PR	Divintales (C. Vera-		s code below:  Notes:		الإدا ك	2 / \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \	State specific reporting standards:		7		7	~	2	1 i 3	7	eauphent blank	trip blank	ed by: Date: Time:	11/04/11	8.6 July 8.8	
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MITKEM  LABORATORIES  ADMSKON OF SPECTRUM ANALTICAL, INC. Featuring HANIBAL TECHNOLOGY	Report To: _sighun.branp @ Ch2 tu · Co.			d d	TEPHEN BERIND	$2=HC1$ $3=H_2SO_4$ $9=$ $H_1$ $PCc_4$	N.S.	SO=Soil	G=Grab C=Composite	Sample Id: Date:	WART-HWOSE-IIII 11/09/11	VINAT-HWOSB-IIIIA	YNAI-MMOSBP-1111	MAT-MWCS BP-1111 A	VNAT-HWO7-1111	WAI-MET-1111A		AMAI-MMO3-1111A	VWAI - EBOI- 110911	WWAI - TBCI-1109111				7
MITKEM LABORATORIES ADDRESSON OF SPECTRUM ANALITICAL.	Report To: Si				Project Mgr.:	1=Na <sub>2</sub> S2O <sub>3</sub> 8= NaHSO <sub>4</sub>	DW=Drinking Water	O=Oil SW= Surface Water XI= DI. work CR X2=		Lab Id;	ما	-S		S <sub>o</sub>		9	1.15.4		\( \frac{\sqrt{\sq}}}}}}}}}}}} \sqrt{\sq}}}}}}}}}} \sqititentinet\sintitex{\sqrt{\sqrt{\sq}}}}}}}}} \end{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sq}}}}}}}}} \end{\sqrt{\sqrt{\sqrt{\sqrt{\sq}\sq}}}}}}}}}} \end{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sq}	7	Se D E-mail to			

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F CUSTODY RECORL				RQN:	Ascorbic Acid 7=CH;OH	Containers:	sssl	V AC	Matrix # of V( # of Al	T T	7			11.04.11			Kennquished by:	J. White		
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MITK LABORA ADAM SPECTROMA	Report To:			Project Mgr.:	1=Na <sub>2</sub> S2O <sub>3</sub> 8= NaHSO <sub>4</sub>	DW=Drinking Water	0=0il SW= Surface Wate		Lab Id:	(2)	٥						☐ E-mail to _	ЕДД Гоглас		Condition upor

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# CHAIN OF CUSTODY RECORD

MITKEM LABORATORIES

· All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
Samples disposed of after 30 days unless Special Handling: TAT- Indicate Date Needed:

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	Invoice To:	- Project No.:_	Project No.: 392 485. FIL. FK	
		Site Name:	Site Name: AOCI Weaves	
		Location:	VIERUES	State: Poerto Rico
Const	DO N.	— Sampler(s):_	Sampler(s): D.WhitaNee	
rioject mgi otronomie	F.O. INO.:	<u> </u>		
ICI 3=H <sub>2</sub> SO <sub>4</sub> 4=HNO <sub>3</sub>	=Na <sub>3</sub> S2O <sub>3</sub> 2=HCl 3=H <sub>2</sub> SO <sub>4</sub> 4=HNO <sub>3</sub> 5=NaOH 6=Ascorbic Acid 7=CH <sub>3</sub> OH	List preservat	List preservative code below:	
8=NaHSO₄ 9= H2POҶ 10=	1]=	2 / 2	2 / 4 / 4	Notes:

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8= NaHSO <sub>4</sub> 9= <b>H2PO</b> -f 10=	DW=Drinking Water GW=Groundwater	O=Oil SW= Surface Water SO=Soil	X1= <b>DI worek</b> X2=	G=Grab C=Co	Sample Id:	WMAT-TBOI-11:01	WWAL-HWOY-1111	Ann I - Find - 1111 A	JO WAI-MMCZ-1111	3 VINAI-MINCZ-1111A	JE TWAI-HWOZ-LLIMAS	WARI-MWOZ-(IIIMSA	70 WWAT-NINGS- BILSD	TWAT-MIMCZ-111150A	J-J- HWAI-EGOI-111011	5	
8= N	DW=Drink	0=0il S	X1=_X		 Lab Id:	17	\$	7	26	7	36		20		E-C .	☐ E-mail to	

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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.	S FI.FK	S ACI	Ues State: Puetto fice	Dunitake	ow: Notes:	QA/QC Reporting Level	CLevell CLevell		State specific reporting standards:					6	ju ju	Date: Time:	11/10/11 1330	00:8 11-11-11	
TAT . M. S. S. D.	Project No.: 392485	Site Name: Weaves	Location: VIERUES	Sampler(s): <b>D.M.A</b>	List preservative code below:	Analyses:	Çor Çor	24 ° 200 S	L Tela	7	7	2	7			Received by:	Feber	Hund meles	
CHAIN OF CUSTODY RECORD	.0			RQN:	6=Ascorbic Acid 7=CH <sub>3</sub> OH	Containers:	ssslí	DA Vi	Type Matrix # of A # of CI # of CI # of CI	G GW 2	Z.B	J.	C CW 2	11 orta	Co-trid Cie	Relinquished by:	(Dompto	Fedex	
	Invoice To:			P.O. No.:	4=HNO <sub>3</sub> 5=NaOH 10=	er WW=Wastewater	SI	osite	Date: Time:	10/11 0420	11/0/11	11/0/11 0950	11 10 m 09 50	.					7, 12, 2, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
MITKEM  LABORATORIES  ADVISION OF SPECTRUM ANALYTICAL, INC. Featuring HANTBAL TECHNOLOGY	Report To:	•		Project Mgr.: Stanka Beand	1=Na <sub>2</sub> S2O <sub>3</sub> 2=HCl 3=H <sub>2</sub> SO <sub>4</sub> 8= NaHSO <sub>4</sub> 9= <b>H2 PC 4</b>	ter GW=	> ~	G=Grab C=Composite	Lab Id: Sample Id: I	111	\frac{1}{2}		20 MMSI-MWOS-1111			The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	EDD Format		Condition upon receipt: Mced  Ambient MC

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Reviewed By:	Colu	/				L	og-in	Date 11/0	09/2011
Work Order: K2359	Client Name: Cl	H2M Hill Inc.							
Project Name/Event:	CTO-0083 Vieques AOC	E and I							
Remarks: (1/2) Please sample/extract transfe submitted with this da	r logbook pages	Lab Sample ID	ниоз	Preser H2SO4	2		H3PO4	VOA Matrix	Soil HeadSpace or Air Bubble > or equal to 1/4"
1. Custody Seal(s)	Present / Absent	K2359-01						. н	
	Intact/Broken	K2359-02	<2			_		Н	
  2. Custody Seal Nos.	N/A	K2359-03				-		Н	
D = 001 B + 001-1		K2359-04						Н	
<ol> <li>Traffic Reports/ Chair of Custody Records (TR/COCs) or Packing Lists</li> </ol>	Present / Absent								
4. Airbill	AirBill/Sticker Present/Absent								
5. Airbíll No.	FedEx 8763 4395 5638								
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	5 °C								
10. Does information on TR/COCs and sample tags agree?	Y ds / No								
1. Date Received at Laboratory	11/09/2011								
2. Time Received	10:30								
	Transfer								
raction (1) TVOA/VOA	Fraction (2) SVOA/PEST/ARO								
Area #	Area #								
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n	On								
R Temp Gun ID:MT-1		VO	A Matrix	(Key:					
coolantCondition: ICE			į	JS = Unp	reserve	d Soil	A=	Air	
reservative Name/Lot No:			Į	JA = Unp	reserve	d Aquec	ous H=	HCI	
			N	/ = MeOl	Н		Ę=	Encore	
			1	l = NaHS	SO4		F =	Freeze	
		Sec	e Sampl	e Conditi	ion Noti	fication/0	Corrective	e Action Form	Yes / No
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Received By: Dani	a mile					Page	01 of 01	
Reviewed By:	a	Dichy!	_			Log-	in Date 11.	/11/2011
Work Order: K2359	Client Name: Cl	H2M Hill Inc.						
Project Name/Event:	CTO-0083 Vieques AOC	I / AOC-I						
Remarks: (1/2) Please sample/extract transfe submitted with this da	r logbook pages	Lạb Sample ID	HNO3	Prese	rvation HÇ1	NaOH H3E	VOA Matrix	Soil HeadSpace or Air Bubble > or equal to 1/4"
1. Custody Seal(s)	Present / Absent	V2250.05		i				
	Intact / Broken	K2359-05 K2359-06				22	H	
2. Custody Seal Nos.	N/A		-		-17.0		H	
z. costody sear Nos.	N/A	K2359-07	ļ		-			
<ol> <li>Traffic Reports/ Chair of Custody Records</li> </ol>	Present / Absent	K2359-08	-0				H	
(TR/COCs) or Packing		K2359-09	<2				Н	
Lists		K2359-10	-				H	
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	Present / Absent	K2359-13					Н	
5. Airbill No.	FedEx 8762 4395 5649	K2359-14					Н	
		KQ359-1	15					
6. Sample Tags	Present / Absent							
Sample Tag Numbers		[2359-1	6					
	Listed/							
	Not Listed on Chain- of-Custody							
. Sample Condition	Intact / Broken/							
	Leaking							
3. Cooler Temperature Indicator Bottle	Present/Absent							
. Cooler Temperature	5 °C							
Does information on TR/COCs and sample tags agree?	Yes / No							
1. Date Received at Laboratory	11/11/2011							
2. Time Received	09:05							
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raction (1) TVOA/VOA	Fraction (2) SVOA/PEST/ARO							
rea #	Area #							
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R Temp Gun ID:MT-1		VC	OA Matrix	x Key:				
oolantCondition: ICE					preserve	d Soil	A= Air	
reservative Name/Lot No:		-					H = HCl	
				л = MeO		•	E = Encore	
				l = NaH			F = Freeze	
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		Ra	d OK	Yes /	No			
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Received By: Durin	me					P	age 01	of 01	
Reviewed By:	\	_		-		10	og-in	Date 11/	12/2011
Work Order: K235	Client Name: C	H2M Hill Inc.			-				
Project Name/Event:	CTO-0083 Vieques AOC	I / AOC-I	_					_	
Remarks: (1/2) Please sample/extract transfe submitted with this da	r logbook pages	Tak Garania TD	III O			n (pH)	112704	VOA	Soil HeadSpace or Air Bubble > or equal to 1/4"
1. Custody Seal(s)	Present / Absent	Lab Sample ID	ниоз	H2SO4	HCl	Naon	н3РО4	Matrix	
Į.	Turk a shall be a least	K2359-17							
O Contrado Cara Nas	Intact / Broken	K2359-18	<2					H	
2. Custody Seal Nos.	N/A	K2359-19						UA	
3. Traffic Reports/ Chair	Present / Absent	K2359-20	<2					Н	
of Custody Records (TR/COCs) or Packing Lists		K2359-21 K2359-22						H H	
4. Airbill	AirBill/Sticker Present/Apsent								
5. Airbill No.	FedEx 8762 4395 5844								
6. Sample Tags	Present / Absent								
Sample Tag Numbers									
	Listed/								
	Not Listed on Chain- of-Custody								
7. Sample Condition	Intact/Broken/ Leaking								
3. Cooler Temperature Indicator Bottle	Present / Absent								
9. Cooler Temperature	5 °C								
0. Does information on TR/COCs and sample tags agree?	Yes / No								
1. Date Received at Laboratory	11/12/2011								
2. Time Received	09:00	ny .							
Sample	Transfer								
raction (1) TVOA/VOA	Fraction (2) SVOA/PEST/ARO								
rea #	Area #								
У	Ву								
n	On								
R Temp Gun ID:MT-1		V	DA Matri	x Key:					-
oolantCondition: ICE				JS = Unp	oreserve	d Soil	A=	Air	
reservative Name/Lot No:			ı	JA = Unp	oreserve	d Aquec	ous H=	HCI	
				л = MeO				Encore	
			١	N = NaHS	504		F≖	Freeze	
		Se	e Samp	le Condit	ion Noti	fication/0	Correctiv	e Action Forn	n Yes / No
		Ra	id OK	Yes /	) <sub>No</sub> _				

# Page of Spectrum Analytical, Inc. RI Division Sample Condition Notification Project#: K2359 Date of Receipt: 11-09-11 Received By: Daniel mile Client: CH2M Client project #/name: \[\text{Vicques}\] **Unusual Occurance Description:** VWAZ - MWOS - III = IL amper rec's broken Client Contacted: Contacted via: Phone/Fax/E-mail Date: Time: Contacted By: Name of person contacted: Anita Client Response: Responded via: Phone/Fax/E-mail Date: Name of person responding/ Responding to: attache email Action Taken:

Form ID: QAF.0005

### Edward Lawler [Warwick]

From: Anita.Dodson@CH2M.com

Sent: Friday, November 11, 2011 10:41 AM

To: Hillary.Ott@CH2M.com; Edward Lawler [Warwick]; Stephen.Brand@CH2M.com

Cc: John.Swenfurth@CH2M.com

**Subject:** RE: another FW: Minor correction for FW: Samples shipped from AOC I today 11/10/11 from Vieques to Mitkem Hillary - Thanks for the update.

Stephen – Since the cooler with FEDEX airbill 5866 is unaccounted for, I think it best that we go ahead and assume those samples will need to be recollected. IF FEDEX can find this cooler and get it to Mitkem tomorrow we will be ok, but barring a miracle, that's likely NOT to happen. Please go ahead and plan on recollecting those samples. I will call your cell phone tomorrow if the cooler arrives at Mitkem.

Ed – Would it be possible to get an update from Mitkem on the status of cooler receipt tomorrow? I will be checking email and can also be reached on my cell at 757-284-9208.

Thanks,

Anita

From: Ott, Hillary/WDC

Sent: Friday, November 11, 2011 10:37 AM

To: Edward Lawler [Warwick]; Brand, Stephen/VBO; Dodson, Anita/VBO

Cc: Swenfurth, John/TPA

Subject: RE: another FW: Minor correction for FW: Samples shipped from AOC I today 11/10/11 from

Viegues to Mitkem

Hello Everyone,

I just got off the phone with FEDEX. Two coolers ending in 5844, 5855 are still in Memphis, TN and should arrive tomorrow for Saturday delivery. The customer service representative placed an expedited shipping note to those two coolers. FEDEX has also put an inquiry into tracking down the third cooler, 5866. At this point no one is quite sure where this cooler is. They will be calling me with updates when they have located the package.

Please remember to be very careful when filling out the Air Bills. It looks like the address for Mitkem was incorrect.

Thanks,

Hillary Ott

Environmental Information Specialist CH2M Hill 15010 Conference Center Drive Chantilly, VA 20151

From: Edward Lawler [Warwick] [mailto:elawler@mitkem.com]

Sent: Friday, November 11, 2011 10:17 AM

To: Brand, Stephen/VBO; Ott, Hillary/WDC; Dodson, Anita/VBO

Cc: Swenfurth, John/TPA

Subject: another FW: Minor correction for FW: Samples shipped from AOC I today 11/10/11 from Vieques to Mitkem

Actually, the second cooler we received today was shipped two days ago.

So in summary, we have received both coolers that were shipped on 11/9, and none of the coolers shipped yesterday.

Our understanding is that the third cooler shipped yesterday, with the incorrect deliver-to address (airbill ending in 5866), needs someone from CH2M-Hill to contact Fedex and change the deliver-to address. We will be here until noon on Saturday to receive samples.

Thanks.

--Ed

From: Edward Lawler [Warwick]

Sent: Friday, November 11, 2011 10:12 AM

To: 'Stephen.Brand@CH2M.com'; Hillary.Ott@CH2M.com; Anita.Dodson@CH2M.com

Cc: John.Swenfurth@CH2M.com

Subject: Minor correction for FW: Samples shipped from AOC I today 11/10/11 from Vieques to Mitkem

There is a minor correction to the information below. We have received ONE cooler that was shipped yesterday. The airbill ending in 5650, the COC with SVOCs and DRO. The rest of the information remains the same.

--Ed

From: Edward Lawler [Warwick]

Sent: Friday, November 11, 2011 9:43 AM

To: 'Stephen.Brand@CH2M.com'; Hillary.Ott@CH2M.com; Anita.Dodson@CH2M.com

Cc: John.Swenfurth@CH2M.com

Subject: RE: Samples shipped from AOC I today 11/10/11 from Vieques to Mitkem

Good morning-

As of 9:40am on 11/11/11, we received the cooler that was supposed to be here yesterday. Samples are in the lab, and there is a good chance we will have the NO3 analyzed within the holding time. Cooler arrived at 5 degrees C.

However, we have NOT received the 3 coolers that were shipped yesterday. I tracked these, and two of them say they will be here by 10:30 (which I believe to be fiction, because we typically get all Fedex deliveries at the same time of the day, and there were no additional coolers on the truck that left here a short while ago). The third cooler (tracking number ending in 5866) they couldn't seem to find. I think the airbill was not completed correctly.

We will be here tomorrow to receive any samples that arrive on Saturday.

--Ed

From: Stephen.Brand@CH2M.com [mailto:Stephen.Brand@CH2M.com]

Sent: Thursday, November 10, 2011 3:39 PM

To: Edward Lawler [Warwick]; Hillary.Ott@CH2M.com; Anita.Dodson@CH2M.com

Cc: John.Swenfurth@CH2M.com

Subject: Samples shipped from AOC I today 11/10/11 from Viegues to Mitkem

Here are the chains, notes, and FedEx forms for today's shipment. Three coolers. Let me know if

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11/11/2011

### there are any problems.

Stephen Braud P.G.
Hydrogeologist
5700 Cleveland Street, Suite 101
Virginia Beach, VA 23462
Direct - 757.671.6211
Fax - 703.376.5970
Mobile - 757.285.7685
www.ch2mhill.com
Target Zero!

Please consider the environment before printing this email

### Edward Lawler [Warwick]

From:

Michael.Zamboni@CH2M.com

Sent:

Tuesday, November 15, 2011 10:04 AM

To:

Edward Lawler [Warwick]

Cc:

Stephen.Brand@CH2M.com; Michael.Zamboni@CH2M.com; John.Swenfurth@CH2M.com;

Hillary.Ott@CH2M.com; Brett.Doerr@CH2M.com

Subject:

RE: Viegues AOC I Groundwater Samples

Attachments: 20111115 Cancelled Samples.xisx

Thanks Ed. Because the persulfate concentration in each well (immediately prior to sampling) was less than a cutoff point, we didn't need to collect the ascorbic acid-preserved VOCs. The VOCs should have been HCl-preserved. Therefore, I can cancel the analysis of AA-VOCs samples (sample IDs end in "A") as long as there is a corresponding HCl-preserved analysis for the same sample. Would you please cancel analysis for the attached samples and let me know if anything seems out-of-the ordinary?

Thanks, Mike Z.

K2359\_06A, 08A, 10A, 12A, 19A, 21A

From: Edward Lawler [Warwick] [mailto:elawler@mitkem.com]

Sent: Tuesday, November 15, 2011 8:04 AM

**To:** Zamboni, Michael/WDC **Cc:** Brand, Stephen/VBO

Subject: RE: Viegues AOC I Groundwater Samples

Mike-

These were going to be analyzed this morning. I have put them "on-hold" so they won't be run. If you decide to have these analyzed (I think the 7-day hold time goes out tomorrow), please let me know ASAP.

Thanks

--Ed

From: Michael.Zamboni@CH2M.com [mailto:Michael.Zamboni@CH2M.com]

Sent: Monday, November 14, 2011 5:27 PM

To: Edward Lawler [Warwick]

Cc: Michael.Zamboni@CH2M.com; Stephen.Brand@CH2M.com

Subject: Vieques AOC I Groundwater Samples

Hi Ed,

I was just wondering if you've analyzed any of the Vieques AOC I Groundwater Samples yet for VOCs from ascorbic acid-preserved vials. These are the sample IDs which end in "A". We were contemplating if we could cancel these analyses, but it may be a moot point if you've already analyzed them.

Thanks, Mike Z.

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,			
	Sample ID to Cancel	Date/Time	Analysis
	VWAI-MW02-1111A	11/10/2011 9:50	VOCs (AA)
	VWAI-MW02-1111MSA	11/10/2011 9:50	VOCs (AA)
	VWAI-MW02-1111SDA	11/10/2011 9:50	VOCs (AA)
	VWAI-MW03-1111A	11/9/2011 11:15	VOCs (AA)
	VWAI-MW04-1111A	11/10/2011 9:20	VOCs (AA)
	VWAI-MW05B-1111A	11/9/2011 9:00	VOCs (AA)
	VWAI-MW05BP-1111A	11/9/2011 9:05	VOCs (AA)
	VWAI-MW07-1111A	11/9/2011 9:20	VOCs (AA)

## Edward Lawler [Warwick]

From:

Hillary.Ott@CH2M.com

Sent:

Tuesday, November 15, 2011 3:50 PM

To:

Edward Lawler [Warwick]

Cc:

Michael.Zamboni@CH2M.com

Subject: Attachments: Vieques-AOCI-CTF.pdf

Vieques AOCI - Login Revisions

Hi Ed,

After reviewing the Login for Vieques AOC 1, I found a couple mistakes that will need to be updated. I have attached a Corrections to File Memo documenting the changes that need to be made. Also, I noticed on the login for VWAI-MW05-1111 and VWAI-MW05P-1111 you have them logged in for SW8260 but we cancelled those analyses last week.

Can you please update and send me the revised login?

Thanks,

Hillary Ott

Environmental Information Specialist CH2M Hill 15010 Conference Center Drive Chantilly, VA 20151

£2359-02,-03

CH2MHILL

# **Corrections to COCs**

TO:

Ed Lawler, Mitkem.

COPIES:

File

Data Validation Package

Laboratory Package SDG: K2359

FROM:

Hillary Ott

Project Data Manager

DATE:

November 15, 2011

This memo is to document corrections made to entries on the Chains of Custody (COC) and Logins for Vieques, AOCI.

The corrections include changes to the sample time on the Login:

Sample ID	Date Collected	Incorrect Time Collected	Correct Time Collected	SDG
VWAI-TB01-111011	11/10/2011	9:00	7:00	K2359

-X/7

The corrections include changes to the sample date on the Login:

Sample ID	Incorrect Date Collected	Correct Date Collected	Time Collected	SDG
VWAI-EB01-111011	1/10/2011	11/10/2011	7:00	K2359

KZ317-22

The corrections include cancellation of analyses:

Sample ID	Date Collected	Time Collected	Requested Analyses	Analyses to Cancel	SDG	
VWAI-MW05-1111	11/8/2011	9:35	List 1 VOCs, SVOCs, GRO, DRO, ORO, Field Filtered Iron & Manganese, Sulfate, Nitrate, TOC.	List 1 VOCs	K2359	-02
VWAI-MW05P-1111	11/8/2011	9:40	List 1 VOCs, SVOCs, GRO, DRO, ORO, Field Filtered Iron & Manganese, Sulfate, Nitrate, TOC.	List 1 VOCs	K2359	-05

1

#### **Edward Lawler [Warwick]**

From: Hillary.Ott@CH2M.com

Sent: Wednesday, November 16, 2011 9:14 AM

To: Edward Lawler [Warwick]

Cc: Michael.Zamboni@CH2M.com

Subject: RE: Vieques AOCI - Login Revisions

Hi Ed,

Please cancel the 2 samples for VOC. The VWAI-MW05B-1111 and VWAI-MW05BP-1111 you received on 11/9 were the recollected samples for VOC.

Thanks,

## Hillary Ott

Environmental Information Specialist CH2M Hill 15010 Conference Center Drive Chantilly, VA 20151

From: Edward Lawler [Warwick] [mailto:elawler@mitkem.com]

Sent: Wednesday, November 16, 2011 7:45 AM

To: Ott, Hillary/WDC

Subject: RE: Vieques AOCI - Login Revisions

Hi Hillary—

I recall Anita saying that those 2 VOC samples would be cancelled and recollected, but we never received the recollected samples. So I didn't cancel the original analyses. (with so much other confusion about this project, I may have missed another communication).

Can you please confirm that you don't want these 2 samples analyzed for VOCs? (we still have them scheduled for GRO analysis).

Thanks

- Ed

From: Hillary.Ott@CH2M.com [mailto:Hillary.Ott@CH2M.com]

Sent: Tuesday, November 15, 2011 3:50 PM

**To:** Edward Lawler [Warwick] **Cc:** Michael.Zamboni@CH2M.com

Subject: Vieques AOCI - Login Revisions

Hi Ed,

After reviewing the Login for Vieques AOC 1, I found a couple mistakes that will need to be updated. I have attached a Corrections to File Memo documenting the changes that need to be made. Also, I noticed on the login for VWAI-MW05-1111 and VWAI-MW05P-1111 you have them logged in for SW8260 but we cancelled those analyses last week.

Can you please update and send me the revised login?

		A Region II Date: August 2008 SOP: HW-24, Rev. 2 YES NO N/A
I.		PACKAGE COMPLETENESS AND DELIVERABLES
		ER: K2359 LAB: Spectrum Arralytical
SITE	NAME:	· Viegues CTO-083 AOC I
1.0	Data	Completeness and Deliverables (Irmsted Compd list)
	1.1	Has all data been submitted in CLP deliverable format or CLP Forms Equivalent?
	ACTIO	ON: If not, note the effect on review of the data in the Data Assessment narrative.
2.0	Cove	r 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?
	ACTIO	ON: If not, note the effect on review of the data in the Data Assessment narrative.
II.		VOLATILE ANALYSES
1.0	Traf	fic 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?
	ACTIO	ON: 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
		- 6 VOA -

Date: August 2008 SOP: HW-24, Rev. 2

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 11/8-10/11 Analy 11/15-18/11 Recd 11/9-12/11 Temp 4-5°C

2.0 <u>Holding Times</u>

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<sub>4</sub>, the maximum holding time is 14 days from sample collection. If

Date: August 2008 SOP: HW-24, Rev. 2

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	ΙI	Equival	ent)	ļ
----	---	-----------	----------	------	------	----	---------	------	---

3.1	Have the	volatile	surrogate	recoveries	been	listed	on	Surrogate
	Recovery	forms for	r each of t	the following	ng mat	rices:		

a.	Water		
b.	Soil		

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

Neco	very forms for each matrix.		/	
a.	Water	1		
b.	Soil			

ACTION: If large errors exist, deliverables are unavailable or information is missing, document the effect(s) in Data

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Date: August 2008 SOP: HW-24, Rev. 2

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 inhouse 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 <sub>8</sub>	80-120	70-130
Dichloroethane-d <sub>4</sub>	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.

Were method blanks reanalyzed?

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?

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Date: August 2008 SOP: HW-24, Rev. 2

YES NO N/A

ACTION: If all surrogate recoveries are > 10% but 1 or more compounds do not meet method specifications:

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

	_	ion II hod 8260B VOA	Date: August 2008 SOP: HW-24, Rev. 2		
			YES NO N/A		
Note	:	LCS consists of an aliquot of a similar to the sample matrix and volume.			
ACTION:		If any <u>Laboratory Control Sample</u> call the lab for explanation /renote in the data assessment.			
4.2		the Laboratory Control Samples as uency for each of the following ma			
	Α.	Water	<u> </u>		
	В.	Soil	<u> </u>		
	C.	Med Soil	<u> </u>		
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.			
ACTI	ON:	If any MS/MD, MS/MSD or replicate missing, take the action specific			
4.3		in house LCS recovery limits been 9.7).	n developed (Method 8000C,		
4.4		n house limits are not developed, ts between 70 - 130% (Method 8000)			
4.5	hous	one or more of the volatile LCS e laboratory recovery criteria fo e limits are not present use 70 -	r spiked analytes? If in		

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Date: August 2008 SOP: HW-24, Rev. 2

YES NO N/A

Table 3. LCS Actions for Volatile Analysis

Criteria	Action			
	Detected Spiked Compounds	Non-Detected Spiked Compounds		
<pre>%R &gt; Upper     Acceptance     Limit</pre>	J	No Qualifiers		
%R < Lower Acceptance Limit	J	บJ		
Lower Acceptance Limit ≤ %R	No Qual	ifications		

5.0	<u>Matrix</u>	Spikes	(Form	III	or	ea	uivale	ent	)

MSIMSD

[ ]

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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USEPA	Region	ΙΙ	
SW846	Method	8260B	VOA

Date: August 2008 SOP: HW-24, Rev. 2

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	11	 ~
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.

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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 OC 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 Qu	alifications		

USEPA	Region	ΙΙ	
SW846	Method	8260B	VOA

Date: August 2008 SOP: HW-24, Rev. 2

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 ?

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- 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 <u>not</u> 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.

□ — —

Date: August 2008 SOP: HW-24, Rev. 2

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

 $\hbox{not be qualified because of contamination in}\\$ 

another blank. Field blanks must be qualified for

w└♥ ≡üΩ⊚≡Ω⊙⊙ èsurgodatie Lor ⊊alibration QC problems.

ACTION: Follow the directions in Table 5 below to qualify sample results due to contamination. Use the

sample results due to contamination. Use the largest value from all the associated blanks.

JWAI-+BOI-110811-MDD

VWAI-TBO!-110911\_MOQ

VWAI-TBOI-111011-1000

VWAI-EBOI-110811-1100

VWAI-EBOI-110911-1000

VWAI - EBOI-111011 - 1000

Date: August 2008 SOP: HW-24, Rev. 2

Table 5. Volatile Organic Analysis Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples				
	Detects	Not detected	No qualification				
	_	< CRQL	Report CRQL value with a U				
	< CRQL*	≥ CRQL	Use professional judgement				
		< CRQL	Report CRQL value with a U				
Method, Storage, Field,	> CRQL*	<pre></pre>	Report the concentration for the sample with a U, or qualify the data as unusable R				
Trip, Instrument**		≥ CRQL and ≥ blank contamination	Use professional judgement				
		< CRQL	Report CRQL value with a U				
	= CRQL*	≥ 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.

			ion II hod 8260B VOA	Date: August 2008 SOP: HW-24, Rev. 2 YES NO N/A
	7.3		there field/rinse/equipment blanks every sample?	s associated
	ACTIO	ON:	For low level samples, note in do that there is no associated field blank. Exception: samples taken water tap do not have associated	d/rinse/equipment from a drinking
8.0	GC/MS	App	aratus and Materials	
	8.1	colu Chec	the lab use the proper gas chromatimn(s) for analysis of volatiles by the kerner data, instrument logs or contested what type of column(s) we	y Method 8260B? ntact the lab
	NOTE:	:	For the analysis of volatiles, the use of 60 m. x 0.75 mm capil coated with VOCOL(Supelco) or equivee (see SW-846, page 8260B-7, sections)	lary column, uivalent column.
	ACTIO	ON:	If the specified column, or equipodocument the effects in the Data professional judgement to determ data.	Assessment. Use
9.0	GC/MS	S Ins	trument Performance Check (CLP Fo.	rm V Equivalent)
	9.1	pres form	the GC/MS Instrument Performance (ent for Bromofluorobenzene (BFB), is list the associated samples with yzed?	and do these
	9.2	mass	the enhanced bar graph spectrum and /charge (m/z) listing for the BFB ided for each twelve hour shift?	bn
	9.3	Has	an instrument performance check so	olution (BFB)

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Date: August 2008 SOP: HW-24, Rev. 2

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?

щ\_\_\_\_

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.

			ion II hod 8260B VOA	SOP: HW-2	4, Rev. 2	.,,
					YES NO 1	N/A
10.0	Targe	et Ana	alytes (CLP Form I Equivalent)			
	10.1	prese	the Organic Analysis reporting form ent with required header informatio , for each of the following:			
		a.	Samples and/or fractions as approp	oriate		
		b.	Matrix spikes and matrix spike dup	olicates		1
		С.	Blanks		14_	
		d.	Laboratory Control Samples		<u> </u>	
	10.2	iden Repo	the reconstructed Ion Chromatograms tified compounds, and the data systrts) included in the sample package owing?	em printou	ıts (Quant	he
		a.	Samples and/or fractions as approp	oriate	14	
		b.	Matrix spikes and matrix spike dup (Mass spectra not required)	olicates	<u> </u>	_
		С.	Blanks		<u>                                     </u>	
		d.	Laboratory Control Samples		<u>-</u>	
	ACTIO	ON:	If any data are missing, take acti specified in 3.2 above.	on		
	10.3		hromatographic performance acceptabect to:	ole with	f	
		Base	line stability?		<u> </u>	

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USEPA Region II SW846 Method 8260B VOA	Date: August 2008 SOP: HW-24, Rev. 2
	YES NO N/A
Resolution?	14
Peak shape?	14
Full-scale graph (attenuation)	?
Other:	_
ACTION: Use professional judgement the data.	t to determine the acceptability of
10.4 Are the lab-generated standard volatile compounds present for	-
3.2 above. If the lab does	issing, take action specified in s not generate their own standard he Data Assessment. If spectra are for missing spectra.
10.5 Is the RRT of each reported constandard RRT in the continuing	
10.6 Are all ions present in the started relative intensity greater that also present in the sample mass	n 10% (of the most abundant ion)
10.7 Do the relative intensities of in the sample agree within $\pm$ 3 relative intensities in the re	0% of the corresponding
ACTION: Use professional judgement acceptability of data. If incorrect identifications should be rejected ("R"), Presumptive evidence of the compound) or changed to no calculated detection limit	<pre>it is determined that   were made, all such data   flagged ("N") - he presence of the on detected ("U") at the</pre>

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Date: August 2008 SOP: HW-24, Rev. 2

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.

Moch

- 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.

Date: August 2008 SOP: HW-24, Rev. 2

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?

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<sub>2</sub>(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?

V

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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Date: August 2008 SOP: HW-24, Rev. 2

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 comtinuing 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)

Date: August 2008 SOP: HW-24, Rev. 2

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  $\le 30.0\$$ . If \$RSD values reported are > 30.0\$ document in the Data Assessment.

Date: August 2008 SOP: HW-24, Rev. 2

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 GC/MS Calibration Verification (CLP Form VII Equivalent)

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Date: August 2008 SOP: HW-24, Rev. 2

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  $\leq$  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

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Date: August 2008 SOP: HW-24, Rev. 2

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 <u>Internal Standards (CLP Form VIII Equivalent)</u>

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)?

Date: August 2008 SOP: HW-24, Rev. 2

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.

(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.
  - 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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Date: August 2008 SOP: HW-24, Rev. 2

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.

VWAI-MWOSBP-1111 > MOD

DataQual VOA

**Initial Calibration Date:** 

11/14/2011

RRF and %RSD Calculations:

Compound Name:

1,2-dichloroethane

Lab Value:

0.2720

Area of Compound	1251031
Area of Internal STD	1151324
Conc. of Internal STD	50
Conc. of Compound	200
Calculated RRF	0.272

Compound Name:

benzene

Lab Value:

12.90

RRF of STD 1	0.9940
RRF of STD 2	0.9550
RRF of STD 3	0.8120
RRF of STD 4	0.8100
RRF of STD 5	0.7160
RRF of STD 6	0.9750
Calculated % RSD	12.90

**Continuing Calibration File ID:** 

11/15/2011

RRF and %D Calculations:

Compound Name:

1,2-dichloroethane

Lab Value:

0.289

Area of Compound	377827
Area of Internal STD	1309593
Conc. of Internal STD	50
Conc. of Compound	50
Calculated RRF	0.289

Compound Name:

1,2-dichloropropane

Lab Value:

1.5

Average RRF	0.252
Calibration Check RRF	0.248
Calculated % D	1.59

VOA DataQual

### SAMPLE CALCULATION

VWAI-MW07-1111

Sample ID: Standard ID:

11/15/2011

Compound:

benzene

Concnetration:

5.3 ug/L

	Water (ug/L)	Soil (ug/Kg)	Soil ug/Kg)
Area of Compound	120597		
Area of Internal STD	1298350		
Conc. of Internal (ng)	250	250	
RRF of Compound	0.877		
Dilution Factor	1	1	
Weight of Sample	NA		
Volume of Sample	5	NA	
% Moisture	NA		
Aliquot of sample	NA	NA	
Concentration	5.30	#DIV/0!	#DIV/0!

	RT of Internal STD	RT of Compound	RRT
Sample	5.057	4.832	0.956
Standard	5.057	4.832	0.956

### REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client: CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC I

Laboratory Workorder / SDG #: K2359 SW846 8260C, VOC by GC-MS

### I. SAMPLE RECEIPT

Several communications with the client regarding samples to analyze and/or cancel are included in the Sample Transmittal section of this report.

### 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 for a select list of volatile compounds following procedures in laboratory test code: SW846 8260C.

### IV. PREPARATION

Aqueous Samples were prepared following procedures in laboratory test code: SW5030.

### V. INSTRUMENTATION

The following instrumentation was used:

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.

Instrument Code: V6

Instrument Type: GCMS-VOA Description: HP6890 / HP5973 Manufacturer: Hewlett-Packard

Model: 6890 / 5973

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. Laboratory Control Spikes (LCS):

Percent recoveries for lab control samples were within the QC limits.

### E. Internal Standards:

Internal standard peak areas were within the QC limits.

### F. Dilutions:

No sample in this SDG required analysis at dilution.

### G. Samples:

No other unusual occurrences were noted during sample analysis.

-0

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Spectrum, 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:	(dodt tohn	
Date:	12/9/11	

USEPA Re SW846 Me	gion II thod 8270D (Rev.4, January 1998)	Date: August, 2008 SOP HW-22 Rev.4		
		YES NO N/A		
E -	The concentration of this analyte exceeds the of the instrument.	ne calibration range		
А -	Indicates a Tentatively Identified Compound adol-condensation product.	(TIC) is a suspected		
X,Y,Z-	Laboratory defined flags. The data reviewer qualifiers during validation so that the dat understand their impact on the data.			
I.	PACKAGE COMPLETENESS AND DELIVERABI	LES		
CASE NUMBER: K2359 LAB: Spectrum Analytical SITE NAME: Vilgues CTO-083 AOC I				
	(lim	ited compd list)		
1.0 <u>Dat</u>	a Completeness and Deliverables			
1.1	Has all data been submitted in CLP deliverable format?	ole		
ACT	ION: If not, note the effect on review of the in the data assessment narrative.	ne data		
2.0 <u>Cov</u>	er 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?	<u> </u>		

				45		
	A Region I 6 Method 8	I 270D (Rev. <b>4,</b> January	1998)		August, W-22 Rev	
					YES NO	N/A
II.		SEMIVOL	ATILE ANALYSE	S		
1.0	Traffic F	eports and Laborator	y Narrative			
	1.1 Are samples?	the Traffic Report F	orms present	for all	<u> </u>	
	ACTION:	If no, contact lab or illegible copies	-	nt of missing	İ	
	any samp	ne Traffic Reports o problems with sample les, analytical prob cting the quality of	receipt, con lems or speci	dition of	تا	
	ACTION:	If any sample analy TCLP, contains 50%-be flagged as estime sample, other than 90% water, all non-as unusable (R), and	90% water, al ated ("J"). I TCLP, contain detects data	l data should f a soil s more than are qualified	ı	
	ACTION:	If samples were not melted upon arrival cooler temperature all positive result "UJ". Sampled	at the labor was elevated	atory and the (10°C), flag non-detects	4-5	
2.0	Holding T	imes Kecd 11/1	9-12/11	Analy 12	/2-3/11	
	dete	any semivolatile te emined from date of action, been exceede	collection to	-	, 4	

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

USEPA Region II SW846 Method 8270D (Rev.4, January 1998)

Date: August, 2008 SOP HW-22 Rev.4

YES NO N/A

40 days of the date of extraction.

### Table of Holding Time Violations

Sample ID	Sample Matrix	Date Sampled	(Se Date Lab Received	Date Extracted	Report) Date Analyzed
			21		
			11		
			/		

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).

USEPA Region II Date: August, 200								
	_		270D (Rev.4, January 1998)		: Augu HW-22			
					YES	NO	N/A	
3.0		Surro	ogate Recovery (Form II/Equivalent)					
	3.1	liste	the semi volatile surrogate recoveriesed on CLP Surrogate Recovery forms (Foreach of the following matrices:					
		a.	Low Water		W			
		b.	Low/Med Soil				<del></del>	
	3.2	appro	o, are <u>all the samples listed</u> on the opriate Surrogate Recovery Summary formeach matrix:	ms				
		a.	Low Water		1			
		b.	Low/Med Soil					
	ACTIO	: NC	If CLP deliverables are unavailable, of the effect(s) in data assessments. In cases the lab may have to be contacted obtain the data necessary to complete validation.	n some d to	С			
	3.3	Were	outliers marked correctly with an aste	erisk?	4			
		ACTIO	ON: Circle all outliers in red.					
	3.4	recover method recover from page	two or more base neutral <u>OR</u> acid surreveries out of specification for any samed blank (Reviewer should use lab in howery limits. Use surrogate recovery limits are not available of the surrogate of the surrogate of the surrogate recovery limits are not available of the surrogate of the surrogate recovery limits are not available of the surrogate of the surrogate recovery limits are not available of the surrogate of the surrogate recovery limits are not available of the surrogate of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limits are not available of the surrogate recovery limit	mple or ouse mits anuary 2	2005	V	_	
		Note:	Examine lab in house limits for a	reasonal	olenes	ss.		
		If ye	es, were samples re-analyzed?				V	

# 2H - FORM II SV-2 WATER SEMIVOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: K2359 Mod. Ref No.: SDG No.: SK2359

CLIENT	SDMC1	SDMC2	SDMC3			TOT
SAMPLE NO.	(NBZ) #	(FBP) #	(TPH) #			ruo
01 MB-63017	102	99	126			_ 0
02 VWAI-MW05-11 11	93	92	51	A 71-	,	0
03 VWAI-MW05P-1 111	93	90	47 *	Nac		
04 VWAI-EB01-11 0811	89	86	99	i		0
05 VWAI-MW03-11	78	80	61	0.	/	0
06 VWAI-MW07-11	70	54	49 *	) MA		1
07 VWAI-EB01-11 0911	94	87	87			 0
08 VWAI-MW04-11	85	85	71			0
09 VWAI-MW02-11	91	88	72			0
10 VWAI-MW02-11 11MS	94	95	72			0
11 VWAI-MW02-11 11MSD	95	91	78			0
12 VWAI-EB01-11 1011	90	85	97			0
13 LCS-63017	93	92	121			0
14 LCSD-63017	88	83	116			0

		QC LIMITS
SDMC1	(NBZ) = Nitrobenzene-d5	(40-110)
SDMC2	(FBP) = 2-Fluorobipheny1	(50-110)
SDMC3	(TPH) = Terpheny1-d14	(50-135)

 $<sup>\</sup>ensuremath{\mathtt{\#}}$  Column to be used to flag recovery values

<sup>\*</sup> Values outside of contract required QC limits

D DMC diluted out

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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, for the affected fraction only (i.e. either base-neutral or acid 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. If recoveries are greater than the upper acceptance limit, do not qualify non-detects.

If any base-neutral  $\underline{or}$  acid surrogate has a recovery of < 10%:

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

V

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

	A Reg 6 Met		I 270D (Rev.4, January 1998)	Date: August, 2008 SOP HW-22 Rev.4		
				YES NO N/A		
			effect in data assessments.			
4.0	<u>Matr</u>	ix Sp	ikes (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	e spiking compounds:		
			Base/neutrals  1,2,4-Trichlorobenzene Acenaphthene  2,4-Dinitrotoluene Pyrene N-Nitroso-di-n-propylamine 1,4-Dichlorobenzene	Acids Pentachlorophenol Phenol 2-Chlorophenol 4-Chloro-3-methylphenol 4-Nitrophenol		
	Note	:	Some projects may require the of interest.	spiking of specific compounds		
	Note:		See Method 8270D-sec 8.4.2 for to prepare and analyze duplicate spike/matrix spike duplicate. to contain target analytes, the matrix spike and a duplicate a field sample. If samples are target analytes, laboratory shand matrix spike duplicate pair	ate samples or a martix  If samples are expected nen laboratory may use one analysis of an unspiked not expected to contain nould use a matrix spike		
	4.2		matrix spikes analyzed at the uency for each of the following			
		a.	Low Water	<u> </u>		
		b.	Low Solid	<u> </u>		
		С.	Med Solid	<u> </u>		

Date: August, 2008 SOP HW-22 Rev.4

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.

W		

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).

<u>Water</u>	<u>Solids</u>
0 6	
out of	out of

		ion I hod 8	I 270D (Rev.4, January 1998)	Date: August, 2008 SOP HW-22 Rev.4					
				YES NO N/A					
4.5 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?									
		Water							
		$U_{\perp}$	out of $\frac{3}{}$ out	of					
	ACTI	ON:	Circle all outliers with red pencil.						
	ACTI	ON:	No action is taken on MS/MSD data <u>alone</u> However, using informed professional judgement, the data reviewer may use th matrix spike and matrix spike duplicate results in conjunction with other QC cr to determine the need for some qualific of the data.	e iteria					
	4.6		a Laboratory Control Sample (LCS) analyz ytical batch?	ed with each					
	NOTE	:	When the results of the matrix spike an indicate a potential problem due to the matrix itself, the LCS results are used verify that the laboratory can perform analysis in a clean matrix.	sample to					
5.0	Blan	ks_(Fo	orm IV/Equivalent)						
	5.1	Is th	ne Method Blank Summary (Form IV) presen	t? <u>i1</u>					
	5.2	Frequ	uency of Analysis:						
		repo	a reagent/method blank analysis been rted per 20 samples of similar matrix, o entration level, and for each extraction n?						
	5.3	Has a	a method blank been analyzed either afte	er					

- 13 **-**

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	_	ion I hod 8	I 270D (Rev.4, January 1998)	Date: SOP H	_		
					YES	NO	N/A
			calibration standard or at any other timeng the analytical shift for each GC/MS sy			_	
	ACTIO	ON:	If any method blank data are missing, callab for explanation/resubmittal. If not available, use professional judgement to determine if the associated sample data should be qualified.				
	5.4	chro	matography: review the blank raw data - matograms (RICs), quant reports or data s touts and spectra.	system	n		
		stab	he chromatographic performance (baseline ility) for each instrument acceptable for semivolatiles?	:	14	<i>/</i>	_
	ACTI	ON:	Use professional judgement to determine effect on the data.	the			
6.0	Cont	<u>amina</u>	tion				
	NOTE	:	"Water blanks", "drill blanks" and "dist water blanks" are validated like any oth sample and are <u>not</u> used to qualify the of Do not confuse them with the other QC bl discussed below.	ner data.	i		
	6.1	posi When conc the	ny method/instrument/reagent blanks have tive results for target analytes and/or Tapplied as described below, the contaminentration in these blanks are multiplied sample dilution factor and corrected for ent moisture where necessary.	nant		W	
	6.2		ny field/rinse/ blanks have positive resu 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).

VWAI-EBO1-110811 -no€

VWAI-ERO1-1109H - MOD

VWAI-EBOI-111011 - MOD

Date: August, 2008 SOP HW-22 Rev.4

YES NO N/A

### Blank Action for Semivolatile Analyses

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
		< CRQL	Report CRQL value with a U
	> CRQL *	<pre>&gt; CRQL and &lt; blank contamination</pre>	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 result for target analytes and/or TICs?	lts			
No	te: Use professional judgement to determine if carryover occurred and qualify analytaccordingly.	ces			
7.0 <u>GC</u>	/MS Apparatus and Materials				
7.	Did the lab use the proper gas chromatograph: column for analysis of semivolatiles by Metho 8270D? Check raw data, instrument logs or conthe lab to determine what type of column was The method requires the use of 30 m x 0.25 mm (or 0.32 mm ID), silicone-coated, fused silicone-coated, capillary column.	od ontact used m ID			
AC	TION: If the specified column, or equivalent, not used, document the effects in the data assessment. Use professional judgement determine the acceptability of the data	ata to			
8.0 <u>GC</u>	MS Instrument Performance Check (Form V/Equival	<u>lent)</u>			
8 <b>.</b>	<pre>1 Are the GC/MS Instrument Performance Check Fo   (Form V) present for decafluorotriphenylphosy   (DFTPP)?</pre>				
	TE: The performance solution should also contains intachlorophenol, and benzidine to verify injection port inertness and column performant 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 (bas upon lab experience) and show no peak degradation tailing before samples are analyzed. (see	nce.  pe  sed ation		.5	

USEPA Regio	on II od 8270D (Rev.4, January 1998)	Date: August, 2008 SOP HW-22 Rev.4
		YES NO N/A
F	page 8270D-12).	
n	Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the DFTPP provided for each twelve hour shift?	<u>-</u>
k	Has an instrument performance check solution been analyzed for every twelve hours of samplanalysis per instrument?	.e
ACTION	N: List date, time, instrument ID, and samp analyses for which no associated GC/MS tuning data are available.	ole
DATE ————	TIME INSTRUMENT SAMPLE NUMBE	ERS
ACTIO	N: If lab cannot provide missing data, rejective ("R") all data generated outside an acceptive twelve hour calibration interval.	
ACTIO	N: If mass assignment is in error, flag all associated sample data as unusable (R).	
	Have the ion abundances been normalized to m/z 198?	<u> </u>
	Have the ion abundance criteria been met for each instrument used?	16
ACTIO	N: List all data which do not meet ion abur	ndance

criteria (attach a separate sheet).

	_	ion II hod 8:	I 270D (Rev.4, January 1998)		: Augu HW-22		
					YES	NO	N/A
	ACTIO	ON:	If ion abundance criteria are not met, action specified in section 3.2	take			
	8.6	betw	there any transcription/calculation erro een mass lists and Form Vs? (Check at le values but if errors are found, check mo	east		<u>L</u>	_
	8.7		the appropriate number of significant res (two) been reported?		ميار	/	
	ACTIO	ON:	If large errors exist, call lab for explanation/resubmittal, make necessary corrections and document effect in data assessments.				
	8.8		the spectra of the mass calibration compptable?	oound	Ù		
	ACTI	ON:	Use professional judgement to determine whether associated data should be acceptualified, or rejected.				
9.0	<u>Targ</u>	et An	alytes				
	9.1	pres	the Organic Analysis Data Sheets (Form Dent with required header information on , for each of the following:				
		a.	Samples and/or fractions as appropriate	9	M	_	
		b.	Matrix spikes and matrix spike duplicat	ces	14		
		С.	Blanks		14		
	9.2	perf	any special cleanup, such as GPC, been ormed on all soil/sediment sample extrac section 7.2, page 8270D-14)?	cts		<del></del>	<u></u>

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		YES NO N/A
ACTIO	ON: If data suggests that extract cleanup was need performed, use professional judgement. Mak note in the data assessment narrative.	
9.3	Are the Reconstructed Ion Chromatograms, mass spectra for the identified compounds, and the dasystem 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	
ACTI(	ON: 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?	<u></u>
	Peak shape?	<u>u</u>
	Full-scale graph (attenuation)?	
	Other:	
ACTI:	ON: Use professional judgement to determine the acceptability of the data.	Ž
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.

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.

USEPA SW846	-		70D +	(Rev.4,	, Janu	lary !	1998)					: Aug HW-22		
												YES	NO	N/A
10.0 <u>T</u>	<u>'entat</u>	<u>:ively</u>	<u>y Id∈</u>	entifie	<u>ed Com</u>	npounc	ds (T	<u>IC)</u>						
1	f a	for th and do	his p o lis	ively I project sted TI imated	t, are ICs in	e all nclude	Form e scar	n Is, l ın numl	Part 1 ber o	B pre r ret	esent tenti	; on	M 1	D
N	NOTE:	1	lab w	ew samp was rec er to s	quired	d to i	ident	ify no	on ta	rget		ytes		
1	i s	identi spectr	ifiec ra in	ass spe d compo ncludeo llowing	ounds d in t	and a	assoc	ciated	l "bes	st mat				
	а	a. S	Samp]	les and	d/or f	fractí	ions	as ap	propr	iate				
	þ	b. B	Blank	ks										
A	ACTION			ny TIC ified i				.ng, t	ake a	ction	1			
A	ACTION			"JN" qu tified				o ana	lytes					
1	а	as TIC	C con	arget o mpounds listed	s in a	anothe	er (e	e.g.,	an ac		sted	· 		_
А	ACTION	<b>√:</b> i	i.	Flag w as a T		"R" ar	ny ta	rget (	compo	und l	iste	d		
		i	ii.	Make s			_		-			ι •		
1	S	spectr	rum w	ons pre with a	relat	tive i	inten	nsity	great			n e		

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USEPA Region SW846 Method	n II d 8270D (Rev.4, January 1998)	Date: Augu SOP HW-22		
		YES	NO	N/A
Sē	ample mass spectrum?	1_1		<u></u>
	o TIC and "best match" standard relative ion tensities agree within $\pm~20$ %?	n l		<u></u>
ACTION:	Use professional judgement to determine acceptability of TIC identifications. I is determined that an incorrect identification was made, change the identification to "unknown" or to some specific identification (example: "C3 substituted benzene") as appropriate an remove "JN". Also, when a compound is found in any blank, but is a suspected artifact of a common laboratory contami the result should be qualified as unusa "R."	f it less d not nant,		
11.0 <u>Compo</u> u	und Quantitation and Reported Detection Lim	<u>its</u>		9 3
Fo Ve qu	re there any transcription/calculation erroom I results? Check at least two positive erify that the correct internal standard, uantitation ion, and RRF were used to calcuorm I result. Were any errors found?	values.	L	/_
NOTE:	Structural isomers with similar mass sp but insufficient GC resolution (i.e. pe valley between the two peaks > 25%) sho reported as isomeric pairs. The review should check the raw data to ensure that such isomers were included in the quantitation (i.e., add the areas of the coeluting peaks to calculate the total concentration).	rcent uld be er t all		
re	re the method detection limits adjusted to eflect sample dilutions and, for soils, sam bisture?	ple <u>Ll</u>		
	- 23 -			

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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?

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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.

Base/Neutral Fraction

ACTION: For any target analyte with average RRF < 0.05

- "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%)?

4

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

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

Acid Fraction

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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  $\geq$  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?

USEPA Region II SW846 Method 8270D (Rev.4, January 1998)		: Aug HW-22		
		YES	NO	N/A
13.6 If the pesticide compounds include DDT, was percent breakdown of DDT to DDD and DDE greathan 20%?				
ACTION: If DDT percent breakdown exceeds 20%:				
i. Qualify all positive results for D with "J". If DDT was not detected DDD and DDE results are positive, qualify the quantitation limit for as unusable, "R".	, but			
ii. Qualify all positive results for DDE as presumptively present at an approximate concentration "JN".		d		
14.0 GC/MS Calibration Verification (Form VII/Equival	ent)			
14.1 Are the Calibration Verification Forms (Form present and complete for all compounds of interest?	VII)	4	// <del></del>	
14.2 Has a calibration verification standard been analyzed for every twelve hours of sample an per instrument?		s	/ <sup>*</sup>	
ACTION: List below all sample analyses that wer within twelve hours of a calibration verification analysis for each instrume used.				
ACTION: If any forms are missing or no calibrat verification standard has been analyzed within twelve hours of every sample ana		,		

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> YES NO N/A

call lab for explanation/resubmittal. 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%?



Circle all outliers in red. ACTION:

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?

Circle all outliers in red. ACTION:

ACTION: If RRF < 0.05, qualify as unusable ("R")</pre> 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).



USEPA Region II Date: August, 2008 SW846 Method 8270D (Rev.4, January 1998) SOP HW-22 Rev.4 YES NO N/A ACTION: Circle errors in red. If errors are large, call lab for ACTION: 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? List each outlying internal standard below. ACTION: Sample ID IS # Area LowerLimit Upper Limit (Attach additional sheets if necessary.) Check Table 5, 8270D-41 for associated analytes. Note: 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.

Region Method	(Rev.4,	January	1998

Date: August, 2008 SOP HW-22 Rev.4

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?

4

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

### 16.0 Laboratory Control Samples (LCS)

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

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

14

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

r Lar

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?

Date: August, 2008

SOP HW-22 Rev.4

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.

VWAI-MWO5-1111 > moquel

DataQual SVOA

Initial Calibration Date: 12/1/2011

RRF and %RSD Calculations:

Compound Name: naphthalene Lab Value: 1.155

Area of Compound	621062
Area of Internal STD	268811
Conc. of Internal STD	40
Conc. of Compound	80
Calculated RRF	1.155

Compound Name: 2-methylnaphthalene

Lab Value: 7.7

RRF of STD 1	0.696
RRF of STD 2	0.74
RRF of STD 3	0.747
RRF of STD 4	0.744
RRF of STD 5	0.799
RRF of STD 6	0.879
RRF of STD 7	0.741
Calculated % RSD	7.7

Continuing Calibration File ID: 12/5/2011

RRF and %D Calculations:

Compound Name: bis(2-ethylhexyl)phthalate

Lab Value: 0.689

Area of Compound	217885
Area of Internal STD	505725
Conc. of Internal STD	40
Conc. of Compound	25
Calculated RRF	0.689

Compound Name: naphthalene

Lab Value: 6.8

Average RRF	1.022
Calibration Check RRF	0.953
Calculated % D	6.8

DataQual **SVOA** 

# SAMPLE CALCULATION

Sample ID: Standard ID:

VWAI-MW05-1111

12/2/2011

Compound:

2-methylnaphthalene

Concnetration: 11 ug/L

	Water (ug/L)	Soil (ug/Kg)
Area of Compound	41944	
Area of Internal STD	193580	
Conc. of Internal (ng)	40	2
RRF of Compound	0.764	
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	11.34	#DIV/0!

	RT of Internal STD	RT of Compound	RRT
Sample	5.32	6.655	1.251
Standard	5.319	6.655	1.251

# FIELD DUPLICATE SAMPLE SUMMARY

Sample ID:

VWAI-MW05-111

Duplicate Sample ID:

VWAI-MW05P-111

Water: RPD>75% Soil: RPD>100%

Compound	Sample Conc.	Dup. Sample Conc.	%RPD
2-methylnaphthalene	11	11	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!

<sup>\*</sup> one values below LOD only values above LOD listed

COMMENTS:

No qualifications required.

### REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client: CH2M-Hill, Inc.

Project: CTO-0083 Viegues AOC I

Laboratory Workorder / SDG #: K2359

SW846 8270D, SVOA by GC-MS

### I. SAMPLE RECEIPT

Several communications with the client regarding samples to analyze and/or cancel are included in the Sample Transmittal section of this report.

### 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 for select semivolatile organic compounds 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: S3

Instrument Type: GCMS-SEMI Description: HP6890 / HP5973 Manufacturer: Hewlett-Packard

Model: 6890 / 5973

### 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 QC acceptance criteria generally allow one surrogate recovery outside of the QC limits per fraction.

VWAI-MW05P-1111 (K2359-03B), recovery is below criteria for Terphenyl-d14 at 47% with criteria of (50-135).

VWAI-MW07-1111 (K2359-15A), recovery is below criteria for Terphenyl-d14 at 49% with criteria of (50-135).

# D. Spikes:

### 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: VWAI-MW02-1111 (K2359-20EMS) and VWAI-MW02-1111 (K2359-20EMSD).

Percent recoveries and replicate RPDs were within the QC limits.

# E. Internal Standards:

Internal standard peak areas were within the QC limits.

	-					
_	- 11	П	115	٠ı.	$\sim$ 1	20
F.		41	14 3	ш	LH	าร

No sample in this SDG required analysis at dilution.

# 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, 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:	(dud film	
Date:	12/12/11	

# **DataQual**

### Worksheets - GRO BY 8015B

This SDG contains GRO results SW-846 method 8015B. Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Laboratory: Spectrum Analytical

### **Holding Times**

Sampling Date: 11/8-10/11 14-day sample holding time was applied based

Received Date: 11/9-12/11 on SW-846 recommendations

Analysis Dates: 11/22/11 Cooler Temp: 4-5°C

All sample analysis holding time requirements were met.

#### Calibrations

A five-point calibration curve was analyzed for both the target compound and the surrogate compound. The RFs and %RSDs were calculated and met criteria for both the target compound and the surrogate compound. Continuing calibration standards were analyzed per the method. All %Ds were within QC limits.

#### **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  $\leq$  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 is either is >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.

No contamination was exhibited in the method -no qualifications required. All QC blanks exhibited no contamination.

# Surrogate Recoveries Summary

All criteria met with.

### Laboratory Control Spike

All criteria met.

Vieques CTO-083 AOC I SDG# K2359 Page 1 of 2

. . .

# **DataQual**

# Matrix Spike/Matrix Spike Duplicate Summary

An MS/MSD was submitted for sample VWAI-MW02-1111-ALL CRITERIA WERE MET.

# Field Duplicate Sample Summary

A field duplicate was not submitted for this data package.

Sample ID:

VWAI-MW05-1111

Duplicate Sample ID:

VWAI-MW05P-1111

Compound	Sample Conc.	Duplicate Conc.	RPD
GRO	0	0	#DIV/0!

Comments:

No qualifications required.

# Specific Comments:

Raw data was verified.

Validator Signature:

Date: \_

Vieques CTO-083 AOC I SDG# K2359

Page 2 of 2

GRO DataQual

**Initial Calibration Date:** 

5/17/2011

RF and %RSD Calculations:

Compound Name:

GRO

Lab Value:

4.692 E4

Area of Compound	93849135
Conc of Compd	2000
Calculated RRF	46924.57

Compound Name:

GRO

Lab Value:

18.17

RRF of STD 1	4.670
RRF of STD 2	4.787
RRF of STD 3	4.694
RRF of STD 4	4.692
RRF of STD 5	6.791
Calculated % RSD	18.17

Continuing Calibration File ID: RF and %D Calculations:

11/22/2011

Compound Name:

GRO

Lab Value CF:

43.665 E3

Lab Value %D:

14.8

Area of compound	21832321
Concentration	500
Calculated CF	43664.6

Average CF	51.268
Calibration Check CF	43.665
Calculated % D	14.83

### REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client: CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC I

Laboratory Workorder / SDG #: K2359

SW846 8015D GRO, Gasoline Range Organic (GRO) by GC-FID

### I. SAMPLE RECEIPT

Several communications with the client regarding samples to analyze and/or cancel are included in the Sample Transmittal section of this report.

### 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.

# V. INSTRUMENTATION

The following instrumentation was used:

Instrument Code: V4

Instrument Type: GC-FID/PID

Description: HP5890 A

Manufacturer: Hewlett-Packard

Model: 5890

### VI. ANALYSIS

# A. Calibration:

Calibrations met the method/SOP acceptance criteria.

Gasoline Range Organics are calibrated using the average response factor from a GRO component spike. This GRO component spike includes compounds from MTBE through Naphthalene. Samples are integrated from the retention times of MTBE through Naphthalene range inclusive. The laboratory control sample spikes are performed using a gasoline product spike.

### B. Blanks:

All method blanks were within the acceptance criteria.

### C. Surrogates:

Surrogate standard percent recoveries were within the QC limits.

# D. Spikes:

### Laboratory Control Spikes (LCS):

Percent recoveries for lab control samples were within the QC limits.

# Matrix Spike / Matrix Spike Duplicate (MS/MSD):

Matrix spikes were performed on samples: VWAI-MW02-1111 (K2359-20AMS) and VWAI-MW02-1111 (K2359-20AMSD).

Percent recoveries and replicate RPDs were within the QC limits.

### E. Dilutions:

No sample in this SDG required analysis at dilution.

### 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, 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:	(durth tohn	
Date:	_12/12/11	

### **DataQual**

### Worksheets - DRO BY 8015D\_

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: 11/8-10/11

Received Date: 11/9/11; 1/11/11

or A

Preparation Date: 11/15/11 Analysis Dates: 11/29/11 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 \_\_\_l\_\_\_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 \_\_\_l\_\_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:

NA

U - The blank contamination concentration is  $\leq$  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.

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

VIEQUES, CTO-83 AOC I SOILS SDG \_\_SK2359 \_ Page 1 of 2

### **DataQual**

### Worksheets - DRO BY 8015D\_

### 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: **NONE** 

### Field Duplicate Sample Summary

Sample ID: VWAI-MW05-1111

Duplicate Sample ID:

VWAI-MW05P-1111

Compound	Sample Conc.	Duplicate Conc.	RPD
ETPH	1.9	1.9	0%
ORO	0.54	0.71	27%

Comments: Flag ORO as estimated in both samples (>20% 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 water samples. Raw data and quantitation calculations were verified.

Reviewer JA Cleveland

Date: 1-14-12

VIEQUES, CTO-83 AOC I SOILS SDG \_\_SK2359 \_ Page 2 of 2

DRO by SW-846 8015M

### DataQual

Initial Calibration Date:

11/22/11 on F1.I

RRF and %RSD Calculations:

Compound Name:

dro C10 TO C28 in Level 2

Lab Value:

0.9190

Area of Compound	54809086
Conc. of Compound	200
Area of Internal Standard	11929317
Conc. of Internal Standard	40
Calculated RF	0.9189

Compound Name:

DRO (C10-C28)

Lab Value:

3.83

RF of STD 1	0.8560
RF of STD 2	0.9190
RF of STD 3	0.9280
RF of STD 4	0.9650
RF of STD 5	0.9180
RF of STD 6	0.9430
RF of STD 7	
Calculated % RSD	3.97

\*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, 11/29/11, 2024

RRF and %D Calculations:

FILE ID 111129A.B\F1H7460.D

Compound Name: Lab Value:

ORO - C29 TO C40 0.922

Area of Compound	430286026
Conc. of Compound	1400
Area of Internal Standard	13327694
Conc. of Internal Standard	40
Calculated RF	0.9224

Compound Name:

ORO

Lab Value:

1.2

Average RF	0.9330
Calibration Check RF	0.9220
Calculated % D	1.2

**DataQual** DRO

### **SAMPLE CALCULATION**

Sample ID:VWAI-MW05-1111Standard ID:ICAL, 11/29/11, F1

Compound:DROConcentration:1.9 mg/L

	Water (mg/L)	Soil (mg/Kg)
Area of Compound	562472983	
RF of Compound	0.928	
Area of Internal Standard	12678236	
Conc. Of Internal Standard	40	
Final Volume	1	
Dilution Factor	1	
GPC Factor	NA	
Injection Volume	1	
Weight of Sample	NA	
Initial Volume of Sample	1000	NA
% Solids Factor	NA	
Concentration	1.91	#DIV/0!

### REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client: CH2M-Hill, Inc.

Project: CTO-0083 Viegues AOC I

Laboratory Workorder / SDG #: K2359

SW846 8015D TPH, Total Petroleum Hydrocarbons (TPH) by GC-FID

### I. SAMPLE RECEIPT

Several communications with the client regarding samples to analyze and/or cancel are included in the Sample Transmittal section of this report.

### 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.

### V. INSTRUMENTATION

The following instrumentation was used:

Instrument Code: F1

Instrument Type: GC-FID

Description: HP6890

Manufacturer: Hewlett-Packard

Model: 6890

### VI. ANALYSIS

### A. Calibration:

Calibrations met the method/SOP acceptance criteria.

Calibrations met the Method/SOP acceptance criteria. Diesel Range Organics (DRO) are quantified using the average response factor from C9 - C28 hydrocarbon standards. Oil range organics (ORO) are quantified using the average response factor from C29 - C40 hydrocarbon standards. Continuing calibration verifications are evaluated by comparison of the average response for the individual C9 through C28 peaks (for DRO, or C29 - C 40 for ORO) to the average from the initial calibration. Samples are integrated from the retention time of C9 through C28 (for DRO or C29 - C40 for ORO) inclusive. The laboratory control sample spikes are performed using a diesel fuel product spike.

Please note that the analyte DRO (C9 - C28 range hydrocarbons) are reported as "Extractable Total Petroleum Hydrocarbons" on the data sheets, while ORO (C29 - C40) are reported as "Oil Range Organics" on the data sheets. These results are as described above, with "Extractable Total Petroleum Hydrocarbons" including only the C9 - C28 range organics.

### 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. Please note that laboratory QC spikes appear in the DRO range only, not in the ORO range.

### Matrix Spike / Matrix Spike Duplicate (MS/MSD):

Matrix spikes were performed on samples: VWAI-MW02-1111 (K2359-20EMS) and VWAI-MW02-1111 (K2359-20EMSD).

Percent recoveries were within the QC limits.

Replicate RPDs were within the advisory QC limits.

### E. Dilutions:

No sample in this SDG required analysis at dilution.

### 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, 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.

<b>(</b> Signed:	lud forh	
Date:	12/0/11	

SOP:	HW-2 Revision 13	Appendix A.1	Sept. 2006
			YES NO N/A
A.I.I	Contract Compliance Screening	Report	
	Present?		
	ACTION: If no contact	DSCC/DO	
	ACTION: If no, contact	K3CC/PO.	
A.I.2	Record of Communication (from	RSCC)	
	Present?		
	ACTION: If no, request	from the RSCC.	
A.1.3	Sampling Trip Report		
	Present and complete?		[]
	ACTION: If no, contact I	RSCC/PO.	
A.I.4	Chain of Custody/Sample Traffic	Report	
	Present?		
	Legible?		
	Signature of sample custod present?	ań	
	ACTION: If no, contact RSC	CC/WAM/PO.	
A.I.5	Cover Page		
	Present?		
	Is the Cover Page properly and the verbatim signed by	the lab	
	manager or the manager's o	designee?	
	Do the sample identification		
	on the Cover Page agree will light the last on the Cover Page agree will be something the last on the cover Page agree will be something the last on the Cover Page agree will be something to the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the last of the las	ur sample	<i>H</i>
	(a) Traffic Report Sheet?	COC forms agree	

SOP:	HW-2	Revision 13	Appendix A.1	Sept. 2006
	(b) Fo	rm l's?		YES NO N/A
		Is the number of samples on the Page the same as the number of samples on the Traffic Report sh and the Regional Record of Com (ROC) for the data Case?	f eet	
		ACTION: If no for any of the above, prepar Telephone Record Log and conta for re-submittal of the corrected of from the laboratory.	act RSCC/PO	
A.1.6	SDG I	Narrative, DC-1 & DC-2 Form	CLP Forems	not provided
		Is the SDG Narrative present?	LOG In Info 15	
		Is Sample Log-In Sheet(Form DC present and complete?	21)	
		Is Complete SDG Inventory Shee present and complete?	et(Form DC-2)	
		ACTION:  If no, write in the Contract-Problet  Non-Compliance Section of the  Narrative.	ms/ e Data Review	
A.1.7	Form	to XV		
A.1.7.1		Are all the Form I through Form X labeled with:	V	
		Laboratory Name?		<u></u>
		Laboratory Code?		
		RAS/Non-RAS Case No.?		
	;	SDG No.?		

### REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client: CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC I

Laboratory Workorder / SDG #: K2359 SW846 6010C

### I. SAMPLE RECEIPT

Several communications with the client regarding samples to analyze and/or cancel are included in the Sample Transmittal section of this report.

### 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 for Iron and Manganese only following procedures in laboratory test code: SW846 6010C

### IV. PREPARATION

Aqueous Samples were prepared following procedures in laboratory test code: SW3005A

### V. INSTRUMENTATION

The following instrumentation was used to perform

Instrument Code: OPTIMA3

Instrument Type: ICP

Description: Optima ICP-OES Manufacturer: Perkin-Elmer

Model: 4300 DV

### VI. ANALYSIS

### A. Calibration:

Calibrations met the method/SOP acceptance criteria.

### B. Blanks:

All method blanks were within the acceptance criteria.

### C. Laboratory Control Spikes (LCS):

Percent recoveries for laboratory control samples were within the QC limits.

### D. Samples:

No 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, 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.

USEPA Region 2

SOP:	HW-2	Revision 13	Appendix A.1	Sept. 2006	
		Contract No.?	_	YES NO N/A	
A.1.7.	2	ACTION:  If no for any of the above, Contract Problem/Non-Co of the "Data Review Narra PO for corrected Form(s) After comparing values or against the raw data, do a transcription errors exceed reported values on the Fo	ompliance Section ative" and contact from the laboratory. The Forms I-IX The iny computation/ The iny of the		
	(a) al	ll analytes analyzed by ICP	-AES?	_ 15	
	(b) al	I analytes analyzed by ICP	-MS?	_ 🗀 🗸	
	(c) M	ercury?		_ U	
	(d) C	yanide?	_ [] _/		
	and c	ON:  b, prepare Telephone Recocontact CLP PO/TOPO for from the laboratory.			
A.1.8	hard	Data shall not be validated wit lelectronic copies of the a data for samples and QC	associated		
A.1.8.	1	Digestion/Distillation Log			
	-	stion Log for ICP-AES XII)present?			
	~	stion Log for ICP-MS XII) present?			
		stion Log for mercury n XII) present?			
		ation Log for cyanide n XII) present?			
	Are p	H values for metals and			156

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SOP:	HW-2	Revision 13	Appendix A.1	Sept. 2006
				YES NO N/A
		reported for each s sample?		
		cent solids calculations for soils/sediments?		
		paration dates present on the preparation logs/bench sheets	?	<u></u>
	NOTE: Digestion/land dilutio	Distillation log must include weights, voluns used to obtain the reported results.	mes,	
A.1.8.	2 Is real-time	the analytical instrument e printouts present for:		
	ICP-AE	S?		
	ICP-MS	?		
	Mercury	?		
	Cyanide	?		
i	and inst	aboratory bench sheets rument raw data printouts rry to support all sample and QC operations:		
I	Legible?			
f	Properly I	abeled?		LJ
,		ld samples, QC samples QC samples present on:		
[	Digestion	/Distillation log?		
I	nstrumer	nt Printouts?		<u> </u>

### 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.

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SOP:	HW-2	Revisio	on 13	Appendix A.1	Sept. 2006
					YES NO N/A
(8	Examine s determine	sample Traffic R	eports and digest	ueous and soil samples) ion/distillation logs to e collection date to the sample	,
A.1.9.	1	Cyanide dis	tillation(14 da	ys)exceeded?	_ 🗀
		Mercury and	alysis(28 days	s) exceeded?	_ [_]
		Other Metal	s analysis(18	0 days)exceeded?	
	and fla	, reject (R) a ag as estima	nd red-line no ated (J)results eserved prop	s≥MDL even	
,	a list of which ex be prepared the num (Subtract from the	ion to qualifying all samples and xceeded the holared. Report for aber of days that at the sample coes sample preparas list to the data	analytes ding times must each sample were exceeded. llection date ation date).		
A.1.9.2	2	Is pH of aqu	eous sample	s for:	
	Metals	s Analysis	<u>≤</u> 2?		
	Cyanio	de Analysis	≥ 12?		
		or any of the a	above, flag and detects as	"J".	
A.1.9.3	Is the c	cooler tempe	erature ≤ 10 (	C°?	
		er temperatur	e is >10°C , fla and detects a	0	

A.1.10 Final Data Correctness - Form I

A.1.10.1 Are Form I's for all samples

### SAMPLE CALCULATION

EPA SAMPLE ID:

VWAI-MW03-1111

COMPOUND:

Manganese 1350 ug/L

**CONCENTRATION:** %Solids –

NA

Raw Data result: 1.3545 mg/L

1.3545 mg/L (1000 ug/1mg) = 1354.5 ug/L

### FIELD DUPLICATE SAMPLE SUMMARY

Note: All reported results are noted in the table below because the client requested that the MDL be used as reporting limit instead of the RL for this project. RPDs or absolute differences were calculated based on Region II guidelines: if results are >5X RL RPD is calculated, if results are <5X RL the absolute difference is calculated. Flags are applied to field duplicate pair only as follows: For RPD values - RPD  $\ge$  35% but <120% results are J, RPD >120%, results are R. For absolute difference values - >+/-2X RL results are J, >+/-4X RL results are R.

Sample ID:

none

Duplicate Sample ID:

Analyte Sample Co		Duplicate Conc.	RPD or absolute difference
			0.000
			#DIV/0!

Comments:

No qualifications required.

Sample ID:

none

Duplicate Sample 1D:

Analyte	Sample Conc.	Duplicate Conc.	RPD or absolute difference	
			0.000	
			0.000	

Comments:

No qualifications required.

Cleveland

Reviewer

Date: 1/14/12

USEPA Region 2

SOP:	HW-2	Revision 13	Appendix A.1	Sept. 2006
				YES NO N/A
	prese	nt and complete?		
	Log ar	<u>DN</u> : prepare Telephone Record nd contact CLP PO/TOPO ttal from the laboratory.		
A.1.10		Verify there are no calcula reported on Form I's. Circ	•	
		Is the calculation error les	s than 10% of the correc	t result?
		Are results on Form I's rep MG/KG for soils)?	ported in correct units (ug	g/L for aqueous and
	,	Are results on Form I'S re	ported by correct signif	icant figures? []
		Are soil sample results on corrected for percent solid		[]
		Are all "less than MDL" va by the CRQLs and coded v	•	[ <u> </u>
	b	Are values less than the Cout greater than or equal to IDLs flagged with "J"?	[7]) ( b.	arm 1s
		Are appropriate contractua ontrol and Method qualifie		sed B flag reviewer changed to
	ŗ	ACTION: f no for any of the above or prepare Telephone Record CLP PO/TOPO for correct	Log, and contact	
A.1.10	a s	Do EPA sample identification and the corresponding laboration numbers and the Cover Page, Form In the raw data?	oratory ers match	
	V	Vas a brief physical descri	ption	

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			YES NO	N/A
	of the samples before and digestion given on the Form		[]	
,	Was any sample result out mercury/cyanide calibration or the ICP-AES/ICP-MS lindiluted and noted on the February	n range near range	[]	not CIP project
	ACTION: If no for any of the above, the Contract-Problem/Non-Section of the Data Review	-Compliance		
A.1.11 <u>Initia</u>	al Calibration			
A.1.11.1	Is a record of at least 2 poi (A blank and a standard)ca present for ICP-AES analy	alibration		
	Is a record of at least 2 poi (a blank and a standard)calibra present for ICP-MS analys	ation	[]	
	Is a record of at least 5 poi (a blank & 4 standards)present		[]	
	Is a record of at least 4 poi (a blank & 4 standards)present		[] _	
	ACTION:  If incomplete or no initial cawas performed, reject (R) at the associated data (detection).	and red-line		
	Is one initial calibration stated the CRQL level for cyanimercury?		[] _	
	ACTION: If no, write in the Contract I Non-Compliance Section o Review Narrative.			
A.1.11.2	Is the curve correlation coefficient ≥ 0.995 for:	-		- A

SOP: HW-2	Revision 13 A	opendix A.1	Sep	pt. 2006	
	Mercury Analysis?		YES	<u>NO</u> N/	A
	Cyanide Analysis?		[]		/
	ICP-AES(more than 2 point (	Calib.)?	[]		
	ICP-MS (more than 2 point of	calib.)?	f 1		
	ACTION:  If no, qualify the associate results ≥ MDL as estimated non-detects as "UJ".  NOTE:  The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (cabsorbance, peak area, peak height,	"J" and ne e.g.	LJ		
A.1.12	Initial and Continuing Calibr	ation Verification-	Form II	<u>A</u>	
A.1.12.1	Present and complete for exmetal and cyanide?	rery			
	Present and complete for IC and ICP-MS when both these were used for the same anal	methods	[]		
	ACTION:  If no for any of the above, Telephone Record Log and co for re-submittal from the 1	ntact PO/TOPO			
A.1.12.2	Was a Continuing Calibratic Verification performed ever 10 samples or every 2 hours whichever is more frequent?	Y	V	<u> </u>	
	ACTION: If no for any of the above, in the Contract-Problem/Non Section of the Data Review	-Compliance			
A.1.12.3	Was an ICV or a mid-range s distilled and analyzed with of cyanide samples?		[]		

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SOP: HW-2	Revision 13	Appendix A.1	S	Sept. 20	006
			YES	NO	N/A
	Section of the Data	ne above, write oblem/Non-Compliance a Review Narrative and MDL as estimated (J).			
A.1.12.2	Circle on each Form IIA a that are outside the contr				
	Are ICV/CCVs within con	trol limits for:			
	Metals - 90-110%F	3?	[]		
	Hg - 80-120%R?		[]		
	Cyanide - 85-115%F	₹?	[]		
		between a previous technically a ent technically acceptable CCV	•		
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 qualify all samples reported from				
A.1.12.3	Was the distilled ICV or r standard for cyanide with limits (85-115%)?	•	[]		
	ACTION: If no, Qualify all cyanide is	results <u>&gt;</u> MDL as "J".			

### A.1.13 CRQL Standard Analysis - Form IIB

A.1.13.1 For each ICP-AES run, was a CRI

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(	(CRQI	L or MDL when MDL > CRQL) ard analyzed? (Note:CRI is not required for Ca, Fe, Mg, Na and K.)  For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) stanalyzed for each mass/isotope to for the analysis?  For each mercury run, was a CRC standard analyzed?  For each cyanide run, was a CRC standard analyzed?	andard used QL	not	YES [] regured run for [] []	for wa	
V 10	i The aff CP-AE CP-MS Mercur Cyanid	ACTION:  If no for any of the above, write this deficiency in the Contract Pro Non-Compliance Section of the D Narrative, inform CLP PO and flagin the affected ranges (detects <2 and non-detects UJ.  fected ranges are:  ES Analysis - *True Value ± CRQL of Analysis - *True Value ± CRQL of Analysis - *True Value ± CRQL of Analysis - *True Value ± CRQL of Analysis - *True Value ± CRQL of Analysis - *True Value ± CRQL of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL standard of the CRQL	eata Review g results exCRQL)as	J	all Mi were . non-det in mw UJ.	> 2X ect 1	POL o
A.1.13.2	   c   t   <u> </u> <u> </u>	Was a CRQL standard analyzed a CV/ICB, before the final CCV/CC once every 20 analytical samples the analytical run for each analysi ACTION:  If no, write in the Contract Problem Non-Compliance Section of the Data Review Narrative".	B and in s?		[]		
A.1.13.3		Circle on each Form IIB all percen	it				

recoveries that are outside the

acceptance windows.

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SOP: HW-2	Revision 13	Appendix A.1	Sept.	2006
	Is the CRQL standard within con limits for:	ntrol	YES NO	N/A
	Metals(ICP-AES/ICP-MS)- 70 -	130%?	[] _	
	Mercury- 70 - 130%?		[]	
	Cyanide - 70 - 130%?		[] _	
	ACTION:  If no, flag detects <2xCRQL as non-detects as "UJ" if the CRQL recovery is between 50-69%. Fl detects <2xCRQL if the recover 131% and ≤180%. If the recover 150%, reject(R) and red-line not detects < 2xCRQL, and flag (J) 2xCRQL and ICV/CCV. Reject a detects <2xCRQL and flag (J)de but < ICV/CCV if the recovery is	standard ag(J) only y is between ry is less than n-detects and detects between and red-line only etects ≥ 2xCRQL	Lab did CRI S	not run. tds.
	NOTE:  1.Qualify all field samples and a previous technically accepts the CRQL standard and a subset analysis of the CRQL standard  2.Flag (J) or reject (R) only the sample results on Form I's when raw data are within the affect and the CRQL standard is outs: acceptance windows.  3.The samples and the CRQL standard in the same analytical contents.	able analysis of quent acceptable he final en Sample ted ranges ide the		
A.1.14 <u>Initia</u>	al and Continuing Calibration B	<u>lanks - Form III</u>		
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 Bla analyzed after every CCV and e 10 samples or every 2 hours, wh is more frequent?	very		
	Were the ICB & CCB values ≥ No reported on Form III and flagged			165

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	using MDLs from direct Method "NP1")? (Check Form III again		YES NO N/A
	ACTION: If no, inform CLP PO/TO in the Contract-Problem Section of the "Data Re"	s/Non-Compliance	no + results repor
A.1.14.2	Circle with red pencil on all Calib. Blank values the		
	<u>&gt;</u> !	MDL but ≤ CRQL	
	> (	CRQL	
A.1.14.2.1	When MDL < CRQL, is value ≥ MDL but ≤ CRQ		
	ACTION:  If yes, change sample rebut ≤ CRQL to the CRQ  Do not qualify non-detection.	L with a "U".	•
	nen MDL < CRQL, is any ue > CRQL?	Calib. Blank	[_]
	ACTION:  If yes, reject (R) and red associated sample resul but <icb blank="" ccb="" detects="" red=""> ICB/CCB blank &lt; 10xICB/CCB value. Chresults ≥ MDL but ≤ the with a "U".</icb>	ts > CRQL sult. Flag as "J" k value but nange the sample	
	any Calibration Blank valu	le	
	ACTION: If yes, flag (J) as estimat associated sample result <10xCRQL.		
	NOTE:		

 $_{\rm what} \sim 166$ 

1. For ICB that does not meet the technical

QC Criteria, apply the action to all samples

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2. For app prev a su	orted from the analytical run. CCBs that do not meet the technical QC crit by the action to all samples analyzed between bious technically acceptable analysis of CCB bisequent technically acceptable analysis of in the analytical run.	n a and	<u>YES</u> N	O <u>N/A</u>
A.1.15	Preparation Blank - FORM NOTE: The Preparation Blank for is the same as the calibration	mercury		
A.1.15.1	with and analyzed for:		/.	
	Each Sample Delivery Gro Each batch of the SDG sa digested/distilled?			
	Each matrix type?		[]	
	All instruments used for and cyanide analyses?	r metals		
	ACTION:  If no for any of the aboas estimated (J) all the positive data <10xMDL for Preparation Blank was not	e associated or which the		
	NOTE:  If only one blank was analyzed for than 20 samples, then the first analyzed are not estimated (J), but additional samples must be quality.	20 samples t all	~	
	Circle with red pencil on all Prep. Blank values th			
	≥ MDL but ≤ CRQ	L, and		
	> CRQL			
A.1.15.2.1	When MDL < CRQL, is any value $\geq$ MDL but $\leq$ CRQL?	preparation blank		<u></u>
	ACTION:			

If yes, change sample result > MDL

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	but ≤ CRQL to CRQL with		<u>YES</u>	NO	<u>N/A</u>	
A.1.15.2.2	When the MDL < CRQL, is Blank value greater than			[]	_1 _	
	If yes, is the Prep. Bla greater than the value of Field Blank collected and the SDG samples?	f the associated		[_	]	/
	If yes, is the lowest co that analyte in the asso less than 10 times the P Blank value?	ciated samples		[_	]	
	ACTION:  If yes, reject (R) and r sample results greater t than the Prep.Blank valudetects > Prep. Blank valudetects > Prep. Blank valudetects > Mit with CRQL-U.	han the CRQL but less e. Flag as "J" lue but <10xPrep.Blank	۲,			
	If the Prep. Blank value analyte value in the Fie qualify the sample resul Prep. Blank criteria.	ld Blank, do not	2			
	NOTE: Convert soil sample result to mg wet weight basis to compare with Prep. Blank result on Form III.					
A.1.15.2.3	Is the Prep. Blank conce below the negative CRQL?	ntration -			_	
	ACTION: If yes, flag (J) all asso sample results less than Qualify non-detects as es	10xCRQL.				
A.1.15.2.4	When the MDL is greater CRQL, is the preparation concentration on Form III than two times the MDL?	blank		[ <u>/</u>	<u> </u>	<del>.</del>

ACTION:

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SOP: HW-2	Revision 13	Appendix A.1	S	ept. 20	06
	If yes, reject (R) positive sample res raw data less than Preparation Blank v	ults with sample 10 times the	YES	<u>NO</u> [	N/A
A.1.16		rference Check Sample (IC	S)- Fo	rm IV	
A.1.16.1	Present and complet	e?	[	_	
	Was ICS analyzed at and end of each ana once for every 20 a	lytical run, and	[]	_	
	Was ICS analyzed at the ICP-MS analytic		[]		~
	ACTION: If no, flag as esti sample results.	mated (J) all			
A.1.16.2	ICP-AES Method				
A.1.16.2.1		e ICSA "Found" analyte ontrol limits <u>+</u> of CRQL hed mean value?	[]	_	_
	_	n of Al, Ca, Fe, nits (ug/L or MG/KG) al to its respective	[]		1
	technically accepta ICS and a subsequen	ollowing action to d between a previous ble analysis of the t technically acceptable in the analytical run:			
	Flag (J) as estimated	d only sample results <a>MDL</a>			4.0.0

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YES NO N/A

for which the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".

#### A.1.16.2.3 ICSAB Solution

For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?

If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?

#### ACTION:

If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

#### A.1.16.3 ICP-MS Method

#### A.1.16.3.1 ICSA Solution:

For ICP-MS, are the ICSA "Found" analyte values within the control limits of <u>+</u>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".

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SOP: HW-2	Revision 13	Appendix A.1	Sep	t. 2006
			YES	NO N/A
A.1.16.3.3	ICSAB Solution For ICP-MS, are all in ICSAB within the 80-120% of the true/ value, whichever is	control limits of established mean	[]	
		lowing action to all om the analytical run:		
	analyte recovery is ≤ 150%. If the ICSAB 50-79% flag (J) as e sample results ≥ MDL those all sample det which the ICSAB anal	for which the ICSAB greater than 120% but recovery falls within stimated the associated. Reject (R) and red-lects and non-detects fyte recovery is less to is above 150%, reject	ed ine for han	
A.1.17		r <b>y:</b> Pre-Di <b>q</b> estion/Pre- Ca,Mg,K,and Na(both matr		
A.1.17.1	Was Matrix Spike ana	lysis performed:		
	For each matrix type	?	[]	
	For each SDG?		[]	
	On one of the SDG sa	mples?	[]	
	For each concentrati (i.e., low, med., hig		[]	
	For each analytical (ICP-AES,ICP-MS, Hg,		[]	
	Was a spiked sample analyzed with the SD		[]	
	ACTION: If no for any of the estimated(J)all the for which a spiked s analyzed.	positive data	Lab ded. MSIMSD (	not perform
	NOTE:  If more than one spiked sanalyzed for one SDG, the associated data based on sample analysis.	en qualify the		Tall to results for both Fermi

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			YES	NO V	<u> </u>
A.1.17.2	Was a field blank or PE sam for the spiked sample analy	_	<del></del>		_
	ACTION:  If yes, flag (J) as estimat data of the associated SDG which field blank or PE sam for the spiked sample analy	samples for ple was used			
A.1.17.3	Circle on each Form VA all recoveries that are outside control limits (75-125%) th sample concentrations less times the added spike concentrations	the at have than four			
	Are all recoveries within to control limits when sample concentrations are less that equal to four times the spir concentrations?  NOTE:  Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike additional spike addi	n or ke e	[]		
	Are results outside the con(75-125%) flagged with Lab Quon Form I's and Form VA?		[]	•	
	ACTION:  If no for any of the above, the Contract - Problems/Non- Section of the Data Review 1	-Compliance			
À.1.17.4	Aqueous				
	Are any spike recoveries:				1/
	(a) less than 30%?			[]	+
	(b) between 30-74%?			[]	_
	(c) between 126-150%?			[]	+
	(d) greater than 150%?			[]	1
	ACTION:  If the matrix spike recovery 30%, reject (R) and red-line aqueous data (detects & non-between 30-74%, qualify all aqueous data > MDL as "J" ar	all associated detects). If associated			•

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			YES	NO N	<u>/A</u>
		126-150%, flag (J) J". If greater than 150%, Line all associated data			
	(NOTE:Replace "N" with	n "J", "R" as appropriate.)			
A.1.17.5	Soil/Sediment				
	Are any spike recove	eries:			/
	(a) less than 10%?			[]	<del></del>
	(b) between 10-74%?			[]	+
	(c) between 126-2009	?		[]	_
	(d) greater than 200	)%?		[]	12
	ACTION: If yes for any of thas follows:	ne above, proceed			V
	if between 10-74%, que data > MDL as "J" ar if between 126-200%, data > MDL as "J" If (R) and red-line all		ct		
A.1.18	Lab Duplicates) - F	orm VI			
A.1.18.1	Was the lab duplicat	e analysis performed:			
	For each SDG?		[]		
	On one of the SDG sa	mples?	[]	6	
	For each matrix type	?	[]	_	
	For each concentration (low or med.)?	on range	[]	_	_
	For each analytical (ICP-AES/ICP-MS,Hg,C		[]	1	
	Was a lab duplicate analyzed with the SD		[]	1	
		ch	ant didi	it 10	grest.

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			YES N	O N/A
	ACTION:  If no for any of the estimated all the SD (detects & non-detect analysis were all the statements).	OG sample results		
	NOTE:  If more than one lab dup were analyzed for an SDG the associated samples be worst lab duplicate analyzed.	, then qualify ased on the	•	
A.1.18.2	Was a Field Blank or for the Lab Duplicat			
	ACTION: If yes, flag as esti SDG sample results ( for which Field Bla used for duplicate a	hits & non-detects) nk or PE sample was		
A.1.18.3	Circle on each Form that are:	VI all values		
	RPD > 20%, or			
	Absolute Difference	> CRQL		
	Are all values withi limits (RPD $\leq$ 20% or difference $\leq$ $\pm$ CRQL)?	absolute	[] _	
	If no, are all resul control limits flagg (Lab Qualifier) on Fo all Form I's?	ed with an "*"	[]	
	ACTION: If no, write in the Non-Compliance Section Review Narrative.			
	NOTE: The laboratory is not requested report on Form VI the RPD both values are non-detection.	when		

A.1.18.4 Aqueous

A.1.18.4.1 When sample and duplicate values are both

 $\geq$  5xCRQL (substitute MDL for CRQL when MDL > CRQL),

# Standard Operating Procedure USEPA Region 2

SOP: HW-2	Revision 13	Appendix A.1	9	Sept. 20	06	
	in and DDD 20% but	100%2	YES	NO	N/A	
	is any RPD > 20% but	< 100%?		ſJ		
	is any RPD ≥ 100%?			[]		
	ACTION:  If the RPD is > 20% if flag (J) as estimated sample data > CRQL. So the sample data is associated sample data (NOTE:Replace "*" with "A	d the associated If the RPD is nd red-line the				
A.1.18.4.2		OL for CRQL when MDL >CRQL), erence between sample				
	> ± CRQL?			[]	V	
	> ± 2xCRQL?			[]	<u></u>	
	<ol><li>If one value is &gt;CRQL calculate the absolute</li></ol>	l the associated but < 5xCRQL as "J" UJ". If the absolute QL, reject (R) and ociated non-detects	CRQL			
A.1.18.5	Soil/Sediment					
A.1.18.5.1	When sample and dupli are both > 5xCRQL (suf CRQL when MDL > CRQL),					
	is any RPD ≥ 35% but	< 120%?		[]		
	is any RPD ≥ 120%?			[]		
	ACTION:  If the RPD is > 35% a  (J) as estimated the					175

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Evaluation of Metals Data for the Contract Laboratory Program
Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13	Appendix A.l		Sept. 2	2006	
		· · · · · · · · · · · · · · · · · · ·	YES	NO	<u>N/A</u>	
		the RPD is $\geq$ 120%, reject the associated sample				
A.1.18.5.2	<5xCRQL(substitut	and/or duplicate value ce MDL for CRQL when MDL > CRQL), difference between sample				
	> <u>+</u> 2 x CRQL?		<del></del>	[]	~	٠
	> <u>+</u> 4 x CRQL			[]		
	ACTION: If the absolute	difference is > 2 x CRQL,				

#### ....

1. Replace "\*" with "J", "UJ" or "R" as appropriate.)

and detects  $\geq$  MDL but <5xCRQL.

flag all the associated sample results  $\geq$  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

2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

### A.1.19 Field Duplicates

### Aqueous Field Duplicates

A.1.19.1 Was an aqueous Field Duplicate pair collected and analyzed?
(Check Sampling Trip Report)

#### ACTION:

If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

### Standard Operating Procedure USEPA Region 2

SOP: HW-2	Revision 13	Appendix A.1	S	ept. 20	06	
	QC criteria stated in Sect	ions A.1.19.2 and A.1.	<u>YEŞ</u> 19.3.	NO 1	A/N	
	NOTE:  1. Do not transfer **" from Form 2. Do not calculate RPD when bot 3. Substitute MDL for CRQL when M 4. If one value is > CRQL and the non-detect, calculate the abso between the value > CRQL and t this the criteria to qualify t	h values are non-detects. DL > CRQL. other value is lute difference he MDL, and use				
A.1.19.2	Circle all values on the For Field Duplicates that I					
	RPD <u>&gt;</u> 20% or					
	Difference > ± CRQL					
	When sample and duplicate both >5xCRQL (substitute MDL mdl > CRQL),					·
	is any RPD ≥ 20%?			[]	1	
	is any RPD ≥ 100%?			[]		
	ACTION:  If the RPD is >20% but < 10 the associated sample and results > CRQL. If the RPD and red-line only the associated Duplicate result > CR	its Field Duplicate is > 100%, reject(R) ciated sample and its				
A.1.19.3	When the sample and/or dupl <5xCRQL (substitute MDL for or is the absolute difference and duplicate:	CRQL when MDL >CRQL),				
	> ± CRQL?			[]		
	> <u>+</u> 2 x CRQL?	·		[]	_	
	ACTION:  If the absolute difference flag detects ≥ MDL but < 5% and non-detects as "UJ". If is > 2xCRQL, reject (R) and	CRQL as "J" the difference				177

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Evaluation of Metals Data for the Contract Laboratory Program
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SOP: HW-2	Revision 13	Appendix A.1	Se	pt. 20	06
	and results > MDL but <5xCR0 and its Field Duplicate.		YES	<u>NO</u>	N/A
	Soil/Sediment Field Dupli	cates			
A.1.19.4	Was a soil field duplicate processed to collected and analyzed? (Check Sampling Trip Report)	pair	[]		
	ACTION: If yes, for each soil Field pair proceed as follows:	Duplicate			
	Prepare Appendix A.4 for each pair. Report on Appendix A.4 Field Duplicate results in Prespective Form I's. Calculate sample and its duplicate valuation by than 5xCRQL. Calculate and absolute difference when at (sample or duplicate) is < 5% Field Duplicate analysis in QC Criteria stated in Section	4 all sample and its MG/KG from their ate and report RPD when lues are both greater report the least one value xCRQL. Evaluate the accordance with the			
	NOTE:  1. Do not transfer "*" from Form 1 2. Do not calculate RPD when both 3. Substitute MDL for CRQL when MDL 4. If one value is >CRQL and the of value is non-detect, calculate tabsolute difference between the value > CRQL and the MDL, and ag the criteria to qualify the resu	values are non-detects.  C > CRQL.  ther  the			
1.19.5	Circle on each Appendix A.4 values that have:	all			
	RPD $\geq$ 35%, or Difference > $\pm$ When sample and duplicate value are both $\geq$ 5xCRQL (substitute CRQL when MDL > CRQL),	alues			
	is any RPD > 35% but < 120%?	· _		[]	
	is any RPD ≥ 120%?			[]	

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ACTION:

If the RPD is  $\geq$  35% but < 120%,

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SOP: HW-2	Revi <u>sion</u> 13	Appendix A.1	Se	pt. 2006
		cate results	YES	NO N/A
A.1.19.6	<5xCRQL (substitute N	or duplicate value(s)  MDL for CRQL when MDL > CRQL),  ference between sample  :		
	> <u>+</u> 2 x CRQL?			[_] <u></u>
	> <u>+</u> 4 x CRQL?			[_]
	Sample and its Field but <5xCRQL as "J" a If the difference is red-line non-detects	ference is > 2xCRQL, flag d Duplicate resuts \( \geq \) MDL and non-detects as "UJ". s >4xCRQL, reject(R) and s and detects \( \geq \) MDL but le and its Field Duplicate.		
A.1.20	Laboratory Control S	Sample (LCS) - Form VII		
A.1.20.1	Was one LCS prepared	d and analyzed for:		
t	Each SDG?		[]	
	Each matrix type?		[]	
	Each batch samples of For each Method(ICP-used?		<u></u>	<del>.</del> —
	Was an LCS prepared the samples?  ACTION: If no for any of the Telephone Record Log CLP PO or TOPO for state the data for which a analyzed.	e above, prepare g and contact submittal of the J) as estimated all	[]	
	NOTE: If only one LCS was anal	yzed for		179

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Evaluation of Metals Data for the Contract Laboratory Program
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Appendix A.1 Sept. 2006 SOP: HW-2 Revision 13 YES NO more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J). Aqueous LCS A.1.20.2 Circle on each Form VII the LCS percent recoveries outside control limits 80-120%. NOTE: 1.Use digested ICV as LCS for aqueous mercury 2.Use distilled ICV as LCS for aqueous cyanide

Is any LCS recovery:

Less than 50%?

Between 50% and 79%?

Between 121% and 150%?

Greater than 150%?

### ACTION:

If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

### A.1.20.3 Solid LCS

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII?

ACTION:

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SOP: HW-2	Revision 13	Appendix A.	1 :	Sept. 20	06
	If yes, flag (J) al detects > MDL as es		<u>YES</u>	<u>NO</u>	N/A
	Is the LCS "Found" than the Lower Cont reported on Form VI	rol Limit		[]	
	ACTION: If yes, flag detect non-dectes as "UJ".	s as "J" and			
A.1.21 A.1.21.1	ICP-AES/ICP-MS Ser NOTE: Serial dilution and when the initial concen- greater than 50 x MDL. Was a Serial Diluti	ration is equal to or		ment	is >50 X
	performed:	-	LOQ - no	+ 1000	this high
	For each SDG?		[]	7	
	On one of the SDG s	amples?	[]	-{-	
	For each matrix typ	e?	[]		<del></del>
	For each concentrat (low or med.)?	ion range	[]		
	Was a Serial Diluti analyzed with the S	_	[]	1	
	ACTION: If no for any of th as estimated (J) de all the SDG samples ICP Serial Dilution not performed.	tects > MDL of for which the	No mat	led. :	C was Tall + SD was
A.1.21.2	Was a Field Blank o for the Serial Dilu		not sent	rened [V]	
	ACTION:  If yes, flag as est  ≥ MDL of all the SD				

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A.1.21.3 Circle on Form VIII the Percent Differences

(%D) between sample results and its dilution

results that are outside the control limits ± 10%

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Evaluation of Metals Data for the Contract Laboratory Program
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SOP: HW-2	Revision 13	Appendix A.1	Se	ept. 2006
	when initial concentration	ons > 50 x MDLs.	YES	NO N/A
	Are results outside the limits flagged with an " on Form VIII and all For	E"(Lab Qualifier)	[]	
	ACTION: If no, write in the Cont Non-Compliance Section o Review Narrative.			
A.1.21.4	Are any %D values:			
	> 10%?			[]
	≥ 100%?			
	ACTION:  If the Percent Difference greater than 10%, flag (all associated samples with the %D is > 100%, reall associated samples with the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of the %D is of	J) as estimated hose raw data > MDL; ject (R) and red-line		
	(NOTE:Replace "E" with "J"	or "R" as appropriate.)		
A.1.22	Total/Dissolved or Inorg	anic/Total Analytes		
A.1.22.1	Were any analyses perfordissolved as well as toton the same sample(s)? Were any analyses perfording as well as toton the same sample(s)?	al analytes med for	_	
	ACTION:  If yes, prepare a Form () to compare the difference dissolved (or inorganic) analyte concentrations. difference on Appendix A of the total analyte only the following conditions	es between and total Compute each .5 as a percent y when both of		
	<ul><li>(1) The dissolved(or inoris greater than total co</li><li>(2) greater than or equal</li></ul>	oncentration, and		
A.1.22.2	Is any dissolved (or inor concentration greater that total concentration by mo	an its		182

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Evaluation of Metals Data for the Contract Laboratory Program
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SOP: HW-2	Revision 13	Appendix A.1	Sept. 2006
			YES NO N/A
A.1.22.3	Is any dissolved (or concentration greate total concentration	r than its	
	and total concentrat	oth dissolved/inorganic ions as estimated. If re than 50%, reject (R)	
A.1.23	Field Blank - Form I NOTE: Designate "Field	d Blank" as such on Form I	
A.1.23.1	Was a Field/Rinsate and analyzed with the		
	If yes, is any Field absolute value of an greater than its CRQ		
	If yes, circle the F on Form I that is greCRQL, (or 2 x MDL when MI	eater than the	
	Is any Field Blank value than CRQL also greate Preparation Blank value.	er than the	[_]
	If yes, is the Field (> CRQL and > the proalready rejected due criteria?	ep. blank value)	[_]
	reject all associated the Field Blank result CRQL but less than the Reject on Form I's the whose raw values in a printout are greater than the Field Blank "J" detects between the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of the statement of t	ug/L in the instrument than the CRQL but less value in ug/L. Flag as the Field Blank value and . If the sample result $\geq$	
		alue is less than the	183

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Evaluation of Metals Data for the Contract Laboratory Program
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SOP: HW-2	Revision 13	Appendix A.1	Sept	. 2006
	Prep.Blank value, do m	not qualify the sample	YES NO	O N/A
	results due to the Fie			
	NOTE: 1. Field Blank result prevdue to other criteria contact qualify field samples.			
	<ol><li>Do not use Rinsate Bland soils to qualify water</li></ol>			
A.1.24	Verification of Instru	mental Parameters - Form	IX, XA, XB,	XI
A.1.24.1	Is verification report	t present for:		
	Method Detection Limit	cs (Form IX-Annually)?	<u></u>	
	ICP-AES Interelement (Form XA & XB -Quarter		<u></u>	
	<pre>ICP-AES &amp; ICP-MS Linea (Form XI-Quarterly)?</pre>	ar Ranges	<u> </u>	
	ACTION: If no, contact CLP PO/ submittal from the lab			
A.1.24.2 <u>1</u>	Method Detection Limits	- Form IX		
A.1.24.2.1	Are MDLs present on Fo	orm IX for:		
	All the analytes?		<u>.</u> .	
	All the instruments us	ed?	[	
	Digested and undigeste samples and Calib.Blan		[]	
	ICP-AES and ICP-MS whe instruments are used f same analyte?			
	ACTION: If no for any of the a Telephone Record Log a PO/TOPO for submittal the laboratory. Report write in the Contract	nd contact CLP of the MDLs from to CLP PO and		

Non-Compliance Section of the Data Review Narrative if the MDL concentration is not

less than % CRQL.

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SOP: HW-2	Revision 13	Appendix A.1	Se	ept. 2006
A.1.24.2.2	Is MDL greater than the CRC for any analyte?		YES —	NO N/A
	If yes, is the analyte conce on Form I greater than 5 x the sample analyzed on the whose MDL exceeds CRQL?	MDL for	[]	
	ACTION:  If no, flag as estimated (Journal values less than five times the analyte whose MDL exceeds	MDL for		
A.1.24.3	Linear Ranges - Form XI			
A.1.24.3.1	Was any sample result higher the high linear range for I or ICP-MS?		<del></del>	
	Was any sample result higher the highest calibration state for mercury or cyanide?			
	If yes for any of the above the sample diluted to obtai result reported on Form I?		[]	
	ACTION: If no, flag (J) as estimate affected detects ( $\geq$ MDL) re on Form I.			
A.1.25	ICP-MS Tune Analysis - For	m XIV		
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?		[]	
	ACTION:  If no, reject (R) and red-l sample data for which tunin performed.			
A.1.25.2	Was the tuning solution and or scanned at least five ti consecutively?		[]	
	Were all the required isoto spanning the analytical ran present in the tuning solut	ge	[]	185
	Was the mass resolution wit	hin		1.0 d

USEPA Region 2
Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13	Appendix A.1		Sept. 2006	
301 . 114 2			YES	NO N/A	
0.1 amu fo	er each isotope in the tuning solution?	e	[]		
	Was %RSD less than isotope of each ana tuning solution?		[]		
	ACTION:  If no for any of th all results ≥ MDL a Tune as estimated " associated with tha	ssociated with that J", and all non-detects			
A.1.26	ICP-MS Internal Sta	ndards - Form XV			
A.1.26.1	Were the Internal S to all the samples samples and calibra (except the Tuning	and all QC tion standards	[]		
	Were all the target masses bracketed by of the five interna	the masses	[ <u>·</u> ]		
	(detects & non-detestandards were used the analyte masses,	s, reject (R) and sociated sample data cts). If internal but did not cover all reject (R) and red-line sults not bracketed by			
A.1.26.2	Was the intensity of Standard in each sat of the intensity of Standard in the cal	mple within 60-125% the same Internal	[]		
	If no, was the original state of two fold, Internal stample re-analyzed?	inal sample diluted Standard added and the	[]		
		two fold diluted sample ce limits (60-125%)?	[]		
	as "J" and non-detec	e above, flag detects cts "UJ" of all the c masses between the		136	
	atomic mass of the	internal standard lighter			

# Standard Operating Procedure USEPA Region 2

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Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: 1	₩-2	Revision 13	Appendix A.2	Sep	t. 2006
than	the .	atomic mas	ernal standard, and the s of the internal standard ffected internal standard.	heavier	
A.1.2	7	Percent So	lids of Sediments		
A.1.2	7.1	Are percen	t solids in sediment(s):		
		< 50%?			[]
		non-detect	alify as estimated (J) all s of a sample that has pero 50%(i.e.,moisture content gre	cent solids	
		that were not	the sample results previously flagged QC criteria.		
<u>Inor</u>	-	ic Data Re	site:	Matrix: Soil	L
SDG#			Lab:	Wate	r
Sampl	ing '	Team:	Reviewer:	Other	<del></del>
A.2.1	Th		Flags: flags may have been applie by the data user.	ed in red by the data	a validator and must
	J -		This flag indicates the re	sult qualified as es	timated
	R an	d Red-Line -	A red-line drawn through a The red-lined data are known documented information and	own to contain signi	ficant errors based on
	υ -		This data validation quality MDL when associated blan		sample results
	Full:	y Usable Data	- The results that do usable.	not carry "J" or "re	d-line" are fully

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A.2.2 <u>Laboratory Qualifiers</u>:

The CLP laboratory applies a contractual qualifier on all



# **Environmental Services, LLC**

CH2M HILL 15010 Conference Center Drive Suite 200 Chantilly, Virginia 20151

July 27, 2012 SDG# L1093, 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 # L1093. 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 metals in this SDG (SW-846 method 6010C). The Region II Standard Operating Procedure for the Evaluation of Metals Data for the CLP was used as applicable for the metals data. 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	SVOA	Fe, Mn
VWAI-MW05-0512	L1093-01	water	X	X	X
VWAI-TB01-052212	L1093-02	water	X	10 14 BOXES	
VWAI-EB01-052312	L1093-03	water	X	X	
VWAI-TB01-052312	L1093-04	water	X		
VWAI-MW04-0512	L1093-05	water	Х	X	X
VWAI-MW07-0512	L1093-06	water	X	X	X
VWAI-MW07P-0512	L1093-07	water	X	X	
VWAI-MW05-0512 MS	L1093-01MS	water	X	X	
VWAI-MW05-0512 MSD	L1093-01MSD	water	X	X	

The following quality control samples were provided with this SDG: samples VWAI-TB01-052212 and VWAI-TB01-052312-trip blanks; sample VWAI-EB01-052312-equipment blank; and sample VWAI-MW07P-0512-field duplicate of sample VWAI-MW07-0512.

The samples were evaluated based on the following criteria:

•	Data Completeness	*
•	Sample Condition	*
•	Technical Holding Times	*
•	GC/MS Tuning	*
•	GC Performance	*

- Initial/Continuing Calibrations
  ICSA/ICSAB Standards
  RL Standards
  Blanks
  Internal Standards
  Surrogate Recoveries
  Laboratory Control Samples
  Matrix Spike Recoveries
  Matrix Duplicate RPDs
  Serial Dilutions
  Field Duplicates
  Identification/Quantitation
  Reporting Limits
  Tentatively Identified Compounds
- \* 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**

No qualifications to the data were required.

# **SVOA**

The associated matrix spike and matrix spike duplicate exhibited non-compliant recoveries that required qualifications to the data.

#### Select Filtered Metals

The laboratory did not perform a matrix spike, matrix duplicate or a serial dilution in this SDG. These QC samples are required by Region II. Qualifications were required.

# Specific Evaluation of Data

#### **Data Completeness**

The SDG was received complete and intact. Resubmissions were not required.

#### **Technical Holding Times**

According to chain of custody records, sampling was performed on 5/22-23/12 and samples were received at the laboratory 5/23-24/12. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

#### Matrix Spike/Matrix Duplicates

#### **SVOA**

The matrix spike and matrix spike duplicate associated with sample VWAI-MW05-0512 exhibited low recoveries for bis(2-ethylehexyl) phthalate at 37% and 30% (QC limit 40-125%). Therefore the non-detected result in the associated sample was qualified as estimated UJ, qualifier code: MSL.

#### Select Filtered Metals

The laboratory did not perform a matrix spike/matrix duplicate on a sample from this SDG. Region II required that all positive and non-detect results be qualified as estimated J because of this. Therefore, the reported positive and non-detect results for iron and manganese were qualified as estimated J/UJ with a qualifier code of OT.

#### **Serial Dilution**

#### Select Filtered Metals

The laboratory did not perform a serial dilution sample on a sample from this SDG. Region II required that all positive results be qualified as estimated J because of this. Therefore, the reported positive results for iron and manganese were qualified as estimated J with a qualifier code of OT.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Jacqueline Cleveland

Vice President

# **Summary of Data Qualifications**

# $\underline{VOA}$

Sample ID	Compound	Results	Q flag	Q Code
No qualifications				

# **SVOA**

Sample ID	Compound	Results	Q flag	Q Code
VWAI-MW05-0512	bis(2-ethylehexyl) phthalate	-	UJ	MSL

# Select Filtered Metals

Sample ID	Analyte	Results	Q flag	Q Code
all samples	iron, manganese	+/-	J/UJ	OT

# 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 LOQ (2X sample LOQ for common laboratory contaminants) when the blank value is less than the LOQ. The sample result for the blank contaminant is not qualified with any blank qualifiers.

LOQ

The sample result for the blank contaminant is less than the LOQ (2X sample LOQ for common laboratory contaminants) but greater

(2X sample LOQ for common laboratory contaminants) but greater than the MDL when the blank value is less than the LOQ. The sample result for the blank contaminant is changed to the LOQ and

qualified as non-detect U.

#### **Inorganic Methods**

#### ICB/CCB/PB Action:

No Action - The sample result is greater than the LOQ 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 LOQ, result is reported as non-detect at the LOQ, when the ICB/CCB/PB result is less or greater than the LOQ.

# Glossary of Qualification Flags and Abbreviations, continued

- R Sample result is greater than the LOQ and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the LOQ.
- 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 LOQ.
- J/UJ Sample result is less than 10X LOQ when blank result is below the negative LOQ.

#### 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 LOQ 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 LOQ, result is reported as non-detect at the LOQ, when the FB result is less or greater than the LOQ.
- R Sample result is greater than the LOQ and less than the FB value when the FB value is greater than the LOQ.
- J Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the LOQ.

### **General Abbreviations**

RL	reporting limit
MDL	method detection limit
IDL	instrument detection limit
LOD	Level of Detection
LOQ	Level of Quantitation
+	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
ССН	Continuing Calibration - High Recovery or %Difference
LD	Lab Duplicate Reproducibility
нт	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
ОТ	Other - explained in data validation report
%SOL	High moisture content

EPA SAMPLE NO.

VWAI-MW05-0512

Lab Name: SPECTRUM ANALYTICAL, INC.		Contract:				3	
Lab Code: MITKEM Case No.: L1093	3	Mod. Ref N	lo.:	***************************************	SDG No.:	SL1093	}
Matrix: (SOIL/SED/WATER) WATER		Lab Sample	e ID:	L1093-01	A		
Sample wt/vol: 5.00 (g/mL) ML		Lab File ID:		V6I7263.			
Level: (TRACE/LOW/MED) LOW		Date Recei	.ved:	05/23/20:	12		
% Moisture: not dec.		Date Analy	zed:	05/24/20	12		
GC Column: DB-624 ID: 0.25	(mm)	Dilution F	`actor:	1.0			
Soil Extract Volume:	(uL)	Soil Aliqu	ot Vol	ume:			(uL)
Purge Volume: 5.0	(mL)						
CAS NO. COMPOUND	CONC	CENTRATION:	Q	DL	LOD	LOQ	7
107-06-2 1,2-Dichloroethane		0.50	U	0.41	0.50	5.0	$\dashv$
71-43-2 Benzene		0.50	U	0.33	0.50	5.0	
70-07-5 1 2-Dighlerenrense		1 0	11	0 (1	1 0	ΕΛ	_



EPA SAMPLE NO.

VWAI-TB01-052212

Lab Name: S	SPECTRUM ANALY	rical, in	ic.		Contract:		-			
Lab Code: N	MITKEM C	ase No.:	L1093		Mod. Ref 1	No.:		SDG No.:	SL1093	
Matrix: (SO	IL/SED/WATER)	WATER	4 (0.00)		Lab Sample	e ID:	L1093-02	Α		
Sample wt/vo	ol: 5.00	(g/mL)	ML		Lab File 1	D:	V6I7264.	D		
Level: (TRA	CE/LOW/MED) L	WC			Date Recei	ved:	05/23/20	12		
% Moisture:	not dec.				Date Analy	zed:	05/24/20	12		
GC Column:	DB-624	ID:	0.25	(mm)	Dilution H	actor:	1.0	200		
Soil Extrac	t Volume:			(uL)	Soil Aliqu	ot Vol	ume:	7.		(uL)
Purge Volume	e: 5.0			(mL)						
CAS NO.	COMPOUND			CONC	ENTRATION:		DL	LOD	LOQ	
					UG/L	Q	=	03/	722	
	1,2-Dichloroe	thane			0.50	U	0.41	0.50	5.0	
71-43-2	Benzene				0.50	U	0.33	0.50	5.0	ľ
78-87-5	1,2-Dichlorop	ropane			1.0	U	0.61	1.0	5.0	



EPA SAMPLE NO.

VWAI-EB01-052312

Lab Name: SPECTRUM ANALYTICAL, INC.		Contract:		<u></u>	W 22		
Lab Code: MITKEM Case No.: L109	93	Mod. Ref 1	No.:		SDG No.:	SL1093	}
Matrix: (SOIL/SED/WATER) WATER		Lab Sample	e ID:	L1093-03	A		
Sample wt/vol: 5.00 (g/mL) ML		Lab File I	ID:	V617300.	D	_	
Level: (TRACE/LOW/MED) LOW		Date Recei	ived:	05/24/20	12	_	
% Moisture: not dec.		Date Analy	zed:	05/25/20	12		
GC Column: DB-624 ID: 0.25	5 (mm)	Dilution I	Factor:	1.0	24.5		
Soil Extract Volume:	(uL)	Soil Aliqu	ot Vol	ume:			(uL
Purge Volume: 5.0	(mL)	Ø.					
CAS NO. COMPOUND	CONC	ENTRATION:	Q	DL	LOD	LOQ	
107-06-2 1,2-Dichloroethane		UG/L 0.50	U	0.41	0.50	5.0	_
71-43-2 Benzene		0.50	U	0.33	0.50	5.0	

1.0

0.61

1.0

5.0



78-87-5 1,2-Dichloropropane

EPA SAMPLE NO.

VWAI-TB01-052312

Lab Name: SPECTRUM ANALYTICAL, INC.				Contract:		10 <u></u>					
Lab Code: M	MITKEM Cas	se No.:	L1093		Mod. Ref N	No.:		SDG No.:	SL1093	3	
Matrix: (SO	IL/SED/WATER)	WATER			Lab Sample	e ID:	L1093-04	Α			
Sample wt/vo	5.00	(g/mL)	ML		Lab File 1	D:	V6I7297.	D			
Level: (TRACE/LOW/MED) LOW					Date Recei	ate Received:		05/24/2012			
% Moisture:	not dec.				Date Analy	yzed:	05/25/20	12			
GC Column:	DB-624	ID:	0.25	(mm)	Dilution E	Factor:	1.0				
Soil Extract	t Volume:			(uL)	Soil Aliqu	ot Vol	ume:			(uL)	
Purge Volume	e: <u>5.0</u>	91 1		(mL)							
	****************			CONC	ENTRATION:		1000				
CAS NO.	COMPOUND				UG/L	Q	DL	LOD	LOQ		
107-06-2	1,2-Dichloroeth	ane			0.50	U	0.41	0.50	5.0		
71-43-2	Benzene				0.50	U	0.33	0.50	5.0		
78-87-5	1,2-Dichloropro	pane			1.0	U	0.61	1.0	5.0		



EPA SAMPLE NO.

VWAI-MW04-0512

Lab Name: SPECTRUM ANALYTICAL, INC.		Contract:					
Lab Code: MITKEM Case No.: L1093		Mod. Ref N	No.:		SDG No.:	SL1093	3
Matrix: (SOIL/SED/WATER) WATER		Lab Sample	e ID:	L1093-05	A	West at	
Sample wt/vol: 5.00 (g/mL) ML		Lab File 1	D:	V6I7301.D			
Level: (TRACE/LOW/MED) LOW		Date Recei	ived:	05/24/20	12		
% Moisture: not dec.		Date Analy	zed:	05/25/20	12		
GC Column: DB-624 ID: 0.25	(mm)	Dilution F	actor:	1.0			
Soil Extract Volume:	(uL)	Soil Aliqu	ot Vol	ume:			(uL)
Purge Volume: 5.0	(mL)						
CAS NO. COMPOUND	CONC	ENTRATION:	Q	DL	LOD	LOQ	
107-06-2 1,2-Dichloroethane	+-	0.50	U	0.41	0.50	5.0	-
71-43-2 Benzene	-	2.6	J	0.33	0.50	5.0	_
78-87-5 1,2-Dichloropropane		1.0	U	0.61	1.0	5.0	_



EPA SAMPLE NO.

VWAI-MW07-0512

Lab Name: SPECTRUM ANALYTICAL, INC.	Contract:				
Lab Code: MITKEM Case No.: L1093	Mod. Ref No.:	SDG No.: SL1093			
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: L1093-06A	A			
Sample wt/vol: 5.00 (g/mL) ML	Lab File ID:	D			
Level: (TRACE/LOW/MED) LOW	Date Received: 05/24/201	05/24/2012			
% Moisture: not dec.	Date Analyzed: 05/25/201	12			
GC Column: DB-624 ID: 0.25	nm) Dilution Factor: 1.0				
Soil Extract Volume:	uL) Soil Aliquot Volume:	(uL)			
Purge Volume: 5.0	nL)				
	ONCENTRATION:				
CAS NO. COMPOUND	UG/L Q DL	LOD LOQ			
107-06-2 1,2-Dichloroethane	0.50 U 0.41	0.50 5.0			
71-43-2 Benzene	2.9 J 0.33	0.50 5.0			
78-87-5 1,2-Dichloropropane	1.0 0 0.61	1.0 5.0			



EPA SAMPLE NO.

VWAI-MW07P-0512

Lab Name: SPECTRUM ANALYTICAL, INC.		Contract:						
Lab Code: MITKEM Case No.: L1093	3	Mod. Ref N	lo.:		SDG No.:	SL1093		
Matrix: (SOIL/SED/WATER) WATER		Lab Sample	e ID:	L1093-07	A			
Sample wt/vol:5.00 (g/mL) ML		Lab File I	D:	D: V617303.D				
Level: (TRACE/LOW/MED) LOW		Date Received: 05/24/2012						
% Moisture: not dec.		Date Analyzed: 05/25/2012						
GC Column: DB-624 ID: 0.25	(mm)	Dilution F	actor	: 1.0				
Soil Extract Volume:	(uL)	Soil Aliqu	ot Vol	lume:		(uL)		
Purge Volume: 5.0	(mL)							
CAS NO. COMPOUND	CONC	CENTRATION:	Q	DL	LOD	LOQ		
107-06-2 1,2-Dichloroethane		0.50	U	0.41	0.50	5.0		
71-43-2 Benzene		2.8	J	0.33	0.50	5.0		
78-87-5 1,2-Dichloropropane		1.0	U	0.61	1.0	5.0		

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EPA SAMPLE NO.

VWAI-MW05-0512MS

Lab Name: SPECTRUM ANALYTICAL, INC.			Contract:		9			
Lab Code: MITKEM Case No.	: L1093		Mod. Ref No	0.:		SDG No.:	SL1093	3
Matrix: (SOIL/SED/WATER) WATER	×		Lab Sample	ID:	L1093-01	AMS		
Sample wt/vol: 5.00 (g/mL) ML			Lab File I	ab File ID: V6I7272.D				
Level: (TRACE/LOW/MED) LOW			Date Received: 05/23/2012					
% Moisture: not dec.			Date Analyzed:		05/24/2012			
GC Column: DB-624 ID	: 0.25	(mm)	Dilution Fa	actor:	1.0			
Soil Extract Volume:		(uL)	Soil Alique	ot Vol	ume:			(uL)
Purge Volume: 5.0		(mL)						
CAS NO. COMPOUND		CONC	ENTRATION:	0	Dī	LOD	1.00	
CAS NO. COMPOUND			UG/L	Q	DL	LOD	LOQ	
107-06-2 1,2-Dichloroethane			54		0.41	0.50	5.0	
71-43-2 Benzene			52		0.33	0.50	5.0	
78-87-5 1,2-Dichloropropane			51		0.61	1.0	5.0	

MMDIZ

EPA SAMPLE NO.

VWAI-MW05-0512MS D

Lab Name:	SPECTRUM ANALYT	CICAL, IN	IC.		Contract:		·			
Lab Code: N	MITKEM Ca	ase No.:	L1093		Mod. Ref N	0.:		SDG No.:	SL1093	3
Matrix: (SO	IL/SED/WATER)	WATER			Lab Sample	ID:	L1093-01	AMSD		,
Sample wt/v	01: 5.00	(g/mL)	ML		Lab File I	D:	V6I7273.			
Level: (TRA	CE/LOW/MED) LO	)W			Date Recei	ved:	05/23/20	12		
% Moisture:	not dec.				Date Analy	zed:	05/24/20	12	- 12	
GC Column:	DB-624	ID:	0.25	(mm)	Dilution Fa	actor:	1.0			
Soil Extrac	t Volume:		~	(uL)	Soil Alique	ot Vol	ume:	5.1 - 26°		(uL)
Purge Volume	e: <u>5.0</u>		*	(mL)						
			1	CONC	ENTRATION:	Village	10000	ozz isvreta	O Principal	
CAS NO.	COMPOUND				UG/L	Q	DL	LOD	LOQ	
107-06-2	1,2-Dichloroet	hane			55		0.41	0.50	5.0	
71-43-2	Benzene			18:	54		0.33	0.50	5.0	
78-87-5	1,2-Dichloropr	opane			54		0.61	1.0	5.0	



EPA SAMPLE NO.

VWAI-MW05-0512

Lab Name: SPECTRUM ANALYTICAL, INC.	Contract:					
Lab Code: MITKEM Case No.: L1093	Mod. Ref No.:	SDG No.	: SL1093			
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID:	L1093-01B				
Sample wt/vol:1000 (g/mL) ML	Lab File ID:	S6A9050.D				
Level: (LOW/MED) LOW	Extraction: (Typ	e) SEPF				
% Moisture: Decanted: (Y/N)	Date Received:	05/23/2012				
Concentrated Extract Volume: 1000 (u	L) Date Extracted:	racted: 05/23/2012				
Injection Volume:1.0 (uL) GPC Factor:1.	00 Date Analyzed:	06/04/2012				
GPC Cleanup: (Y/N) N pH:	Dilution Factor:	1.0				
CAS NO. COMPOUND	ONCENTRATION: UG/L Q	DL LOD	LOQ			
91-20-3 Naphthalene	1.3 J	0.96 2.0	2.0			
91-57-6 2-Methylnaphthalene	11	0.94 2.0	2.0			
117-81-7 Bis(2-ethylhexyl)phthalate	2.0	1.3 2.0	5.0 UJ, MS			

W 12312

EPA SAMPLE NO.

VWAI-EB01-052312

Lab Name: SPECTRUM ANALYTICAL, INC.		Contract:				
Lab Code: MITKEM Case No.: L10	93	Mod. Ref	No.:		SDG No.	: SL1093
Matrix: (SOIL/SED/WATER) WATER		Lab Sampl	e ID:	L1093-031	3	X
Sample wt/vol:1000 (g/mL) ML		Lab File	ID:	S6A9046.	ס	
Level: (LOW/MED) LOW		Extractio	n: (Typ	e) SEPF		380
% Moisture: Decanted: (Y/N)		Date Rece	ived:	05/24/203	12	
Concentrated Extract Volume: 10	000 (uL)	Date Extr	acted:	05/25/203	12	
Injection Volume:1.0 (uL) GPC Factor	: 1.00	Date Anal	yzed:	06/04/203	12	
GPC Cleanup:(Y/N) N pH:		Dilution	Factor:	1.0	ă.	
CAS NO. COMPOUND	CONC	ENTRATION: 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
117-81-7 Bis(2-ethylhexyl)phthalate		2.0	U	1.3	2.0	5.0



EPA SAMPLE NO.

VWAI-MW04-0512

Lab Name: SPECTRUM ANALYTICAL, INC.		Contract:		<u> </u>	170AT	
Lab Code: MITKEM Case No.: L1	1093	Mod. Ref	No.:		SDG No.:	SL1093
Matrix: (SOIL/SED/WATER) WATER		Lab Sampl	e ID:	L1093-05	В	
Sample wt/vol: 1000 (g/mL) MI		Lab File	ID:	S6A9047.	D	
Level: (LOW/MED) LOW		Extractio	n: (Typ	e) SEPF		
% Moisture: Decanted: (Y/N	1)	Date Rece	ived:	05/24/20	12	
Concentrated Extract Volume:	1000 (uL)	Date Extr	acted:	05/25/20	12	Si.
Injection Volume:1.0 (uL) GPC Factor	or: 1.00	Date Anal	yzed:	06/04/20	12	,
GPC Cleanup: (Y/N) N pH:		Dilution	Factor:	1.0		
CAS NO. COMPOUND	CONC	ENTRATION: UG/L	Q	DL	LOD	roð
91-20-3 Naphthalene		2.2		0.96	2.0	2.0
91-57-6 2-Methylnaphthalene		2.0	U	0.94	2.0	2.0
117-81-7 Bis(2-ethylhexyl)phthalat	te	2.0	U	1.3	2.0	5.0

Wan

EPA SAMPLE NO.

VWAI-MW07-0512

Lab Name: SPECTRUM ANALYTICA	L, INC.	Contract:				
Lab Code: MITKEM Case	No.: L1093	Mod. Ref No.	.:	111	SDG No.:	SL1093
Matrix: (SOIL/SED/WATER) WAY	TER	Lab Sample 1	ID:	L1093-06	3	
Sample wt/vol: 1000 (g.	/mL) ML	Lab File ID:		S6A9048.	D	-
Level: (LOW/MED) LOW		Extraction:	(Type	SEPF		
% Moisture: Decant	ed: (Y/N)	Date Receive	ed:	05/24/20	12	
Concentrated Extract Volume:	1000 (uL)	Date Extract	ted:	05/25/20:	12	
Injection Volume:(uL) (	SPC Factor: 1.00	Date Analyze	ed:	06/04/20	12	
GPC Cleanup: (Y/N) N	рН:	Dilution Fac	ctor:	1.0		
CAS NO. COMPOUND	CONC	ENTRATION:	Q	DL	LOD	LOO
91-20-3 Naphthalene		3.3		0.96	2.0	2.0
91-57-6 2-Methylnaphthale	ne	3.4	- 1	0.94	2.0	2.0
117-81-7 Bis(2-ethylhexyl)	phthalate	2.0 U		1.3	2.0	5.0

Whi

EPA SAMPLE NO.

VWAI-MW07P-0512

Lab Name: SPECTRUM ANALYTICAL, I	NC.	Contract:				
Lab Code: MITKEM Case No.:	L1093	Mod. Ref N	10.:		SDG No.:	: SL1093
Matrix: (SOIL/SED/WATER) WATER		Lab Sample	ID:	L1093-07E	3	
Sample wt/vol:1000 (g/mL)	ML	Lab File I	D:	S6A9049.	)	
Level: (LOW/MED) LOW		Extraction	: (Typ	e) SEPF		
% Moisture: Decanted:	(Y/N)	Date Recei	ved:	05/24/201	2	
Concentrated Extract Volume:	1000 (uL)	Date Extra	cted:	05/25/201	.2	
Injection Volume:1.0 (uL) GPC	Factor: 1.00	Date Analy	zed:	06/04/201	.2	
GPC Cleanup: (Y/N) N pH:		Dilution F	actor:	1.0		
CAS NO. COMPOUND	CONC	ENTRATION: UG/L	Q	DL	LOD	LOQ
91-20-3 Naphthalene		3.2		0.96	2.0	2.0
91-57-6 2-Methylnaphthalene		3.3		0.94	2.0	2.0
117-81-7 Bis(2-ethylhexyl)phth	alate	2.0	U	1.3	2.0	5.0

Whi

EPA SAMPLE NO.

VWAI-MW05-0512MS

Lab Name: S	SPECTRUM ANALY	rical, in	ic.	Contract:		0		
Lab Code: M	IITKEM C	ase No.:	L1093	Mod. Ref N	o.:	3	SDG No.	: SL1093
Matrix: (SO)	IL/SED/WATER)	WATER	·	Lab Sample	ID:	L1093-01	BMS	
Sample wt/vo	1000	(g/mL)	ML	Lab File I	D:	S6A9051.	)	
Level: (LOW/	MED) LOW			Extraction	: (Typ	e) SEPF		
% Moisture:	Dec	canted: (	Y/N)	Date Recei	ved:	05/23/20:	12	
Concentrated	d Extract Volu	me:	1000 (	uL) Date Extra	cted:	05/23/20	12	
Injection Vo	olume:(u	ıL) GPC Fa	actor: 1	.00 Date Analy	zed:	06/04/203	12	
GPC Cleanup:	(Y/N) <u>N</u>	pH:		Dilution Fa	actor:	1.0		
CAS NO.	COMPOUND		C	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
91-20-3	Naphthalene			36		0.96	2.0	2.0
91-57-6	2-Methylnaphtl	nalene		46		0.94	2.0	2.0
117-81-7	Bis(2-ethy1he:	xyl)phtha	late	18		1.3	2.0	5.0



EPA SAMPLE NO.

VWAI-MW05-0512MS

Lab Name: S	SPECTRUM ANALY	TICAL, IN	NC.	Contract:					
Lab Code: M	IITKEM C	ase No.:	L1093	Mod. Ref N	lo.:	-	SDG No.	: SL1093	
Matrix: (SO	IL/SED/WATER)	WATER		Lab Sample	ID:	L1093-01	BMSD	33,000	
Sample wt/vo	ol:1000	(g/mL)	ML	Lab File I	D:	S6A9052.	D		
Level: (LOW,	/MED) LOW		Ç+'	Extraction	: (Typ	oe) SEPF			
% Moisture:	Dec	canted:	(Y/N)	Date Recei	ved:	05/23/20	12		
Concentrated	d Extract Volum	me:	1000 (1	L) Date Extra	cted:	05/23/20	12		
Injection Vo	olume:(1.0 (t	aL) GPC F	actor: 1.	00 Date Analy	zed:	06/04/20	12		
GPC Cleanup:	:(Y/N) N	pH:		Dilution F	actor:	1.0			
CAS NO.	COMPOUND		CC	ONCENTRATION: UG/L	Q	DL	LOD	LOQ	
91-20-3	Naphthalene			38		0.96	2.0	2.0	1
91-57-6	2-Methylnapht	halene		49		0.94	2.0	2.0	1
117-81-7	Bis(2-ethylhe:	xyl)phtha	alate	15		1.3	2.0	5.0	1

Whiz

#### U.S. EPA - CLP

EPA SAMPLE NO.

	INORGANIC	ANALYSIS DATA SHEET		VWAI-MW04-0512
Lab Name:	Spectrum Analytical, Inc.	Contract: 933	62, N62	
Lab Code:	MITKEM Case No.:	SAS No.:		SDG No.: SL1093
Matrix (so	il/water): WATER	Lab Sample ID:	L1093-0	5
Level (low,	/med): MED	Date Received:	05/24/2	012
% Solids:	0.0			

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	М	MDL	LOD	PQL
7439-89-6	Iron	50	10	TO TU	P	31.0	50.0	200
7439-96-5	Manganese	712	J	OT	P	10.0	15.0	50.0

80 JUS


U.S. EPA - CLP

EPA SAMPLE NO.

	INORGANIC	C ANALYSIS DATA SHEET		VWAI-MW05-0512
Lab Name:	Spectrum Analytical, Inc.	Contract: 9335	62, N62	
Lab Code:	MITKEM Case No.:	SAS No.:		SDG No.: SL1093
Matrix (so	il/water): WATER	Lab Sample ID:	L1093-0	1
Level (low	/med): MED	Date Received:	05/23/20	012
% Solids:	0.0			

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS No.	Analyte	Concentration	С	Q	М	MDL	LOD	PQL
7439-89-6	Iron	107	B	JOT	P	31.0	50.0	200
7439-96-5	Manganese	1230		JOT	Р	10.0	15.0	50.0

Ac 1/3

-		

U.S. EPA - CLP

EPA SAMPLE NO.

		INORGANIC	ANALYSIS DATA	SHEET		VWAI-MW07-0512
Lab Name:	Spectrum Analytical,	Inc.	Contract:	933562,	N62	
						2

Lab Code: MITKEM Case No.: SAS No.: SDG No.: SL1093

Matrix (soil/water): WATER Lab Sample ID: L1093-06

Level (low/med): MED Date Received: 05/24/2012

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS No.	Analyte	Concentration	С	Q	М	MDL	LOD	PQL
7439-89-6	Iron	50	V	WJ OT	P	31.0	50.0	200
7439-96-5	Marganese	15	Ų	UJ OT	P	10.0	15.0	50.0

\$ V3/12

#### REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client: CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC I

Laboratory Workorder / SDG #: L1093

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

#### V. INSTRUMENTATION

The following instrumentation was used

Instrument Code: V6

Instrument Type: GCMS-VOA Description: HP6890 / HP5973 Manufacturer: Hewlett-Packard

Model: 6890 / 5973

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: VWAI-MW05-0512 (L1093-01AMS) and VWAI-MW05-0512 (L1093-01AMSD).

Percent recoveries were within the QC limits.

Replicate RPDs were within the advisory QC limits.

#### E. Internal Standards:

Internal standard peak areas were within the QC limits.

#### F. Dilutions:

No sample in this SDG required analysis at dilution.

# 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, 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.

	The	7	
Signed:		×-	
Date:	6/14/2012		

## REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client: CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC I

Laboratory Workorder / SDG #: L1093

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

#### 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.

VWAI-MW05-0512 (L1093-01B), recovery is below criteria for Terphenyl-d14 at 22% with criteria of (50-135).

VWAI-MW05-0512 (L1093-01BMS), recovery is below criteria for Terphenyl-d14 at 18% with criteria of (50-135).

VWAI-MW05-0512 (L1093-01BMSD), recovery is below criteria for Terphenyl-d14 at 17% with criteria of (50-135).

VWAI-EB01-052312 (L1093-03B), recovery is below criteria for Terphenyl-d14 at 46% with criteria of (50-135).

VWAI-MW04-0512 (L1093-05B), recovery is below criteria for Terphenyl-d14 at 30% with criteria of (50-135).

VWAI-MW07-0512 (L1093-06B), recovery is below criteria for Terphenyl-d14 at 34% with criteria of (50-135).

VWAI-MW07P-0512 (L1093-07B), recovery is below criteria for Terphenyl-d14 at 43% with criteria of (50-135).

### D. Spikes:

## 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: VWAI-MW05-0512 (L1093-01BMS) and VWAI-MW05-0512 (L1093-01BMSD).

Percent recoveries were within the QC limits with the following exceptions:

VWAI-MW05-0512 (L1093-01BMS)Percent Recovery is outside QC Limits, recovery is below criteria for Bis(2-ethylhexyl)phthalate at 37% with criteria of (40-125).

VWAI-MW05-0512 (L1093-01BMSD)Percent Recovery is outside QC Limits, recovery is below criteria for Bis(2-ethylhexyl)phthalate at 30% with criteria of (40-125).

Replicate RPDs were within the advisory QC limits.

#### E. Internal Standards:

Internal standard peak areas were within the QC limits.

## F. Dilutions:

No sample in this SDG required analysis at dilution.

## 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, 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.

	T)-lef	
Signed:	_ 0	
Date:	6/14/2012	

## REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client: CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC I

Laboratory Workorder / SDG #: L1093

SW846 6010C

## 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 6010C

#### IV. PREPARATION

Aqueous Samples were prepared following procedures in laboratory test code: SW3005A

## V. INSTRUMENTATION

The following instrumentation was used to perform analysis:

Instrument Code: OPTIMA3

Instrument Type: ICP

Description: Optima ICP-OES Manufacturer: Perkin-Elmer

Model: 4300 DV

#### VI. ANALYSIS

## A. Calibration:

Calibrations met the method/SOP acceptance criteria.

#### B. Blanks:

All method blanks were within the acceptance criteria.

## C. Spikes:

## 1. Laboratory Control Spikes (LCS):

Percent recoveries for laboratory control samples were within the QC limits.

## Matrix spike (MS):

A matrix spike was not performed on any sample in this SDG.

## D. Post Digestion Spike (PDS):

A post-digestion spike was not performed on any sample in this SDG.

## E. Duplicate sample:

A duplicate analysis was not performed on any sample in this SDG.

## F. Serial Dilution (SD):

A serial dilution was not performed on any sample in this SDG.

## 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, 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: \_\_\_\_\_\_\_ Sum (Fund)

Date: 06/14/12



## CHAIN OF CUSTODY RECORD

Special Handling:

TAT- Indicate Date Needed: \_\_\_\_

All TATs subject to laboratory approval.
Min. 24-hour portification needed for rushes.
 Samples disposed of after 30 days unless otherwise instructed.

		HANIBAL TECHNOLOGY		Page _ L _ of _ L								otherwise instructed.							
	Report To:_	Stephen Brand		Invoice	To: <u>57</u>	ephen	Bro.	end	_				Proje	ct N	:.c	392485.	FI.	FK	
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	Project Mgr	S. BRAND		P.O. No.				RQI	V:	-				8 8	16,202				
	1=Na 8= Na	<sub>2</sub> S2O <sub>3</sub> 2=HCl 3=H <sub>2</sub> aHSO <sub>4</sub> 9= <u>H<sub>3</sub>PO4</u>	5=NaOH	5=NaOH 6=Ascorbic Acid				7=CH <sub>3</sub> OH			List preservative code below:					Not	es:		
		ing Water GW=Groundwater WW=Wastewater					Containers:					9 6	Analyses:				QA/QC Reporting Level		
	O=Oil SW	V= Surface Water SO= X2=	Soil SL-Sluc	lge A=Air			'ials	Glass	ilass		i			57%	WCHEM (SOU, NUS,	(00)		□ Level III	
			٦ p	xin	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		VOCS	OCS	F-METALS	em (s	WCHEN CTOC		Other			
	Lab Id:	Sample Id:	Date:	Time:	Туре	Matrix		1000	# of			2	5	T,	WCF	1	1		
93	Q1.	VWAI-MW05-0512	5/22/12	1055	6	GW		2		2	6	2	2	1	1	2			positive designation
1	01	VWAI-MWOS-MS-USIZ	5/22/12	1055	16	GW		2			3	2	2					MSINIS	
	01	VWAS-MW05-50-0512	5/22/12	1055	16	GW	2	2		,	6	2	2					ms ims	
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# CHAIN OF CUSTODY RECORD

Special Handling:
TAT-Indicate Date Needed:

All TAT's subject to laboratory approval.
Min. 24-hour notification needed for rushes.

	SI	PECTRUM ANALYTICAL INC Featuring HANIBAL TECHNOLOGY				P	age_	1_	_of _	<u></u>						amples disp therwise in	posed of after 30 structed.	days unless
I	Report To:	Stephen Brand/VI	30	_ Invoice T	o: <u>5</u> 7	lepten	Bro	ind 1	VBC	2	_	Proj	ect No	s.:_3	9248	EFER	к	
-	~		1000000	-				19 1.00			-	Site	Name	: 1/1	EQUES	AOC.	I	
-											-	Loca	tion:	V.Z	EQUE	5, PR	>	State: PR
																	Whotaker, p	
1	Project Mgr	: Stephen Ben	ND / Citzy HILL	_ P.O. No.:	-		-	RQ	v:	-	_		*13000000					
1		2S2O <sub>3</sub> 2=HCl 3=H <sub>2</sub>						7=C	H <sub>3</sub> O	Н	_			-	e code b	elow:		.lathar
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		/= Surface Water SO= X2=				1	Vials	Glass.	Glass				571	3,110;	1200		□ Level III	
		G=Grab C=C	Composite				) A C	nper	ear (	astic		1,5	1	(50	200		□ Other	
	Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	26	SVVCS	FMETOLS	WCHEM (SQ, NO.)	WCHEM (Tec		State specific	reporting standard
3	03	VWAT-EBU!- OESE	5/23/12	0705	G	5W	2	2			2	2					EQUIPM	ent blowl
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Received By: 191	11	-			034111111111111111111111111111111111111	D	age 0.	1 of 00	No.
Reviewed By:	P				7.01	L	og-in	Date 05/2	23/2012
Work Order: L1093	Client Name: C	CH2M Hill, Inc.		1000				951WA	
Project Name/Event	: CTO-0083 Vieques AOC	E and I					*1-8		
Remarks: (1/2) Please		T		Prese	rvatio	n (pH)			Soil HeadSpace
sample/extract transf submitted with this d		Lab Sample ID	ниоз	B2S04	HCI	NaOH	H3P04	VOA Matrix	or Air Bubble or equal to 1/
. Custody Seal(s)	Present / Absent	L1093-01	<2				<2		. ———
	Intact/Broken	L1093-02	<2		-		<2	Ascerbic Ac	} d
. Custody Seal Nos.	N/A	1095-02		-		L	1	Aumpie Ar	tar.
3. Traffic Reports/ Chai of Custody Records (TR/COCs) or Packing Lists								HС∟	JV 5/23/12
. Airbill	AirBill / Sticker Present / Apsent								
. Airbill No.	FedEx 8708 2609 2940								
. Sample Tags	Present/Absent	3							
Sample Tag Numbers	Listed/					Visi			
	Not Listed on Chain- of-Custody	$\triangleright$							
. Sample Condition	Intact/Broken/ Leaking	1							
Cooler Temperature Indicator Bottle	Present / Absent	D							
. Cooler Temperature	4.0 °C	1							
D. Does information on TR/COCs and sample tags agree?	Yes / No								
Laboratory	05/23/2012								
. Time Received	08:55								
	e Transfer								
raction (1) TVOA/VOA	Fraction (2) SVOA/PEST/ARO								
rea 4	Area #								
у	ву								
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R Temp Gun ID:MT-1		vo	)A Matri:	x Key:					
polantCondition: ICE			t	JS = Un	preserve	ed Soil	A=	Air	
reservative Name/Lot No:			1	JA = Un	preserve	ed Aque	ous H	= HCI	
			1	n = MeC	H		Ξ:	= Encore	
			1	v = NaH	SO4		F =	Freeze	
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			90						
		Ra	d OK	Yes /	) No				

Wo: £1033 / £10.032 504 / £W10.103 532

Sample Condition Form 6

	Analytical, Inc. Fea	iculing manic	sar le	,cunal	ogy	Krode	Island Di	vision
Received By: //	1/1 1					Page	01 cf 00	
Reviewed By: / / Com	Birl					Log-i	n Date 05/2	4/2012
Work Order: 1.1093	Client Name: C	H2M Hill, Inc.			_			
Project Name/Event:	CTO-0083 Viegues AOC	ī						
Remarks: (1/2) Please				Préser	vation	n (pH)	9	Scil HeadSpace
sample/extract transfe submitted with this da		Lab Sample ID	HNO3	H2SO4	HCL	NaOH H3PC	VOA Matrix	or Air Bubble > or equal to 1/4
1. Custody Seal(s)	Present/Absent	L1093-03		-			A	
	Intact / Broken	L1093-04					Ascentic	
2. Costedy Seal Nos.	N/A	1.1093-05	<2			-	Ascerbic	
		L1093-05	<2		-			-
<ol> <li>Traffic Reports/ Chair of Custody Records (TR/COCs) or Packing lists</li> </ol>	Present / Absent	L1093-07					Ascorbic Ascorbic	
4. Airbill	AirBill / Sticker Present / Absent							
5. Airbill No.	FedEx 8729 0909 2519,							8
6. Sample Tags	Present / Absent							
Sample Tag Numbers	Listed/							
nd.	Not Listed on Chain-							S
(	of-Custody	)						
7. Sample Condition	Intact/Broken/							
	Leaking							
B. Cooler Temperature Indicator Bottle	Present / Absent	>						
0. Cooler Temperature	5,5 °C							\$/
10. Does information on TR/COCs and sample tags agree?	Yes / No							(197
1. Date Received at Laboratory	05/24/2012						*	
Z. Time Received	12:30							
Sample	Transfer							
raction (1) TVOA/VOA	Fraction (2) SVOA/PEST/ARO							
rea #	Area #							
у	Ву							
)n	On						_	(Partie)
R Temp Gum ID:MT-1		VC	A Matri	x Key:				
CoolantCondition: ICE				JS = Uni			A= Air	
Preservative Name/Lot No:	9					d Aqueous I	H = HCI	
<b>9</b> %				MeO		i	E = Encore	
				N = NaH			= Freeze	
(A)	ē.		/		`	fication/Correc	ctive Action Form	Yes (No)
			d OK	Yes /	1 No			

Sample Condition Form 7

		****
	USEPA Region II SW846 Method 8260B VOA	Date: August 2008 SOP: HW-24, Rev. 2
I.	PACKAGE COMPLETENESS AND DELIVERAB	YES NO N/A
CASE	NUMBER: L1093 LAB:	Spectrum
SITE	NAME: Viegues AOC I CTO-083	
1.0	Data Completeness and Deliverables	
	1.1 Has all data been submitted in CLP deli- format or CLP Forms Equivalent?	verable
	ACTION: If not, note the effect on review the Data Assessment narrative.	of the data in
2.0	Cover Letter, SDG Narrative	
	2.1 Is a laboratory narrative, and/or cover signed release present?	letter
	2.2 Are case number and SDG number(s) contain the narrative or cover letter?	ined
	ACTION: If not, note the effect on review the Data Assessment narrative.	of the data in
II.	VOLATILE ANALYSES	
1.0	Traffic Reports and Laboratory Narrative	
	1.1 Are the Traffic Reports, and/or Chain o from the field samplers present for all sign release present?	
	ACTION: If no, contact the laboratory/samp of missing or illegible copies.	ling team for replacement
	1.2 Is a sampling trip report present (if r	equired)? [
	1.3 Sample Conditions/Problems	
	- 6 VOA -	

2.0

Holding Times

Date: August 2008 SOP: HW-24, Rev. 2

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 5/22-23/12 analy 5/24-25/12 Irle'd 5/23-24/12 temp 4-5°C

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<sub>4</sub>, the maximum holding time is 14 days from sample collection. If

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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 q	ualifications						
	No	≻ 7 days	J	R						
	Yes	≤14 days	No q	ualifications						
	Yes	≻ 14 days	J	R						
Non Aqueous	No	≤ 14 days	J	R						
	Yes	≤ 14 days	No q	ualifications						
	Yes/No	≻ 14 days	J	R						

3.0	Surrogate Re	covery (CL)	P Form I	I Equi	valent)

Reco	very	forms	for	each	of	the	following	matrices:		
a.	Wate	er							4	

3.1 Have the volatile surrogate recoveries been listed on Surrogate

b. Soil \_\_\_\_\_

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

а.	Water	
b.	Soil	Ц

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 inhouse 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 <sub>8</sub>	80-120	70-130
Dichloroethane-d <sub>4</sub>	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.

Were method blanks reanalyzed?

specification for any sample or method blank. Table 2.

If yes, were samples reanalyzed?

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3.5 Were one or more volatile surrogate recoveries out of

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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").
- 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").
- 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.

	egion II ethod 8260B VOA	Date: August 2008 SOP: HW-24, Rev. 2
		YES NO N/A
Note:	LCS consists of an aliquot of a c similar to the sample matrix and volume.	clean (control) matrix of the same weight or
ACTION:	If any <u>Laboratory Control Sample</u> call the lab for explanation /resnote in the data assessment.	data are missing, submittals. Make
	re the Laboratory Control Samples ar equency for each of the following ma	
A.	Water	Щ
В.	Soil	ш
С.	Med Soil	
Note:	The LCS is spiked with the same a concentrations as the matrix spike 9.5). If different make note in Matrix/LCS spiking standards show volatile organic compounds which compounds being investigating. A spike should include 1,1-dichlorochlorobenzene, toluene, and benze	de (SW-846 8000C, Section data assessment.  ald be prepared from are representative of the At a minimum, the matrix pethene, trichloroethene,
ACTION:	If any MS/MD, MS/MSD or replicate missing, take the action specifie	
	ve in house LCS recovery limits been ct 9.7).	n developed (Method 8000C,
	in house limits are not developed, mits between 70 - 130% (Method 8000)	-
hou	re one or more of the volatile LCS ruse laboratory recovery criteria for use limits are not present use 70 -	r spiked analytes? If in

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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 s %R	No Qual	lifications	

5.0 Matrix Spikes (Form III or equiv	. 0	. 0	0 Matri	x Spi	kes	(Form	$\perp \perp \perp 1$	or	equivaler	IL)
--------------------------------------	-----	-----	---------	-------	-----	-------	-----------------------	----	-----------	-----

VWAI-MW05-0512

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?

14\_

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	Щ
b.	Waste	<u> </u>
C -	Soil/Solid	r 1

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, 14 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.

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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 Qu	ualifications	

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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?

1

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?

14\_\_\_\_

#### 7.0 Contamination

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

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YES NO N/A

7.2 Do any field/rinse blanks have positive volatile organic compound results?

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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.

VWAI-TB01-052212 LB01-052312 / NO€ TB01-052312

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Table 5. Volatile Organic Analysis Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
	Detects	Not detected	No qualification
		< CRQL	Report CRQL value with a U
	< CRQL*	> CRQL	Use professional judgement
		< CRQL	Report CRQL value with a U
Method, Storage, Field,	e, > CRQL*	<pre></pre>	Report the concentration for the sample with a U, or qualify the data as unusable R
Trip, Instrument**		≥ CRQL and ≥ blank contamination	Use professional judgement
		< CRQL	Report CRQL value with a U
	= CRQL*	≥ 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?

For low level samples, note in data assessment ACTION: 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  $60 \text{ m.} \times 0.75 \text{ mm}$  capillary column, coated with VOCOL(Supelco) or equivalent column. (see SW-846, page 8260B-7, section 4.9.2)

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

## 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
- 9.3 Has an instrument performance check solution (BFB)

mass/charge (m/z) listing for the BFB provided for each twelve hour shift?

053

USEPA Region II Date: August 2008 SW846 Method 8260B VOA SOP: HW-24, Rev. 2 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. If the laboratory/project officer cannot provide missing ACTION: data, reject ("R") all data generated outside an acceptable twelve hour calibration interval. 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.

			222	*	
		-	ion II hod 8260B VOA	Date: Aug SOP: HW-2	
10.0	Targe	et An	alytes (CLP Form I Equivalent)		
	10.1	pres	the Organic Analysis reporting form ent with required header informatio , for each of the following:		
		a.	Samples and/or fractions as approp	oriate	<u> </u>
		b.	Matrix spikes and matrix spike dup	licates	<u>u</u>
		c.	Blanks		14
		d.	Laboratory Control Samples		TA
	10.2	iden Repo	the reconstructed Ion Chromatograms tified compounds, and the data systems) included in the sample package owing?	em printou	ts (Quant
		a.	Samples and/or fractions as approp	oriate	
		b.	Matrix spikes and matrix spike dup (Mass spectra not required)	olicates	<u> </u>
		c.	Blanks		<u> </u>
		d.	Laboratory Control Samples		14
	ACTI	ON:	If any data are missing, take acti specified in 3.2 above.	Lon	

10.3 Is chromatographic performance acceptable with
 respect to:

Baseline stability?

[ 4

USEPA Reg SW846 Met	ion II hod 8260B VOA	Date: August 2008 SOP: HW-24, Rev. 2
		YES NO N/A
Reso	lution?	
Peak	shape?	<u> </u>
Full	-scale graph (attenuation)?	<u> </u>
Othe	r:	
ACTION:	Use professional judgement to dete	ermine the acceptability of
	the lab-generated standard mass spetile compounds present for each same	
ACTION:	If any mass spectra are missing, to 3.2 above. If the lab does not gen spectra, make a note in the Data A missing, contact the lab for missing.	nerate their own standard Assessment. If spectra are
	he RRT of each reported compound windard RRT in the continuing calibrat	
rela	all ions present in the standard matrix tive intensity greater than 10% (of present in the sample mass spectrum)	f the most abundant ion)
in t	the relative intensities of the character in the sample agree within ± 30% of the tive intensities in the reference s	e corresponding_
ACTION:	Use professional judgement to determine acceptability of data. If it is desincorrect identifications were made should be rejected ("R"), flagged Presumptive evidence of the present compound) or changed to non detection limit. In order	etermined that  de, all such data  ("N") -  nce of the  ted ("U") at the

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YES NO N/A

positively identified, the data must comply with the criteria listed in 9.6, 9.7, and 9.8.

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

11.0 Tentatively Identified Compounds (TIC) (CLP Form I/TIC Equivalent)

- 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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SW846	Method	8260B	VOA

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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?

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<sub>2</sub> (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?

<u>'</u> \_ \_ \_

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)

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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?

14

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 GC/MS Calibration Verification (CLP Form VII Equivalent)

Date: August 2008 SOP: HW-24, Rev. 2

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  $\leq$  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

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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 <u>Internal Standards (CLP Form VIII Equivalent)</u>

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)?

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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.
  - 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 (Uvalues) "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.

Date: August 2008 SOP: HW-24, Rev. 2

YES NO N/A

## 17.0 Field Duplicates

17.1 Were any field duplicates submitted for volatile analysis?

K\_\_\_

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.

VWAI-MW07-0512 > no qual, VWAI-MW07P-0512 > per attached sheet

065

DataQual VOA

Initial Calibration Date:

5/23/2012

RRF and %RSD Calculations:

Compound Name:

1,2-dichloroethane

Lab Value:

0.2960

Area of Compound	743143
Area of Internal STD	626681
Conc. of Internal STD	50
Conc. of Compound	200
Calculated RRF	0.296

Compound Name:

benzene

Lab Value:

7.7

RRF of STD 1	0.9470
RRF of STD 2	0.9830
RRF of STD 3	0.8970
RRF of STD 4	0.8660
RRF of STD 5	0.7840
RRF of STD 6	0.9050
Calculated % RSD	7.7

Continuing Calibration File ID:

5/25/2012

RRF and %D Calculations:

Compound Name:

1,2-dichloropropane

Lab Value:

0.262

Area of Compound	165930
Area of Internal STD	632646
Conc. of Internal STD	50
Conc. of Compound	50
Calculated RRF	0.262

Compound Name:

1,2-dichloroethane

Lab Value:

6.0

Average RRF	0.301	
Calibration Check RRF	0.319	
Calculated % D	-6.0	

DataQual

# FIELD DUPLICATE SAMPLE SUMMARY

Sample ID: VWAI-MW07-0512

Duplicate Sample ID: VWAI-MW07P-0512

Water: RPD>20% Soil: RPD>30%

Compound	Sample Conc.	Dup. Sample Conc.	%RPD
benzene	2.9	2.8	4
			#DIV/0!
			#DIV/0!
2.7			#DIV/0!
***			#DIV/0!
			#DIV/0!
			#DIV/0!
		· · · · · · · · · · · · · · · · · · ·	#DIV/0!
			#DIV/0!
-			#DIV/0!
			#DIV/0!
700			#DIV/0!
			#DIV/0!

COMMENTS: No qualifications required

<sup>\*</sup> one of the results below the LOD

	Region II Method 8270D (Rev.4, January 1998)	Date: August, 2008 SOP HW-22 Rev.4
		YES NO N/A
E ·	The concentration of this analyte exceeds the of the instrument.	e calibration range
Α .	Indicates a Tentatively Identified Compound adol-condensation product.	(TIC) is a suspected
X, Y, Z	- Laboratory defined flags. The data reviewer qualifiers during validation so that the dat understand their impact on the data.	
I.	PACKAGE COMPLETENESS AND DELIVERABI	LES
CASE	NUMBER: L1093 LAB: Spe NAME: Viegues AOCI CTO-083	ctrum
SITE	NAME: Viegues AOCI CTO-083	
1.0	Data Completeness and Deliverables	
	1.1 Has all data been submitted in CLP deliveral format?	ole
J	ACTION: If not, note the effect on review of the in the data assessment narrative.	ne data
2.0	Cover Letter, SDG Narrative	
	2.1 Is a laboratory narrative or cover letter present?	Ц
72	2.2 Are case number and SDG number(s) contained in the narrative or cover letter?	14

	A Region II 6 Method 82	[ 270D (Rev.4, January 1998)	Date: August, 2008 SOP HW-22 Rev.4
			YES NO N/A
II.		SEMIVOLATILE ANALYSES	18
1.0	Traffic Re	eports and Laboratory Narrative	
	1.1 Are samples?	the Traffic Report Forms present for all	14
	ACTION:	If no, contact lab for replacement of m or illegible copies.	issing
¢	any p	ne Traffic Reports or Lab Narrative indiproblems with sample receipt, condition les, analytical problems or special notacting the quality of the data?	of
T.	ACTION:	If any sample analyzed as a soil, other TCLP, contains 50%-90% water, all data be flagged as estimated ("J"). If a soi sample, other than TCLP, contains more 90% water, all non-detects data are qua as unusable (R), and detects are flagge	should l than lified
	ACTION:	If samples were not iced, or if the ice melted upon arrival at the laboratory a cooler temperature was elevated (10°C), all positive results "J" and all non-de "UJ".	nd the Tump flag 4-5°C tects
2.0	Holding T	"UJ". Sampled 5/22-23/12 Re imes Extr 5/23-25/12 Ar	naly 6/4/12
	dete	any semivolatile technical holding time rmined from date of collection to date of action, been exceeded?	s,
	semi days samp	inuous extraction of water samples for volatile analysis must be started within of the date of collection. Soil/sedime les must be extracted within 14 days of ection. Extracts must be analyzed withi	nt

Date: August, 2008 SOP HW-22 Rev.4

YES NO N/A

40 days of the date of extraction.

### Table of Holding Time Violations

Sample ID	Sample Matrix	Date Sampled	(So Date Lab Received	ee Traffic Date Extracted	Report) Date Analyzed
		====			
	<u>- 112-123-1-1</u>		Ma	<u></u>	
	-		] ——	-	
	· · · · · · · · ·	1000000	5=====0		

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).

		ion II	I 270D (Rev	v.4, Jan	uary 199	8)		e: Augu HW-22		
2								YES	NO	N/A
3.0		Surro	ogate Rec	covery (	Form II/	<u>Equivalent)</u>				
	3.1	liste		Surroga	ate Reco	gate recoverie very forms (Fo trices:				
		a.	Low Wate	er				14	_	
		b.	Low/Med	Soil				$\Box$		_
	3.2	appro		Surrogate		<u>isted</u> on the ry Summary for	ms		···	
		a.	Low Wate	er				LY		
		b.	Low/Med	Soil				<u>[ ]</u>	·	
	ACTIO	ON:	the effe	ect(s) in ne lab ma the data	n data a: ay have	unavailable, ssessments. I to be contacte ry to complete	n some d to	nt		
	3.3	Were	outliers	s marked	correct	ly with an ast	erisk?	14	-	
		ACTIO	ON: Cir	ccle all	outlier	s in red.				
	3.4	recovered recovered from page	veries ou od blank very limi USEPA Na	of specific (Reviewed)  its. Use stional in house	ecificat er should surroga Function e limits	l <u>OR</u> acid surrion for any sad use lab in he recovery lial Guidlines Jare not avail C-24).	mple or ouse mits anuary			_
		Note:				se limits for	reason	ablenes	SS.	
		If ye	es, were	samples	re-anal	yzed?			_	
					- 9					971

# 2H - FORM II SV-2 WATER SEMIVOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

SDG No.: SL1093 Lab Code: MITKEM Case No.: L1093 Mod. Ref No.:

	EPA SAMPLE NO.	SDMC1 (NBZ) #	SDMC2 (FBP) #	SDMC3 (TPH)	#		TOT
01	MB-66318	75	72	77			0
02	LCS-66318	72	73	73			0
03	MB-66345	80	76	78			0
04	LCS-66345	77	7.8	80			0
05	LCSD-66345	79	75	85			0
	VWAI-EB01-05 2312	58	59	46	*		1
07	VWAI-MW04-05 12	58	59	30	*		1
08	VWAI-MW07-05 12	60	63	34	*		1
09	VWAI-MW07P-0 512	56	62	43	*		1
10	VWAI-MW05-05	73	65	22	*		1
11	VWAI-MW05-05 12MS	78	69	18	*		1
12	VWAI-MW05-05 12MSD	79	72	17	*		1

			QC LIMITS
SDMC1	(NBZ)	= Nitrobenzene-d5	(40-110)
SDMC2	(FBP)	= 2-Fluorobiphenyl	(50-110)
SDMC3	(TPH)	= Terphenyl-d14	(50-135)

#### som111.10.27.A

<sup>#</sup> Column to be used to flag recovery values

<sup>\*</sup> Values outside of contract required QC limits

D DMC diluted out

Date: August, 2008 SOP HW-22 Rev.4

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, for the affected fraction only (i.e. either base-neutral or acid compounds):

- Flag all positive results as estimated ("J").
- Flag all non-detects as estimated detection limits ("UJ") when recoveries are less than the lower acceptance limit.
- If recoveries are greater than the upper acceptance limit, do not qualify non-detects.

If any base-neutral  $\underline{or}$  acid surrogate has a recovery of < 10%:

- 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? \_ 14

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

USEPA Region II Date: August, 2008 SW846 Method 8270D (Rev.4, January 1998) SOP HW-22 Rev.4 YES NO N/A effect in data assessments. 4.0 Matrix Spikes (Form III/Equivalent) VWAI-MW05-0512 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 4-Chloro-3-methylphenol Pyrene N-Nitroso-di-n-propylamine 4-Nitrophenol 1,4-Dichlorobenzene Some projects may require the spiking of specific compounds Note: of interest. See Method 8270D-sec 8.4.2 for deciding on whether Note: 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: Low Water a. b. Low Solid

Med Solid

C.

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.

1	
1 W	

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
2 out of 6	out of

# 3C - FORM III SV-1 WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab	Name:	SPECTRUM ANA	LYTICAL, IN	C	Cont	ract:			
Lab	Code:	MITKEM	Case No.:	L1093	Mod.	Ref No.:	SDG	No.:	SL1093
Mati	rix Spi	ke - EPA Samp	ole No.: VWA	I-MW05-0512					

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS %REC	#	QC. LIMITS REC.
Naphthalene	50.0000	1.2732	35.7838	69		40-100
2-Methylnaphthalene	50.0000	11.0377	46.3900	71		45-105
Bis(2-ethylhexyl)phthalate	50.0000	0.0000	18.4985	(37)	*	40-125

JUI

	SPIKE ADDED	MSD CONCENTRATION	MSD %REC	#	%RPD #	QC	LIMITS	
COMPOUND	(ug/L)	(ug/L)			porternative educa-	RPD	REC.	
Naphthalene	50.0000	38.1297	74		7	0-40	40-100	
2-Methylnaphthalene	50.0000	48.7442	75		6	0-40	45-105	
Bis(2-ethylhexyl)phthalate	50.0000	14.7979	(30)	*	22	0-40	40-125	

- $\ensuremath{\text{\#}}$  Column to be used to flag recovery and RPD values with an asterisk
- \* Values outside of QC limits

RPD:	0	out	of	- 1	3 c	utside	lim	nits		
Spike	Recove	ery:	÷-	2	out	of	6	_outside	limits	
COMMEN	NTS:									

Manager and State Comments		ion I hod 8	I 270D (Rev.4, January 1998)			ust, 200 Rev.4	8
					YES	NO N/	Α
	4.5		many RPD's for matrix spike an icate recoveries are outside Q				
		Wate	<u>r</u>	Solids			
		_0	out of 3	out of	_		
	ACTIO	ON:	Circle all outliers with red	pencil.			
	ACTIO	ON:	No action is taken on MS/MSD However, using informed profe judgement, the data reviewer matrix spike and matrix spike results in conjunction with o to determine the need for som of the data.	ssional may use the duplicate ther QC criteri			
	4.6		a Laboratory Control Sample (Lytical batch?	CS) analyzed wi	th eac	ch	•
	NOTE	<b>:</b> )	When the results of the matri indicate a potential problem matrix itself, the LCS result verify that the laboratory canalysis in a clean matrix.	due to the samp s are used to			
5.0	Blan	ks_(F	orm IV/Equivalent)				
	5.1	Is t	ne Method Blank Summary (Form	IV) present?	14		_
	5.2	Freq	uency of Analysis:				
80		repo	a reagent/method blank analysi rted per 20 samples of similar entration level, and for each n?	matrix, or	4		_

5.3 Has a method blank been analyzed either after

Date: August, 2008 SOP HW-22 Rev.4

YES NO

the calibration standard or at any other time during the analytical shift for each GC/MS system used ?

4

N/A

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.

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 <u>not</u> used to qualify the data. Do not confuse them with the other QC blanks discussed below.

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)?

14

USEPA	Region	II			
SW846	Method	8270D	(Rev. 4,	January	1998)

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).

VWAI-EBOI-052312 -MOQ

YES NO N/A

#### Blank Action for Semivolatile Analyses

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
		< CRQL	Report CRQL value with a U
	> CRQL *	<pre></pre>	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?

14

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

USEPA Region II SW846 Method 8270D (Rev.4, January 1998)		: Aug HW-22		
		YES	NO	N/A
that exceeded the initial calibration range.		П		V
6.5 Does the instrument blank have positive resu for target analytes and/or TICs?	lts		IL	_
Note: Use professional judgement to determine if carryover occurred and qualify analy accordingly.				
7.0 GC/MS Apparatus and Materials				
7.1 Did the lab use the proper gas chromatograph column for analysis of semivolatiles by Meth 8270D? Check raw data, instrument logs or compart the lab to determine what type of column was a The method requires the use of 30 m x 0.25 m (or 0.32 mm ID), silicone-coated, fused silicapillary column.	od contac used m ID			2 <u> </u>
ACTION: If the specified column, or equivalent, not used, document the effects in the dassessment. Use professional judgement determine the acceptability of the data	lata . to			
8.0 GC/MS Instrument Performance Check (Form V/Equiva	lent)			
8.1 Are the GC/MS Instrument Performance Check F (Form V) present for decafluorotriphenylphos (DFTPP)?		K		_
NOTE: The performance solution should also contain pentachlorophenol, and benzidine to verify injection port inertness and column performathe degradation of DDT to DDE and DDD must less than 20% total and the response of pentachlorophenol and benzidine should be within normal ranges for these compounds (baupon lab experience) and show no peak degrad or tailing before samples are analyzed. (see	nce. be used dation		.5	

- 17 -

981

USEPA Region II SW846 Method 8270D (Rev.4, January 1998	Date: August, 2008 SOP HW-22 Rev.4
	YES NO N/A
page 8270D-12).	
8.2 Are the enhanced bar graph sp mass/charge (m/z) listing for provided for each twelve hour	r the DFTPP
8.3 Has an instrument performance been analyzed for every twelve analysis per instrument?	
ACTION: List date, time, instrument analyses for which no astuning data are available.	ssociated GC/MS
DATE TIME INSTRUMENT	SAMPLE NUMBERS
ACTION: If lab cannot provide m.  ("R") all data generated twelve hour calibration	d outside an acceptable
ACTION: If mass assignment is in associated sample data as	SERVICE OF THE PROPERTY OF THE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE SERVICE
8.4 Have the ion abundances been m/z 198?	normalized to
8.5 Have the ion abundance crite each instrument used?	ria been met for
ACTION: List all data which do criteria (attach a sepa	

	A Reg: 6 Metl		I 270D (Rev.4, January 1998)		e: Augu HW-22		
					YES	NO	N/A
	ACTIO	ON:	If ion abundance criteria are not met, taction specified in section 3.2	take			
	8.6	betw	there any transcription/calculation errore een mass lists and Form Vs? (Check at lea values but if errors are found, check mon	ast	( <del></del> )	Y	_
	8.7		the appropriate number of significant res (two) been reported?		4		
	ACTI	ON:	If large errors exist, call lab for explanation/resubmittal, make necessary corrections and document effect in data assessments.				
	8.8		the spectra of the mass calibration compo ptable?	ound			8 <del></del> 8
	ACTI	ON:	Use professional judgement to determine whether associated data should be accept qualified, or rejected.				
9.0	Tarq	et An	alytes				
	9.1	pres	the Organic Analysis Data Sheets (Form I ent with required header information on a , for each of the following:	001			
		a.	Samples and/or fractions as appropriate		4	_	-
		b.	Matrix spikes and matrix spike duplicate	es	4	_	
ř		c.	Blanks		14	_	-
	9.2	perf	any special cleanup, such as GPC, been ormed on all soil/sediment sample extract section 7.2, page 8270D-14)?	ts	П	:\ <u>-</u>	~

USEPA Rec SW846 Met	504	I 270D (Rev.4, January 1998)	Date: August, 2008 SOP HW-22 Rev.4
0			YES NO N/A
ACT	ION:	If data suggests that extract cleanup we performed, use professional judgement. note in the data assessment narrative.	
9.3	spec syst	the Reconstructed Ion Chromatograms, mas tra for the identified compounds, and the em printouts (Quant Reports) included in le package for each of the following?	e data
	а.	Samples and/or fractions as appropriate	<u> </u>
ř	b.	Matrix spikes and matrix spike duplicat (Mass spectra not required)	es
	С.	Blanks	<u> </u>
ACT	ION:	If any data are missing, take action specified in 3.2 above.	
9.4	Are Repo	the response factors shown in the Quant rt?	<u> </u>
9.5		hromatographic performance acceptable wi ect to:	th
	Base	line stability?	14
	Reso	lution?	<u> </u>
	Peak	shape?	тд — —
	Full	-scale graph (attenuation)?	<u> </u>
	Othe	r:	
ACT	ION:	Use professional judgement to determine acceptability of the data.	the
9.6	Are	the lab-generated standard mass spectra	of

identified semivolatile compounds present for

USEPA	Region	II			
SW846	Method	8270D	(Rev. 4,	January	1998

YES NO N/A

each sample?

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

data.

9.7 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?



- 9.8 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% (of the most abundant ion) also present in the sample mass spectrum?
- 9.9 Do the relative intensities of the characteristic ions in the sample agree within ± 30% of the corresponding relative intensities in the reference spectrum?

IД \_\_\_

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.

	A Regi 6 Meth			Rev.4	, Jar	nuary	1998	8)				Aug W-22		2008
O <sub></sub>		•										YES	NO	N/A
10.0	<u>Tenta</u>	If Te	entati this p	vely projec	Ident t, ar	tifie re al inclu	ed Cor .1 Fo: .1de se	mpounc rm Is, can nu	ls were : Part B mber or "JN" qua	prese reter	ent; ntic		Ma	1
	NOTE:	í	lab w	as re	quire	ed to	ide	ntify	etermine non tare 8270D-2	get ar		/tes		
	10.2	ident spect	tified	d comp nclude	ounds d in	s and	d ass	ociate	atively ed "best ckage fo			Ll		<u>/</u>
		a.	Sampl	es an	d/or	frac	ction	s as â	ppropri	ate				
		b.	Blank	(S									· <del></del>	/
	ACTIO	: NC		ny TIC fied					take ac	tion				
	ACTIO	ON:		'JN" q				to ar	nalytes					
	10.3	as T	IC con	npound	ls in	anot	her		fraction an acid		ted	-		/
	ACTIO	: NC	i.	Flag as a		"R"	any	target	compoun	nd lis	sted	Ė		
			ii.				77		compound cother		ion.			
	10.4								ence mas		า			

10% (of the most abundant ion) also present in the

			ii.	
USEPA Regi SW846 Meth		Date: Aug SOP HW-22		
		YES	NO	N/A
	sample mass spectrum?	П		V
10.5	Do TIC and "best match" standard relative ion intensities agree within ± 20%?		<del>2</del>	
ACTIO	N: Use professional judgement to determine acceptability of TIC identifications. If is determined that an incorrect identification was made, change the identification to "unknown" or to some I 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 contamination the result should be qualified as unusabe "R."	ess l not nant,		
11.0 <u>Comp</u>	ound Quantitation and Reported Detection Limi	.ts		
11.1	Are there any transcription/calculation error Form I results? Check at least two positive verify that the correct internal standard, quantitation ion, and RRF were used to calcul Form I result. Were any errors found?	alues.	14	
NOTE:	Structural isomers with similar mass spectual insufficient GC resolution (i.e. per valley between the two peaks > 25%) show reported as isomeric pairs. The reviewed should check the raw data to ensure that such isomers were included in the quantitation (i.e., add the areas of the coeluting peaks to calculate the total concentration).	ccent ald be er all		
11.2	Are the method detection limits adjusted to reflect sample dilutions and, for soils, samp moisture?	ole	_	<u></u>

Date: August, 2008 SOP HW-22 Rev.4

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?

14\_\_\_\_

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?

Date: August, 2008 SOP HW-22 Rev.4

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.

Base/Neutral Fraction

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%)?

[4/

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

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

Acid Fraction

Date: August, 2008 SOP HW-22 Rev.4

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  $\geq$  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.)

\_ 4

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?

		e: Aug HW-22		
		YES	NO	N/A
13.6 If the pesticide compounds include DDT, was the percent breakdown of DDT to DDD and DDE greated than 20%?				1
ACTION: If DDT percent breakdown exceeds 20%:				
i. Qualify all positive results for DDT with "J". If DDT was not detected, DDD and DDE results are positive, qualify the quantitation limit for I as unusable, "R".	bu'			
ii. Qualify all positive results for DDN DDE as presumptively present at an approximate concentration "JN".	) a	nd		
14.0 GC/MS Calibration Verification (Form VII/Equivaler	<u>nt)</u>			
14.1 Are the Calibration Verification Forms (Form Verification Forms of Interest?	VII	)	/	
14.2 Has a calibration verification standard been analyzed for every twelve hours of sample anal per instrument?	lys	is	/_	_
ACTION: List below all sample analyses that were within twelve hours of a calibration verification analysis for each instrument used.		t		
	—:			
ACTION: If any forms are missing or no calibration verification standard has been analyzed within twelve hours of every sample analy		s,		

Date: August, 2008 SOP HW-22 Rev.4

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).



		100					
USEPA Region I SW846 Method 8		4, January 199	8)	Date: SOP H			
					YES	NO	N/A
ACTION:	Circle er:	rors in red.					
ACTION:	explanation	ns and documen	<pre>ll lab for , make any neces t effect(s) in t</pre>				
15.0 <u>Internal</u>	Standards	(Form VIII)					
ever limi	y sample a	nd blank withi	neas (Form VIII) n the upper and each continuing		W	_	
ACTION:	List each	outlying inte	ernal standard be	low.			
Sample ID	IS #	Area	LowerLimit		Uppe	r Lin	nit
-					>		<del></del> 3i
			heets if necessar				
Note:	Check Tab	le 5, 8270D-41	for associated	analyt	tes.		
ACTION:	outs with non-	ide the upper "J" all posit	andard area coun or lower limit, ive results and ues) quantitated adard.	flag			
		detects associ	ated with IS > 1	00%			

USEPA	Region	II			
SW846	Method	8270D	(Rev. 4,	January	1998

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?

12/

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?

L V\_

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

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

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

# 17.0 Field Duplicates

17.1 Were any field duplicates submitted for semivolatile analysis?

USEPA	Region	II			
SW846	Method	8270D	(Rev. 4,	January	1998)

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.

VWAI-MWOTP-0512 No qualifications
VWAI-MWOTP-0512 per attached
pheet

095

DataQual SVOA

Initial Calibration Date: 6/1/2012

RRF and %RSD Calculations:

Compound Name: naphthalene Lab Value: 1.006

Area of Compound	385375
Area of Internal STD	191614
Conc. of Internal STD	40
Conc. of Compound	80
Calculated RRF	1.006

Compound Name: 2-methylnaphthalene

Lab Value: 5.0

RRF of STD 1	0.711
RRF of STD 2	0.824
RRF of STD 3	0.771
RRF of STD 4	0.734
RRF of STD 5	0.734
RRF of STD 6	0.725
RRF of STD 7	0.759
Calculated % RSD	5.1

Continuing Calibration File ID: 6/4/2012

RRF and %D Calculations:

Compound Name: bis(2-ethylhexyl)phthalate

Lab Value: 0.599

Area of Compound	181980
Area of Internal STD	486010
Conc. of Internal STD	40
Conc. of Compound	25
Calculated RRF	0.599

Compound Name: naphthalene

Lab Value: 0.7

Average RRF	1.056
Calibration Check RRF	1.063
Calculated % D	-0.7

DataQual SVOA

# FIELD DUPLICATE SAMPLE SUMMARY

Sample ID:

VWAI-MW07-0512 VWAI-MW07P-0512

Duplicate Sample ID:

Water: RPD>75% Soil: RPD>100%

Compound	Sample Conc.	Dup. Sample Conc.	%RPD
naphthalene	3.3	3.2	3
2-methylnaphthalene	3.4	3.3	3
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
7.			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
<del>, </del>			#DIV/0!
			#DIV/0!
			#DIV/0!

<sup>\*</sup> one values below LOD only values above LOD listed

COMMENTS:

No qualifications required

SDG SLIØ93

# Standard Operating Procedure

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

✓SOP:	HW-2	Revisio	n 13	Appendix A.1	Sept. 2006
A.I.I	Contra	act Complia	nce Screening F	Report	YES NO N/A
		Present?	<u> </u>		
		ACTION:	If no, contact R	SCC/PO.	
A.I.2	Recor	d of Commu	unication (from F	RSCC)	
		Present?		Å	[_]
		ACTION:	If no, request from	om the RSCC.	
A.1.3	Samp	ling Trip Re	<u>port</u>		~
		Present and	complete?		[_] _
		ACTION:	If no, contact R	SCC/PO.	
A.I.4	Chain	of Custody	/Sample Traffic	Report	
		Present?			
		Legible?			
		Signature of present?	f sample custodia	in ]	
		ACTION: If	no, contact RSC0	C/WAM/PO.	
A.I.5	Cover	Page			s
		Present?			<u> </u>
		and the verb	Page properly file patim signed by the the manager's de	ne lab	<u></u>
		on the Cove	ole identification r r Page agree with n numbers on:		19C
		(a) Traffic R	eport Sheet?		

# Standard Operating Procedure

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program
Data Assessment and Contract Compliance Review

SOP: HW	-2 Revision 13	Appendix A.1	Sept. 2006
(b)	Form I's?	Б.	YES NO N/A
	Is the number of sample Page the same as the r samples on the Traffic I and the Regional Record (ROC) for the data C	number of Report sheet rd of Communication	[]
.40	ACTION: If no for any of the above Telephone Record Log for re-submittal of the confrom the laboratory.	and contact RSCC/PO	
A.1.6 <u>SD</u>	G Narrative, DC-1 & DC-2	Form .	
	Is the SDG Narrative pr	esent?	<u></u>
<u> </u>	Is Sample Log-In Sheet present and complete?	(Form DC-1)	
	Is Complete SDG Inver- present and complete?	tory Sheet(Form DC-2)	
	ACTION: If no, write in the Contra Non-Compliance Sec Narrative.	ction of the Data Review	
A.1.7 <u>Fo</u>	rm I to XV	1	wied ?
A.1.7.1	Are all the Form I through	gh Form XV FORMO DOD QUE	5C 4. 2
	Laboratory Name?	Folding DOD	<u> </u>
	Laboratory Code?	V 0	<u></u>
	RAS/Non-RAS Case No	0.?	<u></u>
$\overline{}$	SDG No.?		

# Standard Operating Procedure

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

✓SOP:	HW-2	Revision 13	Appendix A	.1	Sept. 2006	
		Contract No.?			YES NO N/A	
A.1.7.	2	ACTION:  If no for any of the above Contract Problem/Non-Co of the "Data Review Narra PO for corrected Form(s) After comparing values or against the raw data, do a transcription errors exceed reported values on the Fo	ompliance Section ative" and contact from the laboratory. n Forms I-IX any computation/ ed 10% of the			
	(a) al	l analytes analyzed by ICF	P-AES?		一 四 一	
	(b) al	l analytes analyzed by ICF	P-MS?		_ [_]	
	(c) M	ercury?			_ 🗀	
	(d) C	yanide?			_ [] _ [	
<u> </u>	and c	ON: s, prepare Telephone Reco contact CLP PO/TOPO for from the laboratory.				
A.1.8	hard	<u>Data</u> shall not be validated wi /electronic copies of the data for samples and QC	associated			
A.1.8.	1	Digestion/Distillation Log				
		stion Log for ICP-AES XII)present?			LY	
		stion Log for ICP-MS XII) present?				
		stion Log for mercury n XII) present?	£			
_		ation Log for cyanide 1 XII) present?				
	Are p	H values for metals and			100	Ĉ

# Standard Operating Procedure USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP:	HW-2 Revision 13	Appendix A.1	Sept. 2006
			YES NO N/A
	cyanide reported for each		
	aqueous sample?		
	Are percent colide calculations		/
	Are percent solids calculations present for soils/sediments?		
	process for concretamente.		<b>—</b> —
	Are preparation dates present on the	Tar	
	sample preparation logs/bench sheets	5?	
	NOTE:		
	Digestion/Distillation log must include weights, volu- and dilutions used to obtain the reported results.	umes,	
A.1.8.	2 Is the analytical instrument		
71.1.0	real-time printouts present for:		
	ICP-AES?		
•	ICP-MS?		
	Mercury?		
<b>→</b>	Cyanide?		
	Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:		
	Legible?		Li
	Properly labeled?	ł	W
	Are all field samples, QC samples and field QC samples present on:		
	Digestion/Distillation log?		<u> </u>
	Instrument Printouts?		
	*		
)	ACTION: If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, v Telephone Record Log and contact To for re-submittal from the laboratory.	vrite	

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program
Data Assessment and Contract Compliance Review

SOP: HW-	2 Revision	13	Appendix A.1	Sept. 2006	
				YES NO N/A	
(Exami deten	ne sample Traffic Rep	Times: (Aqueous a orts and digestion/distilla from the sample collection	ation logs to		
A.1.9.1	Cyanide distill	lation(14 days)exc	eded?	_ 🗆 🗸	
	Mercury analy	vsis(28 days) exce	eded?	_ 🗀 🗹	
	Other Metals	analysis(180 days	exceeded?	—M_	
If y		d red-line non-dete ed (J)results > MD served properly.			
In a a lis which be put the (Sulf from Attack	ddition to qualifying the st of all samples and are checkeded the holding prepared. Report for earnumber of days that we btract the sample collers the sample preparation this list to the data regative.	nalytes ng times must ach sample ere exceeded. ction date on date).	1		
A.1.9.2	Is pH of aque	ous samples for:			
Me	etals Analysis 🔄	<u> 2</u> ?		<u> </u>	
Су	anide Analysis	≥ 12?			
lf n	TION: o for any of the ab n-detects as "R" ar				9
A.1.9.3 Is th	ne cooler temper	ature ≤ 10 C°?		<u>L</u> _	
If c	cTION: ooler temperature n-detects as "UJ" a	is >10 °C , flag	<del>1</del>		
A.1.10 <b>Fir</b>	nal Data Correct	ness - Form I			

A.1.10.1

Are Form I's for all samples

# Standard Operating Procedure USEPA Region 2

SOP:	HW-2	Revision 13	Appendix A.1	Sept. 2006
				YES NO N/A
	pres	ent and complete?		<u> </u>
	If no Log	TION: , prepare Telephone Reco and contact CLP PO/TOP mittal from the laboratory.		
A.1.10	0.2		llation and transcription errorcle on each Form I all resu	
		Is the calculation error le	ess than 10% of the correct	result? L
	×	Are results on Form I's r MG/KG for soils)?	eported in correct units (ug	/L for aqueous and
(9		Are results on Form I'S	reported by correct signifi	cant figures? [
		Are soil sample results of corrected for percent so		[_]
		Are all "less than MDL" by the CRQL's and code LOQ s Are values less than the but greater than or equa MDLs flagged with "J"?	with "U"? but down	LODS  1 to [_]  A with
		Are appropriate contract control and Method qualit		
		ACTION:  If no for any of the above prepare Telephone Reconctive PO/TOPO for corrections.	ord Log, and contact	
A.1.10	0.3	Do EPA sample identific and the corresponding la sample identification nur on the Cover Page, Forr in the raw data?	aboratory mbers match	[]
		Was a brief physical des	scription	

# $\begin{array}{c} \textbf{Standard Operating Procedure} \\ \textbf{USEPA Region 2} \end{array}$

SOP: HW-	Revision 13	Appendix A.1	Sept. 2006	
50% <del>M.</del>			YES NO N/A	
	of the samples before and after digestion given on the Form I's?		[_] _	
	Was any sample result outside to mercury/cyanide calibration rangor the ICP-AES/ICP-MS linear radiluted and noted on the Form I?	ge ange	[] <u> </u>	/
	ACTION: If no for any of the above, note the Contract-Problem/Non-Composition of the Data Review Narr	oliance		
A.1.11 <u>Initi</u>	al Calibration			
A.1.11.1	Is a record of at least 2 point (A blank and a standard)calibrate present for ICP-AES analysis?	ion		
<u> </u>	Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?		[	1
	Is a record of at least 5 point cal (a blank & 4 standards)present for H		[] <u>\</u>	_
	Is a record of at least 4 point call (a blank & 4 standards) present for cy		[_]	_
*	ACTION: If incomplete or no initial calibrat was performed, reject (R) and re the associated data (detects & n	d-line		
	Is one initial calibration standard at the CRQL level for cyanide a mercury?		[] <u>\</u>	/
	ACTION: If no, write in the Contract Proble Non-Compliance Section of the I Review Narrative.			
٦.1.11.2	Is the curve correlation coefficient > 0.995 for:			

# Standard Operating Procedure USEPA Region 2

SOP: HW-2	Revision 13	Appendix A.1	Sept. 20	06
	Mercury Analysis?		YES NO :	N/A
	Cyanide Analysis?	30.	[]	V
	ICP-AES(more than 2 point	Calib.)?	[_/]	
~	ICP-MS (more than 2 point	calib.)?	î î	
	ACTION:  If no, qualify the associate results ≥ MDL as estimated non-detects as "UJ".  NOTE:  The correlation coefficient shall be calculated by the data validate using standard concentrations and corresponding instrument response absorbance, peak area, peak height	r the (e.g.		
A.1.12	Initial and Continuing Calib	ration Verification-	Form IIA	
A.1.12.1	Present and complete for emetal and cyanide?	every	[	
e	Present and complete for I and ICP-MS when both these were used for the same and	methods	[]	<u>~</u>
	ACTION:  If no for any of the above Telephone Record Log and of for re-submittal from the	contact PO/TOPO		
A.1.12.2	Was a Continuing Calibrati Verification performed even 10 samples or every 2 hour whichever is more frequent	ery	<u>[ _1 _</u>	
	ACTION:  If no for any of the above in the Contract-Problem/No Section of the Data Review	n-Compliance		
A.1.12.3	Was an ICV or a mid-range distilled and analyzed vit of cyanide samples?	standard h each batch	[]	

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13	Appendix A.1		Sept.	2006	
			YES	NO	N/A	
A.1.12.2	ACTION:  If no for any of the a in the Contract-Proble Section of the Data Requalify results ≥ MDL	m/Non-Compliance view Narrative and				
	Circle on each Form IIA all pe that are outside the contract w					
	Are ICV/CCVs within control li	mits for:				
	Metals - 90-110%R?	8	[ <u>\\</u>	1 _		
	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:					
	Qualify as estimated (J) all de if the ICV/CCV %R is between Qualify only positive results(≥ between 111-125%(121-135% red-line only detects if the recovery is great CN). Reject (R) and red-line a detects)if the recovery is less	n 75-89%(65-79% for Hg; 70-6 MDL) as "J" if the ICV/CCV % 6 for Hg;116-130% for CN). R der than 125% (135% for Hg; Il associated results (hits and	%R is eject (F 130% f non-	R) and		
A.1.12.3	NOTE: For ICV that does not fall within the accequalify all samples reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual reported from the annual rep					
	Was the distilled ICV or mid-rastandard for cyanide within ac limits (85-115%)?		[]	.] _		
	ACTION: If no, Qualify all cyanide result	s ≥ MDL as "J".				

## A.1.13 CRQL Standard Analysis - Form IIB

A.1.13.1 For each ICP-AES run, was a CRI

# Standard Operating Procedure USEPA Region 2

SOP: HW-	·2 Revision 13	Appendix A.1	Sept. 2006
	RQL or MDL when MDL > CRQL ndard analyzed? (Note:CRI is not required Ca, Fe, Mg, Na and K.)	M.	YES NO N/A
	For each ICP-MS run, was a (CRQL or MDL when MDL > CRQL analyzed for each mass/isoto for the analysis?	_) standard	[_]
	For each mercury run, was a standard analyzed?	CRQL	[]
	For each cyanide run, was a standard analyzed?	CRQL	[1 <u>~</u>
ICF ICF Me	ACTION:  If no for any of the above, wre this deficiency in the Contract Non-Compliance Section of the Narrative, inform CLP PO and in the affected ranges (detected and non-detects UJ.  See affected ranges are:  P-AES Analysis - *True Value ± Cleaning Paralysis	et Problems/ the Data Review d flag results ts <2xCRQL)as J  RQL RQL RQL RQL	CRI Atd was not my but a Atd at LOQ was analyzed for Mn
A.1.13.2	Was a CRQL standard analy ICV/ICB, before the final CCV once every 20 analytical sam the analytical run for each an	V/CCB and oples in	[] <u>\</u>
	ACTION: If no, write in the Contract Properties Non-Compliance Section of to "Data Review Narrative".		
A.1.13.3	Circle on each Form IIB all per recoveries that are outside the acceptance windows.		

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	Is the CRQL standard withi	n control	YES NO N/A
	Metals(ICP-AES/ICP-MS)-	70 - 130%?	[]
	Mercury- 70 - 130%?		
	Cyanide - 70 - 130%?		[] <u>~</u>
	ACTION:  If no, flag detects <2xCRQI non-detects as "UJ" if the Corecovery is between 50-699 detects <2xCRQL if the recovery and ≤180%. If the recovery reject(R) and red-lindetects < 2xCRQL, and flag 2xCRQL and ICV/CCV. Redetects <2xCRQL and flag but < ICV/CCV if the recovery	CRQL standard %. Flag(J) only covery is between covery is less than e non-detects and g (J) detects between ject and red-line only (J)detects ≥ 2xCRQL	
	NOTE:  1. Qualify all field samples a previous technically act the CRQL standard and a sanalysis of the CRQL standard; and the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of the crown of	sceptable analysis of subsequent acceptable adard aly the final s when Sample affected ranges outside the standard must be	
A.1.14 <u>Init</u> i	ial and Continuing Calibration	on Blanks - Form III	
A.1.14.1	Present and complete for a the instruments used for the metals and cyanide analyse	е	[
	Was an initial Calibration B analyzed after ICV?	lank	
	Was a continuing Calibration analyzed after every CCV and 10 samples or every 2 hour is more frequent?	and every	
	Were the ICB & CCB value reported on Form III and fla		

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*	using MDLs from direct Method "NP1")? (Check Form III again	analysis(Preparation	<u>YES</u>	NO N/A
	ACTION: If no, inform CLP PO/TO in the Contract-Problem Section of the "Data Re	OPO and make a note		
A.1.14.2	Circle with red pencil or all Calib. Blank values t			
	<u>&gt;</u>	MDL but ≤ CRQL		
	>	CRQL		
A.1.14.2.1	When MDL < CRQL, is value ≥ MDL but ≤ CRC		-	
<b>~</b> )	ACTION:  If yes, change sample redut ≤ CRQL to the CRQD not qualify non-dete	ોL with a⊧"U".		
	/hen MDL < CRQL, is any slue > CRQL?	/ Calib. Blank		[]
*	ACTION:  If yes, reject (R) and recassociated sample resubut <icb blank="" ccb="" redetects=""> ICB/CCB blance &lt; 10xICB/CCB value. Cresults &gt; MDL but &lt; the with a "U".</icb>	ilts > CRQL esult. Flag as "J" nk value but change the sample		
	any Calibration Blank val elow the negative CRQL?		-	[
	ACTION: If yes, flag (J) as estimated associated sample results <10xCRQL.			
*	NOTE:			

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For ICB that does not meet the technical QC Criteria, apply the action to all samples

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	baca noocoomene a	and conteract compri	rance novie	
SOP: HW-2	Revision 13	Appendix A.1	Sep	t. 2006
1,		3335	YES 1	NO N/A
2. For app pre- a su	orted from the analytical run.  CCBs that do not meet the technical QC criterily the action to all samples analyzed between a vious technically acceptable analysis of CCB are absequent technically acceptable analysis of the B in the analytical run.	a nd		
A.1.15	Preparation Blank - FORM NOTE: The Preparation Blank for me is the same as the calibration by	ercury		
A.1.15.1	Was one Preparation Blank with and analyzed for:	k prepared		
	Each Sample Delivery Grow	up (SDG)?	[]	
	Each batch of the SDG sandigested/distilled?	nples		· ·
	Each matrix type?		[1	
	All instruments used for and cyanide analyses?	metals	[1]	
	ACTION:  If no for any of the above as estimated (J) all the positive data <10xMDL for Preparation Blank was not NOTE:  If only one blank was analyzed for than 20 samples, then the first 2 analyzed are not estimated (J), but additional samples must be qualified.	associated r which the t analyzed.  or more consumples all		
A.1.15.2	Circle with red pencil on all Prep. Blank values that			
	≥ MDL but ≤ CRQI	, and		
	> CRQL			
A.1.15.2.1	When MDL < CRQL, is any property value $\geq$ MDL but $\leq$ CRQL?	oreparation blank	_	[_]
	ACTION:  If yes, change sample res	sult > MDL		

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***	but ≤ CRQL to CRQL with a		YES	NO N/A	
	2				
A.1.15.2.2	When the MDL $\leq$ CRQL, is an Blank value greater than i	1978년			
	If yes, is the Prep. Blank greater than the value of Field Blank collected and the SDG samples?	the associated		[]	
	If yes, is the lowest conc that analyte in the associ less than 10 times the Pre Blank value?	ated samples		[]	V
	ACTION:  If yes, reject (R) and red sample results greater that than the Prep.Blank value. detects > Prep. Blank value If the sample result > MDI it with CRQL-U.	n the CRQL but less Flag as "J" e but <10xPrep.Blan	ς.		
	If the Prep. Blank value is analyte value in the Field qualify the sample results Prep. Blank criteria.	Blank, do not	9		
	NOTE: Convert soil sample result to mg/Kg wet weight basis to compare with th Prep. Blank result on Form III.				
A.1.15.2.3	Is the Prep. Blank concent below the negative CRQL?	ration -	[_		_
	ACTION: If yes, flag (J) all associant results less than 1 Qualify non-detects as est	0xCRQL.			
A.1.15.2.4	When the MDL is greater the CRQL, is the preparation be concentration on Form III than two times the MDL?	lank		[ <u>V</u> ]	21
	ACTION:				

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	If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.	YES	NO M	1/ <u>A</u>	540
A:1.16	<pre>ICP-AES/ICP-MS Interference Check Sample (IC NOTE: Not required for CN, Hg, Al, Ca, Fe and Mg.</pre>	(S) - Fo	orm IV		
A.1.16.1	Present and complete?	[/]	_	18	
1001	Was ICS analyzed at the beginning and end of each analytical run, and once for every 20 analytical samples?	[ <u>/</u> ]	_		
	Was ICS analyzed at the beginning of the ICP-MS analytical run?	[]			
	<pre>ACTION: If no, flag as estimated (J) all sample results.</pre>				
A.1.16.2	ICP-AES Method				
A.1.16.2.1	ICSA Solution: For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value?  If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV?	[]			
<i>→</i>	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				

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YES NO N/

for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".

### A.1.16.2.3 ICSAB Solution

For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?

If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?

### ACTION:

If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results  $\geq$  MDL for which the ICSAB analyte recovery is greater than 120% but  $\leq$  150%. If the ICSAB recovery falls within 50-79%, qualify sample results  $\geq$  MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

### A.1.16.3 ICP-MS Method

### A.1.16.3.1 ICSA Solution:

For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?

### ACTION:

If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results  $\geq$  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".

# Standard Operating Procedure USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13	Appendix A.1	Sept. 20	06
			YES NO	N/A
A.1.16.3.3	ICSAB Solution For ICP-MS, are all in ICSAB within the 80-120% of the true, value, whichever is	control limits of established mean	[]	_
	samples reported from Flag (J) as estimated sample results ≥ MDI analyte recovery is ≤ 150%. If the ICSAM 50-79% flag (J) as estimated sample results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample det which the ICSAM analyte results ≥ MDI those all sample results ≥ MDI those all sample results ≥ MD	I for which the ICSAB greater than 120% but B recovery falls within estimated the associated I. Reject (R) and red-lirects and non-detects for lyte recovery is less that y is above 150%, reject (	r an	
1.1.17	Spiked Sample Recove	ery: Pre-Digestion/Pre-Di Ca,Mg,K,and Na(both matric		
A.1.17.1	Was Matrix Spike and	alysis performed:	./	e e e e e e e e e e e e e e e e e e e
	For each matrix type	?	[1	
	For each SDG?		[1	<del>s</del> 3
w	On one of the SDG sa	amples?	[1	
	For each concentration (i.e., low, med., high		[] \(\frac{1}{4}\)	
	For each analytical (ICP-AES, ICP-MS, Hg,		[]	
	Was a spiked sample analyzed with the SI		[] <del></del>	_
	ACTION: If no for any of the estimated(J)all the for which a spiked sanalyzed.	positi!ve data	Flag + resu	lts in
	NOME:			

If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

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SOP: HW-2	Revision 13	Appendix A.1	Se	ept. 200	)6
	· · · · · · · · · · · · · · · · · · ·		YES	<u>NO</u> <u>1</u>	I/A
A.1.17.2	Was a field blank or PE s for the spiked sample ana				<u></u> 3
æ	ACTION:  If yes, flag (J) as estimed data of the associated SD which field blank or PE second for the spiked sample analysis.	G samples for ample was used			
A.1.17.3	Circle on each Form VA al recoveries that are outsi control limits (75-125%) sample concentrations les times the added spike con	de the that have s than four			
24	Are all recoveries within control limits when sample concentrations are less tequal to four times the sequal to four times the sequence of concentrations?  NOTE:  Disregard the out of control serve of concentrations are greater than equal to four times the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and the spike and t	e han or pike  pike	[]	_	
	Are results outside the c (75-125%)flagged with Lab on Form I's and Form VA?		[]	-	~
	ACTION: If no for any of the abov the Contract - Problems/N Section of the Data Revie	on-Compliance			
A.1.17.4	Aqueous				
	Are any spike recoveries:				
	(a) less than 30%?		-	[]	
	(b) between 30-74%?		·	[]	_
	(c) between 126-150%?		( <del></del>	[]	$\rightarrow$
	(d) greater than 150%?			[]	*
	ACTION:  If the matrix spike recov 30%, reject (R) and red-li aqueous data (detects & n between 30-74%, qualify a aqueous data > MDL as "J"	rie all associated on-detects). If ll associated			

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SOP: HW-2	Revision 13	Appendix A.1	Se	pt. 200	6	
			YES	NO N	<u>/ A</u>	
		126-150%, flag (J) $^{\prime}$ . If greater than 150%, ine all associated data $\geq$	MDL.			
	(NOTE:Replace "N" with	"J", "R" as appropriate.)				
A.1.17.5	Soil/Sediment					
	Are any spike recover	ries:			/	
	(a) less than 10%?			[]	V	
	(b) between 10-74%?		32 <u></u>	[]	+	
	(c) between 126-200%	?	5 <del></del>	[]	7	
	(d) greater than 200%	b? /	12 <del></del>	[]	-	
	ACTION:  If yes for any of the as follows:	e above, proceed				
···	if between 126-200%, data $\geq$ MDL as "J" If (R) and red-line all	and red-line all ects & non-detects);			N.	
A.1.18	Lab Duplicates) - Fo	orm VI				
A.1.18.1	Was the lab duplicate	e analysis performed:		1		
	For each SDG?		[]			
	On one of the SDG sam	mples?	[]	_		
	For each matrix type?	?	[]			
	For each concentration (low or med.)?	on range	[]	1	·	
	For each analytical M (ICP-AES/ICP-MS, Hg, CN		[]	+		
	Was a lab duplicate panalyzed with the SDG		r 1	\$		

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			YES	NO N/A
e	ACTION:  If no for any of the estimated all the SDC (detects & non-detect duplicate analysis was	G sample results ts) for which the lab	all +/	- results I-no QC med.
	NOTE:  If more than one lab dupl were analyzed for an SDG, the associated samples ba worst lab duplicate analy	then qualify sed on the	seyor	nea.
A.1.18.2	Was a Field Blank or for the Lab Duplicate	- (5.40	_	( <u>√</u> ) _
ū.	ACTION:  If yes, flag as esting SDG sample results (he for which Field Bland used for duplicate a	nits & non-detects) nk or PE sample was		*
A.1.18.3	Circle on each Form that are:	/I all values		
J	RPD > 20%, or	į		
	Absolute Difference	> CRQL		
	Are all values within limits (RPD $\leq$ 20% or difference $\leq$ $\pm$ CRQL)?		[]	
	If no, are all result control limits flagge (Lab Qualifier) on For all Form I's?	ed with an "*"	[]	
	ACTION:  If no, write in the Connection Non-Compliance Section Review Narrative.			
	NOTE: The laboratory is not requestreport on Form VI the RPD both values are non-detections.	when i		
A.1.18.4	Aqueous			

Aqueous

A.1.18.4.1 When sample and duplicate values are both

 $\geq$  5xCRQL (substitute MDL for CRQL when MDL > CRQL),

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9.	is any RPD > 20% but	< 100%?	YES	NO N/A	
	is any RPD $\geq$ 100%?			[]	
a	ACTION:  If the RPD is > 20% flag (J) as estimate sample data ≥ CRQL. ≥ 100%, reject (R) a associated sample da  (NOTE:Replace "*" with "	d the associated If the RPD is nd red-line the			
A.1.18.4.2		DL for CRQL when MDL >CRQL), erence between sample			
`	> ± CRQL?		<u></u> 7	<u></u>	
_	$> \pm 2xCRQL?$		<u></u> Y	[]	
	<ol><li>If one value is &gt;CRQL calculate the absolute</li></ol>	<pre>l the associated but &lt; 5xCRQL as "J" UJ". If the absolute QL, reject (R) and ociated non-detects</pre>	CRQL		
A.1.18.5	Soil/Sediment	w			
A.1.18.5.1	When sample and dupl are both $\geq$ 5xCRQL (su CRQL when MDL > CRQL),				
	is any RPD $\geq$ 35% but	< 120%?	-		
	is any RPD ≥ 120%?		-	[]	
	<pre>ACTION: If the RPD is &gt; 35% (J) as estimated the</pre>	and < 120%, flag			

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		the RPD is <u>&gt;</u> 120%, reject the associated sample	YES	NO	N/A
A.1.18.5.2	<5xCRQL(substitut	and/or duplicate value e MDL for CRQL when MDL > CRQL), difference between sample			
×	> ± 2 x CRQL?			[]	
	<pre>flag all the ass but &lt; 5xCRQL as If the absolute</pre>	difference is > 2 x CRQL, ociated sample results > MDL "J" and non-detects as "UJ". difference is > 4xCRQL, reject all the associated non-detects	_	[]	

### NOTE .

1. Replace "\*" with "J", "UJ" or "R" as appropriate.)

and detects  $\geq$  MDL but <5xCRQL.

 If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

## A.1.19 Field Duplicates

### Aqueous Field Duplicates

A.1.19.1 Was an aqueous Field Duplicate pair collected and analyzed?
(Check Sampling Trip Report)

## ACTION:

If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

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-	servero de la es os su se		YES	NO	N/A	
	QC criteria stated	in Sections A.1.19.2 and A.1.	.19.3.			
Ī	<ol> <li>Do not calculate RPD</li> <li>Substitute MDL for CR</li> <li>If one value is &gt;CRQL</li> <li>non-detect, calculate</li> </ol>	and the other value is the absolute difference RQL and the MDL, and use				
A.1.19.2	Circle all values of for Field Duplicate	on the Form (Appendix A.4) es that have:	92/			
	RPD ≥ 20% or					
	Difference $> \pm$ CRQI	i				
	When sample and dup both $\geq 5 \times CRQL$ (substimul > CRQL),					
	is any RPD $\geq$ 20%?			[	_1 _/	
/	is any RPD $\geq$ 100%?			[_	_]	
	the associated samp results $\geq$ CRQL. If	but < 100%, flag (J) only ple and its Field Duplicate the RPD is $\geq$ 100%, reject(R) the associated sample and its bult $\geq$ CRQL.				
A.1.19.3	<5xCRQL (substitute	Mor duplicate value(s) MDL for CRQL when MDL >CRQL), ference between sample				
	> ± CRQL?		_	[		
	> <u>+</u> 2 x CRQL?		1	[		
		3				
		ference is > CRQL, but < 5xCRQL as "J"				

is > 2xCRQL, reject (R) and red-line non-detects

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	and results ≥ MDL but <5 and its Field Duplicate.		YES	NO N/A
	Soil/Sediment Field Du	uplicates		
A.1.19.4	Was a soil field duplica collected and analyzed? (Check Sampling Trip Repor		[]	/
	ACTION:  If yes, for each soil Figure proceed as follows:			
	Prepare Appendix A.4 for pair. Report on Appendix Field Duplicate results respective Form I's. Calsample and its duplicate than 5xCRQL. Calculate absolute difference when (sample or duplicate) is Field Duplicate analysis QC Criteria stated in Se	x A.4 all sample and its in MG/KG from their loulate and report RPD was values are both greated and report the n at least one value < 5xCRQL. Evaluate the s in accordance with the	when er	
	NOTE:  1. Do not transfer "*" from F  2. Do not calculate RPD when  3. Substitute MDL for CRQL whe  4. If one value is >CRQL and t value is non-detect, calcul absolute difference between value > CRQL and the MDL, a the criteria to qualify the	both values are non-detects. en MDL > CRQL. the other tate the tive and apply		
	6			
A.1.19.5	Circle on each Appendix values that have:	A.4 all		
	RPD $\geq$ 35%, or Difference When sample and duplicat are both $\geq$ 5xCRQL (substance CRQL when MDL > CRQL),	te values		
划	is any RPD $\geq$ 35% but < 1	120%?		[] ~
	is any RPD ≥ 120%?	œ.	¥	[_] _
		8		

ACTION:

If the RPD is  $\geq$  35% but < 120%,

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ene	flag only the associated sample and its Field Duplicate resured to ERQL as "J". If the RPD is reject (R) and red-line only and its Field Duplicate resured.	lts ≥ 120%, the sample	YES	NO N/	<u>A</u>
A.1.19.6	When the sample and/or duplic <5xCRQL (substitute MDL for CRC is the absolute difference beand Field Duplicate:	QL when MDL > CRQL),			
	$> \pm 2 \times CRQL$ ?			[]	_
	> <u>+</u> 4 x CRQL?			[]	
J.	ACTION:  If the absolute difference i Sample and its Field Duplica but <5xCRQL as "J" and non-define difference is >4xCRQL red-line non-detects and det <5xCRQL of the sample and it.	te resuts $\geq$ MDL etects as "UJ". , reject(R) and ects $\geq$ MDL but			
A.1.20	Laboratory Control Sample (L	CS) - Form VII			
A.1.20.1	Was one LCS prepared and ana	lyzed for:			
	Each SDG?				_
	Each matrix type?		[]		
	Each batch samples digested/efor each Method(ICP-AES,ICP-lused?				_
	Was an LCS prepared and analythe samples?  ACTION:  If no for any of the above, Telephone Record Log and controls.	prepare	[1]		_
	CLP PO or TOPO for submittal LCS results. Flag (J) as est the data for which an LCS was analyzed.	of the imated all			
	NOTE: If only one LCS was analyzed for				

# Standard Operating Procedure USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13 App	pendix A.1	Se	pt. 2006
×	more than 20 samples, then the first 20 samples analyzed are not flagged (but all additional samples must be qualified (J).		YES	NO N/A
A.1.20.2	Aqueous LCS			
	Circle on each Form VII the LC recoveries outside control lim			
	NOTE: 1.Use digested ICV as LCS for 2.Use distilled ICV as LCS for			
903	8			
	Is any LCS recovery:			1
	Less than 50%?	,		[]
	Between 50% and 79%?	*	-	[]
	Between 121% and 150%?	4		[]
	Greater than 150%?			[ <u>w</u> ]
	ACTION:  If the LCS recovery is less the reject (R) and red-line all as sample data (detects & non-detected a recovery between 50-79%, flas "J" all non-detects as "UJ" recovery is between 121-150%, detects as "J". if the recover than 150%, reject (R) and red-		all	recoveries ere good.
A.1.20.3	Solid LCS			
	If an analyte's MDL is equal to greater than the true value of disregard the "Action" below for analyte even though the LCS is control limits.	LCS, or that		
	Is the LCS "Found" value great than the Upper Control Limit	er		

ACTION:

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13 Appe	endix A.l	Se	pt. 2006
	If yes, flag $(J)$ all the associated detects $\geq$ MDL as estimated $(J)$ .	ated	YES	NO N/A
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?		_	[] _
	ACTION: If yes, flag detects as "J" and non-dectes as "UJ".			
A.1.21	ICP-AES/ICP-MS Serial Dilution NOTE: Serial dilution analysis is required when the initial concentration is equal greater than 50 x MDL.	red only		
A.1.21.1	Was a Serial Dilution analysis performed:			/
	For each SDG?		[]	
	On one of the SDG samples?		[]	<u> </u>
	For each matrix type?		[]	<del>-</del> -
10	For each concentration range (low or med.)?		[]	
	Was a Serial Dilution sample analyzed with the SDG samples?		[]	<b>*</b>
	ACTION:  If no for any of the above, flag as estimated (J) detects ≥ MDL all the SDG samples for which the ICP Serial Dilution Analysis was not performed.	g of he s	- all	+-no SD
A.1.21.2	Was a Field Blank or PE sample of for the Serial Dilution Analysis		<del></del>	
	ACTION:  If yes, flag as estimated (J) do  ≥ MDL of all the SDG samples	etects		
A.1.21.3	Circle on Form VIII the Percent (%D) between sample results and			

results that are outside the control limits  $\pm$  10%

Standard Operating Procedure
USEPA Region 2
Evaluation of Metals Data for the Contract Laboratory Program
Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13	Appendix A.1	Se	pt. 2006
	when initial concentrations	s ≥ 50 x MDLs.	YES	NO N/A
	Are results outside the collimits flagged with an "E" on Form VIII and all Form	(Lab Qualifier)	[]	/
	ACTION:  If no, write in the Contract Non-Compliance Section of the Review Narrative.			
A.1.21.4	Are any %D values:			2
	> 10%?			[]
	≥ 100%?			
	ACTION:  If the Percent Difference greater than 10%, flag (J) all associated samples whose if the %D is ≥ 100%, rejected all associated samples with	as estimated se <b>raw data</b> ≥ MDL; ct (R) and red-line		
_	(NOTE: Replace "E" with "J" or	"R" as appropriate.)		
A.1.22	Total/Dissolved or Inorgan	ic/Total Analytes		
A.1.22.1	Were any analyses performed dissolved as well as total on the same sample(s)? Were any analyses performed inorganic as well as total on the same sample(s)?	analytes d for	_	
	ACTION:  If yes, prepare a Form (Approximate to compare the differences dissolved (or inorganic) and analyte concentrations. Condifference on Appendix A.5 of the total analyte only withe following conditions and	between d total mpute each as a percent when both of		3
	<ul><li>(1) The dissolved(or inorgatis greater than total cond</li><li>(2) greater than or equal total</li></ul>	centration, and		
A.1.22.2	Is any dissolved (or inorgation concentration greater than total concentration by more	its .	_	[_] <u>/</u>

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

√SOP: HW-2	Revision 13	Appendix A.1	Se	pt. 2006
		-8-8-	YES	NO N/A
A.1.22.3	Is any dissolved(or inorgation concentration greater than total concentration by more	n its	1 <del>7</del>	[]
	ACTION: If the percent difference than 20%, flag (J) both diand total concentrations at the difference is more than and red-line both the value.	issolved/inorganic as estimated. If an 50%, reject (R)		
A.1.23	Field Blank - Form I NOTE: Designate "Field Blank	c" as such on Form I		×.
A.1.23.1	Was a Field/Rinsate Bank of and analyzed with the SDG		[]	
	If yes, is any Field/Rinsa absolute value of an analy greater than its CRQL(or 2	yte on Form I		
_	If yes, circle the Field I on Form I that is greater CRQL, (or 2 x MDL when MDL > CR	than the		
	Is any Field Blank value of than CRQL also greater the Preparation Blank value?			
	If yes, is the Field Blank (> CRQL and > the prep. blank already rejected due to ot criteria?	lank value)	[]	
	ACTION: If the Field Blank value w	was not rejected		

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 \le CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

Standard Operating Procedure
USEPA Region 2
Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-	Revision 13	Appendix A.1	Sep	ot. 2	006
	Prep.Blank value, do not que results due to the Field Bl	ualify the sample	YES	NO	<u>N/A</u>
	NOTE:  1. Field Blank result previously due to other criteria cannot be qualify field samples.  2. Do not use Rinsate Blank associate to qualify water samples.	ciated with		6	
A.1.24	Verification of Instrumenta	al Parameters - Form	a IX, XA, XI	B, XI	
A.1.24.1	Is verification report pres	sent for:			
	Method Detection Limits (Fo	orm IX-Annually)?			
	<pre>ICP-AES Interelement Correct (Form XA &amp; XB -Quarterly)?</pre>	ction Factors	[]		-
	<pre>ICP-AES &amp; ICP-MS Linear Rar (Form XI-Quarterly)?</pre>	nges	[_]		1 <del></del> X
$\smile$	ACTION: If no, contact CLP PO/TOPO submittal from the laborate				
A.1.24.2	Method Detection Limits - Fo	orm IX			
A.1.24.2.	l Are MDLs present on Form I	<pre>   for: </pre>	/		
	All the analytes?		[]		
	All the instruments used?		[ 1		
	Digested and undigested samples and Calib.Blanks?		[]	_	
e e	ICP-AES and ICP-MS when bot instruments are used for the same analyte?		[]		_
-	ACTION:  If no for any of the above, Telephone Record Log and corpo/TOPO for submittal of the laboratory. Report to Coverite in the Contract Problem Non-Compliance Section of the Narrative if the MDL concerns.	ontact CLP ne MDLs from CLP PO and Lems/ the Data Review			

less than 1/2 CRQL.

Standard Operating Procedure
USEPA Region 2
Evaluation of Metals Data for the Contract Laboratory Program
Data Assessment and Contract Compliance Review

✓SOP: HW-2	Revision 13	Appendix A.1	Se	pt. 2006
A.1.24.2.2	Is MDL greater than the CAG for any analyte?	ΣΓ	YES	NO N/A
	If yes, is the analyte conce on Form I greater than 5 x the sample analyzed on the whose MDL exceeds CRQL?	MDL for	[]	
	ACTION: If no, flag as estimated (divalues less than five times the analyte whose MDL exceeds	MDL for		
A.1.24.3	Linear Ranges - Form XI			
A.1.24.3.1	Was any sample result higher the high linear range for 1 or ICP-MS?		0	
	Was any sample result higher the highest calibration state for mercury or cyanide?		7 <u> </u>	
J	If yes for any of the above the sample diluted to obta- result reported on Form I?		[]	/
	ACTION: If no, flag (J) as estimate affected detects ( $\geq$ MDL) reon Form I.			
A.1.25	ICP-MS Tune Analysis - For	em XIV		
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	?	[]	
	ACTION:  If no, reject (R) and red-l sample data for which tunin performed.			
A.1.25.2	Was the tuning solution and or scanned at least five to consecutively?		[]	
	Were all the required isoto spanning the analytical ran present in the tuning solut	nge	[]	
<u> </u>	Was the mass resolution wit	chin		

# $\begin{array}{c} \textbf{Standard Operating Procedure} \\ \textbf{USEPA Region 2} \end{array}$

OP: HW-2	Revision 13 Ap	pendix A.l		Sept. 2	006
			YES	NO N/	A
0.1 amu fo	r each isotope in the tuning solution?		[]	<del></del>	$\underline{\checkmark}$
	Was %RSD less than 5% for isotope of each analyte in tuning solution?		[]		$ \underline{\checkmark} $
	ACTION:  If no for any of the above all results > MDL associat  Tune as estimated "J", and associated with that Tune	ed with that all non-detects			
A.1.26	ICP-MS Internal Standards	- Form XV			
A.1.26.1	Were the Internal Standard to all the samples and all samples and calibration st (except the Tuning Solutio	QC andards	[]		<u> </u>
	Were all the target analytemasses bracketed by the ma of the five internal stand	sses	[]		1
	ACTION:  If none of the Internal St added to the samples, reject red-line all the associate (detects & non-detects). I standards were used but ditte analyte masses, reject only the analyte results not the internal standard mass	ct (R) and d sample data f internal d not cover all (R) and red-line ot bracketed by			
A.1.26.2	Was the intensity of an In Standard in each sample wi of the intensity of the sa Standard in the calibration	thin 60-125% me Internal	[]		<u>~</u>
	If no, was the original saturate two fold, Internal Standard sample re-analyzed?	######################################	[]		$\checkmark$
	Was the %RI for the two fo within the acceptance limit		[]	<u></u>	_
	ACTION: If no for any of the above as "J" and non-detects "UJ analytes with atomic masse	" of all the			
	atomic mass of the interna	l standard lighter			

Standard Operating Procedure

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program

Data Assessment and Contract Compliance Review

_OP: HW-2	Revision 13	Appendix A.2	Sept. 2006
than the a	affected interna	al standard, and the	
	atomic mass of	the internal standard he	avier
	than the affect	cted internal standard.	
A.1.27	Percent Solids	of Sediments	
	***************************************		
A.1.27.1	Are percent so	olids in sediment(s):	
	< 50%?		r 1
	< 50%:		
	ACTION:		
		y as estimated (J) all de	
		a sample that has percen	
	less than 50%	(i.e., moisture content greate	er than 50%).
	NOTE:		
	Flag(J) only the		
	that were not produce to other QC of		
	AMERICAN TO STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE		
T.norgani	ic Data Revi	ew Narrative	,
$\mathcal{L}_{i}$			
			/
Case#		Site:	Matrix: Soil
SDG#		Lab:	Water
			7
Sampling 7	ream:	Reviewer:	Other
A.2.1 Data	a Validation Fla	ags:	
			in red by the data validator and must
	considered by		espect of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of the sea of t
220			
J -	Thi	s flag indicates the resul	It qualified as <b>estimated</b>
Rano	d Red-Line - A	red-line drawn through a s	ample result indicates unusable value.
-,			to contain significant errors based of
,	doc	cumented information and m	ust not be used by the data user.
/	m)		
/υ-		S data validation qualification when associated blank	er is applied to sample results
/	≥ 1	when associated brank	is contaminated
Fully	Usable Data -/	The results that do not	carry "J" or "red-line" are fully
		<u>usable</u> .	
- \	. /		
	oratory Qualific		lifian an all
_ Ine	chr ranotatory	applies a contractual qual	illiet ou all

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### Worksheets - Metals

## SAMPLE CALCULATION

EPA SAMPLE ID:

VWAI-MW05-0512

COMPOUND:

Manganese 1230 ug/L

CONCENTRATION: %Solids –

NA

Raw Data result: 1.2334 mg/L

1.2334 mg/L (1000 ug/1mg) = 1233.4 ug/L

## FIELD DUPLICATE SAMPLE SUMMARY

Note: All reported results are noted in the table below because the client requested that the MDL be used as reporting limit instead of the RL for this project. RPDs or absolute differences were calculated based on Region II guidelines: if results are >5X RL RPD is calculated, if results are <5X RL the absolute difference is calculated. Flags are applied to field duplicate pair only as follows: For RPD values - RPD  $\ge$  35% but <120% results are J, RPD >120%, results are R. For absolute difference values - >+/-2X RL results are J, >+/-4X RL results are R.

Sample ID:

none

Duplicate Sample ID:

Analyte	Sample Conc.	Duplicate Conc.	RPD or absolute difference
			0.000
			#DIV/0!

Comments:

No qualifications required.

Sample ID:

none

Duplicate Sample ID:

Analyte	Sample Conc.	Duplicate Conc.	RPD or absolute difference
			0.000
		;	0.000

Comments:

No qualifications required.

Reviewer

Date: 7/27/6



## **Environmental Services, LLC**

CH2M HILL 5701 Cleveland Street Suite 200 Virginia Beach, VA 23462

January 25, 2013 SDG# SL2472, Spectrum Analytical, Inc. Viegues Island, Puerto Rico, CTO-083

Dear Ms. Dean,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # SL2472. 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 metals in this SDG (SW-846 method 6010B). The Region II Standard Operating Procedure for the Evaluation of Metals Data for the CLP was used as applicable for the metals data. 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	SVOA	Fe, Mn
VWAJ-MW04-1112	L2472-01	water	X	X	X
VWAI-EB01-112812	L2472-02	water	X	Х	
VWAI-MW05-1112	L2472-03	water	X	X	X
VWAI-TB01-112812	L2472-04	water	X		
VWAI-MW07-1112	L2472-05	water	X	X	X
VWAJ-MW07P-1112	L2472-06	water	X	X	
VWAI-EB01-112912	L2472-07	water	X	X	
VWAI-TB01-112912	L2472-08	water	X		
VWAI-MW04-1112	L2472-01MS	water	X	X	
VWAJ-MW04-1112	L2472-01MSD	water	X	X	

The following quality control samples were provided with this SDG: samples VWAI-TB01-112812 and VWAI-TB01-112912-trip blanks; sample VWAI-EB01-112812 and VWAI-EB01-112912-equipment blanks; and sample VWAI-MW07P-1112-field duplicate of sample VWAI-MW07-1112.

The samples were evaluated based on the following criteria:

- Data Completeness
- Sample Condition
- Technical Holding Times
  - MS Tuning
- GC/MS Tuning

•	GC Performance	*
•	ICP MS Tuning	*
•	Initial/Continuing Calibrations	*
•	ICSA/ICSAB Standards	*
•	RL Standards	*
•	Blanks	*
•	Internal Standards	*
•	Surrogate Recoveries	*
•	Laboratory Control Samples	*
•	Matrix Spike Recoveries	
•	Matrix Duplicate RPDs	
•	Serial Dilutions	*
•	Field Duplicates	
•	Identification/Quantitation	*
•	Reporting Limits	*
•	Tentatively Identified Compounds	NA

## 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**

The field duplicate pair exhibited non-compliant field duplicate reproducibility which resulted in qualifications to the data.

## **SVOA**

The field duplicate pair exhibited non-compliant field duplicate reproducibility which resulted in qualifications to the data.

<sup>\* -</sup> indicates that qualifications were not required based on this criteria

## **Select Filtered Metals**

The laboratory did not perform a matrix spike or a matrix duplicate in this SDG. These QC samples are required by Region II. Qualifications were required.

## Specific Evaluation of Data

## **Data Completeness**

The SDG was received complete and intact. Resubmissions were not required.

## **Technical Holding Times**

According to chain of custody records, sampling was performed on 11/28-29/12 and samples were received at the laboratory 11/29-30/12. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

## Matrix Spike/Matrix Duplicate

## Select Filtered Metals

The laboratory did not perform a matrix spike/matrix duplicate on a field sample from this SDG. Region II required that all positive and non-detect results be qualified as estimated J/UJ because of this. Therefore, the reported results for iron and manganese were qualified as estimated J/UJ with a qualifier code of OT.

## **Field Duplicates**

### VOA

Sample VWAI-MW07-1112 and duplicate sample VWAI-MW07P-1112 exhibited non-compliant field duplicate reproducibility for benzene with 200% RPD; therefore the results for this compound were qualified as estimated (J/UJ), qualifier code: FD.

## **SVOA**

Sample VWAI-MW07-1112 and duplicate sample VWAI-MW07P-1112 exhibited non-compliant field duplicate reproducibility for 2-methylnaphthalene with 200% RPD; therefore the results for this compound were qualified as estimated (J/UJ), qualifier code: FD.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Jacqueline Cleveland

Vice President

## **Summary of Data Qualifications**

## <u>VOA</u>

Sample ID	Compound	Results	Q flag	Q Code
VWAI-MW07-1112, VWAI-MW07P-1112	benzene	+/-	J/UJ	FD

## **SVOA**

Sample ID	Compound	Results	Q flag	Q Code
VWAI-MW07-1112, VWAI-MW07P-1112	2-methylnaphthalene	+/-	J/UJ	FD

## Select Filtered Metals

Sample ID	Analyte	Results	Q flag	Q Code
all samples	iron, manganese	+/-	J/UJ	OT

## Glossary of Qualification Flags and Abbreviations

## **Qualification Flags (Q-Flags)**

- U not detected above the reported sample quantitation limit
- estimated value J
- UJ reported quantitation limit is qualified as estimated
- analyte has been tentatively identified N
- analyte has been tentatively identified, estimated value JN
- 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 LOD (2X sample LOD for common laboratory contaminants) when the blank value is less than the LOD. The sample result for

the blank contaminant is not qualified with any blank qualifiers.

LOD The sample result for the blank contaminant is less than the LOD (2X sample LOD for common laboratory contaminants) but greater than the MDL when the blank value is less than the LOD. The sample result for the blank contaminant is changed to the LOD and

qualified as non-detect U.

## **Inorganic Methods**

## ICB/CCB/PB Action:

- No Action The sample result is greater than the LOD 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 LOD, result is reported as non-detect at the LOD, when the ICB/CCB/PB result is less or greater than the LOD.
- R-Sample result is greater than the LOD and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the LOD.
- 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 LOD.
- Sample result is less than 10X LOD when blank result is J/UJ below the negative LOD.

CH2M HILL Vieques Island, Puerto Rico, CTO-083 AOC-I SDG# SL2472

## Glossary of Qualification Flags and Abbreviations, continued

## 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 LOD 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 LOD, result is reported as non-detect at the LOD, when the FB result is less or greater than the LOD.

R - Sample result is greater than the LOD and less than the FB value when the FB value is greater than the LOD.

J - Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the LOD.

#### **General Abbreviations**

RL	reporting limit
MDL	method detection limit
IDL	instrument detection limit
LOD	Level of Detection
LOD	Level of Quantitation
+	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
ССН	Continuing Calibration - High Recovery or %Difference
LD	Lab Duplicate Reproducibility
нт	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
ОТ	Other - explained in data validation report
%SOL	High moisture content

EPA SAMPLE NO.

VWAI-MW04-1112

Lab Name: 5	Jab Name: SPECTRUM ANALYTICAL, INC.			Contract:			W		
Lab Code: N	MITKEM Case No.:	L2472		Mod. Ref N	No.:	13	SDG No.:	SL2472	!
Matrix: (SOIL/SED/WATER) WATER				Lab Sample	e ID:	L2472-01	Α		
Sample wt/vo	ol:5.00 (g/mL)	ML		Lab File	ID:	V500540.	D		
Level: (TRA	CE/LOW/MED) LOW			Date Recei	ived:	11/29/20	12		
% Moisture:	not dec.			Date Analy	yzed:	11/30/20	12	_	
GC Column:	DB-624 ID:	0.25	(mm)	Dilution H	Factor:	1.0			
Soil Extract	t Volume:	184	(uL)	Soil Aliqu	ot Vol	ume:			(uL
Purge Volume	e: <u>5.0</u>		(mL)						
CAS NO.	COMPOUND		CONC	ENTRATION:	Q	DL	LOD	LOQ	7
	1,2-Dichloroethane			UG/L 0.50	U	0.41	0.50	5.0	_
TOTAL DESIGNATION OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY	71-43-2 Benzene			2.2	J	0.33	0.50	5.0	
	1 2-Dichloropropage				II	0.61	1 0	5.0	-



EPA SAMPLE NO.

VWAI-EB01-112812

Lab Name: 5	SPECTRUM ANALYTICAL, INC.				Contract:			16		
Lab Code: N	MITKEM C	ase No.:	L2472		Mod. Ref 1	No.:	-	SDG No.:	SL2472	2
Matrix: (SO	IL/SED/WATER)	WATER			Lab Sample	e ID:	L2472-02	A		
Sample wt/v	01:5.00	(g/mL)	ML		Lab File	ID:	V500541.	D		
Level: (TRA	CE/LOW/MED) Lo	WC			Date Recei	ived:	11/29/20	12		
% Moisture:	not dec.				Date Analy	yzed:	11/30/20	12		
GC Column:	DB-624	ID:	0.25	(mm)	Dilution H	actor:	1.0			
Soil Extrac	t Volume:			(uL)	Soil Aliqu	ot Vol	ume:			(uL)
Purge Volume	e: <u>5.0</u>	-		(mL)						
CAS NO.	COMPOUND			CONC	ENTRATION:	Q	DL	LOD	LOO	
		and a			UG/L	580				
107-06-2	1,2-Dichloroet	chane			0.50	U	0.41	0.50	5.0	
71-43-2	71-43-2 Benzene		Text as	0.50	U	0.33	0.50	5.0		
78-87-5	1,2-Dichlorop	copane			1.0	U	0.61	1.0	5.0	



EPA SAMPLE NO.

VWAI-MW05-1112

Lab Name: 5	SPECTRUM ANALYT	CICAL, IN	IC.		Contract:		8		F:	
Lab Code: N	MITKEM Ca	ase No.:	L2472	Mod. Ref		No.:	11	SL2472	2	
Matrix: (SO	IL/SED/WATER)	WATER			Lab Sample	e ID:	L2472-03	A		
Sample wt/vo	ol:5.00	(g/mL)	ML		Lab File 1	ID:	V500544.	D		
Level: (TRAC	CE/LOW/MED) LO	W			Date Recei	lved:	11/29/20	12		
% Moisture:	not dec.				Date Analy	yzed:	11/30/20	12		
GC Column:	DB-624	ID:	0.25	(mm)	Dilution E	Factor:	1.0			
Soil Extract	t Volume:			(uL)	Soil Aliqu	ot Vol	ume:		-	(uL)
Purge Volume	e: <u>5.0</u>	-		(mL)						
CAS NO.	COMPOUND			CONC	ENTRATION:	Q	DL	LOD	LOQ	7
107-06-2	1,2-Dichloroethane				0.50	U	0.41	0.50	5.0	_
71-43-2	71-43-2 Benzene				0.50	U	0.33	0.50	5.0	
78-87-5	1 2-Dichloropy	conana		11 2	1.0	11	0.61	1 0	5.0	



EPA SAMPLE NO.

VWAI-TB01-112812

5.0

Lab Name: SPECTRUM ANALYTICAL, INC.	Contract:
Lab Code: MITKEM Case No.: L2472	Mod. Ref No.: SDG No.: SL2472
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: L2472-04A
Sample wt/vol: 5.00 (g/mL) ML	Lab File ID: V500542.D
Level: (TRACE/LOW/MED) LOW	Date Received: 11/29/2012
% Moisture: not dec.	Date Analyzed: 11/30/2012
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
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



78-87-5 1,2-Dichloropropane

0.61

EPA SAMPLE NO.

VWAI-MW07-1112

Lab Name: SPECTRUM	ANALYTICAL, IN	VC.	Contract:			¥			
Lab Code: MITKEM	Case No.:	L2472		Mod. Ref N	No.:		SDG No.:	SL2472	(
Matrix: (SOIL/SED/W	ATER) WATER			Lab Sample	e ID:	L2472-05	A		-
Sample wt/vol:	5.00 (g/mL)	ML		Lab File 1	D:	V500545.	D		
Level: (TRACE/LOW/M	ED) LOW			Date Recei	.ved:	11/30/20	12		
% Moisture: not dec				Date Analy	zed:	11/30/20	12		
GC Column: DB-624	ID:	0.25	(mm)	Dilution E	actor:	1.0			
Soil Extract Volume			(uL)	Soil Aliqu	ot Vol	ume:			(uL)
Purge Volume: 5.0			(mL)						
CAS NO. COMPOUN	1D		CONC	ENTRATION:	Q	DL	LOD	LOQ	
107-06-2 1 2-Dick	loroethane			0.50	r1	0.41	0.50	5.0	-

0.82

0.33

0.61

0.50

M1513

71-43-2 Benzene

78-87-5 1,2-Dichloropropane

EPA SAMPLE NO.

VWAI-MW07P-1112

Lab Name: 5	SPECTRUM ANAL	YTICAL, IN	ic.		Contract:					
Lab Code: N	MITKEM	Case No.:	L2472		Mod. Ref	No.:		SDG No.:	SL2472	2
Matrix: (SO	IL/SED/WATER)	WATER			Lab Sampl	e ID:	L2472-06	A		
Sample wt/vo	5.0	0 (g/mL)	ML		Lab File	ID:	V500546.I	0		
Level: (TRAC	CE/LOW/MED)	LOW			Date Rece	ived:	11/30/20	12	G -	2
% Moisture:	not dec.				Date Anal	yzed:	11/30/201	12		
GC Column:	DB-624	ID:	0.25	(mm)	Dilution	Factor:	1.0		- 10	
Soil Extract	t Volume:			(uL)	Soil Aliq	uot Vol	Lume:			(uL)
Purge Volume	e: <u>5.0</u>			(mL)						
CAS NO.	COMPOUND			CONC	ENTRATION:	Q	DL	LOD	LOQ	7
107-06-2	1,2-Dichloro	ethane			0.50	U_	0.41	0.50	5.0	٦.
71-43-2	Benzene				0.50	D	0.33	0.50	5.0	TILTER

1.0

0.61

M73

78-87-5 1,2-Dichloropropane

EPA SAMPLE NO.

VWAI-EB01-112912

Lab Name: 5	SPECTRUM ANALYI	CICAL, IN	ic.		Contract:			**		
Lab Code: N	MITKEM Ca	ase No.:	L2472	<u> </u>	Mod. Ref 1	No.:		SDG No.:	SL2472	3
Matrix: (SO	IL/SED/WATER)	WATER			Lab Sample	e ID:	L2472-07	A		
Sample wt/ve	01: 5.00	(g/mL)	ML		Lab File 1	ID:	V500547.1	D		
Level: (TRA	CE/LOW/MED) LO	ν			Date Recei	ived:	11/30/20	12		
% Moisture:	not dec.				Date Analy	yzed:	11/30/20	12		
GC Column:	DB-624	ID:	0.25	(mm)	Dilution I	Factor:	1.0			
Soil Extrac	t Volume:			(uL)	Soil Aliqu	ot Vol	ume:			(uL)
Purge Volume	e: <u>5.0</u>			(mL)						
	1			CONC	ENTRATION:	1				7
CAS NO.	COMPOUND				UG/L	Q	DL	LOD	LOQ-	
107-06-2	1,2-Dichloroet	hane			0.50	U	0.41	0.50	5.0	7
71-43-2 Benzene				0.50	U	0.33	0.50	5.0		
78-87-5	1,2-Dichloropr	opane			1.0	U	0.61	1.0	5.0	



EPA SAMPLE NO.

VWAI-TB01-112912

Lab Name: SPECTRUM ANALYTICAL, INC.	Cont	ract:				
Lab Code: MITKEM Case No.: L2472	Mod.	Ref No.:		SDG No.:	SL2472	2
Matrix: (SOIL/SED/WATER) WATER	Lab :	Sample ID:	L2472-08.	A		
Sample wt/vol: 5.00 (g/mL) ML	Lab l	b File ID: V500543.D				
Level: (TRACE/LOW/MED) LOW	Date	Received:	11/30/20	12		
% Moisture: not dec.	Date	Analyzed:	11/30/20	12		
GC Column: DB-624 ID: 0.25	(mm) Dilu	ion Factor	: 1.0			
Soil Extract Volume:	(uL) Soil	Aliquot Vo	lume:			(uL)
Purge Volume: 5.0	(mL)					
	CONCENTRA	TION:			*	7
CAS NO. COMPOUND	UG/L	Q	DL	LOD	LOQ	
107-06-2 1,2-Dichloroethane	(	0.50 U	0.41	0.50	5.0	
71-43-2 Benzene	(	.50 U	0.33	0.50	5.0	
78-87-5 1,2-Dichloropropane	1	.0 U	0.61	1.0	5.0	



EPA SAMPLE NO.

VWAI-MW04-1112MS

Lab Name: S	ab Name: SPECTRUM ANALYTICAL, INC.				Contract:					
Lab Code: 1	MITKEM Ca	ase No.:	L2472		Mod. Ref N	0.:		SDG No.:	SL2472	2
Matrix: (SO	IL/SED/WATER)	WATER			Lab Sample	ID:	L2472-012	AMS		
Sample wt/v	ol: 5.00	(g/mL)	ML		Lab File I	D:	V500528.1	)		
Level: (TRA	CE/LOW/MED) LO	WC			Date Recei	ved:	11/29/20	12		2001
% Moisture:	not dec.				Date Analy	zed:	11/30/20	12		
GC Column:	DB-624	ID:	0.25	(mm)	Dilution F	actor	: 1.0			
Soil Extrac	t Volume:			(uL)	Soil Aliqu	ot Vol	lume:			(uL)
Purge Volume	e: 5.0			(mL)						
CAS NO.	COMPOUND	<u> </u>		CONC	CENTRATION:	Q	DL	LOD	LOQ	
107-06-2	1,2-Dichloroethane				46		0.41	0.50	5.0	
71-43-2	Benzene				49		0.33	0.50	5.0	
78-87-5	1 2-Dichloropr	conana			17		0.61	1.0	5.0	



EPA SAMPLE NO.

VWAI-MW04-1112MS D

Contract:						
	Mod. Ref N	0.:	SDG No.: SL2472			
	Lab Sample	ID:	L2472-01	AMSD		
	Lab File ID: V500529.D					
	Date Recei	ved:	11/29/20	12		
	Date Analy	zed:	11/30/20	12		
(mm)	Dilution F	actor:	1.0			
(uL)	Soil Alique	ot Vol	.ume:	-		(uL)
(mL)						
CONC		0	DL	LOD	LOO	7
						4
					-	
	47		0.61	1.0	5.0	$\dashv$
	(mm) (uL) (mL)	Lab Sample Lab File I Date Recei Date Analy  (mm) Dilution F  (uL) Soil Alique  (mL)  CONCENTRATION: UG/L  46 49	Lab Sample ID:  Lab File ID:  Date Received:  Date Analyzed:  (mm) Dilution Factor:  (uL) Soil Aliquot Vol  (mL)  CONCENTRATION:  UG/L  46  49	Lab Sample ID: L2472-01.  Lab File ID: V500529.  Date Received: 11/29/20  Date Analyzed: 11/30/20  (mm) Dilution Factor: 1.0  (uL) Soil Aliquot Volume:  (mL)  CONCENTRATION: UG/L Q DL 46 0.41 49 0.33	Lab Sample ID: L2472-01AMSD  Lab File ID: V500529.D  Date Received: 11/29/2012  Date Analyzed: 11/30/2012  (mm) Dilution Factor: 1.0  (uL) Soil Aliquot Volume:  (mL)  CONCENTRATION: Q DL LOD  46 0.41 0.50 49 0.33 0.50	Lab Sample ID: L2472-01AMSD  Lab File ID: V500529.D  Date Received: 11/29/2012  Date Analyzed: 11/30/2012  (mm) Dilution Factor: 1.0  (uL) Soil Aliquot Volume:  (mL)  CONCENTRATION: UG/L Q DL LOD LOQ  46 0.41 0.50 5.0 49 0.33 0.50 5.0

M1513

EPA SAMPLE NO.

VWAI-MW04-1112

Lab Name: SPECTRUM ANALYTICAL, INC.	Contract:
Lab Code: MITKEM Case No.: L2472	Mod. Ref No.: SDG No.: SL2472
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: L2472-01C
Sample wt/vol:1000 (g/mL) ML	Lab File ID: S6B1996.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 11/29/2012
Concentrated Extract Volume: 1000 (	aL) Date Extracted: 11/29/2012
Injection Volume:1.0 (uL) GPC Factor: 1.	00 Date Analyzed: 12/18/2012
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	ONCENTRATION: UG/L Q DL LOD LOQ
91-20-3 Naphthalene	1.6 J 0.96 2.0 2.0
91-57-6 2-Methylnaphthalene	2.0 U 0.94 2.0 2.0
117-81-7 Bis(2-ethylhexyl)phthalate	2.0 U 1.3 2.0 5.0

W 011515

EPA SAMPLE NO.

VWAI-EB01-112812

Lab Name:	SPECTRUM ANALYTICAL, INC.		Contract:		92		
Lab Code: 1	MITKEM Case No.: L2472		Mod. Ref	No.:		SDG No.:	SL2472
Matrix: (SO	IL/SED/WATER) WATER		Lab Sampl	e ID:	L2472-02B		
Sample wt/v	ol:1000 (g/mL) ML		Lab File	ID:	S6B1999.D	1	
Level: (LOW	/MED) LOW		Extractio	n: (Typ	e) SEPF		
% Moisture:	Decanted: (Y/N)		Date Rece	ived:	11/29/2012	2	
Concentrate	d Extract Volume: 1000	0 (uL)	Date Extr	acted:	11/29/2012	2	7
Injection Vo	olume: 1.0 (uL) GPC Factor:	1.00	Date Anal	yzed:	12/18/2012	2	
GPC Cleanup	:(Y/N) N pH:		Dilution	Factor:	1.0		
		CONC	ENTRATION:	1		T	7
CAS NO.	COMPOUND	001.0	UG/L	Q	DL	LOD	LOQ
91-20-3	Naphthalene		2.0	Ū	0.96	2.0	2.0
91-57-6	2-Methylnaphthalene		2.0	U	0.94	2.0	2.0
117-81-7	Bis(2-ethylhexyl)phthalate		1.5	J	1.3	2.0	5.0

Milas

EPA SAMPLE NO.

VWAI-MW05-1112

Lab Name: SPECTRUM ANALYTICAL, INC.	Contract:
Lab Code: MITKEM Case No.: L2472	Mod. Ref No.: SDG No.: SL2472
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: L2472-03C
Sample wt/vol:1000 (g/mL) ML	Lab File ID: S6B2000.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 11/29/2012
Concentrated Extract Volume: 1000 (u	Date Extracted: 11/29/2012
Injection Volume:	0 Date Analyzed: 12/18/2012
GPC Cleanup:(Y/N) N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	NCENTRATION: UG/L Q DL LOD LOQ
91-20-3 Naphthalene	2.0 U 0.96 2.0 2.0
91-57-6 2-Methylnaphthalene	11 0.94 2.0 2.0
117-81-7 Bis(2-ethylhexyl)phthalate	2.0 U 1.3 2.0 5.0

EPA SAMPLE NO.

VWAI-MW07-1112

Lab Name: SPECTRUM ANALYTICAL, INC.	Contract:
Lab Code: MITKEM Case No.: L2472	Mod. Ref No.: SDG No.: SL2472
Matrix: (SOIL/SED/WATER) WATER	Lab Sample ID: L2472-05C
Sample wt/vol:1000 (g/mL) ML	Lab File ID: S6B2033.D
Level: (LOW/MED) LOW	Extraction: (Type) SEPF
% Moisture: Decanted: (Y/N)	Date Received: 11/30/2012
Concentrated Extract Volume: 1000 (uL	) Date Extracted: 11/30/2012
Injection Volume:1.0 (uL) GPC Factor:1.00	Date Analyzed: 12/19/2012
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1.0
CAS NO. COMPOUND	CENTRATION: 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 0.94 2.0 2.0 0.1
117-81-7 Bis(2-ethylhexyl)phthalate	2.0 °U 1.3 2.0 5.0

WN 513

EPA SAMPLE NO.

VWAI-MW07P-1112

Lab Name: S	SPECTRUM ANALYI	CICAL, IN	C.		Contract:					
Lab Code: N	MITKEM Ca	ase No.:	L2472		Mod. Ref N	0.:		SDG No.:	SL2472	
Matrix: (SO	IL/SED/WATER)	WATER			Lab Sample	ID:	L2472-06B			
Sample wt/vo	ol:1000	(g/mL)	ML		Lab File I	D:	S6B2002.D	8		
Level: (LOW,	/MED) LOW				Extraction	: (Typ	e) SEPF			
% Moisture:	Dec	anted: (	Y/N)		Date Recei	ved:	11/30/201	2		
Concentrated	d Extract Volum	ne:	1000	(uL)	Date Extra	cted:	11/30/201	2		
Injection Vo	olume:(u	L) GPC Fa	actor: 1	1.00	Date Analy	zed:	12/18/201	2		
GPC Cleanup:	: (Y/N) N	pH:			Dilution F	actor:	1.0			E
CAS NO.	COMPOUND			CONCE	UG/L	Q	DL	LOD	LOQ	
91~20~3	Naphthalene				2.0	U	0.96	2.0	2.0	+0
91-57-6	2-Methylnaphth	nalene			1.1	8	0.94	2.0	2.0	J,H
117-81-7	Bis(2-ethylhex	kyl)phtha	late		2.0	U	1.3	2.0	5.0	

W/33

EPA SAMPLE NO.

VWAI-EB01-112912

Lab Name:	SPECTRUM ANALYTIC	CAL, INC.		Contract:		<u> </u>		
Lab Code: 1	MITKEM Cas	e No.: L2472		Mod. Ref 1	No.:		SDG No.:	SL2472
Matrix: (SO	IL/SED/WATER) W	ATER		Lab Sample	e ID:	L2472-07B	1	
Sample wt/v	01:(	g/mL) ML		Lab File	ID:	S6B2003.D		
Level: (LOW	/MED) LOW			Extraction	n: (Typ	oe) SEPF		
% Moisture:	Decar	nted: (Y/N)	<u></u>	Date Rece	ived:	11/30/201	2	
Concentrate	d Extract Volume	:1000	(uL)	Date Extra	acted:	11/30/201	2	
Injection V	olume: (uL)	GPC Factor:	1.00	Date Analy	yzed:	12/18/201	2	
GPC Cleanup	: (Y/N) N	pH:	-	Dilution 1	Factor:	1.0		
CAS NO.	COMPOUND		CONCE	NTRATION: UG/L	Q	DL	LOD	LOQ
91-20-3	Naphthalene			2.0	U	0.96	2.0	2.0
91-57-6	2-Methylnaphtha	lene		2.0	U	0.94	2.0	2.0
117-81-7	Bis(2-ethylhexy	l)phthalate		2.0	U	1.3	2.0	5.0

M1513

EPA SAMPLE NO.

VWAI-MW04-1112MS

Lab Name:	SPECTRUM ANALY	TICAL, IN	NC.	Contract:		-		
Lab Code: 1	MITKEM C	ase No.:	L2472	Mod. Ref N	lo.:		SDG No.:	SL2472
Matrix: (SO	IL/SED/WATER)	WATER	31	Lab Sample	ID:	L2472-01C	MS	14.
Sample wt/v	ol: 1000	(g/mL)	ML	Lab File I	D:	S6B2031.D		
Level: (LOW	/MED) LOW	Α	1770 PG-PU-RG	Extraction	: (Typ	oe) SEPF		
% Moisture:	De	canted:	(Y/N)	Date Recei	ved:	11/29/201	2	
Concentrate	d Extract Volu	me:	1000 (uL	) Date Extra	cted:	11/29/201	2	
Injection V	olume:(1.0	uL) GPC F	actor: 1.00	Date Analy	zed:	12/19/201	2	
GPC Cleanup	: (Y/N) N	pH:	7 <u>6-13</u> 7	Dilution F	actor:	1.0		
CAS NO.	COMPOUND	3	CON	CENTRATION: UG/L	Q	DL	LOD	LOQ
91-20-3	Naphthalene			41		0.96	2.0	2.0
91-57-6	2-Methylnapht	halene		42		0.94	2.0	2.0
117-81-7	Bis(2-ethylhe	xyl)phtha	alate	41		1.3	2.0	5.0

11513

EPA SAMPLE NO.

VWAI-MW04-1112MS D

Lab Name:	SPECTRUM ANALYTICAL, INC.		Contract:		8			
Lab Code: 1	MITKEM Case No.: L2472	!	Mod. Ref N	0.:		SDG No.:	SL2472	
Matrix: (SO	IL/SED/WATER) WATER		Lab Sample	ID:	L2472-01C	MSD		
Sample wt/v	ol:000 (g/mL) ML	71	Lab File I	D:	S6B2032.D			
Level: (LOW	/MED) LOW		Extraction	: (Typ	e) SEPF			
% Moisture:	Decanted: (Y/N)		Date Recei	ved:	11/29/201	2		
Concentrate	d Extract Volume: 100	0 (uL)	Date Extra	cted:	11/29/201	2		
Injection V	olume: 1.0 (uL) GPC Factor:	1.00	Date Analy	zed:	12/19/201	2		
GPC Cleanup	:(Y/N) N pH:		Dilution F	actor:	1.0			
CAS NO.	COMPOUND	CONC	ENTRATION: UG/L	Q	DL	LOD	LOQ	
91-20-3	Naphthalene		43		0.96	2.0	2.0	
91-57-6	2-Methylnaphthalene		43		0.94	2.0	2.0	
117-81-7	Bis(2-ethylhexyl)phthalate		42		1.3	2.0	5.0	

W1513

U.S. EPA - CLP

1

EPA SAMPLE NO.

		INORGANIC	ANALYSIS DATA SHEET		VWAI-MW04-1112
Lab Name:	Spectrum Analyti	cal, Inc.	Contract: 933	562, N62	
Lab Code:	MITKEM Case	No.:	SAS No.:		SDG No.: SL2472
Matrix (so	il/water): WATER		Lab Sample ID:	L2472-0	)1
Level (low	/med): MED		Date Received:	11/29/2	2012
e colido.	0 0				

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS No.	Analyte	Concentration	C.	Q	M	MDL	LOD	PQL
7439-89-6	Iron	34.3	B	J OT	P	31.0	50.0	200
7439-96-5	Manganese	1140		TOT	P	10.0	15.0	50.0



3			

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FORM I - IN

SW846

J. 64 027

U.S. EPA - CLP

1

EPA SAMPLE NO.

	INORGAN	C ANALYSIS DATA SHEET	WAI-MW05-1112
Lab Name:	Spectrum Analytical, Inc.	Contract: 933562, N62	
Lab Code:	MITKEM Case No.:	SAS No.:	SDG No.: SL2472
Matrix (so	il/water): WATER	Lab Sample ID: L2472-03	li .
Level (low	/med): MED	Date Received: 11/29/20	12
% Solids:	0.0		

Concentration Units (ug/L or mg/kg dry weight): ug/L

CAS No.	Analyte	Concentration	C	Q	М	MDL	LOD	PQL
7439-89-6	Iron	248		JOI	P	31.0	50.0	200
7439~96-5	Manganese	1450		JM	P	10.0	15.0	50.0



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FORM I - IN

SW846

#### U.S. EPA - CLP

1

EPA SAMPLE NO.

Lab Name:	Spectrum A	nalytical,	INORGANIC ANA	LYSIS DATA SH Contract:		2, N62	VWAI-MW07-1112
Lab Code:	MITKEM	Case No.:		SAS No.:	2		SDG No.: SL2472
Matrix (so	il/water):	WATER		Lab Sample	ID: I	2472-0	)5
Level (low	/med): MED			Date Receiv	ed:	.1/30/2	2012
% Solids:	0.0						

Concentration Units (ug/L or mg/kg dry weight): ug/L

15

7439-96-5 Manganese

CAS No. Analyte Concentration C Q M MDL LOD PQL 7439-89-6 Iron 50 V 17 07 P 31.0 50.0 200

P



15.0

50.0

10.0

#### REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client: CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC I

Laboratory Workorder / SDG #: L2472

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: SW5035

#### V. INSTRUMENTATION

The following instrumentation was used

Instrument Code: V5

Instrument Type: GCMS-VOA Description: HP6890 / HP6890 Manufacturer: Hewlett-Packard

Model: 6890 / 6890

#### 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: VWAI-MW04-1112 (L2472-01AMS) and VWAI-MW04-1112 (L2472-01AMSD).

Percent recoveries were within the QC limits.

Replicate RPDs were within the advisory QC limits.

#### E. Internal Standards:

Internal standard peak areas were within the QC limits.

#### F. Dilutions:

No sample in this SDG required analysis at dilution.

## 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, 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.

	T-LE	
Signed:		
Date:	12/23/2012	

#### REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client: CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC I

Laboratory Workorder / SDG #: L2472

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.

VWAI-MW04-1112 (L2472-01CMS), recovery is below criteria for Terphenyl-d14 at 50% with criteria of (50-135).

VWAI-MW05-1112 (L2472-03C), recovery is below criteria for Terphenyl-d14 at 37% with criteria of (50-135).

VWAI-MW07P-1112 (L2472-06B), recovery is below criteria for Terphenyl-d14 at 33% with criteria of (50-135).

## 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: VWAI-MW04-1112 (L2472-01CMS) and VWAI-MW04-1112 (L2472-01CMSD).

Percent recoveries were within the QC limits.

Replicate RPDs were within the advisory QC limits.

#### E. Internal Standards:

Internal standard peak areas were within the QC limits.

#### F. Dilutions:

No sample in this SDG required analysis at dilution.

#### 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, 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:	they _	
Date:	12/27/2012	

#### REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client: CH2M-Hill, Inc.

Project: CTO-0083 Vieques AOC I

Laboratory Workorder / SDG #: L2472

SW846 6010C

#### 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 6010C.

## IV. PREPARATION

Aqueous Samples were prepared following procedures in laboratory test code: SW3005A.

#### V. INSTRUMENTATION

The following instrumentation was used:

Instrument Code: OPTIMA2

Instrument Type: ICP

Description: Optima 3100 XL Manufacturer: Perkin-Elmer

Model: 3100 XL

#### VI. ANALYSIS

#### A. Calibration:

Calibrations met the method/SOP acceptance criteria.

#### B. Blanks:

All method blanks were within the acceptance criteria.

#### C. Spikes:

## 1. Laboratory Control Spikes (LCS):

Percent recoveries for laboratory control samples were within the QC limits.

## 2. Matrix spike (MS):

A matrix spike was not performed on any sample in this SDG.

## D. Post Digestion Spike (PDS):

A post-digestion spike was not performed on any sample in this SDG.

## E. Duplicate sample:

A duplicate analysis was not performed on any sample in this SDG.

## F. Serial Dilution (SD):

Serial Dilution analyses were performed on sample: VWAI-MW07-1112 (L2472-05DSD).

Percent differences were within the QC limits.

#### 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, 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.

Shann B Law le

Signed:

Date: 12/27/12



SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

## Data Flag/Qualifiers:

- U Not Detected. This compound was analyzed-for but not detected. For most analyses the reporting limit (lowest standard concentration) is the value listed. For Department of Defense programs, this is the Limit of Detection (LOD).
- J This flag indicates an estimated value due to either
  - · the compound was detected below the reporting limit, or
  - · estimated concentration for Tentatively Identified Compound
- B This flag indicates the compound was also detected in the associated Method Blank. The B flag has an alternative meaning for Inorganics analyses reported using CLP ILM-type metals forms, indicating a "trace" concentration below the reporting limit and equal to or above the detection limit.
- D For Organics analysis, this flag indicates the compound concentration was obtained from a secondary dilution analysis
- E This flag indicates the compound concentration exceeded the Calibration Range. The E flag has an alternative meaning for Inorganics analyses reported using CLP metals forms, indicating an estimated concentration due to the presence of interferences, as determined by the serial dilution analysis.
- P This flag is used for pesticides/PCB/herbicide compound when there is a greater than 40% difference for detected concentration between the two GC columns used for primary and confirmation analyses. This difference typically indicates an interference, causing one value to be unusually high. The **lower** of the two values is generally reported on the Form 1, and both values reported on the Form 10.
- A Used to flag semivolatile organic Tentatively Identified Compound library search results for compounds identified as aldol condensation byproducts.
- N Used to flag results for volatile and semivolatile Organics analysis Tentatively Identified Compounds where an analyte has passed the identification criteria, and is considered to be positively identified. For Inorganics analysis the N flag indicates the matrix spike recovery falls outside of the control limit.
- \* For Inorganics analysis the \* flag indicates Relative Percent Difference for duplicate analyses is outside of the control limit.



SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

## Sample ID Suffixes

- DL Diluted analysis. The sample was diluted and reanalyzed. The DL may be followed by a digit if more than one diluted reanalysis is provided. The DL suffix is not attached to an analysis initially performed at dilution, only to reanalyses performed at dilution
- RE Reanalysis. Appended to the client sample ID to indicate a reextraction and reanalysis or a reanalysis of the original sample extract.
- RA Reanalysis. Appended to the laboratory sample ID indicates a reanalysis of the original sample extract.
- RX Reextraction. Appended to the laboratory sample ID indicates a reextraction of the sample.
- MS Matrix Spike.
- MSD Matrix Spike Duplicate
- DUP Duplicate analysis
- SD Serial Dilution
- PS Post-digestion or Post-distillation spike. For metals or inorganic analyses



# CHAIN OF CUSTODY RECORD

Special Handling:
TAT-Indicate Date Needed: PER COMPACT

All TATs subject to laboratory approval.
 Min. 24-hour notification needed for rushes.

SPI	ECTRUM ANALYTICAL INC Featuring HANIBAL TECHNOLOGY				P	age_	<u>i</u>	_of_	1_					· Samples otherwis	Secretary Strangers	sed of after 30 da ructed.	ys unless
15010 C	ONFERENCE CENTE	R DR	Invoice	To:	KC	Can	18	500	7	_	- 55		35	392.485. 1 eames, PR		K	100
571-21										_	Loca	tion:	Vie	gues		Harn Sta	ate: PR
Project Mgr.	: Stephen Brand		P.O. No	).:			RQI	٧:						, , ,			
1=Na <sub>2</sub> 8= Na	$82O_3$ 2=HCl 3=H <sub>2</sub> : HSO <sub>4</sub> 9= <u>iWO</u> 3	SO <sub>4</sub> 4=HNO 10=	5=NaOH <i>H<sub>5</sub>P</i> 04	6=Asco	orbic A	cid		- 050	_	NP		1		ve code below:		No	tes:
	ng Water GW=Ground						Coı	ntain	ers:	<u> </u>		·	Anal	yses:	- %	QA/QC Rep	orting Level
	= Surface Water SO= X2=	X3				Vials	# of Amber Glass	Glass		System.	N Vac-SW-8200B.	8.00B	0300	SMESTOB		☐ Level III	☐ Level II ☐ Level IV
	G=Grab C=C	Composite		_	~	OA	mbe	lear	lasti	25	×-×	Siv	B	35		☐ Other	
Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA	# of A	# of Clear Glass	# of Plastic	Ma	165	Freshils	WCHEM EPP 300	WEHEN		State specific rep	orting standards:
2472-01	VWAI-11104-1112	11/28/12	0905	6W		4	2	0	2	2	2	ì	i	2			
1 - 0)	VWAI-MWOH-112-MS		0905	GW		2	2	0	0	2	a	0	O	0			
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_03	VWAI-EBU1-112812		0950	AQ		2	2	0	0	2	2	0	0	0			
\$ -03	NWAI-MWOS-11/2		1/25	GW		4	2	0	2	2	2	í	ľ	2			
2472-04	VWAI-TBOI-112212	Α	1145	TB		2	0	0	0	O	a	d	0	0		ATB has H	CI pres.
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# SPECTRUM ANALYTICAL, INC Featuring HANIBAL TECHNOLOGY

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Special Handling:

TAT- Indicate Date Needed: PER CONTRACT

- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- · Samples disposed of after 30 days unless otherwise instructed.

SPEC	CTRUM ANALYTICAL, INC Featuring HANIBAL TECHNOLOGY				P	age _	1	_ of _	1						interplating a	Access of the second	structed.	
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	LY, VA 2015	/	_			_											S	nto: PD
5+1-21	12-9324		_	-		-		_		-								
Project Mgr.:			P.O. No.	:		_	RQI	N:		_	Sam	pler(s	):_/	2/4	corp	2V	T. Hern	
1=Na <sub>2</sub> S 8= NaH	S2O <sub>3</sub> 2=HCl 3=H <sub>2</sub> S HSO <sub>4</sub> 9= <u>H<sub>3</sub>FO4</u>	SO <sub>4</sub> 4=HNO <sub>3</sub>	5=NaOH	6=Asc	orbic A	cid	7=C	CH <sub>3</sub> O	Н	100		reser 4		e cod	e belo	ow:	No.	otes:
	g Water GW=Ground				_		Cor	ntaine	ers:			17	Analy	/ses:	L		OA/OC Re	porting Level
O=Oil SW=	= Surface Water SO=	Soil SL=Sluc	lge A=Air		1	Vials	# of Amber Glass	of Clear Glass		50B	STAC.	FARENCE SWEHE	EPAZO	5453143			□ Level I	□ Level ∏ □ Level IV
	G=Grab C=C	omposite			J.	OA	mber	lear (	of Plastic	553	1383	8.5	M	N S			Other	
Lab Id:	Sample Id:	Date:	Time:	Туре	Matrix	# of VOA	# of A	# of C	# of Pl	VOC	SVOC	FRESE	MCHEM	WCHE			State specific re	porting standards:
M72-05	VWAT-MWO7-1112	11/29/12	0915		GW	4	a	0	コ	2	2	1	1	2				
1 - 80	IWAI-MWO7P-1112		0920		GW			0	0	2	ス	O	0	0				
- 07	WAI-EBOI-112762		1045		AQ	2	2	0	0	ス	2	0	0	0				
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Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

Received By: VS					- 51	lp.	age 0	1 of 00		
Reviewed By:	VO.						ma <del>n</del> ana may	Date 11/2	29/2012	
Work Order: L2472	Client Name: CI	H2M Hill, Inc.					- 9			
33	CTO-0083 Vieques AOC									
Remarks: (1/2) Please	27.75			Preser	cvatio	n (pH)	_		Soil HeadSpa	ace
sample/extract transfe submitted with this da	er logbook pages	Lab Sample ID	ниоз	H2SO4	HC1		H3P04	VOA Matrix	or Air Bubbl or equal to	.e >
1. Custody Seal(s)	Present / Absent	L2472-01	<2				<2	ASCORBIC		
35	Intact / Broken	L2472-02						ASCORBIC		
2. Custody Seal Nos.	N/A	L2472-03	<2		-		<2	ASCORBIC		
		L2472-04	E-M-TO					Н		
3. Traffic Reports/ Chai of Custody Records (TR/COCs) or Packing Lists	Present / Absent	37-77-77-55						8		
4. Airbill	AirBill/Sticker Present/Apsent			R						
5. Airbill No.	FedEx 8763 4395 6027,									
6. Sample Tags	Present / Absent							22	9	
Sample Tag Numbers	Listed/					8				
(	Not Listed on Chain- of-Custody	)						St.		
7. Sample Condition	Intact/Broken/ Leaking	26		943				5 5 8		
8. Cooler Temperature Indicator Bottle	Present / Absent		128							
9. Cooler Temperature	4,3 °C					9				×
10. Does information on TR/COCs and sample tags agree?	Yes / No				8					
11. Date Received at Laboratory	11/29/2012			¥2					æ	
12. Time Received	10:54				10					
Sample	Transfer							*		
Fraction (1) TVOA/VOA	Fraction (2) SVOA/PEST/ARO						Si .			
Area #	Area #									
Ву	Ву									1
On .	On									
IR Temp Gun ID:MT-1		VC	OA Matri	x Kev:		277		- 7		-
CoolantCondition: ICE				JS = Unp	oreserve	ed Soil	Α=	Air	•	
Preservative Name/Lot No:				JA = Unp				HCI		
				M = MeO		a , iquot		Encore		
50				VI = NaH:				Freeze	int <sup>fil</sup>	
	Đ	Se				fication/		e Action Form	1 Yes No	$\supset$
E		Ra	d OK	Yes 1	) <sub>No</sub>	*				-
COMPANY OF THE PROPERTY AND A STATE OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE P					7.		7			

Spectrum Analytical, Inc. Featuring Hanibal Technology -- Rhode Island Division

Received By: \56	*					P	age 0	l of 00	
Reviewed By: 141	$\sim$					L	og-in	Date 11/3	30/2012
Work Order: L2472	Client Name: CF	H2M Hill, Inc	:.						
Project Name/Event:	CTO-0083 Vieques AOC	E and I		34					
Remarks: (1/2) Please s sample/extract transfer submitted with this date	r logbook pages	Lab Sample II	HNO3	Preservation (pH)			H3P04	VOA	Soil HeadSpace or Air Bubble or equal to 1/
1. Custody Seal(s)	Present / Absent	2				171700000		Matrix	
	Intact/Broken	L2472-05	<2	ļ				ASCORBIC	
2. Custody Seal Nos.	N/A	L2472-06	100					ASCORBIC	
2. custody bear nos.	N/A		-					ASCORBIC	
<ol> <li>Traffic Reports/ Chain of Custody Records (TR/COCs) or Packing Lists</li> </ol>	Present / Absent	L2472-08	1		2	*	2	Н	* *
4. Airbill	AirBill / Sticker Present / Absent								
5. Airbill No.	FedEx 8763 4395 6049								
6. Sample Tags Sample Tag Numbers	Present / Absent  Listed /  Not Listed on Chain- of-Custody	)					140		
7. Sample Condition (  8. Cooler Temperature ( Indicator Bottle	Intact/Broken/ Leaking  Present/Absent						(5		S.
9. Cooler Temperature	1.5 °C	¥							
10. Does information on TR/COCs and sample tags agree?	Yes / No								
11. Date Received at Laboratory	11/30/2012	1800						8	e
12. Time Received	10:25	40)							
Sample T									
	Fraction (2) SVOA/PEST/ARO		*:					9W 20	
- 100 March 1982	Area #	9					-		
8	Ву								
	On							7	
TR Temp Gun ID:MT-87		V	OA Matri	The same of the same of		45.1			
CoolantCondition: ICE	*		Į	JS = Ung	oreserve	ed Soil	A=	Air	
Preservative Name/Lot No:			ı	JA = Unp	oreserve	ed Aqueo	ous H=	HCI	**
		17	1	M = MeO	Н		E =	Encore	
	æ	1	١	V = NaHS	504		F=	Freeze	
ā			1			fication/0	Correctiv	e Action Form	Yes No
		R	ad OK	Yes /	√No				

	USEPA RESW846 ME	egion II ethod 8260B VOA	Date: August 2008 SOP: HW-24, Rev. 2
ı.		PACKAGE COMPLETENESS AND DELIVERAR	YES NO N/A
CASE	NUMBER:_	L2472 LAB:_	Spectrum Analytical
SITE	NAME:	Viegues ADCI	
1.0	Data Con	npleteness and Deliverables	
		s all data been submitted in CLP deli	verable
	ACTION:	If not, note the effect on review the Data Assessment narrative.	of the data in
2.0	Cover Le	etter, SDG Narrative	
		a laboratory narrative, and/or covergned release present?	letter
		e case number and SDG number(s) conta the narrative or cover letter?	ained
	ACTION:	If not, note the effect on review the Data Assessment narrative.	of the data in
II.		VOLATILE ANALYSES	
1.0	Traffic	Reports and Laboratory Narrative	
	fro	e the Traffic Reports, and/or Chain of the field samplers present for all gn release present?	
	ACTION:	If no, contact the laboratory/sammer of missing or illegible copies.	oling team for replacement
	1.2 Is	a sampling trip report present (if	required)? [4
	1.3 Sar	mple Conditions/Problems	
		- 6 VOA -	

Date: August 2008 SOP: HW-24, Rev. 2

YES NO N/A

1.3.1 Do the Traffic Reports, Chain of Custodies, or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data?

ACTION: If all the VOA vials for a sample have air bubbles or the VOA vial analyzed had air bubbles, flag all positive results "J" and all non-detects "R".

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

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

2.0 Holding Times V 11/28-29/12 a 11/30/12 t 1.5-4°C

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 NaHSO4, the maximum holding time is 14 days from sample collection. If

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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 q	ualifications		
	Yes/No	≻ 14 days	J	R		

# 3.0 Surrogate Recovery (CLP Form II Equivalent)

3.1		very forms for each of the following matrices:	
	a.	Water	M
	b.	Soil	Ц — —
3.2		o, are all the samples listed on the appropriativery forms for each matrix:	te Surrogate
	a.	Water	<u>K</u>
	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 inhouse 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 <sub>8</sub>	80-120	70-130
Dichloroethane-d <sub>4</sub>	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:

- Flag all positive results as estimated ("J").
- 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?

	. /	
, ,		
1		

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.

		gion II Chod 8260B VOA	Date: August 2008 SOP: HW-24, Rev. 2
			YES NO N/A
Note	::	LCS consists of an aliquot of a cl similar to the sample matrix and o volume.	ean (control) matrix of the same weight or
ACTI	ON:	If any <u>Laboratory Control Sample</u> de call the lab for explanation /resuncte in the data assessment.	
4.2		the Laboratory Control Samples ana quency for each of the following mat	
	Α.	Water	Ц
	В.	Soil	<u> </u>
	c.	Med Soil	П — —
Note	e:	The LCS is spiked with the same and concentrations as the matrix spike 9.5). If different make note in domatrix/LCS spiking standards should volatile organic compounds which a compounds being investigating. At spike should include 1,1-dichloroe chlorobenzene, toluene, and benzene	(SW-846 8000C, Section lata assessment.  In the description of the late of the late aminimum, the matrix ethene, trichloroethene,
ACTI	ON:	If any MS/MD, MS/MSD or replicate missing, take the action specified	
4.3		e in house LCS recovery limits been 9.7).	developed (Method 8000C,
4.4		n house limits are not developed, a ts between 70 - 130% (Method 8000c	
4.5	hous	e one or more of the volatile LCS rese laboratory recovery criteria for se limits are not present use 70 - 1	spiked analytes? If in

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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 Qual	lifications			

							9 2
_	0	Matrix	Cnikaci	Form	TTT	or	equivalent)
Э.	U	Martix	Shires	LOTH	TTT	OI	cquivaiche

VWAI-MW04-1112

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?

т**к** — —

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?

M\_\_\_

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	<u> </u>
b.	Waste	Ш
c.	Soil/Solid	r 1

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.

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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				

¥			ion II hod 8260B VOA		Date: Aug SOP: HW-2	ust 2008 4, Rev. 2
						YES NO N/A
6.0	Blan	k (CL	P Form IV Equivalent)			. /
	6.1	Is t	he Method Blank Summary	form present	t?	ц — —
	6.2	anal	uency of Analysis: Has yzed for every 20 (or l lar matrix or concentra h?	less) samples	of	n /
	6.3		a method blank been and em used ?	alyzed for each	ch GC/MS	<u> </u>
	ACTI	ON:	If any blank data are specified above (section not available, reject data. However, using data reviewer may subsmissing method blank of	ion 3.2). If ® all associprofessional stitute field	blank dat ated posit judgement	a is ive :, the
	6.4	chro	matography: review the matograms, quant report			
		stab	the chromatographic persolity) for each instructulatile organic compounds	ment acceptab		<u>K</u>
7.0	Cont	amina	ition			
	NOTE	) <b>:</b>	"Water blanks", "drill are validated like any qualify the data. Do no blanks discussed below	y other sampl not confuse t	e and are	<pre>not used to</pre>
	7.1	resu as c	any method/instrument/realts for target analyted described below, the conse blanks are multiplied corrected for percent of	s and/or TICs ntaminant con d by the samp	? When app acentration ble dilution	olied n in on factor

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YES NO N/A

7.2 Do any field/rinse blanks have positive volatile organic compound results?

4\_

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.

VWAI-TB01-112812 MO€ VWAI-EB01-112812 MO€ VWAI-TB01-112912 MO€ VWAI-EB01-112912 MO€

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Table 5. Volatile Organic Analysis Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
	Detects	Not detected	No qualification
		< CRQL	Report CRQL value with a U
ľ	< CRQL*	≥ CRQL	Use professional judgement
		< CRQL	Report CRQL value with a U
Method, Storage, Field,	> CRQL*	≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or qualify the data as unusable R
Trip, Instrument**		≥ CRQL and ≥ blank contamination	Use professional judgement
		< CRQL	Report CRQL value with a U
	= CRQL*	≥ 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.

USEPA Region II Date: August 2008 SW846 Method 8260B VOA SOP: HW-24, Rev. 2 YES NO N/A 7.3 Are there field/rinse/equipment blanks associated with every sample? For low level samples, note in data assessment ACTION: 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) If the specified column, or equivalent, was not used, ACTION: document the effects in the Data Assessment. 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)

USEPA Reg SW846 Met	ion II hod 8260B VOA	Date: August 2008 SOP: HW-24, Rev. 2
		YES NO N/A
anal	analyzed for every twelve hours of ysis per instrument?(see Table 4, 88260B-36)	Mile Water Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of Control of
ACTION:	List date, time, instrument ID, an analyses for which no associated available.	
ACTION:	If the laboratory/project officer data, reject ("R") all data generativelye hour calibration interval.	
ACTION:	If mass assignment is in error, for data as unusable, "R".	lag all associated sample
9.4 Have	the ion abundances been normalized	d to m/z 95?
	the ion abundance criteria been me instrument used?	et for
ACTION:	List all data which do not meet is criteria (attach a separate sheet	
ACTION:	If ion abundance criteria are not specified in section 3.2.	met, take action as
betw	there any transcription/calculation een mass lists and reported values values but if errors are found, che	? (Check at least
	the appropriate number of significates (two) been reported?	cant
ACTION: section	If large errors exist, take action on 3.2.	n as specified in
9.8 Are	the spectra of the mass calibration	n compounds acceptable.
ACTION:	Use professional judgement to detedata should be accepted, qualified	ermine whether associated d, or rejected.

			ion II hod 8260B VOA	Date: Aug SOP: HW-2	
					YES NO N/A
10.0	Targe	et An	alytes (CLP Form I Equivalent)		
	10.1	pres	the Organic Analysis reporting form ent with required header information, for each of the following:		¥
		a.	Samples and/or fractions as approp	oriate	М
		b.	Matrix spikes and matrix spike dup	olicates	ц
		c.	Blanks		ц
		d.	Laboratory Control Samples		<u> </u>
	10.2	iden Repo	the reconstructed Ion Chromatograms tified compounds, and the data systems; included in the sample package owing?	em printou	ts (Quant
		a.	Samples and/or fractions as approp	oriate	Щ
		b.	Matrix spikes and matrix spike dup (Mass spectra not required)	olicates	<u> </u>
		c.	Blanks		<u> </u>
		d.	Laboratory Control Samples		14
	ACTIO	ON:	If any data are missing, take acti specified in 3.2 above.	.on	
	10.3		hromatographic performance acceptablect to:	ole with	
		Base	line stability?		ц

USEPA Regi	ion II nod 8260B VOA	Date: August 2008 SOP: HW-24, Rev. 2
		YES NO N/A
Reso	lution?	4
Peak	shape?	<u> </u>
Full	-scale graph (attenuation)?	<u> </u>
Othe	r:	
ACTION:	Use professional judgement to dete	ermine the acceptability of
	the lab-generated standard mass spe tile compounds present for each sam	
ACTION:	If any mass spectra are missing, to 3.2 above. If the lab does not gen spectra, make a note in the Data A missing, contact the lab for missing.	herate their own standard Assessment. If spectra are
	he RRT of each reported compound widerd RRT in the continuing calibrat	
rela	all ions present in the standard matrix tive intensity greater than 10% (of present in the sample mass spectro	the most abundant ion)
in t	he relative intensities of the char he sample agree within ± 30% of the tive intensities in the reference s	corresponding
ACTION:	Use professional judgement to determine acceptability of data. If it is desincorrect identifications were made should be rejected ("R"), flagged Presumptive evidence of the present compound) or changed to non detect calculated detection limit. In order	etermined that  de, all such data  ("N") -  nce of the  ted ("U") at the

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Date: August 2008 SOP: HW-24, Rev. 2

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.

NOTICE

- 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:

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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SW846	Method	8260B	VOA

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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?

		. /
r	3	1

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<sub>2</sub>(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?

<u>п</u> \_ <u>г</u>

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)

Date: August 2008 SOP: HW-24, Rev. 2

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?

Ч\_\_\_

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 GC/MS Calibration Verification (CLP Form VII Equivalent)

USEPA	Region	II	
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YES NO N/A

15.1	Are	the	Calib	rati	on	Verific	cati	on	reporting	forms	present	and	
	comp	lete	for	all	COL	npounds	of	int	terest?		14		_

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

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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 <u>Internal Standards (CLP Form VIII Equivalent)</u>

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)?

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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.

(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.
  - 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 (Uvalues) "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? 1/1

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.

VWAI-MWO7P-1112 > gual, see attacked VWAI-MWO7P-1112 > gual, see attacked

VOA DataQual

# FIELD DUPLICATE SAMPLE SUMMARY

Sample ID:

VWAI-MW07-1112

Duplicate Sample ID: VWAI-MW07P-1112

Water: RPD>30% Soil: RPD>30%

Compound	Sample Conc.	Dup. Sample Conc.	%RPD
benzene	0.82		200
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
•			#DIV/0!
		7.02	#DIV/0!
			#DIV/0!
1842			#DIV/0!
			#DIV/0!
W4575	CONVENIENCE		#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

COMMENTS:

Qualify benzene as estimated.

<sup>\*</sup> one of the results below the LOD only results with both above the LOD are reported

DataQual VOA

Initial Calibration Date:

11/26/2012

RRF and %RSD Calculations:

Compound Name:

1,2-dichloroethane

Lab Value:

0.546

Area of Compound	1025756
Area of Internal STD	939357
Conc. of Internal STD	50
Conc. of Compound	100
Calculated RRF	0.546

Compound Name:

benzene

Lab Value:

7.7

RRF of STD 1	0.9470
RRF of STD 2	0.9830
RRF of STD 3	0.8970
RRF of STD 4	0.8660
RRF of STD 5	0.7840
RRF of STD 6	0.9050
Calculated % RSD	7.7

Continuing Calibration File ID:

11/30/2012

RRF and %D Calculations:

Compound Name:

1,2-dichloropropane

Lab Value:

0.460

Area of Compound	386446
Area of Internal STD	840654
Conc. of Internal STD	50
Conc. of Compound	50
Calculated RRF	0.460

Compound Name:

1,2-dichloroethane

Lab Value:

4.0

Average RRF	0.596
Calibration Check RRF	0.572
Calculated % D	4.0

DataQual VOA

# SAMPLE CALCULATION

Sample ID:

VWAI-MW04-1112

Standard ID:

11/30/2012 benzene

Compound: Concnetration:

2.2 ug/L

	Water (ug/L)	Soil (ug/Kg)	Soil ug/Kg)
Area of Compound	52376		
Area of Internal STD	795127		\$
Conc. of Internal (ng)	250	250	
RRF of Compound	1.481		-
Dilution Factor	1	11	
Weight of Sample	NA		
Volume of Sample	5	NA	
% Moisture	NA		
Aliquot of sample	NA	NA	2
Concentration	2.22	#DIV/0!	#DIV/0!

	RT of Internal STD	RT of Compound	RRT
Sample	4.476	4.232	0.945
Standard	4.477	4.233	0.945

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			YES NO N/A				
E	-	The concentration of this analyte exceeds the of the instrument.	e calibration range				
A	-	Indicates a Tentatively Identified Compound adol-condensation product.	(TIC) is a suspected				
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.							
	2						
I.		PACKAGE COMPLETENESS AND DELIVERABLE	ES				
CASE	NUMB	ER: L2472 LAB: Spects	um Analytical				
SITE	NAME	: Viegues AOCI					
1.0	<u>Data</u>	Completeness and Deliverables					
	1.1	Has all data been submitted in CLP deliverable format?	le				
	ACTI	ON: If not, note the effect on review of the in the data assessment narrative.	e data				
2.0	Cove	r Letter, SDG Narrative					
	2.1	Is a laboratory narrative or cover letter present?	<u> </u>				
	2.2	Are case number and SDG number(s) contained in the narrative or cover letter?	ть				

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	Region		90 5	2.	202.0000
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> 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?

If any sample analyzed as a soil, other than ACTION: 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".

melted upon arrival at the laboratory and the  $\pm 1.5-4^{\circ}\mathrm{C}$ ACTION: cooler temperature was elevated (10°C), flag all positive results "J" and all non-detects A 11/28-29/12 e 11/29-30/12

2.0 Holding Times

N 11/29-30/12

a 12/18-19/12

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

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YES NO N/A

40 days of the date of extraction.

## Table of Holding Time Violations

			(S	ee Traffic	Report)
Sample	Sample	Date	Date Lab	Date	Date
ID	Matrix	Sampled	Received	Extracted	Analyzed
	-				
<u></u> 0		t <del>i </del>	( <del></del>	<u> </u>	
			0. /		
			1		
<del></del>		/\	J	*	<del></del>
<del></del>					

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).

	_	ion II hod 82		Rev.4,	Janua	ary 199	8)			e: Augu HW-22		
										YES	NO	N/A
3.0		Surro	ogate	Recove	ry (Fo	orm_II/	Equivalen	nt)				
	3.1	liste	ed on	CLP Su	rrogat	ce Reco	gate recovery form				,	
		a.	Low W	ater						4	_	
÷		b.	Low/M	ed Soi	1					П	_	-
	3.2	appro	opriat		ogate		<u>isted</u> on ry Summar			G G		
		a.	Low W	ater						4		_
		b.	Low/M	led Soi	1					$\Box$		
	ACTIO	ON:	the e cases obtai	ffect( the l	s) in ab may data r	data a y have	unavaila ssessment to be con ry to com	s. In s	ome	nt	,	
	3.3	Were	outli	ers ma	rked c	correct	ly with a	n asteri	sk?	17		
		ACTIO	ON:	Circle	all c	outlier	s in red.					
ž.	3.4	recovered recovered from page	veries od bla very l USEPA 130,	out onk (Redink India)  Nation  if in	of spec viewer Use s onal Fu house	cificat r shoul surroga unction	of OR acidation for a duse laborate recover al Guidli are not CC-24).	any sampl o in hous ery limit nes Janu	e on se s s			_
		Note:	:	Examin	e lab	in hou	se limits	for rea	sona	ablene	ss.	1
		If ye	es, we	re sam	ples r	re-anal	yzed?			<u>L1</u>		_

£ ..

# 2H - FORM II SV-2 WATER SEMIVOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: SPECTRUM ANALYTICAL, INC. Contract:

Lab Code: MITKEM Case No.: L2472 Mod. Ref No.: SDG No.: SL2472

	EPA SAMPLE NO.	SDMC1 (NBZ) #	SDMC2 (FBP) #	SDMC3 (TPH) #	7			TOT
01	MB-69471	96	94	105				0
02	LCS-69471	99	100	106				0
03	MB-69496	97	95	104				0
04	LCS-69496	86	87	91				0
05	LCSD-69496	85	86	90				.0
06	VWAI-MW04-11 12	84	81	57		-		0
07	VWAI-EB01-11 2812	8.4	83	78	1.12			0
08	VWAI-MW05-11 12	82	81	37 *	Mar	/		1
09	VWAI-MW07P-1 112	87	84	33 *	) Mil			1
10	VWAI-EB01-11 2912	84	83	. 83		×	_	0
11	VWAI-MW04-11 12MS	80	80	50 *				1
12	VWAI-MW04-11 12MSD	81	82	50				0
13	VWAI-MW07-11 12	90	88	65				0

			QC LIMITS
SDMC1	(NBZ)	= Nitrobenzene-d5	(40-110)
SDMC2	(FBP)	= 2-Fluorobiphenyl	(50-110)
SDMC3	(TPH)	= Terpheny1-d14	(50-135)

## som12.12.17.A

<sup>#</sup> Column to be used to flag recovery values

<sup>\*</sup> Values outside of contract required QC limits

D DMC diluted out

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YES NO N/A

Were method blanks re-analyzed?

11 \_ V

#### ACTION:

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

- 1. Flag all positive results as estimated ("J").
- Flag all non-detects as estimated detection limits ("UJ") when recoveries are less than the lower acceptance limit.
- 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?

N

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

		-		
	A Reg		I 270D (Rev.4, January 1998)	Date: August, 2008 SOP HW-22 Rev.4
				YES NO N/A
			effect in data assessments.	
				1110
4.0	Matr:	ix Sp.	ikes (Form III/Equivalent)	VWAI-MW04-1112
	4.1	Matr. Samp.	the semivolatile Matrix Spike ix Spike Duplicate/or duplicate le recoveries been listed on the very Form (Form III)?	e unspiked
	NOTE	:	Method 3500B/page 4 states the	e spiking compounds:
			Base/neutrals  1,2,4-Trichlorobenzene Acenaphthene  2,4-Dinitrotoluene Pyrene N-Nitroso-di-n-propylamine 1,4-Dichlorobenzene	Acids Pentachlorophenol Phenol 2-Chlorophenol 4-Chloro-3-methylphenol 4-Nitrophenol
	Note	•	Some projects may require the of interest.	spiking of specific compounds
	Note	:	See Method 8270D-sec 8.4.2 for to prepare and analyze duplicate spike/matrix spike duplicate. to contain target analytes, the matrix spike and a duplicate a field sample. If samples are target analytes, laboratory shand matrix spike duplicate pas	ate samples or a martix  If samples are expected  hen laboratory may use one  analysis of an unspiked  not expected to contain  hould use a matrix spike
	4.2		matrix spikes analyzed at the uency for each of the following	A STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STA
		a.	Low Water	[五一
		b.	Low Solid	<u> </u>
**		c.	Med Solid	<u> </u>

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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.

. /	
. 1	

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).

<u>Water</u>	<u>Solids</u>
$\aleph$ out of $\aleph$	out of

				_	
		ion I hod 8	I 270D (Rev.4, January 1998)	Date: August, 20 SOP HW-22 Rev.4	08
				YES NO N	/A
	4.5	How dupl	many RPD's for matrix spike and maticate recoveries are outside QC lim	trix spike mits?	
		Wate	<u>r</u> <u>Sol:</u>	<u>ids</u>	
		8	out of <u>3</u>	_ out of	
	ACTI	ON:	Circle all outliers with red pence	il.	
*	ACTI	ON:	No action is taken on MS/MSD data However, using informed profession judgement, the data reviewer may matrix spike and matrix spike duplersults in conjunction with other to determine the need for some quantity of the data.	nal use the licate QC criteria	
	4.6		a Laboratory Control Sample (LCS) a	analyzed with each	-
in the second	NOTE	:	When the results of the matrix spindicate a potential problem due to matrix itself, the LCS results are verify that the laboratory can per analysis in a clean matrix.	to the sample e used to	
5.0	Blan	ks (F	orm IV/Equivalent)	2	
	5.1	Is t	he Method Blank Summary (Form IV) p	present?	_
	5.2	Freq	uency of Analysis:		
		repo	a reagent/method blank analysis been rted per 20 samples of similar mate entration level, and for each extra h?	rix, or	
	5.3	Has	a method blank been analyzed either	r after	

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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.

Is the chromatographic performance (baseline stability) for each instrument acceptable for the semivolatiles?

М\_\_\_\_

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.

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)?

1/		
	r 1	
	-31 -36	-

USEPA Region II SW846 Method 8270D (Rev.4, January 1998) Date: August, 2008 SOP HW-22 Rev.4

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

poor spectra, instrument periormano

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).

VWAI -EB01-112812

bis (2-ethylheryl)phth) 1.55 (2.0)

VWAI-EBOI-112912 MOD

(no gual)

Date: August, 2008 SOP HW-22 Rev.4

YES NO N/A

# Blank Action for Semivolatile Analyses

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
		< CRQL	Report CRQL value with a U
	> CRQL *	<pre></pre>	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

	A Region II 6 Method 8270D (Rev.4, January 1998)	Date: SOP H			
		38	YES	NO	N/A
	that exceeded the initial calibration range.	a	டி	_	$\checkmark$
e e e	6.5 Does the instrument blank have positive result for target analytes and/or TICs?	ılts	ar and M	4	
×	Note: Use professional judgement to determine if carryover occurred and qualify analy accordingly.				
7.0	GC/MS Apparatus and Materials				
	7.1 Did the lab use the proper gas chromatograph column for analysis of semivolatiles by Meth 8270D? Check raw data, instrument logs or of the lab to determine what type of column was The method requires the use of 30 m x 0.25 m (or 0.32 mm ID), silicone-coated, fused silicapillary column.	nod contact s used. nm ID		/_	
Ø.	ACTION: If the specified column, or equivalent, not used, document the effects in the casessment. Use professional judgement determine the acceptability of the data	data to			*
8.0	GC/MS Instrument Performance Check (Form V/Equiva	alent)			
*	8.1 Are the GC/MS Instrument Performance Check E (Form V) present for decafluorotriphenylphos (DFTPP)?		4		
	NOTE: The performance solution should also contain pentachlorophenol, and benzidine to verify injection port inertness and column performs. The degradation of DDT to DDE and DDD must less than 20% total and the response of pentachlorophenol and benzidine should be within normal ranges for these compounds (be upon lab experience) and show no peak degrad or tailing before samples are analyzed. (see	ance. be ased dation		.5	

- 17 -

	e: August, 2008 HW-22 Rev.4
	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?	ц
8.3 Has an instrument performance check solution been analyzed for every twelve hours of sample analysis per instrument?	м
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 acceptal twelve hour calibration interval.	ble
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?	4
8.5 Have the ion abundance criteria been met for each instrument used?	ц
ACTION: List all data which do not meet ion abundan criteria (attach a separate sheet).	ce

- 18 -

						ıst, Rev.	2008
07-0-					YES	NO	N/A
į	ACTIO		If ion abundance criteria are not met, action specified in section 3.2	take			
		betwe	there any transcription/calculation erroren mass lists and Form Vs? (Check at levalues but if errors are found, check mo	ast	_	Щ	
	8.7		the appropriate number of significant res (two) been reported?		4	_	
	ACTIC	N:	If large errors exist, call lab for explanation/resubmittal, make necessary corrections and document effect in data assessments.				
3	8.8		the spectra of the mass calibration compotable?	ound	K		
177	ACTIC	ON:	Use professional judgement to determine whether associated data should be acceptualified, or rejected.				
9.0	Targe	et Ana	alytes				
ž.	9.1	prese	the Organic Analysis Data Sheets (Form I ent with required header information on , for each of the following:		,	/	
		a.	Samples and/or fractions as appropriate	2	Y		
		b.	Matrix spikes and matrix spike duplicat	es	M	_	
		c.	Blanks		4	34	e s <del>ectoro</del> s
*	9.2	perf	any special cleanup, such as GPC, been ormed on all soil/sediment sample extrac section 7.2, page 8270D-14)?	cts	П	-	_

		Date: August, 2008 SOP HW-22 Rev.4
		YES NO N/A
 ACTIO	ON: If data suggests that extract cleanup was performed, use professional judgement. I note in the data assessment narrative.	
9.3	Are the Reconstructed Ion Chromatograms, mass spectra for the identified compounds, and the system printouts (Quant Reports) included in sample package for each of the following?	data
	a. Samples and/or fractions as appropriate	Щ — —
	<ul> <li>Matrix spikes and matrix spike duplicate (Mass spectra not required)</li> </ul>	s
	c. Blanks	ц — —
ACTIO	ON: If any data are missing, take action specified in 3.2 above.	
9.4	Are the response factors shown in the Quant Report?	<u> </u>
9.5	Is chromatographic performance acceptable wit respect to:	h
	Baseline stability?	H
	Resolution?	ц
	Peak shape?	<u> </u>
	Full-scale graph (attenuation)?	т <del>д</del> — —
	Other:	ш — —
ACTI	ON: 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

USEPA	Region	II			
SW846	Method	8270D	(Rev.4,	January	1998)

Date: August, 2008 SOP HW-22 Rev.4

YES NO N/A

each sample?

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

spectra are missing, reject all positive

data.

9.7 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?

9.8 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% (of the most abundant ion) also present in the sample mass spectrum?

· \_ \_ \_

9.9 Do the relative intensities of the characteristic ions in the sample agree within ± 30% of the corresponding relative intensities in the reference spectrum?

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

and 9.9.

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

identification.

USEPA Region II	Date: Augu	st, 2	8008
- NOT NOT NOT NOT NOT NOT NOT NOT NOT NOT	SOP HW-22		
	YES	NO	N/A
10.0 Tentatively Identified Compounds (TIC)		A 1 (Q)	
10.1 If Tentatively Identified Compounds were requ for this project, are all Form Is, Part B pre and do listed TICs include scan number or ret time, estimated concentration and "JN" qualif	sent; ention	700	N
NOTE: Review sampling reports to determine if lab was required to identify non target (refer to section 7.6.2, page 8270D-21).			
10.2 Are the mass spectra for the tentatively identified compounds and associated "best mat spectra included in the sample package for ea of the following:			<u>/</u>
a. Samples and/or fractions as appropriate	11		_
b. Blanks			
ACTION: If any TIC data are missing, take action specified in 3.2 above.	n		
ACTION: Add "JN" qualifier only to analytes identified by CAS #.			
10.3 Are any target compounds from one fraction li as TIC compounds in another (e.g., an acid compound listed as a base neutral TIC)?	sted	Ц	
ACTION: i. Flag with "R" any target compound las a TIC.	listed		
ii. Make sure all rejected compounds ar properly reported in the other frac			
10.4 Are all ions present in the reference mass spectrum with a relative intensity greater the 10% (of the most abundant ion) also present i			

[ 경기: 1995년 1997 - 1997 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 199		: Aug HW-22		
		YES	NO	N/A
sample mass spectrum?		П	_	
10.5 Do TIC and "best match" standard relative ion intensities agree within ± 20%?	ı			
ACTION: Use professional judgement to determine acceptability of TIC identifications. If is determined that an incorrect identification was made, change the identification to "unknown" or to some I 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 contaminating the result should be qualified as unusable."	less i not	ı.		
11.0 Compound Quantitation and Reported Detection Limi	<u>its</u>			
11.1 Are there any transcription/calculation error Form I results? Check at least two positive verify that the correct internal standard, quantitation ion, and RRF were used to calcul Form I result. Were any errors found?	/alu	es.	M	/_
NOTE: Structural isomers with similar mass specific but insufficient GC resolution (i.e. per valley between the two peaks > 25%) show reported as isomeric pairs. The reviewed should check the raw data to ensure that such isomers were included in the quantitation (i.e., add the areas of the coeluting peaks to calculate the total concentration).	rcen uld er al	t be		
11.2 Are the method detection limits adjusted to reflect sample dilutions and, for soils, samp moisture?	ole	<u>~</u>	_	<u></u>

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USEPA Region II Date: August, 2008 SW846 Method 8270D (Rev.4, January 1998) SOP HW-22 Rev.4 YES NO N/A If errors are large, call lab for ACTION: explanation/resubmittal, make any necessary corrections and document effect in data assessments. When a sample is analyzed at more than one ACTION: dilution, the lowest detection limits are used (unless a OC 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? If any calibration standard data are missing, ACTION: 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

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?

semivolatile fraction?

M \_ \_

USEPA Region II SW846 Method 8270D (Rev.4, January 1998) Date: August, 2008 SOP HW-22 Rev.4

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%)?

\_ لهار

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

USEPA Region II SW846 Method 8270D (Rev.4, January 1998) Date: August, 2008 SOP HW-22 Rev. 4

> YES NO N/A

Benzo(a) pyrene

If the %RSD for any CCC >30% and no corrective ACTION: action taken, then "J" qualify all positive

hits and "UJ" qualify all non-detects.

ACTION: Circle all outliers in red.

If the % RSD is  $\geq$  20.0%, qualify positive ACTION: 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?

USEPA Region I SW846 Method 8		e: Aug HW-22		
		YES	NO	N/A
perc	ne pesticide compounds include DDT, was the ent breakdown of DDT to DDD and DDE greater 20%?	_	╌	~
ACTION:	If DDT percent breakdown exceeds 20%:			
	i. Qualify all positive results for DDT with "J". If DDT was not detected, b DDD and DDE results are positive, qualify the quantitation limit for DD as unusable, "R".			
	ii. Qualify all positive results for DDD DDE as presumptively present at an approximate concentration "JN".	and		
14.0 GC/MS Ca	libration Verification (Form VII/Equivalent	Σ		
pres	the Calibration Verification Forms (Form VI ent and complete for all compounds of rest?	ı) <u>M</u>		
anal	a calibration verification standard been yzed for every twelve hours of sample analy instrument?	sis V	/	
ACTION:	List below all sample analyses that were n within twelve hours of a calibration verification analysis for each instrument used.	ot		
ACTION:	If any forms are missing or no calibration verification standard has been analyzed within twelve hours of every sample analys			

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USEPA Region II SW846 Method 8270D (Rev.4, January 1998) Date: August, 2008 SOP HW-22 Rev.4

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

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).



USEPA Region I SW846 Method 83		4, January 19	98)		: Aug HW-22		
					YES	NO	N/A
ACTION:	Circle er	rors in red.					
ACTION:	explanation	ns and docume	all lab for l, make any neces nt effect(s) in t				
15.0 <u>Internal</u>	Standards	(Form VIII)					
ever limi	y sample a	nd blank with	reas (Form VIII) in the upper and each continuing		M	/_	-
ACTION:	List each	outlying int	ernal standard be	elow.			
Sample ID	IS #	Area	LowerLimit		Uppe	er Li	mit
							c e
	<del></del> >				-		
<u></u>					:		
	(Attach	additional s	sheets if necessa	ry.)			
Note:	Check Tab	le 5, 8270D-4	1 for associated	analy	tes.		20
ACTION:	outs with non-	ide the upper	tandard area cour or lower limit, tive results and lues) quantitated	flag	i		ω

ii. Non-detects associated with IS > 100%

should not be qualified.

USEPA Region II Date: August, 2008 SW846 Method 8270D (Rev.4, January 1998) SOP HW-22 Rev. 4 YES NO N/A iii. If the IS area is below the lower limit (<50%), qualify all associated nondetects (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? Professional judgement should be used to ACTION: qualify data if the retention times differ by more than 30 seconds. 16.0 Laboratory Control Samples (LCS) 16.1 Were any LCS samples run in order to verify analytes which failed criteria for spike recovery? 16.2 Did the lab spike LCS sample spiked with the same analytes and the same concentrations as the matrix spike? 16.3 Were the mean and standard deviation of all analytes within the QC acceptance ranges as shown in Table 6, 8270D-43? ACTION: If the recovery of any analyte falls out of the designated range, the analytical results for that compound is suspect and should be qualified "J" in the unspiked samples. 17.0 Field Duplicates 17.1 Were any field duplicates submitted for semivolatile analysis?

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USEPA Region II SW846 Method 8270D (Rev. 4, January 1998)

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> YES NO N/A

ACTION: Compare the reported results for field

duplicates and calculate the relative percent

difference.

ACTION: Any gross variation between field duplicate

> results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the

sampler.

VWAI-MWO7-1112 > qual,
VWAI-MWO7P-1112 > qual,
All attached
form

DataQual

# FIELD DUPLICATE SAMPLE SUMMARY

Sample ID:

VWAI-MW07-1112

Duplicate Sample ID:

VWAI-MW07P-1112

Water: RPD>30% Soil: RPD>30%

Compound	Sample Conc.	Dup. Sample Conc.	%RPD
2-methylnaphthalene		1.1	200
			#DIV/0!
			#DIV/0!
		1:	#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
	-83306-		#DIV/0!
			#DIV/0!

<sup>\*</sup> one or both values below LOD

COMMENTS:

Qualify as estimated.

DataQual SVOA

Initial Calibration Date:

12/18/2012

RRF and %RSD Calculations:

Compound Name:

naphthalene

Lab Value:

0.756

Area of Compound	348674
Area of Internal STD	230477
Conc. of Internal STD	40
Conc. of Compound	80
Calculated RRF	0.756

Compound Name:

2-methylnaphthalene

Lab Value:

12.5

RRF of STD 1	0.818
RRF of STD 2	0.788
RRF of STD 3	0.82
RRF of STD 4	0.668
RRF of STD 5	0.692
RRF of STD 6	0.579
RRF of STD 7	0.788
Calculated % RSD	12.45

Continuing Calibration File ID:

12/19/2012

RRF and %D Calculations:

Compound Name:

bis(2-ethylhexyl)phthalate

Lab Value:

0.725

Area of Compound	205333
Area of Internal STD	452887
Conc. of Internal STD	40
Conc. of Compound	25
Calculated RRF	0.725

Compound Name:

naphthalene

Lab Value:

7.5

Average RRF	0.962
Calibration Check RRF	1.034
Calculated % D	-7.5

**SVOA** 

# SAMPLE CALCULATION

Sample ID:

VWAI-MW04-112

Standard ID:

12/18/2012

Compound:

naphthalene

Concnetration: 1.6J ug/L

	Water (ug/L)	Soil (ug/Kg)
Area of Compound	7031	
Area of Internal STD	185698	
Conc. of Internal (ng)	40	2
RRF of Compound	0.962	
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	1.57	#DIV/0!

	RT of Internal STD	RT of Compound	RRT
Sample	5.71	5.727	1.003
Standard	5.716	5.733	1.003

Standard Operating Procedure

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program

Data Assessment and Contract Compliance Review

SOP:	HW-2 Revis	sion 13	Appendix A.1	Sept. 2006
				YES NO N/A
A.I.I	Contract Comp Present?	oliance Screening	g Report	
	ACTION	: If no, contact	RSCC/PO.	
A.I.2	Record of Com	nmunication (fror	m RSCC)	
<u>S</u>	Present?	)		
38	ACTION	: If no, request	t from the RSCC.	
A.1.3	Sampling Trip	Report	ii,	
	Present	and complete?		[_]
	ACTION	: If no, contact	RSCC/PO.	
A 1 4	Ohain af Ouata	-1101- T#	to Dominat	
A.I.4	Chain of Custo	ody/Sample Traffi	ic Report	
_	Present?			
	Legible?			
	Signature present?	e of sample custoo	dian	
	ACTION	: If no, contact RS	CC/WAM/PO.	
A.I.5	Cover Page			
	Present?			
	Is the Co and the v manager	ver Page properly verbatim signed by or the manager's	the lab Jab Handitadesignee?	<u></u>
	on the Co	ample identification over Page agree w tion numbers on:		
12	(a) Traffic	Report Sheet?		

# Standard Operating Procedure USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

₩SOP:	HW-2	Revision 13	Appendix A.	1	Sept. 2006	
	(b) Fo	rm I's?	i.		YES NO N/A	
		Is the number of sample Page the same as the ramples on the Traffic and the Regional Record (ROC) for the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the data Control of the	number of Report sheet rd of Communication	Si	lect target extes	
×	s	ACTION: If no for any of the above Telephone Record Log for re-submittal of the confrom the laboratory.	and contact RSCC/PO			٠
A.1.6	SDG	Narrative, DC-1 & DC-2	Form			
		Is the SDG Narrative pr	resent?			
$\bigcup$		Is Sample Log-In Sheet present and complete?				
		Is Complete SDG Inverpresent and complete?	ntory Sheet(Form DC-2)			
50		ACTION: If no, write in the Contra Non-Compliance Sec Narrative.	act-Problems/ ction of the Data Review			
A.1.7	<u>Form</u>	I to XV	ŧ.			
A.1.7.	1	Are all the Form I through labeled with:	gh Form XV		8	
		Laboratory Name?			W	
		Laboratory Code?			LY	
		RAS/Non-RAS Case No	o.?		[_]	
$\overline{}$		SDG No.?				

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program
Data Assessment and Contract Compliance Review

⇒SOP:	HW-2	Revision 13	Appendix A.1	Sept. 2006	
		Contract No.?		YES NO N/A	
A.1.7.	2	ACTION:  If no for any of the above Contract Problem/Non-C of the "Data Review Narr PO for corrected Form(s) After comparing values of against the raw data, do transcription errors exceed reported values on the Formatten Policy Problem (S)	ompliance Section rative" and contact ) from the laboratory. on Forms I-IX any computation/ ed 10% of the		
	(a) al	l analytes analyzed by ICF	P-AES?	_ 15	
	(b) all	l analytes analyzed by ICF	P-MS?	_ [] _	
	(c) M	ercury?			
	(d) C	yanide?		_ [_]	
$\Rightarrow$	and c	ON:  , prepare Telephone Reconnect CLP PO/TOPO for from the laboratory.			
A.1.8	hard/	Data shall not be validated w electronic copies of the data for samples and QC	associated		
A.1.8.	1	Digestion/Distillation Log			
		tion Log for ICP-AES XII)present?		LJ	
		tion Log for ICP-MS XII) present?			
	Diges (Form	tion Log for mercury XII) present?	à		
		ation Log for cyanide XII) present?			
	Are pl	H values for metals and			

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SOP:	HW-Z Revision 13 Appe	endix A.i	Sept. 2006
1880			YES NO N/A
	cyanide reported for each aqueous sample?		
	Are percent solids calculations present for soils/sediments?	samples	
	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.		14
A.1.8	.2 Is the analytical instrument real-time printouts present for:		
25	ICP-AES?		LÍ
(à	ICP-MS?		
	Mercury?		
$\cong$	Cyanide?		
	Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:		
	Legible?		11
	Properly labeled?		<u> </u>
	Are all field samples, QC samples and field QC samples present on:		
	Digestion/Distillation log?		
	Instrument Printouts?		<u> </u>
Ser.	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.

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⇒sop:	HW-2 Revisi	on 13	Appendix A.1	Sept. 2006	
il.				YES NO N/I	<u> </u>
	(Examine sample Traffic	ng Times: (Aqueou Reports and digestion/dis me from the sample colle			
A.1.9	.1 Cyanide di	stillation(14 days)e	exceeded?	_ []	. H
	Mercury ar	nalysis(28 days) ex	ceeded?	_ [_]	)
	Other Meta	als analysis(180 da	ys)exceeded?		Ų.
	and flag as estimif sample(s) was p	and red-line non-denated (J)results > Notes that the preserved properly.			
<b>:</b>	NOTE: In addition to qualifying a list of all samples anywhich exceeded the hope prepared. Report for the number of days the (Subtract the sample of from the sample prepared). Attach this list to the dat narrative.	d analytes blding times must breach sample at were exceeded. collection date tration date).			
A.1.9	.2 Is pH of aq	ueous samples for	:		
	Metals Analysis	≤ 2?			
	Cyanide Analysis	3 ≥ 12?			
	ACTION: If no for any of the non-detects as "R"	above, flag and detects as "J".			*
A.1.9.3	Is the cooler temp	erature ≤ 10 C°?		<u> </u>	
	ACTION: If cooler temperature non-detects as "Us".				
A.1.10	0 <u>Final Data Corre</u>	ectness - Form I			

A.1.10.1

Are Form I's for all samples

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				YES NO N/A
	pres	ent and complete?		
	If no Log	TION: , prepare Telephone Record and contact CLP PO/TOPO nittal from the laboratory.	E O A	Mr. only
A.1.	10.2		tion and transcription errors i e on each Form I all results t	
		Is the calculation error less	s than 10% of the correct res	ult?
	9	Are results on Form I's rep MG/KG for soils)?	orted in correct units (ug/L fo	or aqueous and
		Are results on Form I'S rep	ported by correct significant	figures?[
<u></u>		Are soil sample results on corrected for percent solid		
		Are all "less than MDL" value by the CRQLs and coded w		[]
	ŧ	Are values less than the C but greater than or equal to MDLs flagged with "J"?		[_]
		Are appropriate contractua control and Method qualifier	, ,	
		ACTION:  If no for any of the above of prepare Telephone Record CLP PO/TOPO for corrected to the second second second second second second second second second second second second second second second second second sec	Log, and contact	
A.1.	10.3	Do EPA sample identificati and the corresponding labor sample identification numb on the Cover Page, Form I in the raw data?	oratory ers match	
$\simeq$		Was a brief physical descri	iption	

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			YES NO N/A	
	of the samples before and digestion given on the Forn			
	algebrain given on the rolls			
34	Was any sample result out			
	mercury/cyanide calibration or the ICP-AES/ICP-MS lin			
	diluted and noted on the Fo		[]	
	ACTION:			
	If no for any of the above, r			
	the Contract-Problem/Non- Section of the Data Review			
A.1.11 <u>Initia</u>	al Calibration			
A.1.11.1	Is a record of at least 2 points	int		
	(A blank and a standard)ca	alibration		
	present for ICP-AES analys	sis?		
	Is a record of at least 2 point	int		
$\cong$	(a blank and a standard)calibra			
	present for ICP-MS analysi	IS?	[]	
	Is a record of at least 5 points		1	
	(a blank & 4 standards)present	t for Hg analysis?	[]	
	Is a record of at least 4 point			
	(a blank & 4 standards)present	t for cyanide?	[]	
	ACTION:			
	If incomplete or no initial ca			
*	was performed, reject (R) a the associated data (detect			
		,		
	Is one initial calibration star at the CRQL level for cyanic			
100	mercury?		[]	
	ACTION:			
	If no, write in the Contract F	Problem/		
	Non-Compliance Section of			
	Review Narrative.			
اب الم.1.11.2 الم.1.11.2	Is the curve correlation			
	coefficient > 0.995 for			

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Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13	Appendix A.1	Sep	t. 2006	
			YES	NO N/	A
	Mercury Analysis?		[]		
	Cyanide Analysis?	*	[]		_
	ICP-AES (more than 2 poin	t Calib.)?	[]		
	ICP-MS (more than 2 poin	t calib.)?			
9	ACTION:  If no, qualify the assocresults ≥ MDL as estimate non-detects as "UJ".  NOTE:  The correlation coefficient shale be calculated by the data validate using standard concentrations are corresponding instrument responsible absorbance, peak area, peak height	ed "J" and  l tor d the e (e.g.	lJ	_	
A.1.12	Initial and Continuing Cal	ibration Verification-	Form IIA	<u>.</u>	
A.1.12.1	Present and complete for metal and cyanide?	every		-	_
96	Present and complete for and ICP-MS when both the were used for the same a	se methods	[]		_
	ACTION:  If no for any of the abo Telephone Record Log and for re-submittal from th	contact PO/TOPO			
A.1.12.2	Was a Continuing Calibra Verification performed e 10 samples or every 2 ho whichever is more freque	very urs	[ <u>~</u>	1	
	ACTION:  If no for any of the abo in the Contract-Problem/ Section of the Data Revi	Non-Compliance			
A.1.12.3	Was an ICV or a mid-rang distilled and analyzed to of cyanide samples?	e standard ith each batch	[]		

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			YES NO N/A	
	Section of the Dat	he above, write oblem/Non-Compliance a Review Narrative and MDL as estimated (J).		
A.1.12.2	Circle on each Form IIA that are outside the cont	7		
	Are ICV/CCVs within cor	ntrol limits for:	<i>y</i>	
39-1	Metals - 90-110%	₹?	. [	
	Hg - 80-120%R?		[_]	
	Cyanide - 85-115%I	R?	[_]	
<u>_</u>		between a previous technically ac ent technically acceptable CCV sta		
	if the ICV/CCV %R is be Qualify only positive resubetween 111-125%(121- red-line only detects if the recovery is CN). Reject (R) and red-	all detects and non-detects, tween 75-89%(65-79% for Hg; 70- ults(≥ MDL) as "J" if the ICV/CCV % -135% for Hg;116-130% for CN). F greater than 125% (135% for Hg; line all associated results (hits and less than 75%(65% for Hg;70% for	%R is Reject (R) and 130% for d non-	
	NOTE: For ICV that does not fall within t qualify all samples reported from			
A.1.12.3	Was the distilled ICV or standard for cyanide with limits (85-115%)?		[_] _ <u>~</u>	
61	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

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	RQL or MDL when MDL > CF ndard analyzed? (Note:CRI is not requir Ca, Fe, Mg, Na and K.)	S. 980	<u>YES NO N</u>	<u>/A</u> 
	For each ICP-MS run, wa (CRQL or MDL when MDL > C analyzed for each mass/is for the analysis?	RQL) standard	[]	
	For each mercury run, was standard analyzed?	as a CRQL	[]	s <del></del> s
	For each cyanide run, wa standard analyzed?	s a CRQL	[]	·
ICP ICP Mer	ACTION:  If no for any of the above this deficiency in the Con Non-Compliance Section Narrative, inform CLP PC in the affected ranges (de and non-detects UJ.  affected ranges are: -AES Analysis - *True Value: -MS Analysis - *True Value: -cury Analysis - *True Value: -true value of the CR	tract Problems/ of the Data Review and flag results etects <2xCRQL)as J  + CRQL + CRQL + CRQL + CRQL + CRQL		
A.1.13.2	Was a CRQL standard an ICV/ICB, before the final once every 20 analytical the analytical run for each	CCV/CCB and samples in	[_]	
	ACTION: If no, write in the Contract Non-Compliance Section "Data Review Narrative".			
A.1.13.3	Circle on each Form IIB a recoveries that are outsid acceptance windows.	2 2 2 2 2 2		

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≤SOP: HW-2	Revision 13	Appendix A.1	Sept. 2006	
	Is the CRQL standard within limits for:	control	<u>YES NO N/</u>	<u>A</u>
8	Metals(ICP-AES/ICP-MS)-	70 - 130%?	[]	V
	Mercury- 70 - 130%?		[]	_
	Cyanide - 70 - 130%?		[]	1
	ACTION:  If no, flag detects <2xCRQL non-detects as "UJ" if the Corecovery is between 50-69% detects <2xCRQL if the recovery and ≤180%. If the recovery reject(R) and red-line detects < 2xCRQL, and flag 2xCRQL and ICV/CCV. Rejected to the recovery results of the recovery results and recovery results are recovery results.	RQL standard 6. Flag(J) only every is between covery is less than e non-detects and (J) detects between ect and red-line only (J)detects ≥ 2xCRQL	Mot a CLP s but all cr QC somples No Quals	eguerce. Heria of Was me Negure
· ·	NOTE:  1. Qualify all field samples a previous technically acc the CRQL standard and a su analysis of the CRQL stand 2. Flag (J) or reject (R) only sample results on Form I's raw data are within the aff and the CRQL standard is cacceptance windows.  3. The samples and the CRQL standard is canalyzed in the same analyses.	ceptable analysis of absequent acceptable dard by the final swhen Sample ffected ranges butside the		
A.1.14 <u>Initia</u>	ıl and Continuing Calibratio	n Blanks - Form III		
A.1.14.1	Present and complete for all the instruments used for the metals and cyanide analyses			€
s:	Was an initial Calibration Bla analyzed after ICV?	ank		
	Was a continuing Calibration analyzed after every CCV ar 10 samples or every 2 hours is more frequent?	nd every	<u></u>	-
<i>→</i>	Were the ICB & CCB values reported on Form III and flag			

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:se: - d	using MDLs from direct Method "NP1")? (Check Form III again		<u>YES</u>	NO N/A
	ACTION:  If no, inform CLP PO/ in the Contract-Proble Section of the "Data R			
A.1.14.2	Circle with red pencil of all Calib. Blank values			
	į	≥ MDL but ≤ CRQL		
	3	> CRQL		
A.1.14.2.1	When MDL < CRQL, i value ≥ MDL but ≤ CR			
J	ACTION:  If yes, change sample but ≤ CRQL to the CR  Do not qualify non-det	QL with a; "U".		
	/hen MDL < CRQL, is ar alue > CRQL?	ny Calib. Blank		[1
a a	ACTION:  If yes, reject (R) and reasoniated sample residut <icb blank="" ccb="" florester=""> ICB/CCB blace &lt; 10xICB/CCB value.  results &gt; MDL but &lt; the with a "U".</icb>	sults > CRQL Result. Flag as "J" ank value but Change the sample		
	any Calibration Blank velow the negative CRQL			<u></u>
	ACTION: If yes, flag (J) as estimassociated sample res			*
	NOTE:			

For ICB that does not meet the technical QC Criteria, apply the action to all samples

Evaluation of Metals Data for the Contract Laboratory Program
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			YES NO N	<u> </u>
2. F ap pr a :	ported from the analytical run. or CCBs that do not meet the technical QC cri oply the action to all samples analyzed betwee evious technically acceptable analysis of CCB subsequent technically acceptable analysis of CB in the analytical run.,	n a and		
A.1.15	Preparation Blank - FOR NOTE: The Preparation Blank for is the same as the calibration	mercury		
A.1.15.1	Was one Preparation Bla with and analyzed for:	pk prepared		
	Each Sample Delivery Gr	oup (SDG)?	[]	1301
	Each batch of the SDG s digested/distilled?	amples		. <del> </del>
	Each matrix type?		[	ş
_	All instruments used fo and cyanide analyses?	r metals		
	ACTION:  If no for any of the aboas estimated (J) all the positive data <10xMDL for Preparation Blank was not become the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the prope	e associated fr which the		
	NOTE:  If only one blank was analyzed than 20 samples, then the first analyzed are not estimated(J), by additional samples must be qual	20 samples ut all		
A.1.15.2	Circle with red pencil or all Prep. Blank values the			
	≥ MDL but ≤ CR(	QL, and		
	> CRQL			
A.1.15.2.	1 When MDL < CRQL, is any value ≥ MDL but ≤ CRQL?	preparation blank	[]	
2	<u>ACTION</u> : If yes, change sample re	( esult ≥ MDL	no +	

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

_3OP: HW−2	Revision 13	Appendix A.1	Se	pt. 2006	
Has		**	YES	NO N/A	_
	but $\leq$ CRQL to CRQL with	a "U".			
A.1.15.2.2	When the MDL $\leq$ CRQL, is Blank value greater than			( <u>V</u> 1	
	If yes, is the Prep. Blagreater than the value of Field Blank collected and the SDG samples?	f the associated	_		
	If yes, is the lowest conthat analyte in the assorbes than 10 times the EBlank value?	ciated samples	_	[_]	
	ACTION:  If yes, reject (R) and results greater to than the Prep.Blank value detects > Prep. Blank value to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result > Market to the sample result	han the CRQL but les e. Flag as "J" lue but <10xPrep.Blas	s nk.		
	If the Prep. Blank value analyte value in the Fie qualify the sample resul Prep. Blank criteria.	ld Blank, do not	me		
	NOTE: Convert soil sample result to mg wet weight basis to compare with Prep. Blank result on Form III.				
A.1.15.2.3	Is the Prep. Blank conce below the negative CRQL?		[.		
	ACTION:  If yes, flag (J) all ass sample results less than Qualify non-detects as e	10xCRQL.			
A.1.15.2.4	When the MDL is greater CRQL, is the preparation concentration on Form II than two times the MDL?	blank		[_] _	

ACTION:

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9	If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.	YES		<u>/A</u>
A.1.16	<pre>ICP-AES/ICP-MS Interference Check S NOTE:Not required for CN, Hg, Al, Ca, Fe</pre>		erm IV	
A.1.16.1	Present and complete?	[]	/	
<b>3</b>	Was ICS analyzed at the beginning and end of each analytical run, and once for every 20 analytical sample		/_	
	Was ICS analyzed at the beginning o the ICP-MS analytical run?	f []		
ž.	ACTION:  If no, flag as estimated (J) all sample results.			
J				2
A.1.16.2	ICP-AES Method			
A.1.16.2.1	<pre>ICSA Solution: For ICP-AES, are the ICSA "Found" a values within the control limits ± of the true/established mean value?</pre>		_	_
	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 greater than or equal to its respectoncentration in the ICSA Solution Form IV?	/KG) tive		
	ACTION:  If yes, apply the following action all samples analyzed between a preventechnically acceptable analysis of ICS and a subsequent technically acceptable analysis of the ICS in the analytical	ious the ceptable		

Flag (J) as estimated only sample results  $\geq MDL$ 

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YES NO N/A

for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".

#### A.1.16.2.3 ICSAB Solution

For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?

If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?

#### ACTION:

If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results  $\geq$  MDL for which the ICSAB analyte recovery is greater than 120% but  $\leq$  150%. If the ICSAB recovery falls within 50-79%, qualify sample results  $\geq$  MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

#### A.1.16.3 ICP-MS Method

#### A.1.16.3.1 ICSA Solution:

For ICP-MS, are the ICSA "Found" analyte values within the control limits of  $\pm$ 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  $\geq$  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".

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sample analysis.

SOP: HW-2	Revision 13	Appendix A.1	Sept. 2006
30			YES NO N/A
A.1.16.3.3	ICSAB Solution For ICP-MS, are all and in ICSAB within the constant of the true/es value, whichever is grant of the strue of the true of true of the true of the true of the true of the true of the true of the true of the true of the true of the true of the true of true of the true of the true of true of true of true of true of true of true of true of true of true of true of true of true of true of true of true of true of true of true of true of true of true of true of true of true of true of true of true of true of t	ontrol limits of stablished mean	
19	ACTION: If no, apply the follosamples reported from		
	Flag (J) as estimated sample results ≥ MDL france analyte recovery is gr ≤ 150%. If the ICSAB r 50-79% flag (J) as est sample results ≥ MDL, those all sample detection which the ICSAB analyte 50%. If the recovery and red-line only detections.	for which the ICSAB reater than 120% but recovery falls within timated the associated Reject (R) and red-linets and non-detects for the recovery is less that is above 150%, reject (	r an
1.1.17	Spiked Sample Recovery Note: Not required for Ca		istillation) - Form V A es); Al and Fe (soil only)
A.1.17.1	Was Matrix Spike analy	sis performed:	
	For each matrix type?		[]
	For each SDG?		i1 <i>←</i>
	On one of the SDG samp	oles?	[] <del> </del>
S 2	For each concentration (i.e., low, med., high)		[]
	For each analytical Me (ICP-AES, ICP-MS, Hg, C		[]
	Was a spiked sample pranalyzed with the SDG		[] <u></u>
	ACTION:  If no for any of the a estimated(J)all the pofor which a spiked sam analyzed.	above, flag as esitive data aple was not	all results were I flagger as no ms was analyzed
<u> </u>	NOTE:  If more than one spiked sam analyzed for one SDG, then associated data based on the	qualify the	OD (10 11)3

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SOP: HW-2	Revision 13	Appendix A.1	S	ept. 20	06
	Α.		YES	NO	N/A
A.1.17.2	Was a field blank or PE samp for the spiked sample analys				
***	ACTION:  If yes, flag (J) as estimated data of the associated SDG swhich field blank or PE samp for the spiked sample analyses.	samples for ole was used			
A.1.17.3	Circle on each Form VA all serecoveries that are outside control limits (75-125%) the sample concentrations less to times the added spike concentrations.	the at have than four			26
~	Are all recoveries within the control limits when sample concentrations are less than equal to four times the spike concentrations?  NOTE:  Disregard the out of control spike recoveries for analytes whose concentrations are greater than on equal to four times the spike added.	n or ke	[]	y <u></u>	<u>V</u>
6	Are results outside the cont (75-125%) flagged with Lab Qu on Form I's and Form VA?		[]	·	
	ACTION:  If no for any of the above, the Contract - Problems/Non-Section of the Data Review N	-Compliance		. ~1	e gerformed
A.1.17.4	Aqueous		11	M	U
	Are any spike recoveries:	est.			10
	(a) less than 30%?			[]	-
	(b) between 30-74%?		-	[]	_
	(c) between 126-150%?		8 <u></u>	[]	+
	(d) greater than 150%?			[]	+
	ACTION:  If the matrix spike recovery 30%, reject (R) and red-line aqueous data (detects & non-between 30-74%, qualify all aqueous data > MDL as "J" ar	all associated detects). If associated			

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SOP: HW-2	Revision 13	Appendix A.1	Se	pt. 200	6
			YES	NO N	<u>/A</u>
		126-150%, flag (J) '. If greater than 150%, ine all associated data > M	DL.		
iş.	(NOTE:Replace "N" with	"J", "R" as appropriate.)			
A.1.17.5	Soil/Sediment				
	Are any spike recover	ries:			1
	(a) less than 10%?		<del></del>	[]	+
	(b) between 10-74%?	×	71 - 11 - 12 - 12 - 12 - 12 - 12 - 12 -	[]	
	(c) between 126-200%	?	-	[]	+
	(d) greater than 2009	§? /	(C <del>CCCCC)</del>	[]	1
	ACTION:  If yes for any of the as follows:	e above, proceed			Ŋ
2 2	if between 126-200%, data ≥ MDL as "J" If (R) and red-line all	and red-line all ects & non-detects);			e
A.1.18	Lab Duplicates) - Fo	orm VI			
A.1.18.1	Was the lab duplicate	e anal <sub>į</sub> ysis performed:		/	
	For each SDG?		[]	7	
90	On one of the SDG san	mples?	[]	+	) <del></del> )
	For each matrix type?	?	[]	+	-
e	For each concentration (low or med.)?	on range	[]	1	
	For each analytical M (ICP-AES/ICP-MS, Hg, CN		[]		
· .	Was a lab duplicate panalyzed with the SDG		[]	<u> </u>	<del>5.0</del>

USEPA Region 2

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13	Appendix A.1	S	ept. 200	6
-			<u>YES</u>	NO N	I/A
×	estimated all the S	ects) for which the lab was not performed.	70	sple m	dup dup atrix dup
	were analyzed for an SI the associated samples worst lab duplicate ana	OG, then qualify based on the		OIL PL	15/12
A.1.18.2	Was a Field Blank of for the Lab Duplica		-		_
*		(hits & non-detects) ank or PE sample was			ù.
A.1.18.3	Circle on each Form	n VI all values			
	RPD > 20%, or				
	Absolute Difference	e > CRQL ~			
	Are all values with limits (RPD $\leq$ 20% of difference $\leq$ $\pm$ CRQL)	or absolute	[]		_
a a	If no, are all resucontrol limits flag (Lab Qualifier) on E all Form I's?	gged with an "*"	[]	_	✓
	ACTION: If no, write in the Non-Compliance Sect Review Narrative.	e Contract-Problems/ cion of the Data			
	NOTE: The laboratory is not report on Form VI the Roth values are non-det	PD when			

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A.1.18.4

Aqueous

A.1.18.4.1 When sample and duplicate values are both

 $\geq$  5xCRQL (substitute MDL for CRQL when MDL > CRQL),

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13	Appendix A.1	S	Sept. 200	6
3	is any RPD > 20% but	< 100%?	YES	NO N	/A
	is any RPD ≥ 100%?	*		[]	/
	ACTION:  If the RPD is > 20% If lag (J) as estimated sample data ≥ CRQL. ≥ 100%, reject (R) as associated sample data (NOTE:Replace "*" with "	d the associated If the RPD is nd red-line the			
A.1.18.4.2		DL for CRQL when MDL >CRQL), erence between sample			
2"	> <u>+</u> CRQL? > <u>+</u> 2xCRQL?			[]	
	<ol><li>If one value is &gt;CRQL calculate the absolute</li></ol>	l the associated but < 5xCRQL as "J" UJ". If the absolute QL, reject (R) and ociated non-detects	CRQL		
A.1.18.5	Soil/Sediment				
A.1.18.5.1	When sample and duplare both ≥ 5xCRQL (su CRQL when MDL > CRQL), is any RPD ≥ 35% but	bstitute MDL for	_	[]	_
)* )	is any RPD $\geq$ 120%?  ACTION:  If the RPD is $\geq$ 35% a  (J) as estimated the			tJ	

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Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13	Appendix A.1		Sept. 2	006
	data $\geq$ CRQL. If the Region (R) and red-line the data $\geq$ CRQL.	RPD is <u>&gt;</u> 120%, reject associtated sample	<u>YES</u>	<u>NO</u>	N/A
A.1.18.5.2		or duplicate value for CRQL when MDL > CRQL), erence between sample			
**	$> \pm 2 \times CRQL$ ?		-	[]	_/
	$> \pm 4 \times CRQL$		-	[]	<u></u>
	ACTION: If the absolute difference flag all the associate	erence is > 2 x CRQL, ted sample results > MDL			

#### MOME.

1. Replace "\*" with "J", "UJ" or "R" as appropriate.)

and detects  $\geq$  MDL but  $<5 \times CRQL$ .

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

 If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

#### A.1.19 Field Duplicates

#### Aqueous Field Duplicates

A.1.19.1 Was an aqueous Field Duplicate pair collected and analyzed?
(Check Sampling Trip Report)

#### ACTION:

If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

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Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13	Appendix A.1		Sept. 20	06
	QC criteria stated in Sect	ions A 1 19 2 and A 1	<u>YES</u>	NO	N/A
			.19.5.		
1	NOTE:  1. Do not transfer "*" from Form 2. Do not calculate RPD when bot 3. Substitute MDL for CRQL when N 4. If one value is >CRQL and the non-detect, calculate the abso between the value > CRQL and t this the criteria to qualify the	th values are non-detects.  MDL > CRQL.  other value is  plute difference  the MDL, and use			
A.1.19.2	Circle all values on the F for Field Duplicates that		187		
	RPD ≥ 20% or				
	Difference > $\pm$ CRQL				
	When sample and duplicate both $\geq 5 \times \text{CRQL}$ (substitute MDL MDL > CRQL),				
	is any RPD $\geq$ 20%?			[]	_
_	is any RPD $\geq$ 100%?			[]	_
	ACTION:  If the RPD is >20% but < 100 the associated sample and results > CRQL. If the RPD and red-line only the associated Duplicate result > CROWN CONTROL OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY O	its Field Duplicate is ≥ 100%, reject(R) ciated sample and its			
A.1.19.3	When the sample and/or dup <5xCRQL (substitute MDL for is the absolute difference and duplicate:	CRQL when MDL >CRQL),			
	> ± CRQL?			[]	
	> ± 2 x CRQL?			[]	_
	ACTION:				
e 2	If the absolute difference flag detects $\geq$ MDL but < 5 and non-detects as "UJ". I is > 2xCRQL, reject (R) and	xCRQL as "J" f the difference			

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Evaluation of Metals Data for the Contract Laboratory Program

Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13	Appendix A.1	Se	ept. 2006	
	and results > MDL and its Field Dupl	but <5xCRQL of the sample licate.	YES	NO N/A	
	Soil/Sediment Fi	eld Duplicates			
A.1.19.4	Was a soil field of collected and anal (Check Sampling Tri	lyzed?	[]		
*	ACTION:  If yes, for each spair proceed as for	soil Fiel <sup>i</sup> d Duplicate ollows:			
	pair. Report on Aprield Duplicate rerespective Form I's sample and its duplicate absolute difference (sample or duplicate and QC Criteria states)  NOTE:  1. Do not transfer "*"	QL and the other , calculate the between tike e MDL, and apply	when er e 1.19.6.		
A.1.19.5	Circle on each Approalues that have:	pendix A.4 all			
	When sample and du	(substitute MDL for			
s#	is any RP⊃ ≥ 35% k	out < 120%?			
	is any RPD ≥ 120%?			[] <u>~</u>	
		ŧ			

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If the RPD is  $\geq$  35% but < 120%,

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13	Appendix A.1	Sept. 2006
(100) H	flag only the associ and its Field Duplic CRQL as "J". If th reject (R) and red-1 and its Field Duplic	ate results e RPD is ≥ 120%, ine only the sample	YES NO N/A
A.1.19.6	<5xCRQL (substitute M	or duplicate value(s) DL for CRQL when MDL > CRQL), erence between sample	
	> <u>+</u> 2 x CRQL?		[]
	> <u>+</u> 4 x CRQL?		[_]
, ,	Sample and its Field but <5xCRQL as "J" a If the difference is red-line non-detects	erence is > 2xCRQL, flag Duplicate resuts > MDL nd non-detects as "UJ". >4xCRQL, reject(R) and and detects > MDL but e and its Field Duplicate.	
A.1.20	Laboratory Control S	ample (LCS) - Form VII	
A.1.20.1	Was one LCS prepared	and analyzed for:	
	Each SDG?		<u></u>
	Each matrix type?		
	Each batch samples d For each Method(ICP-used?		
	Was an LCS prepared the samples?  ACTION:  If no for any of the Telephone Record Log CLP PO or TOPO for so LCS results. Flag (J the data for which as analyzed.	above, prepare and contact ubmittal of the ) as estimated all	( <u>√</u> 1
ب ا	NOTE: If only one LCS was analy	vzed for	

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Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13 App	endix A.1	Sept. 2	006
	more than 20 samples, then the first 20 samples analyzed are not flagged(J but all additional samples must be qualified (J).	<u>YE</u> :	<u>8 NO</u>	<u>N/A</u>
0				
A.1.20.2	Aqueous LCS			
	Circle on each Form VII the LC recoveries outside control lim			
	NOTE: 1.Use digested ICV as LCS for a 2.Use distilled ICV as LCS for			
	Is any LCS recovery:			
	Less than 50%?	_	. [_	í <u> </u>
	Between 50% and 79%?		. [	í
	Between 121% and 150%?	<u> 25</u> 2	[]	
	Greater than 150%?		_ [1/	ſ
	ACTION:  If the LCS recovery is less that reject (R) and red-line all assample data (detects & non-detect a recovery between 50-79%, flact as "J" all non-detects as "UJ" recovery is between 121-150%, detects as "J". if the recovery than 150%, reject (R) and red-	sociated ects); for g detects . if the LCS flag only y is greater		
A.1.20.3	Solid LCS			
,	If an analyte's MDL is equal to greater than the true value of disregard the "Action" below for analyte even though the LCS is control limits.	LCS, or that		
	Is the LCS "Found" value greate than the Upper Control Limit reported on Form VII?	er —	[]	_

ACTION:

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SOP: HW-2	Revision 13	Appendix A.1	S	ept. 200	06
	If yes, flag (J) all the as detects $\geq$ MDL as estimated		YES	<u>NO</u> 1	N/A
	Is the LCS "Found" value lotten than the Lower Control Limit reported on Form VII?  ACTION:			[]	<u> </u>
	If yes, flag detects as "Jonon-dectes as "UJ".	" and			
A.1.21	ICP-AES/ICP-MS Serial D. NOTE: Serial dilution analysis is when the initial concentration i greater than 50 x MDL.	required only	DOD For s	- only	applicable conc.
A.1.21.1	Was a Serial Dilution analy performed:	ysis		1 50	Plice
	For each SDG?		[]		
	On one of the SDG samples?		[]		8
	For each matrix type?	s	[1]		
e)	For each concentration range (low or med.)?	ge	[1]		
	Was a Serial Dilution sample analyzed with the SDG sample				_
	ACTION:  If no for any of the above as estimated (J) detects ≥ all the SDG samples for white ICP Serial Dilution Analyst not performed.	MDL of ich the			
A.1.21.2	Was a Field Blank or PE sar for the Serial Dilution Ana			[1]	·
a a	<pre>ACTION: If yes, flag as estimated     MDL of all the SDG sample</pre>				
A.1.21.3	Circle on Form VIII the Per (%D) between sample results results that are outside the	s and its dilution	8		× v

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Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13 App	endix A.1	Se	pt. 2006
1,000	when initial concentrations ≥ 5	00 x MDLs.	YES	NO N/A
	Are results outside the control limits flagged with an "E" (Lab on Form VIII and all Form I's?		[]	<u></u>
	ACTION: If no, write in the Contract-Proposition Non-Compliance Section of the Review Narrative.			
A.1.21.4	Are any %D values:			
	> 10%?			
	≥ 100%?		_	[
÷	ACTION:  If the Percent Difference (%D) greater than 10%, flag (J) as a all associated samples whose raif the %D is > 100%, reject (all associated samples with raw (NOTE:Replace "E" with "J" or "R"	estimated  aw data > MDL;  R) and red-line  data > MDL.		
A.1.22	Total/Dissolved or Inorganic/To	tal Analytes		
A.1.22.1	Were any analyses performed for dissolved as well as total analon the same sample(s)? Were any analyses performed for inorganic as well as total analon the same sample(s)?	ytes		
9	ACTION:  If yes, prepare a Form (Appendit to compare the differences between dissolved (or inorganic) and total analyte concentrations. Computed difference on Appendix A.5 as a of the total analyte only when the following conditions are form	reen cal e each percent both of		3
	<ul><li>(1) The dissolved (or inorganic) is greater than total concentr</li><li>(2) greater than or equal to 5x</li></ul>	ation, and		
١.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more that	.*		

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Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13	Appendix A.1	S€	ept. 2006
O 750	<del>==</del> **		<u>YES</u>	NO N/A
A.1.22.3	Is any dissolved(or in concentration greater total concentration by	than its		[_]
	ACTION:  If the percent different than 20%, flag (J) both and total concentration the difference is more and red-line both the	th dissolved/inorganic ons as estimated. If e than 50%, reject (R)		
A.1.23	Field Blank - Form I NOTE: Designate "Field I	Blank" as such on Form I		*
A.1.23.1	Was a Field/Rinsate Ba and analyzed with the		[]	<u></u>
	If yes, is any Field/R absolute value of an a greater than its CRQL(			[]
=	If yes, circle the Fie on Form I that is great CRQL, (or 2 x MDL when MDL	ater than the		
	Is any Field Blank val than CRQL also greater Preparation Blank valu	than the	_	[_]
	If yes, is the Field B (> CRQL and > the prep already rejected due to criteria?	o. blank value)	[]	<u></u>
		5		

#### 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

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Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

SOP: HW-2	Revision 13	Appendix A.1	Sept. 2006
	Prep.Blank value, do n		YES NO N/A
ti.	NOTE:  1. Field Blank result previoue to other criteria can qualify field samples.  2. Do not use Rinsate Blank soils to qualify water s	lously rejected annot be used to c associated with	8
A.1.24	Verification of Instru	umental Parameters - Form	n IX, XA, XB, XI
A.1.24.1	Is verification report	present for:	,
	Method Detection Limit	s (Form IX-Annually)?	<u></u>
	ICP-AES Interelement C (Form XA & XB -Quarter		<u></u>
	<pre>ICP-AES &amp; ICP-MS Linea (Form XI-Quarterly)?</pre>	ar Ranges	[ <u></u>
<del></del>	ACTION: If no, contact CLP PO/ submittal from the lab		
A.1.24.2	Method Detection Limits	3 - Form IX	
A.1.24.2.1	Are MDLs present on Fo	orm IX for:	7
	All the analytes?		[
	All the instruments us	ed?	[ <u>V</u>
	Digested and undigeste samples and Calib.Blan		<u></u>
ē	ICP-AES and ICP-MS whe instruments are used f same analyte?		[] <u></u>
	ACTION: If no for any of the a Telephone Record Log a PO/TOPO for submittal the laboratory. Report write in the Contract Non-Compliance Section	nd contact CLP of the MDLs from to CLP PO and Problems/	

Narrative if the MDL concentration is not

less than 1/2 CRQL.

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SOP: HW-2	Revision 13 App	pendix A.1	Sept. 2006
A.1.24.2.2	Is MDL greater than the CEQL for any analyte?	YES	NO N/A
	If yes, is the analyte concentron Form I greater than 5 x MDL the sample analyzed on the inswhose MDL exceeds CRQL?	for	
	ACTION:  If no, flag as estimated (J) a values less than five times MD the analyte whose MDL exceeds	L for	
A.1.24.3	Linear Ranges - Form XI		
A.1.24.3.1	Was any sample result higher the high linear range for ICP-or ICP-MS?		[ <u></u> ]
	Was any sample result higher the highest calibration standarfor mercury or cyanide?		
	If yes for any of the above, we the sample diluted to obtain to result reported on Form I?		.ı
	ACTION:  If no, flag (J) as estimated t affected detects (≥ MDL) report on Form I.		
A.1.25	ICP-MS Tune Analysis - Form X	<u>ıv</u>	
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	ι	.1
	ACTION:  If no, reject (R) and red-line sample data for which tuning w performed.		
A.1.25.2	Was the tuning solution analyzor scanned at least five times consecutively?		ı _ <u>~</u>
_	Were all the required isotopes spanning the analytical range present in the tuning solution		J
_	Was the mass resolution within		

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

JOP: HW-Z	Revision 13 Appendix A.1		Sept. 2006 _	
<u></u>		YES	NO N/A	
0.1 amu fo	r each isotope in the tuning solution?	[]		
	Was %RSD less than 5% for each isotope of each analyte in the tuning solution?	[]		
ē	ACTION:  If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".			
A.1.26	ICP-MS Internal Standards - Form XV			
A.1.26.1	Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)?	[]		
	Were all the target analyte masses bracketed by the masses of the five internal standards?	[]		
	ACTION:  If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.			κ
A.1.26.2	Was the intensity of an Internal Standard in each sample within 60-125% of the intensity of the same Internal Standard in the calibration blank?	[]		
	If no, was the original sample diluted two fold, Internal Standard added and the sample re-analyzed?	[]		
	Was the %RI for the two fold diluted sample within the acceptance limits (60-125%)?	[]		
9 ->	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			

Evaluation of Metals Data for the Contract Laboratory Program Data Assessment and Contract Compliance Review

OP: HW-2	Revision 13	Appendix A.2	Sept	. 2006
	3003800 3.1			
than the a	atomic mas	ernal standard, and the s of the internal standard ffected internal standard.	heavier	
745				
A.1.27	Percent So	lids of Sediments		
A.1.27.1	Are percen	t solids in sediment(s):		
	< 50%?			[]
	non-detect	alify as estimated (J) all s of a sample that has perc 50%(i.e., moisture content great	ent solids	
	that were no	the sample results t previously flagged QC criteria.		
Tnorgan:	ic Data Re	eview Narrative  Site:	Matrix: Soil	8 So <del>per</del> 3
SDG#		Lab:	Water	
Sampling 5	Team:	Reviewer:	Other	
Th		Flags: flags may have been applied by the data user.	d in red by the data	validator and must
J -		This flag indicates the res	sult qualified as <b>es</b> t	timated
Rano	d Red-Line -	A red-line drawn through a The red-lined data are kno documented information and	wn to contain signif	icant errors based or
Ŭ -	¥0	This data validation quali MDL when associated blan		ample results
Fully	y Usable Data	- The results that do rusable.	not carry "J" or "rec	d-line" are fully
17771	oratory Qual	ifiers:  ory applies a contractual qu	ualifier on all	

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#### SAMPLE CALCULATION

EPA SAMPLE ID:

VWAI-MW04-1112

COMPOUND:

Manganese 1140 ug/L

CONCENTRATION: %Solids –

NA

Raw Data result: 1.1432 mg/L

1.1432 mg/L (1000 ug/Img) = 1143.2 ug/L

#### FIELD DUPLICATE SAMPLE SUMMARY

Note: All reported results are noted in the table below because the client requested that the MDL be used as reporting limit instead of the RL for this project. RPDs or absolute differences were calculated based on Region II guidelines: if results are >5X RL RPD is calculated, if results are <5X RL the absolute difference is calculated. Flags are applied to field duplicate pair only as follows: For RPD values - RPD  $\ge$  35% but <120% results are J, RPD >120%, results are R. For absolute difference values - >+/-2X RL results are J, >+/-4X RL results are R.

Sample ID: none Duplicate Sample ID:

Analyte	Sample Conc.	Duplicate Conc.	RPD or absolute difference
	35		0.000
			#DIV/0!

Duplicate Sample ID:

Comments:

Analyte

No qualifications required.

Sample ID: none

Sample Conc.	Duplicate Conc.	RPD or absolute difference
		0.000

0.000

Comments:

No qualifications required.

Reviewer

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Appendix E Final Responses to USEPA and PREQB Comments

# Final Responses to EPA Comments on the Draft In-Situ Remediation Pilot Study Report, Area of Concern I (AOC I) Former Atlantic Fleet Weapons Training Area- Vieques Naval Ammunition Support Detachment Vieques, Puerto Rico March 2013

#### **EPA General Comments**

1. While Section 4 (Conclusions and Path Forward) provides information to substantiate that concentrations decreased at AOC I, the Pilot Study does not provide a sufficient discussion to substantiate that the concentration decreases were specifically related to the application of in-situ chemical oxidation (ISCO) and enhanced in-situ bioremediation (EISB) and not natural processes. In addition, the Pilot Study does not discuss how the application of ISCO and EISB met performance based criteria and data quality objectives (DQOs). Revise Section 4 to provide a discussion to substantiate that the application of ISCO and EISB met performance based criteria and DQOs.

#### Navy Response:

The following paragraphs have been added to the end of Section 3.2:

"As stated in Section 1.1, the objectives of the Pilot Study implemented at AOC I were to: (1) determine if the groundwater Pilot Study technologies could reduce COC concentrations to acceptable levels and (2) determine if the Pilot Study technologies could reduce the groundwater cleanup timeframe (relative to that predicted by natural attenuation alone). The associated project quality objective (PQO), as documented in Worksheet 11 of the Pilot Study SAP (CH2M HILL, 2010a), was to collect data sufficient for determining whether unacceptable risk associated with potential potable groundwater use at the site was mitigated (i.e., all COC concentrations below Pilot Study PRGs) and, therefore, no further action was warranted.

As noted previously, the concentrations of all groundwater COCs in all wells (except benzene and naphthalene in well MW07) had declined to below Pilot Study PRGs before the Pilot Study baseline sampling (i.e., between 2004 and 2010). For MW07, Table 6 summarizes the percent reduction of benzene and naphthalene in monitoring well MW-07 prior to and during the Pilot Study implementation. The table also includes 2-methylnaphthalene because it helps demonstrate the potential affect on COC concentration decline by natural processes and the Pilot Study technologies. As shown in the table, the concentrations of these three COCs declined between 74 percent and 79 percent over the 5 ½ years prior to the Pilot Study (i.e., under the influence of natural attenuation processes alone). During the 2 ½-year Pilot Study, the same COCs declined by about 95 percent.

In addition to the above, natural attenuation modeling (see Attachment C of the Pilot Study SAP [CH2M HILL, 2010a]) indicated it would take approximately 7 years for benzene and 14 years for naphthalene to decline from levels measured at AOC I in 2008 to the Pilot Study PRGs under the influence of natural attenuation processes alone. As shown in Figures 12 and 14, the Pilot Study PRGs for both of these two COCs were achieved in about 4 years (i.e., 2008 to 2012).

The information above indicates the decreases in COC concentrations were attributable to both natural processes and Pilot Study technologies, with the Pilot Study technologies likely accelerating the decline to below the PRGs. Regardless of the relative contribution of natural processes and Pilot Study technologies, the monitoring conducted before and during the Pilot Study indicated all COCs at the site declined to below the PRGs without rebound."

The sub-bullets of the third bullet in Section 4 were revised as follows:

- "...(from 14 μg/L to 0.82 μg/L during the Pilot Study). Benzene concentrations declined naturally by 76 percent prior to the Pilot Study and by 94 percent following the ISCO injection and EISB application; overall concentrations declined by 99 percent. Benzene fell below its PRG of 5 μg/L between November 2011 and May 2012 and no rebound was observed."
- $^{\prime\prime}$ ...(from 21 μg/L to non-detect during the Pilot Study). Naphthalene concentrations declined naturally by 74 percent prior to the Pilot Study and by 95 percent following the ISCO injection and EISB application; overall concentrations declined by 99 percent. Naphthalene fell below its PRG of 6.1 μg/L between November 2011 and May 2012 and no rebound was observed."
- 2. Section 2.5 (Enhanced In-Situ Bioremediation) indicates that oxygen releasing compound (ORC) socks were placed in monitoring wells MW-02, MW-03, MW-04, MW-05, and MW-07 and were removed in August 2011 according to the schedule in the Final In-Situ Remediation Pilot Studies (AOC E and AOC I Sites) Sampling and Analysis Plan, Vieques, Puerto Rico, dated June 2008 (SAP); however, Section 2.5 does not discuss whether the ORC socks met the performance criteria expectations established in the SAP before being removed. Clarify whether the ORC socks met the performance criteria established in the SAP prior to being removed.

#### Navy Response:

Please see the response to Comment #1.

3. A discussion of how the geology and potential preferential pathways at the site may have impacted the pilot study is not included in the Pilot Study. Based on Figure 5 (Geologic Cross Section A-A') and Figure 6 (AOC I Conceptual Site Model), the monitoring wells which were used for the pilot study injections (e.g., MW-02, MW-03, MW-04, and MW-07) were screened in highly fractured bedrock which may have created preferential pathways within the bedrock.

#### Navy Response:

The following was added at the end of the third paragraph of Section 2.2:

"Although fractures in the bedrock at AOC I may have provided preferential pathways for contaminant migration, the ISCO injections would have followed those same pathways since the injections were intentionally performed at very low pressures to avoid creating additional preferential flow pathways. Monitoring during injection was performed and showed no mounding in surrounding wells."

4. Include a discussion of how the geology and potential preferential pathways at the site were evaluated and may have impacted the implementation of the pilot study injections.

#### Navy Response:

Please see the response to Comment #3.

5. The Pilot Study does not describe any measurements of the oxidant demand. For example, the Pilot Study does not discuss whether the oxidant demand at AOC I was solely due to the hydrocarbon release or if there is a background oxidant demand that affected anaerobic conditions in the saturated zone. Depending on the amount of nonaqueous phase liquid (NAPL) present and the extent of hydrocarbon weathering (loss of soluble and volatile constituents), the oxidative treatment may have been affected if constituents subsequently dissolved into anaerobic groundwater. Include a discussion of oxidant demand during the pilot study injections.

#### Navy Response:

With respect to the parameters measured during the Pilot Study, they were those concurred upon by the Navy, USEPA, and PREQB via the SAP process. Regarding oxidant demand, the following paragraph has been added as the first paragraph of Section 2.2:

"During the Pilot Study design, the oxidant (persulfate) demand was estimated based on: a) the historical groundwater geochemical data and water quality parameters (showing the anaerobic nature of the subsurface and likelihood of reduced iron and manganese exerting a demand on persulfate), b) the stoichiometric demand based on the historical COC concentrations, and c) professional judgment from numerous persulfate applications. Due to the very low COC concentrations and lack of NAPL at AOC I, the stoichiometric demand, as is common, was negligible."

6. Monitoring wells in the vicinity of the injection wells (i.e., MW-01, MW-06, MW-08, and MW-09) were not sampled during and after the pilot study injections in 2010, 2011 or 2012. Specifically, downgradient well MW-06 was evaluated in 2004, 2006, and 2008; downgradient wells MW-08 and MW-09 were evaluated in 2006 and 2008; and, upgradient well MW-01 was evaluated in 2004, 2006, and 2008. Clarify how contaminant migration, water geochemistry, and rebound were assessed when the other onsite wells were not evaluated during and after the pilot study injections.

#### Navy Response:

The following sentence has been added at the end of the first paragraph under Section 2:

"The Vieques Technical Subcommittee, comprising representatives of the Navy, USEPA, and EQB, concurred on the wells to include in the Pilot Study based on historical data and Pilot Study objectives. Wells MW-01, MW-06, MW-08, and MW-09 were excluded from contaminant analysis during the Pilot Study because they were either upgradient of (MW-01) or far downgradient from (MW-06, MW-08, and MW-09) the area of contamination. These wells had been installed during the RI for the purposes of nature and extent determination but were not relevant to the Pilot Study. Due to the small size of the groundwater plume and slow groundwater velocity rates (3 to 16 ft/yr), MW-02, MW-03, MW-04, MW-05, and MW-07 were determined by the Technical Subcommittee as the appropriate wells to be used for monitoring contaminant concentrations during the Pilot Study."

Note that Section 2.7 states that to ensure contaminant rebound did not occur, the Technical Subcommittee agreed to perform two additional sampling events for a subset of the AOC I monitoring wells (i.e., MW-04, MW-05, and MW-07) and that the agreement was reached in the February 22, 2012 Technical Subcommittee meeting. Please also note the correspondence from USEPA in Appendix C stating which wells should be monitored for the two additional rounds used for potential rebound monitoring.

7. Section 2.4 (First Post-injection Performance Monitoring Event) indicates that, "At the concentrations observed at this site and given the water geochemistry, it does not appear to make a difference for VOC [volatile organic compounds] groundwater results how or if the samples are preserved;" however, the Pilot Study does not include information or a discussion to substantiate that the samples were not impacted by the persulfate or the ascorbic acid. Provide information and a discussion to substantiate that the samples were not impacted by the persulfate or the ascorbic acid.

#### Navy Response:

It is unclear what the commenter means by providing information to substantiate the samples were not impacted by ascorbic acid. The purpose of adding ascorbic acid is to sequester any residual persulfate that could oxidize contaminants in the sample between the time it is collected and

analysis in the laboratory. Therefore, ascorbic acid does not impact the sample; it potentially protects the sample from additional oxidation.

To provide additional clarity, Table 5 has been updated to include the preservative method associated with each sample and the second paragraph of Section 2.4 has been revised as follows:

- "... (i.e., in accordance with the SAP). Table 4 shows the persulfate concentrations measured in wells at the time of sample collection. Table 5 shows the results of the three analyses (with identification of the preservative method for each) for each well. Of note is that the volatile organic compounds (VOCs) concentrations for each well were essentially the same among the samples preserved with hydrochloric acid, ascorbic acid, and unpreserved. For example, benzene concentrations in samples from well MW-07, which had a measured persulfate concentration between 14 and 21 mg/L, were 9.5  $\mu$ g/L (unpreserved), 9.5  $\mu$ g/L (ascorbic acid), and 9.4  $\mu$ g/L (HCl). Therefore, at the concentrations observed . . . "
- 8. A preliminary remediation goal (PRG) of 1.4 micrograms per liter (μg/L) was originally selected to represent a conservative screening value for naphthalene; however, a value of 6.1 μg/L was utilized. While Section 1.1 (Pilot Study Objectives and Goals) indicates that this value was determined to be more appropriate to use as a PRG, information is not provided and/or referenced in the Pilot Study to document that this value was approved for use. While this change does not significantly affect the outcome of the pilot study, some reporting limits, as shown in Table 5 (Analytical Results for COCs, Dissolved Iron and Manganese), would be above the lower PRG value. Revise the Pilot Study to include and/or reference information to document that the use of the higher value for naphthalene was approved.

#### Navy Response:

The following text has been added after the table of PRGs in Section 1.1:

"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  $\mu$ g/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  $\mu$ g/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  $\mu$ g/L. A PRG of 10  $\mu$ g/L was selected for three sites in New York, as stipulated in the NYSDEC Groundwater Standards, 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).

The May 2013 USEPA Regional Screening Level (RSL) Table provides carcinogenic inhalation toxicity values for naphthalene, with a tap water RSL of 0.14  $\mu$ g/L corresponding to a 1x10-6 excess lifetime cancer risk (ELCR) (or 14  $\mu$ g/L corresponding to 1x10-4 ELCR). USEPA's target range for ELCR is 1x10-4 to 1x10-6. The 2013 RSL table also identifies a tap water RSL of 6.1  $\mu$ g/L for non-carcinogenic endpoints, based on an HI of 1 (for cumulative exposures via ingestion/dermal/inhalation).

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

### **Specific Comments**

1. **Section 3, Groundwater Monitoring Results:** Based on Table 5 (Analytical Results for COCs, Dissolved Iron and Manganese), iron and manganese levels fluctuated throughout the pilot study; however, these fluctuations are not discussed in Section 3. Revise Section 3 to include a discussion of the varying levels in iron and manganese throughout the pilot study and the long-term effect it may have on AOC I.

#### Navy Response:

The following was added as the last paragraph of Section 3.1:

"Dissolved iron and manganese were analyzed to confirm the presence of an oxidative environment post-injection, which would tend to decrease dissolved iron and manganese. As shown in Table 5, this is what was observed; iron and manganese concentrations declined at the injection wells (MW-02, MW-03, MW-04, and MW-07) following the ISCO injection, indicative of the desired oxidative conditions. Several wells also showed increases of these metals toward the end of the study, indicating a return to normal geochemical conditions."

2. **Table 4, Persulfate Concentration:** The table indicates that persulfate in some wells was not measured; however, the Pilot Study does not discuss why persulfate was not measured. In addition, the Pilot Study does not discuss the decision criteria used for measuring or not measuring persulfate concentrations in the onsite wells. Revise Section 2.3 (Persulfate Monitoring) to document deviations from the proposed persulfate measurements. In addition, ensure all deviations are noted in the Pilot Study.

#### Navy Response:

The following was added as the last sentence of Section 2.3 and as a footnote in Table 4:

"Persulfate monitoring was conducted in accordance with the SAP (CH2M HILL, 2010a)."

# Final Responses to PREQBs Comments on the Draft In-Situ Remediation Pilot Study Report, Area of Concern I (AOC I) Former Atlantic Fleet Weapons Training Area-Vieques Former Naval Ammunition Support Detachment Vieques, Puerto Rico March 28, 2013

PREQB has reviewed the report and provides the following minor editorial comments. Note that the substantive comments were discussed during the May 2013 ERP meeting and the Navy indicated that modifications as needed would be made in the draft final version of the report.

#### I. General Comments

1. Please note that it is reported that in November 2011 samples were submitted for GRO, DRO and ORO analyses, but the results were not tabulated. Since GRO, DRO and ORO are not chemicals of concern, please clarify why these analyses was performed or consider removing this information from the report.

#### Navy Response:

GRO, DRO, and ORO have been removed from all locations in the report.

## II. Page-Specific Comments

1. Page 6, Section 2.5: Please correct the date the ORC socks were removed to July 2011, as per Table 1.

#### Navy Response:

Date has been changed from August 2011 to July 2011.

2. Page 7, Section 3.2: This section references Figure 16; however, there are only 15 figures. Please clarify.

#### Navy Response:

The first sentence of Section 3.2 has been edited to refer to Figure 7. The first sentence of the second paragraph has been revised to refer to Figures 7, 12, and 13. The first sentence of the third paragraph has been revised to refer to Figures 7, 14, and 15.

#### 3. Page 7, Section 3.1:

 Please correct the text to state that the DO reading of 6.59 mg/L at MW-02 was from November 2010 (not November 2011).

#### Navy Response:

The date has been changed in Section 3.1 to November 2010.

b. Please clarify that the DO readings of 11.15 and 5.44 mg/L in MW-07 are from 2011 and 2012, respectively.

#### Navy Response:

The sentence has been edited to "... 11.15 mg/L and 5.44 mg/L in 2011 and 2012, respectively, in MW-07 may be the result of localized oxidizing conditions ...."

**4. Appendix D:** For the March 2010 data validation report, please clarify why bis(2-ethylhexyl)phthalate was not qualified as a nondetect in sample MW-05 due to equipment blank contamination, as per the Region II guidelines.

#### Navy Response:

Field samples are associated with their equipment rinseate blanks by the date collected. VWAI-MW05-0310 (collected 3/18/10 12:20) contained bis(2-Ethylhexyl)phthalate at 1.4 J  $\mu$ g/L. The associated equipment blank, VWAI-EB01-031810 (collected 3/18/10 13:00), was nondetect for this compound.