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Mr. James W. Todd
Assistant Manager for Engineering
U. S. Department of Energy
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Dear Mr. Todd:

Subject: ***Submittal of Chemical Waste Landfill (CWL) Annual Post-Closure Care Report, Calendar Year (CY) 2014, Chemical Waste Landfill Post-Closure Care Permit for Sandia National Laboratories/New Mexico (SNL/NM), Environmental Protection Agency Identification Number NM5890110518***

The CWL Annual Post-Closure Care Report for CY2014 is being provided to the Department of Energy (DOE) for submittal to the New Mexico Environment Department (NMED). This submittal is required by Part 2, Section 2.6.3, of the CWL Post-Closure Care Permit and includes information for monitoring and inspection activities conducted at the CWL during CY2014. The report and supporting documentation satisfy requirements listed in Permit Attachment 1, Sections 1.9 and 1.12.

I have signed the certification to be sent to the NMED as the Operator at SNL/NM. If you agree, please sign the certification as the Owner. If you have any questions regarding the enclosed document, please contact David Gibson, Acting Director, at (505) 844-8328/dwgibso@sandia.gov, Catherine Green, Senior Manager, at (505) 284-2218/cegreen@sandia.gov, or Pam Puissant, Manager, at (505) 844-3185/ pmpuiss@sandia.gov.

Sincerely,

Enclosures:
1. Enclosure A – Chemical Waste Landfill Annual Post-Closure Care Report Calendar Year 2014 for Sandia National Laboratories/New Mexico, March 2015
2. Submittal of Chemical Waste Landfill Post-Closure Care Report Calendar Year 2014, Certification Statement

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**Submittal of Chemical Waste Landfill Annual Post-Closure Care Report**
**Calendar Year 2014**
**Chemical Waste Landfill Post-Closure Care Permit**

**Sandia National Laboratories**
**Albuquerque, New Mexico**
**EPA ID No. NM5890110518**

## CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

_____ _____

Michael W. Hazen, Vice-President
Sandia Corporation
Albuquerque, New Mexico
Operator

Date signed

_____ _____

James W. Todd, Assistant Manager
U.S. Department of Energy
National Nuclear Security Administration
Sandia Field Office
Owner

Date signed

# CHEMICAL WASTE LANDFILL
# ANNUAL POST-CLOSURE CARE REPORT
# CALENDAR YEAR 2014

**SANDIA NATIONAL LABORATORIES, NEW MEXICO**
**LONG-TERM STEWARDSHIP**
**CHEMICAL WASTE LANDFILL POST-CLOSURE CARE PERMIT**

# MARCH 2015

## United States Department of Energy
## Sandia Field Office

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# ANNUAL CHEMICAL WASTE LANDFILL POST-CLOSURE CARE REPORT CALENDAR YEAR 2014

**Facility:** Chemical Waste Landfill

**Location:** Sandia National Laboratories
Albuquerque, New Mexico

**EPA ID No.:** NM5890110518

**Permit Basis:** Chemical Waste Landfill Post-Closure Care Permit, issued October 15, 2009, effective June 2, 2011, and subsequently modified.

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# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AOP | administrative operating procedure |
| bgs | below ground surface |
| CAMU | Corrective Action Management Unit |
| CFR | Code of Federal Regulations |
| Closure Plan | Chemical Waste Landfill Final Closure Plan |
| CWL | Chemical Waste Landfill |
| CY | calendar year |
| DO | dissolved oxygen |
| DOE | U.S. Department of Energy |
| DQO | data quality objective |
| EPA | U.S. Environmental Protection Agency |
| ET | evapotranspirative |
| gpm | gallons per minute |
| KAFB | Kirtland Air Force Base |
| LCL | lower confidence limit |
| LE | Landfill Excavation |
| MDL | method detection limit |
| µg/L | micrograms per liter |
| mg/L | milligrams per liter |
| NMED | New Mexico Environment Department |
| NTU | nephelometric turbidity units |
| ORP | oxidation-reduction potential |
| PCCP | Post-Closure Care Permit |
| PCE | tetrachloroethene |
| pH | potential of hydrogen (negative logarithm of the hydrogen ion concentration) |
| ppbv | parts per billion by volume |
| ppmv | parts per million by volume |
| PQL | practical quantitation limit |
| QC | quality control |
| RL | reporting limit |
| RPD | relative percent difference |
| Sandia | Sandia Corporation |
| SAP | sampling and analysis plan |
| SC | specific conductance |
| SNL | Sandia National Laboratories |
| SNL/NM | Sandia National Laboratories, New Mexico |
| TCE | trichloroethene (also trichloroethylene) |
| UCL | upper confidence limit |
| VCM | Voluntary Corrective Measure |
| VE | Vapor Extraction |
| VOC | volatile organic compound |

# 1.0 INTRODUCTION

Sandia National Laboratories (SNL) is a multi-purpose engineering and science laboratory owned by the U.S. Department of Energy (DOE)/National Nuclear Security Administration. SNL is managed and operated by Sandia Corporation (Sandia), a wholly-owned subsidiary of Lockheed Martin Corporation.

The Chemical Waste Landfill (CWL) at SNL/New Mexico (SNL/NM) is a remediated interim status landfill that has undergone closure in accordance with Title 20, Chapter 4, Part 1 of the New Mexico Administrative Code (20.4.1.600 NMAC), incorporating Title 40, Code of Federal Regulations (CFR), Part 265, (40 CFR 265) Subpart G, and the CWL Final Closure Plan (Closure Plan) (SNL/NM December 1992 and subsequent revisions). The CWL Post-Closure Care Permit (PCCP) (NMED October 2009), which became effective June 2, 2011 (Kieling June 2011) and has subsequently been modified, defines all post-closure requirements. Table 1-1 summarizes the modification history of the PCCP through 2014.

Table 1-1
Chemical Waste Landfill Post-Closure Care Permit Modification History

| Date of Modification[a] | Affected Parts of PCCP | Description of Modification |
|---|---|---|
| September 26, 2011 | Attachment 6 (Contingency Plan) | Updates to emergency response agreements, equipment, emergency coordinators, and inclusion of an evacuation route and assembly point figure and updated figure list. |
| November 16, 2011 | Attachment 6 (Contingency Plan) | Correction of a typographical error in the telephone number for an emergency coordinator. |
| February 20, 2012 | Attachments 1-5 | Allow use of equivalent soil-gas passive venting devices and alternate method for analysis of soil-gas samples; clarification of cover inspection and repair specifications; updates to three figures for well locations; revisions to groundwater purging and stability requirements; inclusion of well completion diagrams for the four groundwater monitoring wells, updates to the list of operating procedures; clarification of soil-gas purging requirements; format updates to inspection forms; and correction of typographical errors. |
| November 7, 2013 | Permit Part 3, Attachments 1-4 | Provide clarification that alternative formats may be used to document inspections; provide additional detail regarding soil-gas passive venting devices; remove table and text references to the SNL/NM SOW for Analytical Laboratories, the SMO QAPP, and the Groundwater Monitoring HASP; and clarify data quality requirements for soil-gas samples. |

Notes:
[a]Date represents the effective date of modification.
HASP = Health and safety plan.
QAPP = Quality assurance project plan.
PCCP = Post-Closure Care Permit.
SMO = Sample Management Office.
SNL/NM = Sandia National Laboratories/New Mexico.
SOW = Statement of work.

In addition to permit modifications, DOE/Sandia are required to submit various documents as specified in the PCCP. Table 1-2 summarizes the submittals associated with the PCCP through calendar year (CY) 2014.

Table 1-2
Chemical Waste Landfill Post-Closure Care Permit Document Submittal History

| Date of Submittal[a] | PCCP Requirement | Description of Submittal |
|---|---|---|
| July 22, 2011 | Permit Attachments 2 & 3 | Procedures, plans, and documents cited in the PCCP used by SNL/NM personnel for groundwater and soil-gas monitoring. |
| February 7, 2012 | Permit Attachment 2 | Four procedures and one plan related to groundwater monitoring activities that were updated to include minor changes that do not affect sampling procedures or protocols. Two title changes to procedures incorporated into the November 2011 Class 1 permit modification request. |
| January 24, 2013 | Permit Attachments 2 & 3 | Updates to reference document (SNL/NM Statement of Work for Analytical Laboratories) related to groundwater and soil-gas monitoring to reflect ongoing modifications and improvements in industry practices. |
| December 9, 2013 | Permit Attachments 2 & 3 | Revisions to three procedures related to sample management, shipping, and data review that were revised to keep the documents current and reflecting ongoing modifications and improvements in industry practices. |
| July 8, 2014 | Permit Attachments 2 & 3 | Two operating procedures cited in the PCCP used by SNL/NM personnel to validate analytical data from contract laboratories and conduct activities related to sampling CWL soil-gas wells. |

Notes:
[a]Date represents the date stamp on the DOE transmittal letter for the submittal.
PCCP = Post-Closure Care Permit.
SNL/NM = Sandia National Laboratories/New Mexico.

## 1.1 Purpose and Scope

The purpose of this CWL Annual Post-Closure Care Report is to document monitoring, inspection, maintenance, and repair activities conducted during CY 2014 in accordance with Attachment 1 of the PCCP (NMED October 2009 and subsequent revisions). This annual report documents PCCP activities conducted from January through December 2014 and fulfills the PCCP requirement for annual reporting to the New Mexico Environment Department (NMED).

The PCCP requires monitoring, inspection, and maintenance/repair activities that must be documented and reported for each CY. Monitoring activities include semi-annual groundwater monitoring for specific volatile organic compounds (VOCs) and metals, and annual vadose zone soil-gas monitoring for specific VOCs. Inspection activities are required for the following components: final cover (vegetation and surface); storm-water diversion structures; monitoring

networks and sampling equipment (groundwater and soil-gas); and security fence, locks, gates, signage, and survey monuments. The CWL final cover is a vegetative at-grade soil cover, or evapotranspirative (ET) cover.

The scope of this report includes documentation of all monitoring and inspection activities for CY 2014. Monitoring and inspections performed during this time period included:

- Two semi-annual groundwater monitoring events.
- One annual soil-gas monitoring event.
- Two semi-annual inspections of the groundwater monitoring network and sampling equipment.
- One annual inspection of the soil-gas monitoring network and sampling equipment.
- One annual inspection of final cover vegetation (i.e., biology inspection of the evapotranspirative [ET] Cover).
- Four quarterly inspections of the final cover surface (i.e., physical features excluding the vegetation covered in the biology inspection), storm-water diversion structures, fence, locks, gates, signs, and survey monuments.

This CY 2014 report is organized as follows:

- Chapter 1 presents background information, purpose and scope, and report organization.
- Chapter 2 provides a description of the final cover system, compliance monitoring system (groundwater and soil-gas), storm-water diversion structures, and security fence (fence, locks, gate, signage, and survey monuments).
- Chapter 3 presents monitoring and inspection, maintenance, and repair requirements.
- Chapter 4 presents groundwater monitoring activities and results.
- Chapter 5 presents soil-gas monitoring activities and results.
- Chapter 6 presents inspection, maintenance, and repair activities and results.
- Chapter 7 summarizes regulatory activities.
- Chapter 8 presents a general summary and conclusions for the 2014 reporting period.
- Chapter 9 lists the references cited in this report.

Annexes are provided that include CY 2014 supporting information as follows:

- Annex A – Groundwater Monitoring Forms and Reports
- Annex B – Soil-Gas Monitoring Forms and Reports
- Annex C – Post-Closure Inspection Forms
- Annex D – Chemical Waste Landfill Biology Report

# 2.0 CHEMICAL WASTE LANDFILL POST-CLOSURE CARE CONDITIONS

The CWL is a 1.9-acre remediated interim status landfill located in the southeastern corner of SNL/NM Technical Area III (Figures 2-1 and 2-2) undergoing post-closure care in accordance with the PCCP (NMED October 2009 and subsequent revisions). From 1962 until 1981, the CWL was used for the disposal of chemical and solid waste generated by SNL/NM research activities. Additionally, a small amount of radioactive waste was disposed of during the operational years. Disposal of liquid waste in unlined pits and trenches ended in 1981, and after 1982 all liquid waste disposal was terminated. From 1982 through 1985, only solid waste was disposed of at the CWL, and after 1985 all waste disposal ended. The CWL was also used as a hazardous waste drum-storage facility from 1981 to 1989. A summary of the CWL disposal history is presented in the Closure Plan (SNL/NM December 1992) along with a waste inventory based upon available disposal records and information.

## 2.1 Background

Two voluntary corrective measures (VCMs) were conducted during closure of the CWL. A soil-vapor extraction (VE) VCM was conducted from 1997 through 1998 to reduce the concentrations of VOC soil gas in the vadose zone, to control the VOC soil-gas plume, and to reduce groundwater trichloroethene (TCE) concentrations below the regulatory standard of 5 micrograms per liter (µg/L). TCE concentrations in groundwater have been below 5 µg/L since completion of the VE VCM in 1998. Following the VE VCM, the CWL Landfill Excavation (LE) VCM was conducted from September 1998 through February 2002. All former disposal areas were excavated during the LE VCM. The excavation was backfilled and an ET cover was constructed over the landfill.

Additional information on the VCMs, other closure activities, and CWL current conditions can be found in the CWL Final RCRA Closure Report for the CWL (SNL/NM September 2010), the PCCP (NMED October 2009 and subsequent revisions), and the CWL Corrective Measures Study Report (SNL/NM December 2004). Detailed information on residual soil contamination at the CWL can be found in Part 3, Section 3.1 and Table 3-1 of the PCCP (NMED October 2009 and subsequent revisions).

## 2.2 Final Cover System

The CWL final cover is a centrally crowned “at-grade” ET Cover designed to minimize infiltration of moisture into the former disposal area and to minimize long-term maintenance consistent with 40 CFR 264.111(a). The crown of the cover slopes to the north and south at a 1-percent grade, and east to west at a 3-percent grade to minimize erosion losses and control run-on/run-off. The ET Cover consists of two discrete layers; a 3-foot-thick native soil layer installed from 4 feet below ground surface (bgs) to 1 foot bgs, and a topsoil layer (approximately 1.5-feet thick) installed from 1 foot bgs to the local grade. The topsoil layer was revegetated with native plants

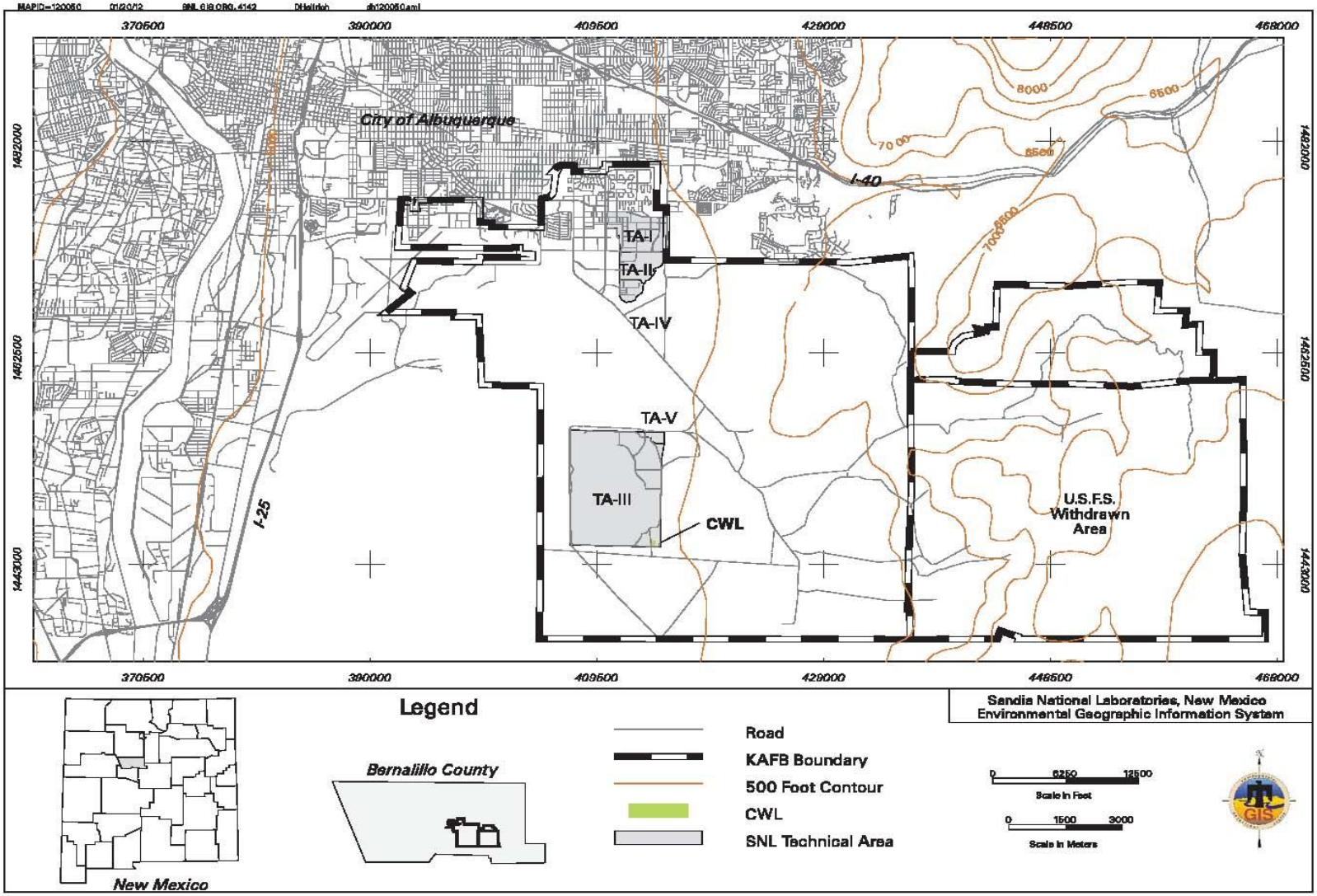


Figure 2-1
Location of the Chemical Waste Landfill with respect to Kirtland Air Force Base and the City of Albuquerque

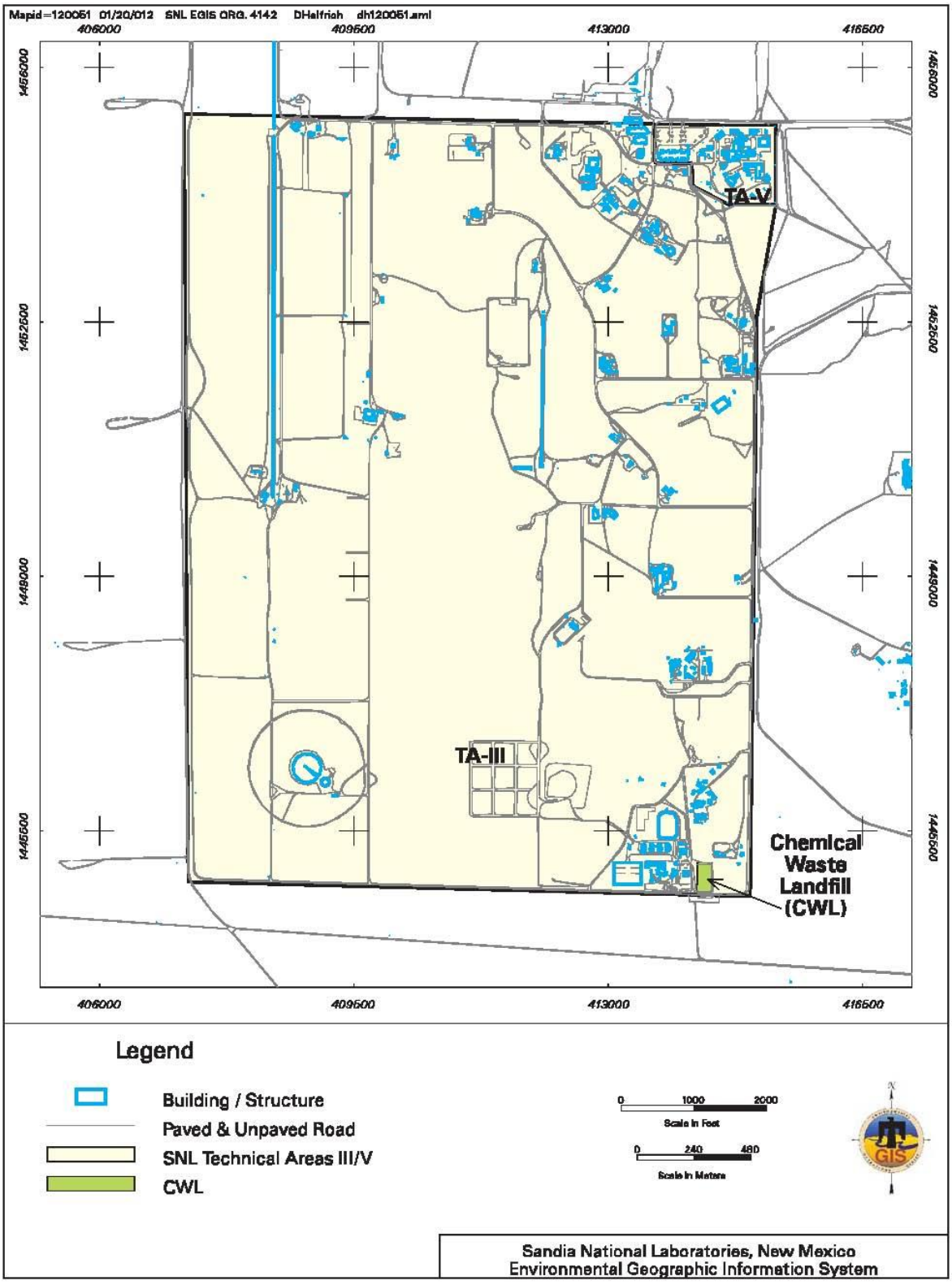


Figure 2-2
Location of the Chemical Waste Landfill within Technical Area III

according to the specifications contained in the Remedial Action Proposal, Annex I, CMS Report (SNL/NM December 2004). Figure 2-3 shows a conceptual schematic profile of the ET Cover and Figure 2-4 shows the central crown and surface drainage patterns.

## 2.3 Compliance Monitoring System

The compliance monitoring system includes a groundwater monitoring well network and a soil-gas monitoring well network, which are described in the following sections.

### 2.3.1 Groundwater Monitoring Network

Groundwater monitoring is performed to ensure the protection of groundwater during the compliance and post-closure care periods. The CWL groundwater monitoring network consists of four NMED-approved monitoring wells that monitor the uppermost part of the regional aquifer in accordance with the requirements of 40 CFR 264.99. The four wells are described below and their locations are shown in Figure 2-4.

- One hydraulically upgradient background well – CWL-BW5, and
- Three hydraulically downgradient compliance wells – CWL-MW9, CWL-MW10, and CWL-MWL11.

Well-completion diagrams for the groundwater monitoring wells are provided in Attachment 2 of the PCCP (NMED October 2009 and subsequent revisions).

### 2.3.2 Soil-Gas Monitoring Network

The soil-gas monitoring network is designed to ensure the protection of groundwater quality by providing early detection data to indicate whether the VOC soil-gas plume has the potential to contaminate groundwater at concentrations exceeding regulatory concentration limits. The five multiport wells, shown in Figure 2-4, are designed to monitor the vadose zone at various depths beneath the CWL in the area most contaminated by past disposal of organic liquid waste. The wells and their depth-specific sampling ports are as follows:

- D1 – Sampling Ports at 100, 160, 240, 350, and 470 feet bgs (5 ports)
- D2 – Sampling Ports at 120, 240, 350, 440, and 470 feet bgs (5 ports)
- D3 – Sampling Ports at 120, 170, 350, 440, and 480 feet bgs (5 ports)
- UI1 – Sampling Ports at 40, 80, and 120 feet bgs (3 ports)
- UI2 – Sampling Ports at 36, 76, and 136 feet bgs (3 ports)

Well-completion diagrams for all of the soil-gas monitoring wells are provided in Attachment 3 of the PCCP (NMED October 2009 and subsequent revisions).

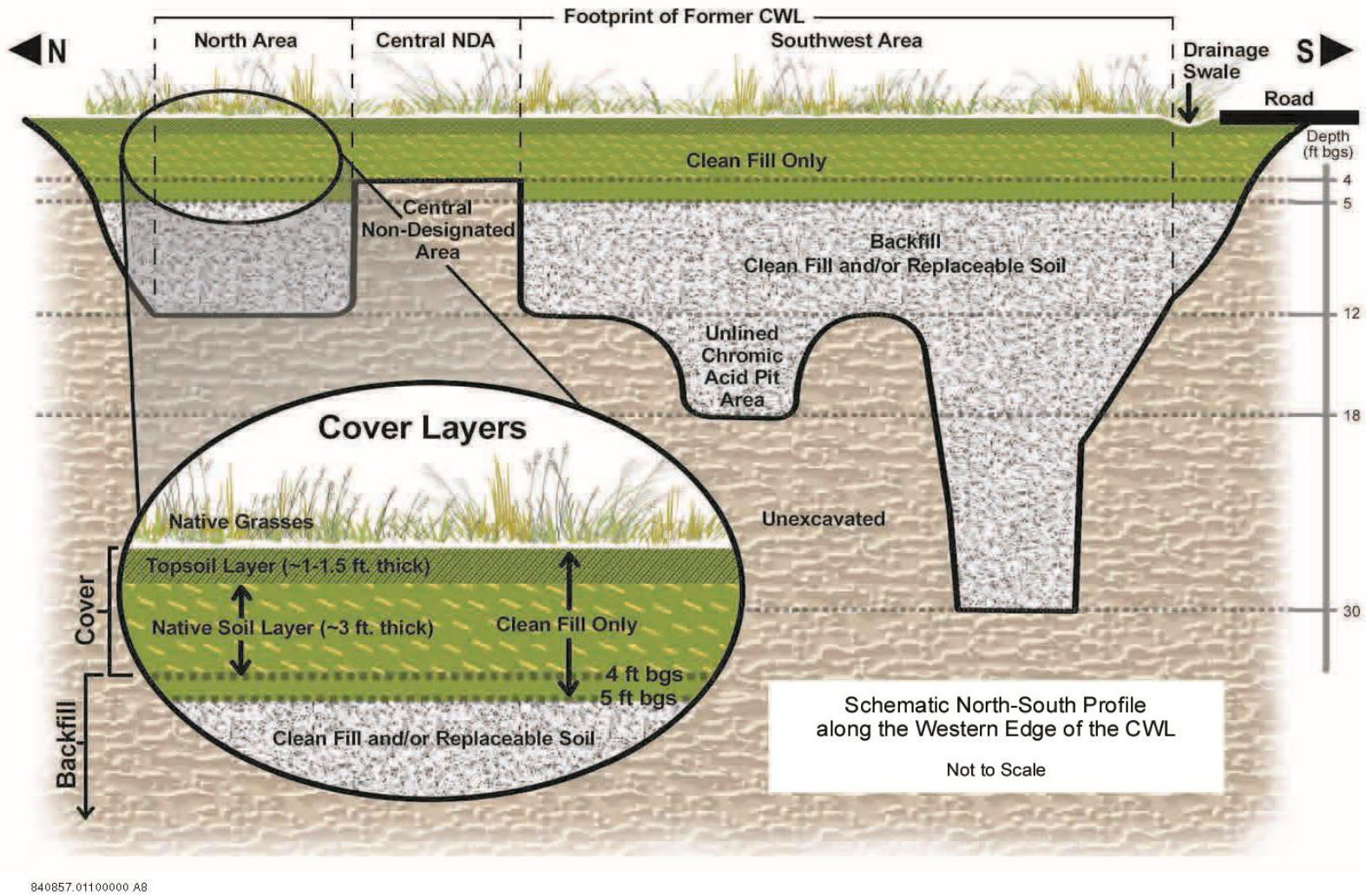


Figure 2-3
Schematic Profile of the Chemical Waste Landfill Evapotranspirative Cover

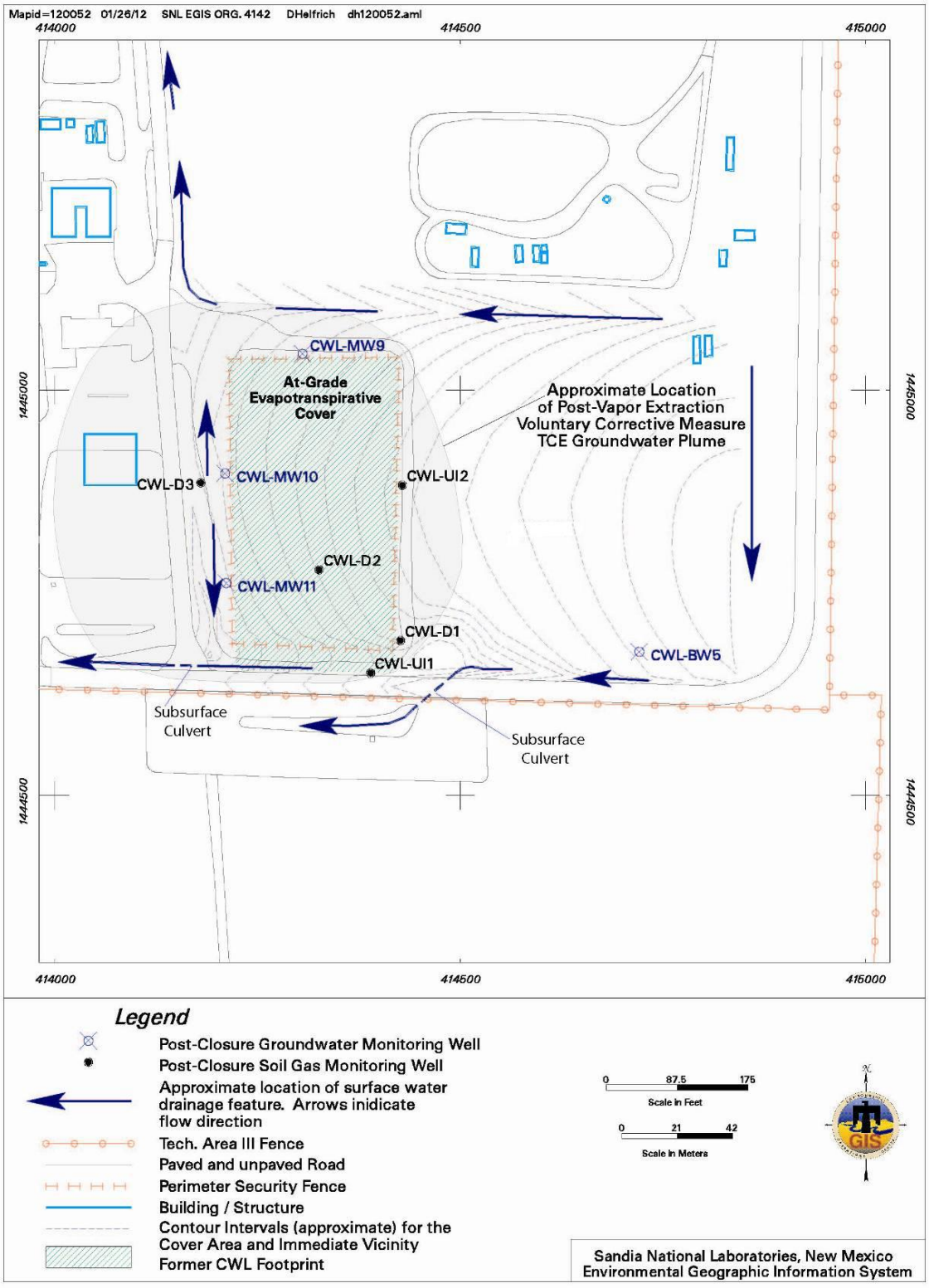


Figure 2-4
Chemical Waste Landfill Surface Drainage Patterns and Monitoring Networks

## 2.4 Storm-Water Diversion Structures

The function of the storm-water diversion features associated with the CWL is to minimize soil erosion caused by storm-water run-on and run-off and to reduce the amount of water that could potentially percolate into the former disposal area. Drainage features are shown in Figure 2-4 and include: ET Cover surface topography/slopes that direct water away from and off the ET Cover surface; road ditches; boundary swales; and two ditch drainage culverts at the southeastern and southwestern corners of the CWL that divert surface-water from the road ditch away from the CWL. The slight northeast and southeast inflection of the surface topography to the east of the ET Cover prevents significant run-on by directing the upgradient surface water toward the northern and southern boundary swales (Figure 2-4). Precipitation that falls directly on the ET Cover is diverted toward the boundary swales that intersect at the northwestern and southwestern corners of the site; its impact is minimized by the native vegetation, the central crown, and gently sloping topography (approximately 3-percent grade from east to west) of the ET Cover surface.

## 2.5 Security Fence

The location of the perimeter security fence is shown in Figure 2-4. It is a four-strand, barbed-wire fence with two gates. The gates remain locked except during inspections, maintenance, and monitoring activities. The keys to the locks are controlled by authorized personnel. Warning signs are posted on all sides of the CWL fence at 100-foot intervals and at the gates.

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# 3.0 MONITORING AND INSPECTION REQUIREMENTS

Monitoring, inspection, maintenance, and repair requirements are defined in the PCCP Attachment 1 (NMED October 2009 and subsequent revisions) and briefly summarized in this chapter. Monitoring requirements include groundwater and soil-gas, which generate empirical data that are evaluated to assess site conditions during the compliance and post-closure care periods. Inspection requirements apply to the final cover, storm-water diversion structures, compliance monitoring system, and security fence. Emergency equipment required by the CWL Contingency Plan (PCCP Attachment 6) is also subject to routine inspections. Maintenance and/or repairs are performed based upon the inspection results. Inspection, maintenance, and repair are performed to ensure the adequate performance of the ET Cover, monitoring networks, and surface features throughout the post-closure care period.

Monitoring, inspection, and maintenance/repair activities were conducted in CY 2014 in accordance with PCCP Attachment 1, Sections 1.8 through 1.10. Results of CY 2014 monitoring, inspection, and repair activities are presented in Chapters 4.0, 5.0, and 6.0. The following sections provide information specific to the requirements for each type of monitoring and inspection activity under the PCCP.

## 3.1 Monitoring Requirements

The frequency, parameters/constituents of concern, and methods for groundwater and soil-gas monitoring are summarized in Table 3-1. The groundwater and soil-gas monitoring networks are described in Section 2.2.1 and 2.2.2 respectively. The groundwater and soil-gas monitoring requirements are detailed in PCCP Attachment 1, Section 1.8. Sampling and analysis plans (SAPs) in PCCP Attachments 2 and 3, respectively, describe the procedures, methods, and analytical protocols for collecting and analyzing groundwater and soil-gas samples.

Table 3-1
Chemical Waste Landfill Groundwater and
Soil-Gas Monitoring Frequency, Parameters, and Methods

| Monitoring System | Monitoring Frequency | Monitoring Parameters/ Constituents of Concern | Monitoring Method |
|---|---|---|---|
| Groundwater | Semi-Annual[a] | TCE by EPA Method 8260[b] and Cr and Ni by EPA Method 6020[b] | Sampling and Analysis per PCCP Attachment 2 |
| Soil-Gas | Annual | EPA Compendium Method TO-14 VOCs[c] or equivalent[d] | Sampling and Analysis per PCCP Attachment 3 |

Notes:
[a]Semi-Annual: An enhanced list of constituents must be analyzed on an annual basis (see Section 1.8.1.1 of PCCP Attachment 1).
[b]EPA November 1986.
[c]EPA January 1999a. See Table 1-5 in PCCP Attachment 1 for the list of the TO-14 VOCs.
[d]Use of an analytical method equivalent to TO-14, such as EPA Method TO-15, was approved by NMED in February 2012 as part of a PCCP modification (Kieling February 2012).
EPA = U.S. Environmental Protection Agency.

For all groundwater monitoring events, environmental samples must be analyzed for TCE, chromium, and nickel. Additionally, during one semi-annual event each year, environmental samples must be analyzed for an enhanced list of VOCs comprised of 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113), tetrachlorethene (PCE), 1,1-dichloroethene (1,1-DCE), chloroform, and trichlorofluoromethane (Freon 11). Groundwater surface elevation must be measured each time groundwater is sampled and the groundwater flow rate, hydraulic gradient, and flow direction must be determined at least annually.

Soil-gas monitoring must be performed annually in accordance with the Soil-Gas SAP (PCCP Attachment 3) using U.S. Environmental Protection Agency (EPA) Compendium Method TO-14 (EPA January 1999a) or equivalent (i.e., such as the newer method TO-15 [EPA January 1999b]) to ensure the collection of data in a manner consistent with historic soil-gas monitoring. Consistency in sampling and analysis is necessary so that results can be evaluated over time to determine changes/trends in soil-gas concentrations.

## 3.2 Inspection, Maintenance, and Repair Requirements

Inspection requirements for the final cover system, storm-water diversion structures, compliance monitoring system, security fence, and emergency equipment are briefly summarized in this section and detailed in PCCP Attachment 1, Section 1.9. All inspections were performed by personnel who meet the qualification and training requirements of PCCP Attachment 5. The schedule for implementing inspections and prescribed maintenance and/or repairs is provided in PCCP Attachment 1, Section 1.10, Table 1-6. Maintenance and/or repairs are performed as needed based upon the inspection results.

### 3.2.1 Final Cover System Inspection/Maintenance/Repair Requirements

Inspection of the final cover includes vegetation inspection and monitoring by the staff biologist (i.e., biology inspection) and cover inspection by a field technician.

#### *3.2.1.1 Vegetation Inspection and Monitoring*

Achieving and maintaining a sustainable native plant community on the final cover is an important component of overall ET Cover performance. Vegetation minimizes erosion by stabilizing the ET Cover surface and reduces infiltration of surface water by transferring soil moisture from the ET Cover to the atmosphere through transpiration.

Cover vegetation monitoring is to be accomplished in a two-phase approach. The first phase concentrates on establishing the vegetation on the ET Cover from seed to a mature plant community such that successful revegetation criteria (defined in PCCP Attachment 1 Section 1.9) are met. These criteria are provided below.

- Total percent foliar coverage equals 20 percent (i.e., 20 percent of the land surface is covered with living plants versus 80 percent bare surface area);

- Of the 20 percent total foliar coverage, 50 percent or greater comprises native perennial species, and 50 percent or less comprises annual species; and

- No contiguous bare spots greater than 200 square feet (approximately 14 by 14 feet).

During this first phase of vegetation inspection and monitoring a staff biologist must inspect and document the inventory of the main flora populating the cover on a quarterly basis. These inspections are to be documented on the Biology Inspection Form/Checklist (PCCP Attachment 4 or equivalent) and include inspecting the cover for contiguous areas lacking vegetation in excess of 200 square feet, signs of animal intrusion, and deep-rooted plants. Repairs required as a result of the inspections to address vegetation parameters not meeting PCCP specifications are to be performed as described in Section 3.2.1.3. At the end of each CY, the staff biologist must compile the results of the quarterly inspections, summarize local climate trends, and present recommendations in a summary report to be included in the annual CWL post-closure care report submitted to NMED.

Once successful revegetation criteria are met, the second phase of cover vegetation inspection and monitoring begins. During this phase the staff biologist inspection frequency changes to annual. The biology inspection is to occur near the end of the growing season (August-September) to most accurately determine the coverage of living plants. As with the first phase, the inspection is to be documented on the Biology Inspection Form/Checklist (PCCP Attachment 4 or equivalent), include inspection results for the same parameters, and be documented in a summary report along with a summary of local climate trends and recommendations.

### *3.2.1.2 Cover Inspection Requirements*

Cover inspections are required to be performed by a field technician on a quarterly basis to assess the physical integrity of the ET Cover. Settlement of the cover surface in excess of 6 inches, erosion of the cover soil in excess of 6 inches deep, areas of ponding water, animal intrusion burrows in excess of 4 inches in diameter, contiguous areas lacking vegetation in excess of 200 square feet, and any other conditions that may impact the cover integrity must be documented on the Post-Closure Inspection Form/Inspection Checklist (PCCP Attachment 4 or equivalent). During the first phase of quarterly cover vegetation monitoring described in Section 3.2.1.1, documentation of animal intrusion burrows in excess of 4 inches in diameter and contiguous areas lacking vegetation in excess of 200 square feet are addressed on the Biology Inspection Form/Checklist (or equivalent). During the second phase of annual cover vegetation monitoring, these inspection parameters must be noted by the field technician on the Post-Closure Inspection Form/Checklist (or equivalent).

### *3.2.1.3 Cover Repairs*

Cover damage exceeding PCCP specifications must be repaired within 60 days to a condition that meets or exceeds the original design. However, repairs to fix inadequate cover vegetation may be delayed until the appropriate growing season if approved by NMED in advance, and if measures are taken as needed to prevent excessive erosion of the ET Cover during the delay

period. Repairs to the cover are to be completed using materials consistent with the cover installation specifications in accordance with PCCP Attachment 1, Section 1.9.1.3.

### 3.2.2 Storm-Water Diversion Structure Inspection Requirements

Inspection of the storm-water diversion structures is required on a quarterly basis to verify structural integrity and to ensure adequate performance. These inspections are to be performed at the same time as the cover inspections. Erosion of the channels or sidewalls in excess of 6 inches deep, accumulations of silt greater than 6 inches deep, or debris that blocks more than one-third of the channel width must be documented on the Post-Closure Inspection Form/Inspection Checklist (PCCP Attachment 4 or equivalent). Repairs, if needed, will be completed within 60 days.

### 3.2.3 Monitoring Well Network Inspection Requirements

Inspection of monitoring wells and sampling equipment is required at the same frequency as the associated monitoring, and is to be performed concurrently with all groundwater and soil-gas monitoring events. Inspections must be documented on the Post-Closure Inspection Form/Inspection Checklist (PCCP Attachment 4 or equivalent) and address the condition of the components including protective casings and bollards, wellhead covers/caps/locks, soil-gas sampling ports, well identification markings, and passive venting BaroBalls™ or equivalent devices. Sampling pumps and tubing are inspected during each sampling event (pumps are not dedicated to the wells). Pump replacement and maintenance/repair, and tubing replacement are performed on an as-needed basis based upon pump and tubing performance, inspections, and review of analytical sampling results. Accumulation of wind-blown plants and debris that would interfere with any of the groundwater or soil-gas monitoring network components will also be documented and removed during these inspections, or within 60 days.

### 3.2.4 Security Fence Inspection Requirements

Inspection of the fence, gates, locks, and warning signs at the CWL is required on a quarterly basis and is to be performed concurrently with the cover inspection. The condition of the fence, including fence wires, posts, gates, locks, and warning signs, is to be inspected and documented on the Post-Closure Inspection Form/Inspection Checklist (PCCP Attachment 4 or equivalent). Accumulation of wind-blown plants and debris on the fence that would obscure warning signs or block access to the CWL will be documented during the inspection and the material removed within 60 days. Local survey monuments must also be inspected and excess soil and/or vegetation covering these features will be removed within 60 days.

### 3.2.5 Emergency Equipment Inspection Requirements

Inspection of emergency equipment is required on a quarterly basis. Emergency equipment is maintained at the nearby Corrective Action Management Unit (CAMU) for use at the CWL, if necessary. A list of emergency equipment and its location is provided in PCCP Attachment 6, Table 6-4.

# 4.0 GROUNDWATER MONITORING RESULTS

This chapter presents groundwater monitoring activities (i.e., sampling and analysis), analytical results, and data evaluation for CY 2014 in accordance with PCCP Attachment 1, Sections 1.8 and 1.12, and Attachment 2 (NMED October 2009 and subsequent revisions). Groundwater sampling field activities are described in Section 4.1, analytical laboratory results and a discussion of data quality are presented in Section 4.2, data evaluation requirements and results are presented in Section 4.3, and hydrogeologic information on the regional aquifer is presented in Section 4.4. A summary of groundwater monitoring activities and results is provided in Section 8.1.

## 4.1 Groundwater Sampling Field Activities

This section describes groundwater monitoring activities conducted at the CWL in conformance with the CWL Groundwater SAP, PCCP Attachment 2 (NMED October 2009 and subsequent revisions), that describes the procedures, methods, and analytical protocols for collecting and analyzing groundwater samples. The data quality objective (DQO) for groundwater monitoring is to collect accurate and defensible data of high quality to determine the concentrations of hazardous constituents in the groundwater in the uppermost aquifer underlying the CWL. Field forms and documentation that address calibration of equipment, well purging and water quality measurements, and equipment decontamination activities are provided in Annex A of this report and filed in the SNL/NM Records Center.

Two semi-annual groundwater sampling events were conducted in CY 2014.

- The first sampling event was conducted January 9-15, 2014. Groundwater samples were collected from monitoring wells CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11, and a duplicate sample was collected from CWL-BW5. Samples collected from all wells were analyzed for TCE, chromium, nickel, and the enhanced list of VOCs. The enhanced list of VOCs includes 1,1-dichloroethene (1,1-DCE), 1,1,2-trichloro-1 2,2-trifluoroethane (Freon 113), chloroform, tetrachloroethene (PCE), and trichlorofluoromethane (Freon 11) in addition to TCE.

- The second sampling event was conducted July 7-11, 2014. Groundwater samples were collected from monitoring wells CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11, and a duplicate sample was collected from CWL-MW9. Samples collected from all wells were analyzed for TCE, chromium, and nickel.

### 4.1.1 Well Purging

Purging removes stagnant water from the well so that a representative groundwater sample can be collected. The minimum purge requirement for a portable piston pump is one saturated casing volume (the volume of all static water in the well screen plus the borehole annulus around the saturated screen interval). During groundwater sampling at the CWL, purging

continued until four stable field measurements for temperature, specific conductance (SC), potential of hydrogen (pH), and turbidity were obtained in all monitoring wells that did not purge dry. As specified in PCCP Attachment 2, Section 2.12, groundwater stability is considered acceptable when four successive measurements are less than five nephelometric turbidity units (NTU) for turbidity or within a range of 10 percent for turbidity values greater than 5 NTU, pH is within 0.1 units, temperature is within 1.0 degree Celsius, and SC is within five percent as micromhos per centimeter. Field measurements for water quality parameters were collected using a YSI™ EXO Water Quality Meter and a HACH™ Model 2100Q portable turbidity meter. Additional water quality measurements included oxidation-reduction potential (ORP) and dissolved oxygen (DO).

A portable Bennett Company groundwater sampling system was used to purge and collect groundwater samples from all wells. Minimum purge requirements were satisfied at all monitoring wells except CWL-MW10. In accordance with PCCP Attachment 2, Section 2.12, this monitoring well was purged to dryness, allowed to recover, and then sampled to collect the most representative groundwater sample possible given the low yield of this well. In an effort to decrease flow rate for CWL-MW10, the existing sampling system is equipped with a flow-meter valve located along the discharge line, and with small diameter tubing. During the purging process at CWL-MW10, the flow rate was continually adjusted to achieve as low a flow rate as possible without causing the pump to fail. This represents a “best faith effort” to purge the wells at the slowest rate possible given equipment limitations as specified in PCCP Attachment 2, Section 2.12.

During January approximately 16.5 gallons were purged from monitoring well CWL-MW10 prior to the well going dry. The average flow rate was 0.14 gallons per minute (gpm), and the estimated flow rate was 0.12 gpm during the final four gallons (equivalent to 0.53 and 0.45 liters per minute, respectively). During July approximately 18 gallons were purged from CWL-MW10 prior to the well going dry. The average flow rate was 0.078 gpm, and the estimated flow rate was 0.065 gpm during the final four gallons (equivalent to 0.30 and 0.25 liters per minute, respectively).

### 4.1.2 Field Quality Control

Field quality control (QC) samples were collected as part of each sampling event and included environmental duplicate, equipment blank, trip blank, and field blank samples. The sampling pump and tubing bundle used to collect groundwater samples were decontaminated prior to sampling each monitoring well.

Duplicate samples were analyzed to estimate the overall reproducibility of the sampling and analysis process and were collected immediately after the original environmental sample to reduce variability caused by time and/or sampling mechanics. Equipment blank (also referred to as a rinsate blank) samples were collected prior to collection of an environmental sample, to verify the equipment decontamination process. Trip blank samples are used to evaluate potential contamination by VOCs during sampling, shipment, and the laboratory process. Field blank samples are used to evaluate potential sample contamination by VOCs resulting from ambient field conditions.

The field QC samples were submitted for analysis with the groundwater samples. A brief explanation of the field QC sampling protocol for the January and July sampling events is provided below. Analytical results are presented in Section 4.2.2.

***First Semi-Annual Sampling Event – January 9-15, 2014***

A duplicate environmental sample was collected from CWL-BW5. One equipment blank sample was collected prior to sampling CWL-BW5 and submitted for all analyses. A total of five trip blank samples were submitted with the January 2014 groundwater samples and analyzed for the enhanced list of VOCs. Two field blank samples were collected for VOC analysis (enhanced list) by pouring deionized water into sample containers at the CWL-BW5 and CWL-MW10 sample locations to simulate the transfer of environmental samples from the sampling system to the sample container.

***Second Semi-Annual Sampling Event – July 7-11, 2014***

A duplicate environmental sample was collected from CWL-MW9. One equipment blank sample was collected prior to sampling CWL-MW9. The samples were submitted for all analyses. A total of five trip blank samples were submitted with the July 2014 groundwater samples and analyzed for TCE. Four field blank samples were collected for TCE analysis by pouring deionized water into sample containers at each CWL monitoring well location to simulate the transfer of environmental samples from the sampling system to the sample container.

### 4.1.3 Waste Management

Purge and decontamination water generated from sampling activities were placed into 55-gallon containers and stored at the Environmental Resources Field Office less than 90-day waste accumulation area. Approximately 260 gallons of wastewater were generated during each groundwater sampling event (total of 520 gallons). Separate waste characterization samples were collected from purge and decontamination water and analyzed for discharge parameters. All wastewater was discharged to the sanitary sewer in accordance with Albuquerque Bernalillo County Water Utility Authority requirements after waste characterization data were compared to discharge limits and determined to meet these requirements.

Personal protective equipment and other solid waste generated during January and July 2014 monitoring activities were packaged into 5-gallon plastic buckets and managed as hazardous waste. This waste was managed at the Hazardous Waste Handling Unit prior to disposal at a permitted off-site facility.

## 4.2 Laboratory Results

Groundwater and field QC samples were submitted to GEL Laboratories for analyses. Samples were analyzed in accordance with applicable EPA analytical methods. For comparison, hazardous constituent concentration limits from the PCCP are included in the analytical results

tables. Analytical results that are above the analytical laboratory method detection limit (MDL) but below the practical quantitation limit (PQL) are qualified as estimated values and designated with a "J" qualifier. Analytical laboratory reports, including certificates of analyses, analytical methods, MDLs, PQLs, dates of analyses, results of QC analyses, and data validation reports are filed in the SNL/NM Records Center.

### 4.2.1 Environmental Sample Results

Table 4-1 summarizes TCE results and Table 4-2 summarizes chromium and nickel results for the January and July 2014 groundwater sampling events. Table 4-3 summarizes results for the additional VOCs (enhanced list) included in the January 2014 event. Table 4-4 summarizes field water quality measurements collected prior to sampling for both events. Field water quality measurements include turbidity, pH, temperature, SC, ORP, and DO. A summary of the results from the January and July sampling events is provided below. Statistical evaluation and comparison of results to concentration limits specified in the PCCP is provided in Section 4.3.

Table 4-1
Summary of Trichloroethene Results
Chemical Waste Landfill Groundwater Monitoring
Analytical Method SW846-8260B[a]
Calendar Year 2014

| Well ID | Result (µg/L) | MDL (µg/L) | PQL (µg/L) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|
| **January 2014 Sampling Event** | | | | | |
| CWL-BW5 | ND | 0.300 | 1.00 | U | -- |
| CWL-BW5 (Duplicate) | ND | 0.300 | 1.00 | U | -- |
| CWL-MW9 | ND | 0.300 | 1.00 | U | -- |
| CWL-MW10 | 2.75 | 0.300 | 1.00 | -- | -- |
| CWL-MW11 | ND | 0.300 | 1.00 | U | -- |
| **July 2014 Sampling Event** | | | | | |
| CWL-BW5 | ND | 0.300 | 1.00 | U | -- |
| CWL-MW9 | ND | 0.300 | 1.00 | U | -- |
| CWL-MW9 (Duplicate) | ND | 0.300 | 1.00 | U | -- |
| CWL-MW10 | 1.12 | 0.300 | 1.00 | -- | -- |
| CWL-MW11 | ND | 0.300 | 1.00 | U | -- |

Notes:
[a]U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition.
[b]Laboratory/Validation Qualifier - If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted samples. See explanation for "U" laboratory qualifier below.
MDL = Method detection limit. The minimum concentration or activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix-specific.
µg/L = Micrograms per liter.
ND = Not detected (at method detection limit).
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by the applicable method under routine laboratory operating conditions.
U = Analyte not present or concentration is below the method detection limit.

Table 4-2
Summary of Chromium and Nickel Results
Chemical Waste Landfill Groundwater Monitoring
Analytical Method SW846-6020[a]
Calendar Year 2014

| Well ID | Analyte | Result (mg/L) | MDL (mg/L) | PQL (mg/L) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| **January 2014 Sampling Event** | | | | | | |
| CWL-BW5 | Chromium | ND | 0.002 | 0.010 | U | -- |
| | Nickel | 0.00267 | 0.0005 | 0.002 | -- | -- |
| CWL-BW5 (Duplicate) | Chromium | ND | 0.002 | 0.010 | U | -- |
| | Nickel | 0.0027 | 0.0005 | 0.002 | -- | -- |
| CWL-MW9 | Chromium | ND | 0.002 | 0.010 | U | -- |
| | Nickel | 0.00187 | 0.0005 | 0.002 | J | J- |
| CWL-MW10 | Chromium | ND | 0.002 | 0.010 | U | -- |
| | Nickel | 0.00311 | 0.0005 | 0.002 | -- | -- |
| CWL-MW11 | Chromium | ND | 0.002 | 0.010 | U | -- |
| | Nickel | 0.00284 | 0.0005 | 0.002 | -- | -- |
| **July 2014 Sampling Event** | | | | | | |
| CWL-BW5 | Chromium | ND | 0.002 | 0.010 | U | -- |
| | Nickel | 0.00166 | 0.0005 | 0.002 | J | J- |
| CWL-MW9 | Chromium | ND | 0.002 | 0.010 | U | -- |
| | Nickel | 0.0015 | 0.0005 | 0.002 | J | J- |
| CWL-MW9 (Duplicate) | Chromium | ND | 0.002 | 0.010 | U | -- |
| | Nickel | 0.00162 | 0.0005 | 0.002 | J | J- |
| CWL-MW10 | Chromium | ND | 0.002 | 0.010 | U | -- |
| | Nickel | 0.00239 | 0.0005 | 0.002 | -- | -- |
| CWL-MW11 | Chromium | ND | 0.002 | 0.010 | U | -- |
| | Nickel | 0.00142 | 0.0005 | 0.002 | J | J- |

Notes:
[a]U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition.
[b]Laboratory/Validation Qualifier - If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted sample. See explanation for "B," "J," "J-," and "U" qualifiers below.
J = Amount detected is below the practical quantitation limit (PQL).
J- = The associated numerical value is an estimated quantity with a suspected negative bias.
U = Analyte is absent or below the method detection limit, if a number is shown units are mg/L.
MDL = Method detection limit. The minimum concentration or activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix-specific.
mg/L = Milligrams per liter.
ND = Not detected (at method detection limit).
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by the applicable method under routine laboratory operating conditions.

Table 4-3
Summary of Additional Volatile Organic Compound Results
Chemical Waste Landfill Groundwater Monitoring
Analytical Method SW846-8260B[a]
January 2014

| Well ID | Analyte | Result (µg/L) | MDL (µg/L) | PQL (µg/L) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| CWL-BW5 | 1,1-Dichloroethene | ND | 0.300 | 1.00 | U | -- |
| | Chloroform | ND | 0.300 | 1.00 | U | -- |
| | Tetrachloroethene | ND | 0.300 | 1.00 | U | -- |
| | Trichlorofluoromethane | ND | 0.300 | 1.00 | U | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | ND | 1.50 | 5.00 | U | -- |
| CWL-MW9 | 1,1-Dichloroethene | ND | 0.300 | 1.00 | U | -- |
| | Chloroform | ND | 0.300 | 1.00 | U | -- |
| | Tetrachloroethene | ND | 0.300 | 1.00 | U | -- |
| | Trichlorofluoromethane | ND | 0.300 | 1.00 | U | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | ND | 1.50 | 5.00 | U | -- |
| CWL-MW9 (Duplicate) | 1,1-Dichloroethene | ND | 0.300 | 1.00 | U | -- |
| | Chloroform | ND | 0.300 | 1.00 | U | -- |
| | Tetrachloroethene | ND | 0.300 | 1.00 | U | -- |
| | Trichlorofluoromethane | ND | 0.300 | 1.00 | U | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | ND | 1.50 | 5.00 | U | -- |
| CWL-MW10 | 1,1-Dichloroethene | ND | 0.300 | 1.00 | U | -- |
| | Chloroform | ND | 0.300 | 1.00 | U | -- |
| | Tetrachloroethene | ND | 0.300 | 1.00 | U | -- |
| | Trichlorofluoromethane | ND | 0.300 | 1.00 | U | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | ND | 1.50 | 5.00 | U | -- |

Refer to footnotes at end of table.

Table 4-3 (Concluded)
Summary of Additional Volatile Organic Compound Results
Chemical Waste Landfill Groundwater Monitoring
Analytical Method SW846-8260B[a]
January 2014

| Well ID | Analyte | Result (µg/L) | MDL (µg/L) | PQL (µg/L) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| CWL-MW11 | 1,1-Dichloroethene | ND | 0.300 | 1.00 | U | -- |
| | Chloroform | ND | 0.300 | 1.00 | U | -- |
| | Tetrachloroethene | ND | 0.300 | 1.00 | U | -- |
| | Trichlorofluoromethane | ND | 0.300 | 1.00 | U | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | ND | 1.50 | 5.00 | U | -- |

Notes:
[a]U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition.
[b]Laboratory/Validation Qualifier - If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted samples.
MDL = Method detection limit. The minimum concentration or activity that can be measured and reported with 99% confidence that the analyte is greater than zero, analyte is matrix-specific.
µg/L = Micrograms per liter.
ND = Not detected (at method detection limit).
PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by the applicable method under routine laboratory operating conditions.
U = Analyte not present or concentration is below the method detection limit.

Table 4-4
Summary of Field Water Quality Measurements[a]
Chemical Waste Landfill Groundwater Monitoring
Calendar Year 2014

| Well ID | Temperature (°C) | SC (µmho/cm) | ORP (mV) | pH | Turbidity (NTU) | DO (% Sat) | DO (mg/L) |
|---|---|---|---|---|---|---|---|
| **January 2014 Sampling Event** | | | | | | | |
| CWL-BW5 | 19.20 | 935.0 | 263.1 | 6.99 | 0.94 | 76.9 | 7.07 |
| CWL-MW9 | 19.16 | 829.0 | 103.7 | 7.07 | 0.29 | 25.5 | 2.36 |
| CWL-MW10 | 17.13 | 742.5 | 64.4 | 7.17 | 1.90 | 21.1 | 2.03 |
| CWL-MW11 | 18.04 | 844.9 | 240.9 | 7.07 | 0.87 | 51.9 | 4.95 |
| **July 2014 Sampling Event** | | | | | | | |
| CWL-BW5 | 25.66 | 1135.9 | 279.4 | 6.90 | 0.30 | 84.7 | 6.88 |
| CWL-MW9 | 25.91 | 1029.6 | 183.1 | 6.95 | 0.21 | 38.8 | 3.14 |
| CWL-MW10 | 25.05 | 964.9 | -18.1 | 7.05 | 1.76 | 34.9 | 2.87 |
| CWL-MW11 | 27.61 | 1105.8 | 300.2 | 6.94 | 0.36 | 65.9 | 5.18 |

Notes:
[a]Field measurements collected prior to sampling.
°C = Degrees Celsius.
% Sat = Percent saturation.
DO = Dissolved oxygen.
mg/L = Milligrams per liter.
µmho/cm = Micromhos per centimeter.
mV = Millivolts.
ORP = Oxidation-reduction potential.
NTU = Nephelometric turbidity units.
pH = Potential of hydrogen (negative logarithm of the hydrogen ion concentration).
SC = Specific Conductance.

### *First Semi-Annual Sampling Event – January 9-15, 2014*

TCE was detected above the laboratory MDL in the CWL-MW10 sample at a concentration of 2.75 µg/L. No other VOCs (enhanced list) were detected.

Chromium was not detected above the laboratory MDL in any samples. Nickel was detected in all groundwater samples at concentrations ranging from 0.00187 milligrams per liter (mg/L) to 0.00311 mg/L.

### *Second Semi-Annual Sampling Event – July 7-11, 2014*

TCE was only detected above the laboratory MDL in the CWL-MW10 sample at a concentration of 1.12 µg/L. There were no other detections of TCE.

Chromium was not detected above the laboratory MDL in any of the groundwater samples. Nickel was detected in all samples at concentrations from 0.00142 mg/L to 0.00239 mg/L.

### 4.2.2 Field Quality Control Sample Results

Tables 4-1 through 4-4 present results for samples collected in the January and July sampling events. Table 4-5 summarizes results of duplicate sample analyses and the calculated relative percent difference (RPD) values between the environmental and duplicate sample results for the January (CWL-BW5) and July (CWL-MW9) 2014 sample pairs. Nickel was the only analyte detected in both environmental-duplicate sample pairs; no VOCs or chromium were detected. RPD values for nickel and show good agreement (i.e., RPD values < 35 for metals).

One equipment blank sample was collected in January and analyzed for all constituents. Chloroform was detected in the January equipment blank sample at a concentration of 2.58 µg/L. No corrective action was necessary since chloroform was not detected in the associated environmental sample (i.e., CWL-BW5 sample). The equipment blank sample collected in July was analyzed for all constituents; no constituents were detected in the sample.

Table 4-5
Summary of Duplicate Sample Results
Chemical Waste Landfill Groundwater Monitoring
Calendar Year 2014

| Well ID/Parameter | Environmental Sample (R1) | Duplicate Sample (R2) | RPD[a] |
|---|---|---|---|
| **January 2014 Sampling Event (CWL-BW5)** | | | |
| Nickel (mg/L) | 0.00267 | 0.0027 | 1 |
| **July 2014 Sampling Event (CWL-MW9)** | | | |
| Nickel (mg/L) | 0.0015 | 0.00162 | 8 |

Notes:
[a]RPD = Relative percent difference is calculated with the following equation and rounded to the nearest whole number.

$$RPD = \frac{|R_1 - R_2|}{[(R_1 + R_2)/2]} \times 100$$

where: $R_1$ = Environmental sample result.
$R_2$ = Duplicate sample result.

mg/L = Milligram(s) per liter.

Of the five trip blank samples and two field blank samples associated with the January sampling event, the only detection was chloroform in both of the field blank samples. No corrective action was required since chloroform was not detected in any of the environmental samples. The five trip blank samples and four field blank samples associated with the July sampling event were analyzed for TCE. TCE was detected in the field blank sample collected at the CWL-MW11 location at a concentration of 3.3 µg/L. No corrective action was required as TCE was not detected in the associated environmental sample.

### 4.2.3 Data Quality

Field QC sample results met the sampling DQOs and validated the adequacy of the field sampling procedures and protocol. Internal laboratory QC samples were analyzed concurrently with all environmental samples in accordance with laboratory procedures and EPA methods. These samples included laboratory control samples, method blanks, matrix spike and matrix spike duplicate samples, surrogate spike samples, and replicate samples. The results were used to evaluate potential contamination associated with the laboratory analytical process and to determine the accuracy and precision of the analytical methods. All chemical data were reviewed and qualified in accordance with SNL/NM Administrative Operating Procedure (AOP) AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data" (SNL/NM June 2014a). Minor issues documented during the data validation process are summarized below.

For the January 2014 sampling event, chloroform was detected at very low concentrations in both the equipment and field blank samples. It is a by-product of the deionized water purification process (i.e., chlorination) and is routinely detected in equipment blank and field blank samples at very low concentrations.

Although infrequent, the detection of TCE in the field blank sample collected at the CWL-MW11 during the July 2014 sampling event demonstrates that very low detections of VOCs are possible as a result of ambient conditions. Note that this sample was collected by pouring deionized water directly into the sample container to simulate the transfer of environmental samples from the sampling system to the sample container. The deionized water did not travel through the portable Bennett sampling system.

Based upon the data validation and review criteria, all analytical data were determined acceptable. Reported QC samples results were in compliance with analytical method and laboratory procedure requirements (i.e., technically defensible). Data Validation Reports and Contract Verification Review forms are provided in Annex A of this report and are filed in the SNL/NM Records Center.

### 4.2.4 Variances and Non-Conformances

No variances or non-conformances were identified during the January and July 2014 semi-annual groundwater sampling events.

## 4.3 Data Evaluation

Groundwater monitoring is required to determine whether the groundwater beneath the CWL is in compliance with the groundwater protection standard under 40 CFR § 264.92 and for the determination of statistical significance under 40 CFR § 264.97(h). In accordance with PCCP Attachment 1, Section 1.8.1.2, statistical evaluation of groundwater monitoring results from new wells is not required until three years of groundwater sampling results have been obtained (i.e., minimum data set for statistical analysis as defined by the NMED is six analytical results). For replacement wells, historical groundwater sampling results are used to augment the data sets and increase the amount of data available for statistical analysis. Historical groundwater

data is limited to data obtained no earlier than May 1998 (i.e., near the completion of the VE VCM).

Statistical evaluation of the groundwater data includes results from CWL-BW5 (and historical background well CWL-BW4A), as well as CWL-MW9, CWL-MW10, and CWL-MW11. Wells CWL-MW9, CWL-MW10, and CWL-MW11 are new wells installed in 2010 and have been sampled eight times as of July 2014 (November-December 2010, July-August 2011, January and July 2012, January and July 2013, January and July 2014). Statistical evaluation of the results from these wells was first presented in the CY 2013 Annual Report. CWL-BW5 is a replacement well for CWL-BW4A. All results for CWL-BW5 and historic results for CWL-BW4A were used for the statistical evaluation presented in the following sections.

### 4.3.1 Statistical Assessment Requirements

Groundwater monitoring data are statistically evaluated on a well-by-well basis for each of the three hazardous constituents in accordance with the requirements stated in PCCP Attachment 1, Section 1.8.1.2. The hazardous constituents and their respective concentration limits are listed in Table 4-6. Prediction and confidence intervals are calculated and used to evaluate groundwater monitoring results. In addition, the cumulative percentage of sample results that are greater than the median (i.e., Median Test) is calculated to determine whether there is statistically significant evidence of increased contamination. If a result is below the analytical laboratory detection limits, the MDL for the constituent is used for statistical analysis. For duplicate analyses, only the highest detection is used for statistical analysis. If a detection is qualified as “not detected” during data validation due to blank contamination, the original result reported by the laboratory is used for statistical analysis. More detailed information regarding statistical assessment requirements is provided below. Statistical assessment results for CY 2014 groundwater monitoring data are presented in Section 4.3.2.

Table 4-6
Concentration Limits for the Hazardous Constituents of Concern at the Chemical Waste Landfill

| Hazardous Constituent | Concentration Limit | Basis of Concentration Limit |
|---|---|---|
| Trichloroethene | 5 µg/L | EPA MCL, 40 CFR § 264.94(b) |
| Chromium | 0.050 mg/L | Table 1, 40 CFR § 264.94(a)(2) |
| Nickel | 0.028 mg/L | SNL/NM background level, 40 CFR § 264.94(a)(1) |

Notes:
CFR = Code of Federal Regulations
EPA = U.S. Environmental Protection Agency
MCL = Maximum contaminant level.
µg/L = Micrograms per liter.
mg/L = Milligrams per liter.

### *Prediction and Confidence Intervals*

The probability that each semi-annual sample result for a given hazardous constituent falls within the range of previous sample results is determined using prediction intervals. The prediction interval for a given hazardous constituent is the range between the 95% upper confidence limit (UCL) and the 95% lower confidence limit (LCL) of the mean. Therefore, the probability of a sample result for a given hazardous constituent falling within the range of previous sample results (i.e., between the LCL and the UCL) is 90%. Strictly for comparison, CY 2014 sample results are also compared to the historical range (minimum and maximum result derived from historical results not including CY 2014 results) to determine whether they fall within, below, or above the range of previous sample results.

The 95% LCL is also used to determine statistically significant evidence that the concentration limit for the particular hazardous constituent has been exceeded (NMED October 2009 and subsequent revisions). The calculated 95% LCL is compared to the concentration limit in Table 4-6. If it exceeds the concentration limit, this is considered statistically significant evidence that the concentration limit has been exceeded, and it triggers corrective action in accordance with PCCP Attachment 1, Section 1.8.3. Individual sample results are not directly compared to concentration limits, and if an individual result exceeds the concentration limit this does not constitute an exceedance requiring corrective action.

### *Median Test*

The median value is calculated using all historic data prior to the sampling event(s) being evaluated. For example, the median value against which the July 2014 CWL-BW5/4A sample results are compared was calculated using all historic results obtained since May 1998 (i.e., completion of the VE VCM) not including the July 2014 sample results. For the next groundwater monitoring event, the median will be recalculated and will include the July 2014 sample results. If the cumulative percentage of results greater than the median for a given hazardous constituent is 80% or greater, that is considered statistically significant evidence of increased contamination. However, no action is required in the case of statistically significant evidence of increasing contamination unless the 95% LCL of the mean for a given constituent exceeds the respective concentration limit (NMED October 2009 and subsequent revisions).

## 4.3.2 Statistical Assessment Results

CY 2014 groundwater sampling data and statistical analysis for CWL-BW5/4A, CWL-MW9, CWL-MW10, and CWL-MW11 are discussed in this section. Statistical assessment results are presented in Table 4-7 and shown graphically in Figures 4-1 through 4-9.

Table 4-7
Statistical Assessment Results Summary
Chemical Waste Landfill
Calendar Year 2014 Sampling Results

| Hazardous Constituent[a] | Minimum[b] | Maximum[b] | Mean[c] | Standard Deviation[c] | LCL[c] | UCL[c] | Distribution Type[c] | Median Test[d] | Concentration Limit Exceeded[e]? |
|---|---|---|---|---|---|---|---|---|---|
| **CWL-BW5/4A** | | | | | | | | | |
| Chromium (mg/L) | 0.00038 | 0.0125 | 0.00329 | 0.00312 | 0.00237 | 0.00421 | Normal | 43% | No |
| Nickel (mg/L) | 0.00109 | 0.049 | 0.00544 | 0.0083 | 0.00299 | 0.00789 | Normal | 47% | No |
| TCE (µg/L) | 0.1 | 0.78 | 0.35 | 0.134 | 0.311 | 0.389 | Normal | 3% | No |
| **CWL-MW9** | | | | | | | | | |
| Chromium (mg/L) | NA | NA | NA | NA | NA | NA | NA | NA | No |
| Nickel (mg/L) | 0.00198 | 0.00435 | 0.00305 | 0.0011 | 0.00231 | 0.00379 | Normal | 40% | No |
| TCE (µg/L) | NA | NA | NA | NA | NA | NA | NA | NA | No |
| **CWL-MW10** | | | | | | | | | |
| Chromium (mg/L) | 0.002 | 0.00325 | 0.00231 | 0.000569 | 0.00193 | 0.00269 | Normal | 20% | No |
| Nickel (mg/L) | 0.00234 | 0.00707 | 0.0036 | 0.00158 | 0.00254 | 0.00466 | Normal | 20% | No |
| TCE (µg/L) | 1.11 | 4.68 | 2.831 | 1.452 | 1.858 | 3.804 | Normal | 40% | No |
| **CWL-MW11** | | | | | | | | | |
| Chromium (mg/L) | 0.002 | 0.00304 | 0.00227 | 0.00040019 | 0.002 | 0.00254 | Normal | 40% | No |
| Nickel (mg/L) | 0.00172 | 0.00449 | 0.00276 | 0.00101 | 0.00208 | 0.00344 | Normal | 20% | No |
| TCE (µg/L) | NA | NA | NA | NA | NA | NA | NA | NA | No |

Notes:
[a]Hazardous Constituents from CWL Permit Attachment 1, Section 1.4.1, Table 1-2 (Table 4-6 of this report).
[b]Minimum and maximum result determined from historical data not including 2014 sample results.
[c]Mean, LCL, UCL, Standard Deviation, and Distribution Type determined using ProUCL statistical program.
[d] Median Test is the cumulative percentage of sample results that are greater than the median.
[e]Exceedance determined by comparing the sample result (Tables 4-1, 4-2, and 4-3) against the concentration limit in CWL Permit Attachment 1, Table 1-2 (Table 4-6 of this report).
LCL = Lower confidence limit.
µg/L = Micrograms/liter.
NA = Not Applicable; constituent has not been detected in any samples from this monitoring well.
mg/L = Milligrams/liter.
TCE = Trichloroethene.
UCL = Upper confidence limit.

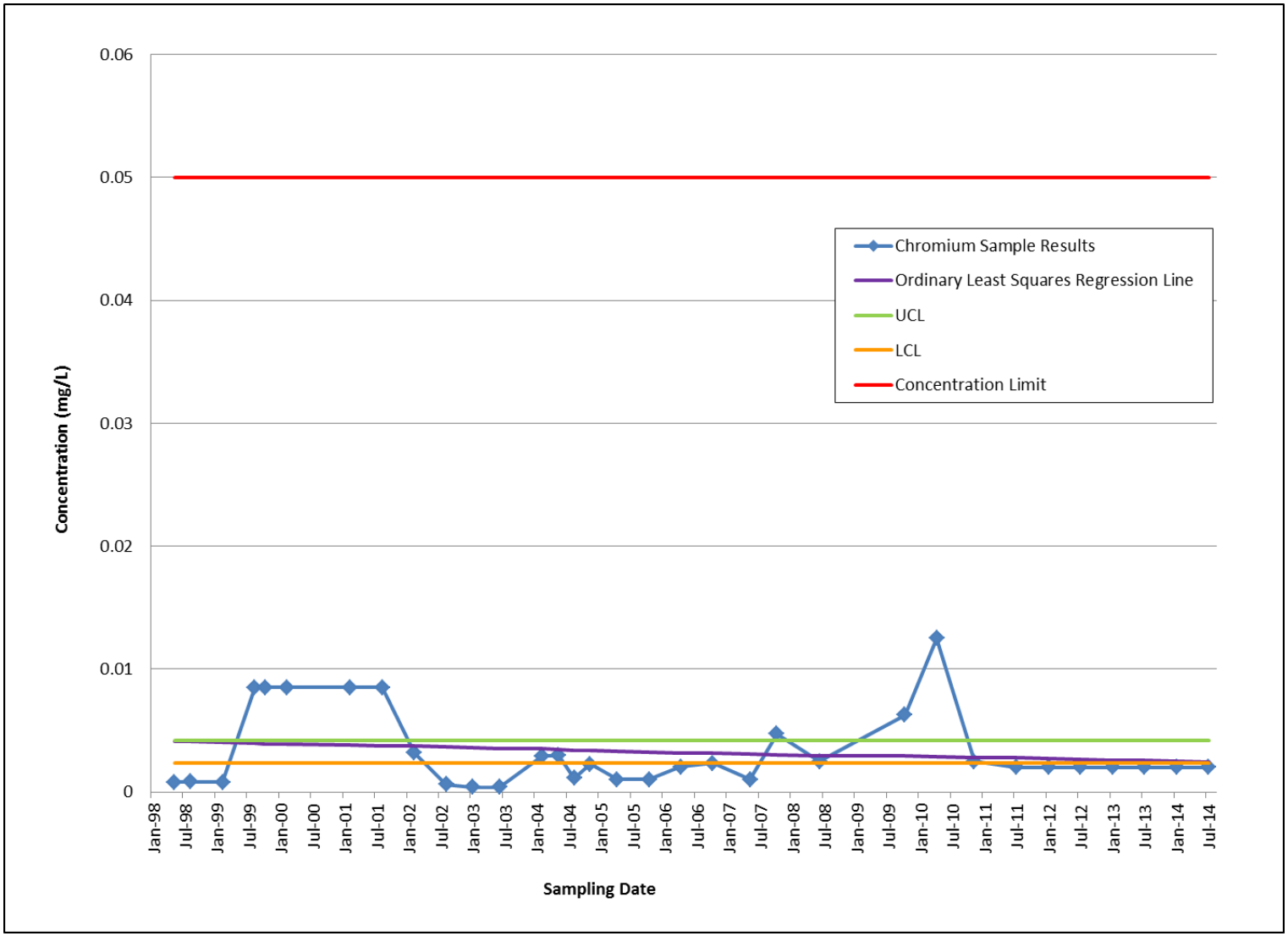


Figure 4-1
Chromium Control Chart for CWL-BW5/4A

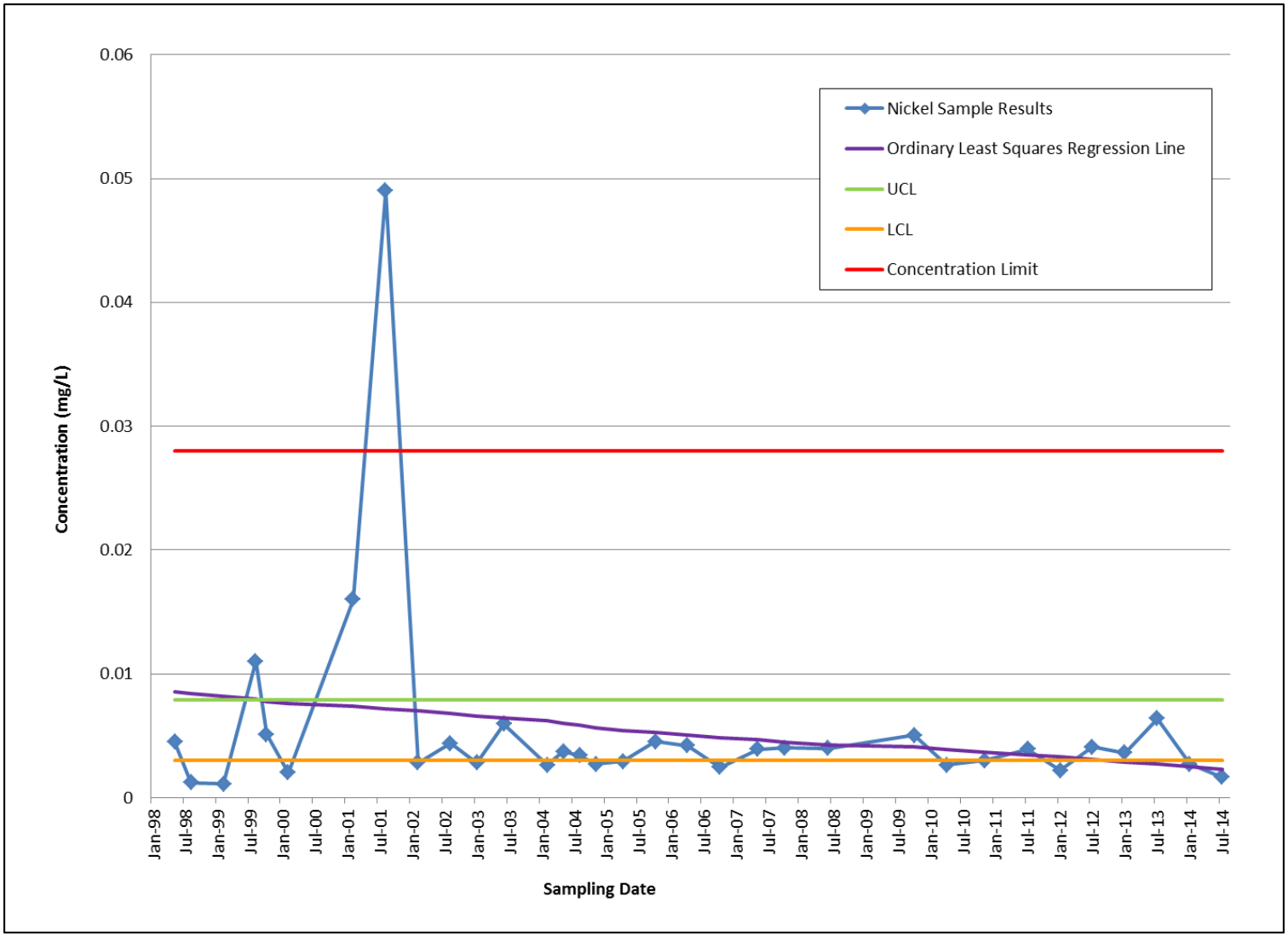


Figure 4-2
Nickel Control Chart for CWL-BW5/4A

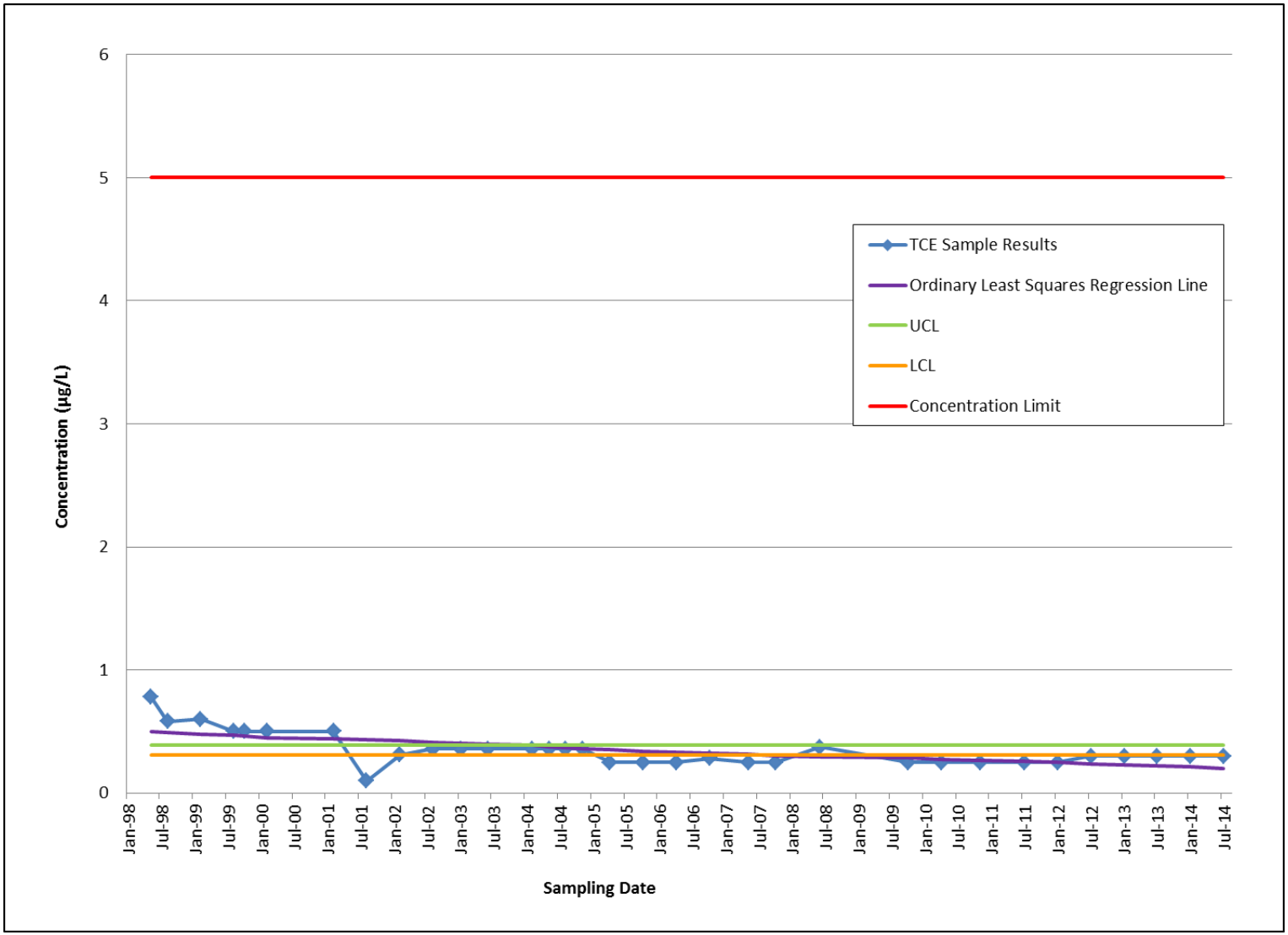


Figure 4-3
TCE Control Chart for CWL-BW5/4A

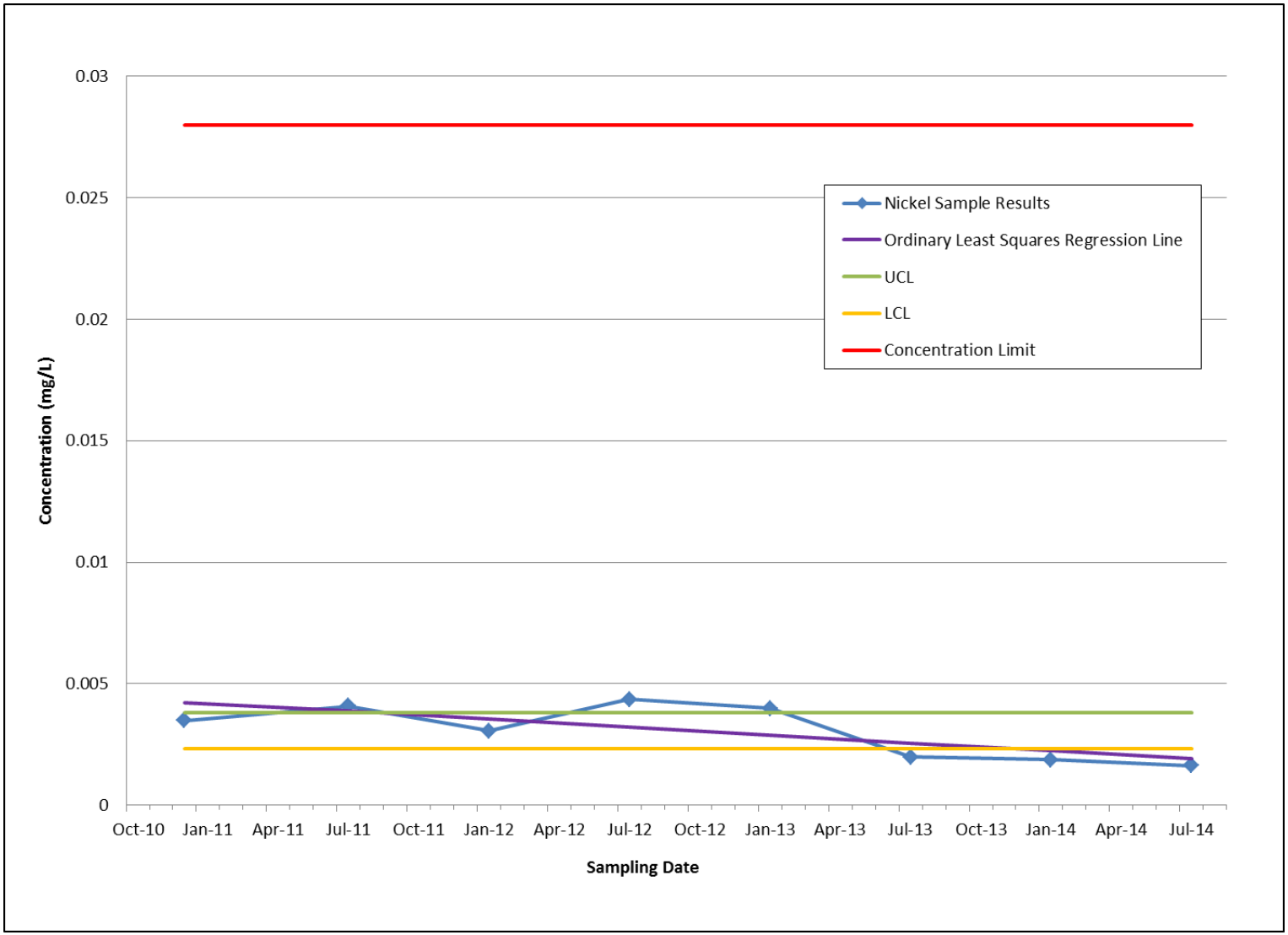


Figure 4-4
Nickel Control Chart for CWL-MW9

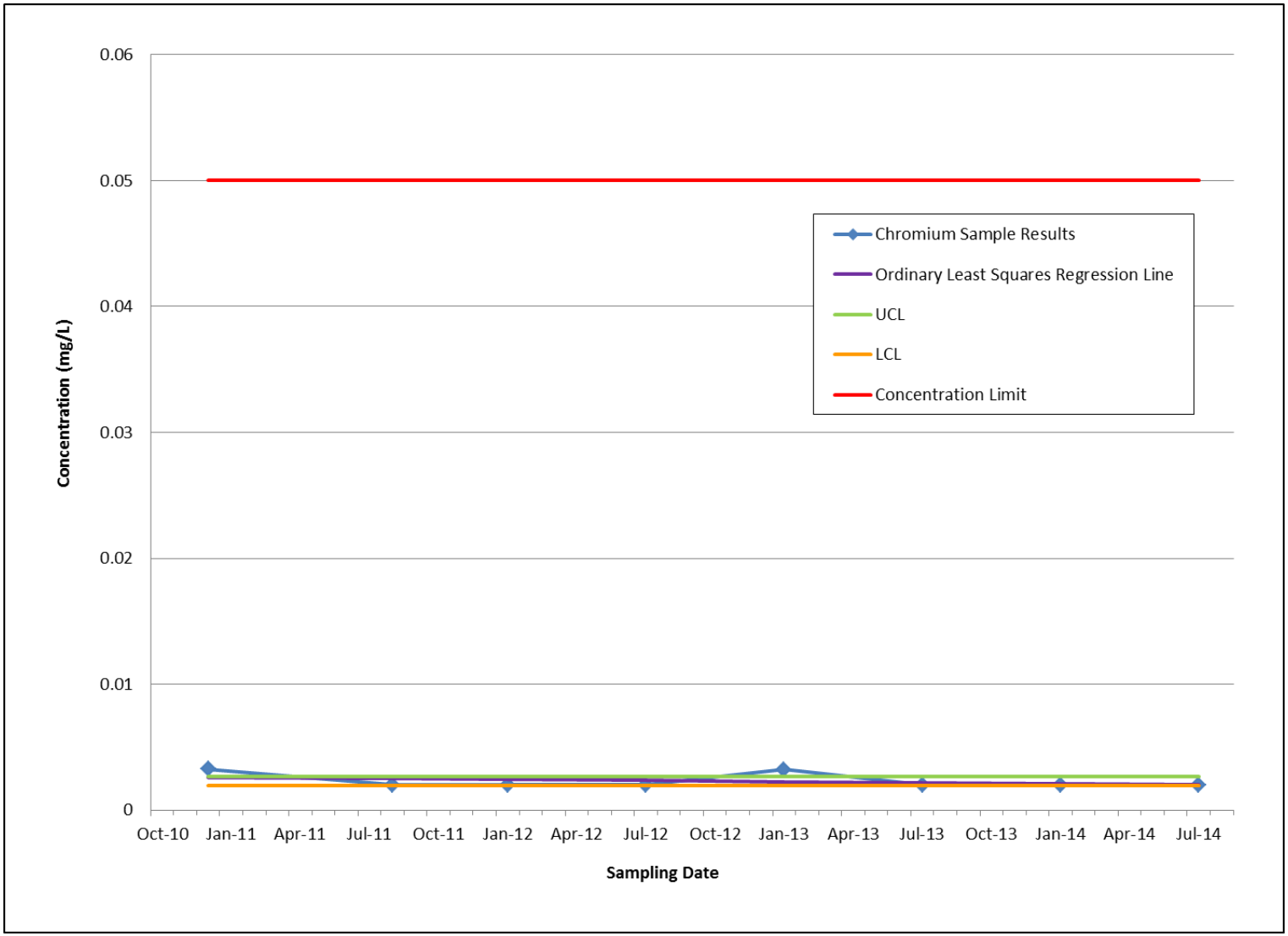


Figure 4-5
Chromium Control Chart for CWL-MW10


Figure 4-6
Nickel Control Chart for CWL-MW10

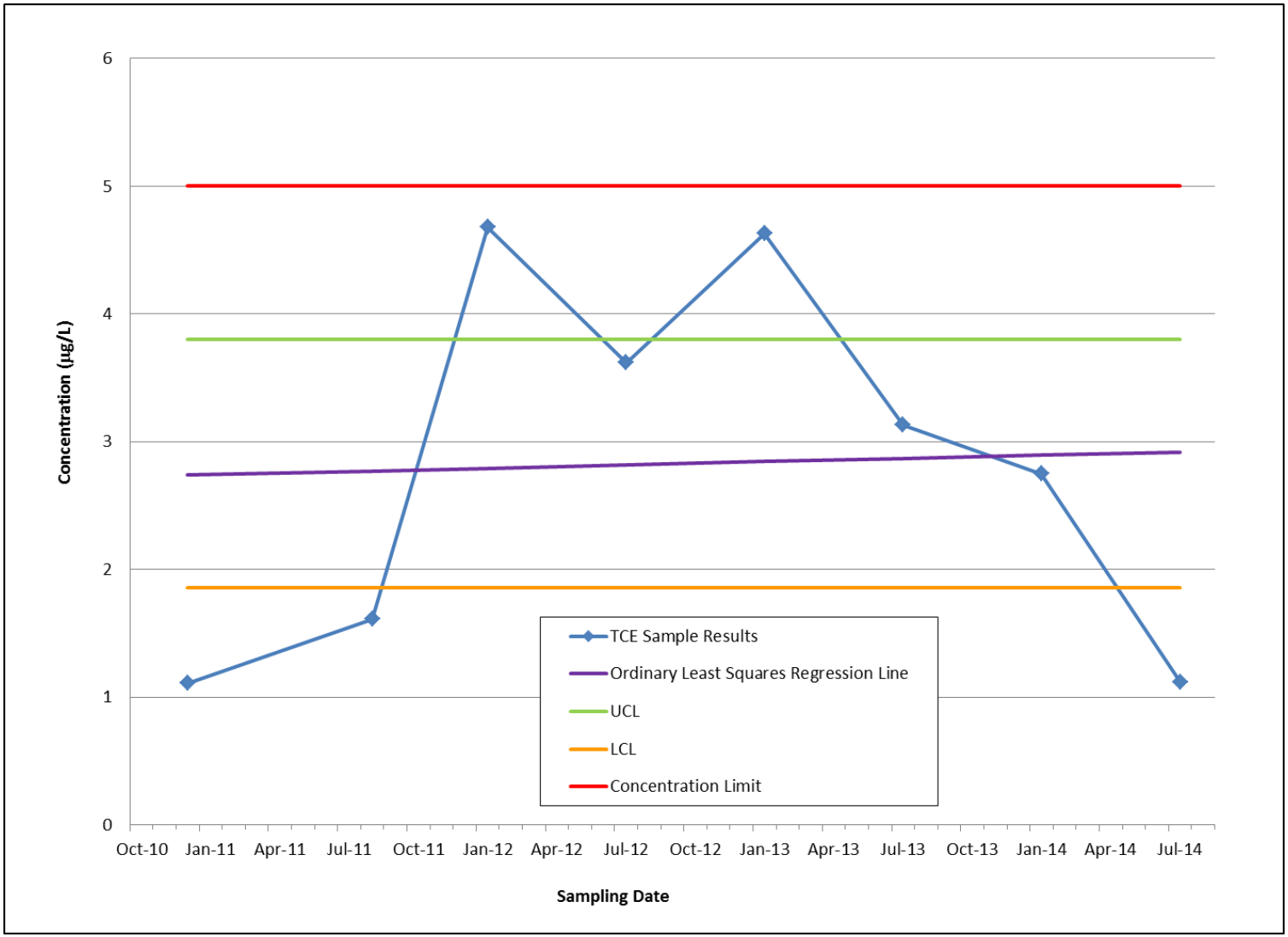


Figure 4-7
TCE Control Chart for CWL-MW10

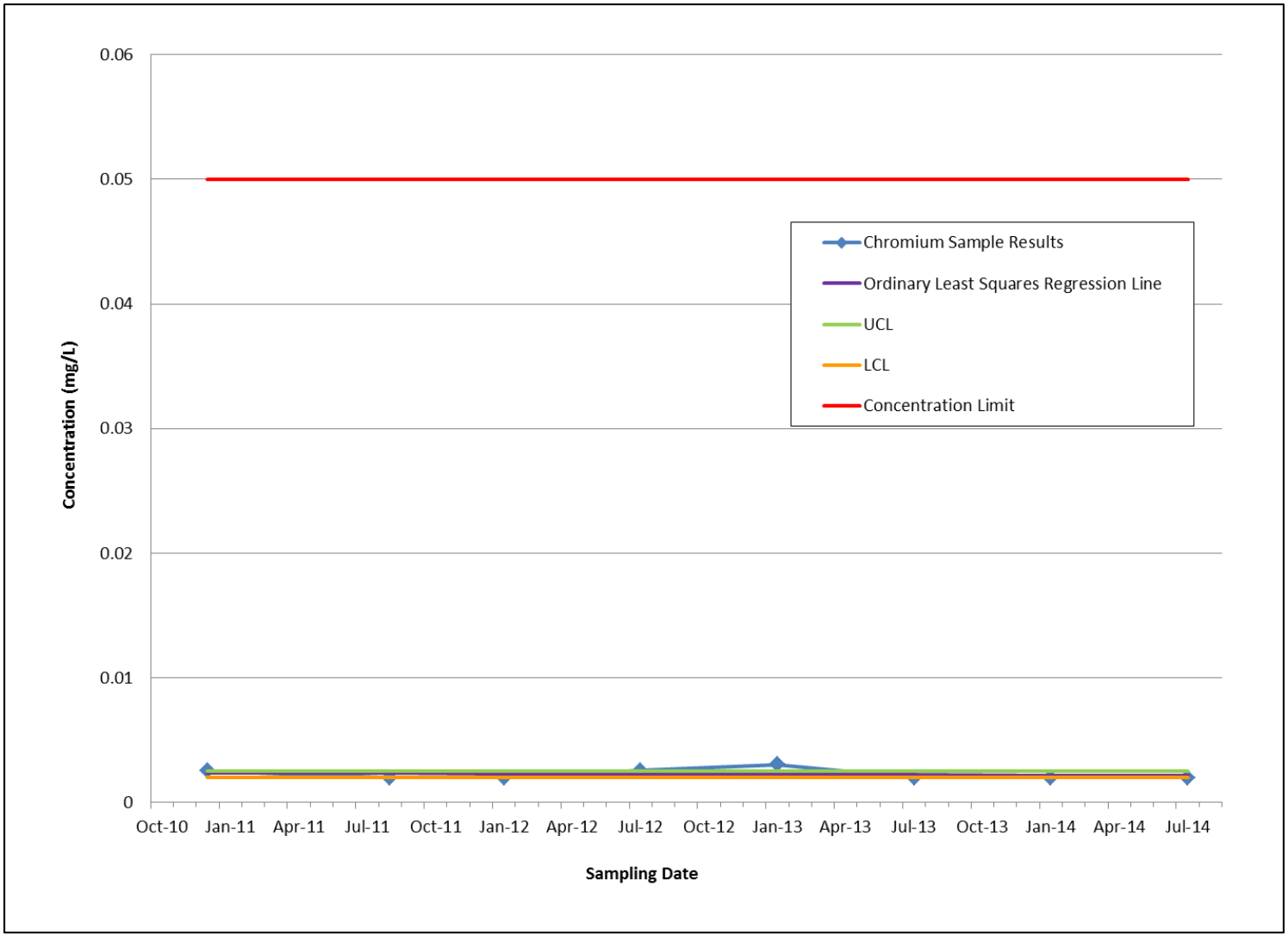


Figure 4-8
Chromium Control Chart for CWL-MW11


Figure 4-9
Nickel Control Chart for CWL-MW11

The statistical analysis of specific constituents was not performed if all results for the data set are non-detections. The statistical analysis presented for new wells CWL-MW9, CWL-MW10, and CWL-MW11 is significantly impacted by the small data set (each contains eight data points for each constituent), the very low concentrations, and in several cases the large number of non-detect results. Because the evaluation process uses the laboratory MDL in the case of laboratory non-detections, the statistical results are also affected by changes in the MDL over time. In general the laboratory MDLs have decreased over time, which impacts the CWL-BW5/4A statistical evaluation results as the historic data set for this well includes results from 1998 through the present. For laboratory detections that are qualified during the data validation process as "not detected" (i.e., "U" qualified) due to blank contamination, the original result reported by the laboratory is used. Results qualified by the laboratory and/or data validation as estimated (i.e., "J" qualified) are used as reported. Statistical results are presented below for all cases where evaluation was possible. As routine monitoring continues and the data sets increase in size, the evaluation results will improve for detected constituents.

### *Prediction Intervals*

*Monitoring Well CWL-BW5/4A*

CY 2014 CWL-BW5 chromium and TCE sample results were all non-detections, and the corresponding MDLs were lower than their respective 95% LCLs, thus are below the prediction interval (range of 95% LCL to 95% UCL). This is due to the decrease in the laboratory detection limits over time and the fact that chromium and TCE are often not detected (only 13 chromium detections and 4 TCE detections out of 33 sampling events). Likewise, the CY 2014 results for nickel were slightly less than the 95% LCL, even though they were both low concentration detections. Results for all three hazardous constituents (using the MDL value for constituents not detected) fell within the historical range.

*Monitoring Well CWL-MW9*

Chromium and TCE have not been detected in any CWL-MW9 samples (CY 2010 through 2014, eight environmental and three duplicate samples). Therefore statistical evaluation of these constituents is not presented. All of the CY 2014 nickel results were detections above the laboratory MDL, were less than the 95% LCL, and were lower than the historical range (i.e., less than the minimum concentration from 2010 through 2013 results).

*Monitoring Well CWL-MW10*

CY 2014 CWL-MW10 chromium sample results were both non-detects, but the laboratory MDL (0.002 mg/L) fell within the range of the 95% LCL and 95% UCL. The nickel result for the January sample fell within the range of the 95% LCL and 95% UCL, but the July result was less than the 95% LCL. Similar to the nickel results, the January TCE result fell within the range of the 95% LCL and 95% UCL, but the July result was less than the 95% LCL. Results for chromium (using the MDL value), nickel, and TCE fell within the historical range.

*Monitoring Well CWL-MW11*

CY 2014 CWL-MW11 chromium sample results were both non-detects, but the laboratory MDL (0.002 mg/L) fell within the range of the 95% LCL and 95% UCL. The January nickel result fell within the range of the 95% LCL and 95% UCL, but the July result was below the 95% LCL. TCE has not been detected in any CWL-MW11 samples (CY 2010 through 2014, eight environmental and one duplicate sample). Therefore statistical evaluation of TCE is not presented. The chromium MDL values are equal to the historic minimum concentration. The January result for nickel falls within the historical range, but the July result is less than the historic minimum.

### *Confidence Intervals*

Chromium, nickel, and TCE 95% LCLs and 95% UCLs of the mean are presented for each CWL monitoring well in Table 4-7 and are shown on the associated control charts (Figures 4-1 through 4-9). As previously explained, no statistical evaluation was performed for constituents that have not been detected in groundwater samples from monitoring wells CWL-MW9 (chromium and TCE) and CWL-MW11 (TCE). All calculated 95% LCLs are below the respective concentration limits; therefore there are no exceedances of any concentration limits.

### *Median Test*

The cumulative percentage of sample results greater than the median (i.e., Median Test) for the three hazardous constituents is below 80% for all detected constituents at all four monitoring wells. Therefore, there is no statistically significant evidence of increasing contamination for any of the hazardous constituents. The highest Median Test result was 47% for nickel (CWL-BW5/4A); both CY 2014 results were less than the 95% LCL of the mean. The low median test results for TCE in CWL-BW5/4A (3%) reflects a data set influenced by non-detection results and an analytical laboratory detection limit that has decreased over time.

In addition, the ordinary least squares regression line is shown on Figures 4-1 through 4-9. This line provides a visual representation of the overall trend of the sample results. As shown in Figures 4-1 through 4-9, all three hazardous constituents show a slight decreasing trend, consistent with the Median Test results. Despite the fluctuations shown in Figure 4-7 resulting from higher TCE concentrations in the 2012 and January 2013 samples from CWL-MW10, there is no statistically significant evidence of increasing contamination as indicated by the Median Test. The last three TCE results from CWL-MW10 samples (July 2013, January 2014, and July 2014) have shown consistent decreases. The variation shown in Figure 4-7 is typical of very low concentrations (low parts per billion) that are fluctuating over time.

## 4.4 Hydrogeologic Assessment

The regional aquifer in the area of the CWL is located within the Santa Fe Group alluvial sediments at a depth of approximately 485 to 500 feet bgs. Regional groundwater beneath Kirtland Air Force Base (KAFB) flows generally westward away from the mountains toward the Rio Grande. Pumping by the City of Albuquerque and KAFB have modified the natural groundwater flow regime and resulted in a steady decline of the upper surface of the regional aquifer. Water levels at the CWL have been declining since monitoring began in 1985. The average rate of decline has been somewhat variable over time, but is typically in the range of 0.4 to 0.8 feet per year. The groundwater elevation decline between October 2013 and October 2014 ranged from 0.38 (CWL-MW11) to 0.85 (CWL-BW5) feet, with an average decline rate of 0.64 feet.

In CY2014, water levels were measured in the groundwater monitoring wells on a quarterly basis, and also during the January and July sampling events. Figure 4-10 depicts the potentiometric surface map of the regional aquifer beneath the CWL based upon the October 2014 water-level measurements. The westward deflection of the potentiometric surface is a localized salient in the potentiometric surface of the regional aquifer. Based on this figure, the local groundwater flow direction varies across the site. However, the overall groundwater flow direction is generally westward in the CWL vicinity, which is consistent with the hydrogeologic conceptual model for the KAFB area (SNL/NM June 2014b). Localized variations in the water table reflect site-specific geologic controls (i.e., vertical and lateral variability in permeability of the saturated Santa Fe Group alluvial sediments). Measured orthogonally from the potentiometric surface contours on Figure 4-10, the horizontal gradient did not change from CY 2013 and is 0.011 feet/feet.

Groundwater velocities were calculated using (a) the current potentiometric surface gradient, (b) the hydraulic conductivity range from the four groundwater monitoring wells (i.e., high and low values from the 2012 slug tests), and (c) a porosity of 29 percent as determined from the laboratory analyses of CWL soil samples (SNL/NM October 1995). The calculated velocities were identical to those reported for CY 2013, and range from approximately $1.8 \times 10^{-4}$ to $2.8 \times 10^{-3}$ feet per day (equivalent to $6.3 \times 10^{-8}$ to $1.0 \times 10^{-6}$ centimeters per second). The average groundwater velocity is $1 \times 10^{-3}$ feet per day (equivalent to $4.1 \times 10^{-7}$ centimeters per second). These very low values are consistent with previous estimates for horizontal groundwater flow at the water table in the CWL vicinity.

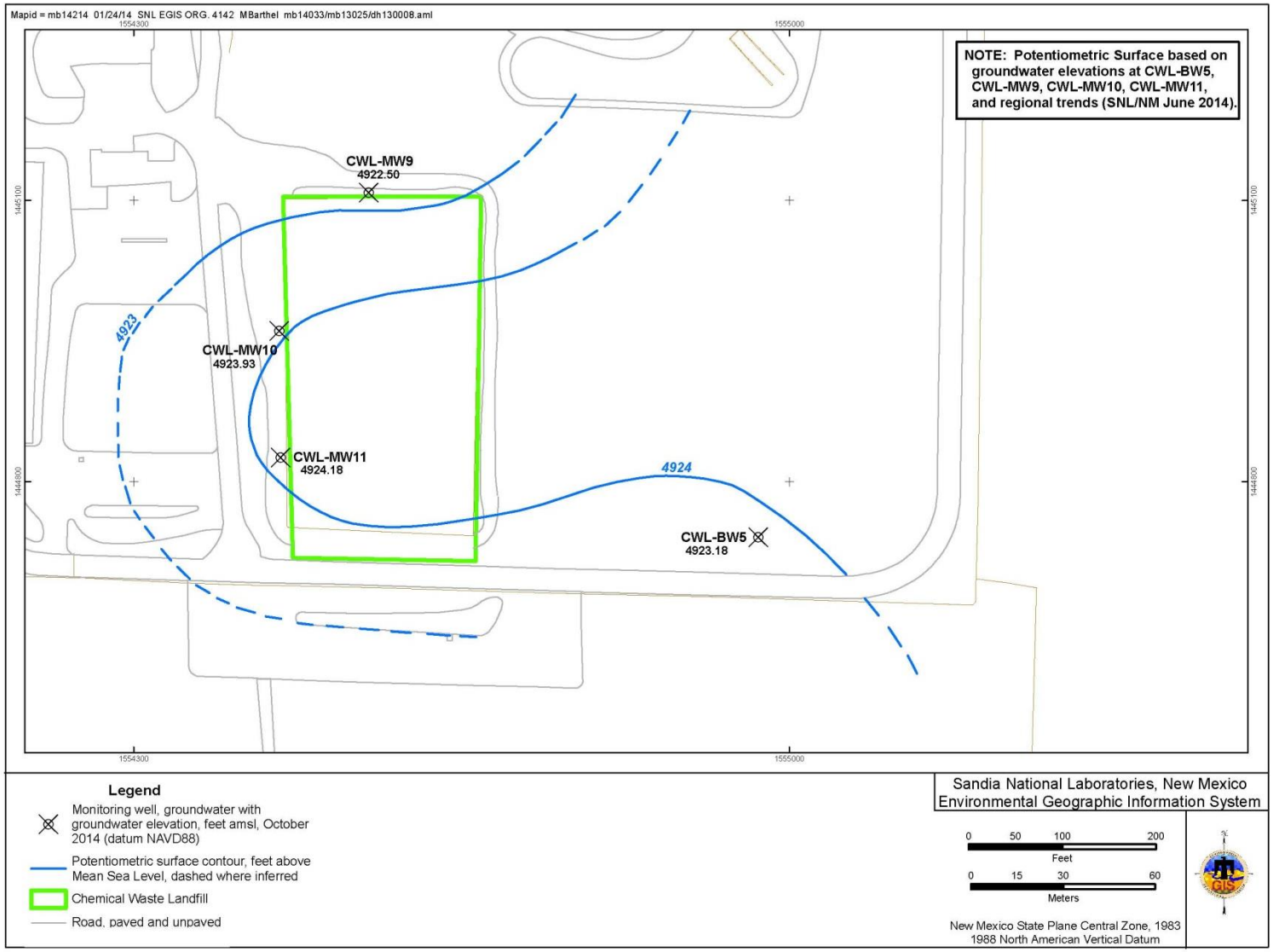


Figure 4-10
Potentiometric Surface of the Regional Aquifer at the Chemical Waste Landfill, October 2014

# 5.0 SOIL-GAS MONITORING RESULTS

This chapter presents soil-gas monitoring activities (i.e., sampling and analysis), analytical results, and data evaluation for CY 2014 in accordance with PCCP Attachment 1, Sections 1.8 and 1.12, and Attachment 3 (NMED October 2009 and subsequent revisions). The CY 2014 annual soil-gas sampling event was the third performed under the PCCP, which became effective June 2, 2011. Soil-gas sampling field activities are described in Section 5.1, analytical laboratory results and a discussion of data quality are presented in Section 5.2, and data evaluation requirements and results are presented in Section 5.3.

## 5.1 Soil-Gas Sampling Field Activities

This section describes soil-gas monitoring activities conducted at the CWL in conformance with the CWL Soil-Gas SAP, PCCP Attachment 3 (NMED October 2009 and subsequent revisions) that describes the procedures, methods, and analytical protocols for collecting and analyzing soil-gas samples. The DQO for soil-gas monitoring is to collect accurate and defensible data of high quality to determine the concentrations of hazardous constituents at various depths in the vadose zone at the CWL (i.e., unsaturated soil and sediments above the regional groundwater aquifer). Field forms and documentation that address calibration of equipment, well evacuation, purge volumes, and vacuum pressure readings for each sample container are provided in Annex B of this report and filed in the SNL/NM Records Center.

Soil-gas samples were collected from monitoring wells CWL-UI1, CWL-UI2, CWL-D1, CWL-D2, and CWL-D3 on January 16, 2014. All samples were analyzed using the EPA Method TO-15 (EPA January 1999) for the 50 VOCs listed in PCCP Attachment 1, Table 1-5. CY 2014 soil-gas sampling activities and results are described in the following sections.

### 5.1.1 Well Evacuation

Purging removes stagnant air from each monitoring well port and sample tubing, allowing the collection of representative soil gas from the soil pore space surrounding the sampling port in the subsurface. Purging continued after meeting the minimum requirement of three tubing volumes until field measurements for VOC levels stabilized, in accordance with PCCP Attachment 3, Section 3.9.2. VOCs were measured by attaching a VOC monitoring instrument to the exhaust port of the vacuum pump.

The CWL soil-gas sampling equipment includes a vacuum pump, a sampling manifold assembly, and a multiport purging chamber. The multiport purging chamber is equipped with individual valves, fittings, and tubing that can be connected to as many as ten individual sample ports. Valves were connected to each sampling port and purging was performed until minimum purge requirements were satisfied. Upon completion of purging, soil-gas samples were collected in SUMMA® canisters per laboratory protocols and sent to the off-site laboratory for analysis.

### 5.1.2 Field Quality Control

Field QC samples include environmental duplicate samples (minimum of two per annual monitoring event) and field blank samples. Field QC samples were submitted for analysis with the soil-gas samples and analytical results are presented in Section 5.2.2 and Annex B.

Duplicate environmental samples are collected immediately after the original environmental sample in order to reduce variability caused by time and/or sampling mechanics. A total of two duplicate samples were submitted for analysis with CY 2014 environmental samples. These sample results are used to evaluate the reproducibility of the sampling and analytical processes.

Field blank samples are prepared in the field during sampling activities by collecting an ultra-pure grade nitrogen gas sample. Results are used to assess whether contamination of the samples may have resulted from ambient field conditions. A total of five field blank samples were submitted for analysis with CY 2014 environmental samples.

### 5.1.3 Waste Management

Only a small volume of solid waste (personal protective equipment) was generated during the two soil-gas monitoring events. This waste was combined with the groundwater monitoring solid waste and managed as hazardous waste. The waste was submitted to the Hazardous Waste Management Facility for ultimate disposal at a permitted off-site facility.

## 5.2 Laboratory Results

Soil-gas samples were submitted to Test America, Inc. for chemical analyses by EPA Method TO-15 (EPA January 1999b) in accordance with PCCP Attachment 1, Section 1.8. Analytical reports (i.e., certificates of analyses), analytical methods, MDLs, reporting limits (RLs), dates of analyses, results of field and laboratory QC analyses, and data validation reports are included in Annex B and filed in the SNL/NM Records Center.

### 5.2.1 Environmental Sample Results

This section summarizes detected VOCs from soil-gas samples collected in January 2014. The January 2014 results are presented in Table 5-1.

In general the 2014 detected VOCs were consistent with the 2013 data set. A total of 33 compounds were detected in the samples collected from the 21 sampling ports. The large number of compounds detected is related to the very low detection limits associated with EPA Method TO-15. The most commonly detected compounds include chloroform (22 detections), 1,1-dichloroethene (1,1-DCE) (22 detections), methylene chloride (22 detections), tetrachlorethene (PCE) (23 detections), 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113) (23 detections), TCE (23 detections), and trichlorofluoromethane (Freon 11) (23 detections).

Table 5-1
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
Calendar Year 2014

| Well ID/Sample Port | Analyte | Result (ppbv) | MDL (ppbv) | RL (ppbv) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| **CWL-UI1-40** | Acetone | 970 | 57 | 1600 | J | 1600U |
| 16-Jan-14 | Chloroform | 750 | 31 | 98 | -- | -- |
| | 1,1-Dichloroethene | 180 | 42 | 260 | J | -- |
| | Ethylbenzene | 61 | 21 | 130 | J | 130U |
| | Methylene chloride | 47 | 24 | 130 | J | -- |
| | Tetrachloroethene | 2800 | 17 | 130 | -- | -- |
| | Toluene | 310 | 17 | 130 | -- | 310U |
| | Trichloroethene | 4800 | 34 | 130 | -- | -- |
| | Trichlorofluoromethane | 180 | 64 | 130 | -- | -- |
| | 1,1,1-Trichloroethane | 56 | 21 | 98 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 730 | 53 | 130 | -- | -- |
| | m,p-Xylene | 260 | 33 | 260 | -- | 260U |
| | o-Xylene | 110 | 18 | 130 | J | 130U |
| | Total Organics | 9543 | NA | NA | NA | NA |
| **CWL-UI1-80** | Acetone | 980 | 59 | 1700 | J | 1700U |
| 16-Jan-14 | Chloroform | 580 | 31 | 99 | -- | -- |
| | 1,2-Dichloroethane | 39 | 29 | 260 | J | -- |
| | 1,1-Dichloroethene | 320 | 43 | 260 | -- | -- |
| | Ethylbenzene | 54 | 21 | 130 | J | 130U |
| | Methylene chloride | 110 | 24 | 130 | J | -- |
| | Tetrachloroethene | 950 | 17 | 130 | -- | -- |
| | Toluene | 280 | 17 | 130 | -- | 280U |
| | Trichloroethene | 6300 | 35 | 130 | -- | -- |
| | Trichlorofluoromethane | 210 | 65 | 130 | -- | -- |
| | 1,1,1-Trichloroethane | 52 | 22 | 99 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 870 | 54 | 130 | -- | -- |
| | m,p-Xylene | 240 | 33 | 260 | J | 260U |
| | o-Xylene | 83 | 18 | 130 | J | 130U |
| | Total Organics | 9431 | NA | NA | NA | NA |

Refer to footnotes at end of table.

Table 5-1 *(Continued)*
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
Calendar Year 2014

| Well ID/Sample Port | Analyte | Result (ppbv) | MDL (ppbv) | RL (ppbv) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| **CWL-UI1-120** | Acetone | 900 | 59 | 1700 | J | 1700U |
| 16-Jan-14 | Chloroform | 450 | 32 | 100 | -- | -- |
| | 1,2-Dichloroethane | 69 | 29 | 270 | J | -- |
| | 1,1-Dichloroethene | 420 | 43 | 270 | -- | -- |
| | Ethylbenzene | 60 | 21 | 130 | J | 130U |
| | Methylene chloride | 240 | 24 | 130 | -- | -- |
| | Styrene | 27 | 20 | 130 | J | -- |
| | Tetrachloroethene | 670 | 17 | 130 | -- | -- |
| | Toluene | 320 | 17 | 130 | -- | 320U |
| | Trichloroethene | 7600 | 35 | 130 | -- | -- |
| | Trichlorofluoromethane | 240 | 65 | 130 | -- | -- |
| | 1,1,1-Trichloroethane | 55 | 22 | 100 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1000 | 54 | 130 | -- | -- |
| | m,p-Xylene | 260 | 33 | 270 | J | 270U |
| | o-Xylene | 84 | 18 | 130 | J | 130U |
| | Total Organics | 10771 | NA | NA | NA | NA |
| **CWL-UI1-120** (Duplicate) | Acetone | 7.3 | 4.6 | 130 | J | 130U |
| 16-Jan-14 | Benzene | 6.0 | 2.0 | 10 | J | -- |
| | Carbon tetrachloride | 25 | 1.6 | 20 | -- | -- |
| | Chloroform | 490 | 2.4 | 7.7 | -- | -- |
| | 1,2-Dibromoethane | 7.9 | 1.9 | 20 | J | -- |
| | 1,2-Dichlorobenzene | 12 | 3.3 | 10 | -- | -- |
| | Dichlorodifluoromethane | 46 | 3.7 | 10 | -- | -- |
| | 1,1-Dichloroethane | 18 | 1.8 | 7.7 | -- | -- |
| | 1,2-Dichloroethane | 38 | 2.3 | 20 | -- | -- |
| | 1,1-Dichloroethene | 490 | 3.3 | 20 | -- | -- |
| | 1,2-Dichloroprppane | 84 | 6.1 | 10 | -- | -- |
| | Methylene chloride | 230 | 1.8 | 10 | -- | -- |
| | Tetrachloroethene | 790 | 1.3 | 10 | -- | -- |
| | Toluene | 8.0 | 1.3 | 10 | J | 10U |
| | Trichloroethene | 7600 | 34 | 130 | -- | -- |
| | Trichlorofluoromethane | 300 | 5.0 | 10 | -- | -- |
| | 1,1,1-Trichloroethane | 57 | 1.7 | 7.7 | -- | -- |
| | 1,1,2-Trichloroethane | 7.0 | 1.7 | 10 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1000 | 4.2 | 10 | -- | -- |
| | o-Xylene | 4.2 | 1.4 | 10 | J | 130U |
| | Total Organics | 11200.9 | NA | NA | NA | NA |

Refer to footnotes at end of table.

Table 5-1 *(Continued)*
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
Calendar Year 2014

| Well ID/Sample Port | Analyte | Result (ppbv) | MDL (ppbv) | RL (ppbv) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| **CWL-UI2-36** | Acetone | 280 | 15 | 430 | J | 430U |
| 16-Jan-14 | Chloroform | 510 | 31 | 98 | -- | -- |
| | Ethylbenzene | 55 | 20 | 130 | J | -- |
| | Methylene chloride | 50 | 23 | 130 | J | -- |
| | Tetrachloroethene | 130 | 17 | 130 | -- | -- |
| | Toluene | 280 | 17 | 130 | -- | -- |
| | Trichloroethene | 2800 | 34 | 130 | -- | -- |
| | Trichlorofluoromethane | 130 | 64 | 130 | -- | -- |
| | 1,1,1-Trichloroethane | 33 | 21 | 98 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 480 | 53 | 130 | -- | -- |
| | m,p-Xylene | 250 | 33 | 260 | J | -- |
| | o-Xylene | 87 | 18 | 130 | J | -- |
| | Total Organics | 4805 | NA | NA | NA | NA |
| **CWL-UI2-76** | Acetone | 300 | 17 | 490 | J | 490U |
| 16-Jan-14 | Chloroform | 520 | 29 | 92 | -- | -- |
| | 1,2-Dichloroethane | 33 | 27 | 240 | J | -- |
| | 1,1-Dichloroethene | 91 | 39 | 240 | J | -- |
| | Ethylbenzene | 57 | 19 | 120 | J | -- |
| | Methylene chloride | 42 | 22 | 120 | J | -- |
| | Styrene | 23 | 18 | 120 | J | -- |
| | Tetrachloroethene | 140 | 16 | 120 | -- | -- |
| | Toluene | 310 | 16 | 120 | -- | -- |
| | Trichloroethene | 3700 | 32 | 120 | -- | -- |
| | Trichlorofluoromethane | 150 | 60 | 120 | -- | -- |
| | 1,1,1-Trichloroethane | 28 | 20 | 92 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 610 | 50 | 120 | -- | -- |
| | m,p-Xylene | 250 | 31 | 240 | -- | -- |
| | o-Xylene | 82 | 17 | 120 | J | -- |
| | Total Organics | 6036 | NA | NA | NA | NA |

Refer to footnotes at end of table.

Table 5-1 *(Continued)*
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
Calendar Year 2014

| Well ID/Sample Port | Analyte | Result (ppbv) | MDL (ppbv) | RL (ppbv) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| **CWL-UI2-136** | Acetone | 960 | 58 | 1600 | J | 1600U |
| 16-Jan-14 | Carbon tetrachloride | 25 | 21 | 260 | J | -- |
| | Chloroform | 570 | 31 | 98 | -- | -- |
| | 1,2-Dichloroethane | 44 | 29 | 260 | J | -- |
| | 1,1-Dichloroethene | 190 | 42 | 260 | J | -- |
| | 1,2-Dichloropropane | 140 | 78 | 130 | -- | -- |
| | Ethylbenzene | 59 | 20 | 130 | J | -- |
| | Methylene chloride | 55 | 23 | 130 | J | -- |
| | Tetrachloroethene | 190 | 17 | 130 | -- | -- |
| | Toluene | 310 | 17 | 130 | -- | -- |
| | Trichloroethene | 6200 | 34 | 130 | -- | -- |
| | Trichlorofluoromethane | 220 | 64 | 130 | -- | -- |
| | 1,1,1-Trichloroethane | 35 | 21 | 98 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 930 | 53 | 130 | -- | -- |
| | m,p-Xylene | 260 | 33 | 260 | -- | -- |
| | o-Xylene | 86 | 18 | 130 | J | -- |
| | Total Organics | 9314 | NA | NA | NA | NA |
| **CWL-UI2-136** (Duplicate) | Acetone | 870 | 57 | 1600 | J | 1600U |
| 16-Jan-14 | Carbon tetrachloride | 22 | 21 | 260 | J | -- |
| | Chloroform | 540 | 31 | 97 | -- | -- |
| | 1,2-Dichloroethane | 49 | 28 | 260 | J | -- |
| | 1,1-Dichloroethene | 190 | 42 | 260 | J | -- |
| | 1,2-Dichloropropane | 140 | 77 | 130 | -- | -- |
| | Ethylbenzene | 69 | 20 | 130 | J | -- |
| | Methylene chloride | 53 | 23 | 130 | J | -- |
| | Styrene | 26 | 19 | 130 | J | -- |
| | Tetrachloroethene | 170 | 16 | 130 | -- | -- |
| | Toluene | 350 | 16 | 130 | -- | -- |
| | Trichloroethene | 5900 | 34 | 130 | -- | -- |
| | Trichlorofluoromethane | 220 | 63 | 130 | -- | -- |
| | 1,1,1-Trichloroethane | 33 | 21 | 97 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 900 | 52 | 130 | -- | -- |
| | m,p-Xylene | 290 | 32 | 260 | -- | -- |
| | o-Xylene | 98 | 17 | 130 | J | -- |
| | Total Organics | 9050 | NA | NA | NA | NA |

Refer to footnotes at end of table.

Table 5-1 *(Continued)*
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
Calendar Year 2014

| Well ID/Sample Port | Analyte | Result (ppbv) | MDL (ppbv) | RL (ppbv) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| **CWL-D1-100** | Acetone | 870 | 56 | 1600 | J | 1600U |
| 16-Jan-14 | Chloroform | 540 | 30 | 94 | -- | -- |
| | 1,2-Dichloroethane | 61 | 28 | 250 | J | -- |
| | 1,1-Dichloroethene | 440 | 41 | 250 | -- | -- |
| | 1,2-Dichloropropane | 95 | 75 | 130 | J | -- |
| | Ethylbenzene | 64 | 20 | 130 | J | -- |
| | Methylene chloride | 48 | 23 | 130 | J | -- |
| | Tetrachloroethene | 740 | 16 | 130 | -- | -- |
| | Toluene | 340 | 16 | 130 | -- | -- |
| | Trichloroethene | 9900 | 33 | 130 | -- | -- |
| | Trichlorofluoromethane | 300 | 62 | 130 | -- | -- |
| | 1,1,1-Trichloroethane | 58 | 20 | 94 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1300 | 51 | 130 | -- | -- |
| | m,p-Xylene | 280 | 31 | 250 | -- | -- |
| | o-Xylene | 82 | 17 | 130 | J | -- |
| | Total Organics | 14248 | NA | NA | NA | NA |
| **CWL-D1-160** | Acetone | 750 | 84 | 2400 | J | 2400U |
| 16-Jan-14 | Chloroform | 490 | 45 | 140 | -- | -- |
| | 1,2-Dichloroethane | 73 | 41 | 380 | J | -- |
| | 1,1-Dichloroethene | 770 | 61 | 380 | -- | -- |
| | 1,2-Dichloropropane | 160 | 110 | 190 | J | -- |
| | Ethylbenzene | 67 | 30 | 190 | J | -- |
| | Methylene chloride | 67 | 34 | 190 | J | -- |
| | Tetrachloroethene | 560 | 24 | 190 | -- | -- |
| | Toluene | 330 | 24 | 190 | -- | -- |
| | Trichloroethene | 16000 | 49 | 190 | -- | -- |
| | Trichlorofluoromethane | 470 | 92 | 190 | -- | -- |
| | 1,1,1-Trichloroethane | 71 | 31 | 140 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 2000 | 77 | 190 | -- | -- |
| | m,p-Xylene | 300 | 47 | 380 | J | -- |
| | o-Xylene | 92 | 25 | 190 | J | -- |
| | Total Organics | 21450 | NA | NA | NA | NA |

Refer to footnotes at end of table.

Table 5-1 *(Continued)*
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
Calendar Year 2014

| Well ID/Sample Port | Analyte | Result (ppbv) | MDL (ppbv) | RL (ppbv) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| **CWL-D1-240** | Acetone | 870 | 79 | 2200 | J | 2200U |
| 16-Jan-14 | Carbon tetrachloride | 65 | 28 | 350 | J | -- |
| | Chloroform | 450 | 42 | 130 | -- | -- |
| | Dichlorodifluoromethane | 72 | 64 | 180 | J | -- |
| | 1,1-Dichloroethane | 33 | 32 | 130 | J | -- |
| | 1,2-Dichloroethane | 72 | 39 | 350 | J | -- |
| | 1,1-Dichloroethene | 970 | 57 | 350 | -- | -- |
| | 1,2-Dichloropropane | 180 | 110 | 180 | -- | -- |
| | Ethylbenzene | 72 | 28 | 180 | J | -- |
| | Methylene chloride | 56 | 32 | 180 | J | -- |
| | Tetrachloroethene | 470 | 23 | 180 | -- | -- |
| | Toluene | 380 | 23 | 180 | -- | -- |
| | Trichloroethene | 19000 | 47 | 180 | -- | -- |
| | Trichlorofluoromethane | 530 | 87 | 180 | -- | -- |
| | 1,1,1-Trichloroethane | 66 | 29 | 130 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 2500 | 72 | 180 | -- | -- |
| | m,p-Xylene | 310 | 44 | 350 | J | -- |
| | o-Xylene | 90 | 24 | 180 | J | -- |
| | Total Organics | 25316 | NA | NA | NA | NA |
| **CWL-D1-350** | Acetone | 1200 | 39 | 1100 | -- | 1200U |
| 16-Jan-14 | 1,1-Dichloroethene | 510 | 57 | 350 | -- | -- |
| | Ethylbenzene | 61 | 28 | 180 | J | -- |
| | Methylene chloride | 61 | 32 | 180 | J | -- |
| | Tetrachloroethene | 220 | 23 | 180 | -- | -- |
| | Toluene | 310 | 23 | 180 | -- | -- |
| | Trichloroethene | 8500 | 46 | 180 | -- | -- |
| | Trichlorofluoromethane | 300 | 87 | 180 | -- | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1300 | 72 | 180 | -- | -- |
| | m,p-Xylene | 270 | 44 | 350 | J | -- |
| | o-Xylene | 81 | 24 | 180 | J | -- |
| | Total Organics | 11613 | NA | NA | NA | NA |

Refer to footnotes at end of table.

Table 5-1 *(Continued)*
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
Calendar Year 2014

| Well ID/Sample Port | Analyte | Result (ppbv) | MDL (ppbv) | RL (ppbv) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| **CWL-D1-470** | Acetone | 5.4 | 0.79 | 22 | J | 22U |
| 16-Jan-14 | Carbon tetrachloride | 1.5 | 0.86 | 11 | J | -- |
| | Chloroform | 1.5 | 1.3 | 4.0 | J | -- |
| | Dichlorodifluoromethane | 8.7 | 1.9 | 5.4 | -- | -- |
| | 1,1-Dichloroethene | 22 | 1.7 | 11 | -- | -- |
| | Methylene chloride | 4.4 | 0.96 | 5.4 | J | -- |
| | Tetrachloroethene | 5.0 | 0.68 | 5.4 | J | -- |
| | Trichloroethene | 160 | 1.4 | 5.4 | -- | -- |
| | Trichlorofluoromethane | 39 | 2.6 | 5.4 | -- | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 150 | 2.2 | 5.4 | -- | -- |
| | Total Organics | 392.1 | NA | NA | NA | NA |
| **CWL-D2-120** | Acetone | 400 | 58 | 1600 | J | -- |
| 16-Jan-14 | 2-Butanone | 65 | 64 | 260 | J | -- |
| | Chloroform | 650 | 31 | 97 | -- | -- |
| | Dichlorodifluoromethane | 49 | 47 | 130 | J | -- |
| | 1,2-Dichloroethane | 95 | 29 | 260 | J | -- |
| | 1,1-Dichloroethene | 560 | 42 | 260 | -- | -- |
| | 1,2-Dichloropropane | 210 | 78 | 130 | -- | -- |
| | Ethylbenzene | 74 | 20 | 130 | J | -- |
| | Methylene chloride | 57 | 23 | 130 | J | -- |
| | Tetrachloroethene | 530 | 17 | 130 | -- | -- |
| | Toluene | 350 | 17 | 130 | -- | -- |
| | Trichloroethene | 13000 | 34 | 130 | -- | -- |
| | Trichlorofluoromethane | 380 | 64 | 130 | -- | -- |
| | 1,1,1-Trichloroethane | 65 | 21 | 97 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1600 | 53 | 130 | -- | -- |
| | m,p-Xylene | 310 | 32 | 260 | -- | -- |
| | o-Xylene | 96 | 17 | 130 | J | -- |
| | Total Organics | 18491 | NA | NA | NA | NA |

Refer to footnotes at end of table.

Table 5-1 *(Continued)*
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
Calendar Year 2014

| Well ID/Sample Port | Analyte | Result (ppbv) | MDL (ppbv) | RL (ppbv) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| **CWL-D2-240** | Acetone | 370 | 49 | 1400 | J | -- |
| 16-Jan-14 | Carbon tetrachloride | 53 | 21 | 260 | J | -- |
| | Chloroform | 630 | 31 | 98 | -- | -- |
| | Dichlorodifluoromethane | 64 | 48 | 130 | J | -- |
| | 1,1-Dichloroethane | 32 | 24 | 98 | J | -- |
| | 1,2-Dichloroethane | 80 | 29 | 260 | J | -- |
| | 1,1-Dichloroethene | 760 | 42 | 260 | -- | -- |
| | 1,2-Dichloropropane | 290 | 79 | 130 | -- | -- |
| | Ethylbenzene | 61 | 21 | 130 | J | -- |
| | Methylene chloride | 78 | 24 | 130 | J | -- |
| | Tetrachloroethene | 510 | 17 | 130 | -- | -- |
| | Toluene | 290 | 17 | 130 | -- | -- |
| | Trichloroethene | 16000 | 34 | 130 | -- | -- |
| | Trichlorofluoromethane | 470 | 64 | 130 | -- | -- |
| | 1,1,1-Trichloroethane | 63 | 21 | 98 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 2000 | 53 | 130 | -- | -- |
| | m,p-Xylene | 270 | 33 | 260 | -- | -- |
| | o-Xylene | 93 | 18 | 130 | J | -- |
| | Total Organics | 22114 | NA | NA | NA | NA |

Refer to footnotes at end of table.

Table 5-1 *(Continued)*
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
Calendar Year 2014

| Well ID/Sample Port | Analyte | Result (ppbv) | MDL (ppbv) | RL (ppbv) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| **CWL-D2-350** | Acetone | 1300 | 57 | 1600 | J | -- |
| 16-Jan-14 | 2-Butanone | 100 | 64 | 260 | J | -- |
| | Chloroform | 360 | 30 | 96 | -- | -- |
| | Dichlorodifluoromethane | 50 | 46 | 130 | J | -- |
| | 1,2-Dichloroethane | 75 | 28 | 260 | J | -- |
| | 1,1-Dichloroethene | 540 | 41 | 260 | -- | -- |
| | 1,2-Dichloropropane | 130 | 77 | 130 | -- | -- |
| | Ethylbenzene | 100 | 20 | 130 | J | -- |
| | 4-Methyl-2-pentanone | 49 | 43 | 130 | J | -- |
| | Methylene chloride | 90 | 23 | 130 | J | -- |
| | Styrene | 46 | 19 | 130 | J | -- |
| | Tetrachloroethene | 340 | 16 | 130 | -- | -- |
| | Toluene | 490 | 16 | 130 | -- | -- |
| | Trichloroethene | 9900 | 34 | 130 | -- | -- |
| | Trichlorofluoromethane | 350 | 63 | 130 | -- | -- |
| | 1,1,1-Trichloroethane | 43 | 21 | 96 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1500 | 52 | 130 | -- | -- |
| | m,p-Xylene | 440 | 32 | 260 | -- | -- |
| | o-Xylene | 140 | 17 | 130 | -- | -- |
| | Total Organics | 16043 | NA | NA | NA | NA |
| **CWL-D2-440** | Acetone | 36 | 1.1 | 31 | -- | -- |
| 16-Jan-14 | 2-Butanone | 5.0 | 1.2 | 5.0 | -- | -- |
| | Carbon tetrachloride | 0.44 | 0.40 | 5.0 | J | -- |
| | Chloroform | 4.5 | 0.59 | 1.9 | -- | -- |
| | Dichlorodifluoromethane | 0.98 | 0.91 | 2.5 | J | -- |
| | 1,1-Dichloroethene | 7.5 | 0.81 | 5.0 | -- | -- |
| | Tetrachloroethene | 4.7 | 0.32 | 2.5 | -- | -- |
| | Trichloroethene | 140 | 0.66 | 2.5 | -- | -- |
| | Trichlorofluoromethane | 4.5 | 1.2 | 2.5 | -- | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 13 | 1.0 | 2.5 | -- | -- |
| | Total Organics | 216.6 | NA | NA | NA | NA |

Refer to footnotes at end of table.

Table 5-1 *(Continued)*
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
Calendar Year 2014

| Well ID/Sample Port | Analyte | Result (ppbv) | MDL (ppbv) | RL (ppbv) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| **CWL-D2-470** | Acetone | 1600 | 23 | 650 | -- | -- |
| 16-Jan-14 | Benzene | 19 | 10 | 52 | J | -- |
| | Benzyl chloride | 22 | 21 | 100 | J | -- |
| | 2-Butanone | 140 | 26 | 100 | -- | -- |
| | Chloroform | 330 | 12 | 39 | -- | -- |
| | 1,2-Dichlorobenzene | 24 | 17 | 52 | J | -- |
| | 1,3-Dichlorobenzene | 21 | 14 | 52 | J | -- |
| | 1,4-Dichlorobenzene | 23 | 19 | 52 | J | -- |
| | Dichlorodifluoromethane | 23 | 19 | 52 | J | -- |
| | 1,1-Dichloroethane | 12 | 9.4 | 39 | J | -- |
| | 1,2-Dichloroethane | 82 | 11 | 100 | J | -- |
| | 1,1-Dichloroethene | 200 | 17 | 100 | -- | -- |
| | 1,2-Dichloropropane | 80 | 31 | 52 | -- | -- |
| | Ethylbenzene | 120 | 8.2 | 52 | -- | -- |
| | 4-Ethyltoluene | 32 | 24 | 52 | J | -- |
| | 2-Hexanone | 38 | 11 | 52 | J | -- |
| | 4-Methyl-2-pentanone | 41 | 18 | 52 | J | -- |
| | Methylene chloride | 48 | 9.4 | 52 | J | -- |
| | Styrene | 55 | 7.7 | 52 | -- | -- |
| | Tetrachloroethene | 260 | 6.6 | 52 | -- | -- |
| | Toluene | 620 | 6.6 | 52 | -- | -- |
| | Trichloroethene | 4700 | 14 | 52 | -- | -- |
| | Trichlorofluoromethane | 160 | 25 | 52 | -- | -- |
| | 1,2,4-Trichlorobenzene | 89 | 56 | 260 | J | -- |
| | 1,1,1-Trichloroethane | 40 | 8.5 | 39 | -- | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 600 | 21 | 52 | -- | -- |
| | 1,2,4-Trimethylbenzene | 44 | 21 | 100 | J | -- |
| | 1,3,5-Trimethylbenzene | 23 | 16 | 52 | J | -- |
| | m,p-Xylene | 530 | 13 | 100 | -- | -- |
| | o-Xylene | 160 | 7.0 | 52 | -- | -- |
| | Total Organics | 10136 | NA | NA | NA | NA |

Refer to footnotes at end of table.

Table 5-1 *(Continued)*
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
Calendar Year 2014

| Well ID/Sample Port | Analyte | Result (ppbv) | MDL (ppbv) | RL (ppbv) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| **CWL-D3-120** | Acetone | 1400 | 29 | 820 | -- | 1400U |
| 16-Jan-14 | Benzene | 15 | 13 | 66 | J | -- |
| | 2-Butanone | 110 | 33 | 130 | J | -- |
| | Chloroform | 160 | 16 | 49 | -- | -- |
| | 1,2-Dichloroethane | 70 | 14 | 130 | J | -- |
| | 1,1-Dichloroethene | 200 | 21 | 130 | -- | -- |
| | 1,2-Dichloropropane | 90 | 39 | 66 | -- | -- |
| | Ethylbenzene | 90 | 10 | 66 | -- | -- |
| | Methylene chloride | 54 | 12 | 66 | J | -- |
| | Styrene | 45 | 9.7 | 66 | J | -- |
| | Tetrachloroethene | 99 | 8.4 | 66 | -- | -- |
| | Toluene | 460 | 8.4 | 66 | -- | -- |
| | Trichloroethene | 4100 | 17 | 66 | -- | -- |
| | Trichlorofluoromethane | 160 | 32 | 66 | -- | -- |
| | 1,1,1-Trichloroethane | 16 | 11 | 49 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 630 | 27 | 66 | -- | -- |
| | 1,2,4-Trimethylbenzene | 30 | 27 | 130 | J | -- |
| | m,p-Xylene | 440 | 16 | 130 | -- | -- |
| | o-Xylene | 150 | 8.9 | 66 | -- | -- |
| | Total Organics | 6919 | NA | NA | NA | NA |

Refer to footnotes at end of table.

Table 5-1 *(Continued)*
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
Calendar Year 2014

| Well ID/Sample Port | Analyte | Result (ppbv) | MDL (ppbv) | RL (ppbv) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| **CWL-D3-170** | Acetone | 1400 | 29 | 810 | -- | 1400U |
| 16-Jan-14 | Benzene | 19 | 13 | 64 | J | -- |
| | 2-Butanone | 120 | 32 | 130 | J | -- |
| | Chloroform | 160 | 15 | 48 | -- | -- |
| | Dichlorodifluoromethane | 28 | 23 | 64 | J | 64U |
| | 1,2-Dichloroethane | 94 | 14 | 130 | J | -- |
| | 1,1-Dichloroethene | 260 | 21 | 130 | -- | -- |
| | 1,2-Dichloropropane | 120 | 39 | 64 | -- | -- |
| | Ethylbenzene | 120 | 10 | 64 | -- | -- |
| | 4-Methyl-2-pentanone | 35 | 22 | 64 | J | -- |
| | Methylene chloride | 51 | 12 | 64 | J | -- |
| | Tetrachloroethene | 110 | 8.2 | 64 | -- | -- |
| | Toluene | 640 | 8.2 | 64 | -- | -- |
| | Trichloroethene | 5400 | 17 | 64 | -- | -- |
| | Trichlorofluoromethane | 200 | 32 | 64 | -- | -- |
| | 1,1,1-Trichloroethane | 17 | 10 | 48 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 800 | 26 | 64 | -- | -- |
| | m,p-Xylene | 530 | 16 | 130 | -- | -- |
| | o-Xylene | 150 | 8.7 | 64 | -- | -- |
| | Total Organics | 8826 | NA | NA | NA | NA |
| **CWL-D3-350** | Acetone | 1100 | 58 | 1600 | J | 1600U |
| 16-Jan-14 | 2-Butanone | 85 | 64 | 260 | J | -- |
| | Chloroform | 140 | 31 | 97 | -- | -- |
| | 1,2-Dichloroethane | 52 | 29 | 260 | J | -- |
| | 1,1-Dichloroethene | 270 | 42 | 260 | -- | -- |
| | 1,2-Dichloropropane | 99 | 78 | 130 | J | -- |
| | Ethylbenzene | 89 | 20 | 130 | J | -- |
| | Methylene chloride | 340 | 23 | 130 | -- | -- |
| | Styrene | 61 | 19 | 130 | J | -- |
| | Tetrachloroethene | 97 | 17 | 130 | J | -- |
| | Toluene | 1100 | 17 | 130 | -- | -- |
| | Trichloroethene | 5300 | 34 | 130 | -- | -- |
| | Trichlorofluoromethane | 210 | 64 | 130 | -- | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 840 | 53 | 130 | -- | -- |
| | m,p-Xylene | 340 | 32 | 260 | -- | -- |
| | o-Xylene | 98 | 17 | 130 | J | -- |
| | Total Organics | 9121 | NA | NA | NA | NA |

Refer to footnotes at end of table.

Table 5-1 *(Continued)*
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
Calendar Year 2014

| Well ID/Sample Port | Analyte | Result (ppbv) | MDL (ppbv) | RL (ppbv) | Laboratory Qualifier[b] | Validation Qualifier[b] |
|---|---|---|---|---|---|---|
| **CWL-D3-440** | Acetone | 1400 | 58 | 1600 | J | 1600U |
| 16-Jan-14 | 2-Butanone | 100 | 65 | 260 | J | -- |
| | Carbon tetrachloride | 30 | 21 | 260 | J | -- |
| | Chloroform | 230 | 31 | 98 | -- | -- |
| | 1,2-Dichloroethane | 97 | 29 | 260 | J | -- |
| | 1,1-Dichloroethene | 400 | 42 | 260 | -- | -- |
| | 1,2-Dichloropropane | 190 | 79 | 130 | -- | -- |
| | Ethylbenzene | 97 | 21 | 130 | J | -- |
| | Methylene chloride | 330 | 24 | 330 | -- | -- |
| | Tetrachloroethene | 150 | 17 | 130 | -- | -- |
| | Toluene | 570 | 17 | 130 | -- | -- |
| | Trichloroethene | 8200 | 34 | 130 | -- | -- |
| | Trichlorofluoromethane | 310 | 64 | 130 | -- | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 1300 | 53 | 130 | -- | -- |
| | m,p-Xylene | 460 | 33 | 260 | -- | -- |
| | o-Xylene | 140 | 18 | 130 | -- | -- |
| | Total Organics | 12604 | NA | NA | NA | NA |
| **CWL-D3-480** | Acetone | 7.4 | 0.18 | 5.0 | -- | 7.4U |
| 16-Jan-14 | Benzene | 0.15 | 0.079 | 0.40 | J | -- |
| | 2-Butanone | 1.6 | 0.20 | 0.80 | -- | -- |
| | Carbon tetrachloride | 0.18 | 0.064 | 0.80 | J | -- |
| | Chloroform | 1.4 | 0.095 | 0.30 | -- | -- |
| | Dichlorodifluoromethane | 0.57 | 0.15 | 0.40 | -- | 0.57U |
| | 1,2-Dichloroethane | 0.13 | 0.088 | 0.80 | J | -- |
| | 1,1-Dichloroethene | 1.5 | 0.13 | 0.80 | -- | -- |
| | 1,2-Dichloropropane | 0.68 | 0.24 | 0.40 | -- | -- |
| | 2-Hexanone | 0.20 | 0.087 | 0.40 | J | -- |
| | Methylene chloride | 1.3 | 0.072 | 0.40 | -- | -- |
| | Tetrachloroethene | 0.90 | 0.051 | 0.40 | -- | -- |
| | Toluene | 0.18 | 0.051 | 0.40 | J | -- |
| | Trichloroethene | 35 | 0.11 | 0.40 | -- | -- |
| | Trichlorofluoromethane | 1.3 | 0.20 | 0.40 | -- | -- |
| | 1,1,1-Trichloroethane | 0.12 | 0.065 | 0.30 | J | -- |
| | 1,1,2-Trichloro-1,2,2-trifluoroethane | 4.2 | 0.16 | 0.40 | -- | -- |
| | Total Organics | 48.84 | NA | NA | NA | NA |

Refer to footnotes at end of table.

Table 5-1 *(Concluded)*
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
Calendar Year 2014

Notes:
[a]Analytical Method EPA 1999, "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Compendium Method TO-15" Center for Environmental Research Information, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio.
[b]Laboratory/Validation Qualifier - Blank (--) cell = all quality control samples met acceptance criteria. "J" and "U," see below.
[c]Total Organics -- sum of validated detected organic compounds.
[d]Detected value >500 ppbv threshold concentration that applies only to deepest well ports at CWL-D1, CWL-D2, and CWL-D3. Statistical evaluation presented in Section 5.3.
EPA = U.S. Environmental Protection Agency.
J = Estimated value. Analyte detected at a level below the practical quantitation limit or reporting limit (RL) and greater than or equal to the MDL.
MDL = Method detection limit. The minimum concentration that can be measured and reported with 99% confidence that the analyte is present (i.e., greater than zero).
NA = Not applicable.
ppbv = parts per billion by volume basis.
RL = Reporting limit. Minimum concentration that can be reported with a statistically established degree of confidence.
U = Analyte not present or concentration is below the method detection limit.

Other commonly detected VOCs included 1,2-dichloropropane (15 detections), ethyl benzene (16 detections), 1,2-dichloroethane (18 detections), 1,1,1-trichloroethane (18 detections), toluene (17 detections), m, p-xylene (16 detections), and o-xylene (16 detections). Acetone was detected 23 times, but 18 of these detections were qualified as non-detections based on data validation review (i.e., field blank contamination, see section 5.2.2).

Similar to the 2013 results, TCE was the most frequently detected VOC and had the highest VOC concentrations. TCE was detected in all January samples at concentrations ranging from 0.035 parts per million by volume (ppmv) at CWL-D3 (480 foot bgs sample port) to 19 ppmv at CWL-D1 (240 foot bgs sample port). In addition, 1,1,2-trichloro-1,2,2-trifluoroethane; trichlorofluoromethane; and PCE were detected in all samples at lower concentrations. Chloroform and 1,1-dichloroethene were detected in all samples except for CWL-D1-350 and CWL-UI1-36, respectively.

The maximum soil-gas concentration from the three deepest sampling ports (CWL-D1-470, CWL-D2-470, CWL-D3-480) was TCE at a concentration of 4.7 ppmv (CWL-D2-470). Only five VOCs exceeded 0.5 ppmv at the three deepest sampling ports and all of these detections were from CWL-D2-470. The five VOCs included acetone (1.6 ppmv), toluene (0.62 ppmv), trichloroethene (4.7 ppmv), 1,1,2-trichloro-1,2,2-trifluoroethane (0.6 ppmv), and m,p-xylene (0.53 ppmv).

### 5.2.2 Field Quality Control Sample Results

Table 5-2 presents field duplicate results for samples collected from wells CWL-UI1-120 and CWL-UI2-136 in January. RPD calculations were performed for all detected compounds with concentrations exceeding five times the analytical laboratory reporting limit in both the environmental and duplicate sample. If a detected compound in one sample was not detected in the corresponding duplicate or environmental sample, no RPD was calculated. The duplicate sample results show good agreement in both sample sets, with all RPDs less than 50%.

In the five field blank samples, acetone was detected four times and the following VOCs were detected one time each: 2-butanone, dichlorodifluoromethane, ethylbenzene, toluene, TCE, m,p-Xylene, and o-Xylene. All detections in the field blank samples were very low concentrations; reported values were less than 1 ppbv except for three acetone detections (1.9, 1.1, and 1.1 ppbv). If a corresponding VOC was detected in associated environmental sample at concentrations less than five times the blank concentration (less than ten times for common laboratory contaminants), then detected values were qualified as not detected during data validation. A total of 34 results were qualified as non-detects during data validation due to field blank sample results; (18) acetone results, (2) dichlorodifluoromethane results, (3) ethyl benzene results, (4) toluene results, (3) m, p-xylene results, and (4) o-xylene results (Table 5-1). Both acetone and toluene are considered common laboratory contaminants. No TCE sample results were qualified because all TCE detections were greater than five times the related field blank concentration.

Table 5-2
Summary of January 2014 Duplicate Samples
Chemical Waste Landfill Soil-Gas Monitoring
Calendar Year 2014

| Well ID/Parameter | Environmental Sample (R1) (ppbv) | Duplicate Sample (R2) (ppbv) | RPD[a] (%) |
|---|---|---|---|
| CWL-UI1-120 | | | |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 1000 | 1000 | < 1 |
| Trichloroethene | 7600 | 7600 | < 1 |
| Tetrachloroethene | 670 | 790 | 16 |
| CWL-UI2-136 | | | |
| Chloroform | 570 | 540 | 5 |
| Trichloroethene | 6200 | 5900 | 5 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 930 | 900 | 3 |

Notes:
[a]RPD = Relative percent difference is calculated with the following equation and rounded to nearest whole number. Bolded values exceed acceptance criterion of less than 50%.

$$RPD = \frac{|R_1 - R_2|}{[(R_1 + R_2)/2]} \times 100$$

where: $R_1$ = Environmental sample result.
$R_2$ = Duplicate sample result.

ppbv = Parts per billion by volume basis.

### 5.2.3 Data Quality

Field QC sample results met the sampling DQOs and validated the adequacy of the field sampling procedures and protocol. RPD results for the two environmental-duplicate sample pairs met the RPD criterion of less than 50%. Internal laboratory QC samples, including laboratory control samples, replicates, matrix spikes, matrix spike duplicates, and surrogate spike samples, were analyzed concurrently with CWL soil-gas samples. The data were reviewed and qualified in accordance with AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data" (SNL/NM June 2014a).

No significant data quality issues were noted for January 2014 data sets. All data were determined to be acceptable and reported quality control measures were in compliance with analytical method and laboratory procedure requirements (i.e., technically defensible). Data Validation Reports and Contract Verification Review forms are provided in Annex B of this report and are filed in the SNL/NM Records Center.

### 5.2.4 Variances and Non-Conformances

There were no variances or non-conformances associated with the CY 2014 soil-gas activities.

## 5.3 Data Evaluation

Soil-gas monitoring is required to determine whether the groundwater beneath the CWL is adequately protected as part of the CWL groundwater monitoring program. In accordance with PCCP Attachment 1, Section 1.8.2.2, statistical evaluation of soil-gas results for specific VOCs that exceed 0.50 ppmv from the three deepest sampling ports of wells CWL-D1 through CWL-D3 (i.e., CWL-D1-470, CWL-D2-470, and CWL-D3-480) are required annually, and include the following:

- calculate the UCL and LCL of the mean at a 95% confidence level using current data and historic data since completion of the VE VCM, and
- compare the LCL to the trigger level of 20 ppmv.

The trigger level of 20 ppmv only applies to the 95% LCL of the mean and not to individual sample results. For the first 5 years after the effective date of the PCCP (June 2, 2011), historical soil-gas monitoring results are to be used to augment the statistical analysis. After June 2, 2016, only soil-gas data collected under the PCCP is to be used. Historical soil-gas data used and presented in Section 5.4 includes results from June 1998, June 1999, August 2001, June 2004, September 2004, and October 2005. Although the VE VCM was not completed until July 1998, the June 1998 data set is included as it is representative of the conditions when the VE system was shut down a month later.

### 5.3.1 Statistical Assessment Requirements

Based upon the soil-gas monitoring results presented in Table 5-1 and discussed in Section 5.2.1, acetone (1.6 ppmv), toluene (0.62 ppmv), 1,1,2-trichloro-1,2,2-trifluoroethane (0.60 ppmv), TCE (4.70 ppmv), and m,p-xylene (0.53 ppmv) in the CWL-D2-470 sample exceeded the 0.5 ppmv threshold. As a result, confidence intervals (UCLs and LCLs) are calculated and used to compare to the trigger level of 20 ppmv. If a result is below the analytical laboratory detection limit, the MDL for the constituent is used for statistical analysis. For duplicate analyses, only the highest detection is used for statistical analysis.

### 5.3.2 Statistical Assessment Results

CY 2014 soil-gas statistical assessment results are presented in Table 5-3. The LCLs for acetone, toluene, and m,p-xylene could not be calculated due to the combination of the low total number of sample results and the high standard deviation (i.e., high variability) of the data set. There are only ten results for these VOCs and the variability in the reported soil-gas concentrations appears to be representative of the residual soil-gas plume that is changing over time.

The calculated LCLs for 1,1,2-trichloro-1,2,2-trifluoroethane and TCE are below the trigger level of 20 ppmv. For the four VOCs where an LCL could not be calculated, the corresponding LCLs would be below the 20 ppmv trigger level if they could be calculated, as their corresponding UCLs are an order of magnitude or more below the trigger level.

Table 5-3
Chemical Waste Landfill Soil-Gas Monitoring
Statistical Assessment Results Summary
Calendar Year 2014

| Soil-Gas Constituent Exceeding Threshold Concentration[a] | Minimum[b] (ppmv) | Maximum[b] (ppmv) | Mean[c] (ppmv) | Standard Deviation[c] | LCL[c] (ppmv) | UCL[c] (ppmv) | Distribution Type[c] | Trigger Level[a] (ppmv) | Trigger Level Exceeded[d]? |
|---|---|---|---|---|---|---|---|---|---|
| Acetone (1.6 ppmv) | 0.001 | 5 | 0.8173 | 1.584 | NA | 1.736 | Normal | 20 | No |
| Toluene (0.062 ppmv) | 0.001 | 0.62 | 0.1141 | 0.2193 | NA | 0.2412 | Normal | 20 | No |
| Trichloroethene (4.7 ppmv) | 0.001 | 7.1 | 4.164 | 2.326 | 2.816 | 5.512 | Normal | 20 | No |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane (0.6 ppmv) | 0.001 | 1.2 | 0.6671 | 0.3675 | 0.4541 | 0.8801 | Normal | 20 | No |
| m,p-Xylene (0.53 ppmv) | 0.001 | 0.53 | 0.09195 | 0.1739 | NA | 0.1928 | Normal | 20 | No |

Notes:
[a]All maximum concentrations are from CWL-D2-470 January environmental sample. CWL Permit Attachment 1, Section 1.8.2.2, defines the threshold concentration (0.50 ppmv) and trigger level (20 ppmv). Both concentration limits apply only to soil-gas constituents detected in the three deepest sampling ports of wells CWL-D1 through CWL-D3.
[b]Minimum and maximum results determined from historical data, including the CY 2014 results.
[c]Mean, standard deviation, LCL, UCL, and Distribution Type determined using ProUCL statistical program.
[d]Exceedance determined by comparing the constituent LCL against the trigger level of 20 ppmv.
LCL = Lower confidence limit.
NA = Not applicable; LCL invalid due to low number of samples and high standard deviation of the data set.
ppmv = Parts per million by volume basis.
UCL = Upper confidence limit.

## 5.4 Historic Data Evaluation

In accordance with PCCP Attachment 1, Section 1.12 and Attachment 3, Section 3.11, current soil-gas monitoring results are compared and evaluated with respect to historic results since completion of the VE VCM. This allows for long-term trends to be defined and provides for more meaningful interpretations of current results with respect to historic data. Tables 5-4 and 5-5 present TCE and total VOCs soil-gas monitoring results, respectively, for the post-closure care monitoring network. Data sets included range from June 1998 (representative of the end of the VE VCM) to January 2014. To be consistent with historic soil-gas monitoring data sets and for a more technically sound historic comparison, the concentrations shown in Tables 5-4 and 5-5 for the 2012 and 2013 data sets are taken from the January sampling events that included results for all monitoring wells and sampling ports. The much more limited data set associated with resampling one port at two monitoring wells in May 2012 and March 2013 were not incorporated into Tables 5-4 and 5-5.

Consistent with pre-VE VCM characterization data, the highest concentrations of TCE in soil gas remain in the central part of the vadose zone, approximately 240 feet bgs (CWL-D1 and CWL-D2 results for the 240 foot bgs depth, 19.0 and 16.0 ppmv, respectively). Consistent with the detailed conceptual site model presented in Annex E of the CWL Corrective Measures Study Report (SNL/NM December 2004), concentrations in this central portion of the plume are generally decreasing over time as VOC soil gas slowly diffuses in three dimensions (i.e., away from this central “core” of the VOC soil-gas plume). As this slow diffusion occurs, concentrations at other depths will sometimes increase. When the October 2005 results are compared to the January 2014 results for the CWL-D1 through CWL-D3 sampling ports (5 sampling ports each, for a total of 15 ports from 100 to 480 feet bgs), nine sampling ports show decreasing levels, whereas six ports show increasing levels. Two of the three deep sampling ports (CWL-D1-470 and CWL-D2-470) had lower concentrations in January 2014 relative to October 2005. These trends are similar for the total VOC results. When January 2014 TCE results are compared to January 2013 results, all ports show decreasing or consistent concentrations except for three (CWL-D1-470, CWL-D2-440, and CWL-D3-480). For total VOC results, seven ports show increases in concentration, while 14 ports show decreases in concentrations.

Figures 5-1 through 5-5 show the concentration of TCE over time for each sampling port of CWL-UI1, CWL-UI2, CWL-D1, CWL-D2, and CWL-D3, respectively. Figures 5-6 through 5-10 show the concentration of total VOCs over time for each sampling port of CWL-UI1, CWL-UI2, CWL-D1, CWL-D2, and CWL-D3, respectively. The figures are graphical representations of the data presented in Tables 5-4 and 5-5. The total VOC plots for CWL-UI1 and CWL-UI2 (Figures 5-6 and 5-7) look very different than the corresponding TCE plots (Figures 5-1 and 5-2). This is because for these locations and the shallower depths represented (36 to 136 feet bgs), acetone used to occur at very high concentrations, especially at the shallowest two ports (36 and 40 feet bgs) (SNL/NM December 2004). Concentrations of total VOCs have decreased dramatically over time at these depths, most likely due to upward diffusion to the surface. Concentrations of TCE in the shallower soil-gas wells have remained relatively stable, and approximately half of the ports show small increases, as reflected in Table 5-4 and Figures 5-1 and 5-2 (compare the October 2005 results to the January 2012-2014 results). These small increases at CWL-UI1 and CWL-UI2 shallow sampling ports are consistent with upward diffusion of TCE soil gas from the former plume “core” located approximately 250 feet bgs.

Table 5-4
Historic Soil-Gas Monitoring Summary – TCE Concentrations[a] (ppmv)
Chemical Waste Landfill

| Well ID & Sample Port Depth[b] | June 1998 | June 1999 | August 2001 | June 2004 | September 2004 | October 2005 | January[c] 2012 | January[c] 2013 | January 2014 |
|---|---|---|---|---|---|---|---|---|---|
| CWL-UI1-40 | 4.5 | 16.0 | 7.9 | 3.8 | 4.0 | 4.5 | 5.20 | 7.30 | 4.80 |
| CWL-UI1-80 | 0.19 | 4.9 | 6.7 | 5.9 | 6.1 | 6.8 | 6.50 | 9.70 | 6.30 |
| CWL-UI1-120 | 3.0 | 5.9 | 9.1 | 6.0 | 14.0 | 13.0 | 7.70 | 11.00 | 7.60 |
| | | | | | | | | | |
| CWL-UI2-36 | 0.037 | 0.70 | ND | 1.6 | ND | 1.2 | 3.10 | 3.50 | 2.80 |
| CWL-UI2-76 | 0.091 | 1.0 | 2.4 | 3.4 | 4.1 | 3.7 | 5.60 | 7.80 | 3.70 |
| CWL-UI2-136 | 5.5 | 1.9 | 4.6 | 3.0 | 1.9 | 3.0 | 8.50 | 6.60 | 6.20 |
| | | | | | | | | | |
| CWL-D1-100 | 0.220 | 2.5 | 7.1 | 9.8 | 13.0 | 12.0 | 10.00 | 12.00 | 9.90 |
| CWL-D1-160 | 120.0 | 14.0 | 21.0 | 25.0 | 29.0 | 22.0 | 14.00 | 16.00 | 16.00 |
| CWL-D1-240 | 160.0 | 44.0 | 44.0 | 34.0 | 34.0 | 24.0 | 22.00 | 23.00 | 19.00 |
| CWL-D1-350 | 0.013 | 11.0 | 19.0 | 13.0 | 22.0 | 2.8 | 13.00 | 13.00 | 8.50 |
| CWL-D1-470 | 0.077 | 0.17 | 0.25 | 0.25 | 0.27 | 0.34 | 0.51 | 0.08 | 0.16 |
| | | | | | | | | | |
| CWL-D2-120 | 3.1 | 21.0 | 20.0 | 22.0 | 25.0 | 16.0 | 16.00 | 19.00 | 13.00 |
| CWL-D2-240 | ND | 40.0 | 38.0 | 26.0 | 13.0 | 17.0 | 18.00 | 23.00 | 16.00 |
| CWL-D2-350 | 0.064 | 12.0 | 18.0 | 11.0 | 17.0 | 5.0 | 11.00 | 13.00 | 9.90 |
| CWL-D2-440 | 0.082 | 1.0 | 7.6 | 2.5 | 5.9 | 2.8 | 1.80 | 0.11 | 0.14 |
| CWL-D2-470 | ND | 0.94 | 5.8 | 3.1 | 4.6 | 4.3 | 4.10 | 7.00 | 4.70 |
| | | | | | | | | | |
| CWL-D3-120 | 0.009 | 1.1 | 4.0 | 6.0 | 4.9 | 4.5 | 7.00 | 5.30 | 4.10 |
| CWL-D3-170 | ND | 2.5 | 9.9 | 4.5 | 6.6 | 4.4 | 7.90 | 7.20 | 5.40 |
| CWL-D3-350 | ND | 1.6 | 2.4 | 2.2 | 1.5 | 1.4 | 8.80 | 7.80 | 5.30 |
| CWL-D3-440 | ND | 1.8 | 0.26 | 0.75 | 3.4 | 3.3 | 6.80 | 13.00 | 8.20 |
| CWL-D3-480 | ND | 1.9 | 1.2 | 0.2 | 2.1 | 4.1 | 0.21 | 0.03 | 0.04 |

Notes:
January 2012 – 2014 concentrations have been rounded for significant digit consistency; they may not exactly match the reported concentrations corresponding data tables.
[a]June 1998 through January 2012 are EPA Method TO-14 results. January 2013 and 2014 are EPA Method TO-15 results. If a duplicate sample was collected, the maximum concentration of the environmental-duplicate sample pair is shown,
[b]Port depth is the last number in the Well Identification (ID), and is in feet below ground surface.
[c]Results associated with duplicate resampling conducted in May (2012 data set) and March (2013 data set) are not included. CWL-D3-440 results for January 2012 collected in March 2012 due to issues with sampling this port; could not be sampled in January 2012.
ND = Not detected.
ppmv = Parts per million by volume.
TCE = Trichloroethene.

Table 5-5
Historic Soil-Gas Monitoring Summary – Total Volatile Organic Compound Concentrations[a] (ppmv)
Chemical Waste Landfill

| Well ID & Sample Port Depth[b] | June 1998 | June 1999 | August 2001 | June 2004 | September 2004 | October 2005 | January[c] 2012 | January[c] 2013 | January 2014 |
|---|---|---|---|---|---|---|---|---|---|
| CWL-UI1-40 | 112 | 246 | 141 | 11.78 | 11.47 | 13.15 | 11.76 | 14.68 | 9.54 |
| CWL-UI1-80 | 0.22 | 9.63 | 13 | 10.61 | 10.67 | 11.61 | 10.18 | 13.74 | 9.43 |
| CWL-UI1-120 | 6.32 | 9.94 | 45.42 | 9.36 | 21.41 | 19.18 | 11.07 | 14.64 | 11.20 |
| | | | | | | | | | |
| CWL-UI2-36 | 17.6 | 2117 | 1800 | 813.7 | 850.0 | 391.78 | 4.64 | 5.02 | 4.81 |
| CWL-UI2-76 | 0.126 | 1.65 | 4.37 | 5.52 | 6.90 | 5.96 | 7.85 | 10.74 | 6.04 |
| CWL-UI2-136 | 10.5 | 4.21 | 7.98 | 4.42 | 2.85 | 4.89 | 11.45 | 9.12 | 9.31 |
| | | | | | | | | | |
| CWL-D1-100 | 0.248 | 4.93 | 11.9 | 14.59 | 18.22 | 17.25 | 13.84 | 15.90 | 14.25 |
| CWL-D1-160 | 167 | 21.4 | 30.1 | 33.32 | 38.41 | 29.28 | 18.48 | 20.33 | 21.45 |
| CWL-D1-240 | 261 | 78.4 | 61.5 | 45.27 | 44.74 | 32.60 | 22.46 | 28.71 | 25.32 |
| CWL-D1-350 | 0.02 | 20.7 | 31.7 | 18.73 | 30.53 | 4.07 | 16.56 | 16.31 | 11.61 |
| CWL-D1-470 | 0.105 | 0.231 | 0.921 | 0.612 | 0.82 | 0.603 | 0.87 | 0.13 | 0.39 |
| | | | | | | | | | |
| CWL-D2-120 | 5.4 | 33.0 | 29.4 | 29.26 | 34.23 | 22.31 | 20.70 | 24.05 | 18.49 |
| CWL-D2-240 | 0.047 | 101 | 52.9 | 34.72 | 17.62 | 22.83 | 22.90 | 28.38 | 22.11 |
| CWL-D2-350 | 0.091 | 22.9 | 25.9 | 15.42 | 23.41 | 7.50 | 13.31 | 16.01 | 16.04 |
| CWL-D2-440 | 0.453 | 4.38 | 11.8 | 3.85 | 9.29 | 4.17 | 2.60 | 0.15 | 0.22 |
| CWL-D2-470 | 0.058 | 6.95 | 8.40 | 4.17 | 6.60 | 6.40 | 5.78 | 8.49 | 10.14 |
| | | | | | | | | | |
| CWL-D3-120 | 0.009 | 2.17 | 6.20 | 8.39 | 7.10 | 6.23 | 9.19 | 6.80 | 6.92 |
| CWL-D3-170 | 0.037 | 5.01 | 15.0 | 6.11 | 9.40 | 6.12 | 10.57 | 9.18 | 8.83 |
| CWL-D3-350 | 0.106 | 2.76 | 3.98 | 3.39 | 2.34 | 2.27 | 12.90 | 10.44 | 9.12 |
| CWL-D3-440 | 0.017 | 4.04 | 0.519 | 0.96 | 5.14 | 4.64 | 9.69 | 17.73 | 12.60 |
| CWL-D3-480 | 0.001 | 4.47 | 1.85 | 0.31 | 3.30 | 5.71 | 0.30 | 0.06 | 0.05 |

Notes:
January 2012 - 2014 concentrations have been rounded for significant digit consistency; they may not exactly match the reported concentrations corresponding data tables.
[a]The total VOC concentration is the sum of all detected constituents. June 1998 through January 2012 are EPA Method TO-14 results. January 2013 and 2014 are EPA Method TO-15 results. If a duplicate sample was collected, the maximum concentration of the environmental-duplicate sample pair is shown,
[b]Port depth is the last number in the Well Identification (ID), and is in feet below ground surface.
[c]Results associated with duplicate resampling conducted in May (2012 data set) and March (2013 data set) are not included. CWL-D3-440 results for January 2012 collected in March 2012 due to issues with sampling this port; could not be sampled in January 2012.
ppmv = Parts per million by volume.
VOC = Volatile organic compound.

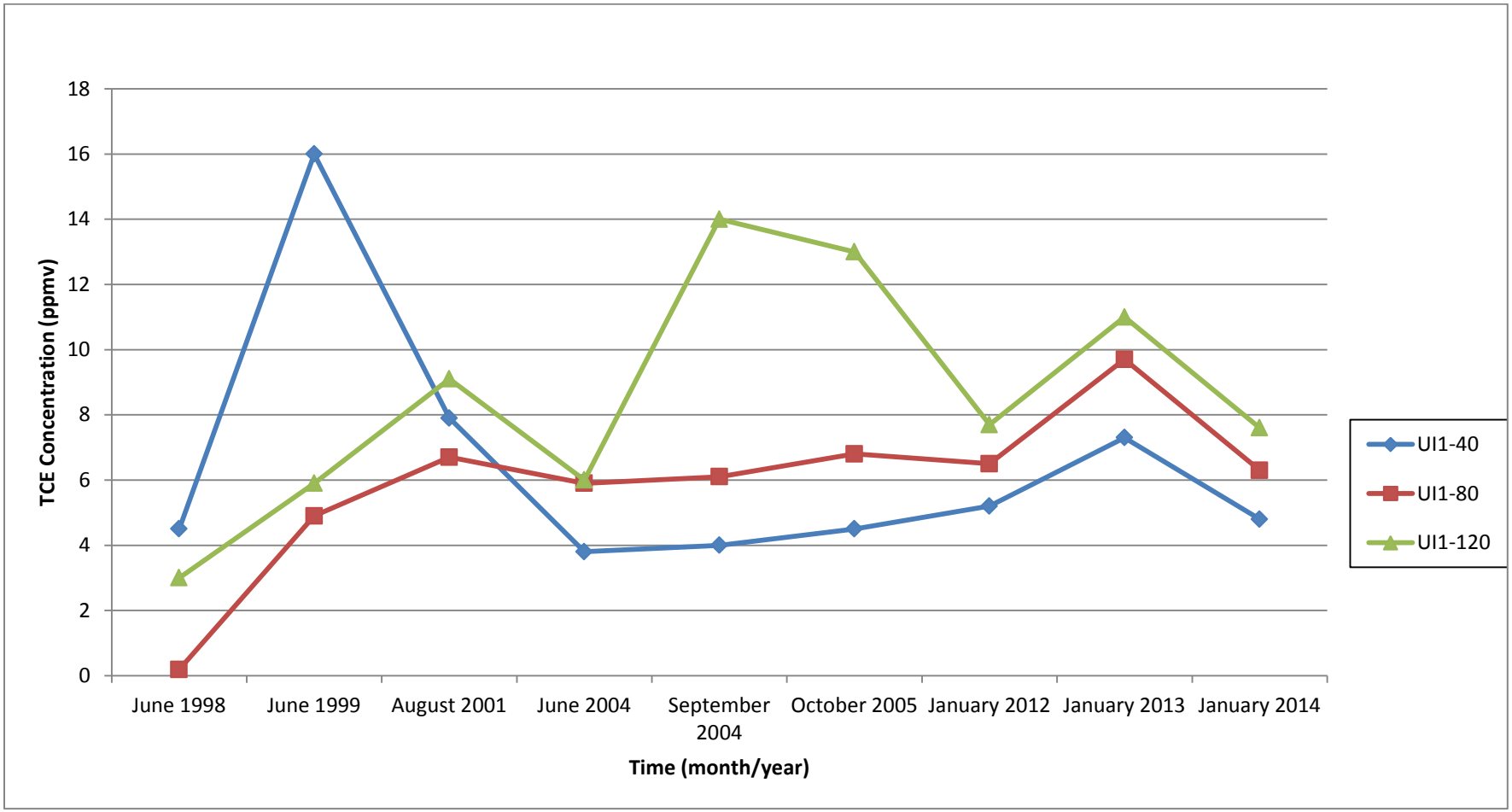


Figure 5-1
Historic Total TCE Compound Concentrations vs. Time
Chemical Waste Landfill Well UI-1 Ports

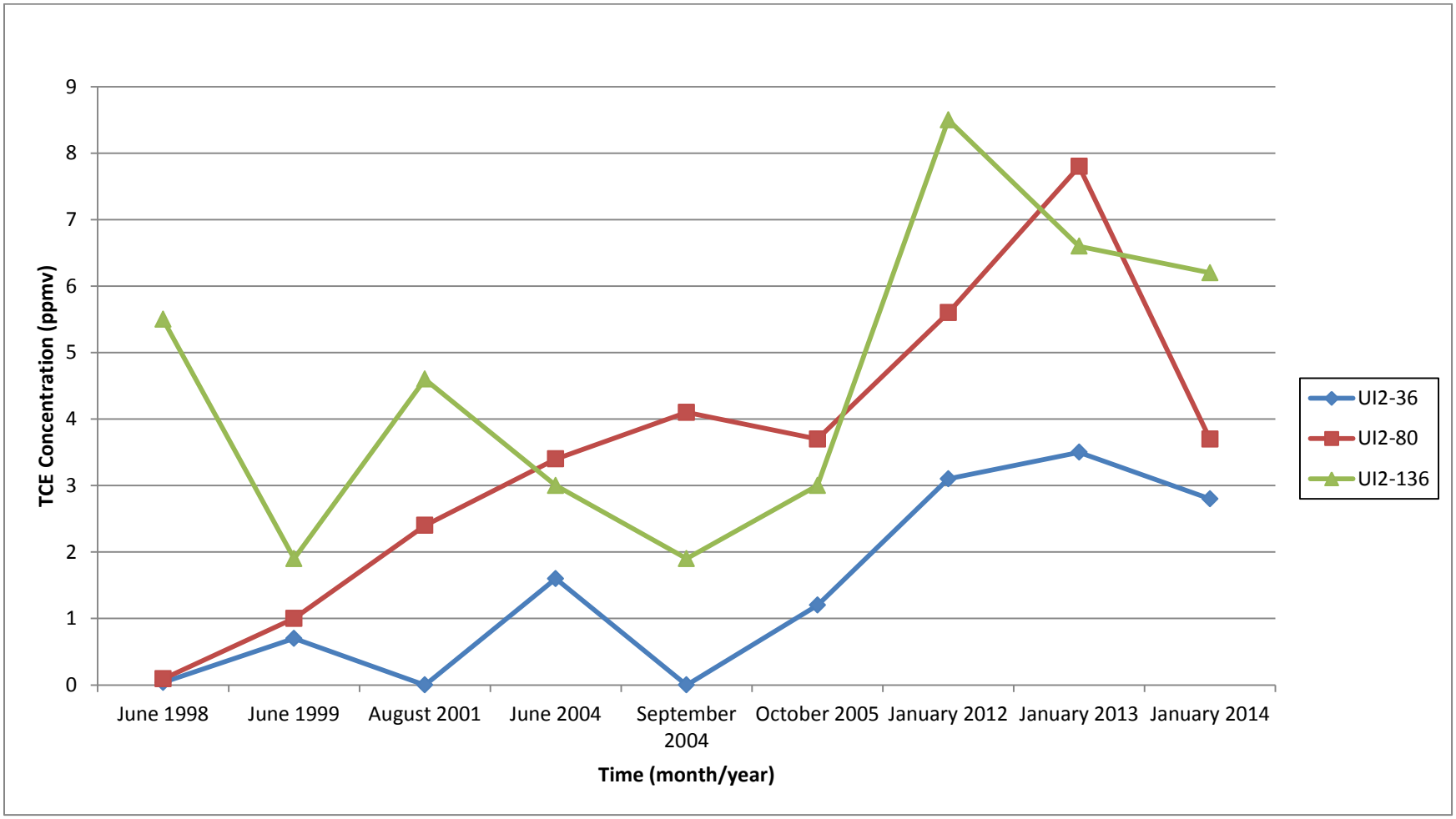


Figure 5-2
Historic Total TCE Compound Concentrations vs. Time
Chemical Waste Landfill Well UI-2 Ports

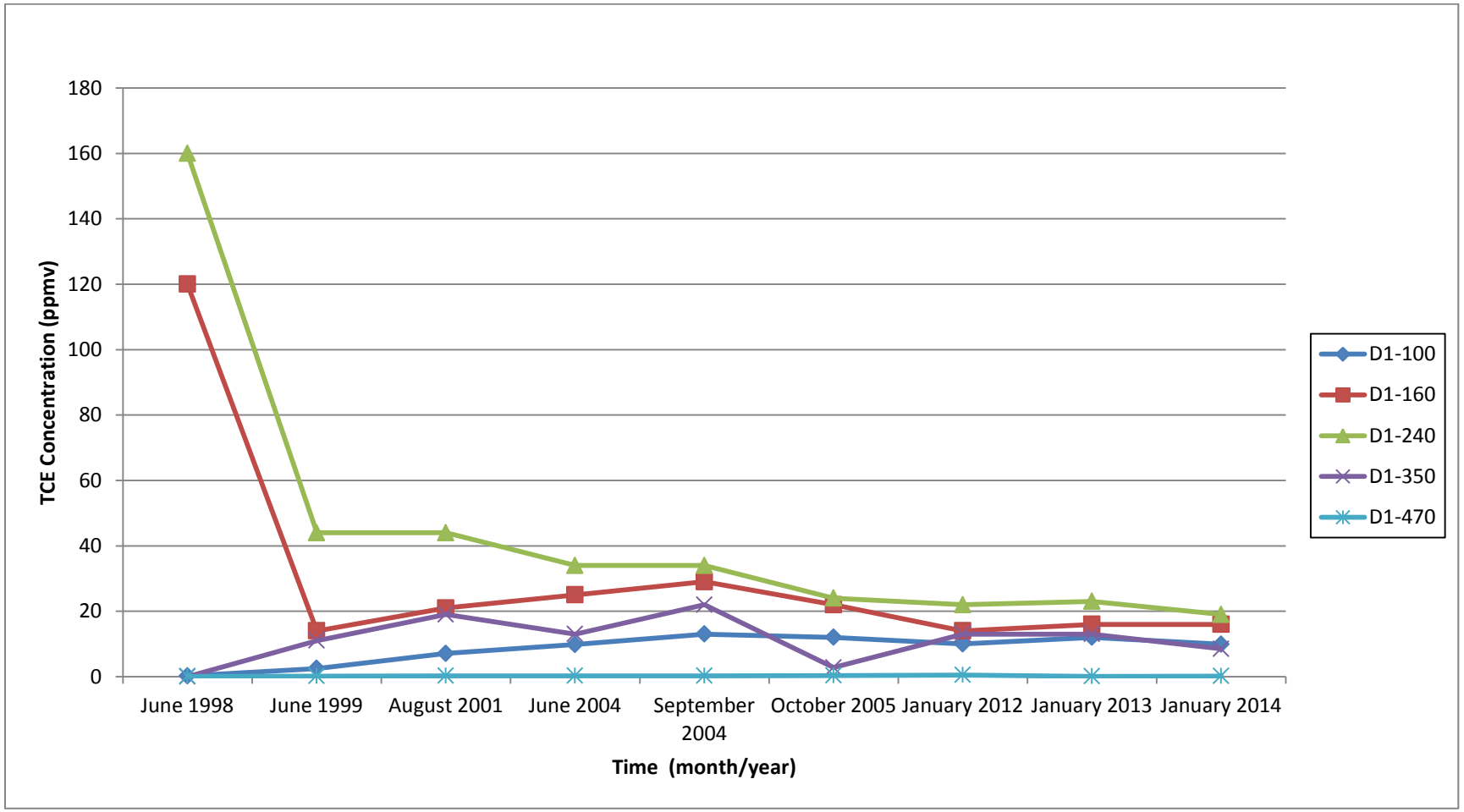


Figure 5-3
Historic Total TCE Compound Concentrations vs. Time
Chemical Waste Landfill Well D1 Ports

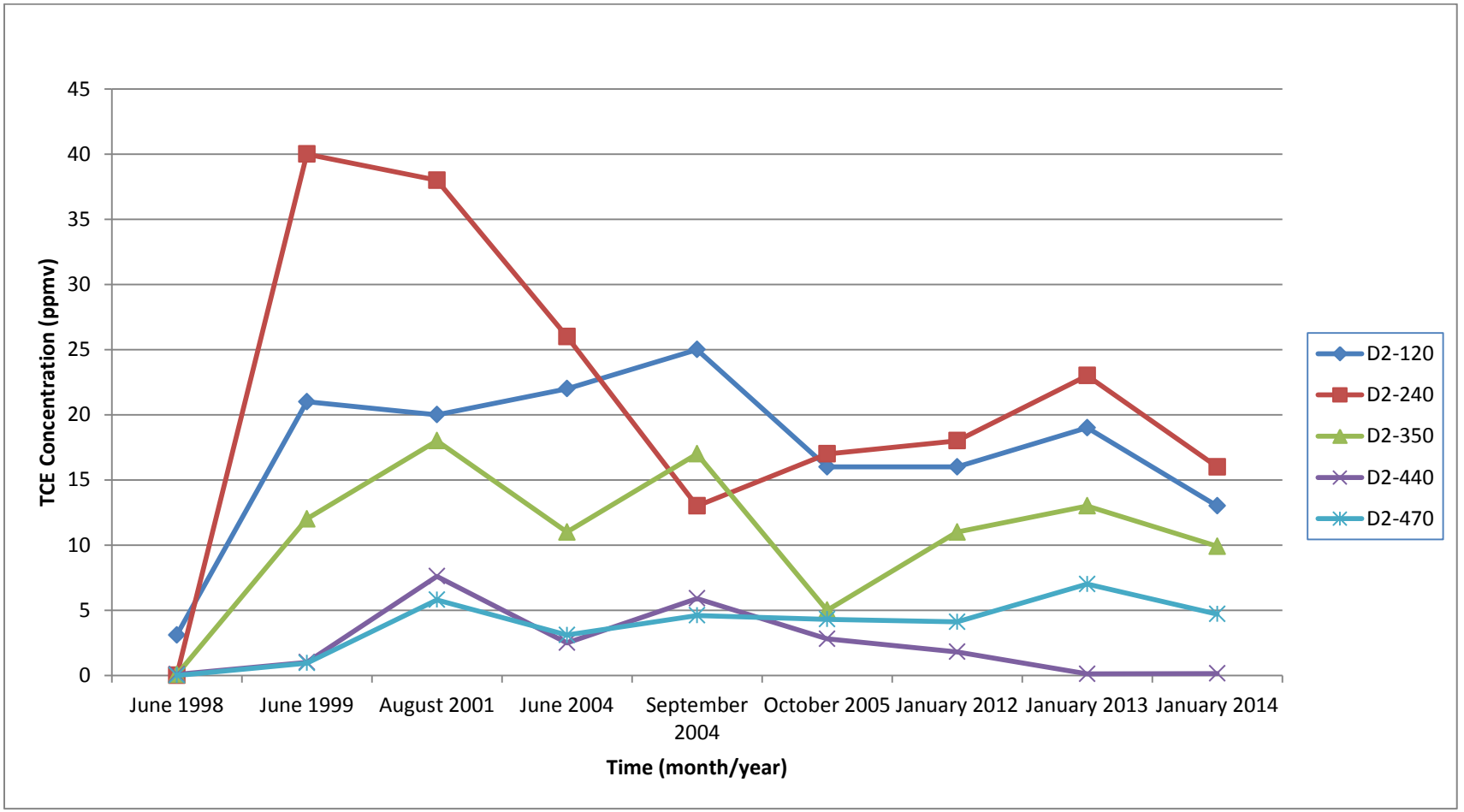


Figure 5-4
Historic Total TCE Compound Concentrations vs. Time
Chemical Waste Landfill Well D2 Ports

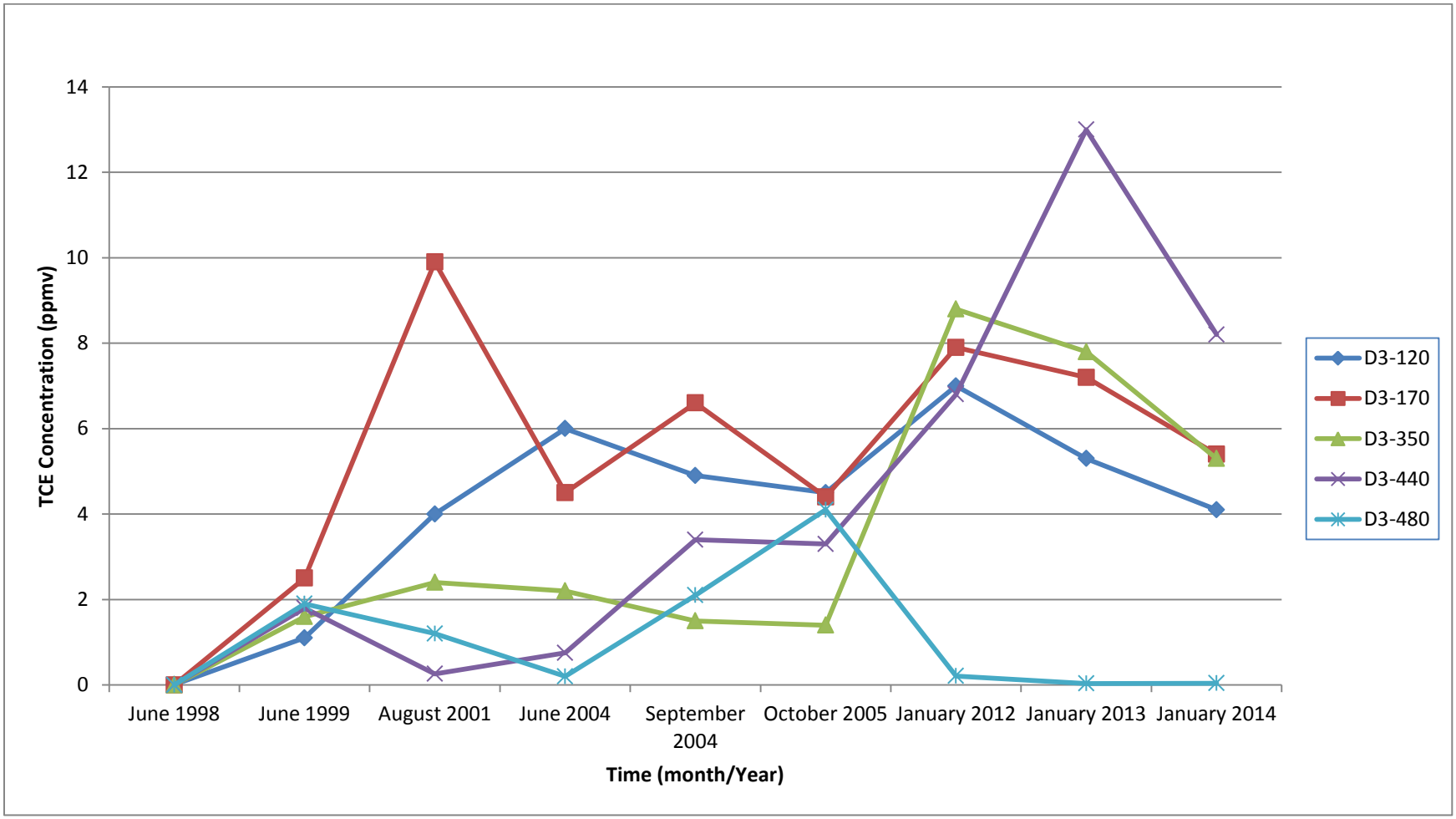


Figure 5-5
Historic Total TCE Compound Concentrations vs. Time
Chemical Waste Landfill Well D3 Ports

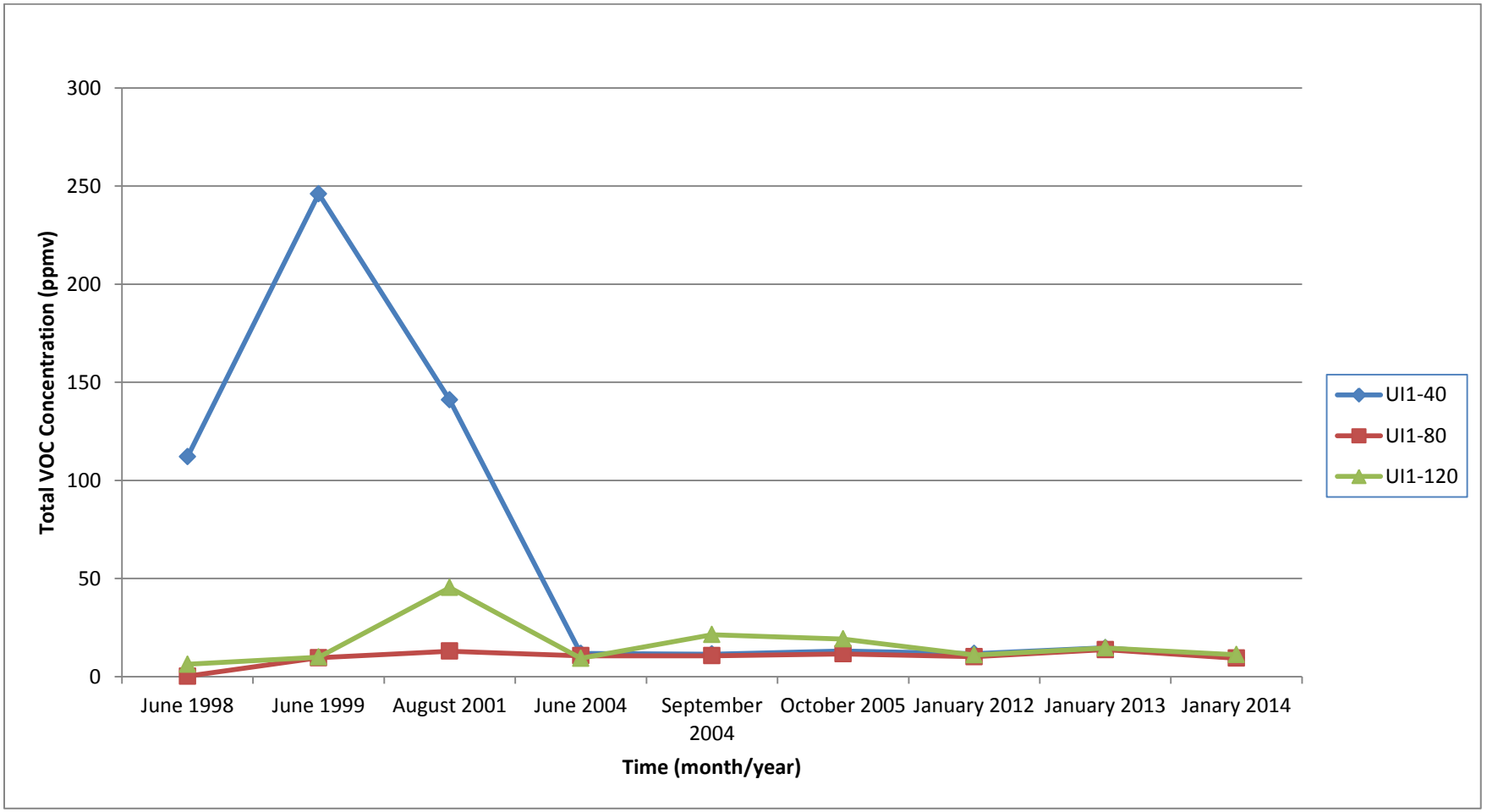


Figure 5-6
Historic Total VOC Compound Concentrations vs. Time
Chemical Waste Landfill Well UI-1 Ports

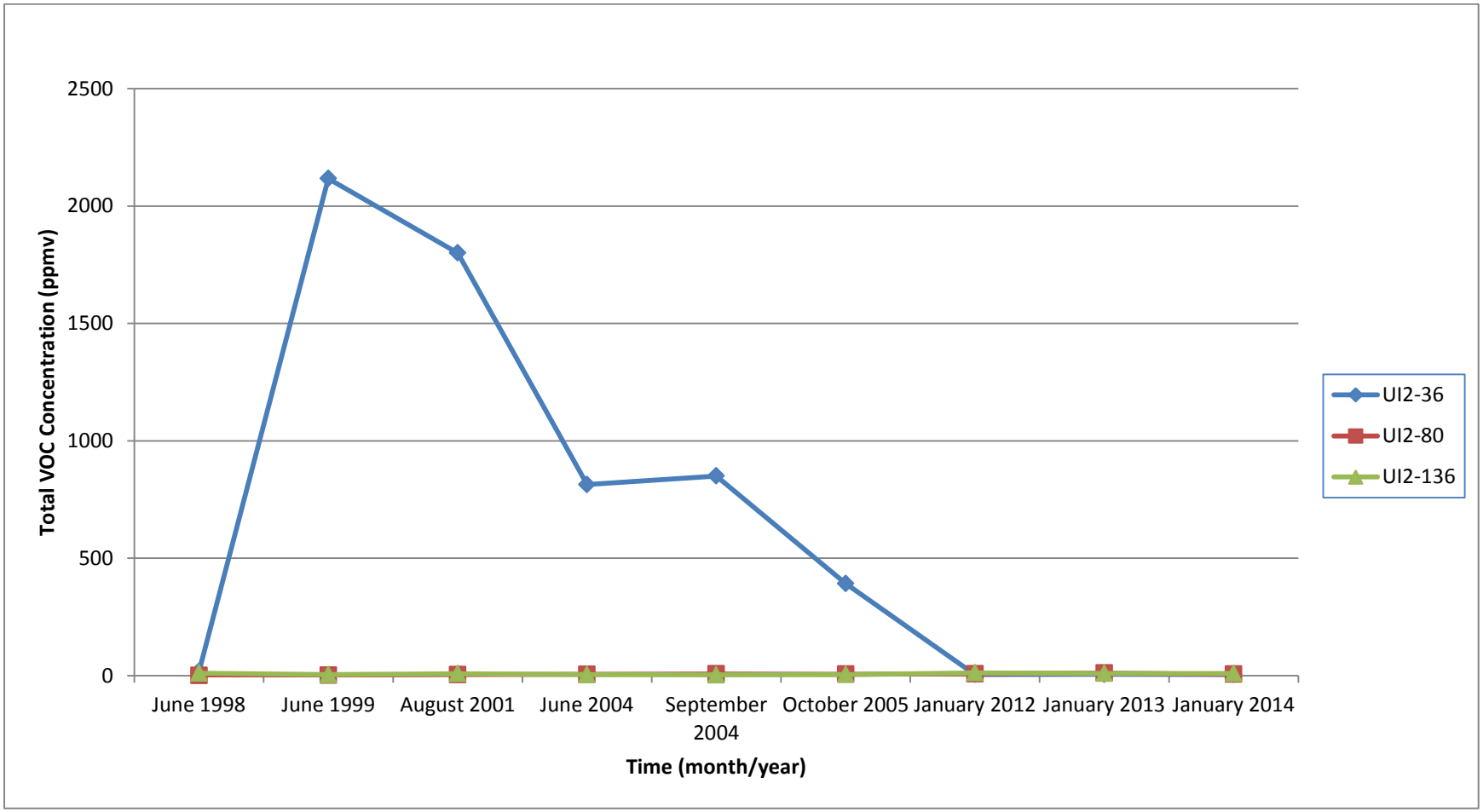


Figure 5-7
Historic Total VOC Compound Concentrations vs. Time
Chemical Waste Landfill Well UI-2 Ports

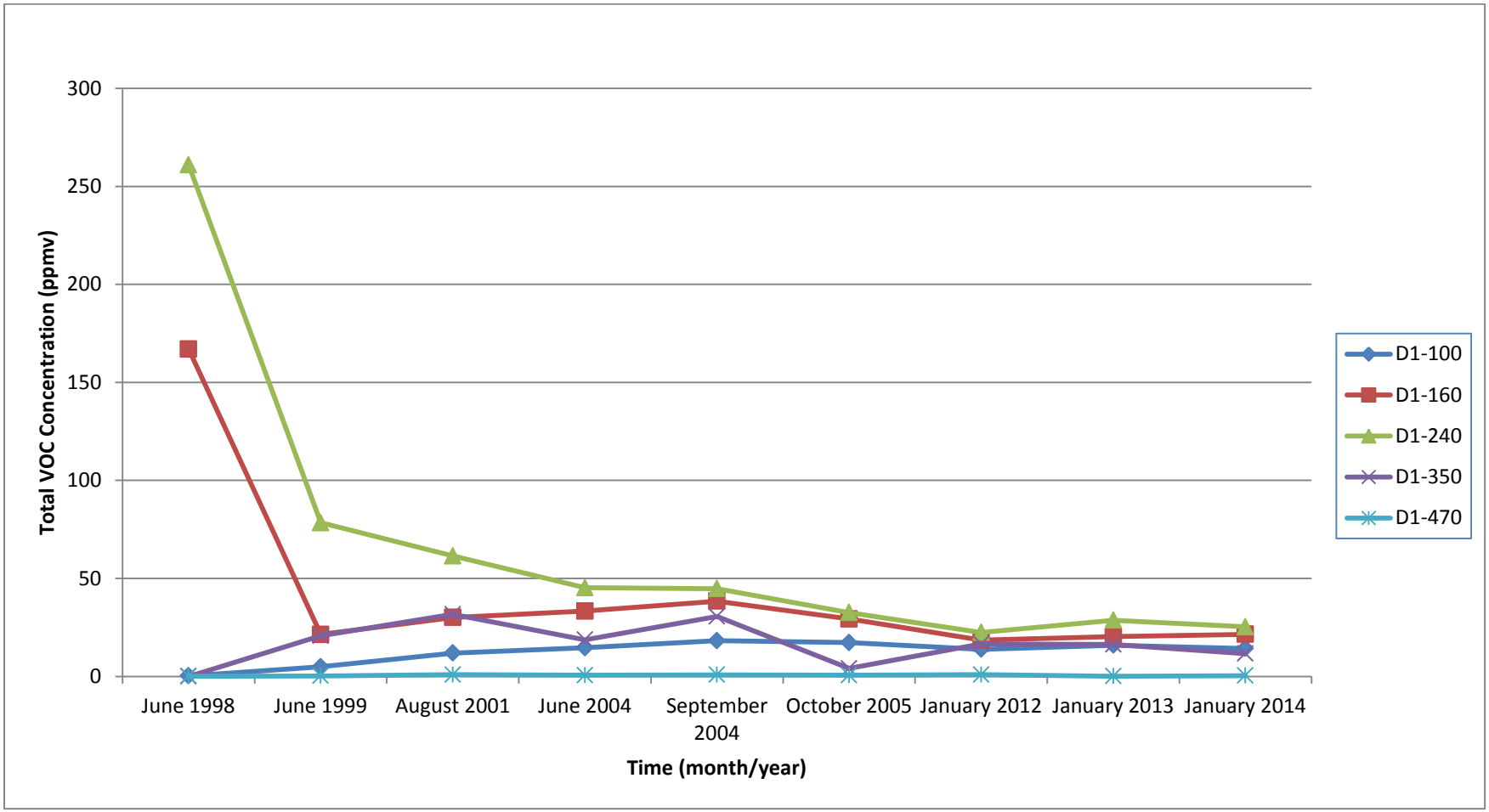


Figure 5-8
Historic Total VOC Compound Concentrations vs. Time
Chemical Waste Landfill Well D1 Ports

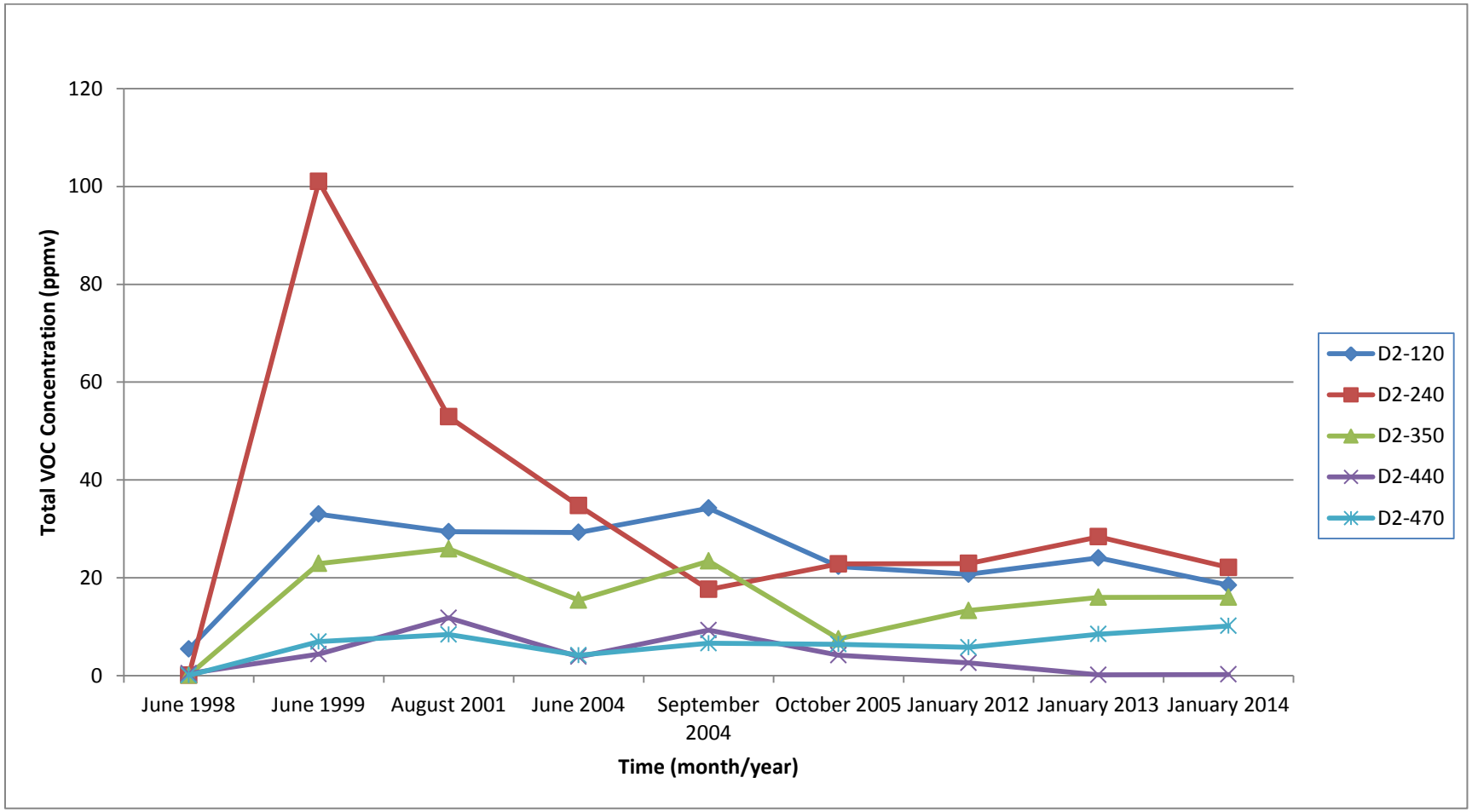


Figure 5-9
Historic Total VOC Compound Concentrations vs. Time
Chemical Waste Landfill Well D2 Ports

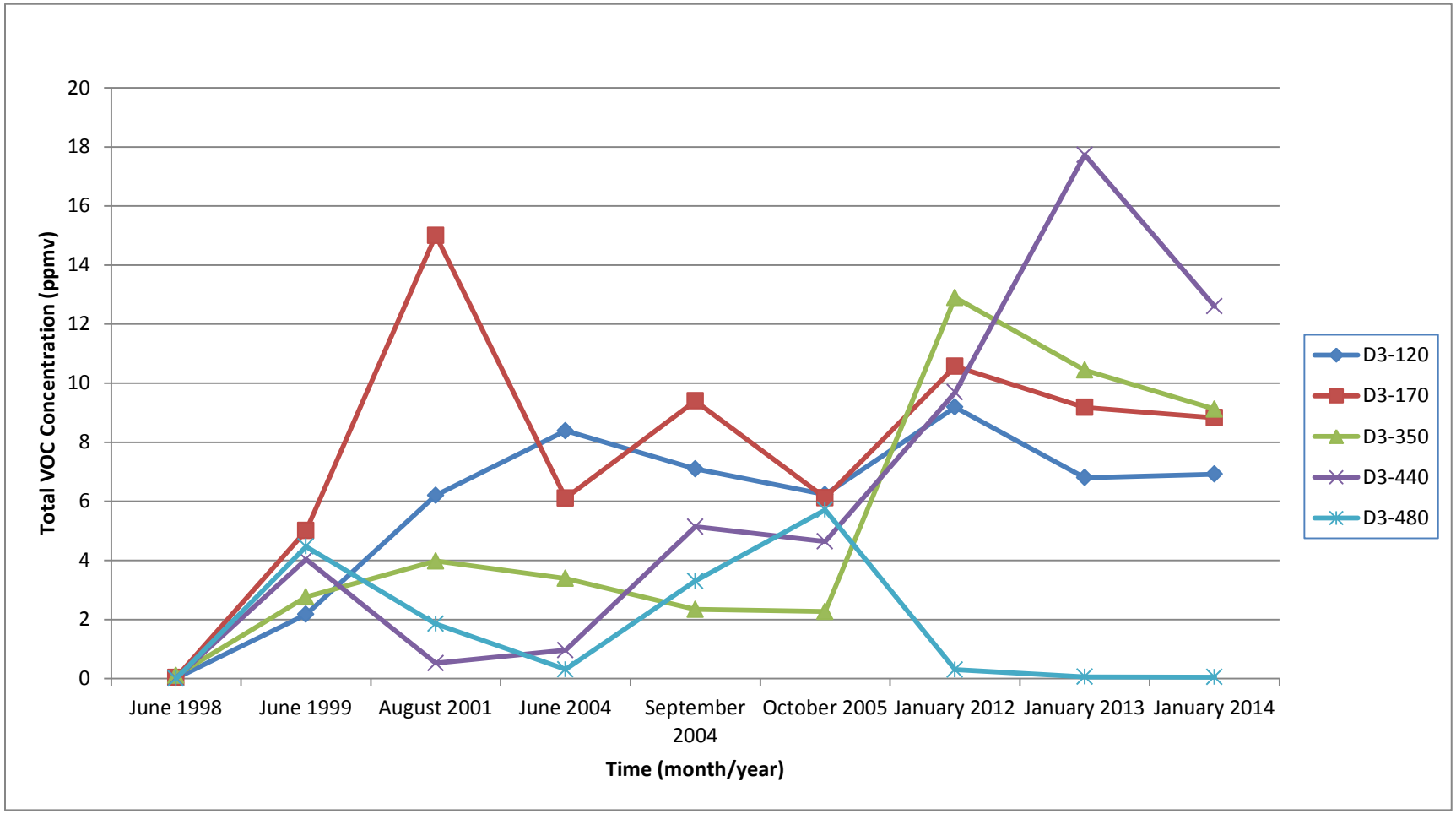


Figure 5-10
Historic Total VOC Compound Concentrations vs. Time
Chemical Waste Landfill Well D3 Ports

The majority of the CWL residual soil-gas plume is represented by the CWL-D1 through D3 wells that have significantly deeper sampling ports, ranging from 110 to 480 feet bgs. TCE is the primary VOC of concern, although trichlorofluoromethane, 1,1,2-trichloro-1,2,2-trifluoroethane, PCE, 1,1-dichloroethene, and chloroform were also been detected in most of the samples. Together with TCE, these VOCs comprise the majority of the total VOC concentration calculated for each sample. Concentrations are generally steady or decreasing over time (Figures 5-3 and 5-4), except at the CWL-D3 location (Figure 5-5). Relative to June 1999 results, concentrations are generally higher in the CWL-D3 ports except at the 480 foot bgs port, which has decreased. All sampling ports at CWL-D3 show lower TCE concentrations in 2014 relative to 2013, except at the 480 foot bgs port (unrounded results for 2013 and 2014 are essentially the same, 34 ppbv and 35 ppbv, respectively). Over the historic monitoring period, the highest TCE and total VOC concentrations in the deepest ports have been consistently observed at the CWL-D2 location (one to two orders of magnitude higher). It is important to note the vertical scale difference on Figures 5-4 and 5-5 relative to Figure 5-3, as it exaggerates the appearance of minor (ppmv) changes in TCE concentration. This is especially true of Figure 5-5. Again, these trends are also reflected in the total VOC plots shown in Figures 5-8 through 5-10.

TCE in groundwater is currently only being detected in CWL-MW10, which is the closest groundwater monitoring well to CWL-D3 (see Figure 2-4). Because of the concern that VOC soil gas could potentially enter a groundwater well through the upper unsaturated portion of the well screen or at casing joints that may not be air-tight and contaminate groundwater samples, passive soil-gas venting devices (i.e., Baroballs™) were installed on all groundwater monitoring wells in March 2012. The Baroball™ devices remained on all groundwater and soil-gas monitoring wells throughout CY 2014 and were inspected during the sampling events. It is unlikely that the current residual VOC soil-gas plume will directly impact groundwater due to the declining surface of the regional aquifer beneath the CWL (Section 4.4 and Annex E of CWL Corrective Measures Study Report [SNL/NM December 2004]). Based upon historical groundwater monitoring results and statistical evaluation of more recent results (Section 4.3), statistically significant evidence of increasing contamination in groundwater has not been observed since completion of the VE VCM in 1998.

Overall, the CY 2014 data set is consistent with historic post-VE VCM soil-gas monitoring results and suggests the residual VOC soil-gas plume beneath the CWL is slowly dissipating in three dimensions through diffusion in the vadose zone. These data and conclusions are consistent with the conceptual site model presented in Annex E of the CWL Corrective Measures Study Report (SNL/NM December 2004).

# 6.0 INSPECTION, MAINTENANCE, AND REPAIR RESULTS

This chapter presents a summary of CY 2014 inspection, maintenance, and repair activities. Requirements for inspection, maintenance, and repair are presented in Section 3.2 of this report. The CWL post-closure care systems and features that require periodic inspection, maintenance, and/or repair include:

- Final cover system (vegetation and cover)
- Surface-water diversion structures
- Compliance monitoring system (groundwater and soil-gas monitoring networks and sampling equipment)
- Perimeter security fence (including signs, gates, locks, and survey monuments)

A schedule for implementing inspections and prescribed maintenance is provided in PCCP Attachment 1, Section 1.10, Table 1-6. CY 2014 inspections are summarized in the following sections and results are documented on the CWL Post-Closure Inspection Forms/Checklists provided in Annex C of this report, in conformance with the requirements in PCCP Attachment 1, Section 1.9 and 1.10 (NMED October 2009 and subsequent revisions).

## 6.1 Final Cover System

The final cover system includes the ET Cover vegetation and the cover surface. ET Cover vegetation is inspected by the staff biologist and documented on the Biology Inspection Form/Checklist for the CWL Cover. The ET Cover surface is inspected by a field technician along with the storm-water diversion structures, security fence, and survey monuments, and documented on the Post-Closure Inspection Form/Inspection Checklist.

### 6.1.1 Vegetation Monitoring and Inspection

Based upon results from ET Cover vegetation inspection conducted in CY 2011, it was determined that the three criteria for successful revegetation had been met (PCCP Attachment 1, Section 1.9). This determination changed the required frequency of cover vegetation inspection to an annual basis. ET Cover vegetation was monitored throughout CY 2014 and cover maintenance activities were performed both before (April, May, June, and August) and after (October) the CY 2014 annual inspection (Section 6.1.2).

The annual Biology Inspection of the ET Cover vegetation was conducted on September 2, 2014 by the SNL/NM staff biologist. The inspection was conducted at the end of the New Mexico growing season so an accurate determination of living plants at the site could be performed. Although 2010 through 2012 meteorological conditions (i.e., lack of significant rainfall events that fully saturate the soil) caused significant vegetation stress, the ET Cover foliar coverage and vegetation continue to meet PCCP requirements for successful revegetation (i.e., greater than 20% foliar coverage, with greater than 50% of that foliar coverage comprised of native species). The ET Cover maintenance work performed in August 2013 (weed removal,

spot herbicide application, and reseeding of sparse areas followed by supplemental watering in September-October 2014) was particularly important relative to helping the previously established ET Cover native grasses recover, and in facilitating the successional development of new (to the ET Cover) native grass species. No barren areas exceeding 200 square feet or large mammal burrows (i.e., greater than four inches in diameter) were observed during the annual biology inspection, but ant hills/burrows and small mammal burrows were observed similar to previous inspections. In general the level of weedy plant species present on the cover was very low. Juvenile four-wing saltbush plants (i.e., potentially deep-rooted plants) were identified across the cover but at a very low (i.e., trace) percent foliar coverage.

The foliar coverage based on the September annual inspection was approximately 44%, of which 98% is native vegetation (Inspection Form in Annex C). This is an improvement from 2013 inspection results, which was 38% foliar coverage, of which 90% was native vegetation. The successional changes in ET Cover vegetation is evident in the percent foliar coverage of blue grama grass clumps, which decreased from 45% in September 2012 to 18% in September 2013 to 15% in September 2014. Sand dropseed was the dominant native grass in September 2014 (21% foliar coverage), and together with blue grama (15% foliar coverage) comprises the majority of the current ET Cover vegetation. Only trace amounts of four-wing saltbush were observed during the September 2014 inspection. Similar to the 2013 inspection, many weedy species, including weedy grasses, were present on the cover.

The 2014 Chemical Waste Landfill Biology Report (Biology Report) is presented in Annex D of this report and provides background information on ET Cover revegetation efforts. This report includes a summary of 2014 cover maintenance activities and local climate trends, additional details on the September Biology Inspection and the successional development of the native grasses, ET Cover photographs, and recommendations. CY 2014 cover maintenance activities are summarized below.

### 6.1.2 Cover Maintenance

Cover maintenance performed during CY 2014 is summarized below. Overall, the cover maintenance required was less than in 2013 and involved smaller-scale weed removal activities. In all cases, work was performed by hand and no vehicle traffic was allowed on the ET Cover.

***April 7 – 11, 2014***

Dry, dead weed material (primarily tumbleweeds) was removed from the cover vegetation, storm water diversion features, and perimeter fence line. Approximately 60 cubic yards of compressed weed debris were removed and disposed at the KAFB Landfill. The majority of this material was tumbleweeds that had blown in against the perimeter fence.

***May 28 – June 3, 2014***

Dry, dead weed material (primarily tumbleweeds) was removed from the storm water diversion features and perimeter fence line. In addition, dead and live weeds were removed from the ET Cover, the western perimeter area between the fence and road, and a 10-foot buffer area

outside the fence. Approximately 30 cubic yards of compressed weed debris were removed and disposed at the KAFB Landfill. The majority of this material was tumbleweeds that had blown in against the perimeter fence.

During the July 2014 groundwater monitoring event and well/equipment inspection, a small burrow was observed just inside the fence line on the western perimeter, near monitoring well CWL-MW11. The staff biologist was notified and inspected the burrow using a small, downhole camera to determine extent and activity level on July 10, 2014. The shallow burrow was determined to be inactive (i.e., abandoned) and was backfilled with adjacent soil.

### *August 14 – 19, 2014*

Dry, dead weed material (primarily tumbleweeds) was removed from the storm water diversion features and perimeter fence. Dead and live weeds were removed from the ET Cover, the western perimeter area between the fence and road, and a 10-foot buffer area outside the fence. The herbicide Strike 3® from Winfield Solutions was applied to the western perimeter area between the fence line and the road (i.e., outside of the ET Cover and perimeter fence) in accordance with manufacturer's instructions to prevent additional weed growth in this area immediately adjacent to the ET Cover. Approximately 15 cubic yards of compressed weed debris were removed and disposed at the KAFB Landfill. The majority of this material was tumbleweeds that had blown in against the perimeter fence.

### *October 28, 2014*

Dry, dead weed material (primarily tumbleweeds) was removed from the storm water diversion features and perimeter fence. Dead and live weeds were removed from the ET Cover, the western perimeter area between the fence and road, and a 10-foot buffer area outside the fence. Approximately 1 cubic yard of compressed weed debris was removed and disposed at the KAFB Landfill.

### *CY 2014 Supplemental Watering*

The staff biologist recommended supplemental watering in CY 2014 to augment natural precipitation. Water was applied to the ET Cover using a large sprinkler at six locations to ensure an even distribution. The amount of water used at each sprinkler location was calculated based on the aerial coverage of the sprinkler to be equivalent to a ½- inch rain event. Supplemental watering events for CY 2014 are summarized below.

- May 27-28: one, ½-inch-equivalent watering event.
- June 3: one, ½-inch-equivalent watering event.
- October 13-14: one, 1-inch-equivalent watering event.

### 6.1.3 Cover Inspection

Quarterly cover surface inspections were performed by a field technician in March, June, September, and December of 2014. No inspection parameters required repairs.

## 6.2 Storm-Water Diversion Structure Inspection

Quarterly inspections of storm-water diversion structures by a field technician were performed in March, June, September, and December of 2014. During the March inspection, windblown tumbleweed debris was noted at the entrance of the two drainage culverts at the south end of the site (part of the southern boundary drainage swale). This tumbleweed debris was removed in early April during ET Cover maintenance work described above (Section 6.1.2). During the September inspection, windblown tumbleweeds were noted in the two drainage culverts at the south end of the site. The culverts were cleared during the inspection. During the December inspection, soil accumulation in excess of 6-inches was noted in the culvert at the southwest corner of the site. The soil was removed from the culvert at the time of the inspection. No other inspection parameters required repairs.

## 6.3 Monitoring Well Network Inspection

Semi-annual inspection of the groundwater monitoring network and sampling equipment was performed by a field technician in January and July of 2014. In January the annual inspection for the soil-gas monitoring wells and sampling equipment was also performed. No inspection parameters required repairs. Baroball™ passive venting devices remain on all soil-gas and groundwater monitoring wells, and are in good condition.

During the July groundwater monitoring well inspection, a small animal burrow was observed just inside the fence line on the western perimeter, near monitoring well CWL-MW11. The staff biologist was notified and addressed the burrow (see Section 6.1.1).

## 6.4 Security Fence Inspection

Quarterly inspections of the security fence, access controls (gates, locks, signs), and survey monuments were performed by a field technician in March, June, September, and December of 2014. During the March inspection, windblown tumbleweed debris was noted on the perimeter fence. This tumbleweed debris was removed in early April during ET Cover maintenance work described above (Section 6.1.2). During the June inspection, the western most survey benchmark was covered with windblown soil, which was cleared/removed at the time of the inspection. During the September inspection, the two western-most survey benchmarks were covered with windblown plant debris and soil. The survey benchmarks were cleared during the inspection. During the December inspection, tumbleweed debris was observed on the perimeter fence. The tumbleweeds were removed from the fence during the inspection. No other inspection parameters required repairs.

## 6.5 Emergency Equipment Inspection

For the CWL, quarterly inspection of emergency equipment listed in PCCP Attachment 6, Table 6-4, is required. This equipment is inspected weekly and documented on the CAMU 90-Day Area inspection forms. Any repairs or replacement of equipment are performed, as necessary, to maintain compliance with requirements for emergency equipment.

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# 7.0 REGULATORY ACTIVITIES

On June 2, 2011, the NMED approved closure of the CWL and the PCCP took effect (Kieling June 2011). NMED-approved Permit modifications and DOE/Sandia submittals since the PCCP became effective are summarized in Chapter 1. Regulatory activities in CY 2014 consisted of one submittal of two updated reference documents cited in the PCCP and submittal of the Calendar Year 2013 Chemical Waste Landfill Annual Post-Closure Care Report (SNL/NM March 2014). These activities are summarized below in Sections 7.1 through 7.3, respectively.

## 7.1 Permit Modification Requests

There were no Permit modification requests in CY 2014.

## 7.2 Permit Submittals

On March 25, 2014, DOE and Sandia submitted the Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2013 to NMED (SNL/NM March 2014).

On July 8, 2014, DOE and Sandia submitted two updated reference documents cited in the PCCP in accordance with requirements of Attachment 2, Section 2.0 and Attachment 3, Section 3.9 of the PCCP (Todd July 2014). Revisions included updates to keep the reference documents current and to reflect ongoing modifications and improvements in industry practices. The revised reference documents became effective on June 16, 2014.

## 7.3 Technical Communication

There were no technical communications with NMED staff in CY 2014.

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# 8.0 SUMMARY AND CONCLUSIONS

A summary of CY 2014 activities and results is provided in this chapter, along with conclusions.

## 8.1 Groundwater and Soil-Gas Monitoring

Two semi-annual groundwater monitoring events were conducted in January and July 2014. Groundwater samples were collected and analyzed in accordance with PCCP Attachment 1, Section 1.8 and Attachment 2 requirements. There were no variances, non-conformances, or project-specific issues related to the sampling activities.

Statistical assessment was conducted on results from replacement well CWL-BW5 and new wells CWL-MW9, CWL-MW10, and CWL-MW11. There was no statistically significant evidence of increasing contamination and no hazardous constituent 95% LCL of the mean exceeded its respective concentration limit. Groundwater surface elevation, hydraulic gradient, flow direction, and groundwater flow rate have been determined and are consistent with historical results.

One annual soil-gas monitoring event was conducted in January 2014. Samples collected from all wells were analyzed for VOCs by analytical method TO-15 for the second time (TO-14 was used prior to 2013). TCE was detected in all samples at concentrations ranging from 0.035 parts ppmv at CWL-D3 (480 foot bgs sample port) to 19 ppmv at CWL-D1 (240 foot bgs sample port). The maximum soil-gas concentration from the three deepest sampling ports (CWL-D1-470, CWL-D2-470, and CWL-D3-480) was TCE at a concentration of 4.7 ppmv (CWL-D2-470). In addition, 1,1,2-trichloro-1,2,2-trifluoroethane; trichlorofluoromethane; and PCE were detected in all samples at lower concentrations. The 95% LCL of the mean was calculated and compared to the 20 ppmv trigger level for all VOCs that exceeded the threshold value of 0.5 ppmv from the deepest sampling ports of wells CWL-D1 through CWL-D3. Only five VOCs exceeded 0.5 ppmv at the three deepest sampling ports and all of these detections were from CWL-D2-470. There were no exceedances of the 20 ppmv trigger level. In general, the soil-gas monitoring results continue to indicate the residual VOC soil-gas plume beneath the CWL is slowly dissipating in three dimensions through diffusion in the vadose zone. These data and conclusions are consistent with the conceptual site model presented in Annex E of the CWL Corrective Measures Study Report (SNL/NM December 2004).

## 8.2 Inspections

Inspections of the CWL final cover system, storm-water diversion structures, compliance monitoring system, and security fence were performed in accordance with PCCP requirements. No repairs were required, but during the December inspection tumbleweed debris was removed from the southern boundary swale (conditions met PCCP specifications, but the debris was removed as preventive maintenance).

Based upon the September biology inspection, the ET Cover continues to meet successful revegetation criteria. ET Cover maintenance was performed in February, August, September,

and October, and included removal of four-wing saltbush, annual weedy species, discrete herbicide application for weed control, seeding, and supplemental watering.

## 8.3 Regulatory Activities

Regulatory activities in CY 2014 included submittal of the Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2013 and submittal of updated reference documents cited in the PCCP.

## 8.4 Conclusions

All PCCP monitoring, inspection, and maintenance/repair requirements have been met for CY 2014. This CWL Annual Post-Closure Care Report documents all activities and results as required by the PCCP Attachment 1, Section 1.12.

# 9.0 REFERENCES

EPA, see U.S. Environmental Protection Agency.

Kieling, J.E., February 2012. "Approval, Class 1 Modification to Chemical Waste Landfill Post-Closure Care Permit for Sandia National Laboratories, November 2011, Sandia National Laboratories, EPA ID No. NM5890110518, HWB-SNL-11-015," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico, February 20, 2012.

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New Mexico Environment Department (NMED), October 2009. "Resource Conservation and Recovery Act, Post-Closure Care Permit, EPA ID No. NM5890110518, to the U.S. Department of Energy/Sandia Corporation, for the Sandia National Laboratories Chemical Waste Landfill," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico, October 15, 2009.

Sandia National Laboratories/New Mexico (SNL/NM), June 2014a. "Data Validation Procedure for Chemical and Radiochemical Data," (AOP 00-03), Sample Management Office, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), June 2014b. "Calendar Year 2013 Annual Groundwater Monitoring Report," SAND2014-15438R, Sandia National Laboratories, Albuquerque, New Mexico.

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Sandia National Laboratories/New Mexico (SNL/NM), October 1995. "Chemical Waste Landfill Groundwater Assessment Report," Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), December 1992. "Chemical Waste Landfill Final Closure Plan and Postclosure Permit Application," Sandia National Laboratories, Albuquerque, New Mexico.

SNL/NM, see Sandia National Laboratories/New Mexico.

Todd, J. W., July 2014. "Submittal of Updated Reference Documents Cited in the Chemical Waste Landfill Post Closure Care Permit for the Department of Energy National Nuclear Security Administration/Sandia Site Office and Sandia National Laboratories/New Mexico, EPA ID No. NM5890110518," U.S. Department of Energy, July 8, 2014.

U.S. Environmental Protection Agency (EPA), January 1999a. "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Compendium Method TO-14A," Center for Environmental Research Information, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio.

U.S. Environmental Protection Agency (EPA), January 1999b. "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Compendium Method TO-15," Center for Environmental Research Information, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio.

U.S. Environmental Protection Agency (EPA), November 1986. "Test Methods for Evaluating Solid Waste," 3rd ed., Update 3, SW-846, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

# ANNEX A
# Chemical Waste Landfill
# CY 2014 Groundwater Monitoring Forms and Reports

## Field Forms

## Data Validation Reports

## Contract Verification Reports

## FIELD SAMPLING FORMS

## CWL POST-CLOSURE CARE GROUNDWATER MONITORING

| Form Title | Corresponding Procedure |
|---|---|
| Tailgate Safety Briefing | PLA 05-09 |
| Groundwater Sample Collection Field Equipment Check Log | FOP 05-02 |
| Portable Pump and Tubing/Water Level Indicator Decontamination Log Form | FOP 05-03 |
| Field Measurement Log For Groundwater Sample Collection | FOP 05-01 |
| Analysis Request and Chain of Custody* | LOP 94-03 |

*Completed AR/COC forms are provided in the Data Validation Section of this Annex.

# FIELD SAMPLING FORMS

# JANUARY 2014 GROUNDWATER MONITORING

# TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-BW5 Date: 01/09/14 Time: 0805

Activities: Groundwater monitoring and sampling
(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:
Temp: 52.3 °F Wind Speed: 0 MPH Humidity: 23.1 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ TT 1/3/14
Other:

*Safety Topics Presented*

| | |
|---|---|
| ☒ Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary. | ☒ Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated. |
| ☒ Wear safety boots. | ☒ Be aware of electrical hazards |
| ☒ Use safe lifting practices. Wear leather gloves if necessary. | ☒ Be aware of pressure hazards. |
| ☒ Be aware of pinch points on pump cable reel and hydraulic tailgate lift. | ☒ No eating or drinking at sampling counter. |
| ☒ Be aware of chemical hazards. | ☒ Be aware of biohazards (snakes, spiders, etc.) |
| ☒ Wear nitrile or latex gloves when sampling. | ☒ Wear communication device (cell phone, EOC pager). |
| ☒ Wear chemical safety goggles. | ☒ Avoid spilling purge / decon water. |

Hospital/Clinic: Sandia Medical Clinic Phone: 844-0911/911

*Attendees*

| Printed Name | Signature |
|---|---|
| Robert Lynch | |
| William Gibson | |
| ALFRED SANTILLANES | |
| | |
| | |

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# TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-MW 9 Date: 1/10/14 Time: 0800

Activities: Groundwater monitoring and sampling
(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:
Temp: 53.2 °F Wind Speed: 0 MPH Humidity: 22.5 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCUVAC ampules~~ TA 1/13/14
Other:

*Safety Topics Presented*

| | |
|---|---|
| ☒ Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary. | ☒ Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated. |
| ☒ Wear safety boots. | ☒ Be aware of electrical hazards |
| ☒ Use safe lifting practices. Wear leather gloves if necessary. | ☒ Be aware of pressure hazards. |
| ☒ Be aware of pinch points on pump cable reel and hydraulic tailgate lift. | ☒ No eating or drinking at sampling counter. |
| ☒ Be aware of chemical hazards. | ☒ Be aware of biohazards (snakes, spiders, etc.) |
| ☒ Wear nitrile or latex gloves when sampling. | ☒ Wear communication device (cell phone, EOC pager). |
| ☒ Wear chemical safety goggles. | ☒ Avoid spilling purge / decon water. |

Hospital/Clinic: Sandia Medical Clinic Phone: 844-0911/911

*Attendees*

| Printed Name | Signature |
|---|---|
| Robert Lynch | |
| William Gibson | |
| Alfred Santillanes | |
| | |
| | |

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# TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-MW11 Date: 1/13/2014 Time: 0825

Activities: Groundwater monitoring and sampling
(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:
Temp: 29 °F Wind Speed: 8 MPH Humidity: 40 % Wind Chill 22 °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ TT 7/3/14
Other:

*Safety Topics Presented*

| | |
|---|---|
| ☒ Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary. | ☒ Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated. |
| ☒ Wear safety boots. | ☒ Be aware of electrical hazards |
| ☒ Use safe lifting practices. Wear leather gloves if necessary. | ☒ Be aware of pressure hazards. |
| ☒ Be aware of pinch points on pump cable reel and hydraulic tailgate lift. | ☒ No eating or drinking at sampling counter. |
| ☒ Be aware of chemical hazards. | ☒ Be aware of biohazards (snakes, spiders, etc.) |
| ☒ Wear nitrile or latex gloves when sampling. | ☒ Wear communication device (cell phone, EOC pager). |
| ☒ Wear chemical safety goggles. | ☒ Avoid spilling purge / decon water. |

Hospital/Clinic: Sandia Medical Clinic Phone: 844-0911/911

*Attendees*

| Printed Name | Signature |
|---|---|
| William Gibson | William J Gibson |
| ALFRED SANTILLANES | Alfred Santillanes |
| Gilbert L. Quintana | Gilbert L Quintana |
| | |
| | |
| | |

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# TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-mW10 Date: 1/14/14 Time: 0800
1/15/14 0820

Activities: Groundwater monitoring and sampling

(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:
Temp: 54.3 °F Wind Speed: 0 MPH Humidity: 26.1 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ TT 1/3/14
Other:

*Safety Topics Presented*

| | | |
|---|---|---|
| ☒ Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary. | | ☒ Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated. |
| ☒ Wear safety boots. | | ☒ Be aware of electrical hazards |
| ☒ Use safe lifting practices. Wear leather gloves if necessary. | | ☒ Be aware of pressure hazards. |
| ☒ Be aware of pinch points on pump cable reel and hydraulic tailgate lift. | | ☒ No eating or drinking at sampling counter. |
| ☒ Be aware of chemical hazards. | | ☒ Be aware of biohazards (snakes, spiders, etc.) |
| ☒ Wear nitrile or latex gloves when sampling. | | ☒ Wear communication device (cell phone, EOC pager). |
| ☒ Wear chemical safety goggles. | | ☒ Avoid spilling purge / decon water. |

Hospital/Clinic: Sandia Medical Clinic Phone: 844-0911/911

*Attendees*

| Printed Name | Signature |
|---|---|
| Robert Lynch | |
| ALFRED SANTILLANES | |
| William Gibson | |
| Robert Lynch 1/15/14 | |
| William Gibson | |

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## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

| | |
|---|---|
| Project Name: CWL GWM | Project No.: 146422.10.11.03 |
| Well I.D.: CWL-BW 5 | Date: 01/09/14 |
| Well Condition: See Inspection Form | Weather Condition: See Tailgate form |
| Method: Portable pump X | Dedicated pump _____ Pump depth: 521' |

## PURGE MEASUREMENTS

| Depth to Water (ft) | Time 24 hr | Vol (L/gal) | Temp (°C) | SC (µS/cm) | ORP (mV) | pH | Turbidity (NTU) | DO (%) | Comments DO mg/L |
|---|---|---|---|---|---|---|---|---|---|
| 511.05 | 0822 | ✓ | START | | | | | | |
| 514.92 | 0844 | 5 | 17.83 | 901.1 | 243.8 | 7.01 | 0.53 | 76.6 | 7.27 |
| 516.03 | 0855 | 10 | 18.80 | 929.6 | 248.0 | 7.04 | 1.03 | 75.5 | 7.01 |
| 516.88 | 0907 | 15 | 19.06 | 934.6 | 254.0 | 7.00 | 1.09 | 77.2 | 7.13 |
| 517.09 | 0911 | 17 | 18.90 | 931.1 | 257.2 | 7.00 | 1.01 | 76.6 | 7.09 |
| 517.30 | 0915 | 19 | 18.91 | 930.4 | 259.6 | 7.00 | 1.23 | 76.6 | 7.10 |
| 517.46 | 0920 | 21 | 19.12 | 934.0 | 260.5 | 7.00 | 1.28 | 76.9 | 7.10 |
| 517.65 | 0924 | 23 | 19.20 | 935.0 | 263.1 | 6.99 | 0.94 | 76.9 | 7.07 |
| | 0925 | ✓ | Sampling | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | (615185 FB-2 12-18-13) |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | ≈4.00 gals purged from tubing |
| | | | | | | | | | 0833 |

## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

| | |
|---|---|
| Project Name: CWL GWM | Project No.: 146422.10.11.03 |
| Well I.D.: CWL-MW 9 | Date: 01/10/14 |
| Well Condition: See Inspection Form | Weather Condition: See Tailgate Form |
| Method: Portable pump X | Dedicated pump _____ Pump depth: 516' |

## PURGE MEASUREMENTS

| Depth to Water (ft) | Time 24 hr | Vol (L/gal) | Temp (°C) | SC (µS/cm) | ORP (mV) | pH | Turbidity (NTU) | DO (%) | Comments DO mg/L |
|---|---|---|---|---|---|---|---|---|---|
| 503.10 | 0816 | | START | | | | | | |
| 507.57 | 0834 | 5 | 18.43 | 793.7 | 249.8 | 7.07 | 0.46 | 18.2 | 1.70 |
| 508.81 | 0845 | 10 | 18.53 | 792.8 | 222.6 | 7.08 | 0.50 | 18.2 | 1.69 |
| 509.54 | 0855 | 15 | 18.29 | 797.9 | 172.6 | 7.07 | 0.84 | 20.1 | 1.89 |
| 510.09 | 0906 | 20 | 19.01 | 818.8 | 133.8 | 7.07 | 0.65 | 21.8 | 2.02 |
| 510.27 | 0913 | 23 | 19.26 | 829.8 | 118.6 | 7.06 | 0.66 | 23.5 | 2.16 |
| 510.33 | 0918 | 25 | 19.28 | 832.0 | 112.8 | 7.07 | 0.64 | 23.8 | 2.19 |
| 510.39 | 0923 | 27 | 19.19 | 829.6 | 107.9 | 7.07 | 0.47 | 24.2 | 2.22 |
| 510.41 | 0928 | 29 | 19.16 | 829.0 | 103.7 | 7.07 | 0.29 | 25.5 | 2.36 |
| | 0929 | | SAMPLING | | | | | | |
| | | | | | | | | | ~4.00 gals purged from tubing |
| | | | | | | | | | 0824 |

## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

| | |
|---|---|
| Project Name: CWL GWM | Project No.: 146422.10.11.03 |
| Well I.D.: CWL-MW 10 | Date: 01/14/14 |
| Well Condition: See Inspection Form | Weather Condition: See Tailgate Form |
| Method: Portable pump X | Dedicated pump _____ Pump depth: 515' |

## PURGE MEASUREMENTS

| Depth to Water (ft) | Time 24 hr | Vol. (L/gal) | Temp (°C) | SC (µS/cm) | ORP (mV) | pH | Turbidity (NTU) | DO (%) | Comments DO mg/L |
|---|---|---|---|---|---|---|---|---|---|
| 500.40 | 0820 | / | START | | | | | | |
| 505.61 | 0901 | 5 | 16.50 | 713.5 | 226.6 | 7.19 | 2.36 | 12.3 | 1.20 |
| 507.26 | 0912 | 7 | 17.04 | 723.0 | 209.8 | 7.19 | 4.68 | 12.1 | 1.16 |
| 508.83 | 0924 | 9 | 17.09 | 724.0 | 209.6 | 7.19 | 8.25 | 14.8 | 1.43 |
| 510.23 | 0935 | 11 | 17.22 | 727.2 | 205.5 | 7.19 | 9.05 | 12.4 | 1.19 |
| 511.07 | 0942 | 12 | 17.13 | 725.9 | 207.0 | 7.19 | 9.05 | 16.8 | 1.61 |
| 511.81 | 0951 | 13 | 16.90 | 724.3 | 207.5 | 7.18 | 11.1 | 15.4 | 1.49 |
| 512.62 | 0958 | 14 | 16.86 | 722.9 | 209.7 | 7.18 | 11.1 | 17.4 | 1.69 |
| 513.55 | 1006 | 15 | 17.03 | 727.5 | 166.2 | 7.18 | 10.7 | 15.2 | 1.46 |
| 514.30 | 1014 | 16 | 16.81 | 723.7 | 118.1 | 7.19 | 10.2 | 15.4 | 1.49 |
| 514.79 | 1020 | 16.5 | 16.97 | 726.3 | 116.7 | 7.19 | 10.6 | 17.7 | 1.66 |
| 514.79 | 1020 | well | DRY | | | | | | |
| 1/15/14 504.31 | 0842 | / | START | | | | | | |
| 506.30 | 0858 | 1 | 15.21 | 709.7 | 101.6 | 7.20 | 1.55 | 27.3 | 2.72 |
| 507.21 | 0905 | 2 | 16.29 | 726.7 | 85.1 | 7.19 | 1.60 | 22.8 | 2.24 |
| 508.03 | 0912 | 3 | 17.13 | 742.5 | 64.4 | 7.17 | 1.90 | 21.1 | 2.03 |
| | 0913 | / | Sampling | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | 1.75 |
| | | | | | | | | | ~4.00 gals purged |
| | | | | | | | | | from tubing |
| | | | | | | | | | 0832 1/15/14 |

*IMPORTANT NOTICE: A printed copy of this document may not be the document currently in effect. The official version is located on the Sandia Restricted Network (SRN), department home page*

0853

# FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

| | |
|---|---|
| Project Name: CWL-GWM | Project No.: 146422.10.11.03 |
| Well I.D.: CWL-MW11 | Date: 1/13/2014 |
| Well Condition: Good See Inspection Form | Weather Condition: See Tailgate Form |
| Method: Portable pump X | Dedicated pump _____ Pump depth: 513 |

## PURGE MEASUREMENTS

| Depth to Water (ft) | Time 24 hr | Vol. (L (gal)) | Temp (°C) | SC (µS/cm) | ORP (mV) | pH | Turbidity (NTU) | DO (%) | Comments DO mg/L |
|---|---|---|---|---|---|---|---|---|---|
| 498.92 | 0830 | | Start → | | | | | | |
| 502.84 | 0912 | 5 | 16.15 | 810 | 278.2 | 7.06 | 0.20 | 60.1 | 5.89 |
| 504.77 | 0931 | 10 | 16.76 | 822 | 256.8 | 7.06 | 0.69 | 58.7 | 5.69 |
| 506.73 | 0953 | 15 | 17.04 | 828.3 | 251.1 | 7.07 | 0.94 | 56.6 | 5.48 |
| 508.71 | 1016 | 20 | 17.63 | 839.7 | 247.7 | 7.07 | 0.76 | 56.0 | 5.33 |
| 509.78 | 1029 | 23 | 17.67 | 840.0 | 246.8 | 7.07 | 0.75 | 54.0 | 5.13 |
| 510.31 | 1035 | 25 | 17.96 | 845.2 | 243.3 | 7.07 | 0.91 | 53.7 | 5.07 |
| 510.96 | 1044 | 27 | 17.95 | 844.1 | 241.7 | 7.07 | 0.93 | 51.6 | 4.88 |
| 511.65 | 1053 | 29 | 18.04 | 849.9 | 240.93 | 7.07 | 0.87 | 51.9 | 4.95 |
| | 1054 | | Sample → | | | | | | |
| | | | | | | | | | 0846 |
| | | | | | | | | | ≈ 1.6 gallons purged |

## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG



| | |
|---|---|
| SNL/NM Project Name: CWL GWM | SNL/NM Project No.: 146422.10.11.03 |
| Calibrations done by: R Lynch | Date: 1/9/14 |

Make & Model: YSI EXO 1

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167

YSI 650 MDS (S/N): NA

### pH Calibration

| pH Calibrated to (std): 7.00 | | | pH sloped to (std): 10.00 | | | |
|---|---|---|---|---|---|---|
| Reference value: | 4.00 | | 7.00 | | 10.00 | |
| | Value | Temp | Value | Temp | Value | Temp |
| 1. Time: 0639 | 4.01 | 18.25 | 7.00 | 18.26 | 10.00 | 18.22 |
| 2. Time: 1052 | 4.02 | 18.3 | 7.00 | 18.3 | 10.00 | 18.3 |
| 3. Time: | | | | | | |
| 4. Time: | | | | | | |
| Standard lot no.: | 3AD782 | | 3AE725 | | 3AD357 | |
| Expiration date: | 4/15 | | 5/15 | | 4/15 | |

### SC Calibration

| Reference Value: 1225 uS | | | Standard Lot No.: 3AE221 |
|---|---|---|---|
| | Value | Temp | Expiration Date: 5/15 |
| 1. Time: 0644 | 1225 | 18.72 | |
| 2. Time: 1054 | 1226 | 18.5 | |
| 3. Time: | | | |
| 4. Time: | | | |

### ORP Calibration

| Reference Value: 200 mV | | | Standard Lot No 1305755 |
|---|---|---|---|
| | Value | Temp | Expiration Date: 1/14 |
| 1. Time: 0645 | 200.10 | 18.07 | |
| 2. Time: 1053 | 200.16 | 18.11 | |
| 3. Time: | | | |
| 4. Time: | | | |

### DO Calibration

| Calibration Value: | 81% air saturation @ 5200 ft | Atmospheric Pressure in Hg |
|---|---|---|
| 1. Time: 0701 | 81.20 | 24.3 |
| 2. Time: 1051 | 81.33 | 24.3 |
| 3. Time: | | |
| 4. Time: | | |

**GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG (continued)** Page 2 of 2

| SNL/NM Project Name: CWL GWM | | Project No.: 146422.10.11.03 | | |
|---|---|---|---|---|
| Calibration done by: R Lynch | | Date: 1/9/14 | | |
| TURBIDIMETER | | | | |
| Make & Model: HACH 2100P HACH 2100Q | | Serial No. S/N 10060C003010 | | |
| Reference Value | RL + 10 | 20 | 100 | 800 |
| Standard Lot No. | 0161 | 0167 | 0168 | 0161 |
| 1. Time 0820 | 9.45 | 19.5 | 93.8 | 791 |
| 2. Time 0940 | 9.61 | 19.8 | 97.6 | 795 |
| 3. Time | | | | |
| 4. Time | | | | |

Comments:

## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG



| | |
|---|---|
| SNL/NM Project Name: CWL GWM | SNL/NM Project No.: 146422.10.11.03 |
| Calibrations done by: R Lynch | Date: 1/10/14 |

Make & Model: YSI EXO 1

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167

YSI 650 MDS (S/N): NA

### pH Calibration

pH Calibrated to (std): 7.00 — pH sloped to (std): 10.00

| Reference value: | 4.00 | | 7.00 | | 10.00 | |
|---|---|---|---|---|---|---|
| | Value | Temp | Value | Temp | Value | Temp |
| 1. Time: 0637 | 3.99 | 18.4 | 7.00 | 18.4 | 10.01 | 18.4 |
| 2. Time: 1030 | 4.01 | 18.8 | 7.00 | 18.7 | 10.00 | 18.7 |
| 3. Time: | | | | | | |
| 4. Time: | | | | | | |
| Standard lot no.: | 3AD782 | | 3AE725 | | 3AD357 | |
| Expiration date: | 4/15 | | 5/15 | | 4/15 | |

### SC Calibration

Reference Value: 1225 uS — Standard Lot No.: 3AE221

| | Value | Temp | Expiration Date: 5/15 |
|---|---|---|---|
| 1. Time: 0640 | 1224 | 18.5 | |
| 2. Time: 1032 | 1227 | 18.8 | |
| 3. Time: | | | |
| 4. Time: | | | |

### ORP Calibration

Reference Value: 200 mV — Standard Lot No. 1305755

| | Value | Temp | Expiration Date: 1/14 |
|---|---|---|---|
| 1. Time: 0638 | 200.1 | 18.5 | |
| 2. Time: 1031 | 200.4 | 18.8 | |
| 3. Time: | | | |
| 4 Time: | | | |

### DO Calibration

| Calibration Value: | 81% air saturation @ 5200 ft. | Atmospheric Pressure in Hg |
|---|---|---|
| 1. Time: 0636 | 81.41 | 24.20 |
| 2. Time: 1029 | 81.4 | 24.22 |
| 3. Time: | | |
| 4. Time: | | |

## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG (continued) Page 2 of 2

| SNL/NM Project Name: CWL GWM | | Project No.: 146422.10.11.03 | | |
|---|---|---|---|---|
| Calibration done by: R Lynch | | Date: 1/10/14 | | |
| TURBIDIMETER | | | | |
| Make & Model: HACH 2100P HACH 2100Q | | Serial No. S/N 10060C003010 | | |
| Reference Value | RL + 10 | 20 | 100 | 800 |
| Standard Lot No. | 0161 | 0167 | 0168 | 0161 |
| 1. Time 0803 | 9.92 | 19.7 | 98.1 | 797 |
| 2. Time 0940 | 9.96 | 19.4 | 97.9 | 796 |
| 3. Time | | | | |
| 4. Time | | | | |

Comments:

## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

| SNL/NM Project Name: CWL-GWM | SNL/NM Project No.: 146422.10.11.03 |
|---|---|
| Calibrations done by: A. Santillanes | Date: 1/13/2014 |

Make & Model: YSI XO 1

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167

YSI 650 MDS (S/N): NA

**pH Calibration**

pH Calibrated to (std): 7.00 pH sloped to (std): 10.00

| Reference value: | 4.00 | | 7.00 | | 10.00 | |
|---|---|---|---|---|---|---|
| | Value | Temp | Value | Temp | Value | Temp |
| 1. Time: 0640 | 4.00 | 18.2 | 7.00 | 18.2 | 10.00 | 18.2 |
| 2. Time: 1215 | 4.01 | 19.5 | 7.00 | 19.3 | 9.98 | 19.4 |
| 3. Time: | | | | | | |
| 4. Time: | | | | | | |
| Standard lot no.: | 3AD782 | | 3AE221 | | 3AD357 | |
| Expiration date: | 4/15 | | 5/15 | | 1/15 | |

**SC Calibration**

Reference Value: 1225 uS Standard Lot No.: 3AE221

Expiration Date: 5/15

| | Value | Temp |
|---|---|---|
| 1. Time: 0642 | 1225 | 18.2 |
| 2. Time: 1208 | 1225 | 19.3 |
| 3. Time: | | |
| 4. Time: | | |

**ORP Calibration**

Reference Value: 200 mV Standard Lot No. 1305755

Expiration Date: 1/14

| | Value | Temp |
|---|---|---|
| 1. Time: 0644 | 200.0 | 18.2 |
| 2. Time: 1204 | 200.0 | 19.3 |
| 3. Time: | | |
| 4. Time: | | |

**DO Calibration**

| Calibration Value: | 81% air saturation @ 5200 ft. | Atmospheric Pressure in Hg |
|---|---|---|
| 1. Time: 0646 | 81.50 | 24.24 |
| 2. Time: 1201 | 81.5 | 24.33 |
| 3. Time: | | |
| 4. Time: | | |

**GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG (continued) Page 2 of 2**

| SNL/NM Project Name: CWL-GWM | | Project No.: 146422.10.11.03 | | |
|---|---|---|---|---|
| Calibration done by: A. Santillanes | | Date: 1/13/2014 | | |
| TURBIDIMETER | | | | |
| Make & Model: HACH 2100P Hach 2100Q | | Serial No. S/N 10060C003010 | | |
| Reference Value | ~~10~~ | 20 | 100 | 800 |
| Standard Lot No. | | | | |
| 1. Time 0650 | 9.98 | 20 | 99.6 | 798 |
| 2. Time 1220 | 9.98 | 20 | 99.7 | 796 |
| 3. Time | | | | |
| 4. Time | | | | |

Comments:

## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG



| | |
|---|---|
| SNL/NM Project Name: CWL GWM | SNL/NM Project No.: 146422.10.11.03 |
| Calibrations done by: R Lynch | Date: 1/14/14 |

Make & Model: YSI EXO 1

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167

YSI 650 MDS (S/N): NA

### pH Calibration

pH Calibrated to (std): 7.00 — pH sloped to (std): 10.00

| Reference value: | 4.00 | | 7.00 | | 10.00 | |
|---|---|---|---|---|---|---|
| | Value | Temp | Value | Temp | Value | Temp |
| 1. Time: 0640 | 4.02 | 18.4 | 6.99 | 18.4 | 10.01 | 18.4 |
| 2. Time: 1102 | 4.01 | 18.6 | 7.00 | 18.6 | 9.99 | 18.6 |
| 3. Time: 0651 | 3.99 | 18.1 | 6.99 | 18.1 | 10.00 | 18.1 |
| 4. Time: 0950 | 4.00 | 18.3 | 6.99 | 18.3 | 10.00 | 18.3 |
| Standard lot no.: | 3AD782 | | 3AE725 | | 3AD357 | |
| Expiration date: | 4/15 | | 5/15 | | 4/15 | |

### SC Calibration

Reference Value: 1225 uS — Standard Lot No.: 3AE221

Expiration Date: 5/15

| | Value | Temp |
|---|---|---|
| 1. Time: 0642 | 1222 | 18.4 |
| 2. Time: 1104 | 1224 | 18.6 |
| 3. Time: 0653 | 1221 | 18.2 |
| 4. Time: 0952 | 1222 | 18.3 |

### ORP Calibration

Reference Value: 200 mV — Standard Lot No. 1305755

Expiration Date: 1/14

| | Value | Temp |
|---|---|---|
| 1. Time: 0641 | 199.8 | 18.4 |
| 2. Time: 1103 | 200.2 | 18.6 |
| 3. Time: 0652 | 200.1 | 18.3 |
| 4. Time: 0951 | 200.7 | 18.4 |

### DO Calibration

| Calibration Value: | 81% air saturation @ 5200 ft. | Atmospheric Pressure in Hg |
|---|---|---|
| 1. Time: 0639 | 81.3 | 24.48 |
| 2. Time: 1101 | 81.2 | 24.45 |
| 3. Time: 0650 | 82.1 | 24.91 |
| 4. Time: 0949 | 82.1 | 24.88 |

## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG (continued) Page 2 of 2

| SNL/NM Project Name: CWL GWM | | Project No.: 146422.10.11.03 | | |
|---|---|---|---|---|
| Calibration done by: R Lynch | | Date: 1/14/14 | | |
| TURBIDIMETER | | | | |
| Make & Model: HACH 2100P HACH 2100Q | | Serial No. S/N 10060C003010 | | |
| Reference Value | RL ÷ 10 | 20 | 100 | 800 |
| Standard Lot No. | 0161 | 0167 | 0168 | 0161 |
| 1. Time 0807 | 9.94 | 19.7 | 103 | 792 |
| 2. Time 1030 | 9.91 | 19.6 | 99.8 | 794 |
| 3. Time 0828 | 9.90 | 19.4 | 101 | 797 |
| 4. Time 0930 | 9.93 | 19.6 | 103 | 794 |

Comments:

**Portable Pump and Tubing / Water Level Indicator**
**Decontamination Log Form**

| **Project Name:** CWL | **Monitoring Well ID # :** BW-5 | **Date:** 1-9-13 |
|---|---|---|

The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03

| **Pump and Tubing Bundle ID #:** 1806-792 | **Water Level Indicator ID #:** 62187 |
|---|---|
| **Personnel Performing Decontamination:**<br>Alfred Santillanes — Print Name: — Initial: AS<br>Robert Lynch — Print Name: — Initial: RL | **Personnel Performing Decontamination:**<br>Alfred Santillanes — Print Name: — Initial: AS<br>Robert Lynch — Print Name: — Initial: RL |

**Condition of Equipment**

**Pump:** Good **Tubing Bundle:** Good **Water Level Indicator:** Good

List of Decontamination Materials

| **Distilled** or **Deonized** (circle one) | $HNO_3$ |
|---|---|
| **Source:** Culligan | **Grade:** Reagent |
| **Lot Number:** 12-18-13 | **UN #:** 2031 |
| | **Manufacturer:** AROC |
| | **Lot Number:** A0305629 |

**Portable Pump and Tubing / Water Level Indicator**
**Decontamination Log Form**

| **Project Name:** CWL | **Monitoring Well ID # :** N/A | **Date:** 1-8-13 |
|---|---|---|

The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03

| **Pump and Tubing Bundle ID #:** 1806-792 | **Water Level Indicator ID #:** N/A |
|---|---|
| **Personnel Performing Decontamination:**<br>William Gibson — Initial: WJG<br>Print Name:<br>Robert Lynch — Initial: RL<br>Print Name: | **Personnel Performing Decontamination:**<br>N/A — Initial:<br>Print Name:<br>N/A — Initial:<br>Print Name: |

**Condition of Equipment**

**Pump:** Good **Tubing Bundle:** Good **Water Level Indicator:** N/A

List of Decontamination Materials

| **Distilled** or **Deonized** (circle one) | **$HNO_3$** |
|---|---|
| | **Grade:** Reagent |
| **Source:** Culligan | **UN #:** 2031 |
| **Lot Number:** 12/18/13 | **Manufacturer:** AROC |
| | **Lot Number:** A0305629 |

**Portable Pump and Tubing / Water Level Indicator**
**Decontamination Log Form**

| | | |
|---|---|---|
| **Project Name:** CWL-GWM | **Monitoring Well ID # :** CWL-MW9 | **Date:** 01-10-14 |

The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03

| | |
|---|---|
| **Pump and Tubing Bundle ID #:** 1806-792 | **Water Level Indicator ID #:** 62187 |
| **Personnel Performing Decontamination:**<br>William Gibson — Print Name: — Initial: WJG<br>Alfred Santillanes — Print Name: — Initial: | **Personnel Performing Decontamination:**<br>William Gibson — Print Name: — Initial: WJG<br>Alfred Santillanes — Print Name: — Initial: |

**Condition of Equipment**

**Pump:** Good **Tubing Bundle:** Good **Water Level Indicator:** Good

List of Decontamination Materials

| | |
|---|---|
| **Distilled** or **Deonized** (circle one)<br>**Source:** Culligan<br>**Lot Number:** 121813 | **$HNO_3$**<br>**Grade:** Reagent<br>**UN #:** 2031<br>**Manufacturer:** AROC<br>**Lot Number:** A0305629 |

**Portable Pump and Tubing / Water Level Indicator**
**Decontamination Log Form**

| **Project Name:** CWL-GWM | **Monitoring Well ID # :** CWL-MW11 | **Date:** 01-13-14 |
|---|---|---|

The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03

| **Pump and Tubing Bundle ID #:** 1806-792 | **Water Level Indicator ID #:** 62187 |
|---|---|
| **Personnel Performing Decontamination:**<br>Alfred Santillanes (Print Name:) (Initial:)<br>William Gibson (Print Name:) (Initial:) | **Personnel Performing Decontamination:**<br>Alfred Santillanes (Print Name:) (Initial:)<br>William Gibson (Print Name:) (Initial:) |

**Condition of Equipment**

**Pump:** Good **Tubing Bundle:** Good **Water Level Indicator:** Good

List of Decontamination Materials

| **Distilled** or **Deonized** (circle one) | **$HNO_3$** |
|---|---|
| **Source:** Culligan | **Grade:** Reagent |
| **Lot Number:** 12/18/13 | **UN #:** 2031 |
| | **Manufacturer:** AROC |
| | **Lot Number:** A0305629 |

**Portable Pump and Tubing / Water Level Indicator**
**Decontamination Log Form**

| **Project Name:** CWL-GWM | **Monitoring Well ID # :** CWL-MW10 | **Date:** 01-15-14 |
|---|---|---|

The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03

| **Pump and Tubing Bundle ID #:** 1806-792 | **Water Level Indicator ID #:** 62187 |
|---|---|
| **Personnel Performing Decontamination:**<br>Robert Lynch — Print Name: — RL — Initial:<br>William Gibson — Print Name: — WJG — Initial: | **Personnel Performing Decontamination:**<br>Robert Lynch — Print Name: — RL — Initial:<br>William Gibson — Print Name: — WJG — Initial: |

**Condition of Equipment**

**Pump:** Good **Tubing Bundle:** Good **Water Level Indicator:** Good

List of Decontamination Materials

| **Distilled** or **Deonized** (circle one) | **$HNO_3$** |
|---|---|
| | **Grade:** Reagent |
| **Source:** Culligan | **UN #:** 2031 |
| **Lot Number:** 121813 | **Manufacturer:** AROC |
| | **Lot Number:** A0305629 |

# SUMMARY SHEET FOR JANUARY 2014 SAMPLES

**Sample Summary for CWL GWM**
**January 2014**

| Sample ID | Sample Date | ARCOC | Sample Number | Sample Type | Associated Equipment Blank (ARCOC #/Sample #) | Associated Trip Blank (ARCOC # / Sample #) | Associated Field Blank (ARCOC # / Sample #) | Comments |
|---|---|---|---|---|---|---|---|---|
| ***CWL GWM: Project Task # 146422.10.11.03. Service Order # CF 327-14*** | | | | | | | | |
| ***Environmental Samples*** | | | | | | | | |
| CWL-BW5 | 9-Jan-14 | 615185 | 095107 | Environmental | 615184 / 095104 | 615185 / 095109 | 615185 / 095106 | |
| CWL-BW5 | 9-Jan-14 | 615185 | 095108 | Duplicate | 615184 / 095104 | 615185 / 095109 | 615185 / 095106 | |
| CWL-MW9 | 10-Jan-14 | 615187 | 095112 | Environmental | n/a | 615187 / 095113 | n/a | |
| CWL-MW10 | 15-Jan-14 | 615191 | 095121 | Environmental | n/a | 615191 / 095122 | 615191 / 095120 | |
| CWL-MW11 | 13-Jan-14 | 615189 | 095116 | Environmental | n/a | 615189 / 095117 | n/a | |
| CWL-EB1 | 8-Jan-14 | 615184 | 095104 | Equipment Blank | n/a | 615184 / 095105 | n/a | Decon prior to CWL-BW5 |
| CWL-FB1 | 8-Jan-14 | 615184 | 095103 | QC - DI water | n/a | 615184 / 095105 | n/a | DI source water |
| CWL-FB2 | 9-Jan-14 | 615185 | 095106 | Field Blank | n/a | 615185 / 095109 | n/a | at CWL-BW5 |
| CWL-FB3 | 15-Jan-14 | 615191 | 095120 | Field Blank | n/a | 615191 / 095122 | n/a | at CWL-MW10 |
| ***Waste Characterization Samples*** | | | | | | | | |
| CWL-BW5 | 9-Jan-14 | 615186 | 095110 | Waste | n/a | 615186 / 095111 | n/a | No data validation required |
| CWL-MW9 | 10-Jan-14 | 615188 | 095114 | Waste | n/a | 615188 / 095115 | n/a | No data validation required |
| CWL-MW10 | 15-Jan-14 | 615192 | 095123 | Waste | n/a | 615192 / 095124 | n/a | No data validation required |
| CWL-MW11 | 13-Jan-14 | 615190 | 095118 | Waste | n/a | 615190 / 095119 | n/a | No data validation required |

# DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

# GROUNDWATER MONITORING

# JANUARY 2014

**AR/COC NUMBERS 615184 and 615185**

PO Box 21987
Albuquerque, NM 87154
1-888-678-5447
www.aqainc.net

# Memorandum

Date: February 11, 2014

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 615184 and 615185
SDG: 341106
Laboratory: GEL
Project/Task: 146422.10.11.03
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 3.

## Summary

Seven samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

## Holding Times

The samples were analyzed within the prescribed holding time and properly preserved.

## Instrument Tune

All instrument tune requirements were met.

## Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as follows.

The CCV %Ds were >20% with positive bias for trichlorofluoromethane and trichlorotrifluoroethane. The associated sample results were NDs and will not be qualified.

## Blanks

No target analytes were detected in the blanks except as follows.

Chloroform was detected at > the PQL in the EB, sample 341106002 and in the FB, sample -005. The associated sample results were NDs and will not be qualified.

Chloroform was detected at > the PQL in the FB sample -001. No samples were associated with this FB.

**Surrogates**

All surrogate recoveries met QC acceptance criteria.

**Internal Standards**

All internal standards met QC acceptance criteria.

**Matrix Spike/Matrix Spike Duplicate (MS/MSD)**

All MS/MSD acceptance criteria were met. It should be noted that the MS/MSD analyses were performed on a sample of similar matrix from ARCOC 615186. No sample data will be qualified as a result.

**Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

**Detection Limits/Dilutions**

All detection limits were properly reported. The samples were not diluted.

**Tentatively Identified Compounds (TICs)**

TIC reports were not required.

**Other QC**

A TB and a FB was submitted with each AR/COC. An EB was submitted with AR/COC 615184 and was applied to the samples submitted with AR/COC 615185. A field duplicate pair was submitted with AR/COC 615185. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

**Reviewed by**: Mary Donivan **Level:** I **Date:** 02/12/14

PO Box 21987
Albuquerque, NM 87154
1-888-678-5447
www.aqainc.net

# Memorandum

Date: February 11, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 615184 and 615185
SDG: 341106
Laboratory: GEL
Project/Task: 146422.10.11.03
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

## Summary

Three samples were prepared and analyzed with approved procedures using method EPA 6020 (ICP-MS). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

## Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved.

## ICP-MS Instrument Tune

The ICP-MS tune met QC acceptance criteria.

## Calibration

All initial and continuing calibration met QC acceptance criteria.

## Reporting Limit Verification

All CRA/CRI recoveries associated with the samples met QC acceptance criteria.

It should be noted that the CRI was analyzed at the PQL and not at 2X the PQL for all target analytes.

**Blanks**

No target analytes were detected in the blanks.

**ICP -MS Internal Standards**

The ICP-MS internal standards met QC acceptance criteria.

**Matrix Spike (MS)**

The MS met all QC acceptance criteria.

**Laboratory Replicate**

The replicate met all QC acceptance criteria.

**Laboratory Control Sample (LCS)**

The LCS met all QC acceptance criteria.

**Detection Limits/Dilutions**

All detection limits were properly reported. The samples were not diluted.

**ICP Interference Check Sample (ICS A and AB)**

Results of the ICS A and AB analyses were evaluated because the sample concentrations of Ca were > those in the ICS solution. All QC acceptance criteria were met.

**ICP Serial Dilution**

The serial dilutions met all QC acceptance criteria.

**Other QC**

An EB was submitted with AR/COC 615184 and was applied to the samples submitted with AR/COC 615185. A field duplicate pair was submitted with AR/COC 615185. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

**Reviewed by**: Mary Donivan **Level:** I **Date:** 02/12/14

# *Sample Findings Summary*

**AR/COC: 615184, 615185**



| Analytical Method | Sample ID | Analyte Name (CAS#) | Qualifier, RC |
|---|---|---|---|

**All other analyses met QC acceptance criteria; no further data should be qualified.**

# Data Validation Summary Worksheet

AR/COC #: 615184 and 615185 | Site/Project: CWL GWM | Validation Date: 02/11/2014

SDG #: 341106 | Laboratory: GEL | Validator: Linda Thal

Matrix: Aqueous | # of Samples: 10 CVR present: Yes | Analysis Type: X Organic X Metals

AR/COC(s) present: Yes | Sample Container Integrity: OK | Rad Gen Chem

**Requested Analyses Not Reported**

| Sample Number | Laboratory ID | organic | genchem | metals | rad | Comments |
|---|---|---|---|---|---|---|
| None | | | | | | |
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**Hold Time/Preservation Outliers**

| Sample Number | Laboratory ID | Analysis | Pres. | Coll. Date | Prep. Date | Anal. Date | Anal. within 2X HT | Anal. beyond 2X HT |
|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | |
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Comments: Sampled 01/08 and 09/2014; EB to be applied to samples on AR/COC 615185; Samples on ARCOC 615186 are not for data validation

Validated by: 

Revised 7/2007

# Organic Worksheet (GC/MS)

AR/COC #: 615184 and 615185 SDG #: 341106 Matrix: Aqueous

Laboratory Sample IDs: 341106001, -002, -004, -005, -006, -008, -010

Method/Batch #s: 8260B: 1360659 Tuning (pass/fail): Pass TICs Required? (yes/no): No

| Analyte (outliers) | Calibration | | | | Method Blank | 5X (10X) MB | LCS %R | MS %R | MSD %R | MS/ MSD RPD | EB -002 | TBs-004 -010 | FB -001 DI water | FB -005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Int. | RF | RSD/ $R^2$ | (ICV) CCV %D | | | | | | | | | | |
| Trichlorofluoromethane | NA | ✓ | ✓ | +20.9 | ✓ | NA | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Chloroform | NA | ✓ | ✓ | ✓ | ✓ | NA | ✓ | ✓ | ✓ | ✓ | 2.58 | ✓ | 2.71 | 2.87 |
| Trichlorotrifluoroethane | NA | ✓ | ✓ | +22 | ✓ | NA | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
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**Surrogate Recovery Outliers**

| Sample ID | | | | | | |
|---|---|---|---|---|---|---|
| None | | | | | | |

**IS Outliers**

| Sample ID | Area | RT | Area | RT | Area | RT | Area | RT | Area | RT | Area | RT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | | | | | |
| | | | | | | | | | | | | |

Comments: HTs OK: ICAL VOA6.I 01/08/2014; 6 TAL only

MS/MSD performed on SNL sample 341106011 from ARCOC 615186 which is not part of DV; spiked with trichlorotrifluoroethane.

EB applies the samples on AR/COC 615185. FB -001 not applied to anything per client request.

# Inorganic Metals Worksheet

AR/COC #: 615184 and 615185 SDG #: 341106 Matrix: Aqueous

Laboratory Sample IDs: 341106003, -007, -009

Method/Batch #s: **3005/6020**: 1359447/1359446(prep)

ICPMS Mass Cal (pass/fail): Pass ICPMS Resolution (pass/fail): Pass

| **Analyte** (outliers) | **Calibration** | | | | | | **Method Blank mg/L** | **5X Blank or (5X MDL) mg/L** | **LCS %R** | **MS %R** | **Lab Rep RPD** | **Serial Dil. %D** | **ICS AB %R** | **ICS A ± MDL ug/L x50 (mg/L)** | **CRA CRI %R** | **EB -003** | **EB X5** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Int.** mg/L | **$R^2$** | **ICV** | **CCV** | **ICB ug/L** | **CCB ug/L** | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | |
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| **IS Outliers** *60-125%* | | | | **IS Outliers** *80-120%* | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID** | **%Recovery** | **%Recovery** | **%Recovery** | **CCV/CCB ID** | **%Recovery** | **%Recovery** | **%Recovery** |
| None | | | | None | | | |

Comments: HTs OK; All matrix QC on sample -007; Ca>100 000 ppb for sample -007 and -009, ICS A and AB in criteria

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTODY



Internal Lab



Batch No. | SMO Use | AR/COC 615184

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | CWL GWM | Date Samples Shipped: | 1/9/14 | SMO Authorization: | ☐ Waste Characterization |
| Project/Task Manager: | Tim Jackson | Carrier/Waybill No. | 793543 | SMO Contact Phone: | ☐ RMMA |
| Project/Task Number: | 146422.10.11.03 | Lab Contact: | Edie Kent/808-556-8171 | Larraine Herrera/505-844-3199 | ☐ Released by COC No. |
| Service Order: | CF327-14 | Lab Destination: | GEL | Send Report to SMO: | ☑ 4° Celsius |
| | | Contract No.: | PO 1303873 | Rita Kavanaugh/505-284-2553 | Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 341106 |
| Tech Area: | | | | | |
| Building: | Room: | Operational Site: | | | |

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preservative | Collection Method | Sample Type | Parameter & Method Requested | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ✓ 095103 | -001 | CWL-FB1 | NA | 1/8/14 13:00 | DIW | G | 3x40 ml | HCL | G | FB | VOCs (SW846-8260) | 001 |
| ✓ 095104 | -001 | CWL-EB1 | NA | 1/8/14 13:00 | DIW | G | 3x40 ml | HCL | G | EB | VOCs (SW846-8260) | 002 |
| ✓ 095104 | -015 | CWL-EB1 | NA | 1/8/14 13:01 | DIW | P | 500 ml | HNO3 | G | EB | Chromium,Nickel (SW846-6020) | 003 |
| ✓ 095105 | -001 | CWL-TB1 | NA | 1/8/14 13:00 | DIW | G | 3x40 ml | HCL | G | TB | VOCs (SW846-8260) | 004 |
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|---|---|---|---|
| Last Chain: | ☐ Yes | Sample Tracking SMO Use | Special Instructions/QC Requirements: |
| Validation Req'd: | ☑ Yes | Date Entered: | EDD ☑ Yes ☐ No |
| Background: | ☐ Yes | Entered by: | Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day |
| Confirmatory: | ☐ Yes | QC inits.: | Negotiated TAT ☐ |
| | | | Sample Disposal ☐ Return to Client ☑ Disposal by Lab |
| | | | Return Samples By: |
| | | | Comments: Send report to Tim Jackson/4142/MS 0729/505-284-2547 |
| | | | VOC's: Report CWL enhanced list of compounds, (Chloroform, 1,1-DCE,PCE,TCE,Freon 11, and Freon 113) |

Conditions on Receipt

Lab Use

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | William Gibson | | WJG | SNL/4142/505-284-3307/505-239-7367 |
| | Robert Lynch | | RL | SNL/4142/505-844-4013/505-250-7090 |
| | Alfred Santillanes | | AS | SNL/4142/505-844-5130/505-228-0710 |
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|---|---|---|---|---|---|---|---|---|
| 1.Relinquished by | | Org. 4142 | Date 1-9-14 | Time 10:08 | 3.Relinquished by | Org. | Date | Time |
| 1. Received by | | Org. 4142 | Date 1/9/14 | Time 1008 | 3. Received by | Org. | Date | Time |
| 2.Relinquished by | | Org 4142 | Date 1/9/14 | Time 1100 | 4.Relinquished by | Org. | Date | Time |
| 2. Received by | | Org. GEL | Date 1-10-14 | Time 0735 | 4. Received by | Org. | Date | Time |

*Prior confirmation with SMO required for 7 and 15 day TAT

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTODY



Internal Lab



Batch No. | SMO Use | AR/COC 615185

| | | | | | |
|---|---|---|---|---|---|
| Project Name: CWL GWM | Date Samples Shipped: 1/9/14 | SMO Authorization: | ☐ Waste Characterization | | |
| Project/Task Manager: Tim Jackson | Carrier/Waybill No. 213563 | SMO Contact Phone: | ☐ RMMA | | |
| Project/Task Number: 146422.10.11.03 | Lab Contact: Edie Kent/808-556-8171 | Lorraine Herrera/505-844-3199 | ☐ Released by COC No. | | |
| Service Order: CF327-14 | Lab Destination: GEL | Send Report to SMO: | ☑ 4° Celsius | | |
| | Contract No.: PO 1303873 | Rita Kavanaugh/505-284-2553 | Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 341106 | | |
| Tech Area: | | | | | |
| Building: Room: | Operational Site: | | | | |

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preservative | Collection Method | Sample Type | Parameter & Method Requested | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 095106 | -001 | CWL-FB2 | NA | 1/9/14 9:25 | DIW | G | 3x40 ml | HCL | G | FB | VOCs (SW846-8260) | 005 |
| 095107 | -001 | CWL-BW5 | 521 | 1/9/14 9:25 | GW | G | 3x40 ml | HCL | G | SA | VOCs (SW846-8260) | 006 |
| 095107 | -015 | CWL-BW5 | 521 | 1/9/14 9:27 | GW | P | 500 ml | HNO3 | G | SA | Chromium,Nickel (SW846-6020) | 007 |
| 095108 | -001 | CWL-BW5 | 521 | 1/9/14 9:25 | GW | G | 3x40 ml | HCL | G | DU | VOCs (SW846-8260) | 008 |
| 095108 | -015 | CWL-BW5 | 521 | 1/9/14 9:27 | GW | P | 500 ml | HNO3 | G | DU | Chromium,Nickel (SW846-6020) | 009 |
| 095109 | -001 | CWL-TB2 | NA | 1/9/14 9:25 | DIW | G | 3x40 ml | HCL | G | TB | VOCs (SW846-8260) | 016 |
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|---|---|---|---|
| Last Chain: ☐ Yes | Sample Tracking SMO Use | Special Instructions/QC Requirements: | Conditions on Receipt |
| Validation Req'd: ☑ Yes | Date Entered: | EDD ☑ Yes ☐ No | |
| Background: ☐ Yes | Entered by: | Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day | |
| Confirmatory: ☐ Yes | QC inits.: | Negotiated TAT ☐ | |
| | | Sample Disposal ☐ Return to Client ☑ Disposal by Lab | |
| | | Return Samples By: | |
| | | Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547 | |
| | | VOCs: Report CWL enhanced list of compounds, (Chloroform,1,1-DCE,PCE,TCE,Freon11,and Freon 113) | Lab Use |

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | William Gibson | | WJG | SNL/4142/505-284-3307/505-239-7367 |
| | ~~Robert Lynch~~ | | | ~~SNL/4142/505-844-4013/505-250-7090~~ |
| | Alfred Santillanes | | | SNL/4142/505-844-5130/505-228-0710 |
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|---|---|---|---|---|---|---|---|---|---|
| 1.Relinquished by | | Org. 4142 | Date 1-9-14 | Time 1012 | 3.Relinquished by | Org. | Date | Time |
| 1. Received by | | Org. 4142 | Date 1/9/14 | Time 1012 | 3. Received by | Org. | Date | Time |
| 2.Relinquished by | | Org. 4142 | Date 1/9/14 | Time 1100 | 4.Relinquished by | Org. | Date | Time |
| 2. Received by | | Org. GEL | Date 1-10-14 | Time 0735 | 4. Received by | Org. | Date | Time |

*Prior confirmation with SMO required for 7 and 15 day TAT

# AR/COC NUMBER 615187

PO Box 21987
Albuquerque, NM 87154
1-888-678-5447
www.aqainc.net

# Memorandum

Date: February 17, 2014

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 615187
SDG: 341182
Laboratory: GEL
Project/Task: 146422.10.11.03
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 3.

## Summary

Two samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

## Holding Times

The samples were analyzed within the prescribed holding time and properly preserved.

## Instrument Tune

All instrument tune requirements were met.

## Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as follows.

The CCV %D was >20% with positive bias for trichlorotrifluoroethane. The associated sample results were NDs and will not be qualified.

## Blanks

No target analytes were detected in the blanks.

**Surrogates**

All surrogate recoveries met QC acceptance criteria.

**Internal Standards**

All internal standards met QC acceptance criteria.

**Matrix Spike/Matrix Spike Duplicate (MS/MSD)**

All MS/MSD acceptance criteria were met. It should be noted that the MS/MSD analyses were performed on a sample of similar matrix from AR/COC 615188. No sample data will be qualified as a result.

**Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

**Detection Limits/Dilutions**

All detection limits were properly reported. The samples were not diluted.

**Tentatively Identified Compounds (TICs)**

TIC reports were not required.

**Other QC**

A TB was submitted with AR/COC 615187.

No other specific issues that affect data quality were identified.

**Reviewed by**: Mary Donivan **Level:** I **Date:** 02/17/14

PO Box 21987
Albuquerque, NM 87154
1-888-678-5447
www.aqainc.net

# Memorandum

Date: February 17, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 615187
SDG: 341182
Laboratory: GEL
Project/Task: 146422.10.11.03
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

## Summary

One sample was prepared and analyzed with approved procedures using method EPA 6020 (ICP-MS). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. Ni was detected in the ICS A at a negative value with an absolute value > the MDL but ≤2X the MDL. The associated sample result was a detect <50X the ICS A value and will be **qualified J-,CK3**.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

## Holding Times and Preservation

The sample was prepared and analyzed within the prescribed holding times and properly preserved.

## ICP-MS Instrument Tune

The ICP-MS tune met QC acceptance criteria.

## Calibration

All initial and continuing calibration met QC acceptance criteria.

## Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria.

It should be noted that the CRI was analyzed at the PQL and not at 2X the PQL for all target analytes.

**Blanks**

No target analytes were detected in the blanks.

**ICP -MS Internal Standards**

The ICP-MS internal standards met QC acceptance criteria.

**Matrix Spike (MS)**

The MS met all QC acceptance criteria. It should be noted that the MS analyses were performed on a sample of similar matrix from AR/COC 615188. No sample data will be qualified as a result.

**Laboratory Replicate**

The replicate met all QC acceptance criteria. It should be noted that the replicate analyses were performed on a sample of similar matrix from AR/COC 615188. No sample data will be qualified as a result.

**Laboratory Control Sample (LCS)**

The LCS met all QC acceptance criteria.

**Detection Limits/Dilutions**

All detection limits were properly reported. The sample was not diluted.

**ICP Interference Check Sample (ICS A and AB)**

Results of the ICS A and AB analyses were evaluated because the sample concentrations of Ca were > those in the ICS solution. All QC acceptance criteria were met except as noted above in the Summary section.

**ICP Serial Dilution**

The serial dilution met all QC acceptance criteria. It should be noted that the serial dilution analyses were performed on a sample of similar matrix from AR/COC 615188. No sample data will be qualified as a result.

**Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by**: Mary Donivan **Level:** I **Date:** 02/17/14

# *Sample Findings Summary*

**AR/COC: 615187**



| Analytical Method | Sample ID | Analyte Name (CAS#) | Qualifier, RC |
|---|---|---|---|
| **SW846 3005/6020 DOE-AL** | | | |
| | 095112-015/CWL-MW9 | Nickel (7440-02-0) | J-, CK3 |

**All other analyses met QC acceptance criteria; no further data should be qualified.**

# Data Validation Summary Worksheet

AR/COC #: 615187 | Site/Project: CWL GWM | Validation Date: 02/17/2014

SDG #: 341182 | Laboratory: GEL | Validator: Linda Thal

Matrix: Aqueous | # of Samples: 3 CVR present: Yes | Analysis Type: X□ Organic X□ Metals

AR/COC(s) present: Yes | Sample Container Integrity: OK | □ Rad □ Gen Chem

**Requested Analyses Not Reported**

| Sample Number | Laboratory ID | organic | genchem | metals | rad | Comments |
|---|---|---|---|---|---|---|
| None | | | | | | |
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**Hold Time/Preservation Outliers**

| Sample Number | Laboratory ID | Analysis | Pres. | Coll. Date | Prep. Date | Anal. Date | Anal. within 2X HT | Anal. beyond 2X HT |
|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | |
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Comments: Sampled 01/10/2014; Samples on ARCOC 615188 are not for data validation

Validated by: 

Revised 7/2007

# Organic Worksheet (GC/MS)

AR/COC #: 615187 SDG #: 341182 Matrix: Aqueous

Laboratory Sample IDs: 341182001 and -003

Method/Batch #s: 8260B: 1361700 Tuning (pass/fail): Pass TICs Required? (yes/no): No

| Analyte (outliers) | Calibration | | | | Method Blank | 5X (10X) MB | LCS %R | MS %R | MSD %R | MS/ MSD RPD | TB -003 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Int. | RF | RSD/ $R^2$ | (ICV) CCV %D | | | | | | | | | | |
| Trichlorotrifluoroethane | NA | ✓ | ✓ | +27 | ✓ | NA | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
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**Surrogate Recovery Outliers**

| Sample ID | | | | | | |
|---|---|---|---|---|---|---|
| None | | | | | | |

**IS Outliers**

| Sample ID | Area | RT | Area | RT | Area | RT | Area | RT | Area | RT | Area | RT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | | | | | |
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Comments: HTs OK: ICAL VOA6.I 01/08/2014; 6 TAL only

MS/MSD performed on SNL sample 341180001 from ARCOC 615188 which is not part of DV; spiked with trichlorotrifluoroethane.

# Inorganic Metals Worksheet

AR/COC #: 615187 SDG #: 341182 Matrix: Aqueous

Laboratory Sample IDs: 341182002

Method/Batch #s: **3005A/6020**: 1359655(prep)/1359656

ICPMS Mass Cal (pass/fail): Pass ICPMS Resolution (pass/fail): Pass

| **Analyte** (outliers) | **Calibration** | | | | | | **Method Blank mg/L** | **5X Blank or (5X MDL) mg/L** | **LCS %R** | **MS %R** | **Lab Rep RPD** | **Serial Dil. %D** | **ICS AB %R** | **ICS A ± MDL ug/L x50 (mg/L)** | **CRA CRI %R** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Int.** mg/L | **$R^2$** | **ICV** | **CCV** | **ICB ug/L** | **CCB ug/L** | | | | | | | | | | | | | |
| Ni | NA | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | NA | ✓ | ✓ | ✓ | ✓ | ✓ | -.78(-.039) | ✓ | | | | |
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| **IS Outliers** *60-125%* | | | | **IS Outliers** *80-120%* | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID** | **%Recovery** | **%Recovery** | **%Recovery** | **CCV/CCB ID** | **%Recovery** | **%Recovery** | **%Recovery** |
| None | | | | None | | | |

Comments: HTs OK; All matrix QC on sample 341180002 from AR/COC 615188; Ca>100 000 ppb for sample -002

SMO 2012-ARCOC (4-2012)

AOP 95-16

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab



Batch No.

SMO Use

**AR/COC 615187**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | CWL GWM | Date Samples Shipped: | 1/10/14 | SMO Authorization: | Donald Hampton |
| Project/Task Manager: | Tim Jackson | Carrier/Waybill No. | 213609 | SMO Contact Phone: | Lorraine Herrera/505-844-3199 |
| Project/Task Number: | 146422.10.11.03 | Lab Contact: | Edie Kent/808-556-8171 | | |
| Service Order: | CF327-14 | Lab Destination: | GEL | Send Report to SMO: | Rita Kavanaugh/505-284-2553 |
| | | Contract No.: | PO 1303873 | | |
| Tech Area: | | | | | |
| Building: | Room: | Operational Site: | | | |

☐ Waste Characterization ☐ RMMA ☐ Released by COC No. ☑ 4° Celsius

Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 341182

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preservative | Collection Method | Sample Type | Parameter & Method Requested | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 095112 | -001 | CWL-MW9 | 516 | 1/10/14 9:29 | GW | G | 3x40 ml | HCL | G | SA | VOCs (SW846-8260) | 001 |
| 095112 | -015 | CWL-MW9 | 516 | 1/10/14 9:30 | GW | P | 500 ml | HNO3 | G | SA | Chromium,Nickel (SW846-6020) | 002 |
| 095113 | -001 | CWL-TB4 | NA | 1/10/14 9:29 | DIW | G | 3x40 ml | HCL | G | TB | VOCs (SW846-8260) | 003 |
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**Last Chain:** ☐ Yes

**Validation Req'd:** ☑ Yes

**Background:** ☐ Yes

**Confirmatory:** ☐ Yes

**Sample Tracking** **SMO Use**

Date Entered:

Entered by:

QC inits.:

**Special Instructions/QC Requirements:**

**EDD** ☑ Yes ☐ No

**Turnaround Time** ☐ 7 Day* ☐ 15 Day* ☑ 30 Day

**Negotiated TAT** ☐

**Sample Disposal** ☐ Return to Client ☑ Disposal by Lab

**Return Samples By:**

**Comments:** Send Report to Tim Jackson/4142/MS 0729/505-284-2547

VOCs: Report CWL enhanced list of compounds, (Chloroform,1,1-DCE,PCE,TCE,Freon11,and Freon 113).

Conditions on Receipt

Lab Use

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | William Gibson | William Gibson | WG | SNL/4142/505-284-3307/505-239-7367 |
| | Robert Lynch | Robert Lynch | RL | SNL/4142/505-844-4013/505-250-7090 |
| | Alfred Santillanes | Alfred Santillanes | AS | SNL/4142/505-844-5130/505-228-0710 |
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|---|---|---|---|---|---|---|---|---|---|
| 1.Relinquished by | Alfred Santillanes | Org. | 4142 | Date | 1/10/14 | Time | 10:04 | 3.Relinquished by | Org. Date Time |
| 1. Received by | Donald Hampton | Org. | 4142 | Date | 1/10/14 | Time | 10:04 | 3. Received by | Org. Date Time |
| 2.Relinquished by | Rita Kavanaugh | Org. | 4142 | Date | 1/10/14 | Time | 1100 | 4.Relinquished by | Org. Date Time |
| 2. Received by | Mike Fischer | Org. | GEL | Date | 1-11-14 | Time | 1010 | 4. Received by | Org. Date Time |

*Prior confirmation with SMO required for 7 and 15 day TAT

# AR/COC NUMBERS 615189 and 615191

PO Box 21987
Albuquerque, NM 87154
1-888-678-5447
www.aqainc.net

# Memorandum

Date: February 19, 2014

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 615189 and 615191
SDG: 341236
Laboratory: GEL
Project/Task: 146422.10.11.03
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 3.

## Summary

Five samples were prepared and analyzed with accepted procedures using method EPA 8260B (VOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

## Holding Times

The samples were analyzed within the prescribed holding time and properly preserved.

## Instrument Tune

All instrument tune requirements were met.

## Calibration

The initial calibration and continuing calibration data met QC acceptance criteria.

## Blanks

No target analytes were detected in the blanks with the following exception. Chloroform was detected at > the PQL in the FB, sample 341236004. The associated sample result was ND and will not be qualified.

**Surrogates**

All surrogate recoveries met QC acceptance criteria.

**Internal Standards**

All internal standards met QC acceptance criteria.

**Matrix Spike/Matrix Spike Duplicate (MS/MSD)**

All MS/MSD acceptance criteria were met. It should be noted that the MS/MSD analyses were performed on a sample of similar matrix from AR/COC 615190. No sample data will be qualified as a result.

**Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

**Detection Limits/Dilutions**

All detection limits were properly reported. The samples were not diluted.

**Tentatively Identified Compounds (TICs)**

TIC reports were not required.

**Other QC**

Two TBs were submitted, one with each AR/COC. A FB was submitted with AR/COC 615191.

No other specific issues that affect data quality were identified.

**Reviewed by:** Monica Dymerski **Level I** **Date:** 02/21/14

PO Box 21987
Albuquerque, NM 87154
1-888-678-5447
www.aqainc.net

# Memorandum

Date: February 19, 2014

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 615189 and 615191
SDG: 341236
Laboratory: GEL
Project/Task: 146422.10.11.03
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 3.

## Summary

Two samples were prepared and analyzed with approved procedures using method EPA 6020 (ICP-MS). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

## Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved.

## ICP-MS Instrument Tune

The ICP-MS tune met QC acceptance criteria.

## Calibration

All initial and continuing calibration met QC acceptance criteria.

## Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria.

It should be noted that the CRI was analyzed at the PQL and not at 2X the PQL for all target analytes.

**Blanks**

No target analytes were detected in the blanks.

**ICP -MS Internal Standards**

The ICP-MS internal standards met QC acceptance criteria.

**Matrix Spike (MS)**

The MS met all QC acceptance criteria. It should be noted that the MS analyses were performed on a sample of similar matrix from AR/COC 615190. No sample data will be qualified as a result.

**Laboratory Replicate**

The replicate met all QC acceptance criteria. It should be noted that the replicate analyses were performed on a sample of similar matrix from AR/COC 615190. No sample data will be qualified as a result.

**Laboratory Control Sample (LCS)**

The LCS met all QC acceptance criteria.

**Detection Limits/Dilutions**

All detection limits were properly reported. The samples were not diluted.

**ICP Interference Check Sample (ICS A and AB)**

Results of the ICS A and AB analyses were evaluated because the concentrations of Ca were > those in the ICS solution for sample 341236002. All QC acceptance criteria were met.

**ICP Serial Dilution**

The serial dilution met all QC acceptance criteria. It should be noted that the serial dilution analyses were performed on a sample of similar matrix from AR/COC 615190. No sample data will be qualified as a result.

**Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Monica Dymerski **Level I** **Date:** 02/21/14

# *Sample Findings Summary*

**AR/COC: 615189, 615191**



| Analytical Method | Sample ID | Analyte Name (CAS#) | Qualifier, RC |
|---|---|---|---|

**All other analyses met QC acceptance criteria; no further data should be qualified.**

# Data Validation Summary Worksheet

AR/COC #: 615189 and 615191 | Site/Project: CWL GWM | Validation Date: 02/19/2014

SDG #: 341236 | Laboratory: GEL | Validator: Linda Thal

Matrix: Aqueous | # of Samples: 7 CVR present: Yes | Analysis Type: X□ Organic X□ Metals

AR/COC(s) present: Yes | Sample Container Integrity: OK | □ Rad □ Gen Chem

**Requested Analyses Not Reported**

| Sample Number | Laboratory ID | organic | genchem | metals | rad | Comments |
|---|---|---|---|---|---|---|
| None | | | | | | |
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**Hold Time/Preservation Outliers**

| Sample Number | Laboratory ID | Analysis | Pres. | Coll. Date | Prep. Date | Anal. Date | Anal. within 2X HT | Anal. beyond 2X HT |
|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | |
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Comments: Sampled 01/13 and 15/2014; Samples on ARCOC 615190 and 615192 are not for data validation

Validated by: 

Revised 7/2007

# Organic Worksheet (GC/MS)

AR/COC #: 615189 and 615191 SDG #: 341236 Matrix: Aqueous

Laboratory Sample IDs: 341236001, -003, -004, -005 and -007

Method/Batch #s: 8260B: 1362014 Tuning (pass/fail): Pass TICs Required? (yes/no): No

| Analyte (outliers) | Calibration | | | | Method Blank | 5X (10X) MB | LCS %R | MS %R | MSD %R | MS/ MSD RPD | TB -003 -007 | FB -004 | FB X5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Int. | RF | RSD/ $R^2$ | (ICV) CCV %D | | | | | | | | | | |
| Chloroform | NA | ✓ | ✓ | ✓ | ✓ | NA | ✓ | ✓ | ✓ | ✓ | ✓ | 2.82 | 14.1 | |
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**Surrogate Recovery Outliers**

| Sample ID | | | | | | |
|---|---|---|---|---|---|---|
| None | | | | | | |

**IS Outliers**

| Sample ID | Area | RT | Area | RT | Area | RT | Area | RT | Area | RT | Area | RT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | | | | | |
| | | | | | | | | | | | | |

Comments: HTs OK: ICAL VOA6.I 01/08/2014; 6 TAL only; CCVs trichlorotrifluoroethane 20.4 and 20.1%D OK

MS/MSD performed on SNL sample 341235001 from ARCOC 615190 which is not part of DV; spiked with trichlorotrifluoroethane.

# Inorganic Metals Worksheet

AR/COC #: 615189 and 615191 SDG #: 341236 Matrix: Aqueous

Laboratory Sample IDs: 341236002 and -006

Method/Batch #s: **3005A/6020**: 1360741(prep)/1360742

ICPMS Mass Cal (pass/fail): Pass ICPMS Resolution (pass/fail): Pass

| **Analyte** (outliers) | **Calibration** | | | | | | **Method Blank mg/L** | **5X Blank or (5X MDL) mg/L** | **LCS %R** | **MS %R** | **Lab Rep RPD** | **Serial Dil. %D** | **ICS AB %R** | **ICS A ± MDL ug/L x50 (mg/L)** | **CRA CRI %R** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Int.** mg/L | **$R^2$** | **ICV** | **CCV** | **ICB ug/L** | **CCB ug/L** | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | | |
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| **IS Outliers** *60-125%* | | | | **IS Outliers** *80-120%* | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID** | **%Recovery** | **%Recovery** | **%Recovery** | **CCV/CCB ID** | **%Recovery** | **%Recovery** | **%Recovery** |
| None | | | | None | | | |

Comments: HTs OK; All matrix QC on sample 341235002 from AR/COC 615190; Ca>100 000 ppb for sample -002 only

SMO 2012-ARCOC (4-2012)

AOP 95-16

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab



Batch No.

SMO Use

AR/COC 615189

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | CWL GWM | Date Samples Shipped: | 1/13/14 | SMO Authorization: | Don Watson |
| Project/Task Manager: | Tim Jackson | Carrier/Waybill No. | 213629 | SMO Contact Phone: | Lorraine Herrera/505-844-3199 |
| Project/Task Number: | 146422.10.11.03 | Lab Contact: | Edie Kent/808-556-8171 | Send Report to SMO: | Rita Kavanaugh/505-284-2553 |
| Service Order: | CF327-14 | Lab Destination: | GEL | | |
| | | Contract No.: | PO 1303873 | | |
| Tech Area: | | | | | |
| Building: | Room: | Operational Site: | | | |

☐ Waste Characterization ☐ RMMA ☐ Released by COC No. ☑ 4° Celsius

Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preservative | Collection Method | Sample Type | Parameter & Method Requested | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 095116 | -001 | CWL-MW11 | 513 | 1/13/14 10:54 | GW | G | 3x40 ml | HCL | G | SA | VOCs (SW846-8260) | |
| 095116 | -015 | CWL-MW11 | 513 | 1/13/14 10:55 | GW | P | 500 ml | HNO3 | G | SA | Chromium,Nickel (SW846-6020) | |
| 095117 | -001 | CWL-TB6 | NA | 1/13/14 10:54 | DIW | G | 3x40 ml | HCL | G | TB | VOCs (SW846-8260) | |

| | | | |
|---|---|---|---|
| Last Chain: | ☐ Yes | Sample Tracking | SMO Use |
| Validation Req'd: | ☑ Yes | Date Entered: | |
| Background: | ☐ Yes | Entered by: | |
| Confirmatory: | ☐ Yes | QC inits.. | |

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547

VOCs: Report CWL enhanced list of compounds, (Chloroform,1,1-DCE,PCE,TCE,Freon11,and Freon 113).

Conditions on Receipt

Lab Use

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | William Gibson | | WG | SNL/4142/505-284-3307/505-239-7367 |
| | Robert Lynch | | RL | SNL/4142/505-844-4013/505-250-7090 |
| | Alfred Santillanes | | AS | SNL/4142/505-844-5130/505-228-0710 |
| | Gilbert Quintana | | GQ | SNL/4143/505-284-2507/505-228-2606 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1.Relinquished by | Alfred Santillanes | Org. 4142 | Date 1-13-14 | Time 11:27 | 3.Relinquished by | Org. | Date | Time |
| 1. Received by | Don Watson | Org. 4142 | Date 1/13/14 | Time 1127 | 3. Received by | Org. | Date | Time |
| 2.Relinquished by | Don Watson | Org. 4142 | Date 1/13/14 | Time 1200 | 4.Relinquished by | Org. | Date | Time |
| 2. Received by | | Org. | Date | Time | 4. Received by | Org. | Date | Time |

*Prior confirmation with SMO required for 7 and 15 day TAT

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTODY



Internal Lab



Batch No.

SMO Use

**AR/COC 615189**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | CWL GWM | Date Samples Shipped: | 1/13/14 | SMO Authorization: Don Wehner | ☐ Waste Characterization |
| Project/Task Manager: | Tim Jackson | Carrier/Waybill No. | 213629 | SMO Contact Phone: | ☐ RMMA |
| Project/Task Number: | 146422.10.11.03 | Lab Contact: | Edie Kent/808-556-8171 | Lorraine Herrera/505-844-3199 | ☐ Released by COC No. |
| Service Order: | CF327-14 | Lab Destination: | GEL | Send Report to SMO: | ☑ 4° Celsius |
| | | Contract No.: | PO 1303873 | Rita Kavanaugh/505-284-2553 | Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 341236 |
| Tech Area: | | | | | |
| Building: | Room: | Operational Site: | | | |

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preservative | Collection Method | Sample Type | Parameter & Method Requested | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ✓ 095116 | -001 | CWL-MW11 | 513 | 1/13/14 10:54 | GW | G | 3x40 ml | HCL | G | SA | VOCs (SW846-8260) | 001 |
| ✓ 095116 | -015 | CWL-MW11 | 513 | 1/13/14 10:55 | GW | P | 500 ml | HNO3 | G | SA | Chromium,Nickel (SW846-6020) | 002 |
| ✓ 095117 | -001 | CWL-TB6 | NA | 1/13/14 10:54 | DIW | G | 3x40 ml | HCL | G | TB | VOCs (SW846-8260) | 003 |
| | | | | | | | | | | | | |
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**Last Chain:** ☐ Yes
**Validation Req'd:** ☑ Yes
**Background:** ☐ Yes
**Confirmatory:** ☐ Yes

**Sample Tracking** — **SMO Use**
Date Entered:
Entered by:
QC inits.:

**Special Instructions/QC Requirements:**
**EDD** ☑ Yes ☐ No
**Turnaround Time** ☐ 7 Day* ☐ 15 Day* ☑ 30 Day
**Negotiated TAT** ☐
**Sample Disposal** ☐ Return to Client ☑ Disposal by Lab
**Return Samples By:**
**Comments:** Send Report to Tim Jackson/4142/MS 0729/505-284-2547

VOCs: Report CWL enhanced list of compounds, (Chloroform,1,1-DCE,PCE,TCE,Freon11,and Freon 113).

Conditions on Receipt

Lab Use

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | William Gibson | | WJG | SNL/4142/505-284-3307/505-239-7367 |
| | Robert Lynch | | RL | SNL/4142/505-844-4013/505-250-7090 |
| | Alfred Santillanes | | AS | SNL/4142/505-844-5130/505-228-0710 |
| | Gilbert Quintana | | GQ | SNL/4143/505-284-2507/505-228-2606 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1.Relinquished by | | Org. 4142 | Date 1-13-14 | Time 11:27 | 3.Relinquished by | Org. | Date Time |
| 1. Received by | | Org. 4142 | Date 1/13/14 | Time 1200 | 3. Received by | Org. | Date Time |
| 2.Relinquished by | | Org. | Date | Time | 4.Relinquished by | Org. | Date Time |
| 2. Received by | | Org. CCL | Date 1-14-14 | Time 0715 | 4. Received by | Org. | Date Time |

***Prior confirmation with SMO required for 7 and 15 day TAT**

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTODY



Internal Lab



Batch No. N/A

SMO Use

**AR/COC 615191**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | CWL GWM | Date Samples Shipped: | 1/15/14 | SMO Authorization: | ☐ Waste Characterization |
| Project/Task Manager: | Tim Jackson | Carrier/Waybill No. | 213295 | SMO Contact Phone: | ☐ RMMA |
| Project/Task Number: | 146422.10.11.03 | Lab Contact: | Edie Kent/808-556-8171 | Lorraine Herrera/505-844-3199 | ☐ Released by COC No. |
| Service Order: | CF327-14 | Lab Destination: | GEL | Send Report to SMO: | ☑ 4° Celsius |
| | | Contract No.: | PO 1303873 | Rita Kavanaugh/505-284-2553 | Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 341236 |
| Tech Area: | | | | | |
| Building: 1115 | Room: 084 | Operational Site: | | | |

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preservative | Collection Method | Sample Type | Parameter & Method Requested | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 095120 | -001 | CWL-FB3 | NA | 1/15/14 9:13 | DIW | G | 3x40 ml | HCL | G | FB | VOCs (SW846-8260) | 004 |
| 095121 | -~~015~~ 001 | CWL-MW10 | 515 | 1/15/14 9:13 | GW | G | 3x40 ml | HCL | G | SA | VOCs (SW846-8260) | 005 |
| 095121 | -~~0~~015 | CWL-MW10 | 515 | 1/15/14 9:14 | GW | P | 500 ml | HNO3 | G | SA | Chromium,Nickel (SW846-6020) | 006 |
| 095122 | -001 | CWL-TB8 | NA | 1/15/14 9:13 | DIW | G | 3x40 ml | HCL | G | TB | VOCs (SW846-8260) | 007 |
| | | | | | | | | | | | | |
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|---|---|---|---|
| Last Chain: * | ☑ Yes | Sample Tracking | SMO Use |
| Validation Req'd: | ☑ Yes | Date Entered: | |
| Background: | ☐ Yes | Entered by: | |
| Confirmatory: | ☐ Yes | QC inits.: | |

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | William Gibson | William Gibson | WDG | SNL/4142/505-284-3307/505-239-7367 |
| | Robert Lynch | Robert Lynch | RDL | SNL/4142/505-844-4013/505-250-7090 |
| | Alfred Santillanes | Alfred Santillanes | AAS | SNL/4142/505-844-5130/505-228-0710 |
| | | | | |
| | | | | |

**Special Instructions/QC Requirements:**

EDD ☑ Yes ☐ No

Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547

VOCs: Report CWL enhanced list of compounds, (Chloroform,1,1-DCE,PCE,TCE,Freon11,and Freon 113).

Conditions on Receipt

Lab Use

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1.Relinquished by | Alfred Santillanes | Org. 4142 | Date 1/15/14 | Time 0852 | 3.Relinquished by | Org. | Date | Time |
| 1. Received by | [signature] SMO | Org. 4142 | Date 1/15/14 | Time 0952 | 3. Received by | Org. | Date | Time |
| 2.Relinquished by | [signature] SMO | Org. 4142 | Date 1/15/14 | Time 1030 | 4.Relinquished by | Org. | Date | Time |
| 2. Received by | [signature] | Org. Ger | Date 1-16-14 | Time 0745 | 4. Received by | Org. | Date | Time |

*Prior confirmation with SMO required for 7 and 15 day TAT

# CONTRACT VERIFICATION REVIEW FORMS

# GROUNDWATER MONITORING

# JANUARY 2014

Note: The review forms in this section include AR/COC numbers for environmental samples and additional AR/COC numbers for waste characterization samples.

| AR/COC Number | Sample Type |
|---|---|
| 615184 | Environmental* |
| 615185 | Environmental* |
| 615186 | Waste |
| 615187 | Environmental* |
| 615188 | Waste |
| 615189 | Environmental* |
| 615190 | Waste |
| 615191 | Environmental* |
| 615192 | Waste |

* These AR/COC forms are provided in the Data Validation Section of this Annex.

# Contract Verification Review (CVR)

Project Leader Jackson Project Name CWL GWM Project/Task No. 146422_10.11.03

ARCOC No. 615184, 615185, 615186 Analytical Lab GEL SDG No. 341106

*In the tables below, mark any information that is missing or incorrect and give an explanation.*

## 1.0 Analysis Request and Chain of Custody Record and Log-In Information

| Line No. | Item | Complete? Yes | Complete? No | If no, explain |
|---|---|---|---|---|
| 1.1 | All items on ARCOC complete - data entry clerk initialed and dated | X | | |
| 1.2 | Container type(s) correct for analyses requested | X | | |
| 1.3 | Sample volume adequate for # and types of analyses requested | X | | |
| 1.4 | Preservative correct for analyses requested | X | | |
| 1.5 | Custody records continuous and complete | X | | |
| 1.6 | Lab sample number(s) provided and SNL sample number(s) cross referenced and correct | X | | |
| 1.7 | Date samples received | X | | |
| 1.8 | Condition upon receipt information provided | X | | |

## 2.0 Analytical Laboratory Report

| Line No. | Item | Complete? Yes | Complete? No | If no, explain |
|---|---|---|---|---|
| 2.1 | Data reviewed, signature | X | | |
| 2.2 | Method reference number(s) complete and correct | X | | |
| 2.3 | QC analysis and acceptance limits provided (MB, LCS, Replicate) | X | | |
| 2.4 | Matrix spike/matrix spike duplicate data provided | X | | |
| 2.5 | Detection limits provided; PQL and MDL(or IDL), MDA and $L_c$ | X | | |
| 2.6 | QC batch numbers provided | X | | |
| 2.7 | Dilution factors provided and all dilution levels reported | X | | |
| 2.8 | Data reported in appropriate units and using correct significant figures | X | | |
| 2.9 | Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported | N/A | | |
| 2.10 | Narrative provided | X | | |
| 2.11 | TAT met | X | | |
| 2.12 | Holding times met | X | | |
| 2.13 | Contractual qualifiers provided | X | | |
| 2.14 | All requested result and TIC (if requested) data provided | X | | |

# Contract Verification Review (Continued)

## 3.0 Data Quality Evaluation

| Item | Yes | No | If no, Sample ID No./Fraction(s) and Analysis |
|---|---|---|---|
| 3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data | X | | |
| 3.2 Quantitation limit met for all samples | X | | |
| 3.3 Accuracy<br>a) Laboratory control sample accuracy reported and met for all samples | | X | VOC LCS recovery failed for 1,2,4-Trichlorobenzene, Dichlorofluoromethane (QC1203020537) |
| b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique | X | | |
| c) Matrix spike recovery data reported and met | | X | VOC MS recovery failed for Dichlorofluoromethane (QC1203020535); Metals MS recovery failed for Potassium (QC1203017755); MS recovery failed for Total Phenol (QC1203017809) |
| 3.4 Precision<br>a) Replicate sample precision reported and met for all inorganic and radiochemistry samples | X | | |
| b) Matrix spike duplicate RPD data reported and met for all organic samples | X | | |
| 3.5 Blank data<br>a) Method or reagent blank data reported and met for all samples | | X | Molybdenum detected in Metals Method Blank (QC1203017752) |
| b) Sampling blank (e.g., field, trip, and equipment) data reported and met | | X | Chloroform detected in FB1 (095103-001), EB1 (095104-001), FB2 (095106-001) |
| 3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits | X | | |
| 3.7 Narrative addresses planchet flaming for gross alpha/beta | N/A | | |
| 3.8 Narrative included, correct, and complete | X | | |
| 3.9 Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151 | N/A | | |

# Contract Verification Review (Continued)

## 4.0 Calibration and Validation Documentation

| Item | Yes | No | Comments |
|---|---|---|---|
| 4.1 GC/MS (8260 and 8270)<br>a) 12-hour tune check provided | X | | |
| b) Initial calibration provided | X | | |
| c) Continuing calibration provided | X | | |
| d) Internal standard performance data provided | X | | |
| e) Instrument run logs provided | X | | |
| 4.2 GC/HPLC (8330, 8082, 9070A, and 8010)<br>a) Initial calibration provided | N/A | | |
| b) Continuing calibration provided | N/A | | |
| c) Instrument run logs provided | N/A | | |
| 4.3 HRGC/HRMS (1668)<br>a) 12-hour tune check provided | N/A | | |
| b) Initial calibration provided | N/A | | |
| c) Continuing calibration provided | N/A | | |
| d) Internal standard performance data provided | N/A | | |
| e) Labeled compound recovery data provided | N/A | | |

| | | | |
|---|---|---|---|
| f) RRTs for samples and standards provided | N/A | | |
| g) Ion abundance ratios for samples and standards provided | N/A | | |
| h) Instrument run logs provided | N/A | | |
| 4.4 LC/MS/MS (6850)<br>a) Initial calibration provided | N/A | | |
| b) Continuing calibration provided | N/A | | |
| c) CRI provided | N/A | | |
| d) Internal standard performance data provided | N/A | | |
| e) Chlorine isotope ratios provided (perchlorate only) | N/A | | |
| f) ICS provided (perchlorate only) | N/A | | |
| 4.5 Inorganics (metals)<br>a) Initial calibration provided | X | | |
| b) Continuing calibration provided | X | | |
| c) ICP interference check sample data provided | X | | |
| d) ICP serial dilution provided | X | | |
| e) Instrument run logs provided | X | | |
| 4.6 Radiochemistry and General Chemistry<br>a) Instrument run logs provided | X | | |

# Contract Verification Review (Concluded)

## 5.0 Data Anomaly Report

| Item | Yes | No | Comments |
|---|---|---|---|
| 5.1 DAR completed for monitoring and surveillance sample data | N/A | | |
| 5.2 Problems or outliers noted | | X | |
| 5.3 Verification or reanalysis requested from lab | | X | |

## 6.0 Problem Resolution

*Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.*

| Sample/Fraction No. | Analysis | Problems/Comments/Resolutions |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Were deficiencies unresolved? θ Yes x No

Based on the review, this data package is complete. x Yes θ No

If no, provide nonconformance report or correction request number _____ and date correction request was submitted: _____

Reviewed by: _____ Date: 02/11/2014

Were resolutions adequate and data package complete? θ Yes θ No

Closed by: _____ Date: _____

# Contract Verification Review (CVR)

Project Leader Jackson Project Name CWL GWM Project/Task No. 146422_10.11.01

ARCOC No. 615187, 615188 Analytical Lab GEL SDG No. 341180

*In the tables below, mark any information that is missing or incorrect and give an explanation.*

## 1.0 Analysis Request and Chain of Custody Record and Log-In Information

| Line No. | Item | Complete? Yes | Complete? No | If no, explain |
|---|---|---|---|---|
| 1.1 | All items on ARCOC complete - data entry clerk initialed and dated | X | | |
| 1.2 | Container type(s) correct for analyses requested | X | | |
| 1.3 | Sample volume adequate for # and types of analyses requested | X | | |
| 1.4 | Preservative correct for analyses requested | X | | |
| 1.5 | Custody records continuous and complete | X | | |
| 1.6 | Lab sample number(s) provided and SNL sample number(s) cross referenced and correct | X | | |
| 1.7 | Date samples received | X | | |
| 1.8 | Condition upon receipt information provided | X | | |

## 2.0 Analytical Laboratory Report

| Line No. | Item | Complete? Yes | Complete? No | If no, explain |
|---|---|---|---|---|
| 2.1 | Data reviewed, signature | X | | |
| 2.2 | Method reference number(s) complete and correct | X | | |
| 2.3 | QC analysis and acceptance limits provided (MB, LCS, Replicate) | X | | |
| 2.4 | Matrix spike/matrix spike duplicate data provided | X | | |
| 2.5 | Detection limits provided; PQL and MDL(or IDL), MDA and $L_c$ | X | | |
| 2.6 | QC batch numbers provided | X | | |
| 2.7 | Dilution factors provided and all dilution levels reported | X | | |
| 2.8 | Data reported in appropriate units and using correct significant figures | X | | |
| 2.9 | Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported | N/A | | |
| 2.10 | Narrative provided | X | | |
| 2.11 | TAT met | X | | |
| 2.12 | Holding times met | X | | |
| 2.13 | Contractual qualifiers provided | X | | |
| 2.14 | All requested result and TIC (if requested) data provided | X | | |

# Contract Verification Review (Continued)

## 3.0 Data Quality Evaluation

| Item | Yes | No | If no, Sample ID No./Fraction(s) and Analysis |
|---|---|---|---|
| 3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data | X | | |
| 3.2 Quantitation limit met for all samples | X | | |
| 3.3 Accuracy<br>a) Laboratory control sample accuracy reported and met for all samples | | X | VOC LCS 1203023213 recovery failed for Dichlorodifluoromethane |
| b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique | X | | |
| c) Matrix spike recovery data reported and met | X | | |
| 3.4 Precision<br>a) Replicate sample precision reported and met for all inorganic and radiochemistry samples | X | | |
| b) Matrix spike duplicate RPD data reported and met for all organic samples | X | | |
| 3.5 Blank data<br>a) Method or reagent blank data reported and met for all samples | | X | Molybdenum detected in Metals Method Blank (QC1203018247) |
| b) Sampling blank (e.g., field, trip, and equipment) data reported and met | X | | |
| 3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits | X | | |
| 3.7 Narrative addresses planchet flaming for gross alpha/beta | N/A | | |
| 3.8 Narrative included, correct, and complete | X | | |
| 3.9 Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151 | N/A | | |

# Contract Verification Review (Continued)

## 4.0 Calibration and Validation Documentation

| Item | Yes | No | Comments |
|---|---|---|---|
| 4.1 GC/MS (8260 and 8270)<br>a) 12-hour tune check provided | X | | |
| b) Initial calibration provided | X | | |
| c) Continuing calibration provided | X | | |
| d) Internal standard performance data provided | X | | |
| e) Instrument run logs provided | X | | |
| 4.2 GC/HPLC (8330, 8082, 9070A, and 8010)<br>a) Initial calibration provided | N/A | | |
| b) Continuing calibration provided | N/A | | |
| c) Instrument run logs provided | N/A | | |
| 4.3 HRGC/HRMS (1668)<br>a) 12-hour tune check provided | N/A | | |
| b) Initial calibration provided | N/A | | |
| c) Continuing calibration provided | N/A | | |
| d) Internal standard performance data provided | N/A | | |
| e) Labeled compound recovery data provided | N/A | | |

| | | | |
|---|---|---|---|
| f) RRTs for samples and standards provided | N/A | | |
| g) Ion abundance ratios for samples and standards provided | N/A | | |
| h) Instrument run logs provided | N/A | | |
| 4.4 LC/MS/MS (6850)<br>a) Initial calibration provided | N/A | | |
| b) Continuing calibration provided | N/A | | |
| c) CRI provided | N/A | | |
| d) Internal standard performance data provided | N/A | | |
| e) Chlorine isotope ratios provided (perchlorate only) | N/A | | |
| f) ICS provided (perchlorate only) | N/A | | |
| 4.5 Inorganics (metals)<br>a) Initial calibration provided | X | | |
| b) Continuing calibration provided | X | | |
| c) ICP interference check sample data provided | X | | |
| d) ICP serial dilution provided | X | | |
| e) Instrument run logs provided | X | | |
| 4.6 Radiochemistry and General Chemistry<br>a) Instrument run logs provided | X | | |

# Contract Verification Review (Concluded)

## 5.0 Data Anomaly Report

| Item | Yes | No | Comments |
|---|---|---|---|
| 5.1 DAR completed for monitoring and surveillance sample data | N/A | | |
| 5.2 Problems or outliers noted | | X | |
| 5.3 Verification or reanalysis requested from lab | | X | |

## 6.0 Problem Resolution

*Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.*

| Sample/Fraction No. | Analysis | Problems/Comments/Resolutions |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Were deficiencies unresolved? θ Yes x No

Based on the review, this data package is complete. x Yes θ No

If no, provide nonconformance report or correction request number _____ and date correction request was submitted: _____

Reviewed by: _____ Date: 02/11/2014

Were resolutions adequate and data package complete? θ Yes θ No

Closed by: _____ Date: _____

# Contract Verification Review (CVR)

Project Leader: Jackson | Project Name: CWL GWM | Project/Task No.: 146422_10.11.03

ARCOC No.: 615189, 615190, 615191, 615192 | Analytical Lab: GEL | SDG No.: 341235

*In the tables below, mark any information that is missing or incorrect and give an explanation.*

## 1.0 Analysis Request and Chain of Custody Record and Log-In Information

| Line No. | Item | Complete? Yes | Complete? No | If no, explain |
|---|---|---|---|---|
| 1.1 | All items on ARCOC complete - data entry clerk initialed and dated | X | | |
| 1.2 | Container type(s) correct for analyses requested | X | | |
| 1.3 | Sample volume adequate for # and types of analyses requested | X | | |
| 1.4 | Preservative correct for analyses requested | X | | |
| 1.5 | Custody records continuous and complete | X | | |
| 1.6 | Lab sample number(s) provided and SNL sample number(s) cross referenced and correct | X | | |
| 1.7 | Date samples received | X | | |
| 1.8 | Condition upon receipt information provided | X | | |

## 2.0 Analytical Laboratory Report

| Line No. | Item | Complete? Yes | Complete? No | If no, explain |
|---|---|---|---|---|
| 2.1 | Data reviewed, signature | X | | |
| 2.2 | Method reference number(s) complete and correct | X | | |
| 2.3 | QC analysis and acceptance limits provided (MB, LCS, Replicate) | X | | |
| 2.4 | Matrix spike/matrix spike duplicate data provided | X | | |
| 2.5 | Detection limits provided; PQL and MDL(or IDL), MDA and $L_c$ | X | | |
| 2.6 | QC batch numbers provided | X | | |
| 2.7 | Dilution factors provided and all dilution levels reported | X | | |
| 2.8 | Data reported in appropriate units and using correct significant figures | X | | |
| 2.9 | Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported | N/A | | |
| 2.10 | Narrative provided | X | | |
| 2.11 | TAT met | X | | |
| 2.12 | Holding times met | X | | |
| 2.13 | Contractual qualifiers provided | X | | |
| 2.14 | All requested result and TIC (if requested) data provided | X | | |

# Contract Verification Review (Continued)

## 3.0 Data Quality Evaluation

| Item | Yes | No | If no, Sample ID No./Fraction(s) and Analysis |
|---|---|---|---|
| 3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data | X | | |
| 3.2 Quantitation limit met for all samples | X | | |
| 3.3 Accuracy<br>a) Laboratory control sample accuracy reported and met for all samples | | X | VOC LCS 1203024553 recovery failed for 2-Hexanone |
| b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique | X | | |
| c) Matrix spike recovery data reported and met | X | | |
| 3.4 Precision<br>a) Replicate sample precision reported and met for all inorganic and radiochemistry samples | X | | |
| b) Matrix spike duplicate RPD data reported and met for all organic samples | X | | |
| 3.5 Blank data<br>a) Method or reagent blank data reported and met for all samples | | X | Acetone detected in VOC Method Blank (1203024552); Molybdenum detected in Metals Method Blank (QC1203020754) |
| b) Sampling blank (e.g., field, trip, and equipment) data reported and met | | X | Chloroform detected in FB3 (095120-001) |
| 3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits | X | | |
| 3.7 Narrative addresses planchet flaming for gross alpha/beta | N/A | | |
| 3.8 Narrative included, correct, and complete | X | | |
| 3.9 Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151 | N/A | | |

# Contract Verification Review (Continued)

## 4.0 Calibration and Validation Documentation

| Item | Yes | No | Comments |
|---|---|---|---|
| 4.1 GC/MS (8260 and 8270)<br>a) 12-hour tune check provided | X | | |
| b) Initial calibration provided | X | | |
| c) Continuing calibration provided | X | | |
| d) Internal standard performance data provided | X | | |
| e) Instrument run logs provided | X | | |
| 4.2 GC/HPLC (8330, 8082, 9070A, and 8010)<br>a) Initial calibration provided | N/A | | |
| b) Continuing calibration provided | N/A | | |
| c) Instrument run logs provided | N/A | | |
| 4.3 HRGC/HRMS (1668)<br>a) 12-hour tune check provided | N/A | | |
| b) Initial calibration provided | N/A | | |
| c) Continuing calibration provided | N/A | | |
| d) Internal standard performance data provided | N/A | | |
| e) Labeled compound recovery data provided | N/A | | |

| | | | |
|---|---|---|---|
| f) RRTs for samples and standards provided | N/A | | |
| g) Ion abundance ratios for samples and standards provided | N/A | | |
| h) Instrument run logs provided | N/A | | |
| 4.4 LC/MS/MS (6850)<br>a) Initial calibration provided | N/A | | |
| b) Continuing calibration provided | N/A | | |
| c) CRI provided | N/A | | |
| d) Internal standard performance data provided | N/A | | |
| e) Chlorine isotope ratios provided (perchlorate only) | N/A | | |
| f) ICS provided (perchlorate only) | N/A | | |
| 4.5 Inorganics (metals)<br>a) Initial calibration provided | X | | |
| b) Continuing calibration provided | X | | |
| c) ICP interference check sample data provided | X | | |
| d) ICP serial dilution provided | X | | |
| e) Instrument run logs provided | X | | |
| 4.6 Radiochemistry and General Chemistry<br>a) Instrument run logs provided | X | | |

# Contract Verification Review (Concluded)

## 5.0 Data Anomaly Report

| Item | Yes | No | Comments |
|---|---|---|---|
| 5.1 DAR completed for monitoring and surveillance sample data | N/A | | |
| 5.2 Problems or outliers noted | | X | |
| 5.3 Verification or reanalysis requested from lab | | X | |

## 6.0 Problem Resolution

*Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.*

| Sample/Fraction No. | Analysis | Problems/Comments/Resolutions |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Were deficiencies unresolved? θ Yes x No

Based on the review, this data package is complete. x Yes θ No

If no, provide nonconformance report or correction request number _____ and date correction request was submitted: _____

Reviewed by: _____ Date: 01/18/2014

Were resolutions adequate and data package complete? θ Yes θ No

Closed by: _____ Date: _____



COC: 615189, 615190, 615191, 615192

# FIELD SAMPLING FORMS

# JULY 2014 GROUNDWATER MONITORING

# TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-BW5 Date: 7/7/14 Time: 0757

Activities: Groundwater Monitoring and Sampling
(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:
Temp: 86.6 °F Wind Speed: 0 MPH Humidity: 44.6 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ TJ 7-15-14
Other:

*Safety Topics Presented*

| | |
|---|---|
| ☒ Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary. | ☒ Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated. |
| ☒ Wear safety boots. | ☒ Be aware of electrical hazards |
| ☒ Use safe lifting practices. Wear leather gloves if necessary. | ☒ Be aware of pressure hazards. |
| ☒ Be aware of pinch points on pump cable reel and hydraulic tailgate lift. | ☒ No eating or drinking at sampling counter. |
| ☒ Be aware of chemical hazards. | ☒ Be aware of biohazards (snakes, spiders, etc.) |
| ☒ Wear nitrile or latex gloves when sampling. | ☒ Wear communication device (cell phone, EOC pager). |
| ☒ Wear chemical safety goggles. | ☒ Avoid spilling purge / decon water. |

Hospital/Clinic: Sandia Medical Clinic Phone: 844-0911/911

*Attendees*

| Printed Name | Signature |
|---|---|
| Robert Lynch | Robert Lynch |
| Alfred Santillanes | Alfred Santillanes |
| William Gibson | William J Gibson |
| | |
| | |

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## TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-MW9 Date: 7/8/14 Time: 0750

Activities: Groundwater Monitoring and Sampling
(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:
Temp: 87.0 °F Wind Speed: 10-15 MPH Humidity: 35.1 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ 7/15/14
Other: _____

*Safety Topics Presented*

| | | |
|---|---|---|
| ☒ Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary. | | ☒ Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated. |
| ☒ Wear safety boots. | | ☒ Be aware of electrical hazards |
| ☒ Use safe lifting practices. Wear leather gloves if necessary. | | ☒ Be aware of pressure hazards. |
| ☒ Be aware of pinch points on pump cable reel and hydraulic tailgate lift. | | ☒ No eating or drinking at sampling counter. |
| ☒ Be aware of chemical hazards. | | ☒ Be aware of biohazards (snakes, spiders, etc.) |
| ☒ Wear nitrile or latex gloves when sampling. | | ☒ Wear communication device (cell phone, EOC pager). |
| ☒ Wear chemical safety goggles. | | ☒ Avoid spilling purge / decon water. |

Hospital/Clinic: Sandia Medical Clinic Phone: 844-0911/911

*Attendees*

| Printed Name | Signature |
|---|---|
| Robert J Lynch | Robert J Lynch |
| ALFRED SANTILLANES | Alfred Santillanes |
| William Gibson | William J Gibson |
| | |
| | |

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# TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-MW11 Date: 7/9/14 Time: 0720

Activities: Groundwater Monitoring and Sampling
(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:
Temp: 87.0 °F Wind Speed: 0 MPH Humidity: 36.5 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ TJ 7-15-14
Other: _____

*Safety Topics Presented*

| | | |
|---|---|---|
| ☒ Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary. | | ☒ Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated. |
| ☒ Wear safety boots. | | ☒ Be aware of electrical hazards |
| ☒ Use safe lifting practices. Wear leather gloves if necessary. | | ☒ Be aware of pressure hazards. |
| ☒ Be aware of pinch points on pump cable reel and hydraulic tailgate lift. | | ☒ No eating or drinking at sampling counter. |
| ☒ Be aware of chemical hazards. | | ☒ Be aware of biohazards (snakes, spiders, etc.) |
| ☒ Wear nitrile or latex gloves when sampling. | | ☒ Wear communication device (cell phone, EOC pager). |
| ☒ Wear chemical safety goggles. | | ☒ Avoid spilling purge / decon water. |

Hospital/Clinic: Sandia Medical Clinic Phone: 844-0911/911

*Attendees*

| Printed Name | Signature |
|---|---|
| Robert Lynch | Robert Lynch |
| ALFRED SANTILLANES | Alfred Santillanes |
| William Gibson | William Gibson |
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| | |

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## TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-MW1D Date: 7/10/14 Time: 0746
7/11/14 0750

Activities: Groundwater Monitoring and Sampling
(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:
Temp: 77.7 °F Wind Speed: 0 MPH Humidity: 41.6 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ TT 2-15-14
Other:

*Safety Topics Presented*

| | |
|---|---|
| ☒ Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary. | ☒ Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated. |
| ☒ Wear safety boots. | ☒ Be aware of electrical hazards |
| ☒ Use safe lifting practices. Wear leather gloves if necessary. | ☒ Be aware of pressure hazards. |
| ☒ Be aware of pinch points on pump cable reel and hydraulic tailgate lift. | ☒ No eating or drinking at sampling counter. |
| ☒ Be aware of chemical hazards. | ☒ Be aware of biohazards (snakes, spiders, etc.) |
| ☒ Wear nitrile or latex gloves when sampling. | ☒ Wear communication device (cell phone, EOC pager). |
| ☒ Wear chemical safety goggles. | ☒ Avoid spilling purge / decon water. |

Hospital/Clinic: Sandia Medical Clinic Phone: 844-0911/911

*Attendees*

| Printed Name | Signature |
|---|---|
| Robert Lynch | Robert Lynch |
| Alfred Santillanes | Alfred Santillanes |
| William Gibson | William J Gibson |
| 7/11/14 Robert Lynch | Robert Lynch |
| William Gibson | William J Gibson |
| Alfred Santillanes | Alfred Santillanes |

## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

| | |
|---|---|
| Project Name: CWL | Project No.: 146422.10.11.03 |
| Well I.D.: CWL-BW 5 | Date: 07/07/14 |
| Well Condition: See Inspection Forms | Weather Condition: See Tailgate Form |
| Method: Portable pump X | Dedicated pump _____ Pump depth: 521' |

## PURGE MEASUREMENTS

| Depth to Water (ft) | Time 24 hr | Vol (L/gal) | Temp (°C) | SC (µS/cm) | ORP (mV) | pH | Turbidity (NTU) | DO (%) | DO mg/L Comments |
|---|---|---|---|---|---|---|---|---|---|
| 511.56 | 0813 | ✓ | — | START | | | | | |
| 513.45 | 0900 | 5 | 22.70 | 1073.1 | 267.9 | 6.91 | 0.43 | 83.1 | 7.16 |
| 513.62 | 0938 | 10 | 23.90 | 1102.7 | 276.8 | 6.91 | 0.73 | 83.7 | 7.04 |
| 513.61 | 1011 | 14 | 25.01 | 1129.4 | 278.1 | 6.91 | 0.52 | 86.5 | 7.12 |
| 513.71 | 1025 | 16 | 24.93 | 1126.4 | 274.5 | 6.90 | 0.34 | 84.5 | 6.98 |
| 513.73 | 1042 | 18 | 24.81 | 1123.4 | 274.2 | 6.90 | 0.29 | ~~84.9~~ 84.0 | / 6.94 |
| 513.71 | 1058 | 20 | 25.65 | 1137.0 | 272.3 | 6.91 | 0.33 | 87.0 | 6.93 |
| 513.71 | 1114 | 22 | 25.66 | 1135.9 | 279.4 | 6.90 | 0.30 | 84.7 | 6.88 |
| | 1115 | ✓ | SAMPLING | | | | | | |
| | | | | | | | | | ~1.6 gals purged from tubing |
| | | | | | | | | | 0925 |

## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

| | |
|---|---|
| Project Name: CWL | Project No.: 146422.10.11.03 |
| Well I.D.: CWL-MW 9 | Date: 07/08/14 |
| Well Condition: See Inspection Forms | Weather Condition: See Twilight Form |
| Method: Portable pump X | Dedicated pump _____ Pump depth: 516' |

## PURGE MEASUREMENTS

| Depth to Water (ft) | Time 24 hr | Vol (L/gal) | Temp (°C) | SC (µS/cm) | ORP (mV) | pH | Turbidity (NTU) | DO (%) | DO mg/L Comments |
|---|---|---|---|---|---|---|---|---|---|
| 503.62 | 0807 | | — | START | | | | | → |
| 505.61 | 0856 | 5 | 25.22 | 980.8 | 253.6 | 7.93 | 0.47 | 34.8 | 2.86 |
| 505.99 | 0932 | 10 | 24.35 | 947.7 | 223.5 | 6.93 | 6.31 | 32.3 | 2.70 |
| 506.11 | 1008 | 15 | 24.83 | 999.8 | 208.2 | 6.94 | 0.20 | 33.7 | 2.79 |
| 506.09 | 1045 | 20 | 25.50 | 1002.8 | 198.5 | 6.95 | 0.17 | 35.5 | 2.90 |
| 506.06 | 1100 | 22 | 26.04 | 1029.4 | 191.8 | 6.95 | 0.28 | 39.0 | 3.15 |
| 506.06 | 1115 | 24 | 26.03 | 1030.2 | 186.8 | 6.95 | 0.38 | 39.5 | 3.20 |
| 506.11 | 1130 | 26 | 26.01 | 1030.9 | 182.4 | 6.95 | 0.19 | 39.2 | 3.17 |
| 506.19 | 1145 | 28 | 25.91 | 1029.6 | 183.1 | 6.95 | 0.21 | 38.8 | 3.14 |
| | 1146 | | | | | | | | |
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| | | | | | | | | | |
| | | | | | | | | | ~1.6 gals purged from tubing |
| | | | | | | | | | 0820 |

## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

| | |
|---|---|
| Project Name: CWL | Project No.: 146422.01.11.03 |
| Well I.D.: CWL-MW 10 | Date: 07/10/14 7/11/14 |
| Well Condition: See Inspection forms | Weather Condition: See Tailgate for — |
| Method: Portable pump X | Dedicated pump _____ Pump depth: 515' |

## PURGE MEASUREMENTS

| Depth to Water (ft) | Time 24 hr | Vol. (L/gal) | Temp (°C) | SC (µS/cm) | ORP (mV) | pH | Turbidity (NTU) | DO (%) | DO mg/L Comments |
|---|---|---|---|---|---|---|---|---|---|
| 500.67 | 0800 | | START → | | | | | | |
| 505.04 | 0919 | 5 | 23.31 | 903.7 | 229.1 | 7.05 | 1.48 | 20.0 | 1.70 |
| | | | | | 229.1 | 7.05 | | 20.0 | 1.70 WJA 7/11/14 |
| 506.90 | 0944 | 7 | 23.20 | 901.3 | 194.9 | 7.06 | 2.08 | 18.0 | 1.54 |
| 508.36 | 1017 | 9 | 24.47 | 923.8 | 161.3 | 7.07 | 1.98 | 17.4 | 1.45 |
| 509.67 | 1042 | 11 | 25.91 | 955.7 | 133.8 | 7.08 | 1.74 | 15.6 | 1.26 |
| 511.07 | 1108 | 13 | 26.29 | 963.7 | 108.8 | 7.08 | 1.98 | 13.9 | 1.12 |
| 512.55 | 1129 | 15 | 26.28 | 965.3 | 98.3 | 7.07 | 2.17 | 12.6 | 1.01 |
| 513.43 | 1141 | 16 | 26.39 | 967.4 | 76.8 | 7.07 | 2.07 | 12.2 | 0.98 |
| 514.21 | 1155 | 17 | 27.09 | 980.7 | 63.3 | 7.07 | 2.67 | 12.9 | 0.98 |
| 515.05 | 1210 | 18 | 27.29 | 986.0 | 52. | 7.09 | 3.46 | 12.6 | 1.00 |
| | | | Well Dry → | | | | | | |
| 7/11/14 505.38 | 0817 | | START → | | | | | | |
| 507.67 | 0850 | 1 | 25.53 | 978.0 | 12.8 | 7.09 | 1.85 | 63.5 | 5.17 |
| 507.27 | 0859 | 1.5 | 25.04 | 964.9 | -10.9 | 7.06 | 1.74 | 40.6 | 3.34 |
| 507.64 | 0808 | 2 | 25.05 | 964.9 | -18.1 | 7.05 | 1.76 | 34.9 | 2.87 |
| WJA | 0809 | | SAMPLING → | | | | | | |
| | 0909 WJA | | | | | | | | |
| 7/11/14 | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | ~1.6 gals purged from tubing |
| | | | | | | | | | 0820/0838 7/11/14 |

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## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

| | |
|---|---|
| Project Name: CWL | Project No.: 146422.10.11.03 |
| Well I.D.: CWL-MW 11 | Date: 07/09/14 |
| Well Condition: See Inspection form | Weather Condition: See Tailgate form |
| Method: Portable pump X | Dedicated pump _____ Pump depth: 513' |

## PURGE MEASUREMENTS

| Depth to Water (ft) | Time 24 hr | Vol (L/gal) | Temp (°C) | SC (µS/cm) | ORP (mV) | pH | Turbidity (NTU) | DO (%) | DO mg/L Comments |
|---|---|---|---|---|---|---|---|---|---|
| 499.07 | 0739 | ✓ | START | | | | | | |
| 502.80 | 0847 | 5 | 23.91 | 989.7 | 306.2 | 6.92 | 0.39 | 68.9 | 5.79 |
| 505.25 | 0927 | 10 | 23.67 | 1018.1 | 275.9 | 6.92 | 0.52 | 66.4 | 5.61 |
| 506.58 | 1033 | 15 | 26.99 | 1094.6 | 315.7 | 6.95 | 0.49 | 70.5 | 5.61 |
| 507.98 | 1132 | 20 | 26.22 | 1076.9 | 305.8 | 6.94 | 0.40 | 67.8 | 5.47 |
| 508.49 | 1154 | 22 | 27.11 | 1097.2 | 305.1 | 6.95 | 0.39 | 68.3 | 5.42 |
| 509.01 | 1220 | 24 | 27.72 | 1110.6 | 310.8 | 6.95 | 0.35 | 67.4 | 5.29 |
| 509.57 | 1243 | 26 | 27.33 | 1102.4 | 306.1 | 6.94 | 0.39 | 67.1 | 5.30 |
| 510.16 | 1306 | 28 | 27.61 | 1105.8 | 300.2 | 6.94 | 0.36 | 65.9 | 5.18 |
| | 1307 | ✓ | SAMPLING | | | | | | |
| | | | | | | | | | ~1.6 gals purged from tubing |
| | | | | | | | | | 0802 |

## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG



| | |
|---|---|
| SNL/NM Project Name: CWL | SNL/NM Project No.: 146422.10.11.03 |
| Calibrations done by: R Lynch | Date: 7/7/14 |

Make & Model: YSI EXO1

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167

YSI 650 MDS (S/N): NA

### pH Calibration

pH Calibrated to (std): 7.00 — pH sloped to (std): 10.00

| Reference value: | 4.00 | | 7.00 | | 10.00 | |
|---|---|---|---|---|---|---|
| | Value | Temp | Value | Temp | Value | Temp |
| 1. Time: 0645 | 4.01 | 23.1 | 6.99 | 23.1 | 10.00 | 23.1 |
| 2. Time: 1212 | 4.01 | 23.4 | 7.00 | 23.4 | 10.00 | 23.4 |
| 3. Time: | | | | | | |
| 4. Time: | | | | | | |
| Standard lot no.. | 3AD782 | | 3AE725 | | 3AD357 | |
| Expiration date. | 4/15 | | 5/15 | | 4/15 | |

### SC Calibration

Reference Value: 1225 uS — Standard Lot No.: 3AE221

Expiration Date: 5/15

| | Value | Temp |
|---|---|---|
| 1. Time: 0647 | 1225 | 23.1 |
| 2. Time: 1211 | 1227 | 23.4 |
| 3. Time: | | |
| 4. Time: | | |

### ORP Calibration

Reference Value: 220 mV — Standard Lot No. 4AA010

Expiration Date: 7/14

| | Value | Temp |
|---|---|---|
| 1. Time: 0646 | 220.0 | 23.3 |
| 2. Time: 1213 | 219.9 | 23.4 |
| 3. Time: | | |
| 4. Time: | | |

### DO Calibration

| Calibration Value: | 81% air saturation @ 5200 ft. | Atmospheric Pressure in Hg |
|---|---|---|
| 1. Time 0644 | 81.8 | 24.48 |
| 2. Time: 1210 | 81.7 | 24.50 |
| 3 Time: | | |
| 4. Time: | | |

**GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG (continued)** **Page 2 of 2**

| SNL/NM Project Name: CWL | | Project No.: 146422.10.11.03 | | |
|---|---|---|---|---|
| Calibration done by: R Lynch | | Date: 7/7/14 | | |
| TURBIDIMETER | | | | |
| Make & Model: HACH 2100P HACH 2100Q | | Serial No. S/N 10060C003010 | | |
| Reference Value | RL + 10 | 20 | 100 | 800 |
| Standard Lot No. | 0161 | 0167 | 0168 | 0161 |
| 1. Time 0759 | 10.1 | 19.7 | 103 | 801 |
| 2. Time 1125 | 10.3 | 19.9 | 99.6 | 799 |
| 3. Time | | | | |
| 4. Time | | | | |

Comments:

## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG



| SNL/NM Project Name: CWL | SNL/NM Project No.: 146422.10.11.03 |
|---|---|
| Calibrations done by: R Lynch | Date: 7/8/14 |

Make & Model: YSI EXO1

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167

YSI 650 MDS (S/N): NA

### pH Calibration

pH Calibrated to (std): 7.00 | pH sloped to (std): 10.00

| Reference value: | 4.00 | | 7.00 | | 10.00 | |
|---|---|---|---|---|---|---|
| | Value | Temp | Value | Temp | Value | Temp |
| 1. Time: 0642 | 4.01 | 21.3 | 6.99 | 21.3 | 10.00 | 21.3 |
| 2. Time: 1317 | 4.00 | 21.7 | 7.00 | 21.7 | 10.01 | 21.7 |
| 3. Time: | | | | | | |
| 4. Time: | | | | | | |
| Standard lot no.: | 3AD782 | | 3AE725 | | 3AD357 | |
| Expiration date: | 4/15 | | 5/15 | | 4/15 | |

### SC Calibration

Reference Value: 1225 uS | Standard Lot No.: 3AE221 | Expiration Date: 5/15

| | Value | Temp |
|---|---|---|
| 1. Time: 0641 | 1227 | 21.3 |
| 2. Time: 1316 | 1230 | 21.7 |
| 3. Time: | | |
| 4. Time: | | |

### ORP Calibration

Reference Value: 220 mV | Standard Lot No.: 4AA010 | Expiration Date: 7/14

| | Value | Temp |
|---|---|---|
| 1. Time: 0643 | 220.1 | 21.3 |
| 2. Time: 1318 | 220.4 | 21.7 |
| 3. Time: | | |
| 4. Time: | | |

### DO Calibration

| Calibration Value: | 81% air saturation @ 5200 ft. | Atmospheric Pressure in Hg |
|---|---|---|
| 1. Time: 0640 | 81.7 | 24.47 |
| 2. Time: 1315 | 81.9 | 24.49 |
| 3. Time: | | |
| 4. Time: | | |

**GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG (continued) Page 2 of 2**

| SNL/NM Project Name: CWL | | Project No.: 146422.10.11.03 | | |
|---|---|---|---|---|
| Calibration done by: R Lynch | | Date: 7/8/14 | | |
| TURBIDIMETER | | | | |
| Make & Model: HACH 2100P HACH 2100Q | | Serial No. S/N 10060C003010 | | |
| Reference Value | 7/14/14 RL ± 10 | 20 | 100 | 800 |
| Standard Lot No. | 0161 | 0167 | 0168 | 0161 |
| 1. Time 0953 | 10.2 | 19.9 | 104 | 800 |
| 2. Time 1150 | 9.99 | 19.6 | 101 | 795 |
| 3. Time | | | | |
| 4. Time | | | | |

Comments:

## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG



| | |
|---|---|
| SNL/NM Project Name: CWL | SNL/NM Project No.: 146422.10.11.03 |
| Calibrations done by: R Lynch | Date: 7/9/14 |

Make & Model: YSI EXO1

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167

YSI 650 MDS (S/N): NA

**pH Calibration**

pH Calibrated to (std): 7.00 pH sloped to (std): 10.00

| Reference value: | 4.00 | | 7.00 | | 10.00 | |
|---|---|---|---|---|---|---|
| | Value | Temp | Value | Temp | Value | Temp |
| 1. Time: 0622 | 4.02 | 21.1 | 7.00 | 21.1 | 10.01 | 21.1 |
| 2. Time. 1432 | 4.01 | 21.7 | 7.01 | 21.8 | 10.02 | 21.7 |
| 3. Time: | | | | | | |
| 4. Time: | | | | | | |
| Standard lot no.: | 3AD782 | | 3AE725 | | 3AD357 | |
| Expiration date: | 4/15 | | 5/15 | | 4/15 | |

**SC Calibration**

Referenee Value: 1225 uS Standard Lot No.: 3AE221

Expiration Date. 5/15

| | Value | Temp |
|---|---|---|
| 1. Time: 0621 | 1229 | 21.1 |
| 2. Time: 1431 | 1231 | 21.8 |
| 3. Time: | | |
| 4. Time: | | |

**ORP Calibration**

Reference Value: 220 mV Standard Lot No 4AA010

Expiration Date 7/14

| | Value | Temp |
|---|---|---|
| 1. Time: 0623 | 219.7 | 21.1 |
| 2. Time 1433 | 220.4 | 21.8 |
| 3. Time: | | |
| 4. Time: | | |

**DO Calibration**

| Calibration Value: | 81% air saturation @ 5200 ft. | Atmospheric Pressure in Hg |
|---|---|---|
| 1. Time 0620 | 81.6 | 24.46 |
| 2. Time: 1430 | 81.8 | 24.50 |
| 3. Time. | | |
| 4 Time: | | |

**GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG (continued)** **Page 2 of 2**

| SNL/NM Project Name: CWL | | Project No.: 146422.10.11.03 | | |
|---|---|---|---|---|
| Calibration done by: R Lynch | | Date: 7/9/14 | | |
| TURBIDIMETER | | | | |
| Make & Model: HACH 2100P HACH 2100Q | | Serial No. S/N 10060C003010 | | |
| Reference Value | RL 7-9-14 10 | 20 | 100 | 800 |
| Standard Lot No. | 0161 | 0167 | 0168 | 0161 |
| 1. Time 0730 | 10.3 | 19.6 | 108 | 795 |
| 2. Time 1313 | 9.99 | 19.7 | 104 | 793 |
| 3. Time | | | | |
| 4. Time | | | | |

Comments:

## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG



| | |
|---|---|
| SNL/NM Project Name: CWL | SNL/NM Project No.: 146422.10.11.03 |
| Calibrations done by: R Lynch | Date: 7/10/14 7/11/14 |

Make & Model: YSI EXO1

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167

YSI 650 MDS (S/N): NA

### pH Calibration

pH Calibrated to (std): 7.00 pH sloped to (std): 10.00

| Reference value. | 4.00 | | 7.00 | | 10.00 | |
|---|---|---|---|---|---|---|
| | Value | Temp | Value | Temp | Value | Temp |
| 1. Time: 0633 | 3.99 | 20.3 | 6.99 | 20.3 | 10.00 | 20.3 |
| 2. Time: 1327 | 4.01 | 20.8 | 7.01 | 20.8 | 10.00 | 20.8 |
| 3. Time: 0642 | 4.01 | 20.2 | 7.00 | 20.2 | 9.98 | 20.2 |
| 4. Time: 1030 | 4.02 | 20.3 | 6.99 | 20.2 | 9.99 | 20.3 |
| Standard lot no : | 3AD782 | | 3AE725 | | 3AD357 | |
| Expiration date: | 4/15 | | 5/15 | | 4/15 | |

### SC Calibration

Reference Value 1225 uS Standard Lot No.: 3AE221

Expiration Date: 5/15

| | Value | Temp |
|---|---|---|
| 1. Time: 0632 | 1227 | 20.3 |
| 2. Time: 1326 | 1229 | 20.8 |
| 3. Time: 0641 | 1225 | 20.2 |
| 4. Time: 1030 | 1224 | 20.3 |

### ORP Calibration

Reference Value: 220 mV Standard Lot No. 4AA010

Expiration Date: 7/14

| | Value | Temp |
|---|---|---|
| 1. Time: 0634 | 219.8 | 20.3 |
| 2. Time: 1328 | 220.4 | 20.8 |
| 3. Time: 0644 | 219.6 | 20.0 |
| 4. Time: 1032 | 220.1 | 20.3 |

### DO Calibration

| Calibration Value: | 81% air saturation @ 5200 ft | Atmospheric Pressure in Hg |
|---|---|---|
| 1. Time 0631 | 81.8 | 24.57 |
| 2. Time: 1325 | 81.9 | 24.55 |
| 3. Time. 0640 | 81.4 | 24.46 |
| 4. Time: 1029 | 81.5 | 24.46 |

**GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG (continued)** **Page 2 of 2**

| SNL/NM Project Name: CWL | | Project No.: 146422.10.11.03 | | |
|---|---|---|---|---|
| Calibration done by: R Lynch | | Date: 7/10/14 7/11/14 | | |
| TURBIDIMETER | | | | |
| Make & Model: HACH 2100P HACH 2100Q | | Serial No. S/N 10060C003010 | | |
| Reference Value | RL = 10 7-10-14 | 20 | 100 | 800 |
| Standard Lot No. | 0161 | 0167 | 0168 | 0161 |
| 1. Time 0750 | 10.1 | 19.7 | 104 | 806 |
| 2. Time 1240 | 9.99 | 20.1 | 99.9 | 798 |
| 3. Time 0805 | 9.97 | 19.6 | 102 | 795 |
| 4. Time 0917 | 9.94 | 19.8 | 104 | 789 |

Comments:

**Portable Pump and Tubing / Water Level Indicator**
**Decontamination Log Form**

| **Project Name:** CWL-GWM | **Monitoring Well ID # :** CWL-BW5 | **Date:** 07 / 07 / 14 |
|---|---|---|

The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03

| **Pump and Tubing Bundle ID #:** 1806-640 | **Water Level Indicator ID #:** 210269 |
|---|---|

| **Personnel Performing Decontamination:** | **Personnel Performing Decontamination:** |
|---|---|
| Robert Lynch — Print Name: — Initial: RL | Robert Lynch — Print Name: — Initial: RL |
| William Gibson — Print Name: — Initial: WJG | ~~Robert Lynch~~ William Gibson — Print Name: — Initial: WJG 1/8/14 |

**Condition of Equipment**

**Pump:** Excellent **Tubing Bundle:** Excellent **Water Level Indicator:** Good

List of Decontamination Materials

| **Distilled** or **Deonized** (circle one) | **$HNO_3$** |
|---|---|
| | **Grade:** Reagent |
| **Source:** Culligan | **UN #:** 2031 |
| **Lot Number:** 062414 | **Manufacturer:** AROC |
| | **Lot Number:** A0316863 |

**Portable Pump and Tubing / Water Level Indicator**
**Decontamination Log Form**

| **Project Name:** CWL-GWM | **Monitoring Well ID # :** CWL-MW9 | **Date:** 7/8/14 |
|---|---|---|

The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03

| **Pump and Tubing Bundle ID #:** 1806- 640 | **Water Level Indicator ID #:** 210269 |
|---|---|
| **Personnel Performing Decontamination:**<br>Robert Lynch (Print Name:) RL (Initial:)<br>Alfred Santillanes (Print Name:) (Initial:) | **Personnel Performing Decontamination:**<br>Robert Lynch (Print Name:) RL (Initial:)<br>Alfred Santillanes (Print Name:) (Initial:) |

**Condition of Equipment**

**Pump:** Excellent **Tubing Bundle:** Excellent **Water Level Indicator:** Good

List of Decontamination Materials

| **Distilled** or **Deonized** (circle one) | **$HNO_3$** |
|---|---|
| **Source:** Culligan | **Grade:** Reagent |
| **Lot Number:** 062414 | **UN #:** 2031 |
| | **Manufacturer:** AROC |
| | **Lot Number:** A0316863 |

**Portable Pump and Tubing / Water Level Indicator**
**Decontamination Log Form**

| **Project Name:** CWL-GWM | **Monitoring Well ID # :** CWL-MW11 | **Date:** 7 / 9 /14 |
|---|---|---|

The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03

| **Pump and Tubing Bundle ID #:** 1806-640 | **Water Level Indicator ID #:** 210269 |
|---|---|
| **Personnel Performing Decontamination:**<br>William Gibson — Print Name: — Initial: WJG<br>Alfred Santillanes — Print Name: — Initial: | **Personnel Performing Decontamination:**<br>William Gibson — Print Name: — Initial: WJG<br>Alfred Santillanes — Print Name: — Initial: |

**Condition of Equipment**

**Pump:** Excellent **Tubing Bundle:** Excellent **Water Level Indicator:** Good

List of Decontamination Materials

| **Distilled** or **Deonized** (circle one) | **$HNO_3$** |
|---|---|
| **Source:** Culligan | **Grade:** Reagent |
| **Lot Number:** 062414 | **UN #:** 2031 |
| | **Manufacturer:** AROC |
| | **Lot Number:** A0316863 |

**Portable Pump and Tubing / Water Level Indicator**
**Decontamination Log Form**

| **Project Name:** CWL-GWM | **Monitoring Well ID # :** CWL-MW10 | **Date:** 7-11-13 |
|---|---|---|

The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03

| **Pump and Tubing Bundle ID #:** 1806-640 | **Water Level Indicator ID #:** 210269 |
|---|---|
| **Personnel Performing Deeontamination:**<br>Robert Lynch (RL) Print Name: Initial:<br>William Gibson (WJG) Print Name: Initial: | **Personnel Performing Decontamination:**<br>Robert Lynch (RL) Print Name: Initial:<br>William Gibson (WJG) Print Name: Initial: |

**Condition of Equipment**

**Pump:** Excellent **Tubing Bundle:** Excellent **Water Level Indicator:** Good

List of Decontamination Materials

| **Distilled** or **Deonized** (circle one) | **$HNO_3$** |
|---|---|
| **Source:** Culligan | **Grade:** Reagent |
| **Lot Number:** 062414 | **UN #:** 2031 |
| | **Manufacturer:** AROC |
| | **Lot Number:** A0316863 |

# SUMMARY SHEET FOR JULY 2014 SAMPLES

**Sample Summary for CWL GWM**
**July 2014**

| Sample ID | Sample Date | ARCOC | Sample Number | Sample Type | Associated Equipment Blank (ARCOC #/Sample #) | Associated Trip Blank (ARCOC # / Sample #) | Associated Field Blank (ARCOC # / Sample #) | Comments |
|---|---|---|---|---|---|---|---|---|
| ***CWL GWM: Project Task # 146422.10.11.03. Service Order # CF 327-14*** | | | | | | | | |
| ***Environmental Samples*** | | | | | | | | |
| CWL-BW5 | 7-Jul-14 | 615599 | 096179 | Environmental | n/a | 615599 / 096180 | 615599 / 096178 | |
| CWL-MW9 | 8-Jul-14 | 615601 | 096184 | Environmental | 615607 / 096199 | 615601 / 096186 | 615601 / 096183 | |
| CWL-MW9 | 8-Jul-14 | 615601 | 096185 | Duplicate | 615607 / 096199 | 615601 / 096186 | 615601 / 096183 | |
| CWL-MW10 | 11-Jul-14 | 615605 | 096195 | Environmental | n/a | 615605 / 096196 | 615605 / 096194 | |
| CWL-MW11 | 9-Jul-14 | 615603 | 096190 | Environmental | n/a | 615603 / 096191 | 615603 / 096189 | |
| CWL-EB1 | 7-Jul-14 | 615607 | 096199 | Equipment Blank | n/a | 615607 / 096200 | n/a | Decon prior to CWL-MW9 |
| CWL-FB1 | 7-Jul-14 | 615599 | 096178 | Field Blank | n/a | 615599 / 096180 | n/a | at CWL-BW5 |
| CWL-FB2 | 8-Jul-14 | 615601 | 096183 | Field Blank | n/a | 615601 / 096186 | n/a | at CWL-MW9 |
| CWL-FB3 | 9-Jul-14 | 615603 | 096189 | Field Blank | n/a | 615603 / 096191 | n/a | at CWL-MW11 |
| CWL-FB4 | 11-Jul-14 | 615605 | 096194 | Field Blank | n/a | 615605 / 096196 | n/a | at CWL-MW10 |
| ***Waste Characterization Samples*** | | | | | | | | |
| CWL-BW5 | 7-Jul-14 | 615600 | 096181 | Waste | n/a | 615600 / 096182 | n/a | No data validation required |
| CWL-MW9 | 8-Jul-14 | 615602 | 096187 | Waste | n/a | n/a | n/a | No data validation required |
| CWL-MW10 | 11-Jul-14 | 615606 | 096197 | Waste | n/a | n/a | n/a | No data validation required |
| CWL-MW11 | 9-Jul-14 | 615604 | 096192 | Waste | n/a | n/a | n/a | No data validation required |

# DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

# GROUNDWATER MONITORING

# JULY 2014

**AR/COC NUMBERS 615599, 615601, 615603, and 615607**

# *Sample Findings Summary*

**AR/COC: 615599, 615601, 615603, 615607**



| Analytical Method | Sample ID | Analyte Name (CAS#) | Qualifier, RC |
|---|---|---|---|
| **SW846 3005/6020 DOE-AL** | | | |
| | 096179-015/CWL-BW5 | Nickel (7440-02-0) | J-, CK3 |
| | 096184-015/CWL-MW9 | Nickel (7440-02-0) | J-, CK3 |
| | 096185-015/CWL-MW9 | Nickel (7440-02-0) | J-, CK3 |
| | 096190-015/CWL-MW11 | Nickel (7440-02-0) | J-, CK3 |

**All other analyses met QC acceptance criteria; no further data should be qualified.**

ANALYTICAL QUALITY ASSOCIATES, INC.

PO Box 21987
Albuquerque, NM 87154
1-888-678-5447
www.aqainc.net

# Memorandum

Date: August 21, 2014

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL
Site: CWL-GWM
AR/COC: 615599, 615601, 615603 and 615607
SDG: 352131
Laboratory: GEL
Project/Task: 146422.10.11.03
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

## Summary

Five samples were prepared and analyzed for Cr and Ni with approved procedures using method EPA 6020 (ICP-MS). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. The Ca concentrations for all samples *except* 352131012 were comparable to or above the ICS levels for the ICP-MS analysis. The ICS A result for Ni was negative with an absolute value >2X the MDL. The associated sample results were detects at <50X the absolute value of the associated ICS A result and will be **qualified J-,CK3** due to a negative ICS A results.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

## Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and properly preserved.

## ICP-MS Instrument Tune

The ICP-MS tune met QC acceptance criteria.

## Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

## Reporting Limit Verification

All CRA/CRI recoveries associated with the samples met QC acceptance criteria.

It should be noted that the CRI was analyzed at the PQL and not at 2X the PQL for all target analytes.

**Blanks**

No target analytes were detected in the blanks.

**ICP -MS Internal Standards**

The ICP-MS internal standards met QC acceptance criteria.

**Matrix Spike (MS)**

The MS met all QC acceptance criteria.

**Laboratory Replicate**

The replicate met all QC acceptance criteria.

**Laboratory Control Sample (LCS)**

The LCS met all QC acceptance criteria.

**Detection Limits/Dilutions**

All detection limits were properly reported. The samples were not diluted.

**ICP Interference Check Sample (ICS A and AB)**

The results for the ICSA and ICSAB met acceptance criteria except as noted above in the Summary section.

**ICP Serial Dilution**

The serial dilutions met all QC acceptance criteria.

**Other QC**

An EB was submitted with ARCOC 615607, and it was associated with samples from 615601. A field duplicate pair was submitted with ARCOC 615601. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

**Reviewed by:** Monica Dymerski **Level I** **Date:** 09/22/14

ANALYTICAL QUALITY ASSOCIATES, INC.

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Albuquerque, NM 87154
1-888-678-5447
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# Memorandum

Date: August 21, 2014

To: File

From: Mary Donivan

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL-GWM
AR/COC: 615599, 615601, 615603 and 615607
SDG: 352125
Laboratory: GEL
Project/Task: 146422.10.11.03
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 4.

## Summary

Twelve samples were prepared and analyzed with accepted procedures for trichloroethylene using method EPA 8260B (VOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

## Holding Times

The samples were analyzed within the prescribed holding time and properly preserved.

## Instrument Tune

All instrument tune requirements were met.

## Calibration

The initial calibration and continuing calibration data met QC acceptance criteria.

## Blanks

No target analytes were detected in the blanks except as follows. Trichloroethylene was detected at a concentration > the PQL in the FB, sample 352131014. The associated sample result was a non-detect and will not be qualified.

**Surrogates**

All surrogate recoveries met QC acceptance criteria.

**Internal Standards**

All internal standards met QC acceptance criteria.

**Matrix Spike/Matrix Spike Duplicate (MS/MSD)**

All MS/MSD acceptance criteria were met.

**Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

**Detection Limits/Dilutions**

All detection limits were properly reported. The samples were not diluted.

**Tentatively Identified Compounds (TICs)**

TIC reports were not required.

**Other QC**

Four TBs were submitted, one associated with each ARCOC. FBs were submitted with ARCOCs 615599, 615601 and 615603 and were associated with the samples in their respective ARCOCs. An EB was submitted with ARCOC 615607, and it was associated with samples from 615601. A field duplicate pair was submitted with ARCOC 615601. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

**Reviewed by:** Monica Dymerski **Level I** **Date:** 09/22/14

# Data Validation Summary Worksheet

AR/COC #: 615599, 615601, 615603 and 605607 Site/Project: CWL-GWM Validation Date: 08/21/2014

SDG #: 352131 Laboratory: GEL Laboratories, LLC Validator: Mary Donivan

Matrix: Aqueous # of Samples: 17 CVR present: Yes Analysis Type: X Organic X Metals

AR/COC(s) present: Yes Sample Container Integrity: OK Rad Gen Chem

**Requested Analyses Not Reported**

| Sample Number | Laboratory ID | organic | genchem | metals | rad | Comments |
|---|---|---|---|---|---|---|
| None | | | | | | |
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**Hold Time/Preservation Outliers**

| Sample Number | Laboratory ID | Analysis | Pres. | Coll. Date | Prep. Date | Anal. Date | Anal. within 2X HT | Anal. beyond 2X HT |
|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |

Comments: Samples collected 07/07 through 07/09/2014

Revised 7/2007

Validated By: Mary A. Donivan

# Organic Worksheet (GC/MS)

AR/COC #: 615599, 615601, 615603 and 615607 SDG #:352131 Matrix: Aqueous

Laboratory Sample IDs: 352131001, -002, -004, -005, -006, -008, -010, -011, -013, -014, -015 and -017

Method/Batch #s: 1403528 Tuning (pass/fail): pass TICs Required? (yes/no) no

| Analyte (outliers) | Calibration | | | | Method Blank | 5X (10X) Blank | LCS %R | MS %R | MSD %R | MS/ MSD RPD | EB -011 | FB -014 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Int. | RF | RSD/ $R^2$ | CCV (ICV) %D | | | | | | | | | | |
| trichloroethylene | NA | ✓ | ✓ | ✓ | ✓ | NA | ✓ | ✓ | ✓ | ✓ | ✓ | 3.3 | | |
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**Surrogate Recovery Outliers**

| Sample ID | | | | | | |
|---|---|---|---|---|---|---|
| None | | | | | | |
| | | | | | | |

**IS Outliers**

| Sample ID | Area | RT | Area | RT | Area | RT | Area | RT | Area | RT | Area | RT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | | | | | |
| | | | | | | | | | | | | |

Comments: HTs OK, ICAL VOA6.I 07/14/14

MS/MSD performed on sample -002

Sample analysis for trichloroethylene only

# Inorganic Metals Worksheet

AR/COC #: 615599, 615601, 615603 and 615607 SDG #: 352131 Matrix: Aqueous

Laboratory Sample IDs: 35213103, -007, -009, -012 and -016

Method/Batch #s: **3005A/6020** (ICP-MS): 1402927(prep)/1402928

ICPMS Mass Cal (pass/fail) pass ICPMS Resolution (pass/fail) pass

| **Analyte** (outliers) | **Calibration** | | | | | | **Method Blank** | **5X Blank or 5X MDL** | **LCS %R** | **MS %R** | **Lab Rep. RPD** | **Serial Dil. %D** | **ICS AB %R** | **ICS A ± MDL** | **CRA/ CRI %R** | **EB -012** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Int.** | **$R^2$** | **ICV** | **CCV** | **ICB** | **CCB** | | | | | | | | | | | | | | |
| Ni | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | NA | ✓ | ✓ | ✓ | ✓ | ✓ | -1.35 | ✓ | ✓ | | | | |
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| **IS Outliers *60-125%*** | | | | **IS Outliers *80-120%*** | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID** | **%Recovery** | **%Recovery** | **%Recovery** | **CCV/CCB ID** | **%Recovery** | **%Recovery** | **%Recovery** |
| None | | | | None | | | |
| | | | | | | | |

**Comments:** HTs OK. Matrix QC performed on -003

SMO 2012-ARCOC (4-2012)

AOP 95-16

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. N/A

SMO Use

AR/COC 615599

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | CWL-GWM | Date Samples Shipped: | 7/7/14 | SMO Authorization: | ☐ Waste Characterization |
| Project/Task Manager: | Tim Jackson | Carrier/Waybill No. | 220630 | SMO Contact Phone: | ☐ RMMA |
| Project/Task Number: | 146422/10.11.03 | Lab Contact: | Edie Kent/803-556-8171 | Lorraine Herrera/505-844-3199 | ☐ Released by COC No. |
| Service Order: | CF 025-14 327 | Lab Destination: | GEL | Send Report to SMO: | ☑ 4° Celsius |
| | EDC 7/3/14 | Contract No.: | PO 1303873 | Rita Kavanaugh/505-284-2553 | Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 352131 |
| Tech Area: | | | | | |
| Building: | Room: | Operational Site: | | | |

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preservative | Collection Method | Sample Type | Parameter & Method Requested | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 096178 | -001 | CWL-FB 1 | N/A | 7/7/14 11:15 | DIW | G | 3x40ml | HCL | G | FB | TCE (SW846-8260B) | 001 |
| 096179 | -001 | CWL-BW5 | 521 | 7/7/14 11:15 | GW | G | 3x40ml | HCL | G | SA | TCE (SW846-8260B) | 002 |
| 096179 | -015 | CWL-BW5 | 521 | 7/7/14 11:16 | GW | P | 500 mL | HNO3 | G | SA | Chromium Nickel (SW846-6920) | 003 |
| 096180 | -001 | CWL-TB 1 | N/A | 7/7/14 11:15 | DIW | G | 3x40ml | HCL | G | TB | TCE (SW846-8260B) | 004 |
| | | | | | | | | | | | | |
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|---|---|---|---|
| Last Chain: | ☐ Yes | Sample Tracking SMO Use | Special Instructions/QC Requirements: |
| Validation Req'd: | ☑ Yes | Date Entered: | EDD ☑ Yes ☐ No |
| Background: | ☐ Yes | Entered by: | Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day |
| Confirmatory: | ☐ Yes | QC inits.: | Negotiated TAT ☐ |

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | Robert Lynch | Robert Lynch | RL | SNL/4142/505-844-4013/505-250-7090 |
| | Alfred Santillanes | Alfred Santillanes | AS | SNL/4142/505-844-5130/505-228-0710 |
| | William Gibson | William Gibson | WJG | SNL/4142/505-284-3307/505-239-7367 |
| | | | | |
| | | | | |

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547

Conditions on Receipt

Lab Use

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1.Relinquished by | Alfred Santillanes | Org. 4142 | Date 7/7/14 | Time 1135 | 3.Relinquished by | Org. | Date | Time |
| 1. Received by | [signature] GMO | Org. 4142 | Date 7/7/14 | Time 1135 | 3. Received by | Org. | Date | Time |
| 2.Relinquished by | [signature] | Org. 4142 | Date 7/7/14 | Time 1200 | 4.Relinquished by | Org. | Date | Time |
| 2. Received by | [signature] | Org. CH | Date 7-8-14 | Time 0815 | 4. Received by | Org. | Date | Time |

*Prior confirmation with SMO required for 7 and 15 day TAT

SMO 2012-ARCOC (4-2012)

AOP 95-16

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab



Batch No. N/A

SMO Use

AR/COC 615601

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | CWL-GWM | Date Samples Shipped: | 7/8/14 | SMO Authorization: | ☐ Waste Characterization |
| Project/Task Manager: | Tim Jackson | Carrier/Waybill No. | 220818 | SMO Contact Phone: | ☐ RMMA |
| Project/Task Number: | 146422/10.11.03 | Lab Contact: | Edie Kent/803-556-8171 | Lorraine Herrera/505-844-3199 | ☐ Released by COC No. |
| Service Order: | CF 327-14 | Lab Destination: | GEL | Send Report to SMO: | ☑ 4° Celsius |
| | | Contract No.: | PO 1303873 | Rita Kavanaugh/505-284-2553 | Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154, Albuquerque, NM 87185-0154 |
| Tech Area: | | | | | |
| Building: | Room: | Operational Site: | | | |

SMO 7/9/14 352131 ~~325131~~

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preserv-ative | Collection Method | Sample Type | Parameter & Method Requested | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 096183 | -001 | CWL-FB 2 | N/A | 7/8/14 11:46 | DIW | G | 3x40ml | HCL | G | FB | TCE (SW846-8260B) | 005 |
| 096184 | -001 | CWL-MW9 | 516 | 7/8/14 11:46 | GW | G | 3x40ml | HCL | G | SA | TCE (SW846-8260B) | 006 |
| 096184 | -015 | CWL-MW9 | 516 | 7/8/14 11:48 | GW | P | 500 ml | HNO3 | G | SA | Chromium Nickel (SW846-6020) | 007 |
| 096185 | -001 | CWL-MW9 | 516 | 7/8/14 11:46 | GW | G | 3x40ml | HCL | G | DU | TCE (SW846-8260B) | 008 |
| 096185 | -015 | CWL-MW9 | 516 | 7/8/14 11:48 | GW | P | 500 ml | HNO3 | G | DU | Chromium Nickel (SW846-6020) | 009 |
| 096186 | -001 | CWL-TB 4 | N/A | 7/8/14 11:46 | DIW | G | 3x40ml | HCL | G | TB | TCE (SW846-8260B) | 010 |
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|---|---|---|---|---|---|
| Last Chain: | ☐ Yes | Sample Tracking | SMO Use | Special Instructions/QC Requirements: | Conditions on Receipt |
| Validation Req'd: | ☑ Yes | Date Entered: | | EDD ☑ Yes ☐ No | |
| Background: | ☐ Yes | Entered by: | | Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day | |
| Confirmatory: | ☐ Yes | QC inits.: | | Negotiated TAT ☐ | |

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | Robert Lynch | | RL | SNL/4142/505-844-4013/505-250-7090 |
| | Alfred Santillanes | | | SNL/4142/505-844-5130/505-228-0710 |
| | William Gibson | | WG | SNL/4142/505-284-3307/505-239-7367 |

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547

Lab Use

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. Relinquished by | | Org. | 4142 | Date | 7/8/14 | Time | 1210 | 3. Relinquished by | Org. | Date | Time |
| 1. Received by | SMO | Org. | 4142 | Date | 7/8/14 | Time | 1210 | 3. Received by | Org. | Date | Time |
| 2. Relinquished by | | Org. | 4142 | Date | 7/8/14 | Time | 1230 | 4. Relinquished by | Org. | Date | Time |
| 2. Received by | | Org. | GEL | Date | 7-9-14 | Time | 0750 | 4. Received by | Org. | Date | Time |

*Prior confirmation with SMO required for 7 and 15 day TAT

SMO 2012-ARCOC (4-2012)

AOP 95-16

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab



Batch No. N/A

SMO Use

AR/COC 615603

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | CWL-GWM | Date Samples Shipped: | 7/10/14 | SMO Authorization: | ☐ Waste Characterization |
| Project/Task Manager: | Tim Jackson | Carrier/Waybill No. | 220954 | SMO Contact Phone: | ☐ RMMA |
| Project/Task Number: | 146422/10.11.03 | Lab Contact: | Edie Kent/803-556-8171 | Lorraine Herrera/505-844-3199 | ☐ Released by COC No. |
| Service Order: | CF 327-14 | Lab Destination: | GEL | Send Report to SMO: | ☑ 4° Celsius |
| | | Contract No.: | PO 1303873 | Rita Kavanaugh/505-284-2553 | Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 352131 |
| Tech Area: | | | | | |
| Building: | Room: | Operational Site: | | | |

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preserv-ative | Collection Method | Sample Type | Parameter & Method Requested | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 096189 | -001 | CWL-FB 3 | N/A | 7/9/14 13:07 | DIW | G | 3x40ml | HCL | G | FB | TCE (SW846-8260) | 014 |
| 096190 | -001 | CWL-MW11 | 513 | 7/9/14 13:07 | GW | G | 3x40ml | HCL | G | SA | TCE (SW846-8260) | 015 |
| 096190 | -015 | CWL-MW11 EDD 7/14/14 | ~~615~~ 513 | 7/9/14 13:09 | GW | P | 500 mL | HNO3 | G | SA | Chromium Nickel (SW846-6020) | 016 |
| 096191 | -001 | CWL-TB 6 | N/A | 7/9/14 13:07 | DIW | G | 3x40ml | HCL | G | TB | TCE (SW846-8260) | 017 |
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|---|---|---|---|
| Last Chain: | ☐ Yes | Sample Tracking | SMO Use |
| Validation Req'd: | ☑ Yes | Date Entered: | |
| Background: | ☐ Yes | Entered by: | |
| Confirmatory: | ☐ Yes | QC inits.: | |

| Special Instructions/QC Requirements: | | | | |
|---|---|---|---|---|
| EDD | ☑ Yes | ☐ No | | |
| Turnaround Time | ☐ 7 Day* | ☐ 15 Day* | ☑ 30 Day | |
| Negotiated TAT | ☐ | | | |
| Sample Disposal | ☐ Return to Client | ☑ Disposal by Lab | | |
| Return Samples By: | | | | |
| Comments: | Send report to Tim Jackson/4142/MS 0729/284-2547 | | | |

Conditions on Receipt

Lab Use

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | Robert Lynch | Robert Lynch | RL | SNL/4142/505-844-4013/505-250-7090 |
| | Alfred Santillanes | Alfred Santillanes | | SNL/4142/505-844-5130/505-228-0710 |
| | William Gibson | William Gibson | WG | SNL/4142/505-284-3307/505-239-7367 |
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|---|---|---|---|---|---|---|---|---|
| 1. Relinquished by | Alfred Santillanes | Org. | 4142 | Date | 7/9/14 | Time | 1335 | 3. Relinquished by |
| 1. Received by | SMO | Org. | 4142 | Date | 7/9/14 | Time | 1335 | 3. Received by |
| 2. Relinquished by | SMO | Org. | 4142 | Date | 7/10/14 | Time | 0805 | 4. Relinquished by |
| 2. Received by | | Org. | CCL | Date | 7-11-14 | Time | 0725 | 4. Received by |

*Prior confirmation with SMO required for 7 and 15 day TAT

SMO 2012-ARCOC (4-2012)

AOP 95-16

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab



Batch No. N/A

SMO Use

**AR/COC 615607**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | CWL-GWM | Date Samples Shipped: | 7/8/14 | SMO Authorization: | ☐ Waste Characterization |
| Project/Task Manager: | Tim Jackson | Carrier/Waybill No. | 220818 | SMO Contact Phone: | ☐ RMMA |
| Project/Task Number: | 146422/10.11.03 | Lab Contact: | Edie Kent/803-556-8171 | Lorraine Herrera/505-844-3199 | ☐ Released by COC No. |
| Service Order: | ~~CF 026-14~~ 327-14 | Lab Destination: | GEL | Send Report to SMO: | ☑ 4° Celsius |
| Tech Area: | 7/8/14 | Contract No.: | PO 1303873 | Rita Kavanaugh/505-284-2553 | Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 352131 |
| Building: | Room: | Operational Site: | | | |

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preservative | Collection Method | Sample Type | Parameter & Method Requested 7/8/14 | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 096199 | -001 | CWL-EB 1 | N/A | 7/7/14 13:23 | DIW | G | 3x40ml | HCL | G | EB SA | TCE (SW846-8260B) | 011 |
| 096199 | -015 | CWL-EB 1 | N/A | 7/7/14 13:24 | DIW | P | 500 mL | HNO3 | G | EB SA | Chromium Nickel (SW846-6920) | 012 |
| 096200 | -001 | CWL-TB 3 | N/A | 7/7/14 13:23 | DIW | G | 3x40ml | HCL | G | TB | TCE (SW846-8260B) | 013 |
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|---|---|---|---|
| **Last Chain:** | ☐ Yes | **Sample Tracking** | **SMO Use** |
| **Validation Req'd:** | ☑ Yes | Date Entered: | |
| **Background:** | ☐ Yes | Entered by: | |
| **Confirmatory:** | ☐ Yes | QC inits.: | |

**Special Instructions/QC Requirements:**

**EDD** ☑ Yes ☐ No

**Turnaround Time** ☐ 7 Day* ☐ 15 Day* ☑ 30 Day

**Negotiated TAT** ☐

**Sample Disposal** ☐ Return to Client ☑ Disposal by Lab

**Return Samples By:**

**Comments:** Send report to Tim Jackson/4142/MS 0729/284-2547

Conditions on Receipt

Lab Use

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | Robert Lynch | | RL | SNL/4142/505-844-4013/505-250-7090 |
| | Alfred Santillanes | | AS | SNL/4142/505-844-5130/505-228-0710 |
| | William Gibson | | WG | SNL/4142/505-284-3307/505-239-7367 |
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|---|---|---|---|---|---|---|---|---|---|
| 1.Relinquished by | Alfred Santillanes | Org. 4142 | Date 7/7/14 | Time 13:43 | 3.Relinquished by | | Org. | Date | Time |
| 1. Received by | | Org. 4142 | Date 7/7/14 | Time 13:43 | 3. Received by | | Org. | Date | Time |
| 2.Relinquished by | | Org. 4142 | Date 7/8/14 | Time 0800 | 4.Relinquished by | | Org. | Date | Time |
| 2. Received by | | Org. GCL | Date 7/9-14 | Time 0752 | 4. Received by | | Org. | Date | Time |

*Prior confirmation with SMO required for 7 and 15 day TAT

# AR/COC NUMBER 615605

ANALYTICAL QUALITY ASSOCIATES, INC.

PO Box 21987
Albuquerque, NM 87154
1-888-678-5447
www.aqainc.net

# Memorandum

Date: August 26, 2014

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL
Site: CWL-GWM
AR/COC: 615605
SDG: 352883
Laboratory: GEL
Project/Task: 146422.10.11.03
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

## Summary

One sample was prepared and analyzed for Cr and Ni with approved procedures using method EPA 6020 (ICP-MS). Data were reported for all required analytes. No problems were identified with the data package that resulted in the qualification of data.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

## Holding Times and Preservation

The sample was prepared and analyzed within the prescribed holding times and properly preserved.

## ICP-MS Instrument Tune

The ICP-MS tune met QC acceptance criteria.

## Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

## Reporting Limit Verification

All CRA/CRI recoveries associated with the sample met QC acceptance criteria.

It should be noted that the CRI was analyzed at the PQL and not at 2X the PQL for all target analytes.

**Blanks**

No target analytes were detected in the blanks.

**ICP -MS Internal Standards**

The ICP-MS internal standards met QC acceptance criteria.

**Matrix Spike (MS)**

The MS met all QC acceptance criteria.

**Laboratory Replicate**

The replicate met all QC acceptance criteria.

**Laboratory Control Sample (LCS)**

The LCS met all QC acceptance criteria.

**Detection Limits/Dilutions**

All detection limits were properly reported. The sample was not diluted.

**ICP Interference Check Sample (ICS A and AB)**

Results of the ICS A and AB analyses were not evaluated because the sample concentrations of Ca, Mg, Al and Fe were < that in the ICS solution.

**ICP Serial Dilution**

The serial dilutions met all QC acceptance criteria.

**Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Monica Dymerski **Level I** **Date:** 08/27/14

ANALYTICAL QUALITY ASSOCIATES, INC.

PO Box 21987
Albuquerque, NM 87154
1-888-678-5447
www.aqainc.net

# Memorandum

Date: August 25, 2014

To: File

From: Mary Donivan

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL-GWM
AR/COC: 615605
SDG: 352883
Laboratory: GEL
Project/Task: 146422.10.11.03
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 4.

## Summary

Three samples were prepared and analyzed with accepted procedures for trichloroethylene using method EPA 8260B (VOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

## Holding Times

The samples were analyzed within the prescribed holding time and properly preserved.

## Instrument Tune

All instrument tune requirements were met.

## Calibration

The initial calibration and continuing calibration data met QC acceptance criteria.

## Blanks

No target analytes were detected in the blanks.

## Surrogates

All surrogate recoveries met QC acceptance criteria.

**Internal Standards**

All internal standards met QC acceptance criteria.

**Matrix Spike/Matrix Spike Duplicate (MS/MSD)**

All MS/MSD acceptance criteria were met. The parent sample for the MS/MSD was an SNL sample from another SDG. No sample data will be qualified as a result.

**Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

**Detection Limits/Dilutions**

All detection limits were properly reported. The samples were not diluted.

**Tentatively Identified Compounds (TICs)**

TIC reports were not required.

**Other QC**

One FB and one TB were submitted, both associated with the sample in this ARCOC.

No other specific issues that affect data quality were identified.

**Reviewed by:** Monica Dymerski **Level I** **Date:** 08/27/14

# *Sample Findings Summary*

**AR/COC: 615605**



| Analytical Method | Sample ID | Analyte Name (CAS#) | Qualifier, RC |
|---|---|---|---|

**All other analyses met QC acceptance criteria; no further data should be qualified.**

# Data Validation Summary Worksheet

AR/COC #: 615605 Site/Project: CWL-GWM Validation Date: 08/25/2014

SDG #: 352883 Laboratory: GEL Laboratories, LLC Validator: Mary Donivan

Matrix: Aqueous # of Samples: 4 CVR present: Yes Analysis Type: X Organic X Metals

AR/COC(s) present: Yes Sample Container Integrity: OK Rad Gen Chem

**Requested Analyses Not Reported**

| Sample Number | Laboratory ID | organic | genchem | metals | rad | Comments |
|---|---|---|---|---|---|---|
| None | | | | | | |
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**Hold Time/Preservation Outliers**

| Sample Number | Laboratory ID | Analysis | Pres. | Coll. Date | Prep. Date | Anal. Date | Anal. within 2X HT | Anal. beyond 2X HT |
|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | |
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Comments: Samples collected 07/11/2014

Revised 7/2007

Validated By: Mary A. Donivan

# Organic Worksheet (GC/MS)

AR/COC #: 615605 SDG #:352883 Matrix: Aqueous

Laboratory Sample IDs: 352883001, -002 and -004

Method/Batch #s: 1406391 Tuning (pass/fail): pass TICs Required? (yes/no) no

| Analyte (outliers) | Calibration | | | | Method Blank | 5X (10X) Blank | LCS %R | MS %R | MSD %R | MS/ MSD RPD | FB -001 | TB -004 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Int. | RF | RSD/ $R^2$ | CCV (ICV) %D | | | | | | | | | | |
| None | | | | | | | | | | | | | | |
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**Surrogate Recovery Outliers**

| Sample ID | | | | | | |
|---|---|---|---|---|---|---|
| None | | | | | | |
| | | | | | | |

**IS Outliers**

| Sample ID | Area | RT | Area | RT | Area | RT | Area | RT | Area | RT | Area | RT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | | | | | |
| | | | | | | | | | | | | |

Comments: HTs OK, ICAL VOAA.I 07/17/14

MS/MSD performed on SNL sample from another SDG

Sample analysis for trichloroethylene only

# Inorganic Metals Worksheet

AR/COC #: 615605 SDG #: 352131 Matrix: Aqueous

Laboratory Sample IDs: 35213103, -007, -009, -012 and -016

Method/Batch #s: **3005A/6020** (ICP-MS): 1402927(prep)/1402928

ICPMS Mass Cal (pass/fail) pass ICPMS Resolution (pass/fail) pass

| **Analyte** (outliers) | **Calibration** | | | | | | **Method Blank** | **5X Blank or 5X MDL** | **LCS %R** | **MS %R** | **Lab Rep. RPD** | **Serial Dil. %D** | **ICS AB %R** | **ICS A ± MDL** | **CRA/ CRI %R** | **EB -012** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Int.** | **$R^2$** | **ICV** | **CCV** | **ICB** | **CCB** | | | | | | | | | | | | | | |
| Ni | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | NA | ✓ | ✓ | ✓ | ✓ | ✓ | -1.35 | ✓ | ✓ | | | | |
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| **IS Outliers *60-125%*** | | | | **IS Outliers *80-120%*** | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID** | **%Recovery** | **%Recovery** | **%Recovery** | **CCV/CCB ID** | **%Recovery** | **%Recovery** | **%Recovery** |
| None | | | | None | | | |
| | | | | | | | |

**Comments:** HTs OK. Matrix QC performed on -003

SMO 2012-ARCOC (4-2012)

AOP 95-16

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab



Batch No.

SMO Use

AR/COC 615605

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | CWL-GWM | Date Samples Shipped: | 7/16/14 | SMO Authorization: | ☐ Waste Characterization |
| Project/Task Manager: | Tim Jackson | Carrier/Waybill No. | 22123 | SMO Contact Phone: | ☐ RMMA |
| Project/Task Number: | 146422/10.11.03 | Lab Contact: | Edie Kent/803-556-8171 | Lorraine Herrera/505-844-3199 | ☐ Released by COC No. |
| Service Order: | CF 327-14 | Lab Destination: | GEL | Send Report to SMO: | ☑ 4° Celsius |
| | | Contract No.: | PO 1303873 | Rita Kavanaugh/505-284-2553 | Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 352883 |
| Tech Area: | | | | | |
| Building: | Room: | Operational Site: | | | |

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preserv-ative | Collection Method | Sample Type | Parameter & Method Requested | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 096194 | -001 | CWL-FB 4 | N/A | 7/11/14 9:09 | DIW | G | 3x40ml | HCL | G | FB | TCE (SW846-8260) | 001 |
| 096195 | -001 | CWL-MW10 | 515 | 7/11/14 9:09 | GW | G | 3x40ml | HCL | G | SA | TCE (SW846-8260) | 002 |
| 096195 | -015 | CWL-MW10 | 515 | 7/11/14 9:11 | GW | P | 500 mL | HNO3 | G | SA | Chromium Nickel (SW846-6020) | 003 |
| 096196 | -001 | CWL-TB 8 | N/A | 7/11/14 9:09 | DIW | G | 3x40ml | HCL | G | TB | TCE (SW846-8260) | 004 |
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|---|---|---|---|
| Last Chain: | ☑ Yes * | Sample Tracking | SMO Use |
| Validation Req'd: | ☑ Yes | Date Entered: | |
| Background: | ☐ Yes | Entered by: | |
| Confirmatory: | ☐ Yes | QC inits.: | |

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547

Conditions on Receipt

Lab Use

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | Robert Lynch | | RL | SNL/4142/505-844-4013/505-250-7090 |
| | Alfred Santillanes | | AS | SNL/4142/505-844-5130/505-228-0710 |
| | William Gibson | | WJG | SNL/4142/505-284-3307/505-239-7367 |
| | | | | |
| | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1. Relinquished by | | Org. 4142 | Date 7/16/14 | Time 1009 | 3. Relinquished by | Org. | Date | Time |
| 1. Received by | GWM | Org. 4142 | Date 7/16/14 | Time 1009 | 3. Received by | Org. | Date | Time |
| 2. Relinquished by | | Org. 4142 | Date 7/16/14 | Time 1100 | 4. Relinquished by | Org. | Date | Time |
| 2. Received by | | Org. GEL | Date 7-17-14 | Time 0750 | 4. Received by | Org. | Date | Time |

*Prior confirmation with SMO required for 7 and 15 day TAT

# CONTRACT VERIFICATION REVIEW FORMS

# GROUNDWATER MONITORING

# JULY 2014

Note: The review forms in this section include AR/COC numbers for environmental samples and additional AR/COC numbers for waste characterization samples.

| AR/COC Number | Sample Type |
|---|---|
| 615599 | Environmental* |
| 615600 | Waste |
| 615601 | Environmental* |
| 615602 | Waste |
| 615603 | Environmental* |
| 615604 | Waste |
| 615605 | Environmental* |
| 615606 | Waste |
| 615607 | Environmental* |

* These AR/COC forms are provided in the Data Validation Section of this Annex.

# Contract Verification Review (CVR)

| | | | | | |
|---|---|---|---|---|---|
| Project Leader | Jackson | Project Name | CWL GWM | Project/Task No. | 146422_10.11.03 |
| ARCOC No. | 615599, 615600, 615601, 615602, 615603, 615604, 615607 | Analytical Lab | GEL | SDG No. | 352125 |

*In the tables below, mark any information that is missing or incorrect and give an explanation.*

## 1.0 Analysis Request and Chain of Custody Record and Log-In Information

| Line No. | Item | Complete? Yes | Complete? No | If no, explain |
|---|---|---|---|---|
| 1.1 | All items on ARCOC complete - data entry clerk initialed and dated | X | | |
| 1.2 | Container type(s) correct for analyses requested | X | | |
| 1.3 | Sample volume adequate for # and types of analyses requested | X | | |
| 1.4 | Preservative correct for analyses requested | X | | |
| 1.5 | Custody records continuous and complete | X | | |
| 1.6 | Lab sample number(s) provided and SNL sample number(s) cross referenced and correct | X | | |
| 1.7 | Date samples received | X | | |
| 1.8 | Condition upon receipt information provided | X | | |

## 2.0 Analytical Laboratory Report

| Line No. | Item | Complete? Yes | Complete? No | If no, explain |
|---|---|---|---|---|
| 2.1 | Data reviewed, signature | X | | |
| 2.2 | Method reference number(s) complete and correct | X | | |
| 2.3 | QC analysis and acceptance limits provided (MB, LCS, Replicate) | X | | |
| 2.4 | Matrix spike/matrix spike duplicate data provided | X | | |
| 2.5 | Detection limits provided; PQL and MDL(or IDL), MDA and $L_c$ | X | | |
| 2.6 | QC batch numbers provided | X | | |
| 2.7 | Dilution factors provided and all dilution levels reported | X | | |
| 2.8 | Data reported in appropriate units and using correct significant figures | X | | |
| 2.9 | Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported | N/A | | |
| 2.10 | Narrative provided | X | | |
| 2.11 | TAT met | X | | |
| 2.12 | Holding times met | X | | |
| 2.13 | Contractual qualifiers provided | X | | |
| 2.14 | All requested result and TIC (if requested) data provided | X | | |

# Contract Verification Review (Continued)

## 3.0 Data Quality Evaluation

| Item | Yes | No | If no, Sample ID No./Fraction(s) and Analysis |
|---|---|---|---|
| 3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data | X | | |
| 3.2 Quantitation limit met for all samples | X | | |
| 3.3 Accuracy<br>a) Laboratory control sample accuracy reported and met for all samples | X | | |
| b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique | X | | |
| c) Matrix spike recovery data reported and met | X | | |
| 3.4 Precision<br>a) Replicate sample precision reported and met for all inorganic and radiochemistry samples | X | | |
| b) Matrix spike duplicate RPD data reported and met for all organic samples | X | | |
| 3.5 Blank data<br>a) Method or reagent blank data reported and met for all samples | | X | Calcium detected in Metals Method Blank (1203126289) |
| b) Sampling blank (e.g., field, trip, and equipment) data reported and met | | X | Detected in FB3: Trichloroethylene (096189-001) |
| 3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits | X | | |
| 3.7 Narrative addresses planchet flaming for gross alpha/beta | N/A | | |
| 3.8 Narrative included, correct, and complete | X | | |
| 3.9 Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151 | N/A | | |

# Contract Verification Review (Continued)

## 4.0 Calibration and Validation Documentation

| Item | Yes | No | Comments |
|---|---|---|---|
| 4.1 GC/MS (8260 and 8270)<br>a) 12-hour tune check provided | X | | |
| b) Initial calibration provided | X | | |
| c) Continuing calibration provided | X | | |
| d) Internal standard performance data provided | X | | |
| e) Instrument run logs provided | X | | |
| 4.2 GC/HPLC (8330, 8082, 9070A, and 8010)<br>a) Initial calibration provided | N/A | | |
| b) Continuing calibration provided | N/A | | |
| c) Instrument run logs provided | N/A | | |
| 4.3 HRGC/HRMS (1668)<br>a) 12-hour tune check provided | N/A | | |
| b) Initial calibration provided | N/A | | |
| c) Continuing calibration provided | N/A | | |
| d) Internal standard performance data provided | N/A | | |
| e) Labeled compound recovery data provided | N/A | | |

| | | | |
|---|---|---|---|
| f) RRTs for samples and standards provided | N/A | | |
| g) Ion abundance ratios for samples and standards provided | N/A | | |
| h) Instrument run logs provided | N/A | | |
| 4.4 LC/MS/MS (6850)<br>a) Initial calibration provided | N/A | | |
| b) Continuing calibration provided | N/A | | |
| c) CRI provided | N/A | | |
| d) Internal standard performance data provided | N/A | | |
| e) Chlorine isotope ratios provided (perchlorate only) | N/A | | |
| f) ICS provided (perchlorate only) | N/A | | |
| 4.5 Inorganics (metals)<br>a) Initial calibration provided | X | | |
| b) Continuing calibration provided | X | | |
| c) ICP interference check sample data provided | X | | |
| d) ICP serial dilution provided | X | | |
| e) Instrument run logs provided | X | | |
| 4.6 Radiochemistry and General Chemistry<br>a) Instrument run logs provided | X | | |

# Contract Verification Review (Concluded)

## 5.0 Data Anomaly Report

| Item | Yes | No | Comments |
|---|---|---|---|
| 5.1 DAR completed for monitoring and surveillance sample data | N/A | | |
| 5.2 Problems or outliers noted | | X | |
| 5.3 Verification or reanalysis requested from lab | | X | |

## 6.0 Problem Resolution

*Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.*

| Sample/Fraction No. | Analysis | Problems/Comments/Resolutions |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Were deficiencies unresolved? θ Yes x No

Based on the review, this data package is complete. θ Yes x No

If no, provide nonconformance report or correction request number 18030 and date correction request was submitted: 09/15/2014

Reviewed by: _____ Date: 08/20/2014

Were resolutions adequate and data package complete? θ Yes θ No

Closed by: _____ Date: 09/18/2014

Date: 08/25/2014

| | | | |
|---|---|---|---|
| To: | Edie Kent / Jannie Shaw-Busby | From: | Lorraine Herrera |
| Company: | GEL | Org: | 4142 |
| Phone: | (843) 556-8171 | Phone: | (505) 844-3199 |
| Fax: | (843) 766-1178 | Fax: | (505) 844-3128 |

Correction Request

COC: 615599 – 615604, 625607 SDG: 352125 Tracking No: 18030

For Metals batch 1402928, the run log is incorrect.

The LCS was analyzed and reported on 8/11/14 @ 20:12:50, but it is ZZZ'd out on the runlog. The sample ID for the LCS is 1203126290.

A corrected runlog is requested.

Thank you,
Lorraine

Sandia National Laboratories
Sample Management Office
P.O. Box 5800
Albuquerque, New Mexico 87185-1331

# Contract Verification Review (CVR)

Project Leader Jackson Project Name CWL-GWM Project/Task No. 146422_10.11.03

ARCOC No. 615605, 615606 Analytical Lab GEL SDG No. 352882

*In the tables below, mark any information that is missing or incorrect and give an explanation.*

## 1.0 Analysis Request and Chain of Custody Record and Log-In Information

| Line No. | Item | Complete? Yes | Complete? No | If no, explain |
|---|---|---|---|---|
| 1.1 | All items on ARCOC complete - data entry clerk initialed and dated | X | | |
| 1.2 | Container type(s) correct for analyses requested | X | | |
| 1.3 | Sample volume adequate for # and types of analyses requested | X | | |
| 1.4 | Preservative correct for analyses requested | X | | |
| 1.5 | Custody records continuous and complete | X | | |
| 1.6 | Lab sample number(s) provided and SNL sample number(s) cross referenced and correct | X | | |
| 1.7 | Date samples received | X | | |
| 1.8 | Condition upon receipt information provided | X | | |

## 2.0 Analytical Laboratory Report

| Line No. | Item | Complete? Yes | Complete? No | If no, explain |
|---|---|---|---|---|
| 2.1 | Data reviewed, signature | X | | |
| 2.2 | Method reference number(s) complete and correct | X | | |
| 2.3 | QC analysis and acceptance limits provided (MB, LCS, Replicate) | X | | |
| 2.4 | Matrix spike/matrix spike duplicate data provided | X | | |
| 2.5 | Detection limits provided; PQL and MDL(or IDL), MDA and $L_c$ | X | | |
| 2.6 | QC batch numbers provided | X | | |
| 2.7 | Dilution factors provided and all dilution levels reported | X | | |
| 2.8 | Data reported in appropriate units and using correct significant figures | X | | |
| 2.9 | Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported | N/A | | |
| 2.10 | Narrative provided | X | | |
| 2.11 | TAT met | X | | |
| 2.12 | Holding times met | X | | |
| 2.13 | Contractual qualifiers provided | X | | |
| 2.14 | All requested result and TIC (if requested) data provided | X | | |

# Contract Verification Review (Continued)

## 3.0 Data Quality Evaluation

| Item | Yes | No | If no, Sample ID No./Fraction(s) and Analysis |
|---|---|---|---|
| 3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data | X | | |
| 3.2 Quantitation limit met for all samples | X | | |
| 3.3 Accuracy<br>a) Laboratory control sample accuracy reported and met for all samples | | X | VOC LCS recovery failed for 1,2-Dibromo-3-chloropropane, Methylene chloride (1203134975) |
| b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique | X | | |
| c) Matrix spike recovery data reported and met | | X | VOC PS recovery failed for Bromomethane, Methylene chloride (1203134976). MS recovery failed for Total Phenol (1203129826) |
| 3.4 Precision<br>a) Replicate sample precision reported and met for all inorganic and radiochemistry samples | X | | |
| b) Matrix spike duplicate RPD data reported and met for all organic samples | X | | |
| 3.5 Blank data<br>a) Method or reagent blank data reported and met for all samples | | X | Calcium detected in Metals Method Blank (1203131101) |
| b) Sampling blank (e.g., field, trip, and equipment) data reported and met | X | | |
| 3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits | X | | |
| 3.7 Narrative addresses planchet flaming for gross alpha/beta | N/A | | |
| 3.8 Narrative included, correct, and complete | X | | |
| 3.9 Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151 | N/A | | |

# Contract Verification Review (Continued)

## 4.0 Calibration and Validation Documentation

| Item | Yes | No | Comments |
|---|---|---|---|
| 4.1 GC/MS (8260 and 8270) | | | |
| a) 12-hour tune check provided | X | | |
| b) Initial calibration provided | X | | |
| c) Continuing calibration provided | X | | |
| d) Internal standard performance data provided | X | | |
| e) Instrument run logs provided | X | | |
| 4.2 GC/HPLC (8330, 8082, 9070A, and 8010) | | | |
| a) Initial calibration provided | N/A | | |
| b) Continuing calibration provided | N/A | | |
| c) Instrument run logs provided | N/A | | |
| 4.3 HRGC/HRMS (1668) | N/A | | |
| a) 12-hour tune check provided | | | |
| b) Initial calibration provided | N/A | | |
| c) Continuing calibration provided | N/A | | |
| d) Internal standard performance data provided | N/A | | |
| e) Labeled compound recovery data provided | N/A | | |

| | | | |
|---|---|---|---|
| f) RRTs for samples and standards provided | N/A | | |
| g) Ion abundance ratios for samples and standards provided | N/A | | |
| h) Instrument run logs provided | N/A | | |
| 4.4 LC/MS/MS (6850)<br>a) Initial calibration provided | N/A | | |
| b) Continuing calibration provided | N/A | | |
| c) CRI provided | N/A | | |
| d) Internal standard performance data provided | N/A | | |
| e) Chlorine isotope ratios provided (perchlorate only) | N/A | | |
| f) ICS provided (perchlorate only) | N/A | | |
| 4.5 Inorganics (metals)<br>a) Initial calibration provided | X | | |
| b) Continuing calibration provided | X | | |
| c) ICP interference check sample data provided | X | | |
| d) ICP serial dilution provided | X | | |
| e) Instrument run logs provided | X | | |
| 4.6 Radiochemistry and General Chemistry<br>a) Instrument run logs provided | X | | |

# Contract Verification Review (Concluded)

## 5.0 Data Anomaly Report

| Item | Yes | No | Comments |
|---|---|---|---|
| 5.1 DAR completed for monitoring and surveillance sample data | N/A | | |
| 5.2 Problems or outliers noted | | X | |
| 5.3 Verification or reanalysis requested from lab | | X | |

## 6.0 Problem Resolution

*Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.*

| Sample/Fraction No. | Analysis | Problems/Comments/Resolutions |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Were deficiencies unresolved? θ Yes x No

Based on the review, this data package is complete. x Yes θ No

If no, provide nonconformance report or correction request number _____ and date correction request was submitted: _____

Reviewed by: _____ Date: 08/25/2014

Were resolutions adequate and data package complete? θ Yes θ No

Closed by: _____ Date: _____

**ANNEX B**
**Chemical Waste Landfill**
**CY 2014 Soil-Gas Monitoring Forms and Reports**

**Field Forms**

**Data Validation Reports**

**Contract Verification Reports**

**Certificates of Analysis – provided on CD in plastic sleeve insert**

# FIELD SAMPLING FORMS

# CWL POST-CLOSURE CARE SOIL-GAS MONITORING

| Form Title | Corresponding Procedure |
|---|---|
| Tailgate Safety Briefing | PLA 05-09 |
| SUMMA® Canister Log | FOP 08-22 |
| Soil Vapor Sampling Form | FOP 08-22 |
| Analysis Request and Chain of Custody* | LOP 94-03 |

*Completed AR/COC forms are provided in the Data Validation Section of this Annex.

# FIELD SAMPLING FORMS

# CALENDAR YEAR 2014 SOIL-GAS MONITORING

# TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL Date: 01/16/14 Time: 0855

Activities: VAPOR WELL SAMPLING
(Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:
Temp: 50.4 °F Wind Speed: 5 MPH Humidity: 34 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU-VAC ampules~~ 7/3/14
Other:

*Safety Topics Presented*

| | | |
|---|---|---|
| ☒ Be aware of slips, trips, and falls. Keep work area clean and use a stepping stool when necessary. | | ☒ Be aware of environmental conditions (heat / cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated. |
| ☒ Wear safety boots. | | ☒ Be aware of electrical hazards |
| ☒ Use safe lifting practices. Wear leather gloves if necessary. | | ☒ Be aware of pressure hazards. |
| ☒ Be aware of pinch points on pump cable reel and hydraulic tailgate lift. | | ☒ No eating or drinking at sampling counter. |
| ☐ Be aware of chemical hazards. | | ☒ Be aware of biohazards (snakes, spiders, etc.) |
| ☐ Wear nitrile or latex gloves when sampling. | | ☒ Wear communication device (cell phone, EOC pager). |
| ☐ Wear chemical safety goggles. | | ☐ Avoid spilling purge / decon water. |

Hospital/Clinic: Sandia Medical Clinic Phone: 844-0911/911

*Attendees*

| Printed Name | Signature |
|---|---|
| William Gibson | |
| Robert Lynch | |
| Gilbert L. Quintana | |
| Tim Jackson | |
| Alfred Sandoval | |

*IMPORTANT NOTICE: A printed copy of this document may not be the document currently in effect. The official version is located on the Sandia Restricted Network (SRN), department home page*

## SUMMA® Canister Log

| Serial # | Date Received | Date Tested for Initial VAC | Initial VAC at 5400 ft (in. Hg) | Date Used | End VAC at 5400 ft (in. Hg) | Date Returned to SMO | |
|---|---|---|---|---|---|---|---|
| 34000519 | 1/14/14 | 1/16/14 | -28 | 1/16/14 | -5 | 1/17/14 | |
| 0504 | | | -25 | | -5 | | |
| 0352 | | | -28 | | -5 | | |
| 0482 | | | -25 | | -5 | | |
| 1661 | | | -26 | | -5 | | |
| 1352 | | | -26 | | -5 | | FB |
| 0091 | | | -26 | | -5 | | |
| 0345 | | | -26 | | -5 | | |
| 0017 | | | -26 | | -5 | | |
| 0206 | | | -26 | | -5 | | |
| 7701 | | | -24 | | -5 | | FB |
| 1659 | | | -26 | | -5 | | FB |
| 0582 | | | -26 | | -5 | | |
| 0022 | | | -22 | | -6 | | |
| 1305 | | | -28 | | -6 | | |
| 0021 | | | -26 | | -5 | | |
| 1347 | | | -28 | | -5 | | |
| 0036 | | | -25 | | -5 | | FB |
| 1201 | | | -26 | | -5 | | |
| 1202 | | | -26 | | -5 | | |
| 0108 | | | -28 | | -5 | | |
| 0690 | | | -26 | | -6 | | |
| 0353 | | | -27 | | -5 | | FB |
| 1584 | | | -27 | | -5 | | |
| 0119 | | | -26 | | -5 | | |
| 0789 | | | -27 | | -5 | | |
| 1559 | | | -26 | | -5 | | |
| 0323 | | | -27 | | -5 | | |
| | | | | | | | |
| | | | | | | | |

SUMMA® Canister Log completed by:

Tim Jackson
Printed Name

T. Jackson
Signature

Background = 0.6 ppm

* PID readings are continuous

## Soil Vapor Sampling Log

| Location | Date | Time | Canister # | PID (ppm) | Starting Vacuum (in. Hg) | Ending Vacuum (in. Hg) | Location Comments |
|---|---|---|---|---|---|---|---|
| CWL-D1-100 | 1/16/14 | 0907 | 34000519 | 0.0 | -28 | -8 | Purge / Sample |
| CWL-D1-160 | | 0909 | n/a | 0.0 | ~~-26~~ n/a 1/16/14 | n/a | Purge |
| ↓ | | 0910 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | | 0912 | 34000504 | n/a | -28 | -8 | Sample |
| CWL-D1-240 | | 0915 | n/a | 0.1 | n/a | n/a | Purge |
| ↓ | | 0916 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | | 0917 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | | 0918 | 34000352 | n/a | -28 | -8 | Sample |
| CWL-D1-350 | | 0928 | n/a | 0.0 | n/a | n/a | Purge |
| ↓ | | 0929 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | | 0930 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | | 0931 | 34000482 | n/a | -28 | -8 | Sample |
| CWL-D1-470 | | 0934 | n/a | 0.0 | n/a | n/a | Purge |
| ↓ | | 0936 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | | 0937 | 34001661 | n/a | -28 | -8 | Sample |
| CWL-U1-140 | | 0953 | 34000091 | 0.0 | -26 | -8 | Purge / Sample |
| CWL-U1-540 | | 0957 | n/a | 0.0 | n/a | n/a | Purge |
| ↓ | | 0958 | 34000345 | n/a | -26 | -8 | Sample |
| CWL-U1-120 | | 1000 | n/a | 0.00 | n/a | n/a | Purge |
| ↓ | | 1001 | ↓ | ↓ | ↓ | ↓ | |
| ↓ | | 1002 | 34000017 | n/a | -26 | -8 | Sample |
| ↓ | | 1004 | 34000206 | ↓ | -26 | -8 | Duplicate |
| CWL-U12-36 | | 1022 | 34000547 | 0.00 | -26 | -8 | Purge/Sample |
| CWL-U12-76 | | 1026 | n/a | 0.00 | n/a | n/a | Purge |
| ↓ | | 1027 | 34000022 | n/a | -22 | -6 | Sample |
| CWL-U12-136 | | 1029 | n/a | 0.0 | n/a | n/a | Purge |
| ↓ | | 1030 | 34001305 | n/a | -28 | -8 | Sample |
| ↓ | ↓ | 1032 | 34000021 | ↓ | -26 | -8 | Duplicate |

## Soil Vapor Sampling Log

| Location | Date | Time | Canister # | PID (ppm) | Starting Vacuum (in. Hg) | Ending Vacuum (in. Hg) | Location Comments |
|---|---|---|---|---|---|---|---|
| CWL-D2-120 | 11/6/14 | 1053 | 34001397 | 0.0 | -28 | -8 | Purge/Sample |
| CWL-D2-240 | | 1056 | n/a | 0.0 | n/a | n/a | Purge |
| ↓ | | 1057 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | | 1058 | 34001207 | n/a | -26 | -8 | Sample |
| CWL-D2-360 | | 1101 | n/a 1116 | 0.0 | n/a | n/a | Purge |
| ↓ | | 1102 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | | 1103 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | | 1104 | 34001202 | n/a | -26 | -8 | Sample |
| CWL-D2-480 | | 1107 | n/a | 0.0 | n/a | n/a | Purge |
| ↓ | | 1108 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | | 1109 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | | 1110 | 34000108 | n/a | -28 | -8 | Sample |
| CWL-D2-490 | | 1112 | n/a | 0.0 | n/a | n/a | Purge |
| ↓ | | 1113 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | | 1114 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | | 1115 | 34000698 | n/a | -26 | -8 | Sample |
| CWL-D3-120 | | 1136 | n/a | 0.0 | n/a | n/a | Purge |
| | | 1137 | 34001584 | n/a | -27 | -8 | Sample |
| CWL-D3-170 | | 1139 | n/a | 0.0 | n/a | n/a | Purge |
| | | 1140 | ↓ | ↓ | ↓ | ↓ | ↓ |
| | | 1141 | 34000119 | n/a | -26 | -8 | Sample |
| CWL-D3-360 | | 1144 | n/a | 0.0 | n/a | n/a | Purge |
| ↓ | | 1145 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | | 1146 | 34000789 | n/a | -27 | -8 | Sample |
| CWL-D3-480 | | 1148 | n/a | 0.0 | n/a | n/a | Purge |
| ↓ | | 1149 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | | 1150 | ↓ | ↓ | ↓ | ↓ | ↓ |
| ↓ | ↓ | 1151 | 34001554 | n/a | -26 | -8 | Sample |
| | | | | | | | |

## Soil Vapor Sampling Log

| Location | Date | Time | Canister # | PID (ppm) | Starting Vacuum (in. Hg) | Ending Vacuum (in. Hg) | Location Comments |
|---|---|---|---|---|---|---|---|
| ewi-D3-440 | 11/16/14 | 1152 | n/a | 4.4 | n/a | n/a | Purge |
| | | | | 4.3 | | | |
| | | 1153 | | 4.1 | | | |
| | | | | 3.5 | | | |
| | | 1155 | | 2.5 | | | |
| | | 1156 | | 2.5 | | | |
| | | 1157 | | 2.5 | | | |
| | | 1200 #56 | 34000823 | n/a | -26 | -8 | Sample |

# SUMMARY SHEET FOR CALENDAR YEAR 2014 SAMPLES

**Sample Summary for CWL Soil Vapor Monitoring**
**FY14**

| Well ID | Sample Date | Sample ID / Port | *SUMMA Number* | ARCOC | Sample Number | Sample Type | Associated Equipment Blank (ARCOC #/Sample #) | Associated Trip Blank (ARCOC #/Sample #) | Associated Field Blank (ARCOC #/Sample #) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| ***Chemical Waste Landfill Soil Vapor Monitoring: Project Task Number 146422.10.11.03 / Service Order Number CF 327-14*** | | | | | | | | | | |
| **CWL-UI1** | 16-Jan-14 | **CWL-UI1-40** | 34000091 | 615194 | 095129 | Environmental | n/a | n/a | 615194 / 095133 | |
| | | **CWL-UI1-80** | 34000345 | | 095130 | Environmental | | | | |
| | | **CWL-UI1-120** | 34000017 | | 095131 | Environmental | | | | |
| | | **CWL-UI1-120** | 34000206 | | 095132 | Duplicate | | | | |
| | | **CWL-UI1-FB1** | 34007701 | | 095133 | Field QC | n/a | n/a | n/a | Ultra Pure N2 |
| **CWL-UI2** | 16-Jan-14 | **CWL-UI2-36** | 34000582 | 615195 | 095134 | Environmental | n/a | n/a | 615195 / 095138 | |
| | | **CWL-UI2-76** | 34000022 | | 095135 | Environmental | | | | |
| | | **CWL-UI2-136** | 34001305 | | 095136 | Environmental | | | | |
| | | **CWL-UI2-136** | 34000021 | | 095137 | Duplicate | | | | |
| | | **CWL-UI2-FB1** | 34001659 | | 095138 | Field QC | n/a | n/a | n/a | Ultra Pure N2 |
| **CWL-D1** | 16-Jan-14 | **CWL-D1-100** | 34000519 | 615196 | 095139 | Environmental | n/a | n/a | 615196 / 095144 | |
| | | **CWL-D1-160** | 34000504 | | 095140 | Environmental | | | | |
| | | **CWL-D1-240** | 34000382 | | 095141 | Environmental | | | | |
| | | **CWL-D1-350** | 34000482 | | 095142 | Environmental | | | | |
| | | **CWL-D1-470** | 34001161 | | 095143 | Environmental | | | | |
| | | **CWL-D1-FB1** | 34001352 | | 095144 | Field QC | n/a | n/a | n/a | Ultra Pure N2 |
| **CWL-D2** | 16-Jan-14 | **CWL-D2-120** | 34001397 | 615197 | 095145 | Environmental | n/a | n/a | 615197 / 095150 | |
| | | **CWL-D2-240** | 34001201 | | 095146 | Environmental | | | | |
| | | **CWL-D2-350** | 34001202 | | 095147 | Environmental | | | | |
| | | **CWL-D2-440** | 34000108 | | 095148 | Environmental | | | | |
| | | **CWL-D2-470** | 34000698 | | 095149 | Environmental | | | | |
| | | **CWL-D2-FB1** | 34000038 | | 095150 | Field QC | n/a | n/a | n/a | Ultra Pure N2 |
| **CWL-D3** | 16-Jan-14 | **CWL-D3-120** | 34001584 | 615198 | 095151 | Environmental | n/a | n/a | 615198 / 095156 | |
| | | **CWL-D3-170** | 34000119 | | 095152 | Environmental | | | | |
| | | **CWL-D3-350** | 34000789 | | 095153 | Environmental | | | | |
| | | **CWL-D3-440** | 34000823 | | 095154 | Environmental | | | | |
| | | **CWL-D3-480** | 34001559 | | 095155 | Environmental | | | | |
| | | **CWL-D3-FB1** | 34000853 | | 095156 | Field QC | n/a | n/a | n/a | Ultra Pure N2 |

# DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

**AR/COC NUMBERS 615194, 615195, 615196, 615197, 615198**

ANALYTICAL QUALITY ASSOCIATES, INC

PO Box 21987
Albuquerque, NM 87154
1-888-678-5447
www.aqainc.net

# Memorandum

Date: March 10, 2014

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL-SVM
AR/COC: 615194, 615195, 615196, 615197 and 615198
SDG: 320-5780-1
Laboratory: TestAmerica Laboratories, Inc. -West Sacramento
Project/Task: 146422.10.11.03
Analysis: VOCs by method TO-15

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM SMO AOP 00-03 Rev 3.

## Summary

Twenty-eight samples were prepared and analyzed with accepted procedures using method EPA TO-15 (Determination of VOCs in Air collected in specially prepared canisters and analyzed by GC-MS). All compounds were successfully analyzed. Problems were identified with the data package that resulted in the qualification of data.

1. Ethylbenzene was detected at < the PQL in the FB, sample 320-5780-5, associated with samples -1 through -4. The associated results for all samples except sample -4 were detects < the PQL and <5X the MB value and will be **qualified 130U,B2** at the PQL.

2. Toluene was detected at > the PQL in the FB, sample 320-5780-5, associated with samples -1 through -4. The associated result for sample -4 was a detect < the PQL and <10X the FB value and will be **qualified 10U,B2** at the PQL. The associated results for samples -1 through1 -3 were detects > the PQL and <10X the FB and will be **qualified 310U,B2; 280U,B2; 320U,B2** (respectively) at the reported values.

3. o-Xylene was detected at < the PQL in the FB, sample 320-5780-5, associated with samples -1 through -4. The associated results for all samples were detects < the PQL and <5X the MB value and will be **qualified 130U,B2; 130U,B2; 130U,B2 and 10U,B2** (respectively) at the PQL.

4. m,p-Xylene was detected at < the PQL in the FB, sample 320-5780-5, associated with samples -1 through -4. The associated results for all samples except sample -4 were detects ≤ the PQL and <5X the FB value and will be **qualified 260U,B2; 260U,B2** and **270U,B2** (respectively) at the PQL.

5. Acetone was detected at < the PQL in the FB, sample 320-5780-5, associated with samples -1 through -4. The associated results for all samples were detects < the PQL and <10X the FB value and will be **qualified 1600U,B2; 1700U,B2; 1700U,B2 and 130U,B2** (respectively) at the PQL.

6. Acetone was detected at < the PQL in the FB, sample 320-5780-10, associated with samples -6 through -9. The associated results for all samples were detects < the PQL and <10X the FB value and will be **qualified 430U,B2; 490U,B2; 1600U,B2 and 1600U,B2** (respectively) at the PQL.

7. Acetone was detected at < the PQL in the FB, sample 320-5780-16, associated with samples -11 through -15. The associated result for sample -14 was a detect > the PQL and <10X the FB value and will be **qualified 1200U,B2** at the reported value. The remaining associated sample results were detects < the PQL and <10X the FB value and will be **qualified 1600U,B2; 2400U,B2; 2200U,B2 and 22U,B2** (respectively) at the PQL.

8. Acetone was detected at < the PQL in the FB, sample 320-5780-28, associated with samples -23 through -27. The associated results for samples -23, -24 and -27 were detects > the PQL and <10X the FB value and will be **qualified 1400U,B2; 1400U,B2 and 7.4U,B2** (respectively) at the reported value. The associated results for samples -25 and -26 were detects < the PQL and <10X the FB value and both will be **qualified 1600U,B2** at the PQL.

9. Dichlorodifluoromethane was detected at < the PQL in the FB, sample 320-5780-28, associated with samples -23 through -27. The associated result for sample -24 was a detect < the PQL and <5X the FB value and will be **qualified 64U,B2** at the PQL. The associated result for sample -27 was a detect > the PQL and <5X the FB value and will be **qualified 0.57U,B2** at the reported value.

Data are acceptable and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

**Holding Times**

The samples were analyzed within the prescribed holding time and properly preserved.

**Instrument Tune**

All instrument tune requirements were met.

**Calibration**

The initial calibration and continuing calibration data met QC acceptance criteria except as follows.

The 1,2-dichloro-1,1,2,2-tetrafluoroethane %D was >30% but ≤45% with negative bias for the CCV associated with samples -1 through -3 and -5 through -18. The associated sample results were NDs and since no other calibration infraction occurred, will not be qualified.

**Blanks**

No target analytes were detected in the blanks except as noted above in the Summary section and as follows.

Ethylbenzene and m,p-xylene were detected at < the PQL in the FB, sample 320-5780-5. The associated results for sample -4 were NDs and will not be qualified.

2-Butanone was detected at < the PQL in the FB, sample 320-5780-16, associated with samples -11 through -15. All associated sample results were NDs and will not be qualified.

Trichloroethene was detected at < the PQL in the FB, sample 320-5780-22, associated with samples -17 through -21. All associated sample results were detects >5X the FB value and will not be qualified.

Dichlorodifluoromethane was detected at < the PQL in the FB, sample 320-5780-28, associated with samples -23 through -27. The associated results for samples -23, -25 and -26 were NDs and will not be qualified.

**Surrogates**

All surrogate acceptance criteria were met.

**Internal Standards**

All internal standards met QC acceptance criteria.

**Matrix Spike/Matrix Spike Duplicate (MS/MSD)**

An MS/MSD was not performed.

**Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)**

The LCS met all QC acceptance criteria.

**Detection Limits/Dilutions**

All detection limits were properly reported. The samples were not diluted except as follows.

Sample -1 was diluted 328X and reanalyzed at a 322X for acetone only.
Sample -2 was diluted 331X and reanalyzed at a 331X for acetone only.
Sample -3 was diluted 334X and reanalyzed at a 334X for acetone only.
Sample -4 was diluted 25.6 and reanalyzed at a 320X for trichloroethene only.
Sample -6 was diluted 325X and reanalyzed at a 86.7X for acetone only.
Sample -7 was diluted 306X and reanalyzed at a 98X for acetone only.
Sample -8 was diluted 325X and reanalyzed at a 325X for acetone only.
Sample -9 was diluted 322X and reanalyzed at a 322X for acetone only.
Sample -11 was diluted 314X and reanalyzed at a 314X for acetone only.
Sample -12 was diluted 470X and reanalyzed at a 470X for acetone only.
Sample -13 was diluted 443X and reanalyzed at a 443X for acetone only.
Sample -14 was diluted 442X, reanalyzed at 442X (surrogates only reported) and reanalyzed at a 221X for acetone only.
Sample -15 was diluted 13.4X and reanalyzed at a 4.45X for acetone only.
Sample -17 was diluted 324X and reanalyzed at a 324X for acetone only.
Sample -18 was diluted 328X and reanalyzed at a 273X for acetone only.
Sample -19 was diluted 320X.
Sample -20 was diluted 6.25X.
Sample -21 was diluted 325X (surrogates only reported) and reanalyzed at 130X.
Sample -23 was diluted 164X.

Sample -24 was diluted 161X.
Sample -25 was diluted 324X.
Sample -26 was diluted 328X.

**Tentatively Identified Compounds (TICs)**

TIC reports were not required.

**Other QC**

Mass spectra acceptability was not verified during data validation.

Five FBs were submitted, one for each AR/COC. A field duplicate pair was submitted with AR/COC 615194 and 615195. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

**Reviewed by**: Mary Donivan **Level:** I **Date:** 03/11/14

# *Sample Findings Summary*

**AR/COC: 615194, 615195, 615196, 615197, 615198**



| Analytical Method | Sample ID | Analyte Name (CAS#) | Qualifier, RC |
|---|---|---|---|
| TO15 | | | |
| | 095129-001/CWL-UI1-40 | ACETONE (67-64-1) | 1600U, B2 |
| | 095129-001/CWL-UI1-40 | ETHYLBENZENE (100-41-4) | 130U, B2 |
| | 095129-001/CWL-UI1-40 | M,P-XYLENE (179601-23-1) | 260U, B2 |
| | 095129-001/CWL-UI1-40 | O-XYLENE (95-47-6) | 130U, B2 |
| | 095129-001/CWL-UI1-40 | TOLUENE (108-88-3) | 310U, B2 |
| | 095130-001/CWL-UI1-80 | ACETONE (67-64-1) | 1700U, B2 |
| | 095130-001/CWL-UI1-80 | ETHYLBENZENE (100-41-4) | 130U, B2 |
| | 095130-001/CWL-UI1-80 | M,P-XYLENE (179601-23-1) | 260U, B2 |
| | 095130-001/CWL-UI1-80 | O-XYLENE (95-47-6) | 130U, B2 |
| | 095130-001/CWL-UI1-80 | TOLUENE (108-88-3) | 280U, B2 |
| | 095131-001/CWL-UI1-120 | ACETONE (67-64-1) | 1700U, B2 |
| | 095131-001/CWL-UI1-120 | ETHYLBENZENE (100-41-4) | 130U, B2 |
| | 095131-001/CWL-UI1-120 | M,P-XYLENE (179601-23-1) | 270U, B2 |
| | 095131-001/CWL-UI1-120 | O-XYLENE (95-47-6) | 130U, B2 |
| | 095131-001/CWL-UI1-120 | TOLUENE (108-88-3) | 320U, B2 |
| | 095132-001/CWL-UI1-120 | ACETONE (67-64-1) | 130U, B2 |
| | 095132-001/CWL-UI1-120 | O-XYLENE (95-47-6) | 130U, B2 |
| | 095132-001/CWL-UI1-120 | TOLUENE (108-88-3) | 10U, B2 |
| | 095134-001/CWL-UI2-36 | ACETONE (67-64-1) | 430U, B2 |
| | 095135-001/CWL-UI2-76 | ACETONE (67-64-1) | 490U, B2 |
| | 095136-001/CWL-UI2-136 | ACETONE (67-64-1) | 1600U, B2 |
| | 095137-001/CWL-UI2-136 | ACETONE (67-64-1) | 1600U, B2 |
| | 095139-001/CWL-D1-100 | ACETONE (67-64-1) | 1600U, B2 |
| | 095140-001/CWL-D1-160 | ACETONE (67-64-1) | 2400U, B2 |

| Analytical Method | Sample ID | Analyte Name (CAS#) | Qualifier, RC |
|---|---|---|---|
| | 095141-001/CWL-D1-240 | ACETONE (67-64-1) | 2200U, B2 |
| | 095142-001/CWL-D1-350 | ACETONE (67-64-1) | 1200U, B2 |
| | 095143-001/CWL-D1-470 | ACETONE (67-64-1) | 22U, B2 |
| | 095151-001/CWL-D3-120 | ACETONE (67-64-1) | 1400U, B2 |
| | 095152-001/CWL-D3-170 | ACETONE (67-64-1) | 1400U, B2 |
| | 095152-001/CWL-D3-170 | DICHLORODIFLUOROMETHANE (75-71-8) | 64U, B2 |
| | 095153-001/CWL-D3-350 | ACETONE (67-64-1) | 1600U, B2 |
| | 095154-001/CWL-D3-440 | ACETONE (67-64-1) | 1600U, B2 |
| | 095155-001/CWL-D3-480 | ACETONE (67-64-1) | 7.4U, B2 |
| | 095155-001/CWL-D3-480 | DICHLORODIFLUOROMETHANE (75-71-8) | 0.57U, B2 |

**All other analyses met QC acceptance criteria; no further data should be qualified.**

# Data Validation Summary Worksheet

AR/COC #: 615194, 615195, 615196, 615197 and 615198 | Site/Project: CWL | Validation Date: 03/11/2014

SDG #: 320-5780-1 | Laboratory: TA West Sacramento, CA | Validator: Linda Thal

Matrix: Air | # of Samples: 28 CVR present: Yes | Analysis Type: X☐ Organic ☐ Metals

AR/COC(s) present: Yes | Sample Container Integrity: OK | ☐ Rad ☐ Gen Chem

**Requested Analyses Not Reported**

| Sample Number | Laboratory ID | organic | genchem | metals | rad | Comments |
|---|---|---|---|---|---|---|
| None | | | | | | |
| | | | | | | |
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**Hold Time/Preservation Outliers**

| Sample Number | Laboratory ID | Analysis | Pres. | Coll. Date | Prep. Date | Anal. Date | Anal. within 2X HT | Anal. beyond 2X HT |
|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comments: Collected 01/16/2014

Validated by: L Thal

Revised 7/2007

# Organic Worksheet (GC/MS)

AR/COC #: 615194, 615195, 615196, 615197 and 615198 SDG #: 320-5780-1 Matrix: Air

Laboratory Sample IDs: 320-5780-1 through -28

Method/Batch #s: TO15: 35856[1]; 35915[2]; 36138[3]; 36193[4] Tuning (pass/fail): Pass TICs Required? (yes/no): NA

| Analyte (outliers) | Calibration | | | | Method Blank | 5X (10X) MB | LCS %R | LCSD %R | LCS LCSD RPD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Int. | RF | RSD/ $R^2$ | (ICV) CCV %D | | | | | | | | | | |
| [1]35856 Acetone reanalyzed | | | | | | | | | | FB -5 | FB-10 | FB-16 | | |
| Acetone | NA | ✓ | ✓ | ✓ | ✓ | NA | 68* | 68* | ✓ | | | | | |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | NA | ✓ | ✓ | -32 | ✓ | NA | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Ethylbenzene | NA | ✓ | ✓ | ✓ | ✓ | NA | ✓ | ✓ | ✓ | .082J | ✓ | ✓ | | |
| Toluene | NA | ✓ | ✓ | ✓ | ✓ | NA | ✓ | ✓ | ✓ | .45 | ✓ | ✓ | | |
| m,p-Xylene | NA | ✓ | ✓ | ✓ | ✓ | NA | ✓ | ✓ | ✓ | .19J | ✓ | ✓ | | |
| o-Xylene | NA | ✓ | ✓ | ✓ | ✓ | NA | ✓ | ✓ | ✓ | .068J | ✓ | ✓ | | |
| 2-Butanone (MEK) | NA | ✓ | ✓ | ✓ | ✓ | NA | ✓ | ✓ | ✓ | ✓ | ✓ | 0.3J | | |
| [2]35915 | | | | | | | | | | FB-22 | FB-28 | | | |
| Trichloroethene | NA | ✓ | ✓ | ✓ | ✓ | NA | ✓ | ✓ | ✓ | .39J | ✓ | ✓ | | |
| Acetone | NA | ✓ | ✓ | ✓ | ✓ | NA | ✓ | ✓ | ✓ | ✓ | 0.96J | ✓ | | |
| Dichlorodifluoromethane | NA | ✓ | ✓ | ✓ | ✓ | NA | ✓ | ✓ | ✓ | ✓ | .18J | ✓ | | |
| [3]36138 | | | | | | | | | | FB -5RA | FB-10RA | FB-16RA | | |
| Acetone | NA | ✓ | ✓ | ✓ | ✓ | NA | ✓ | ✓ | ✓ | 1.1J | 1.1J | 1.9J | | |
| [4]36193 Acetone only | | | | | | | | | | | | | | |
| 1,1-Dichloroethene | NA | ✓ | ✓ | ✓ | ✓ | NA | ✓ | 69** | ✓ | | | | | |

**Surrogate Recovery Outliers**

| Sample ID | | | | | | |
|---|---|---|---|---|---|---|
| None | | | | | | |

**IS Outliers**

| Sample ID | Area | RT | Area | RT | Area | RT | Area | RT | Area | RT | Area | RT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | | | | | |

Comments: No raw data/mass spectra validated. MDLs and RLS reported. Samples spiked with 3 surrogates. Instrument ATMS 2 ICAL 01/31/2014. LCS/LCSD all batches.

*All samples reanalyzed for acetone; ** samples analyzed for acetone only

Cannister Certifications were provided in the data package.

SMO 2012-ARCOC (4-2012)

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTOD

320-5780 Chain of Custody

AOP 95-16

Internal Lab

Page 1 of 1

Batch No. NA

SMO Use

**AR/COC 615194**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | CWL-SVM | Date Samples Shipped. | 1/17/14 | SMO Authorization: | ☐ Waste Characterization |
| Project/Task Manager: | Tim Jackson | Carrier/Waybill No. | 213724 | SMO Contact Phone: | ☐ RMMA |
| Project/Task Number: | 146422.10.11.03 | Lab Contact: | BETH RILEY | Wendy Palencia/505-844-3132 | ☐ Released by COC No. |
| Service Order: | CF327-14 | Lab Destination | TA/West Sacramento | Send Report to SMO: | ☐ 4° Celsius |
| | | Contract No.: | PO 691437 | Wendy Palencia/505-844-3132 | Bill to. Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 |
| Tech Area: | | | | | |
| Building: | Room: | Operational Site: | | | |

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preserv-ative | Collection Method | Sample Type | Parameter & Method Requested | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 095129 | -001 | CWL-UI1-40 (# 34000091) | | 1/16/14 9:53 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095130 | -001 | CWL-UI1-80 (# 34000345) | | 1/16/14 9:57 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095131 | -001 | CWL-UI1-120 (# 34000017) | | 1/16/14 10:02 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095132 | -001 | CWL-UI1-120 (# 34000206) | | 1/16/14 10:04 | SG | SC | 6 L | None | G | DU | VOC-TO15 | |
| 095133 | -001 | CWL-UI1-FB1 (# 7701) | | 1/16/14 10:06 | UPN | SC | 6 L | None | G | FB | VOC-TO15 | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Last Chain: | ☐ Yes | Sample Tracking | SMO Use | Special Instructions/QC Requirements: | Conditions on Receipt |
| Validation Req'd: | ☑ Yes | Date Entered: | | EDD ☑ Yes ☐ No | |
| Background: | ☐ Yes | Entered by: | | Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day | |
| Confirmatory: | ☐ Yes | QC inits.: | | Negotiated TAT ☐ | |

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | William Gibson | | WJG | SNL/4142/505-284-3307/505-239-7367 |
| | Robert Lynch | | RL | SNL/4142/505-844-4013/505-250-7090 |
| | Alfred Santillanes | | AS | SNL/4142/505-844-5130/505-228-0710 |
| | Tim Jackson | | TJ | SNL/4142/505-284-2547/505-263-6639 |
| | Gilbert Quintana | | GQ | SNL/4143/505-284-2507/505-263-2606 |

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547

Lab Use

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Relinquished by | | Org | 4142 | Date | 1/17/14 | Time | 0834 | 3.Relinquished by | Org. | Date | Time |
| 1. Received by | | Org. | 4147 | Date | 1/17/14 | Time | 0834 | 3. Received by | Org. | Date | Time |
| 2.Relinquished by | | Org. | 4142 | Date | 1/17/14 | Time | 0945 | 4.Relinquished by | Org. | Date | Time |
| 2. Received by | | Org. | | Date | 1-22-14 | Time | 915 | 4. Received by | Org. | Date | Time |

*Prior confirmation with SMO required for 7 and 15 day TAT

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02/27/2014

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTODY



Internal Lab



Batch No. N/A

SMO Use

AR/COC 615195

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | CWL-SVM | Date Samples Shipped. | 1/17/14 | SMO Authorization: | ☐ Waste Characterization |
| Project/Task Manager: | Tim Jackson | Carrier/Waybill No. | 213724 | SMO Contact Phone. | ☐ RMMA |
| Project/Task Number: | 146422.10.11.03 | Lab Contact: | BOTH RILEY | Wendy Palencia/505-844-3132 | ☐ Released by COC No. |
| Service Order: | CF327-14 | Lab Destination. | TA/West Sacramento | Send Report to SMO: | ☐ 4° Celsius |
| | | Contract No. | PO 691437 | Wendy Palencia/505-844-3132 | Bill to: Sandia National Laboratories (Accounts Payable), P.O Box 5800, MS-0154 Albuquerque, NM 87185-0154 |
| Tech Area: | | | | | |
| Building: | Room: | Operational Site: | | | |

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preserv-ative | Collection Method | Sample Type | Parameter & Method Requested | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 095134 | -001 | CWL-UI2-36 (# 34000582) | | 1/16/14 10:22 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095135 | -001 | CWL-UI2-76 (# 34000022) | | 1/16/14 10:27 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095136 | -001 | CWL-UI2-136 (# 34001305) | | 1/16/14 10:30 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095137 | -001 | CWL-UI2-136 (# 34000021) | | 1/16/14 10:32 | SG | SC | 6 L | None | G | DU | VOC-TO15 | |
| 095138 | -001 | CWL-UI2-FB1 (# 34001659) | | 1/16/14 10:18 | UPN | SC | 6 L | None | G | FB | VOC-TO15 | |
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|---|---|---|---|---|---|
| Last Chain: | ☐ Yes | Sample Tracking | SMO Use | Special Instructions/QC Requirements: | Conditions on Receipt |
| Validation Req'd: | ☑ Yes | Date Entered: | | EDD ☑ Yes ☐ No | |
| Background: | ☐ Yes | Entered by: | | Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day | |
| Confirmatory: | ☐ Yes | QC inits.: | | Negotiated TAT ☐ | |

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | William Gibson | William Gibson | WG | SNL/4142/505-284-3307/505-239-7367 |
| | Robert Lynch | Robert Lynch | RL | SNL/4142/505-844-4013/505-250-7090 |
| | Alfred Santillanes | Alfred Santillanes | AS | SNL/4142/505-844-5130/505-228-0710 |
| | Tim Jackson | Tim Jackson | TJ | SNL/4142/505-284-2547/505-263-6639 |
| | Gilbert Quintana | Gilbert Quintana | GQ | SNL/4143/505-284-2507/505-263-2606 |

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547

Lab Use

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1.Relinquished by | Alfred Santillanes | Org. | 4142 | Date | 1-17-14 | Time | 0834 | 3.Relinquished by | Org. | Date | Time |
| 1. Received by | GMO | Org. | 4142 | Date | 1-17-14 | Time | 0834 | 3. Received by | Org. | Date | Time |
| 2.Relinquished by | GMO | Org. | 4142 | Date | 1-17-14 | Time | 0945 | 4.Relinquished by | Org. | Date | Time |
| 2. Received by | | Org. | | Date | 1-22-14 | Time | 915 | 4. Received by | Org. | Date | Time |

*Prior confirmation with SMO required for 7 and 15 day TAT

02/27/2014

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTODY



Internal Lab

Batch No. N/A

SMO Use



AR/COC 615196

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | CWL-SVM | Date Samples Shipped | 1/17/14 | SMO Authorization. | ☐ Waste Characterization |
| Project/Task Manager: | Tim Jackson | Carrier/Waybill No | 213724 | SMO Contact Phone: | ☐ RMMA |
| Project/Task Number: | 146422.10.11.03 | Lab Contact. | Brent Rich | Wendy Palencia/505-844-3132 | ☐ Released by COC No. |
| Service Order: | CF327-14 | Lab Destination: | TA/West Sacramento | Send Report to SMO: | ☐ 4° Celsius |
| | | Contract No . | PO 691437 | Wendy Palencia/505-844-3132 | Bill to· Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 |
| Tech Area: | | | | | |
| Building: | Room: | Operational Site: | | | |

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preserv-ative | Collection Method | Sample Type | Parameter & Method Requested | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 095139 | -001 | CWL-D1-100 (# 34000519) | | 1/16/14 9:07 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095140 | -001 | CWL-D1-160 (# 34000504) | | 1/16/14 9:12 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095141 | -001 | CWL-D1-240 (# 34000382) | | 1/16/14 9:18 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095142 | -001 | CWL-D1-350 (# 34000482) | | 1/16/14 9:31 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095143 | -001 | CWL-D1-470 (# 34001661) | | 1/16/14 9:37 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095144 | -001 | CWL-D1-FB1 (# 34001352) | | 1/16/14 9:43 | UPN | SC | 6 L | None | G | FB | VOC-TO15 | |
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| | | | |
|---|---|---|---|
| Last Chain: | ☐ Yes | Sample Tracking | SMO Use |
| Validation Req'd: | ☑ Yes | Date Entered: | |
| Background: | ☐ Yes | Entered by: | |
| Confirmatory: | ☐ Yes | QC inits.: | |

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | William Gibson | William Gibson | WG | SNL/4142/505-284-3307/505-239-7367 |
| | Robert Lynch | Robert Lynch | RL | SNL/4142/505-844-4013/505-250-7090 |
| | Alfred Santillanes | Alfred Santillanes | AS | SNL/4142/505-844-5130/505-228-0710 |
| | Tim Jackson | Tim Jackson | TJ | SNL/4142/505-284-2547/505-263-6639 |
| | Gilbert Quintana | Gilbert Quintana | GQ | SNL/4143/505-284-2507/505-236-2606 |

Special Instructions/QC Requirements:

EDD ☑ Yes ☐ No

Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547

Conditions on Receipt

Lab Use

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1.Relinquished by | Alfred Santillanes | Org | 4142 | Date | 1/17/14 | Time | 0834 | 3.Relinquished by | Org. Date Time |
| 1. Received by | Wendy Palencia | SMO Org. | 4142 | Date | 1/17/14 | Time | 0834 | 3. Received by | Org. Date Time |
| 2.Relinquished by | Wendy Palencia | SMO Org. | 4142 | Date | 1/17/14 | Time | 0945 | 4.Relinquished by | Org. Date Time |
| 2. Received by | | Org. | | Date | 1-22-14 | Time | 915 | 4. Received by | Org. Date Time |

*Prior confirmation with SMO required for 7 and 15 day TAT

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTODY



Internal Lab

Batch No. NA

SMO Use



AR/COC 615197

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | CWL-SVM | Date Samples Shipped. | 1/17/14 | SMO Authorization: | ☐ Waste Characterization |
| Project/Task Manager: | Tim Jackson | Carrier/Waybill No. | 2137 24 | SMO Contact Phone: SMO | ☐ RMMA |
| Project/Task Number: | 146422.10.11.03 | Lab Contact: | BETH RILEY | Wendy Palencia/505-844-3132 | ☐ Released by COC No. |
| Service Order: | CF327-14 | Lab Destination: | TA/West Sacramento | Send Report to SMO: | ☐ 4° Celsius |
| | | Contract No : | PO 691437 | Wendy Palencia/505-844-3132 | Bill to. Sandia National Laboratories (Accounts Payable), P.O Box 5800, MS-0154 Albuquerque, NM 87185-0154 |
| Tech Area: | | | | | |
| Building: | Room: | Operational Site: | | | |

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preserv-ative | Collection Method | Sample Type | Parameter & Method Requested | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 095145 | -001 | CWL-D2-120 (# 34001397) | | 1/16/14 10:53 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095146 | -001 | CWL-D2-240 (# 34001201) | | 1/16/14 10:58 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095147 | -001 | CWL-D2-350 (# 34001202) | | 1/16/14 11:04 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095148 | -001 | CWL-D2-440 (# 34000108) | | 1/16/14 11:10 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095149 | -001 | CWL-D2-470 (# 34000698) | | 1/16/14 11:15 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095150 | -001 | CWL-D2-FB1 (# 34000038) | | 1/16/14 10:47 | UPN | SC | 6 L | None | G | FB | VOC-TO15 | |
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| | | | | | |
|---|---|---|---|---|---|
| Last Chain: | ☐ Yes | Sample Tracking | SMO Use | Special Instructions/QC Requirements: | Conditions on Receipt |
| Validation Req'd: | ☑ Yes | Date Entered: | | EDD ☑ Yes ☐ No | |
| Background: | ☐ Yes | Entered by: | | Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day | |
| Confirmatory: | ☐ Yes | QC inits.: | | Negotiated TAT ☐ | |
| | | | | Sample Disposal ☐ Return to Client ☑ Disposal by Lab | |
| | | | | Return Samples By: | |
| | | | | Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547 | Lab Use |

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | William Gibson | William Gibson | WJG | SNL/4142/505-284-3307/505-239-7367 |
| | Robert Lynch | Robert Lynch | RL | SNL/4142/505-844-4013/505-250-7090 |
| | Alfred Santillanes | Alfred Santillanes | AS | SNL/4142/505-844-5130/505-228-0710 |
| | Tim Jackson | T Jackson | TJ | SNL/4142/505-284-2547/505-263-6639 |
| | Gilbert Quintana | Gilbert Quintana | GQ | SNL/4143/505-284-2507/505-263-2606 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. Relinquished by | Alfred Santillanes | Org. 4142 | Date 1-17-14 | Time 0834 | 3. Relinquished by | | Org. | Date | Time |
| 2. Received by | GMO | Org. 4142 | Date 1-17-14 | Time 0834 | 3. Received by | | Org. | Date | Time |
| 2. Relinquished by | SMO | Org. 4142 | Date 1-17-14 | Time 0945 | 4. Relinquished by | | Org. | Date | Time |
| 3. Received by | | Org. | Date 1-22-14 | Time 915 | 4. Received by | | Org. | Date | Time |

*Prior confirmation with SMO required for 7 and 15 day TAT

SMO 2012-ARCOC (4-2012)

AOP 95-16

# CONTRACT LABORATORY
# ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab



Batch No. N/A

SMO Use

**AR/COC 615198**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | CWL-SVM | Date Samples Shipped: | 1/17/14 | SMO Authorization: | ☐ Waste Characterization |
| Project/Task Manager: | Tim Jackson | Carrier/Waybill No. | 213724 | SMO Contact Phone: | ☐ RMMA |
| Project/Task Number: | 146422.10.11.03 | Lab Contact: | Both Riley | Wendy Palencia/505-844-3132 | ☐ Released by COC No. |
| Service Order: | CF327-14 | Lab Destination. | TA/West Sacramento | Send Report to SMO: | ☐ 4° Celsius |
| | | Contract No.: | PO 691437 | Wendy Palencia/505-844-3132 | Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 |
| Tech Area: | | | | | |
| Building: | Room: | Operational Site: | | | |

| Sample No. | Fraction | Sample Location Detail | Depth (ft) | Date/Time Collected | Sample Matrix | Container Type | Container Volume | Preservative | Collection Method | Sample Type | Parameter & Method Requested | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 095151 | -001 | CWL-D3-120 (# 34001584) | | 1/16/14 11:37 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095152 | -001 | CWL-D3-170 (# 34000119) | | 1/16/14 11:41 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095153 | -001 | CWL-D3-350 (# 34000789) | | 1/16/14 11:46 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095154 | -001 | CWL-D3-440 (# 34000823) | | 1/16/14 12:00 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095155 | -001 | CWL-D3-480 (# 34001559) | | 1/16/14 11:51 | SG | SC | 6 L | None | G | SA | VOC-TO15 | |
| 095156 | -001 | CWL-D3-FB1 (# 34000853) | | 1/16/14 11:32 | UPN | SC | 6 L | None | G | FB | VOC-TO15 | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
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| | | | |
|---|---|---|---|
| Last Chain: | ☐ Yes | Sample Tracking SMO Use | Special Instructions/QC Requirements: |
| Validation Req'd: | ☑ Yes | Date Entered: | EDD ☑ Yes ☐ No |
| Background: | ☐ Yes | Entered by: | Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day |
| Confirmatory: | ☐ Yes | QC inits.: | Negotiated TAT ☐ |
| | | | Sample Disposal ☐ Return to Client ☑ Disposal by Lab |
| | | | Return Samples By: |
| | | | Comments: Send Report to Tim Jackson/4142/MS 0729/505-284-2547 |

Conditions on Receipt

Lab Use

| Sample Team Members | Name | Signature | Init. | Company/Organization/Phone/Cell |
|---|---|---|---|---|
| | William Gibson | William Gibson | WJG | SNL/4142/505-284-3307/505-239-7367 |
| | Robert Lynch | Robert Lynch | RL | SNL/4142/505-844-4013/505-250-7090 |
| | Alfred Santillanes | Alfred Santillanes | AS | SNL/4142/505-844-5130/505-228-0710 |
| | Tim Jackson | Tim Jackson | TJ | SNL/4142/505-284-2547/505-263-6639 |
| | Gilbert Quintana | Gilbert Quintana | GQ | SNL/4143/505-284-2507/505-263-2606 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2.Relinquished by | Alfred Santillanes | Org. 4142 | Date 1-17-14 | Time 0834 | 3.Relinquished by | Org. | Date | Time |
| 2. Received by | SMO | Org. 4142 | Date 1-17-14 | Time 0834 | 3. Received by | Org. | Date | Time |
| 2.Relinquished by | SMO | Org. 4142 | Date 1-17-14 | Time 0945 | 4.Relinquished by | Org. | Date | Time |
| 2. Received by | | Org. | Date 1-22-14 | Time 915 | 4. Received by | Org. | Date | Time |

Prior confirmation with SMO required for 7 and 15 day TAT

# CONTRACT VERIFICATION REVIEW FORMS

Note: The review forms in this section include AR/COC numbers for environmental samples and additional AR/COC numbers for waste characterization samples.

| AR/COC Number | Sample Type |
|---|---|
| 615194 | Environmental* |
| 615195 | Environmental* |
| 615196 | Environmental* |
| 615197 | Environmental* |
| 615198 | Environmental* |

* These AR/COC forms are provided in the Data Validation Section of this Annex.

# Contract Verification Review (CVR)

| | | | | | |
|---|---|---|---|---|---|
| Project Leader | JACKSON | Project Name | CWL SVM | Project/Task No. | 146422_10.11.03 |
| ARCOC No. | 615194, 615195, 615196, 615197 & 615198 | Analytical Lab | TA-WEST SACRAMENTO | SDG No. | 320-5780-1 |

*In the tables below, mark any information that is missing or incorrect and give an explanation.*

## 1.0 Analysis Request and Chain of Custody Record and Log-In Information

| Line No. | Item | Complete? Yes | No | If no, explain |
|---|---|---|---|---|
| 1.1 | All items on ARCOC complete - data entry clerk initialed and dated | X | | |
| 1.2 | Container type(s) correct for analyses requested | X | | |
| 1.3 | Sample volume adequate for # and types of analyses requested | X | | |
| 1.4 | Preservative correct for analyses requested | X | | |
| 1.5 | Custody records continuous and complete | X | | |
| 1.6 | Lab sample number(s) provided and SNL sample number(s) cross referenced and correct | X | | |
| 1.7 | Date samples received | X | | |
| 1.8 | Condition upon receipt information provided | X | | |

## 2.0 Analytical Laboratory Report

| Line No. | Item | Complete? Yes | No | If no, explain |
|---|---|---|---|---|
| 2.1 | Data reviewed, signature | X | | |
| 2.2 | Method reference number(s) complete and correct | X | | |
| 2.3 | QC analysis and acceptance limits provided (MB, LCS, Replicate) | X | | |
| 2.4 | Matrix spike/matrix spike duplicate data provided | N/A | | |
| 2.5 | Detection limits provided; PQL and MDL(or IDL), MDA and $L_c$ | X | | |
| 2.6 | QC batch numbers provided | X | | |
| 2.7 | Dilution factors provided and all dilution levels reported | X | | |
| 2.8 | Data reported in appropriate units and using correct significant figures | X | | |
| 2.9 | Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported | N/A | | |
| 2.10 | Narrative provided | X | | |
| 2.11 | TAT met | X | | |
| 2.12 | Holding times met | X | | |
| 2.13 | Contractual qualifiers provided | X | | |
| 2.14 | All requested result and TIC (if requested) data provided | X | | |

# Contract Verification Review (Continued)

## 3.0 Data Quality Evaluation

| Item | Yes | No | If no, Sample ID No./Fraction(s) and Analysis |
|---|---|---|---|
| 3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data | X | | |
| 3.2 Quantitation limit met for all samples | X | | |
| 3.3 Accuracy<br>a) Laboratory control sample accuracy reported and met for all samples | | X | ACETONE FAILED RECOVERY LIMITS FOR LCS/LCD 320-35856/5 & 320-35856/6 |
| b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique | X | | |
| c) Matrix spike recovery data reported and met | N/A | | |
| 3.4 Precision<br>a) Replicate sample precision reported and met for all inorganic and radiochemistry samples | N/A | | |
| b) Matrix spike duplicate RPD data reported and met for all organic samples | N/A | | |
| 3.5 Blank data<br>a) Method or reagent blank data reported and met for all samples | X | | |
| b) Sampling blank (e.g., field, trip, and equipment) data reported and met | | X | SEVERAL ANALYTES DETECTED AT LOW LEVELS IN FIELD BLANKS |
| 3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits | X | | |
| 3.7 Narrative addresses planchet flaming for gross alpha/beta | N/A | | |
| 3.8 Narrative included, correct, and complete | X | | |
| 3.9 Second column confirmation data provided for methods 8330 (high | N/A | | |

# Contract Verification Review (Continued)

## 4.0 Calibration and Validation Documentation

| Item | Yes | No | Comments |
|---|---|---|---|
| 4.1 GC/MS (8260 and 8270) | | | |
| a) 12-hour tune check provided | X | | |
| b) Initial calibration provided | X | | |
| c) Continuing calibration provided | X | | |
| d) Internal standard performance data provided | X | | |
| e) Instrument run logs provided | X | | |
| 4.2 GC/HPLC (8330, 8082, 9070A, and 8010) | | | |
| a) Initial calibration provided | N/A | | |
| b) Continuing calibration provided | N/A | | |
| c) Instrument run logs provided | N/A | | |
| 4.3 HRGC/HRMS (1668) | | | |
| a) 12-hour tune check provided | N/A | | |
| b) Initial calibration provided | N/A | | |
| c) Continuing calibration provided | N/A | | |
| d) Internal standard performance data provided | N/A | | |
| e) Labeled compound recovery data provided | N/A | | |

# Contract Verification Review (Continued)



| | | | |
|---|---|---|---|
| f) RRTs for samples and standards provided | N/A | | |
| g) Ion abundance ratios for samples and standards provided | N/A | | |
| h) Instrument run logs provided | N/A | | |
| 4.4 LC/MS/MS (6850)<br>a) Initial calibration provided | N/A | | |
| b) Continuing calibration provided | N/A | | |
| c) CRI provided | N/A | | |
| d) Internal standard performance data provided | N/A | | |
| e) Chlorine isotope ratios provided (perchlorate only) | N/A | | |
| f) ICS provided (perchlorate only) | N/A | | |
| 4.5 Inorganics (metals)<br>a) Initial calibration provided | N/A | | |
| b) Continuing calibration provided | N/A | | |
| c) ICP interference check sample data provided | N/A | | |
| d) ICP serial dilution provided | N/A | | |
| e) Instrument run logs provided | N/A | | |
| 4.6 Radiochemistry and General Chemistry<br>a) Instrument run logs provided | N/A | | |

# Contract Verification Review (Concluded)

## 5.0 Data Anomaly Report

| Item | Yes | No | Comments |
|---|---|---|---|
| 5.1 DAR completed for monitoring and surveillance sample data | X | | |
| 5.2 Problems or outliers noted | X | | |
| 5.3 Verification or reanalysis requested from lab | | X | |

## 6.0 Problem Resolution

*Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.*

| Sample/Fraction No. | Analysis | Problems/Comments/Resolutions |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Were deficiencies unresolved? θ Yes X No

Based on the review, this data package is complete. X Yes θ No

If no, provide nonconformance report or correction request number _____ and date correction request was submitted: _____

Reviewed by: W. Palencia Date: 2.28.2014

Were resolutions adequate and data package complete? θ Yes θ No

Closed by: _____ Date: _____

**SOIL-GAS SAMPLING RESULTS**
**CERTIFICATES OF ANALYSIS**

**Chemical Waste Landfill**

**January 2014 – Soil-Gas Samples**

Note: Certificates of Analysis are provided on compact disc only, for printed copies of this report.

Client: Sandia National Laboratories
Project/Site: CWL

TestAmerica Job ID: 320-5780-1

**Client Sample ID: 095129-001/CWL-UI1-40**
**Lab Sample ID: 320-5780-1**
**Date Collected: 01/16/14 09:53**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

**Method: TO-15 - Volatile Organic Compounds in Ambient Air**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 130 | 26 | ppb v/v | | | 02/08/14 01:42 | 328 |
| Benzyl chloride | ND | | 260 | 53 | ppb v/v | | | 02/08/14 01:42 | 328 |
| Bromodichloromethane | ND | | 98 | 22 | ppb v/v | | | 02/08/14 01:42 | 328 |
| Bromoform | ND | | 130 | 23 | ppb v/v | | | 02/08/14 01:42 | 328 |
| Bromomethane | ND | | 260 | 110 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 2-Butanone (MEK) | ND | | 260 | 65 | ppb v/v | | | 02/08/14 01:42 | 328 |
| Carbon disulfide | ND | | 260 | 26 | ppb v/v | | | 02/08/14 01:42 | 328 |
| Carbon tetrachloride | ND | | 260 | 21 | ppb v/v | | | 02/08/14 01:42 | 328 |
| Chlorobenzene | ND | | 98 | 21 | ppb v/v | | | 02/08/14 01:42 | 328 |
| Chloroethane | ND | | 260 | 100 | ppb v/v | | | 02/08/14 01:42 | 328 |
| **Chloroform** | **750** | | 98 | 31 | ppb v/v | | | 02/08/14 01:42 | 328 |
| Chloromethane | ND | | 260 | 65 | ppb v/v | | | 02/08/14 01:42 | 328 |
| Dibromochloromethane | ND | | 130 | 26 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 1,2-Dibromoethane (EDB) | ND | | 260 | 25 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 130 | 51 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 1,2-Dichlorobenzene | ND | | 130 | 43 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 1,3-Dichlorobenzene | ND | | 130 | 36 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 1,4-Dichlorobenzene | ND | | 130 | 49 | ppb v/v | | | 02/08/14 01:42 | 328 |
| Dichlorodifluoromethane | ND | | 130 | 48 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 1,1-Dichloroethane | ND | | 98 | 24 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 1,2-Dichloroethane | ND | | 260 | 29 | ppb v/v | | | 02/08/14 01:42 | 328 |
| **1,1-Dichloroethene** | **180** | **J** | 260 | 42 | ppb v/v | | | 02/08/14 01:42 | 328 |
| cis-1,2-Dichloroethene | ND | | 130 | 29 | ppb v/v | | | 02/08/14 01:42 | 328 |
| trans-1,2-Dichloroethene | ND | | 130 | 33 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 1,2-Dichloropropane | ND | | 130 | 79 | ppb v/v | | | 02/08/14 01:42 | 328 |
| cis-1,3-Dichloropropene | ND | | 130 | 34 | ppb v/v | | | 02/08/14 01:42 | 328 |
| trans-1,3-Dichloropropene | ND | | 130 | 29 | ppb v/v | | | 02/08/14 01:42 | 328 |
| **Ethylbenzene** | **61** | **J** | 130 | 21 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 4-Ethyltoluene | ND | | 130 | 61 | ppb v/v | | | 02/08/14 01:42 | 328 |
| Hexachlorobutadiene | ND | | 660 | 140 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 2-Hexanone | ND | | 130 | 29 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 130 | 44 | ppb v/v | | | 02/08/14 01:42 | 328 |
| **Methylene Chloride** | **47** | **J** | 130 | 24 | ppb v/v | | | 02/08/14 01:42 | 328 |
| Styrene | ND | | 130 | 19 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 1,1,2,2-Tetrachloroethane | ND | | 130 | 23 | ppb v/v | | | 02/08/14 01:42 | 328 |
| **Tetrachloroethene** | **2800** | | 130 | 17 | ppb v/v | | | 02/08/14 01:42 | 328 |
| **Toluene** | **310** | | 130 | 17 | ppb v/v | | | 02/08/14 01:42 | 328 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **730** | | 130 | 53 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 1,2,4-Trichlorobenzene | ND | | 660 | 140 | ppb v/v | | | 02/08/14 01:42 | 328 |
| **1,1,1-Trichloroethane** | **56** | **J** | 98 | 21 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 1,1,2-Trichloroethane | ND | | 130 | 22 | ppb v/v | | | 02/08/14 01:42 | 328 |
| **Trichloroethene** | **4800** | | 130 | 34 | ppb v/v | | | 02/08/14 01:42 | 328 |
| **Trichlorofluoromethane** | **180** | | 130 | 64 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 1,2,4-Trimethylbenzene | ND | | 260 | 53 | ppb v/v | | | 02/08/14 01:42 | 328 |
| 1,3,5-Trimethylbenzene | ND | | 130 | 41 | ppb v/v | | | 02/08/14 01:42 | 328 |
| Vinyl acetate | ND | | 260 | 48 | ppb v/v | | | 02/08/14 01:42 | 328 |
| Vinyl chloride | ND | | 130 | 39 | ppb v/v | | | 02/08/14 01:42 | 328 |

## Client Sample ID: 095129-001/CWL-UI1-40

**Lab Sample ID: 320-5780-1**

**Date Collected: 01/16/14 09:53**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **m,p-Xylene** | **260** | | 260 | 33 | ppb v/v | | | 02/08/14 01:42 | 328 |
| **o-Xylene** | **110** | **J** | 130 | 18 | ppb v/v | | | 02/08/14 01:42 | 328 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *107* | | *70 - 130* | | *02/08/14 01:42* | *328* |
| *1,2-Dichloroethane-d4 (Surr)* | *99* | | *70 - 130* | | *02/08/14 01:42* | *328* |
| *Toluene-d8 (Surr)* | *106* | | *70 - 130* | | *02/08/14 01:42* | *328* |

### Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **970** | **J** | 1600 | 57 | ppb v/v | | | 02/12/14 21:55 | 322 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *108* | | *70 - 130* | | *02/12/14 21:55* | *322* |
| *1,2-Dichloroethane-d4 (Surr)* | *100* | | *70 - 130* | | *02/12/14 21:55* | *322* |
| *Toluene-d8 (Surr)* | *106* | | *70 - 130* | | *02/12/14 21:55* | *322* |

## Client Sample ID: 095130-001/CWL-UI1-80

**Lab Sample ID: 320-5780-2**

**Date Collected: 01/16/14 09:57**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 130 | 26 | ppb v/v | | | 02/08/14 02:31 | 331 |
| Benzyl chloride | ND | | 260 | 54 | ppb v/v | | | 02/08/14 02:31 | 331 |
| Bromodichloromethane | ND | | 99 | 22 | ppb v/v | | | 02/08/14 02:31 | 331 |
| Bromoform | ND | | 130 | 23 | ppb v/v | | | 02/08/14 02:31 | 331 |
| Bromomethane | ND | | 260 | 110 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 2-Butanone (MEK) | ND | | 260 | 66 | ppb v/v | | | 02/08/14 02:31 | 331 |
| Carbon disulfide | ND | | 260 | 26 | ppb v/v | | | 02/08/14 02:31 | 331 |
| Carbon tetrachloride | ND | | 260 | 21 | ppb v/v | | | 02/08/14 02:31 | 331 |
| Chlorobenzene | ND | | 99 | 21 | ppb v/v | | | 02/08/14 02:31 | 331 |
| Chloroethane | ND | | 260 | 100 | ppb v/v | | | 02/08/14 02:31 | 331 |
| **Chloroform** | **580** | | 99 | 31 | ppb v/v | | | 02/08/14 02:31 | 331 |
| Chloromethane | ND | | 260 | 65 | ppb v/v | | | 02/08/14 02:31 | 331 |
| Dibromochloromethane | ND | | 130 | 26 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 1,2-Dibromoethane (EDB) | ND | | 260 | 25 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 130 | 51 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 1,2-Dichlorobenzene | ND | | 130 | 43 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 1,3-Dichlorobenzene | ND | | 130 | 36 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 1,4-Dichlorobenzene | ND | | 130 | 49 | ppb v/v | | | 02/08/14 02:31 | 331 |
| Dichlorodifluoromethane | ND | | 130 | 48 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 1,1-Dichloroethane | ND | | 99 | 24 | ppb v/v | | | 02/08/14 02:31 | 331 |
| **1,2-Dichloroethane** | **39** | **J** | 260 | 29 | ppb v/v | | | 02/08/14 02:31 | 331 |
| **1,1-Dichloroethene** | **320** | | 260 | 43 | ppb v/v | | | 02/08/14 02:31 | 331 |
| cis-1,2-Dichloroethene | ND | | 130 | 29 | ppb v/v | | | 02/08/14 02:31 | 331 |
| trans-1,2-Dichloroethene | ND | | 130 | 33 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 1,2-Dichloropropane | ND | | 130 | 79 | ppb v/v | | | 02/08/14 02:31 | 331 |

## Client Sample ID: 095130-001/CWL-UI1-80

**Lab Sample ID: 320-5780-2**

**Date Collected: 01/16/14 09:57**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| cis-1,3-Dichloropropene | ND | | 130 | 34 | ppb v/v | | | 02/08/14 02:31 | 331 |
| trans-1,3-Dichloropropene | ND | | 130 | 29 | ppb v/v | | | 02/08/14 02:31 | 331 |
| **Ethylbenzene** | **54** | **J** | 130 | 21 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 4-Ethyltoluene | ND | | 130 | 62 | ppb v/v | | | 02/08/14 02:31 | 331 |
| Hexachlorobutadiene | ND | | 660 | 140 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 2-Hexanone | ND | | 130 | 29 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 130 | 45 | ppb v/v | | | 02/08/14 02:31 | 331 |
| **Methylene Chloride** | **110** | **J** | 130 | 24 | ppb v/v | | | 02/08/14 02:31 | 331 |
| Styrene | ND | | 130 | 20 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 1,1,2,2-Tetrachloroethane | ND | | 130 | 23 | ppb v/v | | | 02/08/14 02:31 | 331 |
| **Tetrachloroethene** | **950** | | 130 | 17 | ppb v/v | | | 02/08/14 02:31 | 331 |
| **Toluene** | **280** | | 130 | 17 | ppb v/v | | | 02/08/14 02:31 | 331 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **870** | | 130 | 54 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 1,2,4-Trichlorobenzene | ND | | 660 | 140 | ppb v/v | | | 02/08/14 02:31 | 331 |
| **1,1,1-Trichloroethane** | **52** | **J** | 99 | 22 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 1,1,2-Trichloroethane | ND | | 130 | 22 | ppb v/v | | | 02/08/14 02:31 | 331 |
| **Trichloroethene** | **6300** | | 130 | 35 | ppb v/v | | | 02/08/14 02:31 | 331 |
| **Trichlorofluoromethane** | **210** | | 130 | 65 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 1,2,4-Trimethylbenzene | ND | | 260 | 54 | ppb v/v | | | 02/08/14 02:31 | 331 |
| 1,3,5-Trimethylbenzene | ND | | 130 | 41 | ppb v/v | | | 02/08/14 02:31 | 331 |
| Vinyl acetate | ND | | 260 | 48 | ppb v/v | | | 02/08/14 02:31 | 331 |
| Vinyl chloride | ND | | 130 | 40 | ppb v/v | | | 02/08/14 02:31 | 331 |
| **m,p-Xylene** | **240** | **J** | 260 | 33 | ppb v/v | | | 02/08/14 02:31 | 331 |
| **o-Xylene** | **83** | **J** | 130 | 18 | ppb v/v | | | 02/08/14 02:31 | 331 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *107* | | *70 - 130* | | *02/08/14 02:31* | *331* |
| *1,2-Dichloroethane-d4 (Surr)* | *98* | | *70 - 130* | | *02/08/14 02:31* | *331* |
| *Toluene-d8 (Surr)* | *105* | | *70 - 130* | | *02/08/14 02:31* | *331* |

### Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **980** | **J** | 1700 | 59 | ppb v/v | | | 02/12/14 22:44 | 331 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *106* | | *70 - 130* | | *02/12/14 22:44* | *331* |
| *1,2-Dichloroethane-d4 (Surr)* | *98* | | *70 - 130* | | *02/12/14 22:44* | *331* |
| *Toluene-d8 (Surr)* | *107* | | *70 - 130* | | *02/12/14 22:44* | *331* |

## Client Sample ID: 095131-001/CWL-UI1-120

**Lab Sample ID: 320-5780-3**

**Date Collected: 01/16/14 10:02**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 130 | 26 | ppb v/v | | | 02/08/14 03:19 | 334 |
| Benzyl chloride | ND | | 270 | 54 | ppb v/v | | | 02/08/14 03:19 | 334 |
| Bromodichloromethane | ND | | 100 | 22 | ppb v/v | | | 02/08/14 03:19 | 334 |

**Client Sample ID: 095131-001/CWL-UI1-120**
**Lab Sample ID: 320-5780-3**
**Date Collected: 01/16/14 10:02**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Bromoform | ND | | 130 | 23 | ppb v/v | | | 02/08/14 03:19 | 334 |
| Bromomethane | ND | | 270 | 110 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 2-Butanone (MEK) | ND | | 270 | 66 | ppb v/v | | | 02/08/14 03:19 | 334 |
| Carbon disulfide | ND | | 270 | 26 | ppb v/v | | | 02/08/14 03:19 | 334 |
| Carbon tetrachloride | ND | | 270 | 21 | ppb v/v | | | 02/08/14 03:19 | 334 |
| Chlorobenzene | ND | | 100 | 21 | ppb v/v | | | 02/08/14 03:19 | 334 |
| Chloroethane | ND | | 270 | 100 | ppb v/v | | | 02/08/14 03:19 | 334 |
| **Chloroform** | **450** | | 100 | 32 | ppb v/v | | | 02/08/14 03:19 | 334 |
| Chloromethane | ND | | 270 | 66 | ppb v/v | | | 02/08/14 03:19 | 334 |
| Dibromochloromethane | ND | | 130 | 26 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 1,2-Dibromoethane (EDB) | ND | | 270 | 25 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 130 | 52 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 1,2-Dichlorobenzene | ND | | 130 | 43 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 1,3-Dichlorobenzene | ND | | 130 | 37 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 1,4-Dichlorobenzene | ND | | 130 | 50 | ppb v/v | | | 02/08/14 03:19 | 334 |
| Dichlorodifluoromethane | ND | | 130 | 48 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 1,1-Dichloroethane | ND | | 100 | 24 | ppb v/v | | | 02/08/14 03:19 | 334 |
| **1,2-Dichloroethane** | **69** | **J** | 270 | 29 | ppb v/v | | | 02/08/14 03:19 | 334 |
| **1,1-Dichloroethene** | **420** | | 270 | 43 | ppb v/v | | | 02/08/14 03:19 | 334 |
| cis-1,2-Dichloroethene | ND | | 130 | 30 | ppb v/v | | | 02/08/14 03:19 | 334 |
| trans-1,2-Dichloroethene | ND | | 130 | 33 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 1,2-Dichloropropane | ND | | 130 | 80 | ppb v/v | | | 02/08/14 03:19 | 334 |
| cis-1,3-Dichloropropene | ND | | 130 | 35 | ppb v/v | | | 02/08/14 03:19 | 334 |
| trans-1,3-Dichloropropene | ND | | 130 | 29 | ppb v/v | | | 02/08/14 03:19 | 334 |
| **Ethylbenzene** | **60** | **J** | 130 | 21 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 4-Ethyltoluene | ND | | 130 | 62 | ppb v/v | | | 02/08/14 03:19 | 334 |
| Hexachlorobutadiene | ND | | 670 | 140 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 2-Hexanone | ND | | 130 | 29 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 130 | 45 | ppb v/v | | | 02/08/14 03:19 | 334 |
| **Methylene Chloride** | **240** | | 130 | 24 | ppb v/v | | | 02/08/14 03:19 | 334 |
| **Styrene** | **27** | **J** | 130 | 20 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 1,1,2,2-Tetrachloroethane | ND | | 130 | 23 | ppb v/v | | | 02/08/14 03:19 | 334 |
| **Tetrachloroethene** | **670** | | 130 | 17 | ppb v/v | | | 02/08/14 03:19 | 334 |
| **Toluene** | **320** | | 130 | 17 | ppb v/v | | | 02/08/14 03:19 | 334 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **1000** | | 130 | 54 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 1,2,4-Trichlorobenzene | ND | | 670 | 140 | ppb v/v | | | 02/08/14 03:19 | 334 |
| **1,1,1-Trichloroethane** | **55** | **J** | 100 | 22 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 1,1,2-Trichloroethane | ND | | 130 | 22 | ppb v/v | | | 02/08/14 03:19 | 334 |
| **Trichloroethene** | **7600** | | 130 | 35 | ppb v/v | | | 02/08/14 03:19 | 334 |
| **Trichlorofluoromethane** | **240** | | 130 | 65 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 1,2,4-Trimethylbenzene | ND | | 270 | 54 | ppb v/v | | | 02/08/14 03:19 | 334 |
| 1,3,5-Trimethylbenzene | ND | | 130 | 42 | ppb v/v | | | 02/08/14 03:19 | 334 |
| Vinyl acetate | ND | | 270 | 48 | ppb v/v | | | 02/08/14 03:19 | 334 |
| Vinyl chloride | ND | | 130 | 40 | ppb v/v | | | 02/08/14 03:19 | 334 |
| **m,p-Xylene** | **260** | **J** | 270 | 33 | ppb v/v | | | 02/08/14 03:19 | 334 |
| **o-Xylene** | **84** | **J** | 130 | 18 | ppb v/v | | | 02/08/14 03:19 | 334 |

## Client Sample ID: 095131-001/CWL-UI1-120

**Lab Sample ID: 320-5780-3**

**Date Collected: 01/16/14 10:02**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *106* | | *70 - 130* | | *02/08/14 03:19* | *334* |
| *1,2-Dichloroethane-d4 (Surr)* | *100* | | *70 - 130* | | *02/08/14 03:19* | *334* |
| *Toluene-d8 (Surr)* | *104* | | *70 - 130* | | *02/08/14 03:19* | *334* |

### Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **900** | **J** | 1700 | 59 | ppb v/v | | | 02/12/14 23:33 | 334 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *109* | | *70 - 130* | | *02/12/14 23:33* | *334* |
| *1,2-Dichloroethane-d4 (Surr)* | *100* | | *70 - 130* | | *02/12/14 23:33* | *334* |
| *Toluene-d8 (Surr)* | *106* | | *70 - 130* | | *02/12/14 23:33* | *334* |

## Client Sample ID: 095132-001/CWL-UI1-120

**Lab Sample ID: 320-5780-4**

**Date Collected: 01/16/14 10:04**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **7.3** | **J** | 130 | 4.6 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **Benzene** | **6.0** | **J** | 10 | 2.0 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| Benzyl chloride | ND | | 20 | 4.2 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| Bromodichloromethane | ND | | 7.7 | 1.7 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| Bromoform | ND | | 10 | 1.8 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| Bromomethane | ND | | 20 | 8.6 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| 2-Butanone (MEK) | ND | | 20 | 5.1 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| Carbon disulfide | ND | | 20 | 2.0 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **Carbon tetrachloride** | **25** | | 20 | 1.6 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| Chlorobenzene | ND | | 7.7 | 1.6 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| Chloroethane | ND | | 20 | 7.9 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **Chloroform** | **490** | | 7.7 | 2.4 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| Chloromethane | ND | | 20 | 5.0 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| Dibromochloromethane | ND | | 10 | 2.0 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **1,2-Dibromoethane (EDB)** | **7.9** | **J** | 20 | 1.9 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 10 | 4.0 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **1,2-Dichlorobenzene** | **12** | | 10 | 3.3 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| 1,3-Dichlorobenzene | ND | | 10 | 2.8 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| 1,4-Dichlorobenzene | ND | | 10 | 3.8 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **Dichlorodifluoromethane** | **46** | | 10 | 3.7 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **1,1-Dichloroethane** | **18** | | 7.7 | 1.8 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **1,2-Dichloroethane** | **38** | | 20 | 2.3 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **1,1-Dichloroethene** | **490** | | 20 | 3.3 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| cis-1,2-Dichloroethene | ND | | 10 | 2.3 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| trans-1,2-Dichloroethene | ND | | 10 | 2.6 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **1,2-Dichloropropane** | **84** | | 10 | 6.1 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| cis-1,3-Dichloropropene | ND | | 10 | 2.7 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| trans-1,3-Dichloropropene | ND | | 10 | 2.3 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| Ethylbenzene | ND | | 10 | 1.6 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| 4-Ethyltoluene | ND | | 10 | 4.8 | ppb v/v | | | 02/10/14 00:15 | 25.6 |

## Client Sample ID: 095132-001/CWL-UI1-120

**Lab Sample ID: 320-5780-4**

**Date Collected: 01/16/14 10:04**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Hexachlorobutadiene | ND | | 51 | 11 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| 2-Hexanone | ND | | 10 | 2.2 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 10 | 3.5 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **Methylene Chloride** | **230** | | 10 | 1.8 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| Styrene | ND | | 10 | 1.5 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| 1,1,2,2-Tetrachloroethane | ND | | 10 | 1.8 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **Tetrachloroethene** | **790** | | 10 | 1.3 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **Toluene** | **8.0** | **J** | 10 | 1.3 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **1000** | | 10 | 4.2 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| 1,2,4-Trichlorobenzene | ND | | 51 | 11 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **1,1,1-Trichloroethane** | **57** | | 7.7 | 1.7 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **1,1,2-Trichloroethane** | **7.0** | **J** | 10 | 1.7 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **Trichlorofluoromethane** | **300** | | 10 | 5.0 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| 1,2,4-Trimethylbenzene | ND | | 20 | 4.1 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| 1,3,5-Trimethylbenzene | ND | | 10 | 3.2 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| Vinyl acetate | ND | | 20 | 3.7 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| Vinyl chloride | ND | | 10 | 3.1 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| m,p-Xylene | ND | | 20 | 2.6 | ppb v/v | | | 02/10/14 00:15 | 25.6 |
| **o-Xylene** | **4.2** | **J** | 10 | 1.4 | ppb v/v | | | 02/10/14 00:15 | 25.6 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *102* | | *70 - 130* | | *02/10/14 00:15* | *25.6* |
| *1,2-Dichloroethane-d4 (Surr)* | *99* | | *70 - 130* | | *02/10/14 00:15* | *25.6* |
| *Toluene-d8 (Surr)* | *108* | | *70 - 130* | | *02/10/14 00:15* | *25.6* |

### Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Trichloroethene** | **7600** | | 130 | 34 | ppb v/v | | | 02/13/14 00:21 | 320 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *108* | | *70 - 130* | | *02/13/14 00:21* | *320* |
| *1,2-Dichloroethane-d4 (Surr)* | *100* | | *70 - 130* | | *02/13/14 00:21* | *320* |
| *Toluene-d8 (Surr)* | *107* | | *70 - 130* | | *02/13/14 00:21* | *320* |

## Client Sample ID: 095133-001/CWL-UI1-FB1

**Lab Sample ID: 320-5780-5**

**Date Collected: 01/16/14 10:06**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 0.40 | 0.079 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Benzyl chloride | ND | | 0.80 | 0.16 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Bromodichloromethane | ND | | 0.30 | 0.066 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Bromoform | ND | | 0.40 | 0.070 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Bromomethane | ND | | 0.80 | 0.34 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 2-Butanone (MEK) | ND | | 0.80 | 0.20 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Carbon disulfide | ND | | 0.80 | 0.078 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Carbon tetrachloride | ND | | 0.80 | 0.064 | ppb v/v | | | 02/08/14 05:00 | 1 |

**Client Sample ID: 095133-001/CWL-UI1-FB1**
**Lab Sample ID: 320-5780-5**
**Date Collected: 01/16/14 10:06**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Chlorobenzene | ND | | 0.30 | 0.064 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Chloroethane | ND | | 0.80 | 0.31 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Chloroform | ND | | 0.30 | 0.095 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Chloromethane | ND | | 0.80 | 0.20 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Dibromochloromethane | ND | | 0.40 | 0.079 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,2-Dibromoethane (EDB) | ND | | 0.80 | 0.075 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 0.40 | 0.16 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,2-Dichlorobenzene | ND | | 0.40 | 0.13 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,3-Dichlorobenzene | ND | | 0.40 | 0.11 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,4-Dichlorobenzene | ND | | 0.40 | 0.15 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Dichlorodifluoromethane | ND | | 0.40 | 0.15 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,1-Dichloroethane | ND | | 0.30 | 0.072 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,2-Dichloroethane | ND | | 0.80 | 0.088 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,1-Dichloroethene | ND | | 0.80 | 0.13 | ppb v/v | | | 02/08/14 05:00 | 1 |
| cis-1,2-Dichloroethene | ND | | 0.40 | 0.089 | ppb v/v | | | 02/08/14 05:00 | 1 |
| trans-1,2-Dichloroethene | ND | | 0.40 | 0.10 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,2-Dichloropropane | ND | | 0.40 | 0.24 | ppb v/v | | | 02/08/14 05:00 | 1 |
| cis-1,3-Dichloropropene | ND | | 0.40 | 0.10 | ppb v/v | | | 02/08/14 05:00 | 1 |
| trans-1,3-Dichloropropene | ND | | 0.40 | 0.088 | ppb v/v | | | 02/08/14 05:00 | 1 |
| **Ethylbenzene** | **0.082** | **J** | 0.40 | 0.063 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 4-Ethyltoluene | ND | | 0.40 | 0.19 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Hexachlorobutadiene | ND | | 2.0 | 0.43 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 2-Hexanone | ND | | 0.40 | 0.087 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 0.40 | 0.14 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Methylene Chloride | ND | | 0.40 | 0.072 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Styrene | ND | | 0.40 | 0.059 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,1,2,2-Tetrachloroethane | ND | | 0.40 | 0.069 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Tetrachloroethene | ND | | 0.40 | 0.051 | ppb v/v | | | 02/08/14 05:00 | 1 |
| **Toluene** | **0.45** | | 0.40 | 0.051 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | ND | | 0.40 | 0.16 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,2,4-Trichlorobenzene | ND | | 2.0 | 0.43 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,1,1-Trichloroethane | ND | | 0.30 | 0.065 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,1,2-Trichloroethane | ND | | 0.40 | 0.067 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Trichloroethene | ND | | 0.40 | 0.11 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Trichlorofluoromethane | ND | | 0.40 | 0.20 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,2,4-Trimethylbenzene | ND | | 0.80 | 0.16 | ppb v/v | | | 02/08/14 05:00 | 1 |
| 1,3,5-Trimethylbenzene | ND | | 0.40 | 0.13 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Vinyl acetate | ND | | 0.80 | 0.15 | ppb v/v | | | 02/08/14 05:00 | 1 |
| Vinyl chloride | ND | | 0.40 | 0.12 | ppb v/v | | | 02/08/14 05:00 | 1 |
| **m,p-Xylene** | **0.19** | **J** | 0.80 | 0.10 | ppb v/v | | | 02/08/14 05:00 | 1 |
| **o-Xylene** | **0.068** | **J** | 0.40 | 0.054 | ppb v/v | | | 02/08/14 05:00 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *101* | | *70 - 130* | | *02/08/14 05:00* | *1* |
| *1,2-Dichloroethane-d4 (Surr)* | *97* | | *70 - 130* | | *02/08/14 05:00* | *1* |
| *Toluene-d8 (Surr)* | *102* | | *70 - 130* | | *02/08/14 05:00* | *1* |

## Client Sample ID: 095133-001/CWL-UI1-FB1

**Lab Sample ID: 320-5780-5**

**Date Collected: 01/16/14 10:06**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **1.1** | **J** | 5.0 | 0.18 | ppb v/v | | | 02/13/14 01:13 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *102* | | *70 - 130* | | *02/13/14 01:13* | *1* |
| *1,2-Dichloroethane-d4 (Surr)* | *100* | | *70 - 130* | | *02/13/14 01:13* | *1* |
| *Toluene-d8 (Surr)* | *105* | | *70 - 130* | | *02/13/14 01:13* | *1* |

## Client Sample ID: 095134-001/CWL-UI2-36

**Lab Sample ID: 320-5780-6**

**Date Collected: 01/16/14 10:22**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 130 | 26 | ppb v/v | | | 02/08/14 05:48 | 325 |
| Benzyl chloride | ND | | 260 | 53 | ppb v/v | | | 02/08/14 05:48 | 325 |
| Bromodichloromethane | ND | | 98 | 21 | ppb v/v | | | 02/08/14 05:48 | 325 |
| Bromoform | ND | | 130 | 23 | ppb v/v | | | 02/08/14 05:48 | 325 |
| Bromomethane | ND | | 260 | 110 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 2-Butanone (MEK) | ND | | 260 | 65 | ppb v/v | | | 02/08/14 05:48 | 325 |
| Carbon disulfide | ND | | 260 | 25 | ppb v/v | | | 02/08/14 05:48 | 325 |
| Carbon tetrachloride | ND | | 260 | 21 | ppb v/v | | | 02/08/14 05:48 | 325 |
| Chlorobenzene | ND | | 98 | 21 | ppb v/v | | | 02/08/14 05:48 | 325 |
| Chloroethane | ND | | 260 | 100 | ppb v/v | | | 02/08/14 05:48 | 325 |
| **Chloroform** | **510** | | 98 | 31 | ppb v/v | | | 02/08/14 05:48 | 325 |
| Chloromethane | ND | | 260 | 64 | ppb v/v | | | 02/08/14 05:48 | 325 |
| Dibromochloromethane | ND | | 130 | 26 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 1,2-Dibromoethane (EDB) | ND | | 260 | 24 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 130 | 50 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 1,2-Dichlorobenzene | ND | | 130 | 42 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 1,3-Dichlorobenzene | ND | | 130 | 36 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 1,4-Dichlorobenzene | ND | | 130 | 48 | ppb v/v | | | 02/08/14 05:48 | 325 |
| Dichlorodifluoromethane | ND | | 130 | 47 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 1,1-Dichloroethane | ND | | 98 | 23 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 1,2-Dichloroethane | ND | | 260 | 29 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 1,1-Dichloroethene | ND | | 260 | 42 | ppb v/v | | | 02/08/14 05:48 | 325 |
| cis-1,2-Dichloroethene | ND | | 130 | 29 | ppb v/v | | | 02/08/14 05:48 | 325 |
| trans-1,2-Dichloroethene | ND | | 130 | 33 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 1,2-Dichloropropane | ND | | 130 | 78 | ppb v/v | | | 02/08/14 05:48 | 325 |
| cis-1,3-Dichloropropene | ND | | 130 | 34 | ppb v/v | | | 02/08/14 05:48 | 325 |
| trans-1,3-Dichloropropene | ND | | 130 | 29 | ppb v/v | | | 02/08/14 05:48 | 325 |
| **Ethylbenzene** | **55** | **J** | 130 | 20 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 4-Ethyltoluene | ND | | 130 | 61 | ppb v/v | | | 02/08/14 05:48 | 325 |
| Hexachlorobutadiene | ND | | 650 | 140 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 2-Hexanone | ND | | 130 | 28 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 130 | 44 | ppb v/v | | | 02/08/14 05:48 | 325 |
| **Methylene Chloride** | **50** | **J** | 130 | 23 | ppb v/v | | | 02/08/14 05:48 | 325 |
| Styrene | ND | | 130 | 19 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 1,1,2,2-Tetrachloroethane | ND | | 130 | 22 | ppb v/v | | | 02/08/14 05:48 | 325 |

## Client Sample ID: 095134-001/CWL-UI2-36

**Lab Sample ID: 320-5780-6**

**Date Collected: 01/16/14 10:22**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Tetrachloroethene** | **130** | | 130 | 17 | ppb v/v | | | 02/08/14 05:48 | 325 |
| **Toluene** | **280** | | 130 | 17 | ppb v/v | | | 02/08/14 05:48 | 325 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **480** | | 130 | 53 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 1,2,4-Trichlorobenzene | ND | | 650 | 140 | ppb v/v | | | 02/08/14 05:48 | 325 |
| **1,1,1-Trichloroethane** | **33** | **J** | 98 | 21 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 1,1,2-Trichloroethane | ND | | 130 | 22 | ppb v/v | | | 02/08/14 05:48 | 325 |
| **Trichloroethene** | **2800** | | 130 | 34 | ppb v/v | | | 02/08/14 05:48 | 325 |
| **Trichlorofluoromethane** | **130** | | 130 | 64 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 1,2,4-Trimethylbenzene | ND | | 260 | 53 | ppb v/v | | | 02/08/14 05:48 | 325 |
| 1,3,5-Trimethylbenzene | ND | | 130 | 41 | ppb v/v | | | 02/08/14 05:48 | 325 |
| Vinyl acetate | ND | | 260 | 47 | ppb v/v | | | 02/08/14 05:48 | 325 |
| Vinyl chloride | ND | | 130 | 39 | ppb v/v | | | 02/08/14 05:48 | 325 |
| **m,p-Xylene** | **250** | **J** | 260 | 33 | ppb v/v | | | 02/08/14 05:48 | 325 |
| **o-Xylene** | **87** | **J** | 130 | 18 | ppb v/v | | | 02/08/14 05:48 | 325 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *107* | | *70 - 130* | | *02/08/14 05:48* | *325* |
| *1,2-Dichloroethane-d4 (Surr)* | *101* | | *70 - 130* | | *02/08/14 05:48* | *325* |
| *Toluene-d8 (Surr)* | *104* | | *70 - 130* | | *02/08/14 05:48* | *325* |

### Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **280** | **J** | 430 | 15 | ppb v/v | | | 02/10/14 01:04 | 86.7 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *107* | | *70 - 130* | | *02/10/14 01:04* | *86.7* |
| *1,2-Dichloroethane-d4 (Surr)* | *100* | | *70 - 130* | | *02/10/14 01:04* | *86.7* |
| *Toluene-d8 (Surr)* | *105* | | *70 - 130* | | *02/10/14 01:04* | *86.7* |

## Client Sample ID: 095135-001/CWL-UI2-76

**Lab Sample ID: 320-5780-7**

**Date Collected: 01/16/14 10:27**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 120 | 24 | ppb v/v | | | 02/08/14 06:36 | 306 |
| Benzyl chloride | ND | | 240 | 50 | ppb v/v | | | 02/08/14 06:36 | 306 |
| Bromodichloromethane | ND | | 92 | 20 | ppb v/v | | | 02/08/14 06:36 | 306 |
| Bromoform | ND | | 120 | 21 | ppb v/v | | | 02/08/14 06:36 | 306 |
| Bromomethane | ND | | 240 | 100 | ppb v/v | | | 02/08/14 06:36 | 306 |
| 2-Butanone (MEK) | ND | | 240 | 61 | ppb v/v | | | 02/08/14 06:36 | 306 |
| Carbon disulfide | ND | | 240 | 24 | ppb v/v | | | 02/08/14 06:36 | 306 |
| Carbon tetrachloride | ND | | 240 | 20 | ppb v/v | | | 02/08/14 06:36 | 306 |
| Chlorobenzene | ND | | 92 | 20 | ppb v/v | | | 02/08/14 06:36 | 306 |
| Chloroethane | ND | | 240 | 94 | ppb v/v | | | 02/08/14 06:36 | 306 |
| **Chloroform** | **520** | | 92 | 29 | ppb v/v | | | 02/08/14 06:36 | 306 |
| Chloromethane | ND | | 240 | 60 | ppb v/v | | | 02/08/14 06:36 | 306 |
| Dibromochloromethane | ND | | 120 | 24 | ppb v/v | | | 02/08/14 06:36 | 306 |

**Client Sample ID: 095135-001/CWL-UI2-76**
**Date Collected: 01/16/14 10:27**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

**Lab Sample ID: 320-5780-7**
**Matrix: Air**

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dibromoethane (EDB) | ND | | 240 | 23 | ppb v/v | | | 02/08/14 06:36 | 306 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 120 | 47 | ppb v/v | | | 02/08/14 06:36 | 306 |
| 1,2-Dichlorobenzene | ND | | 120 | 40 | ppb v/v | | | 02/08/14 06:36 | 306 |
| 1,3-Dichlorobenzene | ND | | 120 | 34 | ppb v/v | | | 02/08/14 06:36 | 306 |
| 1,4-Dichlorobenzene | ND | | 120 | 46 | ppb v/v | | | 02/08/14 06:36 | 306 |
| Dichlorodifluoromethane | ND | | 120 | 44 | ppb v/v | | | 02/08/14 06:36 | 306 |
| 1,1-Dichloroethane | ND | | 92 | 22 | ppb v/v | | | 02/08/14 06:36 | 306 |
| **1,2-Dichloroethane** | **33** | **J** | 240 | 27 | ppb v/v | | | 02/08/14 06:36 | 306 |
| **1,1-Dichloroethene** | **91** | **J** | 240 | 39 | ppb v/v | | | 02/08/14 06:36 | 306 |
| cis-1,2-Dichloroethene | ND | | 120 | 27 | ppb v/v | | | 02/08/14 06:36 | 306 |
| trans-1,2-Dichloroethene | ND | | 120 | 31 | ppb v/v | | | 02/08/14 06:36 | 306 |
| 1,2-Dichloropropane | ND | | 120 | 73 | ppb v/v | | | 02/08/14 06:36 | 306 |
| cis-1,3-Dichloropropene | ND | | 120 | 32 | ppb v/v | | | 02/08/14 06:36 | 306 |
| trans-1,3-Dichloropropene | ND | | 120 | 27 | ppb v/v | | | 02/08/14 06:36 | 306 |
| **Ethylbenzene** | **57** | **J** | 120 | 19 | ppb v/v | | | 02/08/14 06:36 | 306 |
| 4-Ethyltoluene | ND | | 120 | 57 | ppb v/v | | | 02/08/14 06:36 | 306 |
| Hexachlorobutadiene | ND | | 610 | 130 | ppb v/v | | | 02/08/14 06:36 | 306 |
| 2-Hexanone | ND | | 120 | 27 | ppb v/v | | | 02/08/14 06:36 | 306 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 120 | 41 | ppb v/v | | | 02/08/14 06:36 | 306 |
| **Methylene Chloride** | **42** | **J** | 120 | 22 | ppb v/v | | | 02/08/14 06:36 | 306 |
| **Styrene** | **23** | **J** | 120 | 18 | ppb v/v | | | 02/08/14 06:36 | 306 |
| 1,1,2,2-Tetrachloroethane | ND | | 120 | 21 | ppb v/v | | | 02/08/14 06:36 | 306 |
| **Tetrachloroethene** | **140** | | 120 | 16 | ppb v/v | | | 02/08/14 06:36 | 306 |
| **Toluene** | **310** | | 120 | 16 | ppb v/v | | | 02/08/14 06:36 | 306 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **610** | | 120 | 50 | ppb v/v | | | 02/08/14 06:36 | 306 |
| 1,2,4-Trichlorobenzene | ND | | 610 | 130 | ppb v/v | | | 02/08/14 06:36 | 306 |
| **1,1,1-Trichloroethane** | **28** | **J** | 92 | 20 | ppb v/v | | | 02/08/14 06:36 | 306 |
| 1,1,2-Trichloroethane | ND | | 120 | 21 | ppb v/v | | | 02/08/14 06:36 | 306 |
| **Trichloroethene** | **3700** | | 120 | 32 | ppb v/v | | | 02/08/14 06:36 | 306 |
| **Trichlorofluoromethane** | **150** | | 120 | 60 | ppb v/v | | | 02/08/14 06:36 | 306 |
| 1,2,4-Trimethylbenzene | ND | | 240 | 50 | ppb v/v | | | 02/08/14 06:36 | 306 |
| 1,3,5-Trimethylbenzene | ND | | 120 | 38 | ppb v/v | | | 02/08/14 06:36 | 306 |
| Vinyl acetate | ND | | 240 | 44 | ppb v/v | | | 02/08/14 06:36 | 306 |
| Vinyl chloride | ND | | 120 | 37 | ppb v/v | | | 02/08/14 06:36 | 306 |
| **m,p-Xylene** | **250** | | 240 | 31 | ppb v/v | | | 02/08/14 06:36 | 306 |
| **o-Xylene** | **82** | **J** | 120 | 17 | ppb v/v | | | 02/08/14 06:36 | 306 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *108* | | *70 - 130* | | *02/08/14 06:36* | *306* |
| *1,2-Dichloroethane-d4 (Surr)* | *100* | | *70 - 130* | | *02/08/14 06:36* | *306* |
| *Toluene-d8 (Surr)* | *105* | | *70 - 130* | | *02/08/14 06:36* | *306* |

## Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **300** | **J** | 490 | 17 | ppb v/v | | | 02/10/14 01:54 | 98 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *107* | | *70 - 130* | | *02/10/14 01:54* | *98* |

## Client Sample ID: 095135-001/CWL-UI2-76

**Lab Sample ID: 320-5780-7**

**Date Collected: 01/16/14 10:27**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA (Continued)

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *99* | | *70 - 130* | | *02/10/14 01:54* | *98* |
| *Toluene-d8 (Surr)* | *107* | | *70 - 130* | | *02/10/14 01:54* | *98* |

## Client Sample ID: 095136-001/CWL-UI2-136

**Lab Sample ID: 320-5780-8**

**Date Collected: 01/16/14 10:30**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 130 | 26 | ppb v/v | | | 02/08/14 07:24 | 325 |
| Benzyl chloride | ND | | 260 | 53 | ppb v/v | | | 02/08/14 07:24 | 325 |
| Bromodichloromethane | ND | | 98 | 21 | ppb v/v | | | 02/08/14 07:24 | 325 |
| Bromoform | ND | | 130 | 23 | ppb v/v | | | 02/08/14 07:24 | 325 |
| Bromomethane | ND | | 260 | 110 | ppb v/v | | | 02/08/14 07:24 | 325 |
| 2-Butanone (MEK) | ND | | 260 | 65 | ppb v/v | | | 02/08/14 07:24 | 325 |
| Carbon disulfide | ND | | 260 | 25 | ppb v/v | | | 02/08/14 07:24 | 325 |
| **Carbon tetrachloride** | **25** | **J** | 260 | 21 | ppb v/v | | | 02/08/14 07:24 | 325 |
| Chlorobenzene | ND | | 98 | 21 | ppb v/v | | | 02/08/14 07:24 | 325 |
| Chloroethane | ND | | 260 | 100 | ppb v/v | | | 02/08/14 07:24 | 325 |
| **Chloroform** | **570** | | 98 | 31 | ppb v/v | | | 02/08/14 07:24 | 325 |
| Chloromethane | ND | | 260 | 64 | ppb v/v | | | 02/08/14 07:24 | 325 |
| Dibromochloromethane | ND | | 130 | 26 | ppb v/v | | | 02/08/14 07:24 | 325 |
| 1,2-Dibromoethane (EDB) | ND | | 260 | 24 | ppb v/v | | | 02/08/14 07:24 | 325 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 130 | 50 | ppb v/v | | | 02/08/14 07:24 | 325 |
| 1,2-Dichlorobenzene | ND | | 130 | 42 | ppb v/v | | | 02/08/14 07:24 | 325 |
| 1,3-Dichlorobenzene | ND | | 130 | 36 | ppb v/v | | | 02/08/14 07:24 | 325 |
| 1,4-Dichlorobenzene | ND | | 130 | 48 | ppb v/v | | | 02/08/14 07:24 | 325 |
| Dichlorodifluoromethane | ND | | 130 | 47 | ppb v/v | | | 02/08/14 07:24 | 325 |
| 1,1-Dichloroethane | ND | | 98 | 23 | ppb v/v | | | 02/08/14 07:24 | 325 |
| **1,2-Dichloroethane** | **44** | **J** | 260 | 29 | ppb v/v | | | 02/08/14 07:24 | 325 |
| **1,1-Dichloroethene** | **190** | **J** | 260 | 42 | ppb v/v | | | 02/08/14 07:24 | 325 |
| cis-1,2-Dichloroethene | ND | | 130 | 29 | ppb v/v | | | 02/08/14 07:24 | 325 |
| trans-1,2-Dichloroethene | ND | | 130 | 33 | ppb v/v | | | 02/08/14 07:24 | 325 |
| **1,2-Dichloropropane** | **140** | | 130 | 78 | ppb v/v | | | 02/08/14 07:24 | 325 |
| cis-1,3-Dichloropropene | ND | | 130 | 34 | ppb v/v | | | 02/08/14 07:24 | 325 |
| trans-1,3-Dichloropropene | ND | | 130 | 29 | ppb v/v | | | 02/08/14 07:24 | 325 |
| **Ethylbenzene** | **59** | **J** | 130 | 20 | ppb v/v | | | 02/08/14 07:24 | 325 |
| 4-Ethyltoluene | ND | | 130 | 61 | ppb v/v | | | 02/08/14 07:24 | 325 |
| Hexachlorobutadiene | ND | | 650 | 140 | ppb v/v | | | 02/08/14 07:24 | 325 |
| 2-Hexanone | ND | | 130 | 28 | ppb v/v | | | 02/08/14 07:24 | 325 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 130 | 44 | ppb v/v | | | 02/08/14 07:24 | 325 |
| **Methylene Chloride** | **55** | **J** | 130 | 23 | ppb v/v | | | 02/08/14 07:24 | 325 |
| Styrene | ND | | 130 | 19 | ppb v/v | | | 02/08/14 07:24 | 325 |
| 1,1,2,2-Tetrachloroethane | ND | | 130 | 22 | ppb v/v | | | 02/08/14 07:24 | 325 |
| **Tetrachloroethene** | **190** | | 130 | 17 | ppb v/v | | | 02/08/14 07:24 | 325 |
| **Toluene** | **310** | | 130 | 17 | ppb v/v | | | 02/08/14 07:24 | 325 |

## Client Sample ID: 095136-001/CWL-UI2-136

**Lab Sample ID: 320-5780-8**

**Date Collected: 01/16/14 10:30**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **930** | | 130 | 53 | ppb v/v | | | 02/08/14 07:24 | 325 |
| 1,2,4-Trichlorobenzene | ND | | 650 | 140 | ppb v/v | | | 02/08/14 07:24 | 325 |
| **1,1,1-Trichloroethane** | **35** | **J** | 98 | 21 | ppb v/v | | | 02/08/14 07:24 | 325 |
| 1,1,2-Trichloroethane | ND | | 130 | 22 | ppb v/v | | | 02/08/14 07:24 | 325 |
| **Trichloroethene** | **6200** | | 130 | 34 | ppb v/v | | | 02/08/14 07:24 | 325 |
| **Trichlorofluoromethane** | **220** | | 130 | 64 | ppb v/v | | | 02/08/14 07:24 | 325 |
| 1,2,4-Trimethylbenzene | ND | | 260 | 53 | ppb v/v | | | 02/08/14 07:24 | 325 |
| 1,3,5-Trimethylbenzene | ND | | 130 | 41 | ppb v/v | | | 02/08/14 07:24 | 325 |
| Vinyl acetate | ND | | 260 | 47 | ppb v/v | | | 02/08/14 07:24 | 325 |
| Vinyl chloride | ND | | 130 | 39 | ppb v/v | | | 02/08/14 07:24 | 325 |
| **m,p-Xylene** | **260** | | 260 | 33 | ppb v/v | | | 02/08/14 07:24 | 325 |
| **o-Xylene** | **86** | **J** | 130 | 18 | ppb v/v | | | 02/08/14 07:24 | 325 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *108* | | *70 - 130* | | *02/08/14 07:24* | *325* |
| *1,2-Dichloroethane-d4 (Surr)* | *100* | | *70 - 130* | | *02/08/14 07:24* | *325* |
| *Toluene-d8 (Surr)* | *107* | | *70 - 130* | | *02/08/14 07:24* | *325* |

### Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **960** | **J** | 1600 | 58 | ppb v/v | | | 02/13/14 02:02 | 325 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *109* | | *70 - 130* | | *02/13/14 02:02* | *325* |
| *1,2-Dichloroethane-d4 (Surr)* | *99* | | *70 - 130* | | *02/13/14 02:02* | *325* |
| *Toluene-d8 (Surr)* | *106* | | *70 - 130* | | *02/13/14 02:02* | *325* |

## Client Sample ID: 095137-001/CWL-UI2-136

**Lab Sample ID: 320-5780-9**

**Date Collected: 01/16/14 10:32**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 130 | 25 | ppb v/v | | | 02/08/14 08:13 | 322 |
| Benzyl chloride | ND | | 260 | 52 | ppb v/v | | | 02/08/14 08:13 | 322 |
| Bromodichloromethane | ND | | 97 | 21 | ppb v/v | | | 02/08/14 08:13 | 322 |
| Bromoform | ND | | 130 | 23 | ppb v/v | | | 02/08/14 08:13 | 322 |
| Bromomethane | ND | | 260 | 110 | ppb v/v | | | 02/08/14 08:13 | 322 |
| 2-Butanone (MEK) | ND | | 260 | 64 | ppb v/v | | | 02/08/14 08:13 | 322 |
| Carbon disulfide | ND | | 260 | 25 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **Carbon tetrachloride** | **22** | **J** | 260 | 21 | ppb v/v | | | 02/08/14 08:13 | 322 |
| Chlorobenzene | ND | | 97 | 21 | ppb v/v | | | 02/08/14 08:13 | 322 |
| Chloroethane | ND | | 260 | 99 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **Chloroform** | **540** | | 97 | 31 | ppb v/v | | | 02/08/14 08:13 | 322 |
| Chloromethane | ND | | 260 | 63 | ppb v/v | | | 02/08/14 08:13 | 322 |
| Dibromochloromethane | ND | | 130 | 25 | ppb v/v | | | 02/08/14 08:13 | 322 |
| 1,2-Dibromoethane (EDB) | ND | | 260 | 24 | ppb v/v | | | 02/08/14 08:13 | 322 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 130 | 50 | ppb v/v | | | 02/08/14 08:13 | 322 |

**Client Sample ID: 095137-001/CWL-UI2-136**
**Lab Sample ID: 320-5780-9**
**Date Collected: 01/16/14 10:32**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichlorobenzene | ND | | 130 | 42 | ppb v/v | | | 02/08/14 08:13 | 322 |
| 1,3-Dichlorobenzene | ND | | 130 | 35 | ppb v/v | | | 02/08/14 08:13 | 322 |
| 1,4-Dichlorobenzene | ND | | 130 | 48 | ppb v/v | | | 02/08/14 08:13 | 322 |
| Dichlorodifluoromethane | ND | | 130 | 47 | ppb v/v | | | 02/08/14 08:13 | 322 |
| 1,1-Dichloroethane | ND | | 97 | 23 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **1,2-Dichloroethane** | **49** | **J** | 260 | 28 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **1,1-Dichloroethene** | **190** | **J** | 260 | 42 | ppb v/v | | | 02/08/14 08:13 | 322 |
| cis-1,2-Dichloroethene | ND | | 130 | 29 | ppb v/v | | | 02/08/14 08:13 | 322 |
| trans-1,2-Dichloroethene | ND | | 130 | 32 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **1,2-Dichloropropane** | **140** | | 130 | 77 | ppb v/v | | | 02/08/14 08:13 | 322 |
| cis-1,3-Dichloropropene | ND | | 130 | 33 | ppb v/v | | | 02/08/14 08:13 | 322 |
| trans-1,3-Dichloropropene | ND | | 130 | 28 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **Ethylbenzene** | **69** | **J** | 130 | 20 | ppb v/v | | | 02/08/14 08:13 | 322 |
| 4-Ethyltoluene | ND | | 130 | 60 | ppb v/v | | | 02/08/14 08:13 | 322 |
| Hexachlorobutadiene | ND | | 640 | 140 | ppb v/v | | | 02/08/14 08:13 | 322 |
| 2-Hexanone | ND | | 130 | 28 | ppb v/v | | | 02/08/14 08:13 | 322 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 130 | 43 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **Methylene Chloride** | **53** | **J** | 130 | 23 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **Styrene** | **26** | **J** | 130 | 19 | ppb v/v | | | 02/08/14 08:13 | 322 |
| 1,1,2,2-Tetrachloroethane | ND | | 130 | 22 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **Tetrachloroethene** | **170** | | 130 | 16 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **Toluene** | **350** | | 130 | 16 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **900** | | 130 | 52 | ppb v/v | | | 02/08/14 08:13 | 322 |
| 1,2,4-Trichlorobenzene | ND | | 640 | 140 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **1,1,1-Trichloroethane** | **33** | **J** | 97 | 21 | ppb v/v | | | 02/08/14 08:13 | 322 |
| 1,1,2-Trichloroethane | ND | | 130 | 22 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **Trichloroethene** | **5900** | | 130 | 34 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **Trichlorofluoromethane** | **220** | | 130 | 63 | ppb v/v | | | 02/08/14 08:13 | 322 |
| 1,2,4-Trimethylbenzene | ND | | 260 | 52 | ppb v/v | | | 02/08/14 08:13 | 322 |
| 1,3,5-Trimethylbenzene | ND | | 130 | 40 | ppb v/v | | | 02/08/14 08:13 | 322 |
| Vinyl acetate | ND | | 260 | 47 | ppb v/v | | | 02/08/14 08:13 | 322 |
| Vinyl chloride | ND | | 130 | 39 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **m,p-Xylene** | **290** | | 260 | 32 | ppb v/v | | | 02/08/14 08:13 | 322 |
| **o-Xylene** | **98** | **J** | 130 | 17 | ppb v/v | | | 02/08/14 08:13 | 322 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *109* | | *70 - 130* | | *02/08/14 08:13* | *322* |
| *1,2-Dichloroethane-d4 (Surr)* | *100* | | *70 - 130* | | *02/08/14 08:13* | *322* |
| *Toluene-d8 (Surr)* | *106* | | *70 - 130* | | *02/08/14 08:13* | *322* |

## Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **870** | **J** | 1600 | 57 | ppb v/v | | | 02/13/14 02:51 | 322 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *108* | | *70 - 130* | | *02/13/14 02:51* | *322* |
| *1,2-Dichloroethane-d4 (Surr)* | *100* | | *70 - 130* | | *02/13/14 02:51* | *322* |
| *Toluene-d8 (Surr)* | *108* | | *70 - 130* | | *02/13/14 02:51* | *322* |

Client: Sandia National Laboratories
Project/Site: CWL

TestAmerica Job ID: 320-5780-1

**Client Sample ID: 095138-001/CWL-UI2-FB1**
**Lab Sample ID: 320-5780-10**
**Date Collected: 01/16/14 10:18**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

**Method: TO-15 - Volatile Organic Compounds in Ambient Air**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 0.40 | 0.079 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Benzyl chloride | ND | | 0.80 | 0.16 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Bromodichloromethane | ND | | 0.30 | 0.066 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Bromoform | ND | | 0.40 | 0.070 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Bromomethane | ND | | 0.80 | 0.34 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 2-Butanone (MEK) | ND | | 0.80 | 0.20 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Carbon disulfide | ND | | 0.80 | 0.078 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Carbon tetrachloride | ND | | 0.80 | 0.064 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Chlorobenzene | ND | | 0.30 | 0.064 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Chloroethane | ND | | 0.80 | 0.31 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Chloroform | ND | | 0.30 | 0.095 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Chloromethane | ND | | 0.80 | 0.20 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Dibromochloromethane | ND | | 0.40 | 0.079 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,2-Dibromoethane (EDB) | ND | | 0.80 | 0.075 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 0.40 | 0.16 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,2-Dichlorobenzene | ND | | 0.40 | 0.13 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,3-Dichlorobenzene | ND | | 0.40 | 0.11 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,4-Dichlorobenzene | ND | | 0.40 | 0.15 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Dichlorodifluoromethane | ND | | 0.40 | 0.15 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,1-Dichloroethane | ND | | 0.30 | 0.072 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,2-Dichloroethane | ND | | 0.80 | 0.088 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,1-Dichloroethene | ND | | 0.80 | 0.13 | ppb v/v | | | 02/08/14 09:05 | 1 |
| cis-1,2-Dichloroethene | ND | | 0.40 | 0.089 | ppb v/v | | | 02/08/14 09:05 | 1 |
| trans-1,2-Dichloroethene | ND | | 0.40 | 0.10 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,2-Dichloropropane | ND | | 0.40 | 0.24 | ppb v/v | | | 02/08/14 09:05 | 1 |
| cis-1,3-Dichloropropene | ND | | 0.40 | 0.10 | ppb v/v | | | 02/08/14 09:05 | 1 |
| trans-1,3-Dichloropropene | ND | | 0.40 | 0.088 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Ethylbenzene | ND | | 0.40 | 0.063 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 4-Ethyltoluene | ND | | 0.40 | 0.19 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Hexachlorobutadiene | ND | | 2.0 | 0.43 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 2-Hexanone | ND | | 0.40 | 0.087 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 0.40 | 0.14 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Methylene Chloride | ND | | 0.40 | 0.072 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Styrene | ND | | 0.40 | 0.059 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,1,2,2-Tetrachloroethane | ND | | 0.40 | 0.069 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Tetrachloroethene | ND | | 0.40 | 0.051 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Toluene | ND | | 0.40 | 0.051 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | ND | | 0.40 | 0.16 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,2,4-Trichlorobenzene | ND | | 2.0 | 0.43 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,1,1-Trichloroethane | ND | | 0.30 | 0.065 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,1,2-Trichloroethane | ND | | 0.40 | 0.067 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Trichloroethene | ND | | 0.40 | 0.11 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Trichlorofluoromethane | ND | | 0.40 | 0.20 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,2,4-Trimethylbenzene | ND | | 0.80 | 0.16 | ppb v/v | | | 02/08/14 09:05 | 1 |
| 1,3,5-Trimethylbenzene | ND | | 0.40 | 0.13 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Vinyl acetate | ND | | 0.80 | 0.15 | ppb v/v | | | 02/08/14 09:05 | 1 |
| Vinyl chloride | ND | | 0.40 | 0.12 | ppb v/v | | | 02/08/14 09:05 | 1 |
| m,p-Xylene | ND | | 0.80 | 0.10 | ppb v/v | | | 02/08/14 09:05 | 1 |

## Client Sample ID: 095138-001/CWL-UI2-FB1

**Lab Sample ID: 320-5780-10**

**Date Collected: 01/16/14 10:18**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| o-Xylene | ND | | 0.40 | 0.054 | ppb v/v | | | 02/08/14 09:05 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *104* | | *70 - 130* | | *02/08/14 09:05* | *1* |
| *1,2-Dichloroethane-d4 (Surr)* | *98* | | *70 - 130* | | *02/08/14 09:05* | *1* |
| *Toluene-d8 (Surr)* | *102* | | *70 - 130* | | *02/08/14 09:05* | *1* |

### Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **1.1** | **J** | 5.0 | 0.18 | ppb v/v | | | 02/13/14 03:42 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *103* | | *70 - 130* | | *02/13/14 03:42* | *1* |
| *1,2-Dichloroethane-d4 (Surr)* | *99* | | *70 - 130* | | *02/13/14 03:42* | *1* |
| *Toluene-d8 (Surr)* | *105* | | *70 - 130* | | *02/13/14 03:42* | *1* |

## Client Sample ID: 095139-001/CWL-D1-100

**Lab Sample ID: 320-5780-11**

**Date Collected: 01/16/14 09:07**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 130 | 25 | ppb v/v | | | 02/08/14 09:53 | 314 |
| Benzyl chloride | ND | | 250 | 51 | ppb v/v | | | 02/08/14 09:53 | 314 |
| Bromodichloromethane | ND | | 94 | 21 | ppb v/v | | | 02/08/14 09:53 | 314 |
| Bromoform | ND | | 130 | 22 | ppb v/v | | | 02/08/14 09:53 | 314 |
| Bromomethane | ND | | 250 | 110 | ppb v/v | | | 02/08/14 09:53 | 314 |
| 2-Butanone (MEK) | ND | | 250 | 62 | ppb v/v | | | 02/08/14 09:53 | 314 |
| Carbon disulfide | ND | | 250 | 24 | ppb v/v | | | 02/08/14 09:53 | 314 |
| Carbon tetrachloride | ND | | 250 | 20 | ppb v/v | | | 02/08/14 09:53 | 314 |
| Chlorobenzene | ND | | 94 | 20 | ppb v/v | | | 02/08/14 09:53 | 314 |
| Chloroethane | ND | | 250 | 97 | ppb v/v | | | 02/08/14 09:53 | 314 |
| **Chloroform** | **540** | | 94 | 30 | ppb v/v | | | 02/08/14 09:53 | 314 |
| Chloromethane | ND | | 250 | 62 | ppb v/v | | | 02/08/14 09:53 | 314 |
| Dibromochloromethane | ND | | 130 | 25 | ppb v/v | | | 02/08/14 09:53 | 314 |
| 1,2-Dibromoethane (EDB) | ND | | 250 | 24 | ppb v/v | | | 02/08/14 09:53 | 314 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 130 | 49 | ppb v/v | | | 02/08/14 09:53 | 314 |
| 1,2-Dichlorobenzene | ND | | 130 | 41 | ppb v/v | | | 02/08/14 09:53 | 314 |
| 1,3-Dichlorobenzene | ND | | 130 | 35 | ppb v/v | | | 02/08/14 09:53 | 314 |
| 1,4-Dichlorobenzene | ND | | 130 | 47 | ppb v/v | | | 02/08/14 09:53 | 314 |
| Dichlorodifluoromethane | ND | | 130 | 46 | ppb v/v | | | 02/08/14 09:53 | 314 |
| 1,1-Dichloroethane | ND | | 94 | 23 | ppb v/v | | | 02/08/14 09:53 | 314 |
| **1,2-Dichloroethane** | **61** | **J** | 250 | 28 | ppb v/v | | | 02/08/14 09:53 | 314 |
| **1,1-Dichloroethene** | **440** | | 250 | 41 | ppb v/v | | | 02/08/14 09:53 | 314 |
| cis-1,2-Dichloroethene | ND | | 130 | 28 | ppb v/v | | | 02/08/14 09:53 | 314 |
| trans-1,2-Dichloroethene | ND | | 130 | 31 | ppb v/v | | | 02/08/14 09:53 | 314 |
| **1,2-Dichloropropane** | **95** | **J** | 130 | 75 | ppb v/v | | | 02/08/14 09:53 | 314 |
| cis-1,3-Dichloropropene | ND | | 130 | 33 | ppb v/v | | | 02/08/14 09:53 | 314 |

## Client Sample ID: 095139-001/CWL-D1-100

**Lab Sample ID: 320-5780-11**

**Date Collected: 01/16/14 09:07**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| trans-1,3-Dichloropropene | ND | | 130 | 28 | ppb v/v | | | 02/08/14 09:53 | 314 |
| **Ethylbenzene** | **64** | **J** | 130 | 20 | ppb v/v | | | 02/08/14 09:53 | 314 |
| 4-Ethyltoluene | ND | | 130 | 59 | ppb v/v | | | 02/08/14 09:53 | 314 |
| Hexachlorobutadiene | ND | | 630 | 140 | ppb v/v | | | 02/08/14 09:53 | 314 |
| 2-Hexanone | ND | | 130 | 27 | ppb v/v | | | 02/08/14 09:53 | 314 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 130 | 42 | ppb v/v | | | 02/08/14 09:53 | 314 |
| **Methylene Chloride** | **48** | **J** | 130 | 23 | ppb v/v | | | 02/08/14 09:53 | 314 |
| Styrene | ND | | 130 | 19 | ppb v/v | | | 02/08/14 09:53 | 314 |
| 1,1,2,2-Tetrachloroethane | ND | | 130 | 22 | ppb v/v | | | 02/08/14 09:53 | 314 |
| **Tetrachloroethene** | **740** | | 130 | 16 | ppb v/v | | | 02/08/14 09:53 | 314 |
| **Toluene** | **340** | | 130 | 16 | ppb v/v | | | 02/08/14 09:53 | 314 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **1300** | | 130 | 51 | ppb v/v | | | 02/08/14 09:53 | 314 |
| 1,2,4-Trichlorobenzene | ND | | 630 | 140 | ppb v/v | | | 02/08/14 09:53 | 314 |
| **1,1,1-Trichloroethane** | **58** | **J** | 94 | 20 | ppb v/v | | | 02/08/14 09:53 | 314 |
| 1,1,2-Trichloroethane | ND | | 130 | 21 | ppb v/v | | | 02/08/14 09:53 | 314 |
| **Trichloroethene** | **9900** | | 130 | 33 | ppb v/v | | | 02/08/14 09:53 | 314 |
| **Trichlorofluoromethane** | **300** | | 130 | 62 | ppb v/v | | | 02/08/14 09:53 | 314 |
| 1,2,4-Trimethylbenzene | ND | | 250 | 51 | ppb v/v | | | 02/08/14 09:53 | 314 |
| 1,3,5-Trimethylbenzene | ND | | 130 | 39 | ppb v/v | | | 02/08/14 09:53 | 314 |
| Vinyl acetate | ND | | 250 | 46 | ppb v/v | | | 02/08/14 09:53 | 314 |
| Vinyl chloride | ND | | 130 | 38 | ppb v/v | | | 02/08/14 09:53 | 314 |
| **m,p-Xylene** | **280** | | 250 | 31 | ppb v/v | | | 02/08/14 09:53 | 314 |
| **o-Xylene** | **82** | **J** | 130 | 17 | ppb v/v | | | 02/08/14 09:53 | 314 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *105* | | *70 - 130* | | *02/08/14 09:53* | *314* |
| *1,2-Dichloroethane-d4 (Surr)* | *98* | | *70 - 130* | | *02/08/14 09:53* | *314* |
| *Toluene-d8 (Surr)* | *104* | | *70 - 130* | | *02/08/14 09:53* | *314* |

### Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **870** | **J** | 1600 | 56 | ppb v/v | | | 02/13/14 07:45 | 314 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *106* | | *70 - 130* | | *02/13/14 07:45* | *314* |
| *1,2-Dichloroethane-d4 (Surr)* | *97* | | *70 - 130* | | *02/13/14 07:45* | *314* |
| *Toluene-d8 (Surr)* | *107* | | *70 - 130* | | *02/13/14 07:45* | *314* |

## Client Sample ID: 095140-001/CWL-D1-160

**Lab Sample ID: 320-5780-12**

**Date Collected: 01/16/14 09:12**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 190 | 37 | ppb v/v | | | 02/08/14 10:41 | 470 |
| Benzyl chloride | ND | | 380 | 77 | ppb v/v | | | 02/08/14 10:41 | 470 |
| Bromodichloromethane | ND | | 140 | 31 | ppb v/v | | | 02/08/14 10:41 | 470 |
| Bromoform | ND | | 190 | 33 | ppb v/v | | | 02/08/14 10:41 | 470 |

Client: Sandia National Laboratories
Project/Site: CWL

TestAmerica Job ID: 320-5780-1

**Client Sample ID: 095140-001/CWL-D1-160**
**Date Collected: 01/16/14 09:12**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

**Lab Sample ID: 320-5780-12**
**Matrix: Air**

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Bromomethane | ND | | 380 | 160 | ppb v/v | | | 02/08/14 10:41 | 470 |
| 2-Butanone (MEK) | ND | | 380 | 94 | ppb v/v | | | 02/08/14 10:41 | 470 |
| Carbon disulfide | ND | | 380 | 37 | ppb v/v | | | 02/08/14 10:41 | 470 |
| Carbon tetrachloride | ND | | 380 | 30 | ppb v/v | | | 02/08/14 10:41 | 470 |
| Chlorobenzene | ND | | 140 | 30 | ppb v/v | | | 02/08/14 10:41 | 470 |
| Chloroethane | ND | | 380 | 140 | ppb v/v | | | 02/08/14 10:41 | 470 |
| **Chloroform** | **490** | | 140 | 45 | ppb v/v | | | 02/08/14 10:41 | 470 |
| Chloromethane | ND | | 380 | 93 | ppb v/v | | | 02/08/14 10:41 | 470 |
| Dibromochloromethane | ND | | 190 | 37 | ppb v/v | | | 02/08/14 10:41 | 470 |
| 1,2-Dibromoethane (EDB) | ND | | 380 | 35 | ppb v/v | | | 02/08/14 10:41 | 470 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 190 | 73 | ppb v/v | | | 02/08/14 10:41 | 470 |
| 1,2-Dichlorobenzene | ND | | 190 | 61 | ppb v/v | | | 02/08/14 10:41 | 470 |
| 1,3-Dichlorobenzene | ND | | 190 | 52 | ppb v/v | | | 02/08/14 10:41 | 470 |
| 1,4-Dichlorobenzene | ND | | 190 | 70 | ppb v/v | | | 02/08/14 10:41 | 470 |
| Dichlorodifluoromethane | ND | | 190 | 68 | ppb v/v | | | 02/08/14 10:41 | 470 |
| 1,1-Dichloroethane | ND | | 140 | 34 | ppb v/v | | | 02/08/14 10:41 | 470 |
| **1,2-Dichloroethane** | **73** | **J** | 380 | 41 | ppb v/v | | | 02/08/14 10:41 | 470 |
| **1,1-Dichloroethene** | **770** | | 380 | 61 | ppb v/v | | | 02/08/14 10:41 | 470 |
| cis-1,2-Dichloroethene | ND | | 190 | 42 | ppb v/v | | | 02/08/14 10:41 | 470 |
| trans-1,2-Dichloroethene | ND | | 190 | 47 | ppb v/v | | | 02/08/14 10:41 | 470 |
| **1,2-Dichloropropane** | **160** | **J** | 190 | 110 | ppb v/v | | | 02/08/14 10:41 | 470 |
| cis-1,3-Dichloropropene | ND | | 190 | 49 | ppb v/v | | | 02/08/14 10:41 | 470 |
| trans-1,3-Dichloropropene | ND | | 190 | 41 | ppb v/v | | | 02/08/14 10:41 | 470 |
| **Ethylbenzene** | **67** | **J** | 190 | 30 | ppb v/v | | | 02/08/14 10:41 | 470 |
| 4-Ethyltoluene | ND | | 190 | 88 | ppb v/v | | | 02/08/14 10:41 | 470 |
| Hexachlorobutadiene | ND | | 940 | 200 | ppb v/v | | | 02/08/14 10:41 | 470 |
| 2-Hexanone | ND | | 190 | 41 | ppb v/v | | | 02/08/14 10:41 | 470 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 190 | 63 | ppb v/v | | | 02/08/14 10:41 | 470 |
| **Methylene Chloride** | **67** | **J** | 190 | 34 | ppb v/v | | | 02/08/14 10:41 | 470 |
| Styrene | ND | | 190 | 28 | ppb v/v | | | 02/08/14 10:41 | 470 |
| 1,1,2,2-Tetrachloroethane | ND | | 190 | 32 | ppb v/v | | | 02/08/14 10:41 | 470 |
| **Tetrachloroethene** | **560** | | 190 | 24 | ppb v/v | | | 02/08/14 10:41 | 470 |
| **Toluene** | **330** | | 190 | 24 | ppb v/v | | | 02/08/14 10:41 | 470 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **2000** | | 190 | 77 | ppb v/v | | | 02/08/14 10:41 | 470 |
| 1,2,4-Trichlorobenzene | ND | | 940 | 200 | ppb v/v | | | 02/08/14 10:41 | 470 |
| **1,1,1-Trichloroethane** | **71** | **J** | 140 | 31 | ppb v/v | | | 02/08/14 10:41 | 470 |
| 1,1,2-Trichloroethane | ND | | 190 | 31 | ppb v/v | | | 02/08/14 10:41 | 470 |
| **Trichloroethene** | **16000** | | 190 | 49 | ppb v/v | | | 02/08/14 10:41 | 470 |
| **Trichlorofluoromethane** | **470** | | 190 | 92 | ppb v/v | | | 02/08/14 10:41 | 470 |
| 1,2,4-Trimethylbenzene | ND | | 380 | 76 | ppb v/v | | | 02/08/14 10:41 | 470 |
| 1,3,5-Trimethylbenzene | ND | | 190 | 59 | ppb v/v | | | 02/08/14 10:41 | 470 |
| Vinyl acetate | ND | | 380 | 68 | ppb v/v | | | 02/08/14 10:41 | 470 |
| Vinyl chloride | ND | | 190 | 56 | ppb v/v | | | 02/08/14 10:41 | 470 |
| **m,p-Xylene** | **300** | **J** | 380 | 47 | ppb v/v | | | 02/08/14 10:41 | 470 |
| **o-Xylene** | **92** | **J** | 190 | 25 | ppb v/v | | | 02/08/14 10:41 | 470 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *109* | | *70 - 130* | | *02/08/14 10:41* | *470* |

**Client Sample ID: 095140-001/CWL-D1-160** — **Lab Sample ID: 320-5780-12**
**Date Collected: 01/16/14 09:12** — **Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *100* | | *70 - 130* | | *02/08/14 10:41* | *470* |
| *Toluene-d8 (Surr)* | *105* | | *70 - 130* | | *02/08/14 10:41* | *470* |

### Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **750** | **J** | 2400 | 84 | ppb v/v | | | 02/13/14 08:34 | 470 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *109* | | *70 - 130* | | *02/13/14 08:34* | *470* |
| *1,2-Dichloroethane-d4 (Surr)* | *98* | | *70 - 130* | | *02/13/14 08:34* | *470* |
| *Toluene-d8 (Surr)* | *107* | | *70 - 130* | | *02/13/14 08:34* | *470* |

**Client Sample ID: 095141-001/CWL-D1-240** — **Lab Sample ID: 320-5780-13**
**Date Collected: 01/16/14 09:18** — **Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 180 | 35 | ppb v/v | | | 02/08/14 11:30 | 443 |
| Benzyl chloride | ND | | 350 | 72 | ppb v/v | | | 02/08/14 11:30 | 443 |
| Bromodichloromethane | ND | | 130 | 29 | ppb v/v | | | 02/08/14 11:30 | 443 |
| Bromoform | ND | | 180 | 31 | ppb v/v | | | 02/08/14 11:30 | 443 |
| Bromomethane | ND | | 350 | 150 | ppb v/v | | | 02/08/14 11:30 | 443 |
| 2-Butanone (MEK) | ND | | 350 | 88 | ppb v/v | | | 02/08/14 11:30 | 443 |
| Carbon disulfide | ND | | 350 | 35 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **Carbon tetrachloride** | **65** | **J** | 350 | 28 | ppb v/v | | | 02/08/14 11:30 | 443 |
| Chlorobenzene | ND | | 130 | 28 | ppb v/v | | | 02/08/14 11:30 | 443 |
| Chloroethane | ND | | 350 | 140 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **Chloroform** | **450** | | 130 | 42 | ppb v/v | | | 02/08/14 11:30 | 443 |
| Chloromethane | ND | | 350 | 87 | ppb v/v | | | 02/08/14 11:30 | 443 |
| Dibromochloromethane | ND | | 180 | 35 | ppb v/v | | | 02/08/14 11:30 | 443 |
| 1,2-Dibromoethane (EDB) | ND | | 350 | 33 | ppb v/v | | | 02/08/14 11:30 | 443 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 180 | 69 | ppb v/v | | | 02/08/14 11:30 | 443 |
| 1,2-Dichlorobenzene | ND | | 180 | 58 | ppb v/v | | | 02/08/14 11:30 | 443 |
| 1,3-Dichlorobenzene | ND | | 180 | 49 | ppb v/v | | | 02/08/14 11:30 | 443 |
| 1,4-Dichlorobenzene | ND | | 180 | 66 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **Dichlorodifluoromethane** | **72** | **J** | 180 | 64 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **1,1-Dichloroethane** | **33** | **J** | 130 | 32 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **1,2-Dichloroethane** | **72** | **J** | 350 | 39 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **1,1-Dichloroethene** | **970** | | 350 | 57 | ppb v/v | | | 02/08/14 11:30 | 443 |
| cis-1,2-Dichloroethene | ND | | 180 | 39 | ppb v/v | | | 02/08/14 11:30 | 443 |
| trans-1,2-Dichloroethene | ND | | 180 | 44 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **1,2-Dichloropropane** | **180** | | 180 | 110 | ppb v/v | | | 02/08/14 11:30 | 443 |
| cis-1,3-Dichloropropene | ND | | 180 | 46 | ppb v/v | | | 02/08/14 11:30 | 443 |
| trans-1,3-Dichloropropene | ND | | 180 | 39 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **Ethylbenzene** | **72** | **J** | 180 | 28 | ppb v/v | | | 02/08/14 11:30 | 443 |
| 4-Ethyltoluene | ND | | 180 | 83 | ppb v/v | | | 02/08/14 11:30 | 443 |
| Hexachlorobutadiene | ND | | 890 | 190 | ppb v/v | | | 02/08/14 11:30 | 443 |

## Client Sample ID: 095141-001/CWL-D1-240

**Lab Sample ID: 320-5780-13**

**Date Collected: 01/16/14 09:18**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2-Hexanone | ND | | 180 | 39 | ppb v/v | | | 02/08/14 11:30 | 443 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 180 | 60 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **Methylene Chloride** | **56** | **J** | 180 | 32 | ppb v/v | | | 02/08/14 11:30 | 443 |
| Styrene | ND | | 180 | 26 | ppb v/v | | | 02/08/14 11:30 | 443 |
| 1,1,2,2-Tetrachloroethane | ND | | 180 | 31 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **Tetrachloroethene** | **470** | | 180 | 23 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **Toluene** | **380** | | 180 | 23 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **2500** | | 180 | 72 | ppb v/v | | | 02/08/14 11:30 | 443 |
| 1,2,4-Trichlorobenzene | ND | | 890 | 190 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **1,1,1-Trichloroethane** | **66** | **J** | 130 | 29 | ppb v/v | | | 02/08/14 11:30 | 443 |
| 1,1,2-Trichloroethane | ND | | 180 | 30 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **Trichloroethene** | **19000** | | 180 | 47 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **Trichlorofluoromethane** | **530** | | 180 | 87 | ppb v/v | | | 02/08/14 11:30 | 443 |
| 1,2,4-Trimethylbenzene | ND | | 350 | 72 | ppb v/v | | | 02/08/14 11:30 | 443 |
| 1,3,5-Trimethylbenzene | ND | | 180 | 55 | ppb v/v | | | 02/08/14 11:30 | 443 |
| Vinyl acetate | ND | | 350 | 64 | ppb v/v | | | 02/08/14 11:30 | 443 |
| Vinyl chloride | ND | | 180 | 53 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **m,p-Xylene** | **310** | **J** | 350 | 44 | ppb v/v | | | 02/08/14 11:30 | 443 |
| **o-Xylene** | **90** | **J** | 180 | 24 | ppb v/v | | | 02/08/14 11:30 | 443 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *109* | | *70 - 130* | | *02/08/14 11:30* | *443* |
| *1,2-Dichloroethane-d4 (Surr)* | *98* | | *70 - 130* | | *02/08/14 11:30* | *443* |
| *Toluene-d8 (Surr)* | *104* | | *70 - 130* | | *02/08/14 11:30* | *443* |

### Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **870** | **J** | 2200 | 79 | ppb v/v | | | 02/13/14 09:23 | 443 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *107* | | *70 - 130* | | *02/13/14 09:23* | *443* |
| *1,2-Dichloroethane-d4 (Surr)* | *97* | | *70 - 130* | | *02/13/14 09:23* | *443* |
| *Toluene-d8 (Surr)* | *105* | | *70 - 130* | | *02/13/14 09:23* | *443* |

## Client Sample ID: 095142-001/CWL-D1-350

**Lab Sample ID: 320-5780-14**

**Date Collected: 01/16/14 09:31**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 180 | 35 | ppb v/v | | | 02/08/14 12:18 | 442 |
| Benzyl chloride | ND | | 350 | 72 | ppb v/v | | | 02/08/14 12:18 | 442 |
| Bromodichloromethane | ND | | 130 | 29 | ppb v/v | | | 02/08/14 12:18 | 442 |
| Bromoform | ND | | 180 | 31 | ppb v/v | | | 02/08/14 12:18 | 442 |
| Bromomethane | ND | | 350 | 150 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 2-Butanone (MEK) | ND | | 350 | 88 | ppb v/v | | | 02/08/14 12:18 | 442 |
| Carbon disulfide | ND | | 350 | 34 | ppb v/v | | | 02/08/14 12:18 | 442 |
| Carbon tetrachloride | ND | | 350 | 28 | ppb v/v | | | 02/08/14 12:18 | 442 |

**Client Sample ID: 095142-001/CWL-D1-350**
**Lab Sample ID: 320-5780-14**
**Date Collected: 01/16/14 09:31**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Chlorobenzene | ND | | 130 | 28 | ppb v/v | | | 02/08/14 12:18 | 442 |
| Chloroethane | ND | | 350 | 140 | ppb v/v | | | 02/08/14 12:18 | 442 |
| Chloroform | ND | | 130 | 42 | ppb v/v | | | 02/08/14 12:18 | 442 |
| Chloromethane | ND | | 350 | 87 | ppb v/v | | | 02/08/14 12:18 | 442 |
| Dibromochloromethane | ND | | 180 | 35 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 1,2-Dibromoethane (EDB) | ND | | 350 | 33 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 180 | 69 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 1,2-Dichlorobenzene | ND | | 180 | 57 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 1,3-Dichlorobenzene | ND | | 180 | 49 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 1,4-Dichlorobenzene | ND | | 180 | 66 | ppb v/v | | | 02/08/14 12:18 | 442 |
| Dichlorodifluoromethane | ND | | 180 | 64 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 1,1-Dichloroethane | ND | | 130 | 32 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 1,2-Dichloroethane | ND | | 350 | 39 | ppb v/v | | | 02/08/14 12:18 | 442 |
| **1,1-Dichloroethene** | **510** | | 350 | 57 | ppb v/v | | | 02/08/14 12:18 | 442 |
| cis-1,2-Dichloroethene | ND | | 180 | 39 | ppb v/v | | | 02/08/14 12:18 | 442 |
| trans-1,2-Dichloroethene | ND | | 180 | 44 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 1,2-Dichloropropane | ND | | 180 | 110 | ppb v/v | | | 02/08/14 12:18 | 442 |
| cis-1,3-Dichloropropene | ND | | 180 | 46 | ppb v/v | | | 02/08/14 12:18 | 442 |
| trans-1,3-Dichloropropene | ND | | 180 | 39 | ppb v/v | | | 02/08/14 12:18 | 442 |
| **Ethylbenzene** | **61** | **J** | 180 | 28 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 4-Ethyltoluene | ND | | 180 | 83 | ppb v/v | | | 02/08/14 12:18 | 442 |
| Hexachlorobutadiene | ND | | 880 | 190 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 2-Hexanone | ND | | 180 | 38 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 180 | 60 | ppb v/v | | | 02/08/14 12:18 | 442 |
| **Methylene Chloride** | **61** | **J** | 180 | 32 | ppb v/v | | | 02/08/14 12:18 | 442 |
| Styrene | ND | | 180 | 26 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 1,1,2,2-Tetrachloroethane | ND | | 180 | 30 | ppb v/v | | | 02/08/14 12:18 | 442 |
| **Tetrachloroethene** | **220** | | 180 | 23 | ppb v/v | | | 02/08/14 12:18 | 442 |
| **Toluene** | **310** | | 180 | 23 | ppb v/v | | | 02/08/14 12:18 | 442 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **1300** | | 180 | 72 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 1,2,4-Trichlorobenzene | ND | | 880 | 190 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 1,1,1-Trichloroethane | ND | | 130 | 29 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 1,1,2-Trichloroethane | ND | | 180 | 30 | ppb v/v | | | 02/08/14 12:18 | 442 |
| **Trichloroethene** | **8500** | | 180 | 46 | ppb v/v | | | 02/08/14 12:18 | 442 |
| **Trichlorofluoromethane** | **300** | | 180 | 87 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 1,2,4-Trimethylbenzene | ND | | 350 | 72 | ppb v/v | | | 02/08/14 12:18 | 442 |
| 1,3,5-Trimethylbenzene | ND | | 180 | 55 | ppb v/v | | | 02/08/14 12:18 | 442 |
| Vinyl acetate | ND | | 350 | 64 | ppb v/v | | | 02/08/14 12:18 | 442 |
| Vinyl chloride | ND | | 180 | 53 | ppb v/v | | | 02/08/14 12:18 | 442 |
| **m,p-Xylene** | **270** | **J** | 350 | 44 | ppb v/v | | | 02/08/14 12:18 | 442 |
| **o-Xylene** | **81** | **J** | 180 | 24 | ppb v/v | | | 02/08/14 12:18 | 442 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *106* | | *70 - 130* | | *02/08/14 12:18* | *442* |
| *4-Bromofluorobenzene (Surr)* | *109* | | *70 - 130* | | *02/13/14 10:11* | *442* |
| *1,2-Dichloroethane-d4 (Surr)* | *97* | | *70 - 130* | | *02/08/14 12:18* | *442* |
| *1,2-Dichloroethane-d4 (Surr)* | *98* | | *70 - 130* | | *02/13/14 10:11* | *442* |
| *Toluene-d8 (Surr)* | *106* | | *70 - 130* | | *02/08/14 12:18* | *442* |

## Client Sample ID: 095142-001/CWL-D1-350

**Lab Sample ID: 320-5780-14**

**Date Collected: 01/16/14 09:31**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *Toluene-d8 (Surr)* | *106* | | *70 - 130* | | *02/13/14 10:11* | *442* |

### Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **1200** | | 1100 | 39 | ppb v/v | | | 02/13/14 20:35 | 221 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *107* | | *70 - 130* | | *02/13/14 20:35* | *221* |
| *1,2-Dichloroethane-d4 (Surr)* | *98* | | *70 - 130* | | *02/13/14 20:35* | *221* |
| *Toluene-d8 (Surr)* | *106* | | *70 - 130* | | *02/13/14 20:35* | *221* |

## Client Sample ID: 095143-001/CWL-D1-470

**Lab Sample ID: 320-5780-15**

**Date Collected: 01/16/14 09:37**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **5.4** | **J** | 22 | 0.79 | ppb v/v | | | 02/10/14 02:43 | 4.45 |
| Benzene | ND | | 5.4 | 1.1 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| Benzyl chloride | ND | | 11 | 2.2 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| Bromodichloromethane | ND | | 4.0 | 0.88 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| Bromoform | ND | | 5.4 | 0.94 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| Bromomethane | ND | | 11 | 4.5 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 2-Butanone (MEK) | ND | | 11 | 2.7 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| Carbon disulfide | ND | | 11 | 1.0 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| **Carbon tetrachloride** | **1.5** | **J** | 11 | 0.86 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| Chlorobenzene | ND | | 4.0 | 0.86 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| Chloroethane | ND | | 11 | 4.1 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| **Chloroform** | **1.5** | **J** | 4.0 | 1.3 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| Chloromethane | ND | | 11 | 2.6 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| Dibromochloromethane | ND | | 5.4 | 1.1 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 1,2-Dibromoethane (EDB) | ND | | 11 | 1.0 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 5.4 | 2.1 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 1,2-Dichlorobenzene | ND | | 5.4 | 1.7 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 1,3-Dichlorobenzene | ND | | 5.4 | 1.5 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 1,4-Dichlorobenzene | ND | | 5.4 | 2.0 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| **Dichlorodifluoromethane** | **8.7** | | 5.4 | 1.9 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 1,1-Dichloroethane | ND | | 4.0 | 0.96 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 1,2-Dichloroethane | ND | | 11 | 1.2 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| **1,1-Dichloroethene** | **22** | | 11 | 1.7 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| cis-1,2-Dichloroethene | ND | | 5.4 | 1.2 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| trans-1,2-Dichloroethene | ND | | 5.4 | 1.3 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 1,2-Dichloropropane | ND | | 5.4 | 3.2 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| cis-1,3-Dichloropropene | ND | | 5.4 | 1.4 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| trans-1,3-Dichloropropene | ND | | 5.4 | 1.2 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| Ethylbenzene | ND | | 5.4 | 0.84 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 4-Ethyltoluene | ND | | 5.4 | 2.5 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| Hexachlorobutadiene | ND | | 27 | 5.8 | ppb v/v | | | 02/08/14 13:07 | 13.4 |

**Client Sample ID: 095143-001/CWL-D1-470** — **Lab Sample ID: 320-5780-15**
**Date Collected: 01/16/14 09:37** — **Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2-Hexanone | ND | | 5.4 | 1.2 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 5.4 | 1.8 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| **Methylene Chloride** | **4.4** | **J** | 5.4 | 0.96 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| Styrene | ND | | 5.4 | 0.79 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 1,1,2,2-Tetrachloroethane | ND | | 5.4 | 0.92 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| **Tetrachloroethene** | **5.0** | **J** | 5.4 | 0.68 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| Toluene | ND | | 5.4 | 0.68 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **150** | | 5.4 | 2.2 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 1,2,4-Trichlorobenzene | ND | | 27 | 5.8 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 1,1,1-Trichloroethane | ND | | 4.0 | 0.87 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 1,1,2-Trichloroethane | ND | | 5.4 | 0.90 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| **Trichloroethene** | **160** | | 5.4 | 1.4 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| **Trichlorofluoromethane** | **39** | | 5.4 | 2.6 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 1,2,4-Trimethylbenzene | ND | | 11 | 2.2 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| 1,3,5-Trimethylbenzene | ND | | 5.4 | 1.7 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| Vinyl acetate | ND | | 11 | 1.9 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| Vinyl chloride | ND | | 5.4 | 1.6 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| m,p-Xylene | ND | | 11 | 1.3 | ppb v/v | | | 02/08/14 13:07 | 13.4 |
| o-Xylene | ND | | 5.4 | 0.72 | ppb v/v | | | 02/08/14 13:07 | 13.4 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *105* | | *70 - 130* | | *02/08/14 13:07* | *13.4* |
| *4-Bromofluorobenzene (Surr)* | *104* | | *70 - 130* | | *02/10/14 02:43* | *4.45* |
| *1,2-Dichloroethane-d4 (Surr)* | *100* | | *70 - 130* | | *02/08/14 13:07* | *13.4* |
| *1,2-Dichloroethane-d4 (Surr)* | *98* | | *70 - 130* | | *02/10/14 02:43* | *4.45* |
| *Toluene-d8 (Surr)* | *105* | | *70 - 130* | | *02/08/14 13:07* | *13.4* |
| *Toluene-d8 (Surr)* | *106* | | *70 - 130* | | *02/10/14 02:43* | *4.45* |

**Client Sample ID: 095144-001/CWL-D1-FB1** — **Lab Sample ID: 320-5780-16**
**Date Collected: 01/16/14 09:43** — **Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 0.40 | 0.079 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Benzyl chloride | ND | | 0.80 | 0.16 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Bromodichloromethane | ND | | 0.30 | 0.066 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Bromoform | ND | | 0.40 | 0.070 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Bromomethane | ND | | 0.80 | 0.34 | ppb v/v | | | 02/08/14 13:59 | 1 |
| **2-Butanone (MEK)** | **0.30** | **J** | 0.80 | 0.20 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Carbon disulfide | ND | | 0.80 | 0.078 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Carbon tetrachloride | ND | | 0.80 | 0.064 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Chlorobenzene | ND | | 0.30 | 0.064 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Chloroethane | ND | | 0.80 | 0.31 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Chloroform | ND | | 0.30 | 0.095 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Chloromethane | ND | | 0.80 | 0.20 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Dibromochloromethane | ND | | 0.40 | 0.079 | ppb v/v | | | 02/08/14 13:59 | 1 |

**Client Sample ID: 095144-001/CWL-D1-FB1**
**Lab Sample ID: 320-5780-16**
**Date Collected: 01/16/14 09:43**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dibromoethane (EDB) | ND | | 0.80 | 0.075 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 0.40 | 0.16 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 1,2-Dichlorobenzene | ND | | 0.40 | 0.13 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 1,3-Dichlorobenzene | ND | | 0.40 | 0.11 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 1,4-Dichlorobenzene | ND | | 0.40 | 0.15 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Dichlorodifluoromethane | ND | | 0.40 | 0.15 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 1,1-Dichloroethane | ND | | 0.30 | 0.072 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 1,2-Dichloroethane | ND | | 0.80 | 0.088 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 1,1-Dichloroethene | ND | | 0.80 | 0.13 | ppb v/v | | | 02/08/14 13:59 | 1 |
| cis-1,2-Dichloroethene | ND | | 0.40 | 0.089 | ppb v/v | | | 02/08/14 13:59 | 1 |
| trans-1,2-Dichloroethene | ND | | 0.40 | 0.10 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 1,2-Dichloropropane | ND | | 0.40 | 0.24 | ppb v/v | | | 02/08/14 13:59 | 1 |
| cis-1,3-Dichloropropene | ND | | 0.40 | 0.10 | ppb v/v | | | 02/08/14 13:59 | 1 |
| trans-1,3-Dichloropropene | ND | | 0.40 | 0.088 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Ethylbenzene | ND | | 0.40 | 0.063 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 4-Ethyltoluene | ND | | 0.40 | 0.19 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Hexachlorobutadiene | ND | | 2.0 | 0.43 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 2-Hexanone | ND | | 0.40 | 0.087 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 0.40 | 0.14 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Methylene Chloride | ND | | 0.40 | 0.072 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Styrene | ND | | 0.40 | 0.059 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 1,1,2,2-Tetrachloroethane | ND | | 0.40 | 0.069 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Tetrachloroethene | ND | | 0.40 | 0.051 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Toluene | ND | | 0.40 | 0.051 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | ND | | 0.40 | 0.16 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 1,2,4-Trichlorobenzene | ND | | 2.0 | 0.43 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 1,1,1-Trichloroethane | ND | | 0.30 | 0.065 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 1,1,2-Trichloroethane | ND | | 0.40 | 0.067 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Trichloroethene | ND | | 0.40 | 0.11 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Trichlorofluoromethane | ND | | 0.40 | 0.20 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 1,2,4-Trimethylbenzene | ND | | 0.80 | 0.16 | ppb v/v | | | 02/08/14 13:59 | 1 |
| 1,3,5-Trimethylbenzene | ND | | 0.40 | 0.13 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Vinyl acetate | ND | | 0.80 | 0.15 | ppb v/v | | | 02/08/14 13:59 | 1 |
| Vinyl chloride | ND | | 0.40 | 0.12 | ppb v/v | | | 02/08/14 13:59 | 1 |
| m,p-Xylene | ND | | 0.80 | 0.10 | ppb v/v | | | 02/08/14 13:59 | 1 |
| o-Xylene | ND | | 0.40 | 0.054 | ppb v/v | | | 02/08/14 13:59 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *102* | | *70 - 130* | | *02/08/14 13:59* | *1* |
| *1,2-Dichloroethane-d4 (Surr)* | *99* | | *70 - 130* | | *02/08/14 13:59* | *1* |
| *Toluene-d8 (Surr)* | *105* | | *70 - 130* | | *02/08/14 13:59* | *1* |

## Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **1.9** | **J** | 5.0 | 0.18 | ppb v/v | | | 02/13/14 11:03 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *103* | | *70 - 130* | | *02/13/14 11:03* | *1* |
| *1,2-Dichloroethane-d4 (Surr)* | *97* | | *70 - 130* | | *02/13/14 11:03* | *1* |

## Client Sample ID: 095144-001/CWL-D1-FB1

**Lab Sample ID: 320-5780-16**

**Date Collected: 01/16/14 09:43**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA (Continued)

| Surrogate | %Recovery | Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|
| Toluene-d8 (Surr) | 105 | | 70 - 130 | | 02/13/14 11:03 | 1 |

## Client Sample ID: 095145-001/CWL-D2-120

**Lab Sample ID: 320-5780-17**

**Date Collected: 01/16/14 10:53**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 130 | 26 | ppb v/v | | | 02/08/14 14:47 | 324 |
| Benzyl chloride | ND | | 260 | 53 | ppb v/v | | | 02/08/14 14:47 | 324 |
| Bromodichloromethane | ND | | 97 | 21 | ppb v/v | | | 02/08/14 14:47 | 324 |
| Bromoform | ND | | 130 | 23 | ppb v/v | | | 02/08/14 14:47 | 324 |
| Bromomethane | ND | | 260 | 110 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **2-Butanone (MEK)** | **65** | **J** | 260 | 64 | ppb v/v | | | 02/08/14 14:47 | 324 |
| Carbon disulfide | ND | | 260 | 25 | ppb v/v | | | 02/08/14 14:47 | 324 |
| Carbon tetrachloride | ND | | 260 | 21 | ppb v/v | | | 02/08/14 14:47 | 324 |
| Chlorobenzene | ND | | 97 | 21 | ppb v/v | | | 02/08/14 14:47 | 324 |
| Chloroethane | ND | | 260 | 100 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **Chloroform** | **650** | | 97 | 31 | ppb v/v | | | 02/08/14 14:47 | 324 |
| Chloromethane | ND | | 260 | 64 | ppb v/v | | | 02/08/14 14:47 | 324 |
| Dibromochloromethane | ND | | 130 | 26 | ppb v/v | | | 02/08/14 14:47 | 324 |
| 1,2-Dibromoethane (EDB) | ND | | 260 | 24 | ppb v/v | | | 02/08/14 14:47 | 324 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 130 | 50 | ppb v/v | | | 02/08/14 14:47 | 324 |
| 1,2-Dichlorobenzene | ND | | 130 | 42 | ppb v/v | | | 02/08/14 14:47 | 324 |
| 1,3-Dichlorobenzene | ND | | 130 | 36 | ppb v/v | | | 02/08/14 14:47 | 324 |
| 1,4-Dichlorobenzene | ND | | 130 | 48 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **Dichlorodifluoromethane** | **49** | **J** | 130 | 47 | ppb v/v | | | 02/08/14 14:47 | 324 |
| 1,1-Dichloroethane | ND | | 97 | 23 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **1,2-Dichloroethane** | **95** | **J** | 260 | 29 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **1,1-Dichloroethene** | **560** | | 260 | 42 | ppb v/v | | | 02/08/14 14:47 | 324 |
| cis-1,2-Dichloroethene | ND | | 130 | 29 | ppb v/v | | | 02/08/14 14:47 | 324 |
| trans-1,2-Dichloroethene | ND | | 130 | 32 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **1,2-Dichloropropane** | **210** | | 130 | 78 | ppb v/v | | | 02/08/14 14:47 | 324 |
| cis-1,3-Dichloropropene | ND | | 130 | 34 | ppb v/v | | | 02/08/14 14:47 | 324 |
| trans-1,3-Dichloropropene | ND | | 130 | 29 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **Ethylbenzene** | **74** | **J** | 130 | 20 | ppb v/v | | | 02/08/14 14:47 | 324 |
| 4-Ethyltoluene | ND | | 130 | 61 | ppb v/v | | | 02/08/14 14:47 | 324 |
| Hexachlorobutadiene | ND | | 650 | 140 | ppb v/v | | | 02/08/14 14:47 | 324 |
| 2-Hexanone | ND | | 130 | 28 | ppb v/v | | | 02/08/14 14:47 | 324 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 130 | 44 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **Methylene Chloride** | **57** | **J** | 130 | 23 | ppb v/v | | | 02/08/14 14:47 | 324 |
| Styrene | ND | | 130 | 19 | ppb v/v | | | 02/08/14 14:47 | 324 |
| 1,1,2,2-Tetrachloroethane | ND | | 130 | 22 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **Tetrachloroethene** | **530** | | 130 | 17 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **Toluene** | **350** | | 130 | 17 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **1600** | | 130 | 53 | ppb v/v | | | 02/08/14 14:47 | 324 |

## Client Sample ID: 095145-001/CWL-D2-120

**Lab Sample ID: 320-5780-17**

**Date Collected: 01/16/14 10:53**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,2,4-Trichlorobenzene | ND | | 650 | 140 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **1,1,1-Trichloroethane** | **65** | **J** | 97 | 21 | ppb v/v | | | 02/08/14 14:47 | 324 |
| 1,1,2-Trichloroethane | ND | | 130 | 22 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **Trichloroethene** | **13000** | | 130 | 34 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **Trichlorofluoromethane** | **380** | | 130 | 64 | ppb v/v | | | 02/08/14 14:47 | 324 |
| 1,2,4-Trimethylbenzene | ND | | 260 | 52 | ppb v/v | | | 02/08/14 14:47 | 324 |
| 1,3,5-Trimethylbenzene | ND | | 130 | 41 | ppb v/v | | | 02/08/14 14:47 | 324 |
| Vinyl acetate | ND | | 260 | 47 | ppb v/v | | | 02/08/14 14:47 | 324 |
| Vinyl chloride | ND | | 130 | 39 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **m,p-Xylene** | **310** | | 260 | 32 | ppb v/v | | | 02/08/14 14:47 | 324 |
| **o-Xylene** | **96** | **J** | 130 | 17 | ppb v/v | | | 02/08/14 14:47 | 324 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *108* | | *70 - 130* | | *02/08/14 14:47* | *324* |
| *1,2-Dichloroethane-d4 (Surr)* | *99* | | *70 - 130* | | *02/08/14 14:47* | *324* |
| *Toluene-d8 (Surr)* | *105* | | *70 - 130* | | *02/08/14 14:47* | *324* |

### Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **400** | **J** | 1600 | 58 | ppb v/v | | | 02/13/14 21:24 | 324 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *107* | | *70 - 130* | | *02/13/14 21:24* | *324* |
| *1,2-Dichloroethane-d4 (Surr)* | *97* | | *70 - 130* | | *02/13/14 21:24* | *324* |
| *Toluene-d8 (Surr)* | *105* | | *70 - 130* | | *02/13/14 21:24* | *324* |

## Client Sample ID: 095146-001/CWL-D2-240

**Lab Sample ID: 320-5780-18**

**Date Collected: 01/16/14 10:58**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 130 | 26 | ppb v/v | | | 02/08/14 15:36 | 328 |
| Benzyl chloride | ND | | 260 | 53 | ppb v/v | | | 02/08/14 15:36 | 328 |
| Bromodichloromethane | ND | | 98 | 22 | ppb v/v | | | 02/08/14 15:36 | 328 |
| Bromoform | ND | | 130 | 23 | ppb v/v | | | 02/08/14 15:36 | 328 |
| Bromomethane | ND | | 260 | 110 | ppb v/v | | | 02/08/14 15:36 | 328 |
| 2-Butanone (MEK) | ND | | 260 | 65 | ppb v/v | | | 02/08/14 15:36 | 328 |
| Carbon disulfide | ND | | 260 | 26 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **Carbon tetrachloride** | **53** | **J** | 260 | 21 | ppb v/v | | | 02/08/14 15:36 | 328 |
| Chlorobenzene | ND | | 98 | 21 | ppb v/v | | | 02/08/14 15:36 | 328 |
| Chloroethane | ND | | 260 | 100 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **Chloroform** | **630** | | 98 | 31 | ppb v/v | | | 02/08/14 15:36 | 328 |
| Chloromethane | ND | | 260 | 65 | ppb v/v | | | 02/08/14 15:36 | 328 |
| Dibromochloromethane | ND | | 130 | 26 | ppb v/v | | | 02/08/14 15:36 | 328 |
| 1,2-Dibromoethane (EDB) | ND | | 260 | 25 | ppb v/v | | | 02/08/14 15:36 | 328 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 130 | 51 | ppb v/v | | | 02/08/14 15:36 | 328 |
| 1,2-Dichlorobenzene | ND | | 130 | 43 | ppb v/v | | | 02/08/14 15:36 | 328 |

**Client Sample ID: 095146-001/CWL-D2-240**
**Lab Sample ID: 320-5780-18**
**Date Collected: 01/16/14 10:58**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,3-Dichlorobenzene | ND | | 130 | 36 | ppb v/v | | | 02/08/14 15:36 | 328 |
| 1,4-Dichlorobenzene | ND | | 130 | 49 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **Dichlorodifluoromethane** | **64** | **J** | 130 | 48 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **1,1-Dichloroethane** | **32** | **J** | 98 | 24 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **1,2-Dichloroethane** | **80** | **J** | 260 | 29 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **1,1-Dichloroethene** | **760** | | 260 | 42 | ppb v/v | | | 02/08/14 15:36 | 328 |
| cis-1,2-Dichloroethene | ND | | 130 | 29 | ppb v/v | | | 02/08/14 15:36 | 328 |
| trans-1,2-Dichloroethene | ND | | 130 | 33 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **1,2-Dichloropropane** | **290** | | 130 | 79 | ppb v/v | | | 02/08/14 15:36 | 328 |
| cis-1,3-Dichloropropene | ND | | 130 | 34 | ppb v/v | | | 02/08/14 15:36 | 328 |
| trans-1,3-Dichloropropene | ND | | 130 | 29 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **Ethylbenzene** | **61** | **J** | 130 | 21 | ppb v/v | | | 02/08/14 15:36 | 328 |
| 4-Ethyltoluene | ND | | 130 | 61 | ppb v/v | | | 02/08/14 15:36 | 328 |
| Hexachlorobutadiene | ND | | 660 | 140 | ppb v/v | | | 02/08/14 15:36 | 328 |
| 2-Hexanone | ND | | 130 | 29 | ppb v/v | | | 02/08/14 15:36 | 328 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 130 | 44 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **Methylene Chloride** | **78** | **J** | 130 | 24 | ppb v/v | | | 02/08/14 15:36 | 328 |
| Styrene | ND | | 130 | 19 | ppb v/v | | | 02/08/14 15:36 | 328 |
| 1,1,2,2-Tetrachloroethane | ND | | 130 | 23 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **Tetrachloroethene** | **510** | | 130 | 17 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **Toluene** | **290** | | 130 | 17 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **2000** | | 130 | 53 | ppb v/v | | | 02/08/14 15:36 | 328 |
| 1,2,4-Trichlorobenzene | ND | | 660 | 140 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **1,1,1-Trichloroethane** | **63** | **J** | 98 | 21 | ppb v/v | | | 02/08/14 15:36 | 328 |
| 1,1,2-Trichloroethane | ND | | 130 | 22 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **Trichloroethene** | **16000** | | 130 | 34 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **Trichlorofluoromethane** | **470** | | 130 | 64 | ppb v/v | | | 02/08/14 15:36 | 328 |
| 1,2,4-Trimethylbenzene | ND | | 260 | 53 | ppb v/v | | | 02/08/14 15:36 | 328 |
| 1,3,5-Trimethylbenzene | ND | | 130 | 41 | ppb v/v | | | 02/08/14 15:36 | 328 |
| Vinyl acetate | ND | | 260 | 48 | ppb v/v | | | 02/08/14 15:36 | 328 |
| Vinyl chloride | ND | | 130 | 39 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **m,p-Xylene** | **270** | | 260 | 33 | ppb v/v | | | 02/08/14 15:36 | 328 |
| **o-Xylene** | **93** | **J** | 130 | 18 | ppb v/v | | | 02/08/14 15:36 | 328 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *107* | | *70 - 130* | | *02/08/14 15:36* | *328* |
| *1,2-Dichloroethane-d4 (Surr)* | *102* | | *70 - 130* | | *02/08/14 15:36* | *328* |
| *Toluene-d8 (Surr)* | *106* | | *70 - 130* | | *02/08/14 15:36* | *328* |

## Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **370** | **J** | 1400 | 49 | ppb v/v | | | 02/13/14 22:13 | 273 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *109* | | *70 - 130* | | *02/13/14 22:13* | *273* |
| *1,2-Dichloroethane-d4 (Surr)* | *98* | | *70 - 130* | | *02/13/14 22:13* | *273* |
| *Toluene-d8 (Surr)* | *106* | | *70 - 130* | | *02/13/14 22:13* | *273* |

Client: Sandia National Laboratories
Project/Site: CWL

TestAmerica Job ID: 320-5780-1

**Client Sample ID: 095147-001/CWL-D2-350**
**Lab Sample ID: 320-5780-19**
**Date Collected: 01/16/14 11:04**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

## Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **1300** | **J** | 1600 | 57 | ppb v/v | | | 02/09/14 15:48 | 320 |
| Benzene | ND | | 130 | 25 | ppb v/v | | | 02/09/14 15:48 | 320 |
| Benzyl chloride | ND | | 260 | 52 | ppb v/v | | | 02/09/14 15:48 | 320 |
| Bromodichloromethane | ND | | 96 | 21 | ppb v/v | | | 02/09/14 15:48 | 320 |
| Bromoform | ND | | 130 | 22 | ppb v/v | | | 02/09/14 15:48 | 320 |
| Bromomethane | ND | | 260 | 110 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **2-Butanone (MEK)** | **100** | **J** | 260 | 64 | ppb v/v | | | 02/09/14 15:48 | 320 |
| Carbon disulfide | ND | | 260 | 25 | ppb v/v | | | 02/09/14 15:48 | 320 |
| Carbon tetrachloride | ND | | 260 | 20 | ppb v/v | | | 02/09/14 15:48 | 320 |
| Chlorobenzene | ND | | 96 | 20 | ppb v/v | | | 02/09/14 15:48 | 320 |
| Chloroethane | ND | | 260 | 99 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **Chloroform** | **360** | | 96 | 30 | ppb v/v | | | 02/09/14 15:48 | 320 |
| Chloromethane | ND | | 260 | 63 | ppb v/v | | | 02/09/14 15:48 | 320 |
| Dibromochloromethane | ND | | 130 | 25 | ppb v/v | | | 02/09/14 15:48 | 320 |
| 1,2-Dibromoethane (EDB) | ND | | 260 | 24 | ppb v/v | | | 02/09/14 15:48 | 320 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 130 | 50 | ppb v/v | | | 02/09/14 15:48 | 320 |
| 1,2-Dichlorobenzene | ND | | 130 | 42 | ppb v/v | | | 02/09/14 15:48 | 320 |
| 1,3-Dichlorobenzene | ND | | 130 | 35 | ppb v/v | | | 02/09/14 15:48 | 320 |
| 1,4-Dichlorobenzene | ND | | 130 | 48 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **Dichlorodifluoromethane** | **50** | **J** | 130 | 46 | ppb v/v | | | 02/09/14 15:48 | 320 |
| 1,1-Dichloroethane | ND | | 96 | 23 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **1,2-Dichloroethane** | **75** | **J** | 260 | 28 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **1,1-Dichloroethene** | **540** | | 260 | 41 | ppb v/v | | | 02/09/14 15:48 | 320 |
| cis-1,2-Dichloroethene | ND | | 130 | 28 | ppb v/v | | | 02/09/14 15:48 | 320 |
| trans-1,2-Dichloroethene | ND | | 130 | 32 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **1,2-Dichloropropane** | **130** | | 130 | 77 | ppb v/v | | | 02/09/14 15:48 | 320 |
| cis-1,3-Dichloropropene | ND | | 130 | 33 | ppb v/v | | | 02/09/14 15:48 | 320 |
| trans-1,3-Dichloropropene | ND | | 130 | 28 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **Ethylbenzene** | **100** | **J** | 130 | 20 | ppb v/v | | | 02/09/14 15:48 | 320 |
| 4-Ethyltoluene | ND | | 130 | 60 | ppb v/v | | | 02/09/14 15:48 | 320 |
| Hexachlorobutadiene | ND | | 640 | 140 | ppb v/v | | | 02/09/14 15:48 | 320 |
| 2-Hexanone | ND | | 130 | 28 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **4-Methyl-2-pentanone (MIBK)** | **49** | **J** | 130 | 43 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **Methylene Chloride** | **90** | **J** | 130 | 23 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **Styrene** | **46** | **J** | 130 | 19 | ppb v/v | | | 02/09/14 15:48 | 320 |
| 1,1,2,2-Tetrachloroethane | ND | | 130 | 22 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **Tetrachloroethene** | **340** | | 130 | 16 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **Toluene** | **490** | | 130 | 16 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **1,1,2-Trichloro-1,2,2-trifluoroetha ne** | **1500** | | 130 | 52 | ppb v/v | | | 02/09/14 15:48 | 320 |
| 1,2,4-Trichlorobenzene | ND | | 640 | 140 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **1,1,1-Trichloroethane** | **43** | **J** | 96 | 21 | ppb v/v | | | 02/09/14 15:48 | 320 |
| 1,1,2-Trichloroethane | ND | | 130 | 21 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **Trichloroethene** | **9900** | | 130 | 34 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **Trichlorofluoromethane** | **350** | | 130 | 63 | ppb v/v | | | 02/09/14 15:48 | 320 |
| 1,2,4-Trimethylbenzene | ND | | 260 | 52 | ppb v/v | | | 02/09/14 15:48 | 320 |
| 1,3,5-Trimethylbenzene | ND | | 130 | 40 | ppb v/v | | | 02/09/14 15:48 | 320 |
| Vinyl acetate | ND | | 260 | 46 | ppb v/v | | | 02/09/14 15:48 | 320 |
| Vinyl chloride | ND | | 130 | 38 | ppb v/v | | | 02/09/14 15:48 | 320 |

## Client Sample ID: 095147-001/CWL-D2-350

**Lab Sample ID: 320-5780-19**

**Date Collected: 01/16/14 11:04**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **m,p-Xylene** | **440** | | 260 | 32 | ppb v/v | | | 02/09/14 15:48 | 320 |
| **o-Xylene** | **140** | | 130 | 17 | ppb v/v | | | 02/09/14 15:48 | 320 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *109* | | *70 - 130* | | *02/09/14 15:48* | *320* |
| *1,2-Dichloroethane-d4 (Surr)* | *100* | | *70 - 130* | | *02/09/14 15:48* | *320* |
| *Toluene-d8 (Surr)* | *107* | | *70 - 130* | | *02/09/14 15:48* | *320* |

## Client Sample ID: 095148-001/CWL-D2-440

**Lab Sample ID: 320-5780-20**

**Date Collected: 01/16/14 11:10**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **36** | | 31 | 1.1 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Benzene | ND | | 2.5 | 0.49 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Benzyl chloride | ND | | 5.0 | 1.0 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Bromodichloromethane | ND | | 1.9 | 0.41 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Bromoform | ND | | 2.5 | 0.44 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Bromomethane | ND | | 5.0 | 2.1 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| **2-Butanone (MEK)** | **5.0** | | 5.0 | 1.2 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Carbon disulfide | ND | | 5.0 | 0.49 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| **Carbon tetrachloride** | **0.44** | **J** | 5.0 | 0.40 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Chlorobenzene | ND | | 1.9 | 0.40 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Chloroethane | ND | | 5.0 | 1.9 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| **Chloroform** | **4.5** | | 1.9 | 0.59 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Chloromethane | ND | | 5.0 | 1.2 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Dibromochloromethane | ND | | 2.5 | 0.49 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 1,2-Dibromoethane (EDB) | ND | | 5.0 | 0.47 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 2.5 | 0.97 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 1,2-Dichlorobenzene | ND | | 2.5 | 0.81 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 1,3-Dichlorobenzene | ND | | 2.5 | 0.69 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 1,4-Dichlorobenzene | ND | | 2.5 | 0.93 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| **Dichlorodifluoromethane** | **0.98** | **J** | 2.5 | 0.91 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 1,1-Dichloroethane | ND | | 1.9 | 0.45 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 1,2-Dichloroethane | ND | | 5.0 | 0.55 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| **1,1-Dichloroethene** | **7.5** | | 5.0 | 0.81 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| cis-1,2-Dichloroethene | ND | | 2.5 | 0.56 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| trans-1,2-Dichloroethene | ND | | 2.5 | 0.63 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 1,2-Dichloropropane | ND | | 2.5 | 1.5 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| cis-1,3-Dichloropropene | ND | | 2.5 | 0.65 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| trans-1,3-Dichloropropene | ND | | 2.5 | 0.55 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Ethylbenzene | ND | | 2.5 | 0.39 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 4-Ethyltoluene | ND | | 2.5 | 1.2 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Hexachlorobutadiene | ND | | 13 | 2.7 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 2-Hexanone | ND | | 2.5 | 0.54 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 2.5 | 0.84 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Methylene Chloride | ND | | 2.5 | 0.45 | ppb v/v | | | 02/09/14 16:37 | 6.25 |

**Client Sample ID: 095148-001/CWL-D2-440**
**Lab Sample ID: 320-5780-20**
**Date Collected: 01/16/14 11:10**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

**Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Styrene | ND | | 2.5 | 0.37 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 1,1,2,2-Tetrachloroethane | ND | | 2.5 | 0.43 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| **Tetrachloroethene** | **4.7** | | 2.5 | 0.32 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Toluene | ND | | 2.5 | 0.32 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **13** | | 2.5 | 1.0 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 1,2,4-Trichlorobenzene | ND | | 13 | 2.7 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 1,1,1-Trichloroethane | ND | | 1.9 | 0.41 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 1,1,2-Trichloroethane | ND | | 2.5 | 0.42 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| **Trichloroethene** | **140** | | 2.5 | 0.66 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| **Trichlorofluoromethane** | **4.5** | | 2.5 | 1.2 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 1,2,4-Trimethylbenzene | ND | | 5.0 | 1.0 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| 1,3,5-Trimethylbenzene | ND | | 2.5 | 0.78 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Vinyl acetate | ND | | 5.0 | 0.91 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| Vinyl chloride | ND | | 2.5 | 0.75 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| m,p-Xylene | ND | | 5.0 | 0.63 | ppb v/v | | | 02/09/14 16:37 | 6.25 |
| o-Xylene | ND | | 2.5 | 0.34 | ppb v/v | | | 02/09/14 16:37 | 6.25 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *106* | | *70 - 130* | | *02/09/14 16:37* | *6.25* |
| *1,2-Dichloroethane-d4 (Surr)* | *98* | | *70 - 130* | | *02/09/14 16:37* | *6.25* |
| *Toluene-d8 (Surr)* | *107* | | *70 - 130* | | *02/09/14 16:37* | *6.25* |

**Client Sample ID: 095149-001/CWL-D2-470**
**Lab Sample ID: 320-5780-21**
**Date Collected: 01/16/14 11:15**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

**Method: TO-15 - Volatile Organic Compounds in Ambient Air**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **1600** | | 650 | 23 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **Benzene** | **19** | **J** | 52 | 10 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **Benzyl chloride** | **22** | **J** | 100 | 21 | ppb v/v | | | 02/10/14 09:14 | 130 |
| Bromodichloromethane | ND | | 39 | 8.6 | ppb v/v | | | 02/10/14 09:14 | 130 |
| Bromoform | ND | | 52 | 9.1 | ppb v/v | | | 02/10/14 09:14 | 130 |
| Bromomethane | ND | | 100 | 44 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **2-Butanone (MEK)** | **140** | | 100 | 26 | ppb v/v | | | 02/10/14 09:14 | 130 |
| Carbon disulfide | ND | | 100 | 10 | ppb v/v | | | 02/10/14 09:14 | 130 |
| Carbon tetrachloride | ND | | 100 | 8.3 | ppb v/v | | | 02/10/14 09:14 | 130 |
| Chlorobenzene | ND | | 39 | 8.3 | ppb v/v | | | 02/10/14 09:14 | 130 |
| Chloroethane | ND | | 100 | 40 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **Chloroform** | **330** | | 39 | 12 | ppb v/v | | | 02/10/14 09:14 | 130 |
| Chloromethane | ND | | 100 | 26 | ppb v/v | | | 02/10/14 09:14 | 130 |
| Dibromochloromethane | ND | | 52 | 10 | ppb v/v | | | 02/10/14 09:14 | 130 |
| 1,2-Dibromoethane (EDB) | ND | | 100 | 9.8 | ppb v/v | | | 02/10/14 09:14 | 130 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 52 | 20 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **1,2-Dichlorobenzene** | **24** | **J** | 52 | 17 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **1,3-Dichlorobenzene** | **21** | **J** | 52 | 14 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **1,4-Dichlorobenzene** | **23** | **J** | 52 | 19 | ppb v/v | | | 02/10/14 09:14 | 130 |

## Client Sample ID: 095149-001/CWL-D2-470

**Lab Sample ID: 320-5780-21**

**Date Collected: 01/16/14 11:15**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Dichlorodifluoromethane** | **23** | **J** | 52 | 19 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **1,1-Dichloroethane** | **12** | **J** | 39 | 9.4 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **1,2-Dichloroethane** | **82** | **J** | 100 | 11 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **1,1-Dichloroethene** | **200** | | 100 | 17 | ppb v/v | | | 02/10/14 09:14 | 130 |
| cis-1,2-Dichloroethene | ND | | 52 | 12 | ppb v/v | | | 02/10/14 09:14 | 130 |
| trans-1,2-Dichloroethene | ND | | 52 | 13 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **1,2-Dichloropropane** | **80** | | 52 | 31 | ppb v/v | | | 02/10/14 09:14 | 130 |
| cis-1,3-Dichloropropene | ND | | 52 | 14 | ppb v/v | | | 02/10/14 09:14 | 130 |
| trans-1,3-Dichloropropene | ND | | 52 | 11 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **Ethylbenzene** | **120** | | 52 | 8.2 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **4-Ethyltoluene** | **32** | **J** | 52 | 24 | ppb v/v | | | 02/10/14 09:14 | 130 |
| Hexachlorobutadiene | ND | | 260 | 56 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **2-Hexanone** | **38** | **J** | 52 | 11 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **4-Methyl-2-pentanone (MIBK)** | **41** | **J** | 52 | 18 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **Methylene Chloride** | **48** | **J** | 52 | 9.4 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **Styrene** | **55** | | 52 | 7.7 | ppb v/v | | | 02/10/14 09:14 | 130 |
| 1,1,2,2-Tetrachloroethane | ND | | 52 | 9.0 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **Tetrachloroethene** | **260** | | 52 | 6.6 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **Toluene** | **620** | | 52 | 6.6 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **600** | | 52 | 21 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **1,2,4-Trichlorobenzene** | **89** | **J** | 260 | 56 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **1,1,1-Trichloroethane** | **40** | | 39 | 8.5 | ppb v/v | | | 02/10/14 09:14 | 130 |
| 1,1,2-Trichloroethane | ND | | 52 | 8.7 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **Trichloroethene** | **4700** | | 52 | 14 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **Trichlorofluoromethane** | **160** | | 52 | 25 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **1,2,4-Trimethylbenzene** | **44** | **J** | 100 | 21 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **1,3,5-Trimethylbenzene** | **23** | **J** | 52 | 16 | ppb v/v | | | 02/10/14 09:14 | 130 |
| Vinyl acetate | ND | | 100 | 19 | ppb v/v | | | 02/10/14 09:14 | 130 |
| Vinyl chloride | ND | | 52 | 16 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **m,p-Xylene** | **530** | | 100 | 13 | ppb v/v | | | 02/10/14 09:14 | 130 |
| **o-Xylene** | **160** | | 52 | 7.0 | ppb v/v | | | 02/10/14 09:14 | 130 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *108* | | *70 - 130* | | *02/09/14 17:26* | *325* |
| *4-Bromofluorobenzene (Surr)* | *109* | | *70 - 130* | | *02/10/14 09:14* | *130* |
| *1,2-Dichloroethane-d4 (Surr)* | *99* | | *70 - 130* | | *02/09/14 17:26* | *325* |
| *1,2-Dichloroethane-d4 (Surr)* | *99* | | *70 - 130* | | *02/10/14 09:14* | *130* |
| *Toluene-d8 (Surr)* | *107* | | *70 - 130* | | *02/09/14 17:26* | *325* |
| *Toluene-d8 (Surr)* | *109* | | *70 - 130* | | *02/10/14 09:14* | *130* |

## Client Sample ID: 095150-001/CWL-D2-FB1

**Lab Sample ID: 320-5780-22**

**Date Collected: 01/16/14 10:47**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Acetone | ND | | 5.0 | 0.18 | ppb v/v | | | 02/09/14 18:20 | 1 |

Client: Sandia National Laboratories
Project/Site: CWL

TestAmerica Job ID: 320-5780-1

**Client Sample ID: 095150-001/CWL-D2-FB1**
**Lab Sample ID: 320-5780-22**
**Date Collected: 01/16/14 10:47**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

**Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 0.40 | 0.079 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Benzyl chloride | ND | | 0.80 | 0.16 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Bromodichloromethane | ND | | 0.30 | 0.066 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Bromoform | ND | | 0.40 | 0.070 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Bromomethane | ND | | 0.80 | 0.34 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 2-Butanone (MEK) | ND | | 0.80 | 0.20 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Carbon disulfide | ND | | 0.80 | 0.078 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Carbon tetrachloride | ND | | 0.80 | 0.064 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Chlorobenzene | ND | | 0.30 | 0.064 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Chloroethane | ND | | 0.80 | 0.31 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Chloroform | ND | | 0.30 | 0.095 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Chloromethane | ND | | 0.80 | 0.20 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Dibromochloromethane | ND | | 0.40 | 0.079 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,2-Dibromoethane (EDB) | ND | | 0.80 | 0.075 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 0.40 | 0.16 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,2-Dichlorobenzene | ND | | 0.40 | 0.13 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,3-Dichlorobenzene | ND | | 0.40 | 0.11 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,4-Dichlorobenzene | ND | | 0.40 | 0.15 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Dichlorodifluoromethane | ND | | 0.40 | 0.15 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,1-Dichloroethane | ND | | 0.30 | 0.072 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,2-Dichloroethane | ND | | 0.80 | 0.088 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,1-Dichloroethene | ND | | 0.80 | 0.13 | ppb v/v | | | 02/09/14 18:20 | 1 |
| cis-1,2-Dichloroethene | ND | | 0.40 | 0.089 | ppb v/v | | | 02/09/14 18:20 | 1 |
| trans-1,2-Dichloroethene | ND | | 0.40 | 0.10 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,2-Dichloropropane | ND | | 0.40 | 0.24 | ppb v/v | | | 02/09/14 18:20 | 1 |
| cis-1,3-Dichloropropene | ND | | 0.40 | 0.10 | ppb v/v | | | 02/09/14 18:20 | 1 |
| trans-1,3-Dichloropropene | ND | | 0.40 | 0.088 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Ethylbenzene | ND | | 0.40 | 0.063 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 4-Ethyltoluene | ND | | 0.40 | 0.19 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Hexachlorobutadiene | ND | | 2.0 | 0.43 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 2-Hexanone | ND | | 0.40 | 0.087 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 0.40 | 0.14 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Methylene Chloride | ND | | 0.40 | 0.072 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Styrene | ND | | 0.40 | 0.059 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,1,2,2-Tetrachloroethane | ND | | 0.40 | 0.069 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Tetrachloroethene | ND | | 0.40 | 0.051 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Toluene | ND | | 0.40 | 0.051 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | ND | | 0.40 | 0.16 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,2,4-Trichlorobenzene | ND | | 2.0 | 0.43 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,1,1-Trichloroethane | ND | | 0.30 | 0.065 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,1,2-Trichloroethane | ND | | 0.40 | 0.067 | ppb v/v | | | 02/09/14 18:20 | 1 |
| **Trichloroethene** | **0.39** | **J** | 0.40 | 0.11 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Trichlorofluoromethane | ND | | 0.40 | 0.20 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,2,4-Trimethylbenzene | ND | | 0.80 | 0.16 | ppb v/v | | | 02/09/14 18:20 | 1 |
| 1,3,5-Trimethylbenzene | ND | | 0.40 | 0.13 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Vinyl acetate | ND | | 0.80 | 0.15 | ppb v/v | | | 02/09/14 18:20 | 1 |
| Vinyl chloride | ND | | 0.40 | 0.12 | ppb v/v | | | 02/09/14 18:20 | 1 |
| m,p-Xylene | ND | | 0.80 | 0.10 | ppb v/v | | | 02/09/14 18:20 | 1 |

## Client Sample ID: 095150-001/CWL-D2-FB1

**Lab Sample ID: 320-5780-22**

**Date Collected: 01/16/14 10:47**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| o-Xylene | ND | | 0.40 | 0.054 | ppb v/v | | | 02/09/14 18:20 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *98* | | *70 - 130* | | *02/09/14 18:20* | *1* |
| *1,2-Dichloroethane-d4 (Surr)* | *99* | | *70 - 130* | | *02/09/14 18:20* | *1* |
| *Toluene-d8 (Surr)* | *104* | | *70 - 130* | | *02/09/14 18:20* | *1* |

## Client Sample ID: 095151-001/CWL-D3-120

**Lab Sample ID: 320-5780-23**

**Date Collected: 01/16/14 11:37**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **1400** | | 820 | 29 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **Benzene** | **15** | **J** | 66 | 13 | ppb v/v | | | 02/09/14 19:09 | 164 |
| Benzyl chloride | ND | | 130 | 27 | ppb v/v | | | 02/09/14 19:09 | 164 |
| Bromodichloromethane | ND | | 49 | 11 | ppb v/v | | | 02/09/14 19:09 | 164 |
| Bromoform | ND | | 66 | 11 | ppb v/v | | | 02/09/14 19:09 | 164 |
| Bromomethane | ND | | 130 | 55 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **2-Butanone (MEK)** | **110** | **J** | 130 | 33 | ppb v/v | | | 02/09/14 19:09 | 164 |
| Carbon disulfide | ND | | 130 | 13 | ppb v/v | | | 02/09/14 19:09 | 164 |
| Carbon tetrachloride | ND | | 130 | 10 | ppb v/v | | | 02/09/14 19:09 | 164 |
| Chlorobenzene | ND | | 49 | 10 | ppb v/v | | | 02/09/14 19:09 | 164 |
| Chloroethane | ND | | 130 | 51 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **Chloroform** | **160** | | 49 | 16 | ppb v/v | | | 02/09/14 19:09 | 164 |
| Chloromethane | ND | | 130 | 32 | ppb v/v | | | 02/09/14 19:09 | 164 |
| Dibromochloromethane | ND | | 66 | 13 | ppb v/v | | | 02/09/14 19:09 | 164 |
| 1,2-Dibromoethane (EDB) | ND | | 130 | 12 | ppb v/v | | | 02/09/14 19:09 | 164 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 66 | 25 | ppb v/v | | | 02/09/14 19:09 | 164 |
| 1,2-Dichlorobenzene | ND | | 66 | 21 | ppb v/v | | | 02/09/14 19:09 | 164 |
| 1,3-Dichlorobenzene | ND | | 66 | 18 | ppb v/v | | | 02/09/14 19:09 | 164 |
| 1,4-Dichlorobenzene | ND | | 66 | 24 | ppb v/v | | | 02/09/14 19:09 | 164 |
| Dichlorodifluoromethane | ND | | 66 | 24 | ppb v/v | | | 02/09/14 19:09 | 164 |
| 1,1-Dichloroethane | ND | | 49 | 12 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **1,2-Dichloroethane** | **70** | **J** | 130 | 14 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **1,1-Dichloroethene** | **200** | | 130 | 21 | ppb v/v | | | 02/09/14 19:09 | 164 |
| cis-1,2-Dichloroethene | ND | | 66 | 15 | ppb v/v | | | 02/09/14 19:09 | 164 |
| trans-1,2-Dichloroethene | ND | | 66 | 16 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **1,2-Dichloropropane** | **90** | | 66 | 39 | ppb v/v | | | 02/09/14 19:09 | 164 |
| cis-1,3-Dichloropropene | ND | | 66 | 17 | ppb v/v | | | 02/09/14 19:09 | 164 |
| trans-1,3-Dichloropropene | ND | | 66 | 14 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **Ethylbenzene** | **90** | | 66 | 10 | ppb v/v | | | 02/09/14 19:09 | 164 |
| 4-Ethyltoluene | ND | | 66 | 31 | ppb v/v | | | 02/09/14 19:09 | 164 |
| Hexachlorobutadiene | ND | | 330 | 71 | ppb v/v | | | 02/09/14 19:09 | 164 |
| 2-Hexanone | ND | | 66 | 14 | ppb v/v | | | 02/09/14 19:09 | 164 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 66 | 22 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **Methylene Chloride** | **54** | **J** | 66 | 12 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **Styrene** | **45** | **J** | 66 | 9.7 | ppb v/v | | | 02/09/14 19:09 | 164 |

**Client Sample ID: 095151-001/CWL-D3-120** — **Lab Sample ID: 320-5780-23**
**Date Collected: 01/16/14 11:37** — **Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

**Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,1,2,2-Tetrachloroethane | ND | | 66 | 11 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **Tetrachloroethene** | **99** | | 66 | 8.4 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **Toluene** | **460** | | 66 | 8.4 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **630** | | 66 | 27 | ppb v/v | | | 02/09/14 19:09 | 164 |
| 1,2,4-Trichlorobenzene | ND | | 330 | 71 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **1,1,1-Trichloroethane** | **16** | **J** | 49 | 11 | ppb v/v | | | 02/09/14 19:09 | 164 |
| 1,1,2-Trichloroethane | ND | | 66 | 11 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **Trichloroethene** | **4100** | | 66 | 17 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **Trichlorofluoromethane** | **160** | | 66 | 32 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **1,2,4-Trimethylbenzene** | **30** | **J** | 130 | 27 | ppb v/v | | | 02/09/14 19:09 | 164 |
| 1,3,5-Trimethylbenzene | ND | | 66 | 21 | ppb v/v | | | 02/09/14 19:09 | 164 |
| Vinyl acetate | ND | | 130 | 24 | ppb v/v | | | 02/09/14 19:09 | 164 |
| Vinyl chloride | ND | | 66 | 20 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **m,p-Xylene** | **440** | | 130 | 16 | ppb v/v | | | 02/09/14 19:09 | 164 |
| **o-Xylene** | **150** | | 66 | 8.9 | ppb v/v | | | 02/09/14 19:09 | 164 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *108* | | *70 - 130* | | *02/09/14 19:09* | *164* |
| *1,2-Dichloroethane-d4 (Surr)* | *99* | | *70 - 130* | | *02/09/14 19:09* | *164* |
| *Toluene-d8 (Surr)* | *107* | | *70 - 130* | | *02/09/14 19:09* | *164* |

**Client Sample ID: 095152-001/CWL-D3-170** — **Lab Sample ID: 320-5780-24**
**Date Collected: 01/16/14 11:41** — **Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

**Method: TO-15 - Volatile Organic Compounds in Ambient Air**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **1400** | | 810 | 29 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **Benzene** | **19** | **J** | 64 | 13 | ppb v/v | | | 02/09/14 19:58 | 161 |
| Benzyl chloride | ND | | 130 | 26 | ppb v/v | | | 02/09/14 19:58 | 161 |
| Bromodichloromethane | ND | | 48 | 11 | ppb v/v | | | 02/09/14 19:58 | 161 |
| Bromoform | ND | | 64 | 11 | ppb v/v | | | 02/09/14 19:58 | 161 |
| Bromomethane | ND | | 130 | 54 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **2-Butanone (MEK)** | **120** | **J** | 130 | 32 | ppb v/v | | | 02/09/14 19:58 | 161 |
| Carbon disulfide | ND | | 130 | 13 | ppb v/v | | | 02/09/14 19:58 | 161 |
| Carbon tetrachloride | ND | | 130 | 10 | ppb v/v | | | 02/09/14 19:58 | 161 |
| Chlorobenzene | ND | | 48 | 10 | ppb v/v | | | 02/09/14 19:58 | 161 |
| Chloroethane | ND | | 130 | 50 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **Chloroform** | **160** | | 48 | 15 | ppb v/v | | | 02/09/14 19:58 | 161 |
| Chloromethane | ND | | 130 | 32 | ppb v/v | | | 02/09/14 19:58 | 161 |
| Dibromochloromethane | ND | | 64 | 13 | ppb v/v | | | 02/09/14 19:58 | 161 |
| 1,2-Dibromoethane (EDB) | ND | | 130 | 12 | ppb v/v | | | 02/09/14 19:58 | 161 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 64 | 25 | ppb v/v | | | 02/09/14 19:58 | 161 |
| 1,2-Dichlorobenzene | ND | | 64 | 21 | ppb v/v | | | 02/09/14 19:58 | 161 |
| 1,3-Dichlorobenzene | ND | | 64 | 18 | ppb v/v | | | 02/09/14 19:58 | 161 |
| 1,4-Dichlorobenzene | ND | | 64 | 24 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **Dichlorodifluoromethane** | **28** | **J** | 64 | 23 | ppb v/v | | | 02/09/14 19:58 | 161 |

## Client Sample ID: 095152-001/CWL-D3-170

**Lab Sample ID: 320-5780-24**

**Date Collected: 01/16/14 11:41**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,1-Dichloroethane | ND | | 48 | 12 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **1,2-Dichloroethane** | **94** | **J** | 130 | 14 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **1,1-Dichloroethene** | **260** | | 130 | 21 | ppb v/v | | | 02/09/14 19:58 | 161 |
| cis-1,2-Dichloroethene | ND | | 64 | 14 | ppb v/v | | | 02/09/14 19:58 | 161 |
| trans-1,2-Dichloroethene | ND | | 64 | 16 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **1,2-Dichloropropane** | **120** | | 64 | 39 | ppb v/v | | | 02/09/14 19:58 | 161 |
| cis-1,3-Dichloropropene | ND | | 64 | 17 | ppb v/v | | | 02/09/14 19:58 | 161 |
| trans-1,3-Dichloropropene | ND | | 64 | 14 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **Ethylbenzene** | **120** | | 64 | 10 | ppb v/v | | | 02/09/14 19:58 | 161 |
| 4-Ethyltoluene | ND | | 64 | 30 | ppb v/v | | | 02/09/14 19:58 | 161 |
| Hexachlorobutadiene | ND | | 320 | 70 | ppb v/v | | | 02/09/14 19:58 | 161 |
| 2-Hexanone | ND | | 64 | 14 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **4-Methyl-2-pentanone (MIBK)** | **35** | **J** | 64 | 22 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **Methylene Chloride** | **51** | **J** | 64 | 12 | ppb v/v | | | 02/09/14 19:58 | 161 |
| Styrene | ND | | 64 | 9.5 | ppb v/v | | | 02/09/14 19:58 | 161 |
| 1,1,2,2-Tetrachloroethane | ND | | 64 | 11 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **Tetrachloroethene** | **110** | | 64 | 8.2 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **Toluene** | **640** | | 64 | 8.2 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **800** | | 64 | 26 | ppb v/v | | | 02/09/14 19:58 | 161 |
| 1,2,4-Trichlorobenzene | ND | | 320 | 70 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **1,1,1-Trichloroethane** | **17** | **J** | 48 | 10 | ppb v/v | | | 02/09/14 19:58 | 161 |
| 1,1,2-Trichloroethane | ND | | 64 | 11 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **Trichloroethene** | **5400** | | 64 | 17 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **Trichlorofluoromethane** | **200** | | 64 | 32 | ppb v/v | | | 02/09/14 19:58 | 161 |
| 1,2,4-Trimethylbenzene | ND | | 130 | 26 | ppb v/v | | | 02/09/14 19:58 | 161 |
| 1,3,5-Trimethylbenzene | ND | | 64 | 20 | ppb v/v | | | 02/09/14 19:58 | 161 |
| Vinyl acetate | ND | | 130 | 23 | ppb v/v | | | 02/09/14 19:58 | 161 |
| Vinyl chloride | ND | | 64 | 19 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **m,p-Xylene** | **530** | | 130 | 16 | ppb v/v | | | 02/09/14 19:58 | 161 |
| **o-Xylene** | **150** | | 64 | 8.7 | ppb v/v | | | 02/09/14 19:58 | 161 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *108* | | *70 - 130* | | *02/09/14 19:58* | *161* |
| *1,2-Dichloroethane-d4 (Surr)* | *99* | | *70 - 130* | | *02/09/14 19:58* | *161* |
| *Toluene-d8 (Surr)* | *110* | | *70 - 130* | | *02/09/14 19:58* | *161* |

## Client Sample ID: 095153-001/CWL-D3-350

**Lab Sample ID: 320-5780-25**

**Date Collected: 01/16/14 11:46**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **1100** | **J** | 1600 | 58 | ppb v/v | | | 02/09/14 20:47 | 324 |
| Benzene | ND | | 130 | 26 | ppb v/v | | | 02/09/14 20:47 | 324 |
| Benzyl chloride | ND | | 260 | 53 | ppb v/v | | | 02/09/14 20:47 | 324 |
| Bromodichloromethane | ND | | 97 | 21 | ppb v/v | | | 02/09/14 20:47 | 324 |
| Bromoform | ND | | 130 | 23 | ppb v/v | | | 02/09/14 20:47 | 324 |

**Client Sample ID: 095153-001/CWL-D3-350**
**Lab Sample ID: 320-5780-25**
**Date Collected: 01/16/14 11:46**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Bromomethane | ND | | 260 | 110 | ppb v/v | | | 02/09/14 20:47 | 324 |
| **2-Butanone (MEK)** | **85** | **J** | 260 | 64 | ppb v/v | | | 02/09/14 20:47 | 324 |
| Carbon disulfide | ND | | 260 | 25 | ppb v/v | | | 02/09/14 20:47 | 324 |
| Carbon tetrachloride | ND | | 260 | 21 | ppb v/v | | | 02/09/14 20:47 | 324 |
| Chlorobenzene | ND | | 97 | 21 | ppb v/v | | | 02/09/14 20:47 | 324 |
| Chloroethane | ND | | 260 | 100 | ppb v/v | | | 02/09/14 20:47 | 324 |
| **Chloroform** | **140** | | 97 | 31 | ppb v/v | | | 02/09/14 20:47 | 324 |
| Chloromethane | ND | | 260 | 64 | ppb v/v | | | 02/09/14 20:47 | 324 |
| Dibromochloromethane | ND | | 130 | 26 | ppb v/v | | | 02/09/14 20:47 | 324 |
| 1,2-Dibromoethane (EDB) | ND | | 260 | 24 | ppb v/v | | | 02/09/14 20:47 | 324 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 130 | 50 | ppb v/v | | | 02/09/14 20:47 | 324 |
| 1,2-Dichlorobenzene | ND | | 130 | 42 | ppb v/v | | | 02/09/14 20:47 | 324 |
| 1,3-Dichlorobenzene | ND | | 130 | 36 | ppb v/v | | | 02/09/14 20:47 | 324 |
| 1,4-Dichlorobenzene | ND | | 130 | 48 | ppb v/v | | | 02/09/14 20:47 | 324 |
| Dichlorodifluoromethane | ND | | 130 | 47 | ppb v/v | | | 02/09/14 20:47 | 324 |
| 1,1-Dichloroethane | ND | | 97 | 23 | ppb v/v | | | 02/09/14 20:47 | 324 |
| **1,2-Dichloroethane** | **52** | **J** | 260 | 29 | ppb v/v | | | 02/09/14 20:47 | 324 |
| **1,1-Dichloroethene** | **270** | | 260 | 42 | ppb v/v | | | 02/09/14 20:47 | 324 |
| cis-1,2-Dichloroethene | ND | | 130 | 29 | ppb v/v | | | 02/09/14 20:47 | 324 |
| trans-1,2-Dichloroethene | ND | | 130 | 32 | ppb v/v | | | 02/09/14 20:47 | 324 |
| **1,2-Dichloropropane** | **99** | **J** | 130 | 78 | ppb v/v | | | 02/09/14 20:47 | 324 |
| cis-1,3-Dichloropropene | ND | | 130 | 34 | ppb v/v | | | 02/09/14 20:47 | 324 |
| trans-1,3-Dichloropropene | ND | | 130 | 29 | ppb v/v | | | 02/09/14 20:47 | 324 |
| **Ethylbenzene** | **89** | **J** | 130 | 20 | ppb v/v | | | 02/09/14 20:47 | 324 |
| 4-Ethyltoluene | ND | | 130 | 61 | ppb v/v | | | 02/09/14 20:47 | 324 |
| Hexachlorobutadiene | ND | | 650 | 140 | ppb v/v | | | 02/09/14 20:47 | 324 |
| 2-Hexanone | ND | | 130 | 28 | ppb v/v | | | 02/09/14 20:47 | 324 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 130 | 44 | ppb v/v | | | 02/09/14 20:47 | 324 |
| **Methylene Chloride** | **340** | | 130 | 23 | ppb v/v | | | 02/09/14 20:47 | 324 |
| **Styrene** | **61** | **J** | 130 | 19 | ppb v/v | | | 02/09/14 20:47 | 324 |
| 1,1,2,2-Tetrachloroethane | ND | | 130 | 22 | ppb v/v | | | 02/09/14 20:47 | 324 |
| **Tetrachloroethene** | **97** | **J** | 130 | 17 | ppb v/v | | | 02/09/14 20:47 | 324 |
| **Toluene** | **1100** | | 130 | 17 | ppb v/v | | | 02/09/14 20:47 | 324 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **840** | | 130 | 53 | ppb v/v | | | 02/09/14 20:47 | 324 |
| 1,2,4-Trichlorobenzene | ND | | 650 | 140 | ppb v/v | | | 02/09/14 20:47 | 324 |
| 1,1,1-Trichloroethane | ND | | 97 | 21 | ppb v/v | | | 02/09/14 20:47 | 324 |
| 1,1,2-Trichloroethane | ND | | 130 | 22 | ppb v/v | | | 02/09/14 20:47 | 324 |
| **Trichloroethene** | **5300** | | 130 | 34 | ppb v/v | | | 02/09/14 20:47 | 324 |
| **Trichlorofluoromethane** | **210** | | 130 | 64 | ppb v/v | | | 02/09/14 20:47 | 324 |
| 1,2,4-Trimethylbenzene | ND | | 260 | 52 | ppb v/v | | | 02/09/14 20:47 | 324 |
| 1,3,5-Trimethylbenzene | ND | | 130 | 41 | ppb v/v | | | 02/09/14 20:47 | 324 |
| Vinyl acetate | ND | | 260 | 47 | ppb v/v | | | 02/09/14 20:47 | 324 |
| Vinyl chloride | ND | | 130 | 39 | ppb v/v | | | 02/09/14 20:47 | 324 |
| **m,p-Xylene** | **340** | | 260 | 32 | ppb v/v | | | 02/09/14 20:47 | 324 |
| **o-Xylene** | **98** | **J** | 130 | 17 | ppb v/v | | | 02/09/14 20:47 | 324 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *108* | | *70 - 130* | | *02/09/14 20:47* | *324* |

## Client Sample ID: 095153-001/CWL-D3-350

**Lab Sample ID: 320-5780-25**

**Date Collected: 01/16/14 11:46**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *101* | | *70 - 130* | | *02/09/14 20:47* | *324* |
| *Toluene-d8 (Surr)* | *108* | | *70 - 130* | | *02/09/14 20:47* | *324* |

## Client Sample ID: 095154-001/CWL-D3-440

**Lab Sample ID: 320-5780-26**

**Date Collected: 01/16/14 12:00**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **1400** | **J** | 1600 | 58 | ppb v/v | | | 02/09/14 21:37 | 328 |
| Benzene | ND | | 130 | 26 | ppb v/v | | | 02/09/14 21:37 | 328 |
| Benzyl chloride | ND | | 260 | 53 | ppb v/v | | | 02/09/14 21:37 | 328 |
| Bromodichloromethane | ND | | 98 | 22 | ppb v/v | | | 02/09/14 21:37 | 328 |
| Bromoform | ND | | 130 | 23 | ppb v/v | | | 02/09/14 21:37 | 328 |
| Bromomethane | ND | | 260 | 110 | ppb v/v | | | 02/09/14 21:37 | 328 |
| **2-Butanone (MEK)** | **100** | **J** | 260 | 65 | ppb v/v | | | 02/09/14 21:37 | 328 |
| Carbon disulfide | ND | | 260 | 26 | ppb v/v | | | 02/09/14 21:37 | 328 |
| **Carbon tetrachloride** | **30** | **J** | 260 | 21 | ppb v/v | | | 02/09/14 21:37 | 328 |
| Chlorobenzene | ND | | 98 | 21 | ppb v/v | | | 02/09/14 21:37 | 328 |
| Chloroethane | ND | | 260 | 100 | ppb v/v | | | 02/09/14 21:37 | 328 |
| **Chloroform** | **230** | | 98 | 31 | ppb v/v | | | 02/09/14 21:37 | 328 |
| Chloromethane | ND | | 260 | 65 | ppb v/v | | | 02/09/14 21:37 | 328 |
| Dibromochloromethane | ND | | 130 | 26 | ppb v/v | | | 02/09/14 21:37 | 328 |
| 1,2-Dibromoethane (EDB) | ND | | 260 | 25 | ppb v/v | | | 02/09/14 21:37 | 328 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 130 | 51 | ppb v/v | | | 02/09/14 21:37 | 328 |
| 1,2-Dichlorobenzene | ND | | 130 | 43 | ppb v/v | | | 02/09/14 21:37 | 328 |
| 1,3-Dichlorobenzene | ND | | 130 | 36 | ppb v/v | | | 02/09/14 21:37 | 328 |
| 1,4-Dichlorobenzene | ND | | 130 | 49 | ppb v/v | | | 02/09/14 21:37 | 328 |
| Dichlorodifluoromethane | ND | | 130 | 48 | ppb v/v | | | 02/09/14 21:37 | 328 |
| 1,1-Dichloroethane | ND | | 98 | 24 | ppb v/v | | | 02/09/14 21:37 | 328 |
| **1,2-Dichloroethane** | **97** | **J** | 260 | 29 | ppb v/v | | | 02/09/14 21:37 | 328 |
| **1,1-Dichloroethene** | **400** | | 260 | 42 | ppb v/v | | | 02/09/14 21:37 | 328 |
| cis-1,2-Dichloroethene | ND | | 130 | 29 | ppb v/v | | | 02/09/14 21:37 | 328 |
| trans-1,2-Dichloroethene | ND | | 130 | 33 | ppb v/v | | | 02/09/14 21:37 | 328 |
| **1,2-Dichloropropane** | **190** | | 130 | 79 | ppb v/v | | | 02/09/14 21:37 | 328 |
| cis-1,3-Dichloropropene | ND | | 130 | 34 | ppb v/v | | | 02/09/14 21:37 | 328 |
| trans-1,3-Dichloropropene | ND | | 130 | 29 | ppb v/v | | | 02/09/14 21:37 | 328 |
| **Ethylbenzene** | **97** | **J** | 130 | 21 | ppb v/v | | | 02/09/14 21:37 | 328 |
| 4-Ethyltoluene | ND | | 130 | 61 | ppb v/v | | | 02/09/14 21:37 | 328 |
| Hexachlorobutadiene | ND | | 660 | 140 | ppb v/v | | | 02/09/14 21:37 | 328 |
| 2-Hexanone | ND | | 130 | 29 | ppb v/v | | | 02/09/14 21:37 | 328 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 130 | 44 | ppb v/v | | | 02/09/14 21:37 | 328 |
| **Methylene Chloride** | **330** | | 130 | 24 | ppb v/v | | | 02/09/14 21:37 | 328 |
| Styrene | ND | | 130 | 19 | ppb v/v | | | 02/09/14 21:37 | 328 |
| 1,1,2,2-Tetrachloroethane | ND | | 130 | 23 | ppb v/v | | | 02/09/14 21:37 | 328 |
| **Tetrachloroethene** | **150** | | 130 | 17 | ppb v/v | | | 02/09/14 21:37 | 328 |
| **Toluene** | **570** | | 130 | 17 | ppb v/v | | | 02/09/14 21:37 | 328 |

## Client Sample ID: 095154-001/CWL-D3-440

**Lab Sample ID: 320-5780-26**

**Date Collected: 01/16/14 12:00**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **1300** | | 130 | 53 | ppb v/v | | | 02/09/14 21:37 | 328 |
| 1,2,4-Trichlorobenzene | ND | | 660 | 140 | ppb v/v | | | 02/09/14 21:37 | 328 |
| 1,1,1-Trichloroethane | ND | | 98 | 21 | ppb v/v | | | 02/09/14 21:37 | 328 |
| 1,1,2-Trichloroethane | ND | | 130 | 22 | ppb v/v | | | 02/09/14 21:37 | 328 |
| **Trichloroethene** | **8200** | | 130 | 34 | ppb v/v | | | 02/09/14 21:37 | 328 |
| **Trichlorofluoromethane** | **310** | | 130 | 64 | ppb v/v | | | 02/09/14 21:37 | 328 |
| 1,2,4-Trimethylbenzene | ND | | 260 | 53 | ppb v/v | | | 02/09/14 21:37 | 328 |
| 1,3,5-Trimethylbenzene | ND | | 130 | 41 | ppb v/v | | | 02/09/14 21:37 | 328 |
| Vinyl acetate | ND | | 260 | 48 | ppb v/v | | | 02/09/14 21:37 | 328 |
| Vinyl chloride | ND | | 130 | 39 | ppb v/v | | | 02/09/14 21:37 | 328 |
| **m,p-Xylene** | **460** | | 260 | 33 | ppb v/v | | | 02/09/14 21:37 | 328 |
| **o-Xylene** | **140** | | 130 | 18 | ppb v/v | | | 02/09/14 21:37 | 328 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *108* | | *70 - 130* | | *02/09/14 21:37* | *328* |
| *1,2-Dichloroethane-d4 (Surr)* | *98* | | *70 - 130* | | *02/09/14 21:37* | *328* |
| *Toluene-d8 (Surr)* | *106* | | *70 - 130* | | *02/09/14 21:37* | *328* |

## Client Sample ID: 095155-001/CWL-D3-480

**Lab Sample ID: 320-5780-27**

**Date Collected: 01/16/14 11:51**

**Matrix: Air**

**Date Received: 01/22/14 09:15**

**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **7.4** | | 5.0 | 0.18 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **Benzene** | **0.15** | **J** | 0.40 | 0.079 | ppb v/v | | | 02/09/14 22:32 | 1 |
| Benzyl chloride | ND | | 0.80 | 0.16 | ppb v/v | | | 02/09/14 22:32 | 1 |
| Bromodichloromethane | ND | | 0.30 | 0.066 | ppb v/v | | | 02/09/14 22:32 | 1 |
| Bromoform | ND | | 0.40 | 0.070 | ppb v/v | | | 02/09/14 22:32 | 1 |
| Bromomethane | ND | | 0.80 | 0.34 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **2-Butanone (MEK)** | **1.6** | | 0.80 | 0.20 | ppb v/v | | | 02/09/14 22:32 | 1 |
| Carbon disulfide | ND | | 0.80 | 0.078 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **Carbon tetrachloride** | **0.18** | **J** | 0.80 | 0.064 | ppb v/v | | | 02/09/14 22:32 | 1 |
| Chlorobenzene | ND | | 0.30 | 0.064 | ppb v/v | | | 02/09/14 22:32 | 1 |
| Chloroethane | ND | | 0.80 | 0.31 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **Chloroform** | **1.4** | | 0.30 | 0.095 | ppb v/v | | | 02/09/14 22:32 | 1 |
| Chloromethane | ND | | 0.80 | 0.20 | ppb v/v | | | 02/09/14 22:32 | 1 |
| Dibromochloromethane | ND | | 0.40 | 0.079 | ppb v/v | | | 02/09/14 22:32 | 1 |
| 1,2-Dibromoethane (EDB) | ND | | 0.80 | 0.075 | ppb v/v | | | 02/09/14 22:32 | 1 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 0.40 | 0.16 | ppb v/v | | | 02/09/14 22:32 | 1 |
| 1,2-Dichlorobenzene | ND | | 0.40 | 0.13 | ppb v/v | | | 02/09/14 22:32 | 1 |
| 1,3-Dichlorobenzene | ND | | 0.40 | 0.11 | ppb v/v | | | 02/09/14 22:32 | 1 |
| 1,4-Dichlorobenzene | ND | | 0.40 | 0.15 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **Dichlorodifluoromethane** | **0.57** | | 0.40 | 0.15 | ppb v/v | | | 02/09/14 22:32 | 1 |
| 1,1-Dichloroethane | ND | | 0.30 | 0.072 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **1,2-Dichloroethane** | **0.13** | **J** | 0.80 | 0.088 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **1,1-Dichloroethene** | **1.5** | | 0.80 | 0.13 | ppb v/v | | | 02/09/14 22:32 | 1 |

## Client Sample ID: 095155-001/CWL-D3-480

**Lab Sample ID: 320-5780-27**

**Date Collected: 01/16/14 11:51**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | ND | | 0.40 | 0.089 | ppb v/v | | | 02/09/14 22:32 | 1 |
| trans-1,2-Dichloroethene | ND | | 0.40 | 0.10 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **1,2-Dichloropropane** | **0.68** | | 0.40 | 0.24 | ppb v/v | | | 02/09/14 22:32 | 1 |
| cis-1,3-Dichloropropene | ND | | 0.40 | 0.10 | ppb v/v | | | 02/09/14 22:32 | 1 |
| trans-1,3-Dichloropropene | ND | | 0.40 | 0.088 | ppb v/v | | | 02/09/14 22:32 | 1 |
| Ethylbenzene | ND | | 0.40 | 0.063 | ppb v/v | | | 02/09/14 22:32 | 1 |
| 4-Ethyltoluene | ND | | 0.40 | 0.19 | ppb v/v | | | 02/09/14 22:32 | 1 |
| Hexachlorobutadiene | ND | | 2.0 | 0.43 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **2-Hexanone** | **0.20** | **J** | 0.40 | 0.087 | ppb v/v | | | 02/09/14 22:32 | 1 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 0.40 | 0.14 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **Methylene Chloride** | **1.3** | | 0.40 | 0.072 | ppb v/v | | | 02/09/14 22:32 | 1 |
| Styrene | ND | | 0.40 | 0.059 | ppb v/v | | | 02/09/14 22:32 | 1 |
| 1,1,2,2-Tetrachloroethane | ND | | 0.40 | 0.069 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **Tetrachloroethene** | **0.90** | | 0.40 | 0.051 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **Toluene** | **0.18** | **J** | 0.40 | 0.051 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **1,1,2-Trichloro-1,2,2-trifluoroethane** | **4.2** | | 0.40 | 0.16 | ppb v/v | | | 02/09/14 22:32 | 1 |
| 1,2,4-Trichlorobenzene | ND | | 2.0 | 0.43 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **1,1,1-Trichloroethane** | **0.12** | **J** | 0.30 | 0.065 | ppb v/v | | | 02/09/14 22:32 | 1 |
| 1,1,2-Trichloroethane | ND | | 0.40 | 0.067 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **Trichloroethene** | **35** | | 0.40 | 0.11 | ppb v/v | | | 02/09/14 22:32 | 1 |
| **Trichlorofluoromethane** | **1.3** | | 0.40 | 0.20 | ppb v/v | | | 02/09/14 22:32 | 1 |
| 1,2,4-Trimethylbenzene | ND | | 0.80 | 0.16 | ppb v/v | | | 02/09/14 22:32 | 1 |
| 1,3,5-Trimethylbenzene | ND | | 0.40 | 0.13 | ppb v/v | | | 02/09/14 22:32 | 1 |
| Vinyl acetate | ND | | 0.80 | 0.15 | ppb v/v | | | 02/09/14 22:32 | 1 |
| Vinyl chloride | ND | | 0.40 | 0.12 | ppb v/v | | | 02/09/14 22:32 | 1 |
| m,p-Xylene | ND | | 0.80 | 0.10 | ppb v/v | | | 02/09/14 22:32 | 1 |
| o-Xylene | ND | | 0.40 | 0.054 | ppb v/v | | | 02/09/14 22:32 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *105* | | *70 - 130* | | *02/09/14 22:32* | *1* |
| *1,2-Dichloroethane-d4 (Surr)* | *98* | | *70 - 130* | | *02/09/14 22:32* | *1* |
| *Toluene-d8 (Surr)* | *105* | | *70 - 130* | | *02/09/14 22:32* | *1* |

## Client Sample ID: 095156-001/CWL-D3-FB1

**Lab Sample ID: 320-5780-28**

**Date Collected: 01/16/14 11:32**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acetone** | **0.96** | **J** | 5.0 | 0.18 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Benzene | ND | | 0.40 | 0.079 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Benzyl chloride | ND | | 0.80 | 0.16 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Bromodichloromethane | ND | | 0.30 | 0.066 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Bromoform | ND | | 0.40 | 0.070 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Bromomethane | ND | | 0.80 | 0.34 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 2-Butanone (MEK) | ND | | 0.80 | 0.20 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Carbon disulfide | ND | | 0.80 | 0.078 | ppb v/v | | | 02/09/14 23:26 | 1 |

**Client Sample ID: 095156-001/CWL-D3-FB1**
**Lab Sample ID: 320-5780-28**
**Date Collected: 01/16/14 11:32**
**Matrix: Air**
**Date Received: 01/22/14 09:15**
**Sample Container: Summa Canister 6L**

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Carbon tetrachloride | ND | | 0.80 | 0.064 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Chlorobenzene | ND | | 0.30 | 0.064 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Chloroethane | ND | | 0.80 | 0.31 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Chloroform | ND | | 0.30 | 0.095 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Chloromethane | ND | | 0.80 | 0.20 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Dibromochloromethane | ND | | 0.40 | 0.079 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,2-Dibromoethane (EDB) | ND | | 0.80 | 0.075 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,2-Dichloro-1,1,2,2-tetrafluoroethane | ND | | 0.40 | 0.16 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,2-Dichlorobenzene | ND | | 0.40 | 0.13 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,3-Dichlorobenzene | ND | | 0.40 | 0.11 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,4-Dichlorobenzene | ND | | 0.40 | 0.15 | ppb v/v | | | 02/09/14 23:26 | 1 |
| **Dichlorodifluoromethane** | **0.18** | **J** | 0.40 | 0.15 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,1-Dichloroethane | ND | | 0.30 | 0.072 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,2-Dichloroethane | ND | | 0.80 | 0.088 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,1-Dichloroethene | ND | | 0.80 | 0.13 | ppb v/v | | | 02/09/14 23:26 | 1 |
| cis-1,2-Dichloroethene | ND | | 0.40 | 0.089 | ppb v/v | | | 02/09/14 23:26 | 1 |
| trans-1,2-Dichloroethene | ND | | 0.40 | 0.10 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,2-Dichloropropane | ND | | 0.40 | 0.24 | ppb v/v | | | 02/09/14 23:26 | 1 |
| cis-1,3-Dichloropropene | ND | | 0.40 | 0.10 | ppb v/v | | | 02/09/14 23:26 | 1 |
| trans-1,3-Dichloropropene | ND | | 0.40 | 0.088 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Ethylbenzene | ND | | 0.40 | 0.063 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 4-Ethyltoluene | ND | | 0.40 | 0.19 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Hexachlorobutadiene | ND | | 2.0 | 0.43 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 2-Hexanone | ND | | 0.40 | 0.087 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 4-Methyl-2-pentanone (MIBK) | ND | | 0.40 | 0.14 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Methylene Chloride | ND | | 0.40 | 0.072 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Styrene | ND | | 0.40 | 0.059 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,1,2,2-Tetrachloroethane | ND | | 0.40 | 0.069 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Tetrachloroethene | ND | | 0.40 | 0.051 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Toluene | ND | | 0.40 | 0.051 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | ND | | 0.40 | 0.16 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,2,4-Trichlorobenzene | ND | | 2.0 | 0.43 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,1,1-Trichloroethane | ND | | 0.30 | 0.065 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,1,2-Trichloroethane | ND | | 0.40 | 0.067 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Trichloroethene | ND | | 0.40 | 0.11 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Trichlorofluoromethane | ND | | 0.40 | 0.20 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,2,4-Trimethylbenzene | ND | | 0.80 | 0.16 | ppb v/v | | | 02/09/14 23:26 | 1 |
| 1,3,5-Trimethylbenzene | ND | | 0.40 | 0.13 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Vinyl acetate | ND | | 0.80 | 0.15 | ppb v/v | | | 02/09/14 23:26 | 1 |
| Vinyl chloride | ND | | 0.40 | 0.12 | ppb v/v | | | 02/09/14 23:26 | 1 |
| m,p-Xylene | ND | | 0.80 | 0.10 | ppb v/v | | | 02/09/14 23:26 | 1 |
| o-Xylene | ND | | 0.40 | 0.054 | ppb v/v | | | 02/09/14 23:26 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *100* | | *70 - 130* | | *02/09/14 23:26* | *1* |
| *1,2-Dichloroethane-d4 (Surr)* | *97* | | *70 - 130* | | *02/09/14 23:26* | *1* |
| *Toluene-d8 (Surr)* | *101* | | *70 - 130* | | *02/09/14 23:26* | *1* |

**ANNEX C**
**Chemical Waste Landfill**
**CY 2014 Post-Closure Inspection Forms**

# COVER/SITE INSPECTIONS

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Cover System / Surface-Water / Security Fence

1. Date of Inspection 3/3/14
2. Time of Inspection 1335
3. Name of Inspector Robert Zbek

**Mandatory requirement:**
The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: (*Inspector must initial box before proceeding with the inspection.*) RZ
Training records maintained at CAMU Administrative Trailer.

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

**I. COVER SYSTEM [Quarterly]**

| *Inspection Parameter* | *Parameter Inspected (Yes or No)* | *Action Required (Yes or No)* | *Note Number* |
|---|---|---|---|
| A. Visible settlement of the soil cover in excess of 6 inches. | yes | No | |
| B. Erosion of the soil cover in excess of 6 inches deep. | yes | No | |
| C. Evidence of water ponding on the CWL cover surface in excess of 100 square feet. | yes | No | |
| D. Animal intrusion burrows in excess of 4 inches in diameter. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist. | yes | No | |
| E. Contiguous areas of no vegetation greater than 200 $ft^2$. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist. | yes | No | |

**II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]**

| *Inspection Parameters* | *Parameter Inspected (Yes or No)* | *Action Required (Yes or No)* | *Note Number* |
|---|---|---|---|
| A. Channel or sidewall erosion in excess of 6 inches deep. | yes | No | |
| B. Channel sediment accumulation in excess of 6 inches deep. | yes | No | |
| C. Debris that blocks more than 1/3 of the channel width. | yes | yes | 1 |

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Cover System / Surface-Water / Security Fence (continued)

| III. SECURITY FENCE [Quarterly] | | | |
|---|---|---|---|
| ***Inspection Parameters*** | ***Parameter Inspected (Yes or No)*** | ***Action Required (Yes or No)*** | ***Note Number*** |
| A. Accumulation of wind-blown plants and debris. | yes | yes | 2 |
| B. Fence wires and posts in need of repair/maintenance. | yes | No | |
| C. Gates in need of oiling/repair/maintenance. | yes | No | |
| D. Locks in need of cleaning or replacement. | yes | No | |
| E. Warning signs in need of repair or replacement. | yes | No | |
| F. Survey monuments in vicinity of CWL visible. | yes | No | |

| IV. PREVIOUS DEFICIENCIES | | | |
|---|---|---|---|
| ***Inspection Parameter*** | ***Parameter Inspected (Yes or No)*** | ***Action Required (Yes or No)*** | ***Note Number*** |
| Uncorrected/undocumented previous deficiencies. | | | |

# Chemical Waste Landfill
## Post-Closure Inspection Form
## Checklist for Cover System / Surface-Water / Security Fence (continued)

**NOTES**

| Note Number | Description |
|---|---|
| 1. | Wind blown tumbleweeds need to be removed from all drainage culverts on the south side of the site |
| 2. | Wind blown tumbleweeds need to be removed from the site fence. |
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# Chemical Waste Landfill
## Post-Closure Inspection Form
## Checklist for Cover System / Surface-Water / Security Fence (continued)

Action (Note Number) 1. assigned to Don Schofield Mike Mitchell Date action completed 4/9/14

Action (Note Number) 2. assigned to Don Schofield Mike Mitchell Date action completed 4/9/14

Action (Note Number) _____ assigned to _____ Date action completed _____

Action (Note Number) _____ assigned to _____ Date action completed _____

Action (Note Number) _____ assigned to _____ Date action completed _____

**Additional Comments:**

Action note numbers 1 & 2 were completed by Segura Landscaping on April 9, 2014 Dates that work was performed by Segura were April 7, 8, & 9,

Inspector's Signature _____

Original to: Chemical Waste Landfill Operating Record

Copy to: Environmental Safety and Health (ES&H) and Security Records Center

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Cover System / Surface-Water / Security Fence

1. Date of Inspection 6/17/14
2. Time of Inspection 0900-0959
3. Name of Inspector Robert Zeck

**Mandatory requirement:**
The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: *(Inspector must initial box before proceeding with the inspection.)* RZ

Training records maintained at CAMU Administrative Trailer.

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

**I. COVER SYSTEM [Quarterly]**

| *Inspection Parameter* | *Parameter Inspected (Yes or No)* | *Action Required (Yes or No)* | *Note Number* |
|---|---|---|---|
| A. Visible settlement of the soil cover in excess of 6 inches. | yes | No | |
| B. Erosion of the soil cover in excess of 6 inches deep. | yes | No | |
| C. Evidence of water ponding on the CWL cover surface in excess of 100 square feet. | yes | No | |
| D. Animal intrusion burrows in excess of 4 inches in diameter. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist. | yes | No | |
| E. Contiguous areas of no vegetation greater than 200 $ft^2$. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist. | yes | No | |

**II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]**

| *Inspection Parameters* | *Parameter Inspected (Yes or No)* | *Action Required (Yes or No)* | *Note Number* |
|---|---|---|---|
| A. Channel or sidewall erosion in excess of 6 inches deep. | yes | No | |
| B. Channel sediment accumulation in excess of 6 inches deep. | yes | No | |
| C. Debris that blocks more than 1/3 of the channel width. | yes | No | |

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Cover System / Surface-Water / Security Fence (continued)

| III. SECURITY FENCE [Quarterly] | | | |
|---|---|---|---|
| *Inspection Parameters* | *Parameter Inspected (Yes or No)* | *Action Required (Yes or No)* | *Note Number* |
| A. Accumulation of wind-blown plants and debris. | yes | No | |
| B. Fence wires and posts in need of repair/maintenance. | yes | No | |
| C. Gates in need of oiling/repair/maintenance. | yes | No | |
| D. Locks in need of cleaning or replacement. | yes | No | |
| E. Warning signs in need of repair or replacement. | yes | No | |
| F. Survey monuments in vicinity of CWL visible. | yes | yes | 1 |

| IV. PREVIOUS DEFICIENCIES | | | |
|---|---|---|---|
| *Inspection Parameter* | *Parameter Inspected (Yes or No)* | *Action Required (Yes or No)* | *Note Number* |
| Uncorrected/undocumented previous deficiencies. | NA | NA | |

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Cover System / Surface-Water / Security Fence (continued)

## NOTES

| Note Number | Description |
|---|---|
| 1 | Western most benchmark not visible. Covered with dirt. |
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# Chemical Waste Landfill
# Post-Closure Inspection Form
## Checklist for Cover System / Surface-Water / Security Fence (continued)

Action (Note Number) 1 assigned to Robert Zink Date action completed 6/17/14

Action (Note Number) _____ assigned to _____ Date action completed _____

Action (Note Number) _____ assigned to _____ Date action completed _____

Action (Note Number) _____ assigned to _____ Date action completed _____

Action (Note Number) _____ assigned to _____ Date action completed _____

**Additional Comments:**

Action note #1 was completed at time of the inspection

Inspector's Signature Robert Zink

Original to: Chemical Waste Landfill Operating Record

Copy to: Environmental Safety and Health (ES&H) and Security Records Center

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Cover System / Surface-Water / Security Fence

1. Date of Inspection 9/10/14
2. Time of Inspection 0915 - 0950
3. Name of Inspector Robert Zick

**Mandatory requirement:**
The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: *(Inspector must initial box before proceeding with the inspection.)* RZ
Training records maintained at CAMU Administrative Trailer.

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

| **I. COVER SYSTEM [Quarterly]** | | | |
|---|---|---|---|
| ***Inspection Parameter*** | ***Parameter Inspected (Yes or No)*** | ***Action Required (Yes or No)*** | ***Note Number*** |
| A. Visible settlement of the soil cover in excess of 6 inches. | yes | No | |
| B. Erosion of the soil cover in excess of 6 inches deep. | yes | No | |
| C. Evidence of water ponding on the CWL cover surface in excess of 100 square feet. | yes | No | |
| D. Animal intrusion burrows in excess of 4 inches in diameter. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist. | yes | No | |
| E. Contiguous areas of no vegetation greater than 200 $ft^2$. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist. | yes | No | |

| **II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]** | | | |
|---|---|---|---|
| ***Inspection Parameters*** | ***Parameter Inspected (Yes or No)*** | ***Action Required (Yes or No)*** | ***Note Number*** |
| A. Channel or sidewall erosion in excess of 6 inches deep. | yes | No | |
| B. Channel sediment accumulation in excess of 6 inches deep. | yes | No | |
| C. Debris that blocks more than 1/3 of the channel width. | yes | yes | 1 |

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Cover System / Surface-Water / Security Fence (continued)

| III. SECURITY FENCE [Quarterly] | | | |
|---|---|---|---|
| *Inspection Parameters* | *Parameter Inspected (Yes or No)* | *Action Required (Yes or No)* | *Note Number* |
| A. Accumulation of wind-blown plants and debris. | yes | yes | 1 |
| B. Fence wires and posts in need of repair/maintenance. | yes | No | |
| C. Gates in need of oiling/repair/maintenance. | yes | No | |
| D. Locks in need of cleaning or replacement. | yes | No | |
| E. Warning signs in need of repair or replacement. | yes | No | |
| F. Survey monuments in vicinity of CWL visible. | yes | yes | 2 |

| IV. PREVIOUS DEFICIENCIES | | | |
|---|---|---|---|
| *Inspection Parameter* | *Parameter Inspected (Yes or No)* | *Action Required (Yes or No)* | *Note Number* |
| Uncorrected/undocumented previous deficiencies. | NA | NA | |

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Cover System / Surface-Water / Security Fence (continued)

## NOTES

| Note Number | Description |
|---|---|
| 1 | All drainage culverts on south side of site had accumulation of wind-blown plants |
| | |
| 2 | The 2 western most survey monuments were not clearly visible due to dirt and weeds. |
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## Chemical Waste Landfill
## Post-Closure Inspection Form
## Checklist for Cover System / Surface-Water / Security Fence (continued)

Action (Note Number) 1 assigned to Robert Ziock Date action completed 9/10/14

Action (Note Number) 2 assigned to Robert Ziock Date action completed 9/10/14

Action (Note Number) ____ assigned to _____ Date action completed _____

Action (Note Number) ____ assigned to _____ Date action completed _____

Action (Note Number) ____ assigned to _____ Date action completed _____

**Additional Comments:**

1. Accumulated wind-blown plants were removed from all drainage culverts on the south side of the site at time of the inspection, by Robert Ziock

2. Weeds and dirt were removed from the two western most survey monuments at time of the inspection, by Robert Ziock

Inspector's Signature Robert Ziock

Original to: Chemical Waste Landfill Operating Record

Copy to: Environmental Safety and Health (ES&H) and Security Records Center

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Cover System / Surface-Water / Security Fence

1. Date of Inspection 12/9/14
2. Time of Inspection 1410
3. Name of Inspector 1445

**Mandatory requirement:**
The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: *(Inspector must initial box before proceeding with the inspection.)* RZ

Training records maintained at CAMU Administrative Trailer.

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

| **I. COVER SYSTEM [Quarterly]** | | | |
|---|---|---|---|
| ***Inspection Parameter*** | ***Parameter Inspected (Yes or No)*** | ***Action Required (Yes or No)*** | ***Note Number*** |
| A. Visible settlement of the soil cover in excess of 6 inches. | yes | No | |
| B. Erosion of the soil cover in excess of 6 inches deep. | yes | No | |
| C. Evidence of water ponding on the CWL cover surface in excess of 100 square feet. | yes | No | |
| D. Animal intrusion burrows in excess of 4 inches in diameter. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist. | yes | No | |
| E. Contiguous areas of no vegetation greater than 200 $ft^2$. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist. | yes | No | |

| **II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]** | | | |
|---|---|---|---|
| ***Inspection Parameters*** | ***Parameter Inspected (Yes or No)*** | ***Action Required (Yes or No)*** | ***Note Number*** |
| A. Channel or sidewall erosion in excess of 6 inches deep. | yes | No | |
| B. Channel sediment accumulation in excess of 6 inches deep. | yes | yes | 1 |
| C. Debris that blocks more than 1/3 of the channel width. | yes | No | |

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Cover System / Surface-Water / Security Fence (continued)

| III. SECURITY FENCE [Quarterly] | | | |
|---|---|---|---|
| ***Inspection Parameters*** | ***Parameter Inspected (Yes or No)*** | ***Action Required (Yes or No)*** | ***Note Number*** |
| A. Accumulation of wind-blown plants and debris. | yes | yes | 2 |
| B. Fence wires and posts in need of repair/maintenance. | yes | No | |
| C. Gates in need of oiling/repair/maintenance. | yes | No | |
| D. Locks in need of cleaning or replacement. | yes | No | |
| E. Warning signs in need of repair or replacement. | yes | No | |
| F. Survey monuments in vicinity of CWL visible. | yes | No | |

| IV. PREVIOUS DEFICIENCIES | | | |
|---|---|---|---|
| ***Inspection Parameter*** | ***Parameter Inspected (Yes or No)*** | ***Action Required (Yes or No)*** | ***Note Number*** |
| Uncorrected/undocumented previous deficiencies. | NA | NA | |

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Cover System / Surface-Water / Security Fence (continued)

## NOTES

| Note Number | Description |
|---|---|
| 1 | Culvert at the southwest corner of the site has sediment accumulation in excess of 6 inches deep on west side of road. |
| 2 | Accumulation of wind-blown plants along the fence surrounding the site. |
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## Chemical Waste Landfill
## Post-Closure Inspection Form
## Checklist for Cover System / Surface-Water / Security Fence (continued)

Action (Note Number) 1 assigned to Robert Zbck Date action completed 12/10/14

Action (Note Number) 2 assigned to Robert Zbck Date action completed 12/9/14

Action (Note Number) _____ assigned to _____ Date action completed _____

Action (Note Number) _____ assigned to _____ Date action completed _____

Action (Note Number) _____ assigned to _____ Date action completed _____

**Additional Comments:**

1. Robert Zbck used a shovel to remove excess sediment accumulation from the culvert on the south west side of the site.

2. Wind-blown plants were removed from the site fence by Robert Zbck as the inspection was being conducted.

Inspector's Signature _____

Original to: Chemical Waste Landfill Operating Record

Copy to: Environmental Safety and Health (ES&H) and Security Records Center

# GROUNDWATER/SOIL-VAPOR EQUIPMENT INSPECTIONS

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Groundwater Monitoring Locations / Sampling Equipment

1. Date of Inspection 01-09-14
2. Time of Inspection 0745
3. Name of Inspector Robert Lynch

**Mandatory requirement:**
The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: *(Inspector must initial box before proceeding with the inspection.)* RL

Training records maintained at CAMU Administrative Trailer.

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

| **I. GROUNDWATER MONITORING LOCATIONS [Semi-annually]** | | | |
|---|---|---|---|
| ***Inspection Parameter*** | ***Parameter Inspected (Yes or No)*** | ***Action Required (Yes or No)*** | ***Note Number*** |
| A. Concrete pads, bollards, and protective casings in need of repair/maintenance. | YES | NO | |
| B. Well cover caps (e.g., PVC caps, J-Plug, or equivalent) in need of repair/maintenance. | YES | NO | 1 |
| C. Well casing in need of repair/maintenance. | YES | NO | |
| D. Monitoring well properly labeled. | YES | NO | |
| E. Locks in need of cleaning or replacement. | YES | NO | |

| **II. GROUNDWATER SAMPLING EQUIPMENT [Semi-annually]** | | | |
|---|---|---|---|
| ***Inspection Parameters*** | ***Parameter Inspected (Yes or No)*** | ***Action Required (Yes or No)*** | ***Note Number*** |
| A. Sampling pump in need of repair/maintenance. | YES | NO | |
| B. Sampling assembly (e.g., tubing, gauges, and valves) in need of repair/maintenance. | YES | NO | |

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Groundwater Monitoring Locations / Sampling Equipment
**(continued)**

| **III. PREVIOUS DEFICIENCIES** | | | |
|---|---|---|---|
| ***Inspection Parameter*** | ***Parameter Inspected (Yes or No)*** | ***Action Required (Yes or No)*** | ***Note Number*** |
| Uncorrected/undocumented previous deficiencies. | NA | NA | |

## NOTES

| **Note Number** | **Description** |
|---|---|
| 1 | Baroball assembly installed on all wells after discussion with NMED personnel on March 5, 2012. CWL-BW5, CWL-MW9, CWL-MW10, CWL-MW11 |
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# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Groundwater Monitoring Locations / Sampling Equipment
## (continued)

Action (Note Number) _____ assigned to _____ Date action completed_____

Action (Note Number) _____ assigned to _____ Date action completed_____

Action (Note Number) _____ assigned to _____ Date action completed_____

Action (Note Number) _____ assigned to _____ Date action completed_____

Action (Note Number) _____ assigned to _____ Date action completed_____

**Additional Comments:**

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Inspector's Signature _____

Original to: Chemical Waste Landfill Operating Record

Copy to: Environmental Safety and Health (ES&H) and Security Records Center

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Soil-Gas Monitoring Locations / Sampling Equipment

1. Date of Inspection 1/16/14
2. Time of Inspection 0900
3. Name of Inspector Robert Lynch

| **Mandatory requirement:** | |
|---|---|
| The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: *(Inspector must initial box before proceeding with the inspection.)* | RL |
| Training records maintained at CAMU Administrative Trailer. | |

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

| **I. SOIL-GAS MONITORING LOCATIONS [Annually]** | | | |
|---|---|---|---|
| ***Inspection Parameter*** | ***Parameter Inspected (Yes or No)*** | ***Action Required (Yes or No)*** | ***Note Number*** |
| A. Concrete pads, bollards, and protective casings in need of repair/maintenance. | YES | NO | |
| B. Well cover caps (e.g., PVC caps, J-Plug , Swagelok® dust caps, passive venting Baroballs™, or equivalent) in need of repair/maintenance. | YES | NO | |
| C. Well casing or sampling ports in need of repair/maintenance. | YES | NO | |
| D. Monitoring location and sampling ports properly labeled. | YES | NO | |
| E. Locks in need of cleaning or replacement. NO | ~~YES~~ 1/14/14 | NA | 1 |

| **II. SAMPLING EQUIPMENT [Annually]** | | | |
|---|---|---|---|
| ***Inspection Parameters*** | ***Parameter Inspected (Yes or No)*** | ***Action Required (Yes or No)*** | ***Note Number*** |
| A. Sampling pump in need of repair/maintenance. | YES | NO | |
| B. Sampling assembly (e.g., tubing, gauges, and valves) in need of repair/maintenance. | YES | NO | |

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Soil-Gas Monitoring Locations / Sampling Equipment
**(continued)**

| **III. PREVIOUS DEFICIENCIES** | | | |
|---|---|---|---|
| ***Inspection Parameter*** | ***Parameter Inspected (Yes or No)*** | ***Action Required (Yes or No)*** | ***Note Number*** |
| Uncorrected/undocumented previous deficiencies. | NA | NA | |

**NOTES**

| **Note Number** | **Description** |
|---|---|
| 1 | No locks — Vapor well Design |
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# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Groundwater Monitoring Locations / Sampling Equipment

1. Date of Inspection 07/07/14
2. Time of Inspection 0740
3. Name of Inspector Robert Lynch

| **Mandatory requirement:** | |
|---|---|
| The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: *(Inspector must initial box before proceeding with the inspection.)* | RL |
| Training records maintained at CAMU Administrative Trailer. | |

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

| **I. GROUNDWATER MONITORING LOCATIONS [Semi-annually]** | | | |
|---|---|---|---|
| *Inspection Parameter* | *Parameter Inspected (Yes or No)* | *Action Required (Yes or No)* | *Note Number* |
| A. Concrete pads, bollards, and protective casings in need of repair/maintenance. | YES | NO | |
| B. Well cover caps (e.g., PVC caps, J-Plug, or equivalent) in need of repair/maintenance. | YES | NO | 1 |
| C. Well casing in need of repair/maintenance. | YES | NO | |
| D. Monitoring well properly labeled. | YES | NO | |
| E. Locks in need of cleaning or replacement. | YES | NO | |

| **II. GROUNDWATER SAMPLING EQUIPMENT [Semi-annually]** | | | |
|---|---|---|---|
| *Inspection Parameters* | *Parameter Inspected (Yes or No)* | *Action Required (Yes or No)* | *Note Number* |
| A. Sampling pump in need of repair/maintenance. | YES | NO | |
| B. Sampling assembly (e.g., tubing, gauges, and valves) in need of repair/maintenance. | YES | NO | |

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Groundwater Monitoring Locations / Sampling Equipment
**(continued)**

| III. PREVIOUS DEFICIENCIES | | | |
|---|---|---|---|
| *Inspection Parameter* | *Parameter Inspected (Yes or No)* | *Action Required (Yes or No)* | *Note Number* |
| Uncorrected/undocumented previous deficiencies. | NA | NA | |

**NOTES**

| Note Number | Description |
|---|---|
| 1 | Baroball assembly installed on all wells after discussion with NMED personnel on March 5, 2012. CWL-BW5, CWL-mw9, CWL-MW10, CWL-MW11 |
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# Chemical Waste Landfill
# Post-Closure Inspection Form
# Checklist for Groundwater Monitoring Locations / Sampling Equipment
## (continued)

Action (Note Number) _____ assigned to _____ Date action completed_____

Action (Note Number) _____ assigned to _____ Date action completed_____

Action (Note Number) _____ assigned to _____ Date action completed_____

Action (Note Number) _____ assigned to _____ Date action completed_____

Action (Note Number) _____ assigned to _____ Date action completed_____

**Additional Comments:**

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Inspector's Signature _____

Original to: Chemical Waste Landfill Operating Record

Copy to: Environmental Safety and Health (ES&H) and Security Records Center

# BIOLOGY INSPECTION

# Chemical Waste Landfill
# Post-Closure Inspection Form
# Biology Inspection Checklist for the CWL Cover

**Mandatory requirement:**

The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: *(Inspector must initial box before proceeding with the inspection.)* JP

Approximate vegetative coverage (i.e., living plants): 44 %

Approximate percent native vegetation of the total vegetative cover: 98 %

Listed below are the main plant species identified growing on the CWL cover and the approximate percent cover for each species.

| Scientific Name | Common Name (optional) | %Total cover photosynthesizing |
|---|---|---|
| Bouteloua gracilis | Blue grama | 15% |
| Bouteloua barbata | Six-weeks grama | 1% |
| Salsola tragus | Russian thistle | trace* |
| Pleuraphis jamesii | Galleta grass | 2% |
| Sporobolus cryptandrus | Sand dropseed | 21% |
| Kallstroemia parviflora | Warty caltrop | trace |
| Panicum capillare | Witchgrass | trace |
| Sporobolus contractus | Spike dropseed | 2% |
| Aristida adscensionis | Six-weeks three-awn | trace |
| Gutierrezia sarothrae | Broom snakeweed | trace |
| Amaranthus species | Pigweed | trace |
| Chamaesyce species | Spurge | trace |
| Dieteria canescens | Hoary tansyaster | trace |
| Atriplex canescens | Four-wing saltbush | trace |

*Note: "trace" means this species is present on the cover at a low level of less than 0.5% (one-half of a percent) of the total cover area.

Although "trace" species observed during the September 2014 annual inspection were present at levels less than 0.5%, they were relatively abundant, collectively totaling approximately 3% from 8 species.

# Chemical Waste Landfill
## Biology Inspection Checklist for the CWL Cover (Continued)

Are there any contiguous areas of no vegetation greater than 200 square feet? (Approximately 14 x14 ft.): No

If "Yes," mark such areas on a map and attach to this checklist, and improve such area(s) with native vegetation via soil augmentation, scarification, and/or reseeding.

Are there any very deeply rooted (roots greater than 8 feet deep at maturity) plant species present on the cover? Yes

Notes: The CWL cover is in excellent shape. The cover is crowded with many green mature native, perennial clump grasses and many lesser-developed clump grasses.

TA3 received 4.97 inches of precipitation from January 2014-August 2014, with 3.5 inches of precipitation occurring in July and August. The CWL was sprinkler irrigated at the end of May and in the beginning of June in two events that each applied 0.5 inches of water.

Many juvenile four-wing saltbush are present across the cover. This shrub species can be deeply rooted at maturity, but the current individuals present on the cover have not yet developed deep root systems. Greatest mortality of four-wing saltbush is achieved by clipping during winter dormancy. The shrubs will be monitored and clipped sometime during the upcoming winter months as a best management practice (there is no requirement to remove potentially deep-rooted plants).

A very low level of weedy species are present on the cover. A weeding event was recently conducted on the cover.

### Inspection for animal burrow intrusion into CWL cover

Are any burrows present on the cover? Yes

Does any burrow(s) appear to be active? Yes

Does any active burrow(s) appear to be that of a species that is able to burrow 6 feet deep or greater? No

If any of the active burrows appear to be that of a species that is able to burrow 6 feet or greater, mark such burrow(s) on a map and attach at the end of this checklist, and take appropriate actions as necessary to prevent damage to the cover.

Notes: Very small mammal burrows and ant burrows were observed on the cover. No map is attached because there are no burrows of a species that is able to burrow 6 feet deep or greater.

**Biological Aspects Map – [note: no sketch map to locate specific features is attached – see notes above]**

Survey Biologist Name: Jennifer Payne Date: 9/2/2014

Original to: Chemical Waste Landfill Operating Record

**ANNEX D**
**CY 2014 Chemical Waste Landfill Biology Report**

# 2014 Chemical Waste Landfill Biology Report

## Introduction

As required by the Chemical Waste Landfill (CWL) Post-Closure Care Permit (PCCP) (NMED October 2009), Attachment 1, Section 1.9.1.1, this summary report for Calendar Year (CY) 2014 presents the results of vegetation inspection and monitoring activities performed by the staff biologist on the CWL evapotranspirative (ET) Cover. The purpose of this report is to provide relevant background information, describe local climate trends over the 2014 growing season, expand on the inspection results, and provide recommendations for future ET Cover vegetation monitoring and maintenance. The annual CWL Biology Inspection of the CWL Cover (Biology Inspection) for CY 2014 was conducted on September 2, 2014. The inspection observations are documented in the "Chemical Waste Landfill Post-Closure Inspection Form Biology Inspection Checklist for the CWL Cover" (Annex C).

A self-sustaining plant community is an important component of overall ET Cover performance. Vegetation minimizes erosion by stabilizing the ET Cover surface and moves soil moisture from the ET Cover Topsoil and Native Soil Layers to the atmosphere through transpiration. Vegetation species that are native to the area create the optimal, self-sustaining plant community because the species are specifically adapted to the local climate and soil conditions. The CWL is located at a relatively high elevation and in a challenging semi-arid climate that experiences high temperatures throughout the summer, cold temperatures in the winter, drying winds in the spring, and infrequent precipitation. Perennial native grass species provide the best ET Cover performance due to their extensive near-surface root systems that are poised to uptake moisture throughout the year and prevent precipitation from percolating more deeply into the subsurface soil. The deeper, permanent roots of perennial native grasses enable them to best withstand drought conditions, provide soil stabilization, and remove moisture from deeper soil layers of the ET Cover relative to non-native or annual species.

## Background Information

The CWL ET Cover was unsuccessfully seeded in September 2005 after cover construction was completed. To meet the criteria for successful revegetation in the timeframe specified in the PCCP (i.e., within 5 years of the PCCP becoming effective), the CWL was weeded, reseeded, and supplemental watering was conducted for approximately two months during the end of the 2009 growing season. The September 2011 CWL Biology Inspection determined the ET Cover met the criteria for successful revegetation as defined in the PCCP. Successful revegetation criteria are defined in the CWL PCCP (Attachment 1, Section 1.9) and were presented along with inspection results in the CWL Annual Post-Closure Care Report for CY 2011 (SNL/NM March 2012).

The September 2012 CWL Biology Inspection documented cover conditions that continued to meet the criteria for successful revegetation. Although very little of the grass was green and actively photosynthesizing at the time of the 2012 inspection due to lack of precipitation and soil moisture, the native blue grama grasses were determined to be dormant but alive. CWL cover vegetation during the 2012 and 2013 inspections was characterized by small and tightly spaced native juvenile clump grasses. The CY 2012

Biology Report and Biology Inspection are included in the CWL Annual Post-Closure Care Report for CY 2012 (SNL/NM March 2013).

The September 2013 CWL Biology Inspection determined the CWL ET Cover continued to meet the criteria for successful revegetation. Blue grama was the dominant grass species, and along with other native grasses comprised the majority of the ET Cover vegetation. Many weedy species, including weedy grasses, were present that had not previously been documented on the cover. Although many juvenile native grass clumps were noted to have died since the 2012 inspection due to the prolonged drought, the open spaces created by their absence allowed for more resilient clumps to begin their development into bigger and more mature grasses. A greater diversity of native grasses was observed in 2013 than in 2012.

Local Climate Trends for 2014 Growing Season

Climate trends for north-central New Mexico are presented in this section as they have a significant impact on the cover vegetation. Since the reseeding effort in August 2009, the local climate has primarily been dominated by an ongoing drought with temperature extremes across the seasons. During the time since reseeding, 2013 has been the only year to receive above average annual precipitation. The last quarter of 2013 was unseasonably warm, followed by very dry winter and spring seasons in 2014. The 2014 summer monsoon season experienced slightly above average monsoonal rains during July and August, but had lower than average annual precipitation. Table 1 provides meteorological data for the 12-month period preceding and including the CY 2014 growing season.

*Precipitation, Relative Humidity and Winds*

Drought has been the dominant meteorological trend in the CWL area since 2008. Total annual precipitation for the 2014 growing season and preceding interval (October 2013-September 2014) was 7.17 inches. This is 20% below the 17-year annual precipitation average of 9 inches for this time period. Precipitation in 2013 and 2014 was greater than recent years, but as of September 30, 2014 the area was still in "Moderate Drought" according to the U.S. Drought Monitor (October 2014).

From October 2013-June 2014, the CWL received 2.56 inches of precipitation, approximately half the average of 4.89 inches for this timeframe. During the 2014 monsoon season (July-September), there was a total of 4.61 inches of precipitation, which is above the monsoon season average. From October-December 2014 an additional 2.08 inches of precipitation occurred, almost exactly the 19-year precipitation average for this quarter.

Relative humidity was close to average for the year. Relative humidity was prominently above normal by 12.2% in November 2013 and 9.1% in July 2014. The only notable low relative humidity month was March 2014 at 10.5% below normal. Winds were average for the year; January 2014 varied most greatly from its monthly average with winds 1.0 mile per hour or 14.5% above normal.

## Table 1
## Summary of 2014 Growing Season Meteorological Data at the CWL[a]

| Month | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | 2013 | 2013 | 2013 | 2014 | 2014 | 2014 | 2014 | 2014 | 2014 | 2014 | 2014 | 2014 | |
| **Temperature (°F)** | | | | | | | | | | | | | **Annual** |
| Monthly Mean | 66.60 | 53.68 | 44.07 | 39.30 | 45.55 | 49.00 | 55.48 | 63.88 | 77.66 | 76.09 | 72.30 | 69.44 | 59.42 |
| 17-year Temp Means | 57.66 | 46.42 | 37.03 | 37.77 | 41.80 | 48.49 | 55.52 | 66.22 | 74.82 | 76.80 | 74.84 | 68.84 | 57.18 |
| **Precipitation (Inches)** | | | | | | | | | | | | | |
| Monthly Total | 0.16 | 0.82 | 0.71 | 0.00 | 0.08 | 0.30 | 0.14 | 0.30 | 0.05 | 2.07 | 2.25 | 0.29 | 7.17 |
| 19-year Precip Means | 1.04 | 0.45 | 0.54 | 0.35 | 0.48 | 0.60 | 0.51 | 0.40 | 0.52 | 1.41 | 1.79 | 0.90 | 9.00 |
| **Relative Humidity (%)** | | | | | | | | | | | | | |
| Monthly Mean | 37.2 | 56.9 | 57.4 | 47.0 | 40.7 | 27.1 | 23.8 | 20.4 | 19.3 | 49.4 | 44.2 | 49.7 | 39.4 |
| 17-year RH Means | 43.8 | 44.7 | 53.4 | 51.2 | 45.2 | 37.6 | 31.0 | 26.7 | 26.0 | 40.3 | 44.9 | 42.1 | 40.6 |
| **Wind (Miles/hour)** | | | | | | | | | | | | | |
| Monthly Mean | 8.42 | 7.45 | 6.11 | 7.92 | 7.39 | 9.07 | 10.54 | 9.58 | 10.00 | 9.04 | 7.50 | 8.39 | 8.45 |
| 17-year Wind Means | 7.82 | 7.11 | 6.84 | 6.92 | 8.03 | 9.08 | 10.60 | 9.88 | 9.74 | 8.39 | 7.93 | 8.00 | 8.36 |

[a]Information Source: SNL/NM Meteorological Monitoring Program.

*Temperature*
The CWL experienced ninety-one degrees of temperature variability, with a low of 6.28°F in December and a high of 97.75°F in June. Although 2014 did not experience any 100°F temperatures, overall temperatures were 2.24°F, or 4%, above normal for the year. Heat stress to plants was not as great during the 2014 growing season as it often is, due to lower maximum temperatures. Temperatures were significantly above normal by 7°-9°F from October-December 2013, followed by slightly above average temperatures for the remainder of the winter and early spring. Significantly above-normal wintertime temperatures can cause plant stress due to reduced dormancy and less plant energy available for root growth.

Cover Development and Maintenance

The successional development of the native grasses on the CWL ET Cover was significant in 2013 and continued in 2014. Less robust individual native grass clumps died in 2013, creating barren interspaces for the remaining, more resilient grass clumps to expand their root systems and grow. This succession process involved a major die-off of the juvenile clump grasses due to stress associated with the prolonged drought as outlined in the previous section. In 2013 native vegetation development on the CWL ET Cover was assisted by weeding, applying additional native seed, and supplemental watering. The September 2013 CWL Biology Inspection determined the CWL ET Cover to have approximately 38% coverage with approximately 90% native vegetation composition.

Maintenance activities performed on the CWL ET Cover in 2014 are summarized below and in Section 6.1.2 of the 2014 CWL Annual Post-Closure Care Report.

*April:* Dead weedy vegetation was removed from the CWL ET Cover, perimeter fence line, and surrounding perimeter area. This maintenance activity primarily removed loose tumbleweeds that had grown on the ET Cover or had blown into the area and accumulated near the fence lines.

*May-Early June:* Live and dead weedy vegetation was removed from the CWL ET Cover. A ½-inch supplemental watering event occurred in late May.

*June:* A ½-inch supplemental watering event was performed in early June.

*July:* During the July 2014 groundwater monitoring event and well/equipment inspection, a small burrow was observed just inside the fence line on the western perimeter, near monitoring well CWL-MW11. The shallow burrow was determined to be inactive (i.e., abandoned) and was backfilled with adjacent soil.

*August:* Live and dead weedy vegetation was removed from the CWL ET Cover, perimeter fence line, and surrounding perimeter area. The herbicide Strike 3® from Winfield Solutions was applied to the western perimeter area between the fence line and the road to prevent additional weed growth.

*October:* Live and dead weedy vegetation was removed from the CWL ET Cover, perimeter fence line, and surrounding perimeter area. A 1-inch supplemental watering event was performed in mid-October.

September 2014 Inspection Results

The September biology inspection determined the CWL ET Cover to have approximately 44% coverage, approximately 98% of which is native vegetation (Figure 1). Sand dropseed was the dominant grass species, and along with other native grasses comprised the majority of the ET Cover vegetation. The ET Cover was crowded with many green, nearly fully-mature native perennial clump grasses as well as some juvenile native grasses. Very low levels of weedy species were present on the cover at the time of the inspection.

The native grass coverage at the northwest corner of the ET Cover improved significantly from previous years (Figure 1). Many of the clump grasses in this area are in a moderately juvenile stage of development. This is the only access point to the ET Cover so sparser coverage in this area is anticipated and not of concern from an ET Cover performance standpoint.

The percent foliar coverage of the various native grass species varied slightly from previous years. As the cover changes into a mature plant community, the native species composition will likely continue to gradually change.

Precipitation greatly assisted the growth of native vegetation on the ET Cover in 2014. In September of 2013 the cover received 4.12 inches of rain and four ½-inch supplemental watering events, followed by 0.16 inches of rain and one additional ½-inch watering event in October. These autumn 2013 wetting events provided deeper, near-surface soil moisture for prime root growth during the cooler seasons. Pre-winter moisture is very beneficial for development into mature native bunchgrasses. This was particularly important in autumn 2013 as only approximately half the normal amount of precipitation occurred during this fall, winter and spring timeframe.

The 2014 summer monsoons provided excellent precipitation, 6% above normal. This warm-season moisture facilitated growth of established native vegetation across the CWL ET Cover.

Recommendations

Weeding events will likely need to be conducted in 2015 to reduce competing weeds to a level that is consistent with the natural surroundings. This will also assist establishment of mature native perennial grasses in the open spaces on the CWL ET Cover.

Late spring supplemental watering may be needed if adequate winter precipitation is not received. Supplemental watering may also be needed in the autumn of 2015 if the monsoon rains and previous 12-month precipitation are below normal.

Southwest portion of the cover

Northwest portion of the cover

Southeast portion of the cover

Northeast portion of the cover

**Figure 1 September 2, 2014 CWL ET Cover Photos**

Monitoring of the northwest corner will continue and, to the extent possible, traffic through this access point will be minimized. Sparse coverage in this area is anticipated, and as long as it is limited to the immediate vicinity of the entrance it will not have an adverse impact on ET Cover performance. The CWL ET Cover will continue to be inspected annually as required under the PCCP.

References

New Mexico Environment Department (NMED), October 2009. "Resource Conservation and Recovery Act, Post Closure Care Permit, EPA ID No. NM5890110518, to the U.S. Department of Energy/Sandia Corporation, for the Sandia National Laboratories Chemical Waste Landfill," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico, October 15, 2009.

Sandia National Laboratories/New Mexico (SNL/NM), March 2013. "Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2012," Sandia National Laboratories, Albuquerque, New Mexico.

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U. S. Drought Monitor (October 2014)
http://droughtmonitor.unl.edu/