National Nuclear Security Administration

Department of Energy
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Hazardous Waste Bureau

Mr. Dave Cobrain
Manager
Permits Management Program
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Dr. East, Bldg. 1
Santa Fe, NM 87505

Subject: Submittal of Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2013, Chemical Waste Landfill Post-Closure Care Permit for Sandia National Laboratories/New Mexico, Environmental Protection Agency Identification Number NM5890110518

Dear Mr. Cobrain:

The Department of Energy/National Nuclear Security Administration and Sandia Corporation are submitting the *Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2013*, dated March 2014, to the New Mexico Environment Department. This submittal is required by Part 2, Section 2.6.3, of the Chemical Waste Landfill (CWL) Post-Closure Care Permit.

This document is comprised of a main report and four annexes that provide information for post-closure care activities conducted at the CWL during Calendar Year 2013. The report and supporting documentation satisfy requirements listed in Permit Attachment 1, Sections 1.9 and 1.12.

If you have questions, please contact John Weckerle of my staff at (505) 845-6026.

Sincerely,

James W. Todd
Assistant Manager for
Engineering

Enclosure

See Page 2

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Submittal of Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2013
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.

4 Mar 2014

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

Date signed

25 MAR 2014

James W. Todd, Assistant Manager
U.S. Department of Energy
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Date signed

Sandia National Laboratories

CHEMICAL WASTE LANDFILL
ANNUAL POST-CLOSURE CARE REPORT
CALENDAR YEAR 2013

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

MARCH 2014

U.S. DEPARTMENT OF ENERGY

United States Department of Energy
Sandia Field Office

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ANNUAL CHEMICAL WASTE LANDFILL POST-CLOSURE CARE REPORT CALENDAR YEAR 2013

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
CWL	Chemical Waste Landfill
Closure Plan	Chemical Waste Landfill Final Closure Plan
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
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
SAP	sampling and analysis plan
Sandia	Sandia Corporation
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

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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 2013.

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 provide various submittals as part of the PCCP. Table 1-2 summarizes the submittals associated with the PCCP through calendar year (CY) 2013.

Table 1-2
Chemical Waste Landfill Post-Closure Care Permit 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.

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 2013 in accordance with Attachment 1 of the CWL PCCP (NMED October 2009 and subsequent revisions). This annual report documents PCCP activities conducted from January through December 2013 and fulfills the CWL PCCP requirement for annual reporting to the New Mexico Environment Department (NMED).

The CWL 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 2013. 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 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 2013 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 2013 reporting period.
- Chapter 9 lists the references cited in this report.

Annexes are provided that include CY 2013 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

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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 CWL 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.

Two voluntary corrective measures (VCMs) were conducted at the CWL. The CWL Landfill Excavation (LE) VCM was conducted from September 1998 through February 2002. Soil-vapor extraction was also conducted as a VCM from 1997 through 1998 prior to the LE VCM to reduce the concentrations of VOC soil gas in the vadose zone, control the VOC soil-gas plume, and to reduce groundwater trichloroethene (TCE) concentrations below the regulatory standard of 5 micrograms per liter (µg/L). All former disposal areas were excavated during the LE VCM and groundwater TCE concentrations have been below the regulatory standard since completion of the Vapor Extraction (VE) VCM in 1998. Approximately 52,000 cubic yards of contaminated soil and debris were removed during the LE VCM.

Additional information on CWL current conditions can be found in the CWL Final RCRA Closure Report for the CWL (SNL/NM September 2010), the CWL 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 CWL PCCP (NMED October 2009 and subsequent revisions).

The following sections summarize information on the physical characteristics of the CWL, including the final cover system, compliance monitoring system, storm-water diversion structures, and security fence. More detailed information is provided in the CWL PCCP Attachment 1, Section 1.3 through 1.6, respectively.

2.1 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

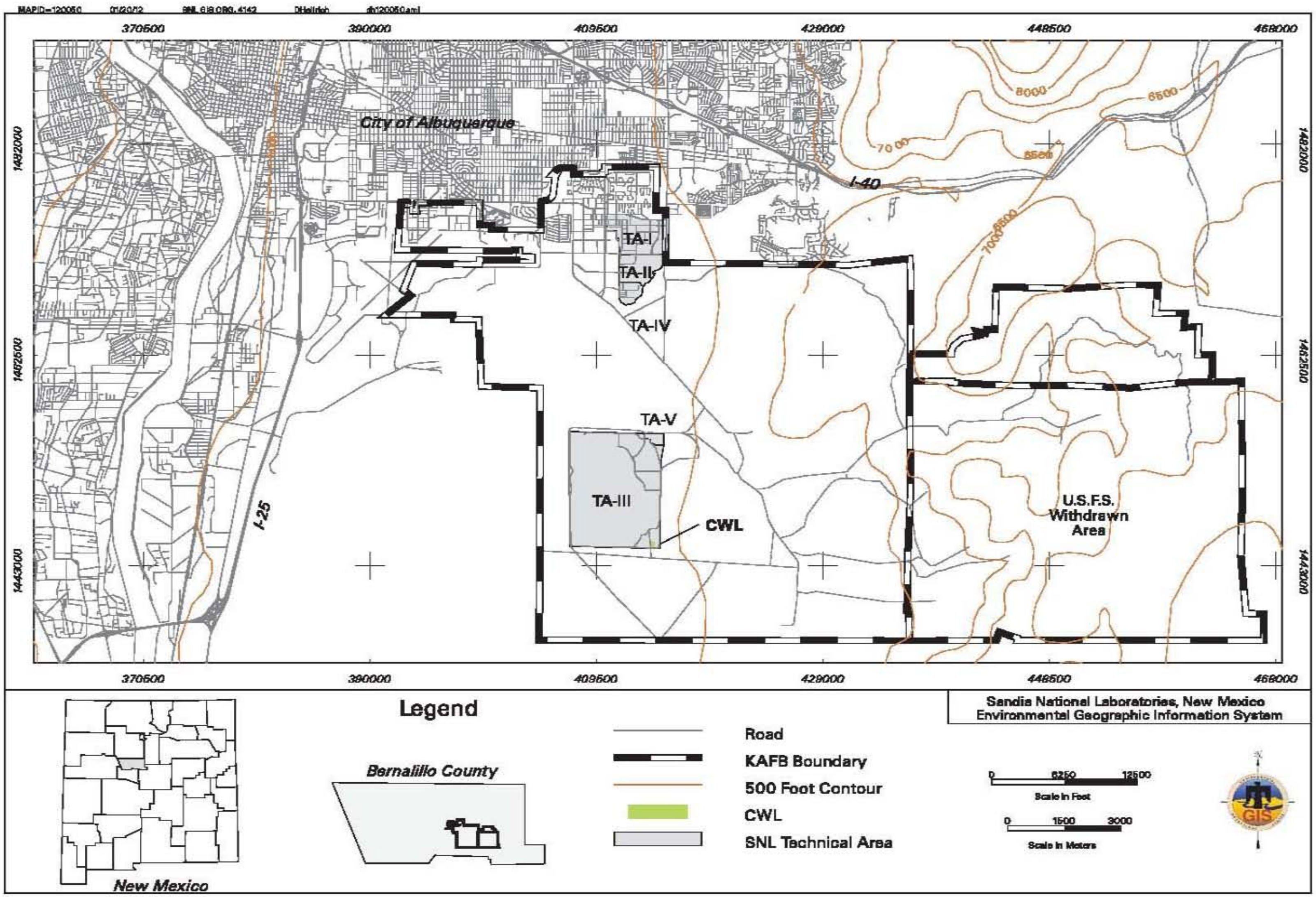

Figure 2-1
Location of the Chemical Waste Landfill with respect to Kirtland Air Force Base and the City of Albuquerque

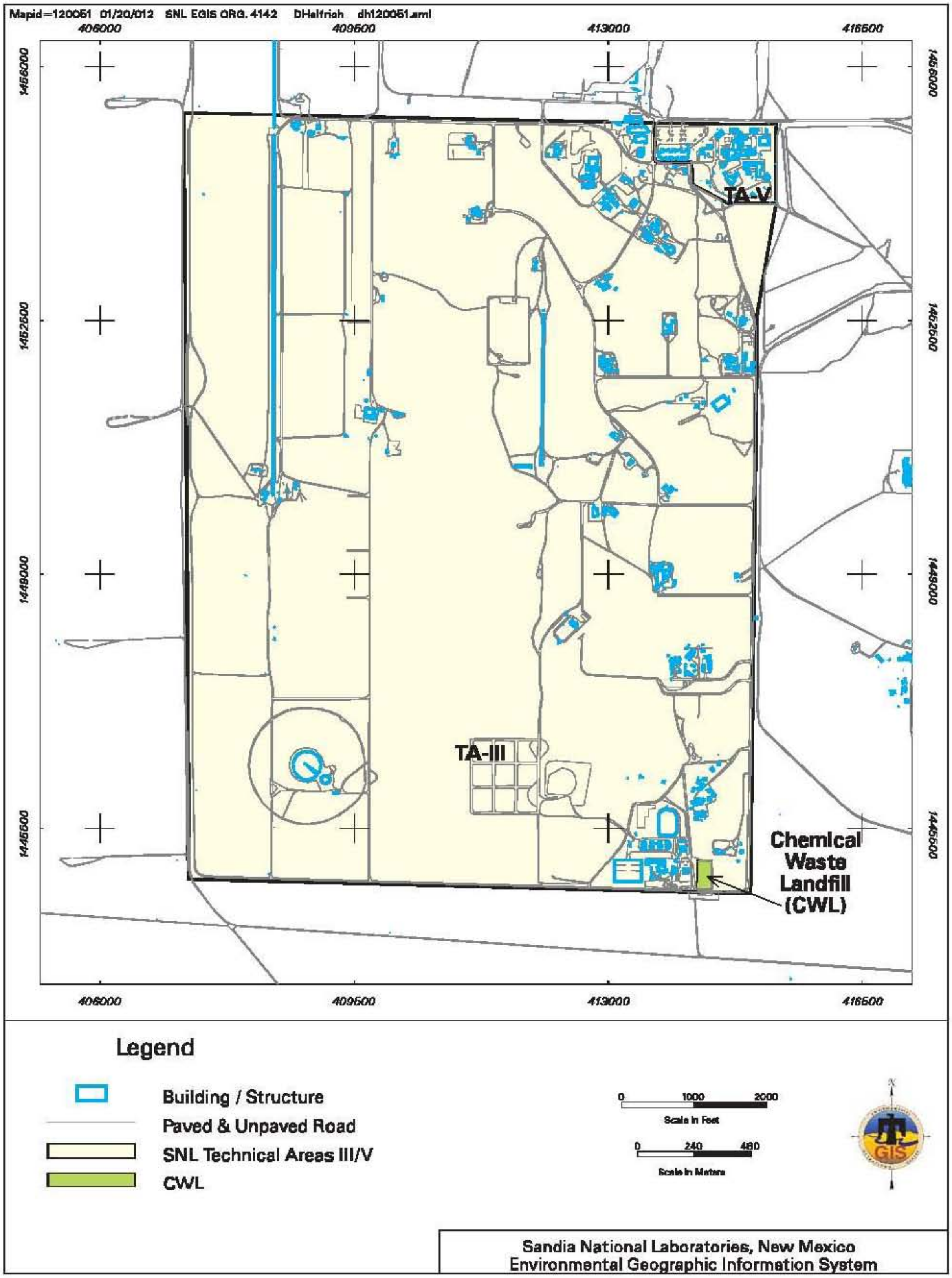

Figure 2-2
Location of the Chemical Waste Landfill within Technical Area III

native plants 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.

2.2 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.

2.2.1 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 CWL PCCP (NMED October 2009 and subsequent revisions).

2.2.2 Soil-Gas Monitoring Network

The soil-gas monitoring network is designed to ensure the protection of groundwater quality by providing early detection data to determine 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)
- U11 – Sampling Ports at 40, 80, and 120 feet bgs (3 ports)
- U12 – 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 CWL PCCP (NMED October 2009 and subsequent revisions).

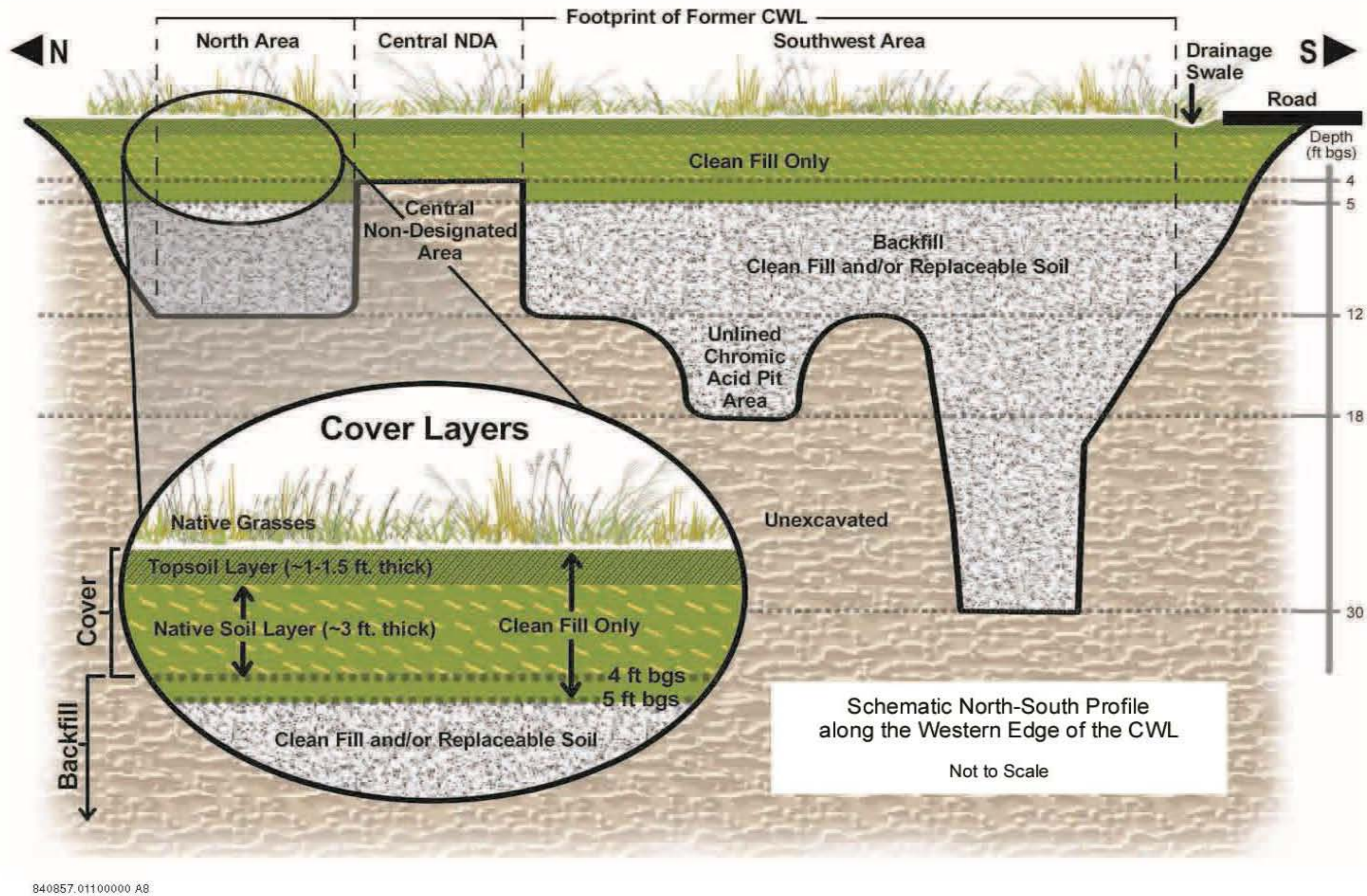

Figure 2-3
Schematic Profile of the Chemical Waste Landfill Evapotranspirative Cover

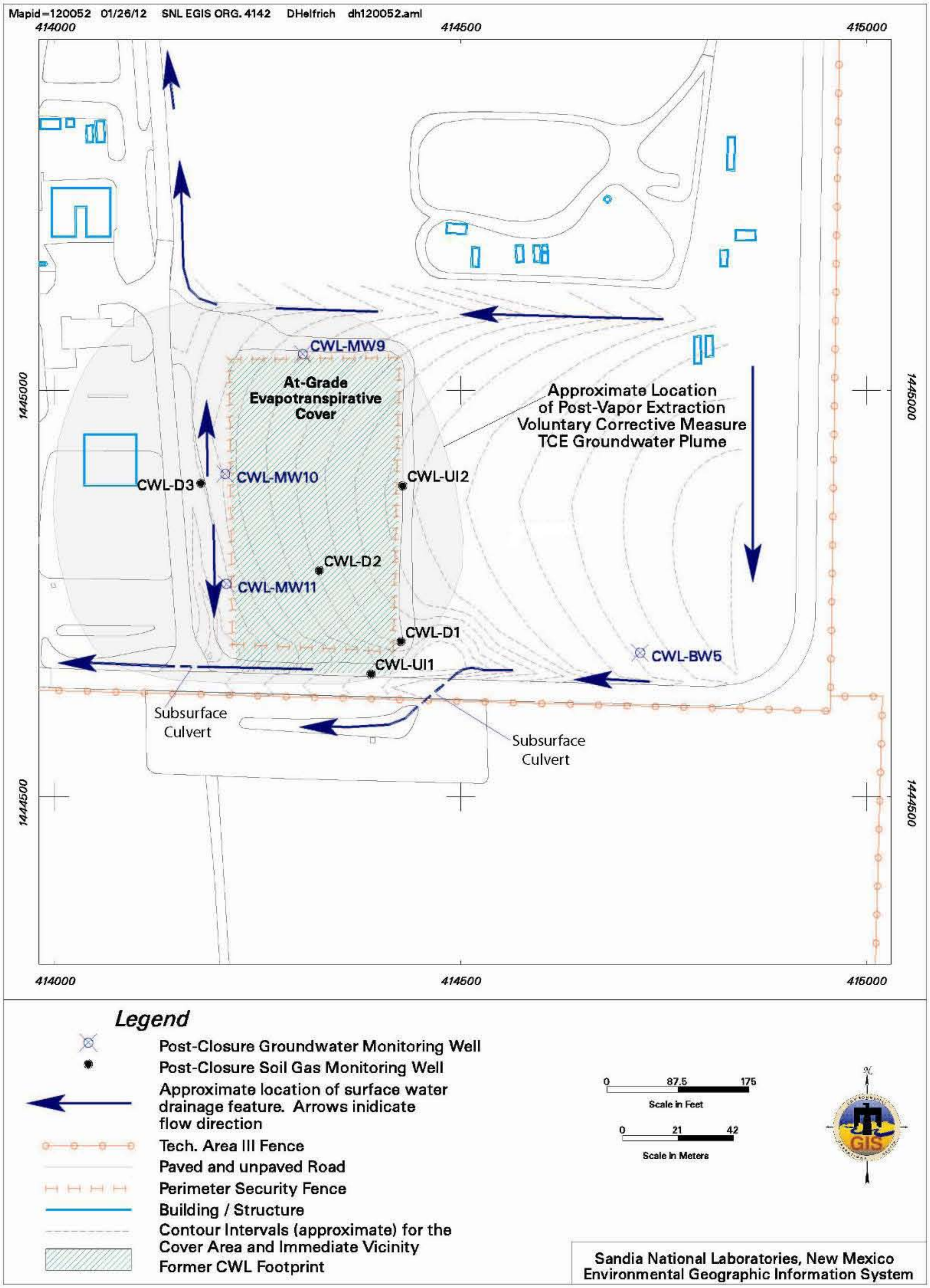

Figure 2-4
Chemical Waste Landfill Surface Drainage Patterns and Monitoring Networks

2.3 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.

2.4 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. Only authorized personnel control the keys to the locks. 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 CWL 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 (CWL 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 2013 in accordance with CWL PCCP Attachment 1, Sections 1.8 through 1.10. Results of CY 2013 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 CWL PCCP Attachment 1, Section 1.8. Sampling and analysis plans (SAPs) in CWL 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-Annually[a]	TCE by EPA Method 8260[b] and Cr and Ni by EPA Method 6020[b]	Sampling and Analysis per CWL PCCP Attachment 2
Soil-Gas	Annually	Compendium Method TO-14 VOCs[c] or equivalent[d]	Sampling and Analysis per CWL PCCP Attachment 3

Notes:
[a]Semi-Annually: 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 1999. 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.
TO-14 = EPA Method TO-14.

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 (CWL PCCP Attachment 3) using U.S. Environmental Protection Agency (EPA) Compendium Method TO-14 (EPA January 1999) or equivalent (i.e., such as the newer method TO-15) 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 CWL PCCP Attachment 1, Section 1.9. All inspections were performed by personnel who meet the qualification and training requirements of CWL PCCP Attachment 5. The schedule for implementing inspections and prescribed maintenance and/or repairs is provided in CWL 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 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 CWL 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 (CWL 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 CWL 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 (CWL 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 (CWL 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 CWL PCCP specifications is required to 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 (CWL 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 (CWL 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 (CWL PCCP Attachment 4 or 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 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 CWL 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 2013 in accordance with CWL 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 2013.

- The first sampling event was conducted January 8-14, 2013. 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, 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 8-12, 2013. Groundwater samples were collected from monitoring wells CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11, and a duplicate sample was collected from CWL-MW10. 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). 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™ Model 6920 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. 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 accordance with PCCP requirements. 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 19 gallons were purged from monitoring well CWL-MW10 prior to the well going dry. The average flow rate was 0.17 gallons per minute (gpm), and the estimated flow rate was 0.13 gpm during the final four gallons (equivalent to 0.64 and 0.49 liters per minute, respectively). During July approximately 16 gallons were purged from CWL-MW10 prior to the well going dry. The average flow rate was 0.15 gpm, and the estimated flow rate was 0.10 gpm during the final four gallons (equivalent to 0.57 and 0.38 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 analysis is used to confirm samples were not contaminated during shipment and storage. Field blank samples were analyzed to detect any potential sample contamination 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 8-14, 2013
A duplicate environmental sample was collected from CWL-MW9. One equipment blank sample was collected prior to sampling CWL-MW9 and submitted for all analyses. A total of five trip

blank samples were submitted with the January 2013 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 8-12, 2013
A duplicate environmental sample was collected from CWL-MW10. One equipment blank sample was collected prior to sampling CWL-MW10. The samples were submitted for all analyses. A total of five trip blank samples were submitted with the July 2013 groundwater samples and analyzed for TCE. Two field blank samples were collected for TCE analysis by pouring deionized water into sample containers at the CWL-MW9 and CWL-MW11 sample locations 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 275 gallons of wastewater were generated during the January 2013 groundwater sampling event and approximately 239 gallons of wastewater were generated during the July 2013 event. 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 2013 monitoring activities were packaged into 5-gallon plastic buckets and managed as hazardous waste. This waste was submitted to the Hazardous Waste Management Facility for ultimate 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 CWL 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 2013 groundwater sampling events. Table 4-3 summarizes results for the

Table 4-1
Summary of Trichloroethene Results
Chemical Waste Landfill Groundwater Monitoring
Analytical Method SW846-8260B[a]
Calendar Year 2013

Well ID	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	Laboratory Qualifier[b]	Validation Qualifier[b]
January 2013 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	4.63	0.300	1.00	--	--
CWL-MW11	ND	0.300	1.00	U	--
July 2013 Sampling Event					
CWL-BW5	ND	0.300	1.00	U	--
CWL-MW9	ND	0.300	1.00	U	--
CWL-MW10	3.13	0.300	1.00	--	--
CWL-MW10 (Duplicate)	2.89	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.

additional VOCs (enhanced list) included in the January 2013 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.

First Semi-Annual Sampling Event – January 8-14, 2013
TCE was detected above the laboratory MDL in the CWL-MW10 sample at a concentration of 4.63 µg/L. No other VOCs (enhanced list) were detected.

Chromium was detected above the laboratory MDL in the CWL-MW11 sample at a concentration of 0.00304J milligrams per liter (mg/L). Nickel was detected in the CWL-MW10 environmental sample at a concentration of 0.00404 mg/L. The very low concentration detections of chromium in the CWL-MW10 sample and nickel in the CWL-BW5, CWL-MW9, and CWL-MW11 samples were qualified as not detected during data validation because the detections are less than five times the concentrations that were detected in the associated laboratory method blank samples.

Table 4-2
Summary of Chromium and Nickel Results
Chemical Waste Landfill Groundwater Monitoring
Analytical Method SW846-6020[a]
Calendar Year 2013

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	Laboratory Qualifier[b]	Validation Qualifier[b]
January 2013 Sampling Event						
CWL-BW5	Chromium	ND	0.002	0.010	U	--
	Nickel	0.0036	0.0005	0.002	B	0.0048U
CWL-MW9	Chromium	ND	0.002	0.010	U	--
	Nickel	0.00399	0.0005	0.002	B	0.0048U
CWL-MW9 (Duplicate)	Chromium	ND	0.002	0.010	U	--
	Nickel	0.00344	0.0005	0.002	B	0.0048U
CWL-MW10	Chromium	0.00321	0.002	0.010	B, J	0.018U
	Nickel	0.00404	0.0005	0.002	B	--
CWL-MW11	Chromium	0.00304	0.002	0.010	J	--
	Nickel	0.00333	0.0005	0.002	B	0.0048U
July 2013 Sampling Event						
CWL-BW5	Chromium	ND	0.002	0.010	U	--
	Nickel	0.00637	0.0005	0.002	--	J-
CWL-MW9	Chromium	ND	0.002	0.010	U	--
	Nickel	0.00198	0.0005	0.002	J	J-
CWL-MW10	Chromium	ND	0.002	0.010	U	--
	Nickel	0.00234	0.0005	0.002	--	--
CWL-MW10 (Duplicate)	Chromium	ND	0.002	0.010	U	--
	Nickel	0.00238	0.0005	0.002	--	--
CWL-MW11	Chromium	ND	0.002	0.010	U	--
	Nickel	0.00172	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 ed.
[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:

B = Analyte is detected in associated laboratory method blank.
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 2013

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	--
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 2013

Well ID/ Sample Date	Temperature (°C)	SC (µmho/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (% Sat)	DO (mg/L)
January 2013 Sampling Event							
CWL-BW5	16.78	1024	226.5	6.64	0.68	77.6	7.44
CWL-MW9	18.22	906	44.1	6.68	0.68	21.4	2.00
CWL-MW10	9.10	797	156.9	6.98	2.67	26.1	3.00
CWL-MW11	14.44	929	198.0	6.68	0.67	50.1	5.10
July 2013 Sampling Event							
CWL-BW5	22.62	1200	104.1	6.85	0.78	77.6	6.61
CWL-MW9	21.64	1066	14.5	6.91	0.71	26.4	2.32
CWL-MW10	22.04	966	60.8	7.16	2.70	21.1	1.84
CWL-MW11	26.73	1119	120.4	6.88	1.25	55.6	4.96

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.

Second Semi-Annual Sampling Event – July 8-12, 2013
TCE only detected above the laboratory MDL in the CWL-MW10 sample at concentrations of 3.13 and 2.89 µg/L in the environmental and duplicate samples, respectively. Both concentrations were lower than the January 2013 results of 4.63 µg/L. There were no other detections of TCE.

Chromium was not detected above the laboratory MDL in any of the samples. Nickel was detected in all samples at concentrations ranging from 0.00172J mg/L (CWL-MW11 sample) to 0.00637 mg/L (CWL-BW5 sample).

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 July 2013 data set. For the environmental-duplicate sample pair collected at CWL-MW9 in January, no VOCs or chromium were detected and the nickel results were qualified during data validation as non-detections. Therefore, RPD values were not calculated. RPD values were calculated for detected constituents from the CWL-MW10 environmental-duplicate sample pair and show very good agreement (i.e., RPD values < 20 for organics and < 35 for metals).

Table 4-5
Summary of Duplicate Sample Results
Chemical Waste Landfill Groundwater Monitoring
Calendar Year 2013

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD[a]
July 2013 Sampling Event			
CWL-MW10			
Trichloroethene (µg/L)	3.13	2.89	8
Nickel (mg/L)	0.00234	0.00238	2

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.

µg/L = microgram(s) per liter.
mg/L = milligram(s) per liter.

One equipment blank sample was collected in January and analyzed for all constituents. Chloroform and chromium were detected in the January equipment blank sample. No corrective action was necessary since chloroform and chromium were not detected in the environmental sample associated with the equipment blank sample (i.e., CWL-MW9 samples). The equipment blank sample collected in July was analyzed for all constituents; no constituents were detected in the sample.

Of the five trip blank samples and two field blank samples associated with the January sampling event, the only detection was chloroform in all 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 two field blank samples associated with the July sampling event were analyzed only for TCE, which was not detected in any of the samples.

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 May 2011). Minor issues documented during the data validation process are summarized below.

For the January 2013 sampling event, the chromium result in the CWL-MW10 sample and the nickel results in CWL-BW5, CWL-MW9, and CWL-MW11 samples were qualified as not detected during data validation. The results are very low concentrations that are less than five times the concentration detected in the associated laboratory method blank samples; therefore they were qualified as not detected at an elevated detection limit equal to the associated blank concentration.

For the July 2013 sampling event, the nickel results in CWL-BW5, CWL-MW9, and CWL-MW11 environmental samples were qualified as estimated values with a negative bias during data validation, based on the associated laboratory quality control sample (interference check sample) results.

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, non-conformances, or project-specific issues were identified during the January and July 2013 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 after completion of the VE VCM (July 1998).

Statistical evaluation includes results from CWL-BW5/4A, as well as CWL-MW9, CWL-MW10, and CWL-MW11. CWL-MW9, CWL-MW10, and CWL-MW11 are new wells installed in 2010 and have been sampled six times as of July 2013 (November-December 2010, July-August 2011, January and July 2012, January and July 2013). Statistical evaluation of the results from these wells is included for the first time in this report. In the following sections the term "historical results" refers to the 2010 through 2013 data set for these new wells. CWL-BW5 is a replacement well for CWL-BW4A. All results for CWL-BW5 (November-December 2010, July-August 2011, January and July 2012, January and July 2013) and historic results for CWL-BW4A (since completion of the VE VCM in 1998) are used for 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 if 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 is used for statistical analysis. More detailed information regarding statistical assessment requirements is provided below and statistical assessment results for CY 2013 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.

<u>Prediction and Confidence Intervals</u>

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%. Sample results are also compared to the historical range (minimum and maximum result) 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 and if it exceeds the concentration limit, this is statistically significant evidence that the concentration limit has been exceeded. This 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 2013 CWL-BW5/4A sample results are compared was calculated using all historic results obtained since July 1998 (i.e., completion of the VE VCM) not including the July 2013 sample results. For the next groundwater monitoring event, the median will be recalculated and include the July 2013 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 due to 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 2013 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.

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 the minimum of six data points for each constituent), the very low concentrations, and in several cases the high 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. Likewise, 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 2013 CWL-BW5 chromium and TCE sample results were both 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. The results for nickel fell within the range of the 95% LCL and 95% UCL. Results for all three hazardous constituents (using the MDL value if constituent was not detected) fell within the historical range.

Table 4-7
Statistical Assessment Results Summary
Chemical Waste Lanfill
Calendar Year 2013 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	0.00337	0.0032	0.00239	0.00435	Normal	46%	No
Nickel (mg/L)	0.00109	0.049	0.00565	0.00853	0.00305	0.00825	Normal	50%	No
TCE (µg/L)	0.1	0.78	0.353	0.138	0.311	0.395	Normal	4%	No
CWL-MW9									
Chromium (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	No
Nickel (mg/L)	0.00198	0.0048	0.00363	0.00102	0.0028	0.00446	Normal	67%	No
TCE (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	No
CWL-MW10									
Chromium (mg/L)	0.002	0.018	0.00667	0.00734	0.00064	0.0127	Normal	33%	No
Nickel (mg/L)	0.00238	0.00707	0.00389	0.00175	0.00245	0.00533	Normal	33%	No
TCE (µg/L)	1.11	4.68	3.13	1.502	1.894	4.366	Normal	67%	No
CWL-MW11									
Chromium (mg/L)	0.002	0.00304	0.00236	0.000431	0.00201	0.00271	Normal	67%	No
Nickel (mg/L)	0.00172	0.0048	0.00321	0.00127	0.00217	0.00425	Normal	33%	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.
[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.
TCE = Trichloroethene.
µg/L = Micrograms/liter.
UCL = Upper confidence limit.
NA = Not Applicable; constituent has not been detected in any samples from this monitoring well.
mg/L = Milligrams/liter.

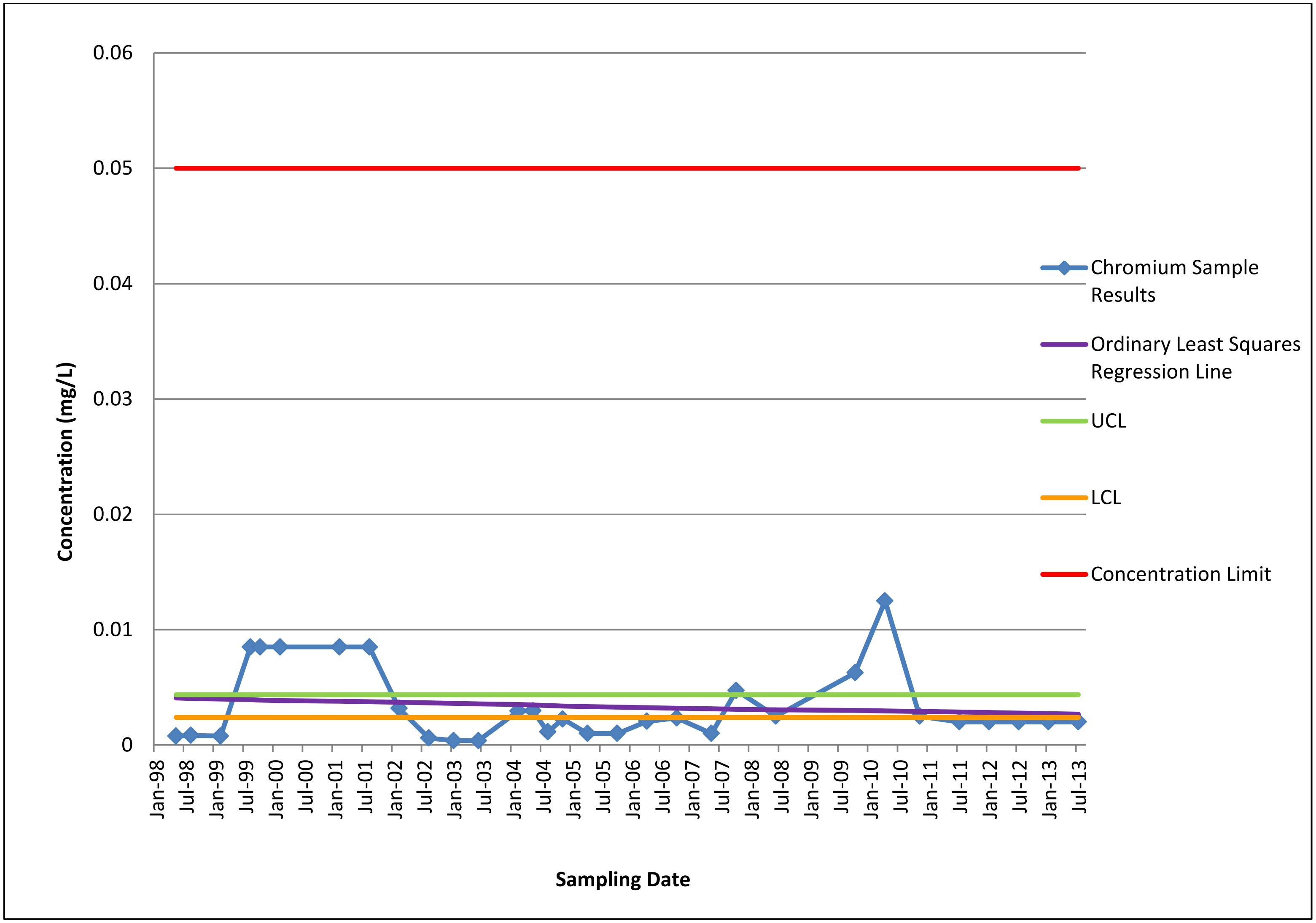

Figure 4-1
Chromium Control Chart for CWL-BW5/4A

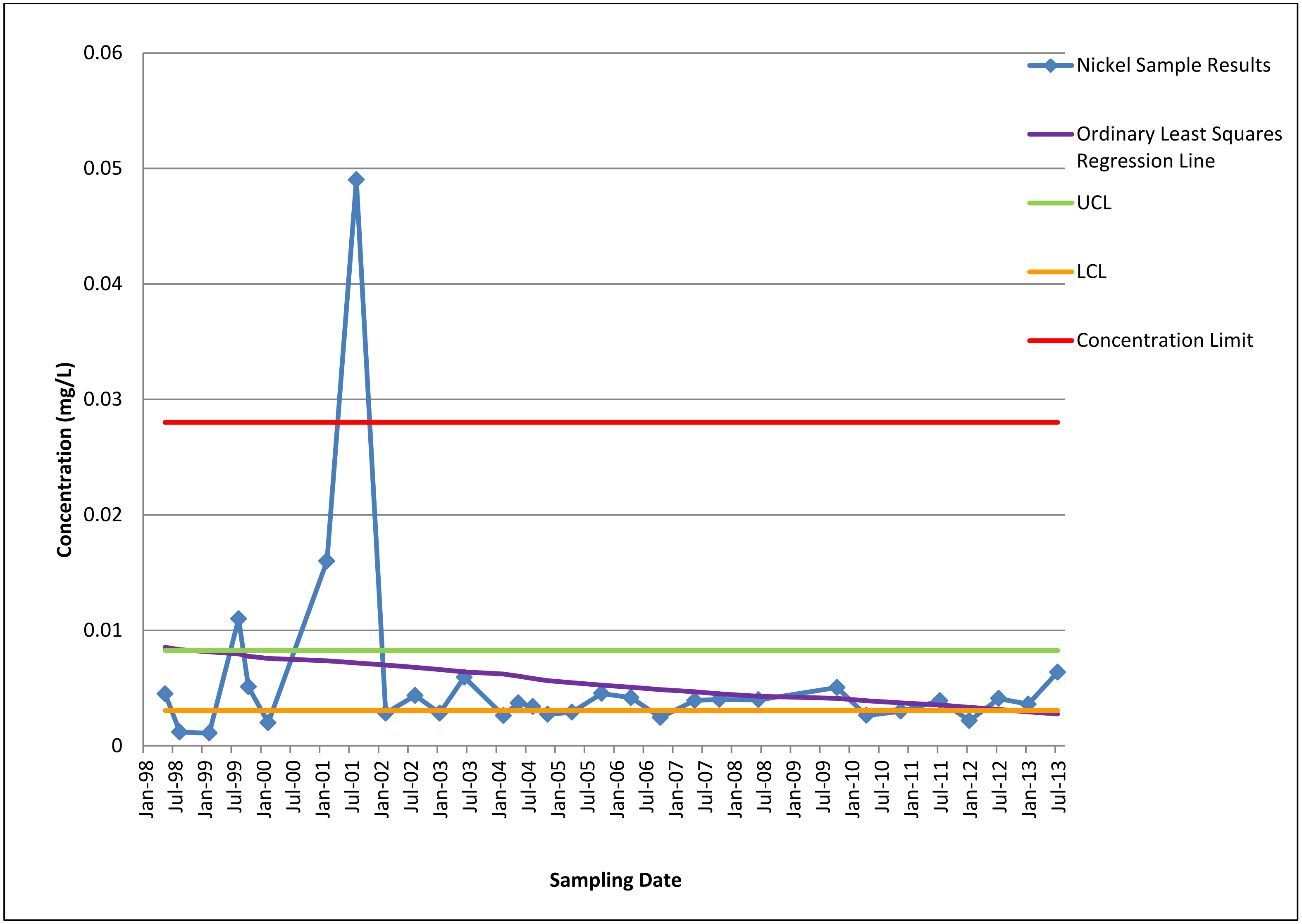

Figure 4-2
Nickel Control Chart for CWL-BW5/4A

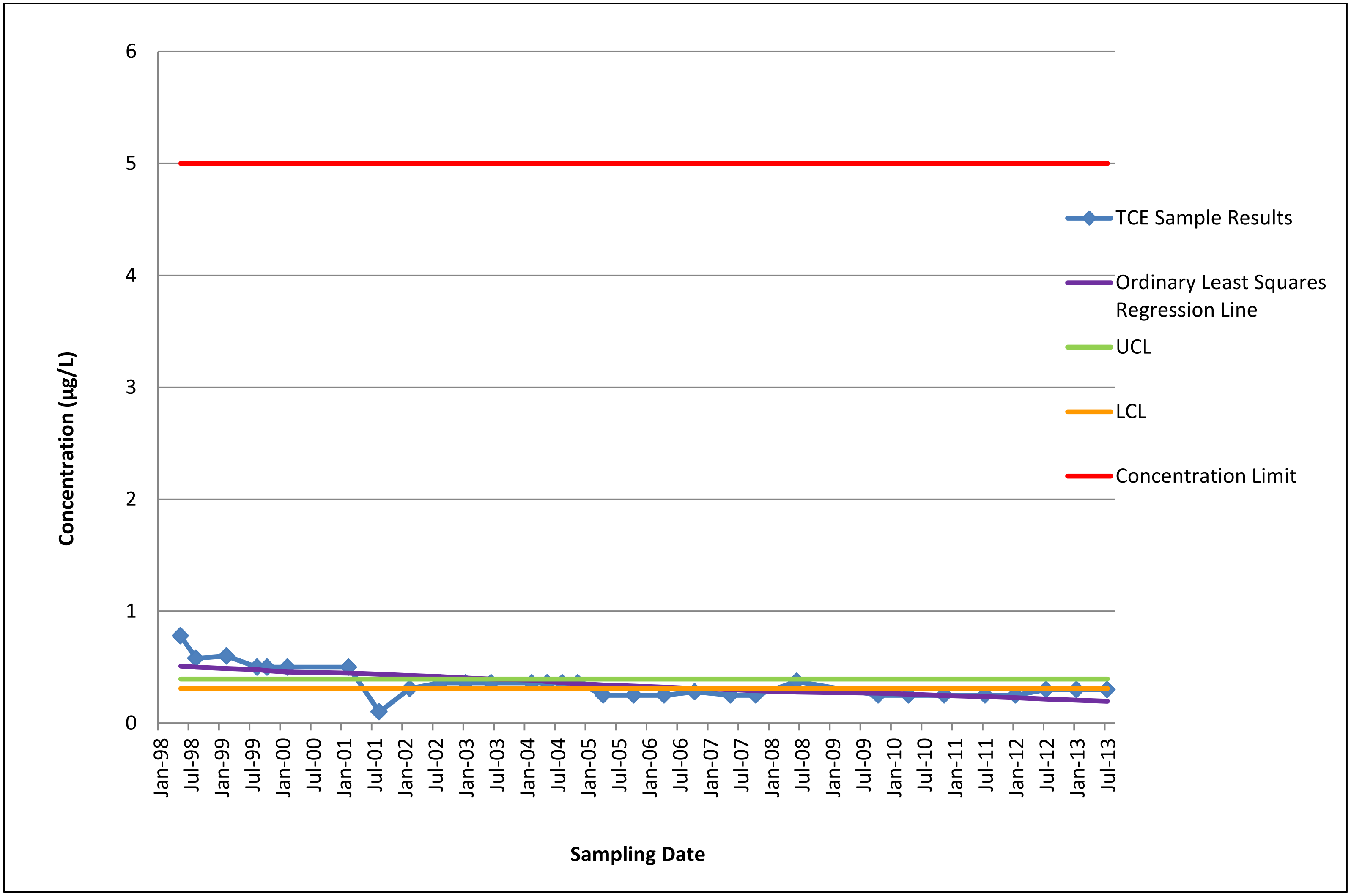

Figure 4-3
TCE Control Chart for CWL-BW5/4A

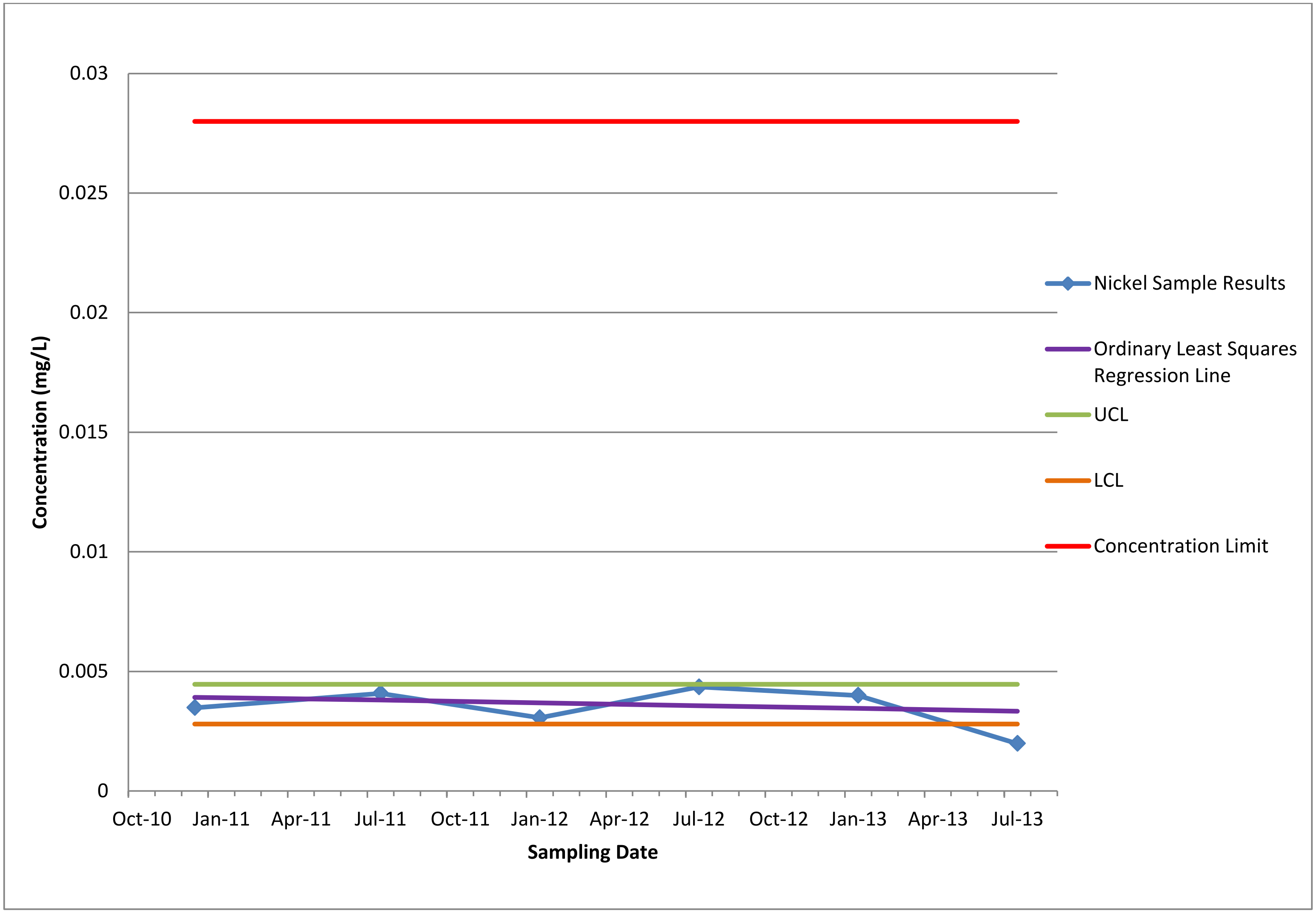

Figure 4-4
Nickel Control Chart for CWL-MW9

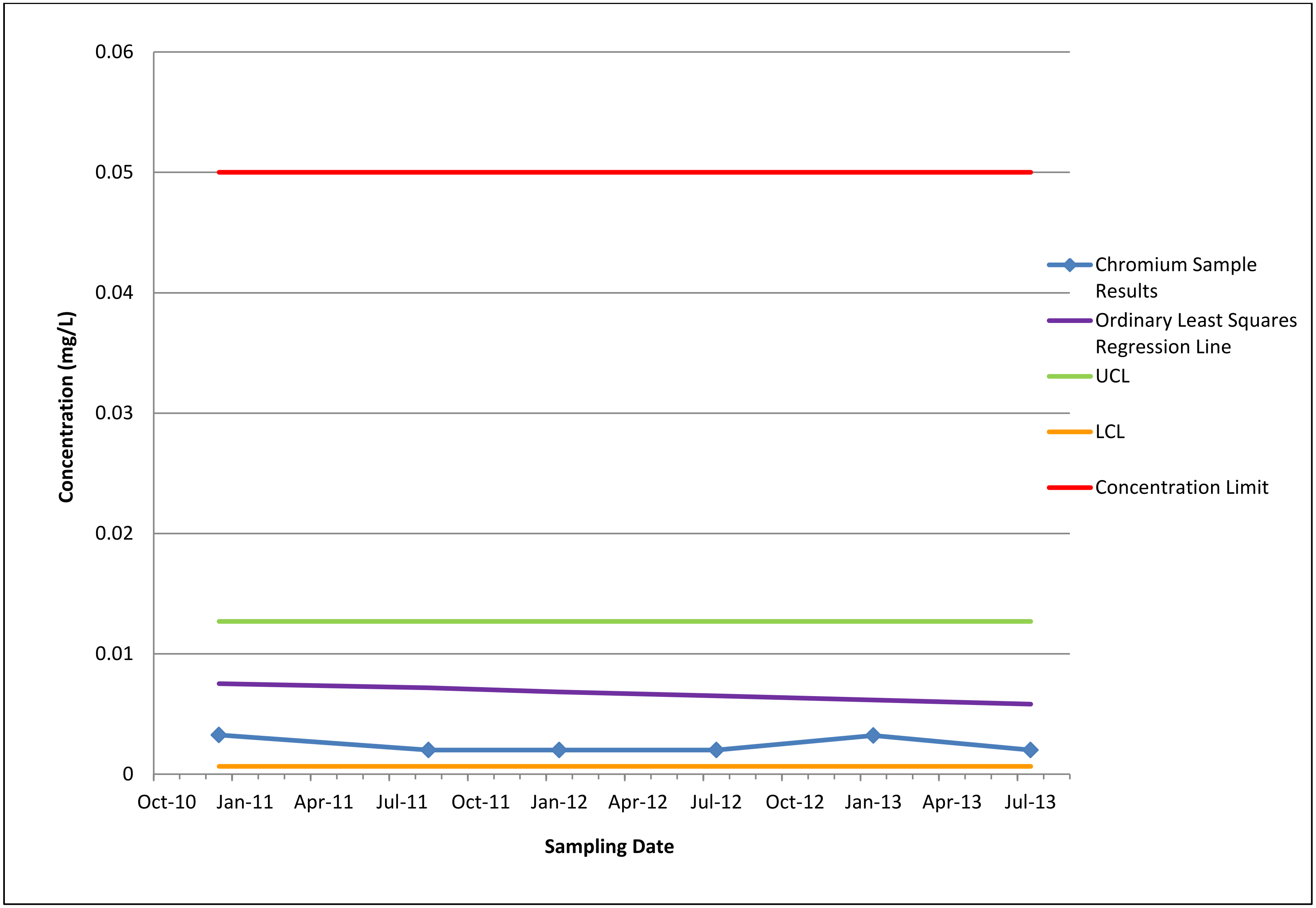

Figure 4-5
Chromium Control Chart for CWL-MW10

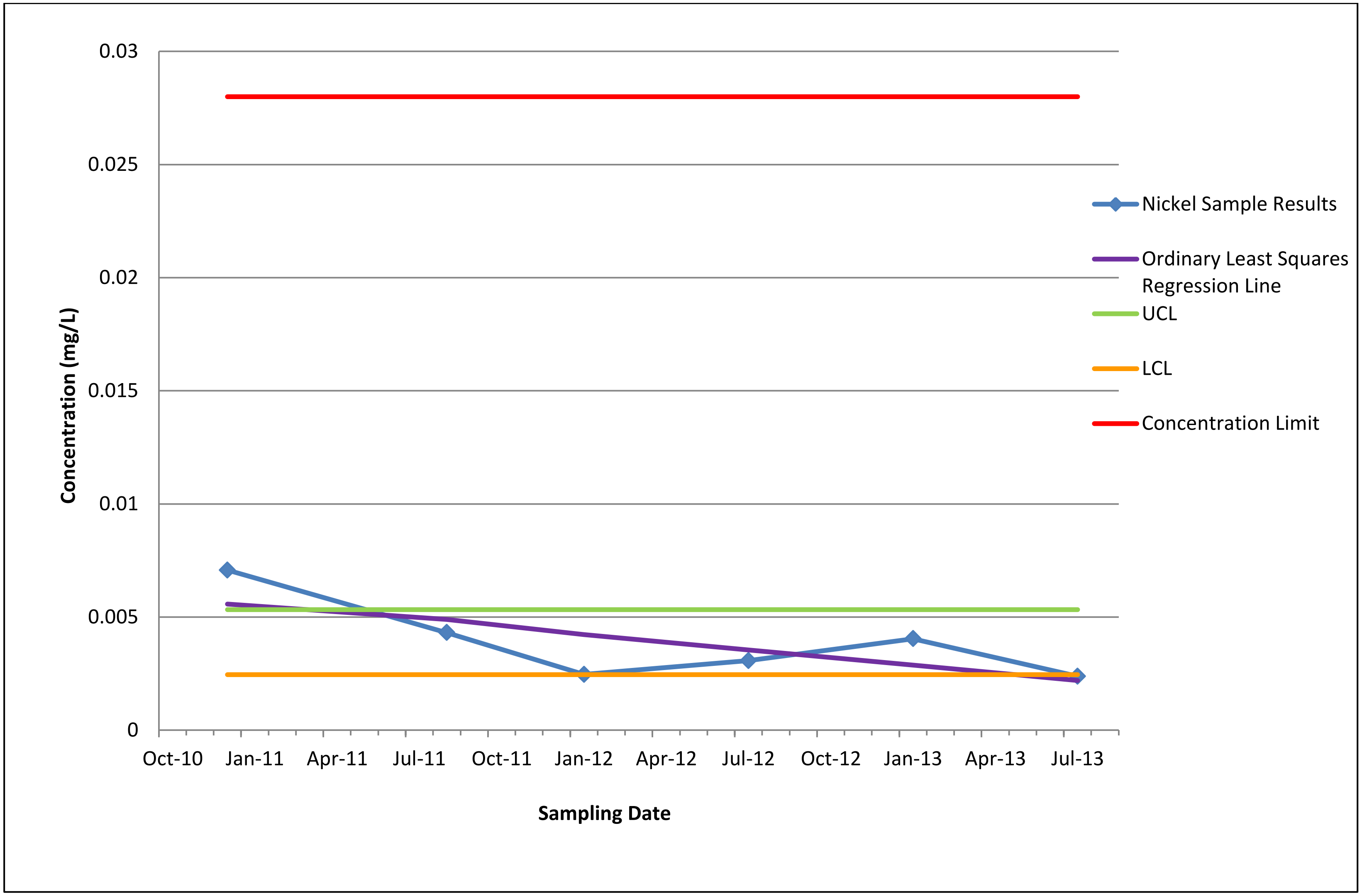

Figure 4-6
Nickel Control Chart for CWL-MW10

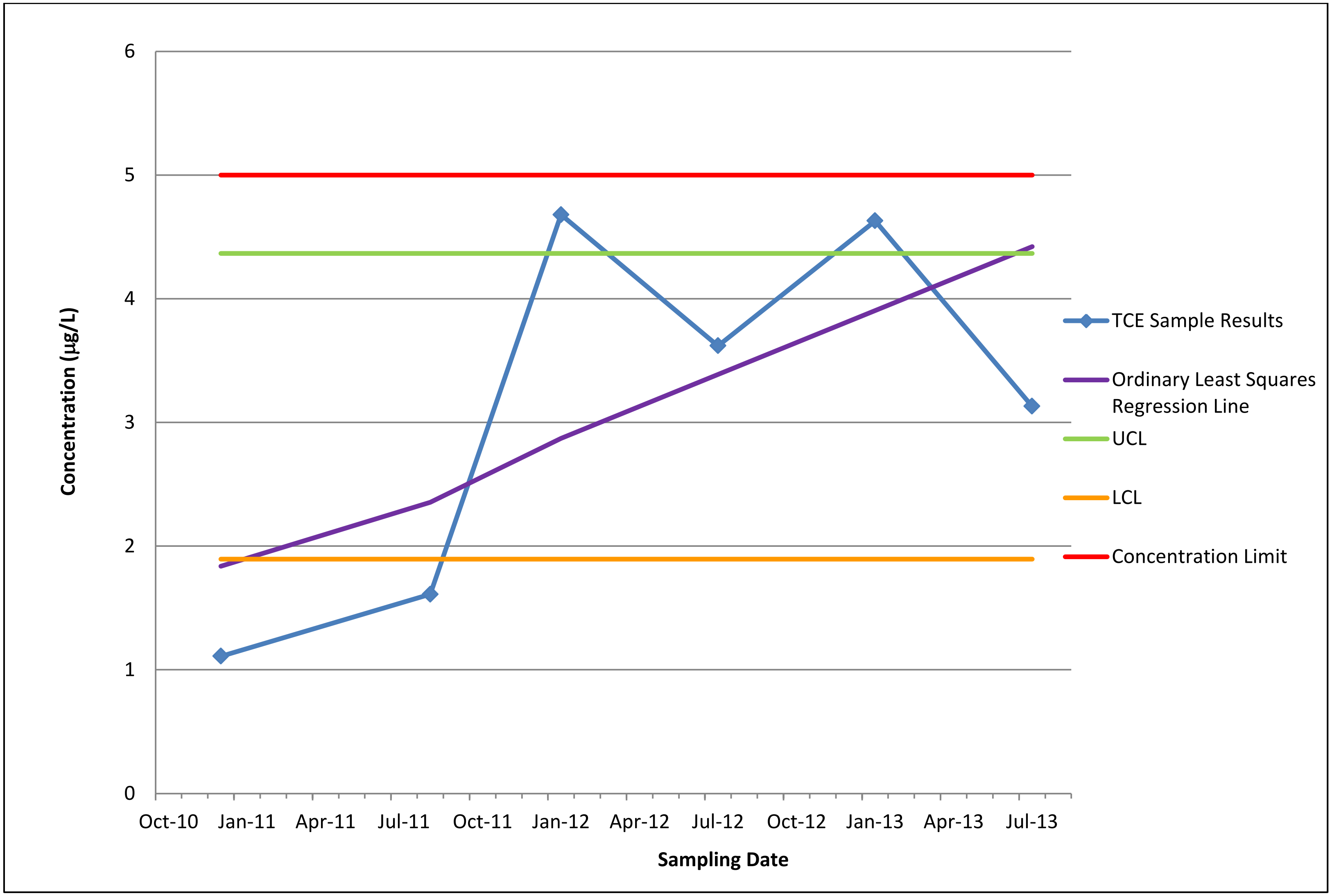

Figure 4-7
TCE Control Chart for CWL-MW10

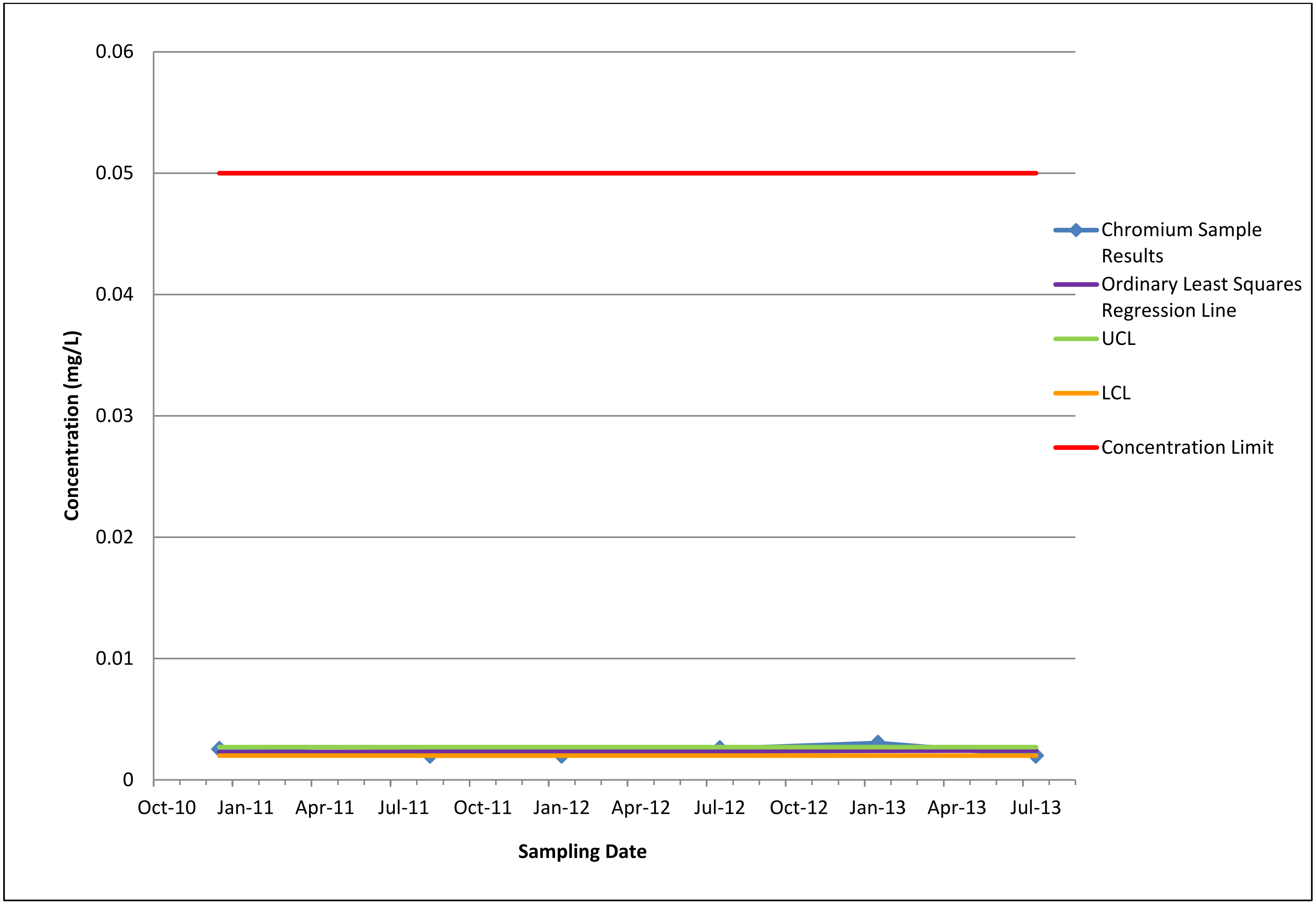

Figure 4-8
Chromium Control Chart for CWL-MW11

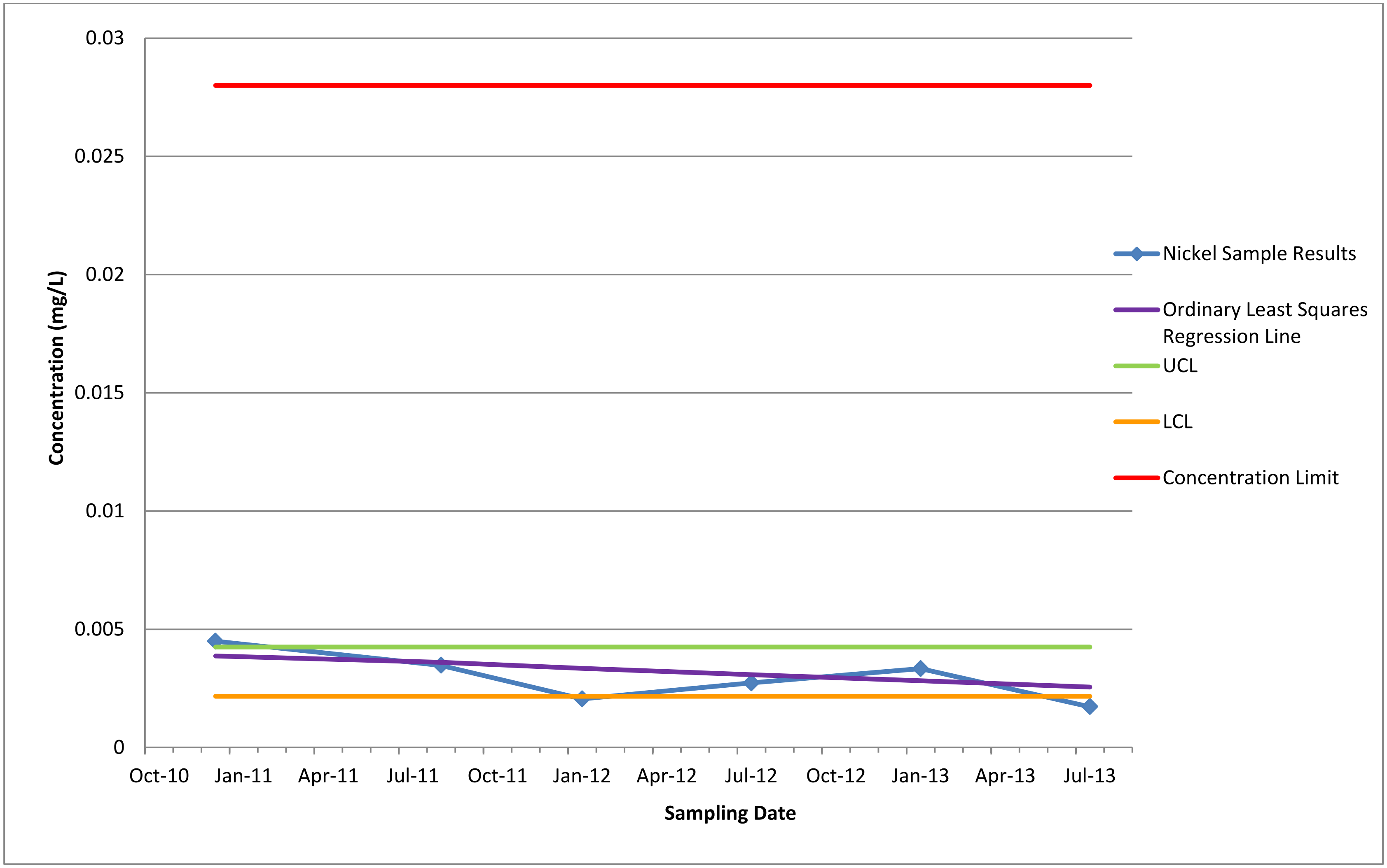

Figure 4-9
Nickel Control Chart for CWL-MW11

Monitoring Well CWL-MW9
Chromium and TCE have not been detected in any CWL-MW9 samples (CY 2010 through 2013, six environmental and two duplicate samples). Therefore statistical evaluation of these constituents is not presented. The January results for nickel (environmental and duplicate sample) fell within the range of the 95% LCL and 95% UCL, but the July result was less than the LCL. January and July nickel results fell within the historical range, with the July result equaling the minimum concentration.

Monitoring Well CWL-MW10
CY 2013 CWL-MW10 chromium sample results 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 both July results were less than the 95% LCL. The January TCE result exceeded the 95% UCL, but both July results fell within the range of the 95% LCL and 95% UCL. Results for chromium and TCE (using the MDL value if constituent not detected) fell within the historical range. Two of the three nickel results fell within the historical range; the environmental sample nickel result from July was below the historical range.

Monitoring Well CWL-MW11
The January chromium result fell within the range of the 95% LCL and 95% UCL, and the MDL for the July result was below the 95% LCL. 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 2013, six environmental and one duplicate sample). Therefore statistical evaluation of TCE is not presented. The July (non-detect/MDL) and January (detection) chromium results are equal to the historic minimum and maximum concentrations, respectively. The January result for nickel falls within the historical range, and the July result is equal to 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 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 67% for nickel (CWL-MW9), TCE (CWL-MW10), and chromium (CWL-MW11). The low median test results for TCE in CWL-BW5/4A (4%) 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. In Figure 4-7, TCE results in 2012 and 2013 for CWL-MW10 are higher than those in 2011 and 2010, but there is no statistically significant evidence of increasing contamination as indicated by the Median test. The most recent detected concentration (3.13 µg/L in July 2013) is the lowest in the last two years.

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 2012 and October 2013 ranged from 0.22 (CWL-MW11) to 0.92 (CWL-BW5) feet.

In CY2013, 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 2013 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 2013). 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 is 0.011 feet/feet.

During 2012, slug tests were performed on the four groundwater monitoring wells to determine the hydraulic conductivity of the aquifer in these locations. This testing is not required by the PCCP but is routinely conducted for groundwater monitoring wells installed at SNL/NM. The range of hydraulic conductivity determined from the four existing groundwater monitoring wells is 4.74×10^{-3} feet per day (1.67×10^{-6} centimeters per second) to 7.46×10^{-2} feet per day (2.63×10^{-5} centimeters per second) (SNL/NM August 2013).

Groundwater velocities were calculated using (a) the current potentiometric surface gradient, (b) the hydraulic conductivity range (i.e., high and low values) from the four groundwater monitoring wells, and (c) a porosity of 29 percent as determined from the laboratory analyses of CWL soil samples (SNL/NM October 1995). The calculated velocities range from approximately 1.8×10^{-4} to 2.8×10^{-3} feet per day (equivalent to 6.3×10^{-8} to 1.0×10^{-6} centimeters per second). The average groundwater velocity is 1×10^{-3} feet per day (equivalent to 4.1×10^{-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.

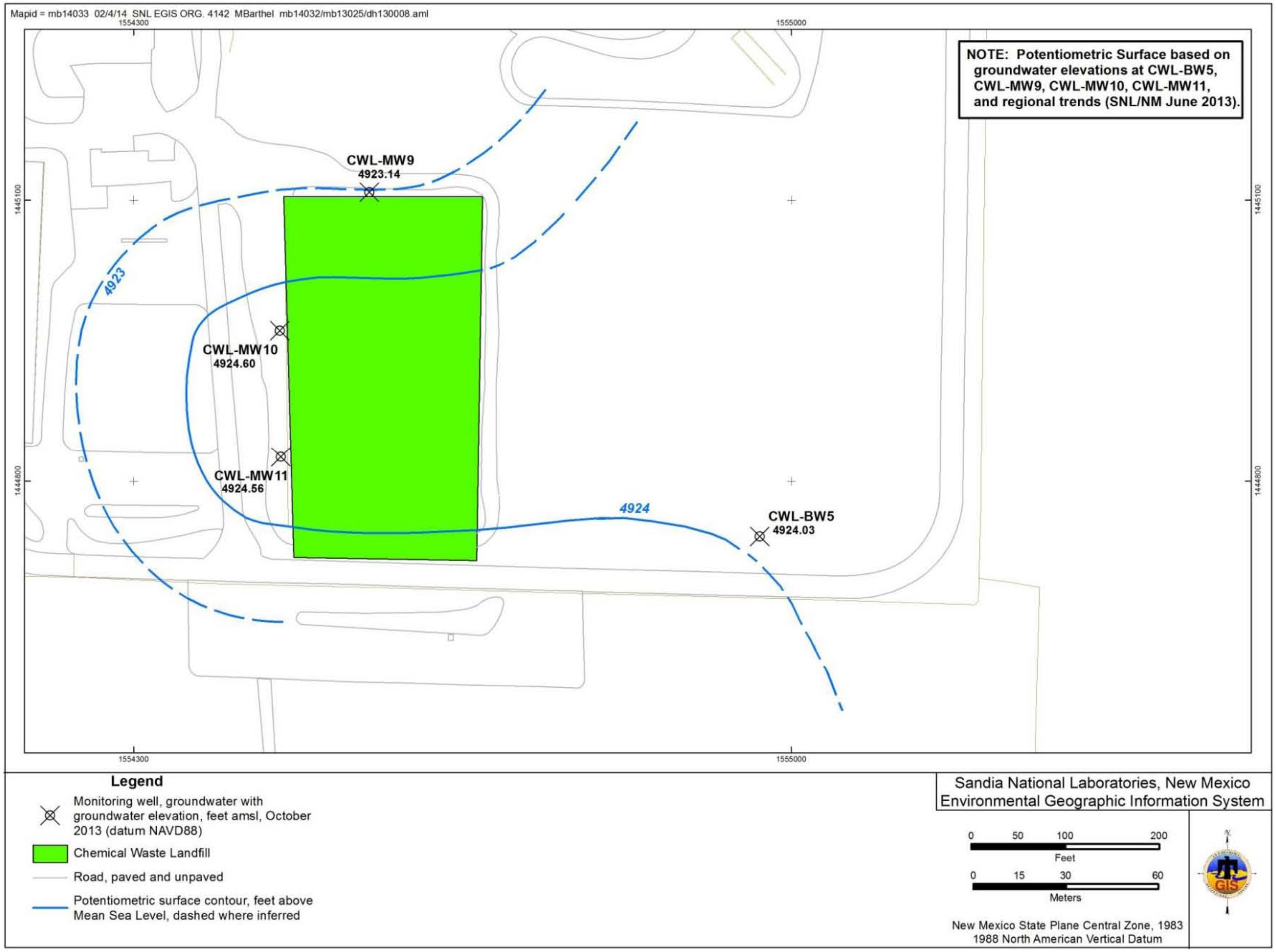

Figure 4-10
Potentiometric Surface of the Regional Aquifer at the Chemical Waste Landfill, October 2013

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 2013 in accordance with CWL PCCP Attachment 1, Sections 1.8 and 1.12, and Attachment 3 (NMED October 2009 and subsequent revisions). The CY 2013 annual soil-gas sampling event was the second 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 17, 2013. Resampling of two soil-gas ports was conducted on March 27, 2013 because specific constituents failed the RPD requirement in the January environmental-duplicate sample pairs. All samples were analyzed using the EPA TO-15 analytical method for the 50 VOCs listed in PCCP Attachment 1, Table 1-5. CY2013 soil-gas sampling activities and results are described in the following sections.

There were two significant changes to Attachment 3 of the Permit that affected the CY2013 soil-gas monitoring effort. First, EPA Method TO-15 was used for the first time to analyze all samples instead of EPA Method TO-14. Analytical laboratories are moving to the TO-15 methodology because it provides equal or lower detection limits with improved quality assurance/quality control. As a result, many laboratories are phasing out Method TO-14. NMED approved this change in February 2012 (Kieling February 2012). Second, NMED approved a change to the RPD acceptance and resampling criterion for soil-gas environmental-duplicate sample pairs from 20% to 50% in November 2013 (Kieling November 2013) due to the inherent variability of soil-gas contamination in the vadose zone. While this latter change occurred after the January and March soil-gas sampling events, the new RPD criterion is applied to the evaluation of CY 2013 environmental and duplicate sample pair results (Section 5.2.2).

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. 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 seven field blank samples were submitted for analysis with CY 2013 environmental samples; five in January, two in March.

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. 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 and March 2013. The January 2013 results are presented in Table 5-1 and the March 2013 resample results (two environmental-duplicate sample pairs) are presented in Table 5-2.

January 17, 2013 Soil-Gas Results

Detected VOCs that were consistent with the 2012 data set include acetone, chloroform, dichlorodifluoromethane, 1,1-dichloroethene (1,1-DCE), 1,2-dichloropropane, methylene chloride, tetrachlorethene, toluene, 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113), TCE, and trichlorofluoromethane (Freon 11). Chloroethane and m,p-xylene were detected once in 2012 (CWL-D3-480 duplicate sample) but were not detected in any of the January 2013 samples. There were 15 VOCs detected in the January 2013 samples that were not detected in 2012; 8 of the 15 were not detected in the post-VE VCM historic data set (June 1998 through October 2005). There was one detection of each of the eight VOCs. All results, summarized below, were very low concentrations (parts per billion by volume [ppbv] or less) and most were near or below the analytical laboratory RL. Five of the eight detections were from one location (CWL-UI2-136).

VOC	No. of Detections	Location of Detection	Concentration (ppbv)
bromodichloromethane	1	CWL-UI2-136	0.2J
cis-1, 2-dichloroethene	1	CWL-UI2-136	0.43
trans-1, 2-dichloroethene	1	CWL-UI2-136	0.27J
vinyl acetate	1	CWL-UI2-136	7
vinyl chloride	1	CWL-UI2-136	0.36J
2-hexanone	1	CWL-D1-470	0.53J
hexachlorobutadiene	1	CWL-D1-470 (duplicate)	0.54J
chloromethane	1	CWL-D3-480	1.2J

"J" values are estimated concentrations below the RL but greater than the MDL. These first-time detections are likely related to the lower analytical MDLs and RLs of Method TO-15. The remaining seven VOCs that were not detected in CY2012 were previously detected in the historic CWL soil-gas data set, with the number of historic detections ranging from 5 (chlorobenzene) to 103 (1,1,1-trichloroethane). The number of detections in the January 2013 results ranged from one to four, and the concentrations of all the 2013 results were very low (1.4 to 50 ppbv).

VOC	No. of Detections January 2013	Concentration (ppbv)	No. of Detections from June 1998-October 2005
benzene	1	2.6	18
2-butanone	4	1.4 – 4.7[a]	11
carbon tetrachloride	1	27	45
chlorobenzene	1	1.4	5
1, 2-dichloroethane	1	17	29
1,1,2-trichloroethane	1	5	7
1,1,1-trichloroethane	4	36 – 50[a]	103

[a]Two of the four concentrations are "J" qualified.

Table 5-1
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
Calendar Year 2013

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-UI1-40	Chloroform	890	31	93	--	--
17-Jan-13	1,1-Dichloroethene	190	62	250	J	--
	Tetrachloroethene	5100	46	120	--	--
	Trichloroethene	7300	46	120	--	--
	Trichlorofluoromethane	230	46	120	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	930	62	120	--	--
	Total Organics[c]	14640	NA	NA	NA	NA
CWL-UI1-80	Chloroform	700	34	100	--	--
17-Jan-13	1,1-Dichloroethene	390	68	270	--	--
	Methylene chloride	72	68	140	J	--
	Tetrachloroethene	1500	51	140	--	--
	Trichloroethene	9700	51	140	--	--
	Trichlorofluoromethane	280	51	140	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1100	68	140	--	--
	Total Organics[c]	13742	NA	NA	NA	NA
CWL-UI1-120	Chloroform	520	45	130	--	--
17-Jan-13	1,1-Dichloroethene	430	89	360	--	--
	Methylene chloride	240	89	180	--	--
	Tetrachloroethene	1000	67	180	--	--
	Trichloroethene	11000	67	180	--	--
	Trichlorofluoromethane	290	67	180	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1200	89	180	--	--
	Total Organics[c]	14680	NA	NA	NA	NA
CWL-UI2-36	Chloroform	540	11	33	--	--
17-Jan-13	Dichlorodifluoromethane	25	16	44	J	--
	1,1-Dichloroethene	34	22	87	J	--
	1,2-Dichloropropane	26	16	44	J	--
	Tetrachloroethene	170	16	44	--	--
	Trichloroethene	3500	16	44	--	--
	Trichlorofluoromethane	160	16	44	--	--
	1,1,1-Trichloroethane	38	16	33	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	530	22	44	--	--
	Total Organics[c]	5023	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 2013

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-UI2-76	Chloroform	910	28	85		--
17-Jan-13	Dichlorodifluoromethane	52	43	110	J	--
	1,1-Dichloroethene	140	57	230	J	--
	1,2-Dichloropropane	99	43	110	J	--
	Tetrachloroethene	280	43	110	--	--
	Trichloroethene	7800	43	110	--	--
	Trichlorofluoromethane	310	43	110	--	--
	1,1,1-Trichloroethane	50	43	85	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1100	57	110	--	--
	Total Organics[c]	10741	NA	NA	NA	NA
CWL-UI2-136	Benzene	2.6	0.20	0.40	--	--
17-Jan-13	Bromodichloromethane	0.20	0.15	0.30	J	--
	2-Butanone	1.4	0.40	0.80	--	--
	Carbon tetrachloride	27	0.20	0.80	--	--
	Chlorobenzene	1.4	0.10	0.30	--	--
	Chloroform	620	8.9	27	--	--
	Dichlorodifluoromethane	38	0.15	0.40	--	--
	1,1-Dichloroethane	8.6	0.15	0.30	--	--
	1,2-Dichloroethane	17	0.20	0.80	--	--
	1,1-Dichloroethene	180	18	71	--	--
	1,2-Dichloropropane	130	13	36	--	--
	cis-1,2-Dichloroethene	0.43	0.20	0.40	--	--
	trans-1,2-Dichloroethene	0.27	0.20	0.40	J	--
	Methylene chloride	4.6	0.20	0.40	--	--
	Tetrachloroethene	220	13	36	--	--
	Toluene	0.72	0.15	0.40	--	U
	Trichloroethene	6600	36	95	--	--
	Trichlorofluoromethane	250	13	36	--	--
	1,1,1-Trichloroethane	38	13	27	--	--
	1,1,2-Trichloroethane	5.0	0.15	0.40	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	970	18	36	--	--
	Vinyl acetate	7.0	0.20	0.80	--	--
	Vinyl chloride	0.36	0.15	0.40	J	--
	Total Organics[c]	9121.86	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 2013

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-D1-100	Chloroform	640	96	290	--	--
17-Jan-13	1,1-Dichloroethene	410	190	770	J	--
	Tetrachloroethene	1200	140	380	--	--
	Trichloroethene	12000	140	380	--	--
	Trichlorofluoromethane	350	140	380	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1300	190	380	--	--
	Total Organics[c]	15900	NA	NA	NA	NA
CWL-D1-160	Chloroform	530	59	180	--	--
17-Jan-13	1,1-Dichloroethene	630	120	470	--	--
	Tetrachloroethene	820	88	240	--	--
	Trichloroethene	16000	88	240	--	--
	Trichlorofluoromethane	450	88	240	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1900	120	240	--	--
	Total Organics[c]	20330	NA	NA	NA	NA
CWL-D1-240	Chloroform	440	73	220	--	--
17-Jan-13	1,1-Dichloroethene	1100	150	590	--	--
	1,2-Dichloropropane	180	110	290	J	--
	Tetrachloroethene	530	110	290	--	--
	Trichloroethene	23000	110	290	--	--
	Trichlorofluoromethane	660	110	290	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	2800	150	290	--	--
	Total Organics[c]	28710	NA	NA	NA	NA
CWL-D1-350	Chloroform	150	48	140	--	--
17-Jan-13	1,1-Dichloroethene	700	96	380	--	--
	Tetrachloroethene	210	72	190	--	--
	Trichloroethene	13000	72	190	--	--
	Trichlorofluoromethane	450	72	190	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1800	96	190	--	--
	Total Organics[c]	16310	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 2013

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-D1-470	Acetone	12	1.5	3.1	--	J
17-Jan-13	2-Butanone	4.7	1.0	2.1	--	--
	Chloroform	0.76	0.26	0.77	J	--
	Dichlorodifluoromethane	1.4	0.39	1.0	--	--
	1,1-Dichloroethene	4.5	0.52	2.1	--	--
	2-Hexanone	0.53	0.52	2.1	J	--
	Methylene chloride	0.80	0.52	1.0	J	--
	Tetrachloroethene	1.9	0.39	1.0	--	--
	Trichloroethene	78	0.39	1.0	--	--
	Trichlorofluoromethane	4.8	0.39	1.0	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	16	0.52	1.0	--	--
	Total Organics[c]	125.39	NA	NA	NA	NA
CWL-D1-470 (Duplicate)	2-Butanone	1.5	1.0	2.0	J	--
17-Jan-13	Chloroform	0.40	0.25	0.75	J	--
	Dichlorodifluoromethane	2.2	0.38	1.0	--	--
	1,1-Dichloroethene	5.2	0.50	2.0	--	--
	Hexachlorobutadiene	0.54	0.50	2.0	J	--
	Methylene chloride	1.8	0.50	1.0	--	--
	Tetrachloroethene	1.3	0.38	1.0	--	--
	Trichloroethene	51	0.38	1.0	--	--
	Trichlorofluoromethane	8.2	0.38	1.0	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	24	0.50	1.0	--	--
	Total Organics[c]	96.14	NA	NA	NA	NA
CWL-D2-120	Chloroform	770	60	180	--	--
17-Jan-13	1,1-Dichloroethene	690	120	480	--	--
	1,2-Dichloropropane	210	90	240	J	--
	Tetrachloroethene	720	90	240	--	--
	Trichloroethene	19000	90	240	--	--
	Trichlorofluoromethane	560	90	240	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	2100	120	240	--	--
	Total Organics[c]	24050	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 2013

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-D2-240	Chloroform	640	78	230	--	--
17-Jan-13	1,1-Dichloroethene	880	160	630	--	--
	1,2-Dichloropropane	260	120	310	J	--
	Tetrachloroethene	580	120	310	--	--
	Trichloroethene	23000	120	310	--	--
	Trichlorofluoromethane	620	120	310	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	2400	160	310	--	--
	Total Organics[c]	28380	NA	NA	NA	NA
CWL-D2-350	Chloroform	250	21	63	--	--
17-Jan-13	Dichlorodifluoromethane	51	31	84	J	--
	1,1-Dichloroethene	510	42	170	--	--
	1,2-Dichloropropane	90	31	84	--	--
	Methylene chloride	58	42	84	J	--
	Tetrachloroethene	300	31	84	--	--
	Trichloroethene	13000	69	180	--	--
	Trichlorofluoromethane	350	31	84	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1400	42	84	--	--
	Total Organics[c]	16009	NA	NA	NA	NA
CWL-D2-440	Acetone	9.7	3.5	6.9	--	J
17-Jan-13	Chloroform	2.8	0.58	1.7	--	--
	1,1-Dichloroethene	5.7	1.2	4.6	--	--
	1,2-Dichloropropane	1.0	0.87	2.3	J	--
	Methylene chloride	1.2	1.2	2.3	J	--
	Tetrachloroethene	3.3	0.87	2.3	--	--
	Trichloroethene	110	0.87	2.3	--	--
	Trichlorofluoromethane	3.4	0.87	2.3	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	11	1.2	2.3	--	--
	Total Organics[c]	148.1	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 2013

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-D2-470	Chloroform	360	22	67	--	--
17-Jan-13	1,1-Dichloroethene	130	45	180	J	--
	1,2-Dichloropropane	99	34	90	--	--
	Tetrachloroethene	340	34	90	--	--
	Trichloroethene	7000[d]	34	90	--	--
	Trichlorofluoromethane	130	34	90	--	--
	1,1,1-Trichloroethane	36	34	67	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	390	45	90	--	--
	Total Organics[c]	8485	NA	NA	NA	NA
CWL-D2-470 (Duplicate)	Chloroform	250	17	51	--	--
17-Jan-13	1,1-Dichloroethene	97	34	140	J	--
	1,2-Dichloropropane	62	26	68	J	--
	Tetrachloroethene	220	26	68	--	--
	Trichloroethene	4400[d]	26	68	--	--
	Trichlorofluoromethane	84	26	68	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	270	34	68	--	--
	Total Organics[c]	5383	NA	NA	NA	NA
CWL-D3-120	Chloroform	160	18	55	--	--
17-Jan-13	Dichlorodifluoromethane	29	27	73	J	--
	1,1-Dichloroethene	200	37	150	--	--
	1,2-Dichloropropane	80	27	73	--	--
	Methylene chloride	62	37	73	J	--
	Tetrachloroethene	110	27	73	--	--
	Trichloroethene	5300	27	73	--	--
	Trichlorofluoromethane	190	27	73	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	670	37	73	--	--
	Total Organics[c]	6801	NA	NA	NA	NA
CWL-D3-170	Chloroform	180	27	80	--	--
17-Jan-13	1,1-Dichloroethene	290	53	210	--	--
	1,2-Dichloropropane	110	40	110	--	--
	Methylene chloride	71	53	110	J	--
	Tetrachloroethene	130	40	110	--	--
	Trichloroethene	7200	40	110	--	--
	Trichlorofluoromethane	250	40	110	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	950	53	110	--	--
	Total Organics[c]	9181	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 2013

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-D3-350	Chloroform	130	22	67	--	--
17-Jan-13	Dichlorodifluoromethane	46	34	90	J	--
	1,1-Dichloroethene	320	45	180	--	--
	1,2-Dichloropropane	100	34	90	--	--
	Methylene chloride	540	45	90	--	--
	Tetrachloroethene	120	34	90	--	--
	Trichloroethene	7800	34	90	--	--
	Trichlorofluoromethane	280	34	90	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1100	45	90	--	--
	Total Organics[c]	10436	NA	NA	NA	NA
CWL-D3-440	Chloroform	250	41	120	--	--
17-Jan-13	Dichlorodifluoromethane	89	61	160	J	--
	1,1-Dichloroethene	470	81	320	--	--
	1,2-Dichloropropane	210	61	160	--	--
	Methylene chloride	1200	81	160	--	--
	Tetrachloroethene	220	61	160	--	--
	Trichloroethene	13000	61	160	--	--
	Trichlorofluoromethane	490	61	160	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1800	81	160	--	--
	Total Organics[c]	17729	NA	NA	NA	NA
CWL-D3-480	Acetone	6.5	1.5	3.0	--	J
17-Jan-13	2-Butanone	1.6	0.99	2.0	J	--
	Chloroform	0.67	0.25	0.74	J	--
	Chloromethane	1.2	0.99	2.0	J	--
	Dichlorodifluoromethane	0.78	0.37	0.99	J	--
	1,1-Dichloroethene	1.2	0.49	2.0	J	--
	1,2-Dichloropropane	0.52	0.37	0.99	J	--
	Methylene chloride	2.8	0.49	0.99	--	--
	Tetrachloroethene	0.70	0.37	0.99	J	--
	Trichloroethene	34	0.37	0.99	--	--
	Trichlorofluoromethane	1.2	0.37	0.99	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	4.1	0.49	0.99	--	--
	Total Organics[c]	55.27	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 2013

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.

Similar to the 2012 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 0.034 parts per million by volume (ppmv) at CWL-D3 (480 foot bgs sample port) to 23 ppmv at CWL-D1 and CWL-D2 (240 foot bgs sample ports). Trichlorofluoromethane, 1,1,2-trichloro-1,2,2-trifluoroethane, tetrachloroethene, 1,1-dichloroethene, and chloroform were also detected in all samples at lower concentrations. No soil-gas concentrations from the three deepest sampling ports (CWL-D1-470, CWL-D2-470, CWL-D3-480) exceeded the trigger level of 20 ppmv, and only one VOC exceeded 0.5 ppmv (TCE at CWL-D2-470).

March 27, 2013 Soil-Gas Results

CWL-D1-470 and CWL-D3-470 were resampled in March because the duplicate samples collected during January 2013 failed the RPD requirement of less than 20% for specific constituents. The original January results (environmental and duplicate sample pairs) are presented in Table 5-1 and are included in the previous discussion of the January 2013 soil-gas results. The March results are presented in Table 5-2 and discussed below; RPD results for both the January and March sample pairs are presented in Section 5.2.2.

The March 2013 results for the CWL-D1-470 sample pair were generally similar to the January 2013 results, with low concentrations of various VOCs. Minor differences between the two data sets include two VOCs (2-hexanone and hexachlorobutadiene) detected in the January 2013 samples at very low concentrations (less than 1 ppbv) but not detected in the March samples. These VOCs were detected in only one of the two January samples. Carbon tetrachloride was detected in the March samples at very low concentrations (1.5 and 2.7 ppbv) but not in the January samples. VOC concentrations were generally higher in the March samples, with TCE having the highest concentration at 0.13 and 0.23 ppmv.

The March 2013 sample results for CWL-D2-470 showed greater variability. All eight VOCs detected in January were also detected in March. However, 14 additional VOCs were detected in the March samples, of which 4 VOCs (chloromethane, dichlorodifluoromethane, 4-ethyltoluene, and 1,1,1-trichloroethane) were detected only once (i.e., in either the environmental sample or the duplicate pair, not both). Eight of these 14 VOCs (carbon disulfide, ethylbenzene, 4-ethyltoluene, 4-methyl-2-pentanone, styrene, 1,2,4-trimethylbenzene, m,p-xylene, and o-xylene) were not detected in January, but were previously detected in the historic data set (June 1998 – October 2005; m,p-xylene was also detected in the 2012 data set). Five of these VOCs (acetone, 2-butanone, dichlorodifluoromethane, methylene chloride, and toluene), were detected in January as well as in the historic data set, and one (chloromethane) was detected in January but not in the historic data set (one detection, see Table 5-2).

Similar to the overall January 2013 results, TCE was detected in all the March samples and had the highest VOC concentrations. Trichlorofluoromethane, 1,1,2-trichloro-1,2,2-trifluoroethane, tetrachloroethene, 1,1-dichloroethene, and chloroform were also detected in all sample pairs at lower concentrations. No soil-gas concentrations from these deep sampling ports (CWL-D1-470 and CWL-D2-470) exceeded the trigger level of 20 ppmv. No VOCs exceeded 0.5 ppmv in the CWL-D1-470 sample. Acetone (1.3 ppmv), carbon disulfide (1.0 ppmv), methylene chloride (2.1 ppmv), 4-methyl-2-pentanone (0.58 ppmv), 1,1,2-trichloro-1,2,2-trifluoroethane (0.76 ppmv), and TCE (7.1 ppmv) exceeded 0.5 ppmv in the CWL-D2-470 environmental sample, but only TCE exceeded 0.5 ppmv in the duplicate sample. The higher concentration of TCE in the samples (7.1 and 4.9 ppmv in the environmental and duplicate pair, respectively) required dilution of the

Table 5-2
Summary of Detected Volatile Organic Compounds – March Resampling
Chemical Waste Landfill Soil-Gas Monitoring – Analytical Method TO-15[a]
Calendar Year 2013

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-D1-470	Acetone	3.3	3.3	6.6	J	--
27-March-13	Carbon tetrachloride	1.5	1.1	4.4	J	--
	Chloroform	1.1	0.55	1.6	J	--
	Dichlorodifluoromethane	8.4	0.82	2.2	--	--
	1,1-Dichloroethene	19	1.1	4.4	--	--
	Methylene chloride	4.3	1.1	2.2	--	--
	Tetrachloroethene	3.1	0.82	2.2	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	110	1.1	2.2	--	--
	Trichloroethene	130	0.82	2.2	--	--
	Trichlorofluoromethane	32	0.82	2.2	--	--
	Total Organics[c]	312.7	NA	NA	NA	NA
CWL-D1-470 (Duplicate)	Carbon tetrachloride	2.7	1.1	4.5	J	--
27-March-13	Chloroform	2	0.56	1.7	--	--
	Dichlorodifluoromethane	15	0.84	2.2	--	--
	1,1-Dichloroethene	36	1.1	4.5	--	--
	Methylene chloride	7.5	1.1	2.2	--	--
	Tetrachloroethene	5.8	0.84	2.2	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	210	1.1	2.2	--	--
	Trichloroethene	230	1.7	4.4	--	--
	Trichlorofluoromethane	58	0.84	2.2	--	--
	Total Organics[c]	567	NA	NA	NA	NA
CWL-D2-470	Acetone	1300[d]	140	270	--	--
27-March-13	2-Butanone	120	91	180	J	--
	Carbon disulfide	1000[d]	46	180	--	--
	Chloroform	330	23	68	--	--
	Chloromethane	94	91	180	J	--
	Dichlorodifluoromethane	80	34	91	J	--
	1,1-Dichloroethene	300	46	180	--	--
	1,2-Dichloropropane	110	34	91	--	--
	Ethyl benzene	75	34	91	J	--
	Methylene chloride	2100[d]	46	91	--	--
	4-methyl-2-Pentanone	580[d]	34	91	--	--
	Styrene	51	34	91	J	--
	Tetrachloroethene	310	34	91	--	--
	Toluene	290	34	91	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	760[d]	46	91	--	--
	1,1,1-Trichloroethane	44	34	68	J	--
	Trichloroethene	7100[d]	34	91	--	--
	Trichlorofluoromethane	230	34	91	--	--
	1,2,4-Trimethylbenzene	120	46	180	J	--
	m- & p-Xylene	180	46	180	--	--
	o-Xylene	140	34	91	--	--
	Total Organics[c]	15314	NA	NA	NA	NA

Table 5-2 (concluded)
Summary of Detected Volatile Organic Compounds – March Resampling
Chemical Waste Landfill Soil-Gas Monitoring – Analytical Method TO-15[a]
Calendar Year 2013

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-D2-470 (Duplicate) 27-March-13	Acetone	1000[d]	140	270	--	--
	2-Butanone	120	91	180	J	--
	Carbon disulfide	450	46	180	--	--
	Chloroform	240	23	68	--	--
	1,1-Dichloroethene	230	46	180	--	--
	1,2-Dichloropropane	79	34	91	J	--
	Ethyl benzene	130	34	91	--	--
	4-Ethyltoluene	54	34	91	J	--
	Methylene chloride	360	46	91	--	--
	4-methyl-, 2-Pentanone	350	34	91	--	--
	Styrene	69	34	91	J	--
	Tetrachloroethene	220	34	91	--	--
	Toluene	420	34	91	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	560[d]	46	91	--	--
	Trichloroethene	4900[d]	34	91	--	--
	Trichlorofluoromethane	160	34	91	--	--
	1,2,4-Trimethylbenzene	150	46	180	J	--
	m- & p-Xylene	270	46	180	--	--
	o-Xylene	230	34	91	--	--
	Total Organics[c]	9992	NA	NA	NA	NA

Notes:
[a]U.S. Environmental Protection Agency, 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" 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.
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.

sample by the laboratory, which in turn elevated the corresponding reporting limit. Duplicate sample concentration results for carbon disulfide and methylene chloride were less than 50% of the corresponding environmental samples (0.45 versus 1.0 and 0.36 versus 2.1 ppmv, respectively). A comparison of the January and March duplicate sample pairs illustrates the inherent variability of low concentration soil-gas analytical data and the variable composition of the residual VOC soil-gas plume beneath the CWL. More discussion of duplicate sample variability is provided in Section 5.2.2.

5.2.2 Field Quality Control Sample Results

Table 5-3 presents field duplicate results for samples collected from wells CWL-D1-470 and CWL-D2-470 in January and March. RPD calculations were performed for all detected compounds with concentrations exceeding five times the analytical laboratory RL 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. As discussed in Section 5.1, the acceptance/resampling criterion for soil-gas RPDs changed from 20% to 50% after soil-gas sampling was completed in January and March. Therefore, resampling was conducted in March based upon the January environmental and duplicate sample results exceeding the initial criterion of less than 20%.

Table 5-3
Summary of Duplicate Samples
Chemical Waste Landfill Soil-Gas Monitoring
Calendar Year 2013

Well ID / Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD[a] (%)
	(ppbv)		
January 2013 Duplicate Sample Results			
CWL-D1-470			
1,1,2-Trichloro-1,2,2-trifluoroethane	16	24	40
Trichloroethene	78	51	42
CWL-D2-470			
Trichloroethene	7000	4400	46
March 2013 Duplicate Resample Results			
CWL- D1-470			
1,1,2-Trichloro-1,2,2-trifluoroethane	110	210	**63**
Trichloroethene	130	230	**56**
Trichlorofluoromethane	32	58	**58**
CWL- D2-470			
1,1,2-Trichloro-1,2,2-trifluoroethane	760	560	30
Trichloroethene	7100	4900	37

[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%.

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

where: R_1 = Environmental sample result.
R_2 = Duplicate sample result.
ppbv = parts per billion by volume basis

The duplicate sample results from CWL-D2-470 show good agreement in both sample sets, and are both less than 50%. The March results for CWL-D1-470 show greater variability and higher concentrations than the January results, but in general all the detections are low concentrations (i.e., less than 0.50 ppmv).

The discussion of the March results in Section 5.2.1 addresses the variability observed when comparing the January and March results for CWL-D1-470 and CWL-D2-470. Additional evaluation of the results is warranted and summarized below in the context of subsurface VOC soil-gas conditions and the sampling process.

With the exception of TCE, 1,1,2-trichloro-1,2,2-trifluoroethane, and trichlorofluoromethane, all results were less than five times the analytical laboratory RL. Based upon a review of the historic CWL soil-gas monitoring results since June 1998, low concentration results at or near the analytical laboratory MDL and RL tend to show the greatest variability, which is reflected in a wider range of RPDs. However, variation is not limited to low concentration detections and is most likely an indication of the variability of VOC soil-gas contamination and VOC concentrations in the deep subsurface, further complicated by the complex, three-dimensional distribution of alluvial sediments. In addition, some variability may be associated with the sampling process, which involves withdrawing soil gas from depths of hundreds of feet bgs from the area surrounding the subsurface sampling port. Very small changes in VOC soil-gas concentrations in the soil pore space (i.e., ppbv and low ppmv changes) can have a significant impact on the measured concentration. Because the duplicate sample is collected immediately after the environmental sample, very small changes in the subsurface VOC soil-gas concentrations will be reflected in subsequent sample results no matter how much air volume is purged during sampling. While it is impossible to state how much of the variability is directly related to the sampling process, the large historic CWL data set indicates that the soil-gas sampling process does produce representative sample results. Variation is most likely related to subsurface VOC soil-gas concentrations that are generally very low and change over time and space. In November 2013, NMED approved a change to the RPD acceptance and resampling criterion for soil-gas environmental-duplicate sample pairs from 20% to 50% (Kieling November 2013) due in part to the recognition of the inherent variability of soil-gas VOC concentrations in the vadose zone. This new criterion will be applied for all future sampling events.

A total of seven field blank samples were submitted with CY 2013 samples; five in January and two in March. In the field blank samples, acetone (1 detection), 2-butanone (1 detection), 2-hexanone (1 detection), and toluene (3 detections) were detected above laboratory MDLs but below the RLs (i.e., “J” qualified, estimated), except for one detection of toluene that slightly exceeded the RL. The toluene detection in the sample from CWL-UI2-136 (0.72 ppbv) was qualified as not detected during data validation because it was less than five times the toluene concentration detected in the associated field blank. No other January results were qualified. No VOCs were detected above the laboratory MDLs in the two March field blank samples.

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 CWL-D1-470 environmental-duplicate sample pair collected in January met the RPD criterion of 50%, but the March sample pair exceeded the criterion for three constituents. This exceedance appears to be related to the very low concentrations of the various VOCs (all less than 0.15 ppmv) and variation in the VOC concentrations of the residual VOC soil-gas plume. Internal laboratory QC samples, including method blanks and duplicate laboratory control 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 May 2011).

No significant data quality issues were noted for January and March data sets. The three acetone results for the January samples were qualified as estimated (i.e., "J" qualifier) because the percent relative standard deviation for acetone was greater than 35% but less than 45%. All January non-detect results for chloroethane were qualified as "estimated" because the laboratory control sample and corresponding duplicate had an RPD exceeding the upper acceptance limit. No issues were identified for the March samples. 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 and one nonconformance noted during the CY 2013 soil-gas activities. The nonconformance involved RPDs for three VOCs detected in the March environmental-duplicate pair from CWL-D1-470 that were outside the acceptance criterion.

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 completed in 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 Tables 5-1 and 5-2 and discussed in Section 5.2.1, acetone (1.3 ppmv), carbon disulfide (1.0 ppmv), methylene chloride (2.1 ppmv), 4-methyl-2-pentanone (0.58 ppmv), 1,1,2-trichloro-1,2,2-trifluoroethane (0.76 ppmv), and TCE (7.1 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.

CWL-D2-470 was sampled twice (January and March) and both times duplicates samples were collected. The highest detection from the four CY 2013 samples was used for statistical analysis. For all six VOCs detected greater than the 0.5 ppmv threshold concentration, the maximum concentration is the result from the environmental sample collected in March. None of the January CWL-D2-470 results (environmental-duplicate pair) exceeded the 0.5 ppmv threshold except for TCE. In the March results, the duplicate sample concentrations for carbon disulfide, methylene chloride, and 4-methyl-2-pentanone did not exceed the 0.5 ppmv threshold.

5.3.2 Statistical Assessment Results

CY 2013 soil-gas statistical assessment results are presented in Table 5-4. The LCLs for acetone, carbon disulfide, methylene chloride, and 4-methyl-2-pentanone 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 nine results for these VOCs except for carbon disulfide, which has only seven results (it is not a CWL contaminant of concern and was not reported in the 1998 and 1999 data sets). As noted in the discussion of the January and March environmental-duplicate sample pair results (Sections 5.2.1 and 5.2.2), variability of soil-gas data has been observed in the recent CY 2013 results, the historic data set, and appears to be representative of variation inherent in 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 below the trigger level.

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 5-5 and 5-6 present TCE and Total VOCs soil-gas monitoring results, respectively, for the post-closure

Table 5-4
Chemical Waste Landfill Soil-Gas Monitoring
Statistical Assessment Results Summary
Calendar Year 2013

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 (1.3 ppmv)	0.001	5	0.7303	1.655	NA	1.756	Normal	20	No
Carbon Disulfide (1.0 ppmv)	0.015	1	0.1674	0.3673	NA	0.4372	Normal	20	No
Methylene Chloride (2.1 ppmv)	0.014	2.1	0.2573	0.6911	NA	0.6857	Normal	20	No
4-Methyl-2-Pentanone (0.58 ppmv)	0.001	0.58	0.08256	0.1871	NA	0.1777	Normal	20	No
1,1,2-Trichloro-1,2,2-Trifluoroethane (0.76 ppmv)	0.001	1.2	0.6746	0.389	0.4335	0.9157	Normal	20	No
Trichloroethene (7.1 ppmv)	0.001	7.1	4.105	2.459	2.581	5.629	Normal	20	No

Notes:

[a]All maximum concentrations are from CWL-D2-470 March 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 2013 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.

Table 5-5
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
CWL-UI1-40	4.5	16.0	7.9	3.8	4.0	4.5	5.2	7.3
CWL-UI1-80	0.19	4.9	6.7	5.9	6.1	6.8	6.5	9.7
CWL-UI1-120	3.0	5.9	9.1	6.0	14.0	13.0	7.7	11.0
CWL-UI2-36	0.037	0.70	ND	1.6	ND	1.2	3.1	3.5
CWL-UI2-76	0.091	1.0	2.4	3.4	4.1	3.7	5.6	7.8
CWL-UI2-136	5.5	1.9	4.6	3.0	1.9	3.0	8.5	6.6
CWL-D1-100	0.220	2.5	7.1	9.8	13.0	12.0	10.0	12.0
CWL-D1-160	120.0	14.0	21.0	25.0	29.0	22.0	14.0	16.0
CWL-D1-240	160.0	44.0	44.0	34.0	34.0	24.0	22.0	23.0
CWL-D1-350	0.013	11.0	19.0	13.0	22.0	2.8	13.0	13.0
CWL-D1-470	0.077	0.17	0.25	0.25	0.27	0.34	0.51	0.078
CWL-D2-120	3.1	21.0	20.0	22.0	25.0	16.0	16.0	19.0
CWL-D2-240	ND	40.0	38.0	26.0	13.0	17.0	18.0	23.0
CWL-D2-350	0.064	12.0	18.0	11.0	17.0	5.0	11.0	13.0
CWL-D2-440	0.082	1.0	7.6	2.5	5.9	2.8	1.8	0.11
CWL-D2-470	ND	0.94	5.8	3.1	4.6	4.3	4.1	7.0
CWL-D3-120	0.009	1.1	4.0	6.0	4.9	4.5	7.0	5.3
CWL-D3-170	ND	2.5	9.9	4.5	6.6	4.4	7.9	7.2
CWL-D3-350	ND	1.6	2.4	2.2	1.5	1.4	8.8	7.8
CWL-D3-440	ND	1.8	0.26	0.75	3.4	3.3	6.8	13
CWL-D3-480	ND	1.9	1.2	0.2	2.1	4.1	0.21	0.034

Notes:
[a]June 1998 through January 2012 are Analytical Method TO-14 results. January 2013 are Analytical 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 5-6
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
CWL-UI1-40	112	246	141	11.78	11.47	13.15	11.76	14.68
CWL-UI1-80	0.22	9.63	13	10.61	10.67	11.61	10.18	13.74
CWL-UI1-120	6.32	9.94	45.42	9.36	21.41	19.18	11.07	14.64
CWL-UI2-36	17.6	2117	1800	813.7	850.0	391.78	4.64	5.02
CWL-UI2-76	0.126	1.65	4.37	5.52	6.90	5.96	7.85	10.74
CWL-UI2-136	10.5	4.21	7.98	4.42	2.85	4.89	11.45	9.12
CWL-D1-100	0.248	4.93	11.9	14.59	18.22	17.25	13.84	15.90
CWL-D1-160	167	21.4	30.1	33.32	38.41	29.28	18.48	20.33
CWL-D1-240	261	78.4	61.5	45.27	44.74	32.60	22.46	28.71
CWL-D1-350	0.02	20.7	31.7	18.73	30.53	4.07	16.56	16.31
CWL-D1-470	0.105	0.231	0.921	0.612	0.82	0.603	0.868	0.125
CWL-D2-120	5.4	33.0	29.4	29.26	34.23	22.31	20.70	24.05
CWL-D2-240	0.047	101	52.9	34.72	17.62	22.83	22.90	28.38
CWL-D2-350	0.091	22.9	25.9	15.42	23.41	7.50	13.31	16.01
CWL-D2-440	0.453	4.38	11.8	3.85	9.29	4.17	2.60	0.148
CWL-D2-470	0.058	6.95	8.40	4.17	6.60	6.40	5.78	8.49
CWL-D3-120	0.009	2.17	6.20	8.39	7.10	6.23	9.19	6.80
CWL-D3-170	0.037	5.01	15.0	6.11	9.40	6.12	10.57	9.18
CWL-D3-350	0.106	2.76	3.98	3.39	2.34	2.27	12.90	10.44
CWL-D3-440	0.017	4.04	0.519	0.96	5.14	4.64	9.69	17.73
CWL-D3-480	0.001	4.47	1.85	0.31	3.30	5.71	0.299	0.055

Notes:
[a]The total VOC concentration is the sum of all detected constituents. June 1998 through January 2012 are Analytical Method TO-14 results. January 2013 are Analytical 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

care monitoring network. Data sets included range from June 1998 (representative of the end of the VE VCM) to January 2013. To be consistent with historic soil-gas monitoring data sets and for a more technically sound historic comparison, the concentrations shown in Tables 5-5 and 5-6 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 5-5 and 5-6.

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, 23.0 ppmv). 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 September 2004 results are compared to the January 2013 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), eight sampling ports show decreasing levels, whereas seven ports show increasing levels. Two of the three deep sampling ports (CWL-D1-470 and CWL-D2-470) had higher concentrations in January 2013 relative to September 2004. These trends are similar for the total VOC results.

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 5-5 and 5-6. 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 stayed relatively low or increased slightly, as reflected in Table 5-5 and Figures 5-1 and 5-2. Trends at CWL-UI1 and CWL-UI2 are also consistent with upward diffusion of TCE soil gas from the former plume “core” located approximately 250 feet bgs.

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 dominant and primary VOC of concern, although trichlorofluoromethane, 1,1,2-trichloro-1,2,2-trifluoroethane, tetrachloroethene, 1,1-dichloroethene, and chloroform have 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 relative to 2012 except at the 440 foot bgs port, and the deepest port (CWL-D3-480) continues to show an overall decreasing trend. 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

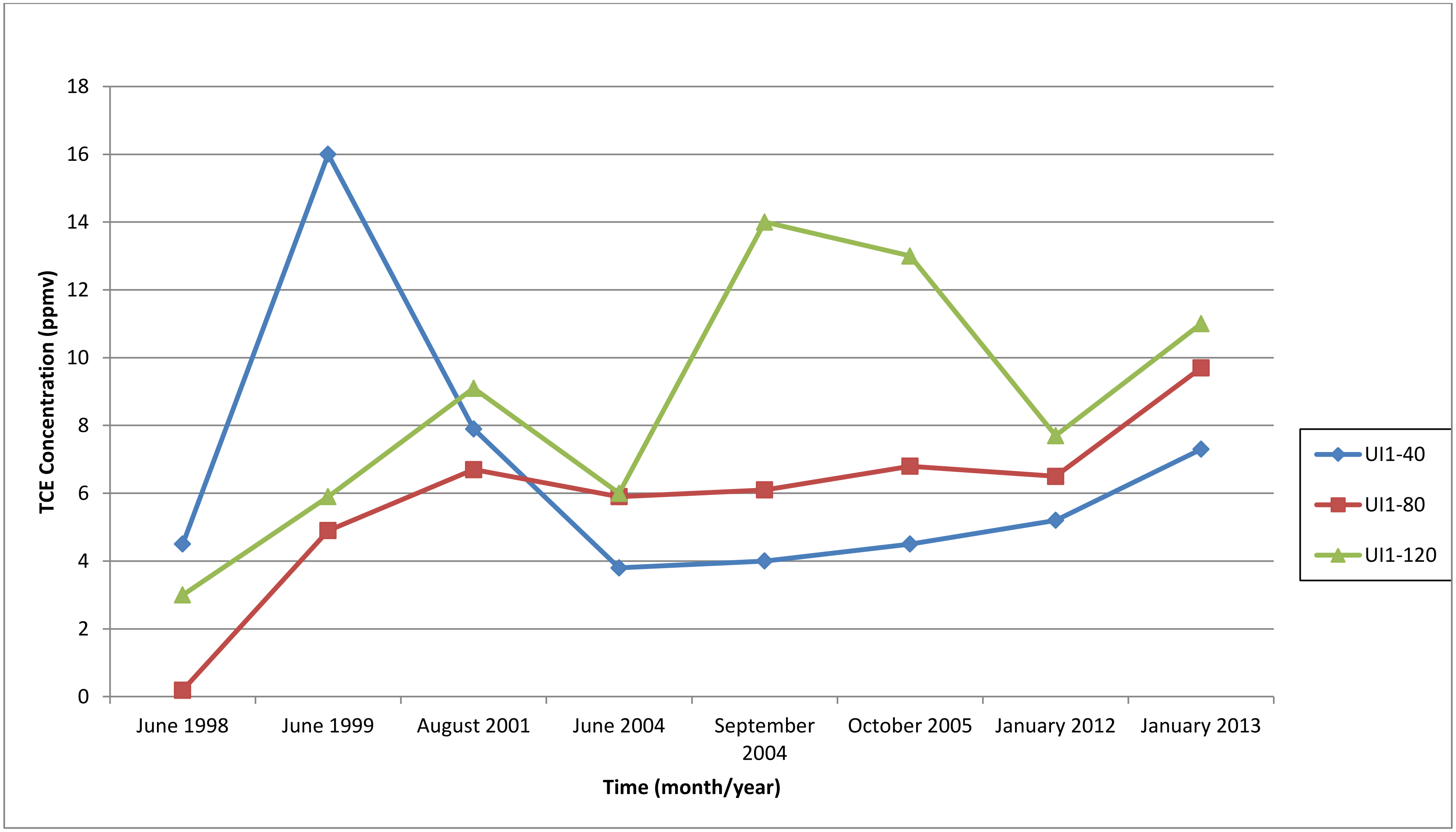

Figure 5-1
Historic Total TCE Compound Concentrations vs. Time
Chemical Waste Landfill Well UI-1 Ports

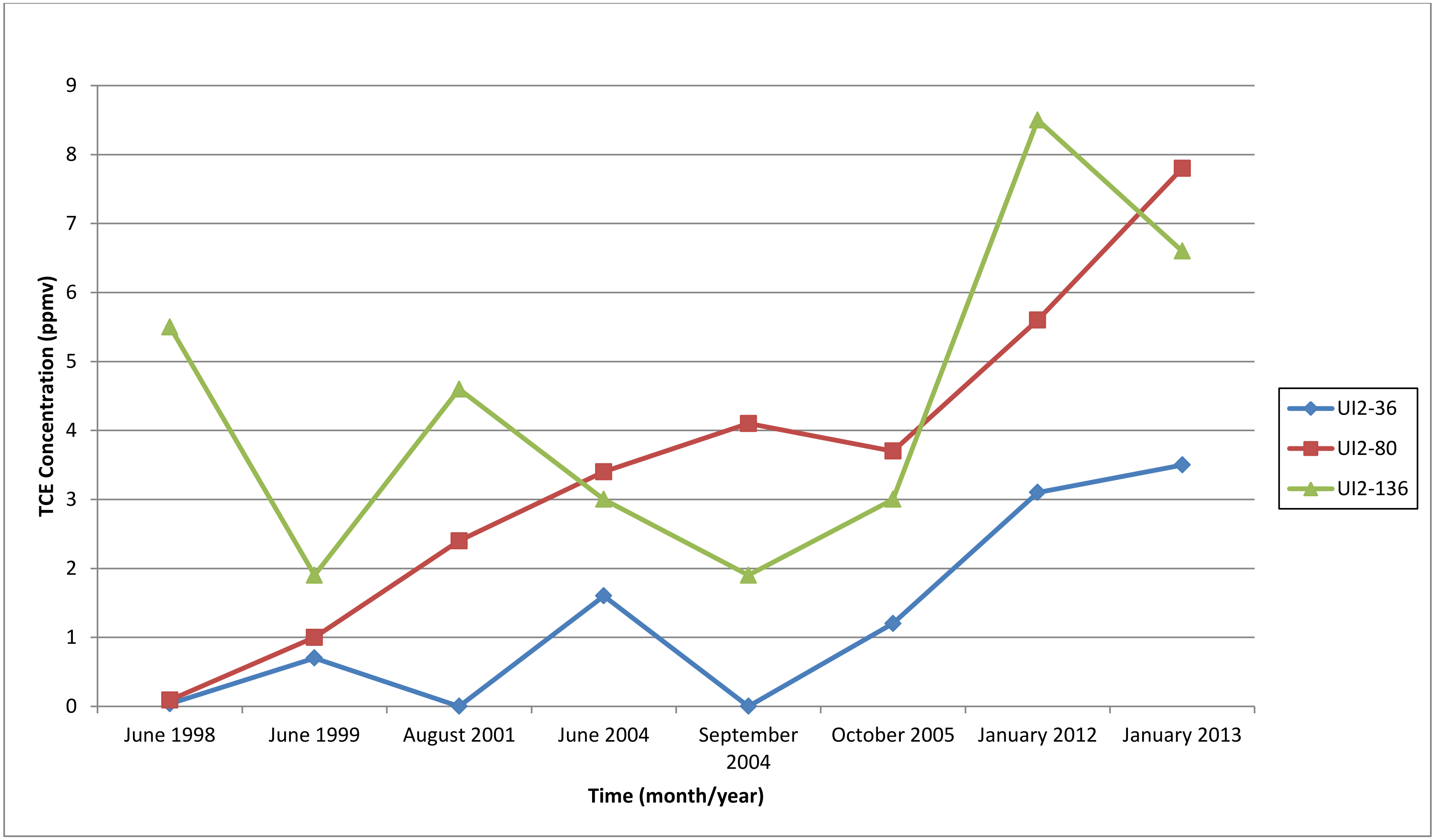

Figure 5-2
Historic Total TCE Compound Concentrations vs. Time
Chemical Waste Landfill Well UI-2 Ports

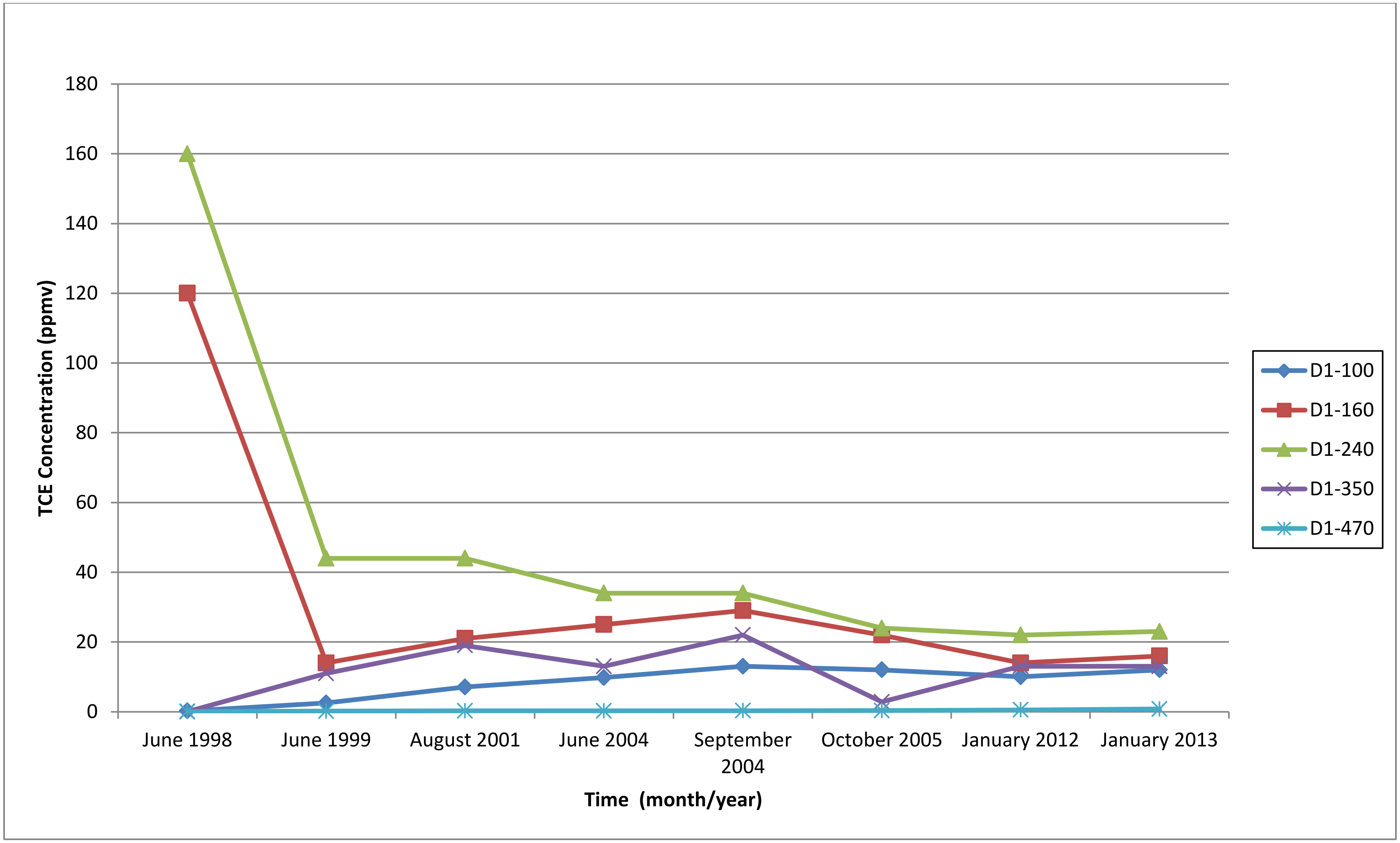

Figure 5-3
Historic Total TCE Compound Concentrations vs. Time
Chemical Waste Landfill Well D1 Ports

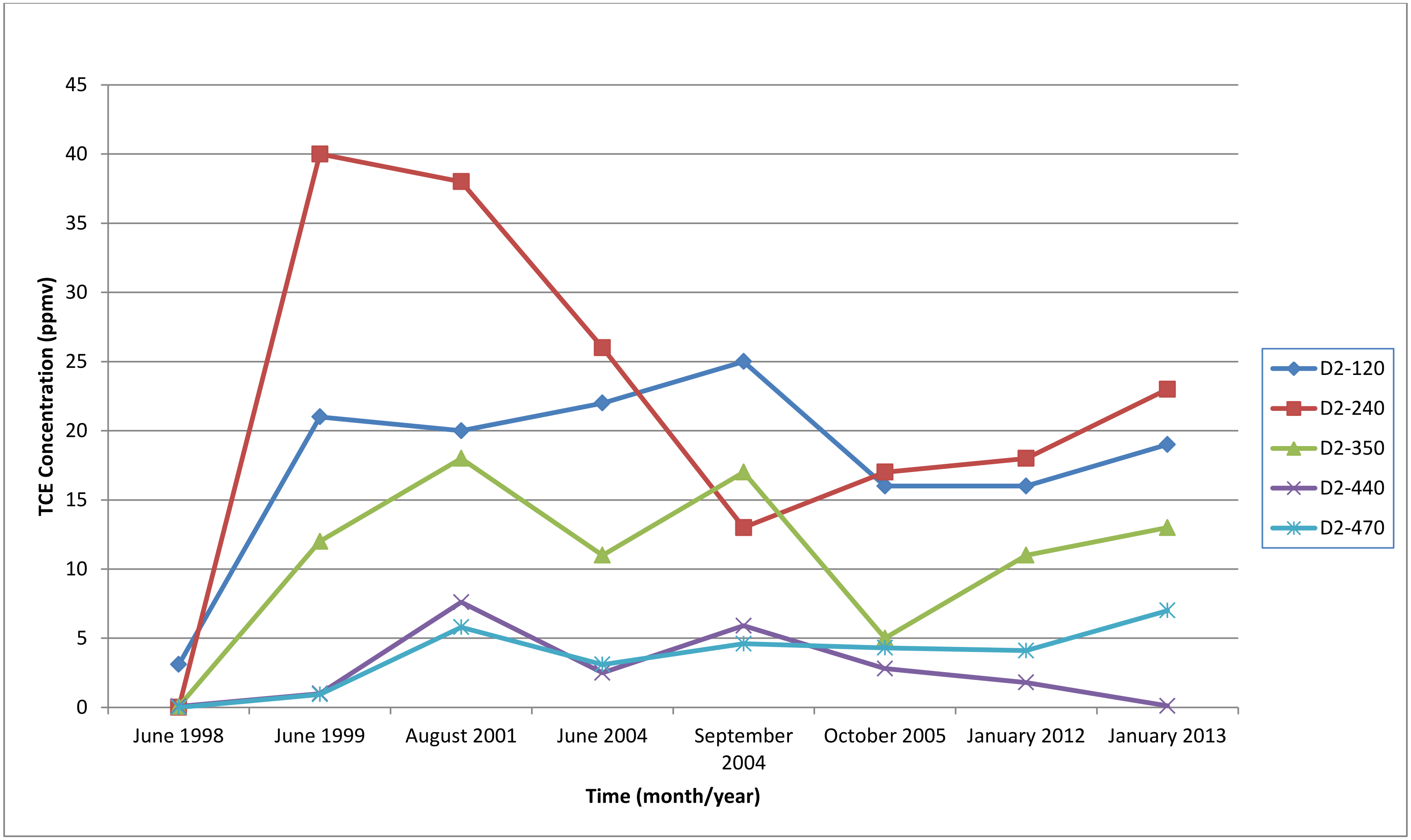

Figure 5-4
Historic Total TCE Compound Concentrations vs. Time
Chemical Waste Landfill Well D2 Ports

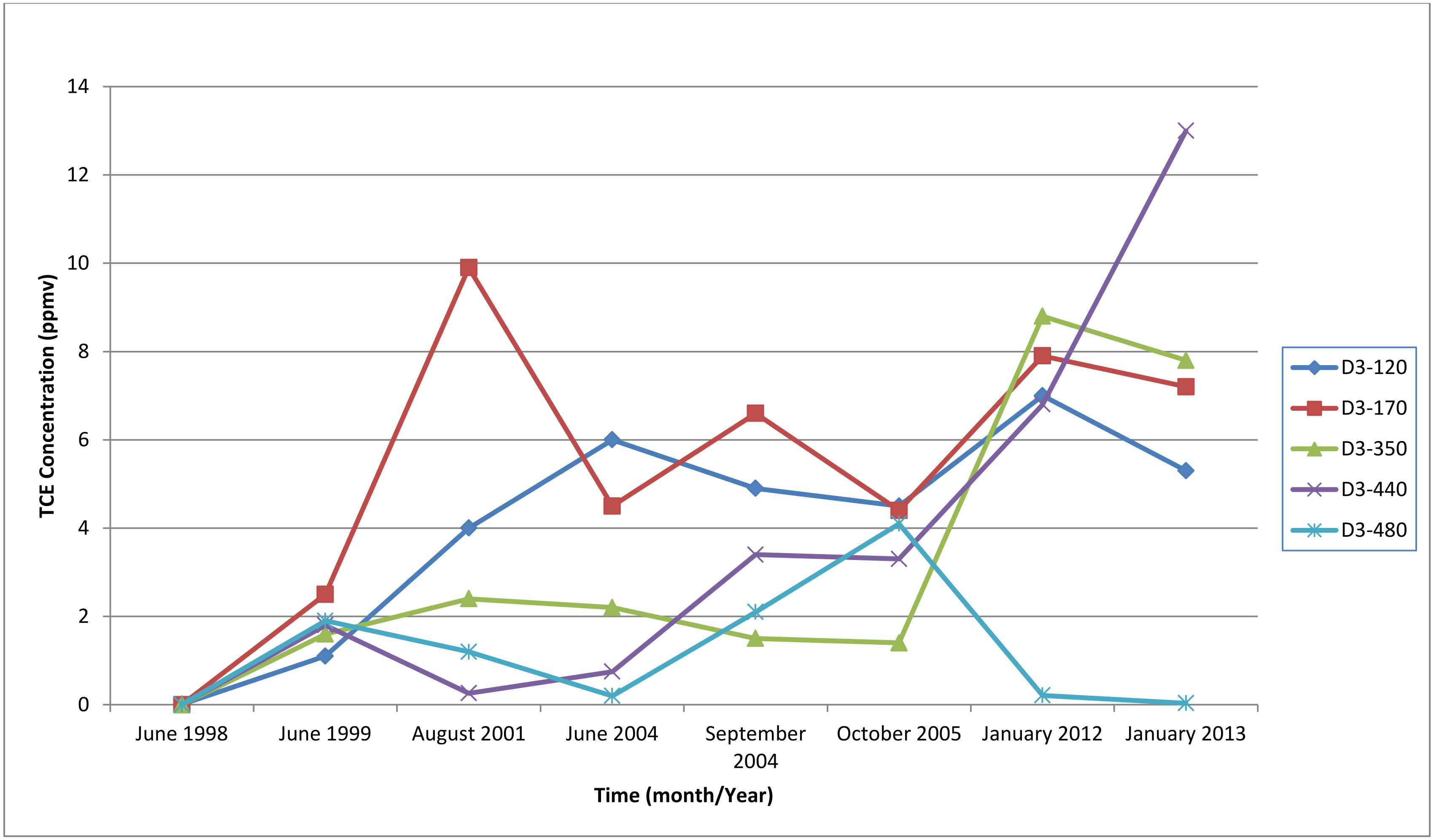

Figure 5-5
Historic Total TCE Compound Concentrations vs. Time
Chemical Waste Landfill Well D3 Ports

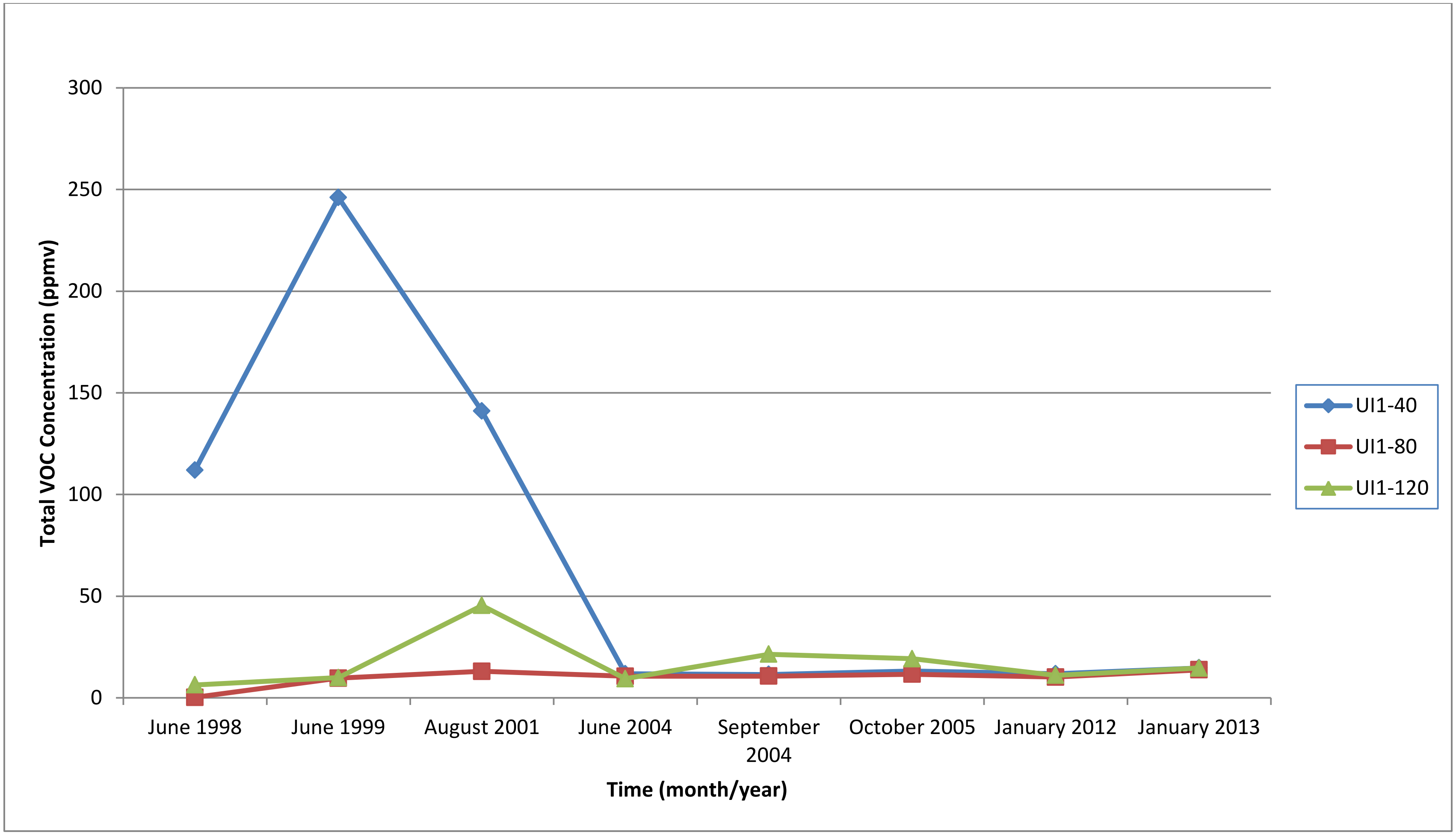

Figure 5-6
Historic Total VOC Compound Concentrations vs. Time
Chemical Waste Landfill Well UI-1 Ports

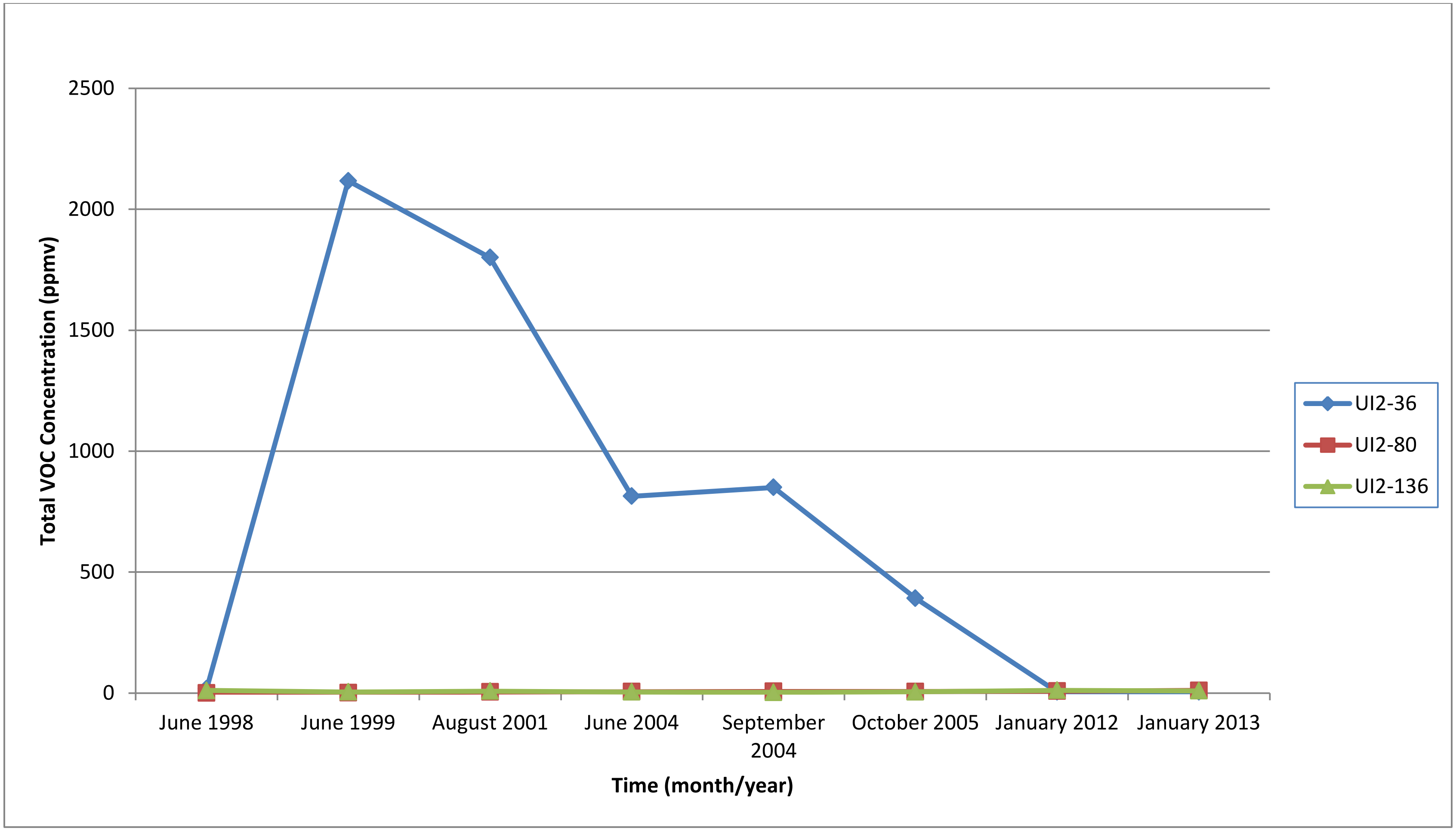

Figure 5-7
Historic Total VOC Compound Concentrations vs. Time
Chemical Waste Landfill Well UI-2 Ports

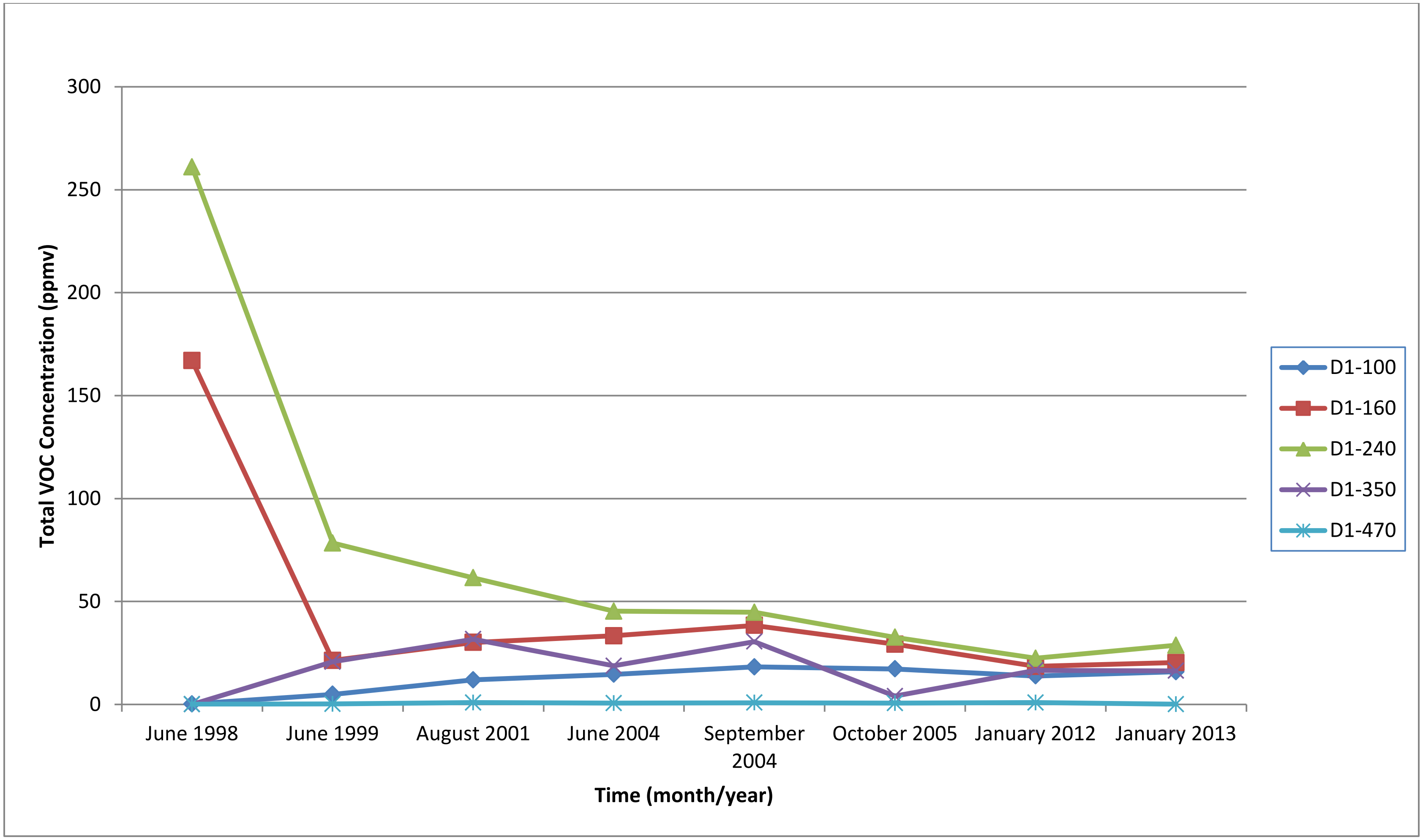

Figure 5-8
Historic Total VOC Compound Concentrations vs. Time
Chemical Waste Landfill Well D1 Ports

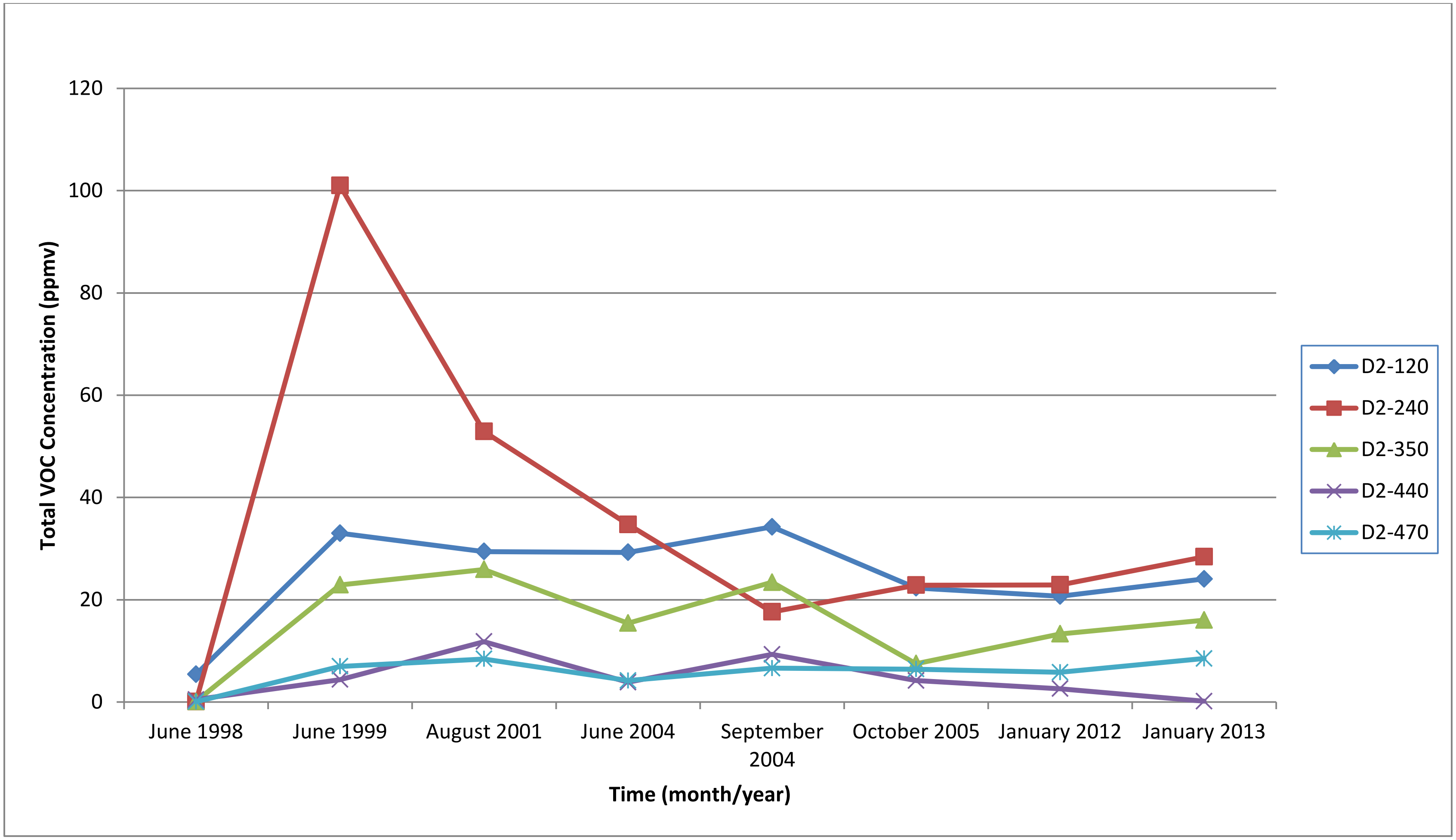

Figure 5-9
Historic Total VOC Compound Concentrations vs. Time
Chemical Waste Landfill Well D2 Ports

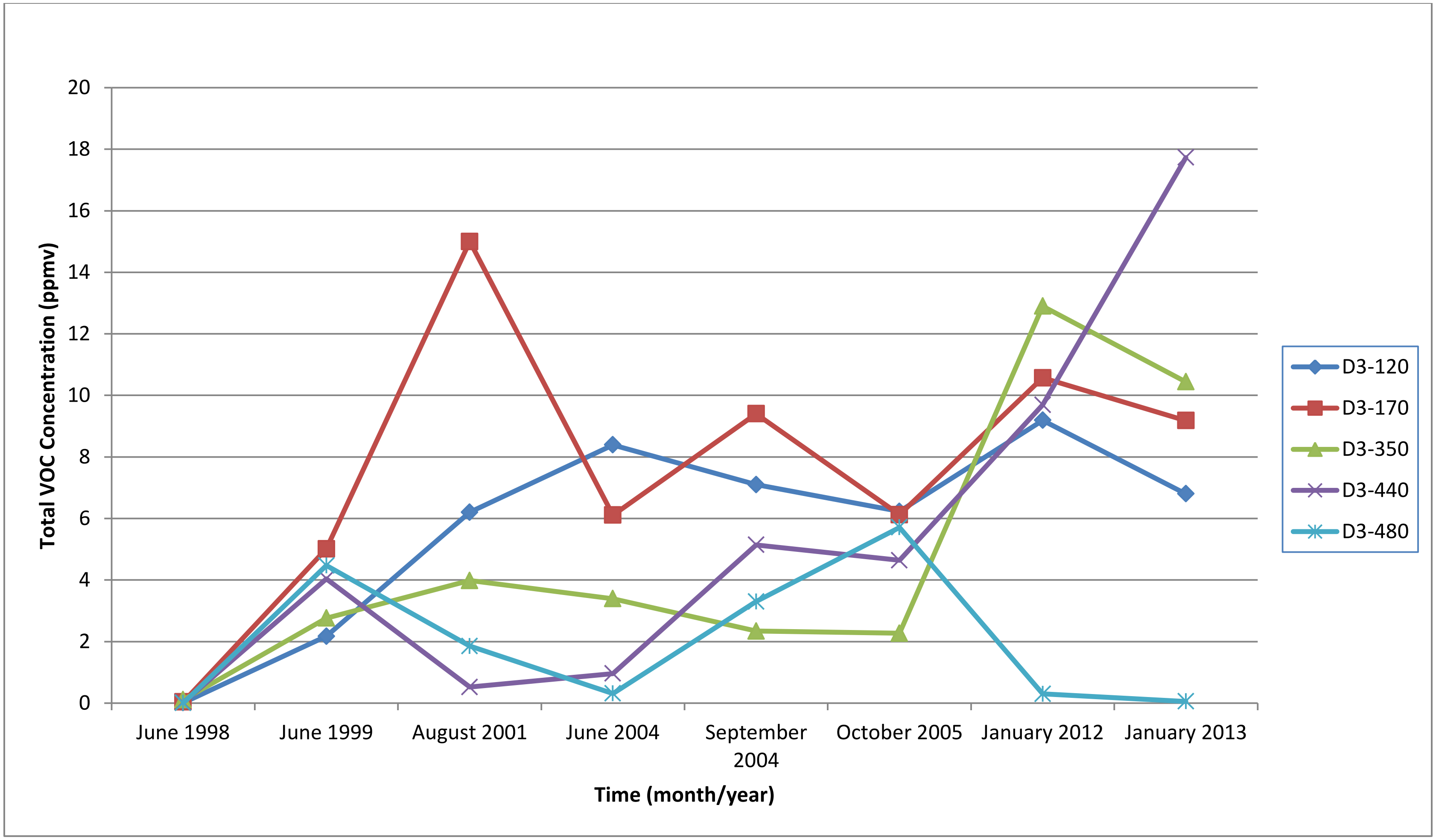

Figure 5-10
Historic Total VOC Compound Concentrations vs. Time
Chemical Waste Landfill Well D3 Ports

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 2013 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 2013 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).

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6.0 INSPECTION, MAINTENANCE, AND REPAIR RESULTS

This chapter presents a summary of CY 2013 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 CWL PCCP Attachment 1, Section 1.10, Table 1-6. CY 2013 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 CWL 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 (CWL 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 2013 and cover maintenance activities were performed both before (February and August) and after (September and October) the CY 2013 annual inspection (Section 6.1.2).

The annual Biology Inspection of the ET Cover vegetation was conducted on September 9, 2013 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). No deeply rooted plants (including four-wing saltbush) or mammal burrows were noted during the annual biology inspection, but ant hills/burrows were observed similar to previous inspections.

The foliar coverage based on the September annual inspection was approximately 38%, of which 90% is native vegetation (Inspection Form in Annex C). Many of the native blue grama grass clumps did not survive the 2012-2013 winter season and the above-normal rainfall in July 2013 (4.75 inches) spurred the growth of opportunistic annual weedy species in the resulting open spaces (weeds removed in August prior to the annual inspection, see Section 6.1.2). This significant change 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. Blue grama remains the dominant grass species, and along with other native grasses comprises the majority of the current ET Cover vegetation. No four-wing saltbush was observed during the September 2013 inspection, but many weedy species, including weedy grasses, were present that have not previously been documented on the cover.

The 2013 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 2013 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 2013 cover maintenance activities are summarized below.

6.1.2 Cover Maintenance

Cover maintenance performed during CY 2013 is summarized below.

February 4 – 5, 2013
Four-wing saltbush (*Atriplex canescens*) seedlings were observed during the September 2012 inspection; these plants were clipped at the ground surface and removed from the site along with other undesirable annual weedy species and weeds. The perimeter fence was also cleared of vegetation. Approximately 50 cubic yards of green waste (not compressed) was removed and disposed at the KAFB Landfill.

August 19 – 30, 2013
All annual weedy species were removed by hand to facilitate removal of the entire plant (including the root system) from the ET Cover and were placed in a green waste roll off container for offsite composting (~30 cubic yards of tightly compressed weeds). Weeds that could not be effectively pulled by hand were spot-sprayed with LESCO® Three-Way Selective Herbicide by a licensed herbicide spray technician equipped with a backpack herbicide sprayer.

Five days after the herbicide application was completed, seeding of the barren areas resulting from the weeding effort was performed to facilitate the growth of desired perennial native grasses. The same seed mix used for the 2009 seeding effort was used, but since a gravel mulch is present over the ET Cover surface a slightly different seeding method was developed, tested, and used to apply the seed mix. The method involved using a utility vehicle to pull a drop spreader that applied the seed mix at a uniform rate, behind which a chain drag was attached and pulled. The chain drag was used to disrupt the gravel mulch surface of the ET Cover such that the seed could be mixed into the gravel mulch to provide a direct soil contact and protective cover for the seed. Smooth-link chain was tested and used after confirming that it accomplished the task of mixing/burying the seed without damaging the existing vegetation. This was confirmed during a visual observation of the task while the drop spreader was calibrated to ensure the proper seeding rate was achieved prior to performing full-scale seeding of the ET Cover surface. The seed mix and seeding rate are summarized below. Based on the ET Cover acreage and the pounds of pure live seed applied, a rate of slightly more than 60 pounds of pure live seed per acre was achieved.

Common Name	Pure Live Seed, Pounds/Acre	% of Mix
"Paloma" Indian rice grass:	23	38%
"Viva" Galleta grass:	12	20%
"Hatchita" Black grama:	17	28%
Sand Dropseed:	4	7%
Alkali sacaton:	4	7%
Approximate Total:	**60**	**100%**

September and October 2013 Supplemental Watering
Immediately following the seeding effort, supplemental watering was performed to facilitate seed germination and seedling growth. Each watering event was performed during the morning hours to minimize evaporative loss and involved applying the equivalent of 0.5 inches of water over the ET Cover surface. Supplemental watering was performed only when natural precipitation was insufficient to maintain high soil moisture content in the surface soil. A total of five events (equivalent to 2.5 inches of rainfall) were conducted on September 5, 10, 19, 24, and October 2. New grass seedlings were evident in the open spaces by mid-September (after the September 9 inspection), especially in the northwest corner near the entrance gate were plant coverage was most sparse. The total of natural rainfall (12.11 inches) and supplemental watering (2.5 inches) for CY 2013 was 14.61 inches.

October 2-4, 2013
All annual weedy species were removed by hand to facilitate removal of the entire plant (including the root system) from the ET Cover and surrounding perimeter. Removed vegetation (~ 20 cubic yards) was placed in a green waste roll off container for offsite composting. Weeds from the ET Cover and perimeter area that could not be effectively pulled by hand were spot-sprayed with LESCO® Three-Way Selective Herbicide by a licensed herbicide spray technician equipped with a backpack herbicide sprayer. On the west side of the site from the perimeter fence to the road (approximately 0.5 acres), a pre-emergent granular herbicide (FreeHand®) was applied as a preventive measure to reduce the growth of weeds during the CY 2014 growing season.

6.1.3 Cover Inspection

Quarterly cover surface inspections were performed by a field technician in March, June, September, and December of 2013. 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 2013. 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). No 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 2013. 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 January groundwater monitoring well inspection, it was noted that the concrete pad for the decommissioned groundwater monitoring well pair CWL-2BU/L was damaged. This decommissioned monitoring well pair is located on the west side of the CWL perimeter area and was damaged by a vehicle. Decommissioned wells do not have protective bollards. Repairs to this concrete pad were completed on February 11, 2013 and included the addition of rebar reinforcement in the concrete pad. Although inspection and repair of decommissioned well pads is not required under the PCCP, it is conducted and documented as part of the inspection process.

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 2013. No repairs were needed.

6.5 Emergency Equipment Inspection

For the CWL, quarterly inspection of emergency equipment listed in CWL 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.

7.0 REGULATORY ACTIVITIES

On June 2, 2011, the NMED approved closure of the CWL and the PCCP became the governing regulatory document for the CWL (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 2013 consisted of submittal of the revised Statement of Work for Analytical Laboratories, cited as a reference document in the PCCP, NMED approval of the February 2013 PCCP modification request (Kieling November 2013), approval of the Calendar Year 2012 Chemical Waste Landfill Annual Post-Closure Care Report (Kieling October 2013), a telephone conference and follow-up email message with NMED to provide notification on ET Cover maintenance-related issues, and a December 2013 submittal of updated reference documents cited in the PCCP. These activities are summarized below in Sections 7.1 through 7.3, respectively.

7.1 Permit Modification Requests

A Permit modification request that affected Part 3 and Attachments 1 through 4 of the PCCP was submitted to NMED on February 11, 2013 (Beausoleil February 2013). The modification included changes to Part 3 and Attachments 1 through 4 of the CWL PCCP as summarized below.

- Part 3 Post-Closure Care Requirements for the Chemical Waste Landfill: Clarifying inspection documentation requirements for consistency with revisions to Permit Attachment 1 and Attachment 4 to allow the use of alternative formats to the inspection forms included in Permit Attachment 4.

- Attachment 1 Post-Closure Care Plan for the CWL: Providing additional detail regarding inspection requirements; and providing additional detail regarding soil-gas passive venting devices.

- Attachment 2 Groundwater Sampling and Analysis Plan: Clarifying requirements by removing redundant and unnecessary documents from the list of operating procedures (SNL/NM Statement of Work for Analytical Laboratories and Quality Assurance Project Plan).

- Attachment 3 Soil-Gas Sampling and Analysis Plan: Clarifying requirements by removing redundant and unnecessary documents from the list of operating procedures (SNL/NM Statement of Work for Analytical Laboratories and Quality Assurance Project Plan); revising the quality assurance acceptance requirement for soil-gas duplicate sample pairs (RPD criterion); and clarifying data requirements for soil-gas duplicate sample pair RPD calculations.

- Attachment 4 Inspection Forms: Clarifying that all forms are included as examples, and alternative formats may be used to document inspections.

This Class 1 modification request was approved by NMED on November 7, 2013; the changes became effective immediately upon approval.

7.2 Permit Submittals

On January 24, 2013, DOE/Sandia submitted an updated reference document, *Sandia National Laboratories/New Mexico Statement of Work for Analytical Laboratories*, cited in the CWL PCCP in accordance with requirements of Attachment 2, Section 2.0 and Attachment 3, Section 3.9 of the PCCP (Beausoleil January 2013). The statement of work was deleted as a reference document in the PCCP effective November 7, 2013 when NMED approved the Class 1 permit modification request described in Section 7.1; future submittals of this document and other removed reference documents will not be required.

On March 26, 2013, DOE and Sandia submitted the Calendar Year 2012 Chemical Waste Landfill Annual Post-Closure Care Report to NMED. The NMED approved the report on October 16, 2013 (Kieling October 2013).

On December 11, 2013, DOE and Sandia submitted three updated reference documents cited in the CWL PCCP in accordance with requirements of Attachment 2, Section 2.0 and Attachment 3, Section 3.9 of the PCCP. 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 November 12, 2013.

7.3 Technical Communication

On August 29, 2013 DOE and Sandia notified NMED of plans to conduct weeding, limited application of herbicide, seeding, and supplemental watering to address ET Cover vegetation issues in a teleconference. On November 13, 2013 DOE/Sandia followed up on this notification with a summary of the activities conducted and preliminary results (Weckerle November 2013). A complete discussion of the CY 2013 ET Cover maintenance activities is provided in Section 6.1.2 and Annex D.

8.0 SUMMARY AND CONCLUSIONS

A summary of CY 2013 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 2013. 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 2013 and resampling of two soil-gas sampling ports was conducted in March 2013 due to RPD exceedances for several VOCs. Samples collected from all wells were analyzed for VOCs by analytical method TO-15 for the first time (TO-14 was used previously). TCE was detected in all samples at concentrations ranging from 0.034 ppmv to 23.00 ppmv. 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. There were no exceedances of the 20 ppmv trigger level. The lower detection limits and greater sensitivity of analytical method TO-15 did result in more detections at low concentrations relative to the 2012 soil-gas data set. 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 CWL 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 2013 included NMED approval of the February 2013 Class 1 Permit modification request, approval of the Calendar Year 2012 Chemical Waste Landfill Annual Post-Closure Care Report, submittal of updated reference documents cited in the CWL PCCP, a telephone conference with NMED to provide advanced notification on ET Cover maintenance activities, and a follow-up email message to document results of cover maintenance activities.

8.4 Conclusions

All PCCP monitoring, inspection, and maintenance/repair requirements have been met for CY 2013. 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

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

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ANNEX A
Chemical Waste Landfill
CY 2013 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 2013 GROUNDWATER MONITORING

TAILGATE SAFETY MEETING FORM

Dept: 4124 Well Location: CWL-BW5 Date: 01/08/13 Time: 0755

Activities: Ground Water 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: ____ °F Wind Speed: ____ MPH Humidity: ____ % Wind Chill ____ °F

Chemicals Used: Acids in sample containers, standard solutions, Hach ACCU-VAC ampules

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	[signature]
William Gibson	[signature]
ALFRED SANTILLANES	[signature]

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-MW9 Date: 01/09/13 Time: 0802

Activities: Ground Water 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: _____ °F Wind Speed: _____ MPH Humidity: _____ % Wind Chill _____ °F

Chemicals Used: Acids in sample containers, standard solutions, Hach ACCU-VAC ampules

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	Robt 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: 01/10/13 Time: 0747

Activities: Ground Water 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: ____ °F Wind Speed: ____ MPH Humidity: ____ % Wind Chill ____ °F

Chemicals Used: Acids in sample containers, standard solutions, Hach ACCU-VAC ampules

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

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Printed Name	Signature
Robert J Lynch	Robt Lynch
ALFRED SANTILLANOS	Alfred C Santillanes
William Gibson	William Gibson

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-MW10 Date: 01/11/13 01-14-13 Time: 0750 0844

Activities: Ground Water 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: 20 °F Wind Speed: 5 MPH Humidity: 20.9 % Wind Chill 15 °F

Chemicals Used: Acids in sample containers, standard solutions, Hach ACCU-VAC ampules

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

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Robert Lynch	[signature]
William Gibson	[signature]
ALFRED SANTILLANES	[signature]
1-14-13 Robert Lynch	[signature]
ALFRED SANTILLANES	[signature]

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL-~~BW5~~ RL	Project No.: 146422.10.11.01
Well I.D.: CWL-BW5	Date: 01/08/13
Well Condition:	Weather Condition:
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 DOmg/L
510.18	0815		START						
513.67	0842	5	16.09	1023	251.4	6.48	0.93	77.6	7.63
514.17	0857	10	16.18	1023	244.3	6.62	1.11	77.1	7.56
513.45	0920	14	15.67	1024	239.9	6.61	1.15	75.3	7.46
513.32	0931	16	15.72	1024	237.7	6.62	0.78	76.2	7.54
513.16	0941	18	15.89	1024	235.1	6.62	0.81	76.1	7.52
513.04	0958	20	16.03	1023	232.1	6.64	0.70	76.7	7.57
513.39	1005	22	16.88	1024	228.1	6.64	0.81	77.2	7.46
513.58	1014	24	16.78	1024	226.5	6.64	0.68	77.6	7.44
	1015		Sampling						
								~4.00 gals. purged
								from tubing
								0828

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL	Project No.: 146422.10.11.01
Well I.D.: CWL-MW9	Date: 01/09/13
Well Condition:	Weather Condition:
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
502.74	0822		START						
506.75	0844	5	15.69	874	222.1	6.73	1.43	12.6	1.25
507.99	0856	10	16.29	874	182.9	6.73	1.26	13.1	1.29
508.70	0908	15	16.76	884	120.3	6.70	1.40	13.7	1.33
509.16	0920	20	17.36	896	68.2	6.70	0.90	14.8	1.42
509.27	0925	22	17.54	903	56.3	6.68	0.79	16.4	1.56
509.34	0930	24	17.92	906	48.0	6.69	0.83	17.2	1.63
509.39	0935	26	18.12	907	44.6	6.68	0.64	19.1	1.80
509.41	0940	28	18.14	906	42.3	6.68	0.70	20.1	1.89
509.44	0945	30	18.22	906	44.1	6.68	0.68	21.4	2.00
	0946		SAMpling						
									~4.00 gals purged
									from tubing
									0832

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL	Project No.: 146422.10.11.01
Well I.D.: CWL-MW10	Date: 01/11/13 01-14-13
Well Condition:	Weather Condition:
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
499.38	0812		START						
504.22	0855	5	13.18	768	205.2	6.97	1.73	36.0	3.77 pump stops
506.58	0912	8	13.33	768	202.0	6.94	1.53	33.3	3.47 >80psi
508.19	0924	10	13.44	766	199.6	6.93	3.29	32.7	3.41
509.59	0934	12	13.30	767	197.0	6.92	5.09	31.0	3.24
510.91	0945	14	13.06	772	191.2	6.90	6.20	29.1	3.06
511.76	0950	15	13.09	775	186.5	6.90	7.86	27.9	2.92
512.63	0956	16	13.34	780	182.4	6.90	8.45	26.4	2.75
513.58	1002	17	13.51	784	175.8	6.91	10.2	24.8	2.57
514.29	1009	18	12.80	791	146.8	6.91	9.98	23.6	2.46
515.11	1020	19	13.31	782	138.0	6.91	16.8	21.9	2.91
515.11	1020	well	DRY						
1/14/13									
499.55	0906		START						
501.25	0922	0.5	8.68	795	185.1	7.03	3.86	42.0	4.82
501.64	0926	1	9.11	797	166.6	6.98	3.14	29.1	3.34
502.17	0930	1.5	9.10	797	156.9	6.98	2.67	26.1	3.00
	0931		SAMpling						
									~1.7 gals purged
									from tubing
									0825/0918 1-14-13

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL	Project No.: 146422.10.11.01
Well I.D.: CWL-MW11	Date: 01/10/13
Well Condition:	Weather Condition:
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
499.05	0753		START						
502.76	0837	5	13.00	946	254.3	6.64	0.81	55.5	5.84
505.48	0907	10	14.87	947	236.8	6.71	1.18	55.9	5.63
508.06	0937	15	15.05	926	226.1	6.70	1.19	47.4	4.75
510.12	1007	20	14.87	919	217.3	6.67	1.56	34.4	3.47
511.05	1018	22	15.45	927	210.7	6.70	1.37	34.7	3.45
511.47	1035	24	14.76	927	208.8	6.68	1.22	31.9	3.30
511.78	1056	26	14.12	929	204.1	6.68	0.95	47.8	4.89
511.89	1116	28	14.37	928	200.1	6.68	0.71	49.1	5.01
511.93	1126	29	14.44	929	198.0	6.68	0.67	50.1	5.10
	1127		Sampling						
									~1.7 gals
									~ ~~4.80~~ gals. purged
									from tubing
									0806

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R. Lynch	Date: 01/08/13

Make & Model: YSI 6920 V2

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033

YSI 650 MDS (S/N): N/A

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: 0701	3.99	18.0	7.00	18.0	9.99	18.0
2. Time: 1110	4.00	19.2	7.00	19.2	10.01	19.2
3. Time:						
4. Time:						
Standard lot no.:	2AG653		2AH113		2AF557	
Expiration date:	JUL-14		AUG-14		JUL-14	

SC Calibration

Reference Value: 1278 uS			Standard Lot No.: 2AG086
	Value	Temp	Expiration Date: JUL-13
1. Time: 0703	1275	18.0	
2. Time: 1112	1277	19.2	
3. Time:			
4. Time:			

ORP Calibration

Reference Value:	220mV		Standard Lot No. 2AD404
	Value	Temp	Expiration Date: JAN-13
1. Time: 0702	219.6	18.0	
2. Time: 1111	220.1	19.2	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0700	80.8	24.27
2. Time: 1109	81.1	24.31
3. Time:		
4. Time:		

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

SNL/NM Project Name: CWL			Project No.: 146422.10.11.01		
Calibration done by: R Lynch			Date: 01/08/13		
TURBIDIMETER					
Make & Model: ~~HACH 2100P~~ HACH 2100Q			Serial No. S/N 10050C002897		
Reference Value	~~RV~~ 10	20	100	800	
Standard Lot No.	0161	0168	0162	0161	
1. Time 0804	10.2	20.1	99.7	798	
2. Time 1026	10.1	20.2	100	796	
3. Time					
4. Time					
Comments:					

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R. Lynch	Date: 01/09/13

Make & Model: YSI 6920 V2

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033

YSI 650 MDS (S/N): N/A

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: 0736	3.99	17.9	7.00	17.9	10.02	18.0
2. Time: 1049	4.01	19.4	7.02	19.4	10.01	19.4
3. Time:						
4. Time:						
Standard lot no.:	2AG653		2AH113		2AF557	
Expiration date:	JUL-14		AUG-14		JUL-14	

SC Calibration

Reference Value: 1278 uS			Standard Lot No.: 2AG086
	Value	Temp	Expiration Date: JUL-13
1. Time: 0738	1272	17.9	
2. Time: 1051	1277	19.4	
3. Time:			
4. Time:			

ORP Calibration

Reference Value:	220mV		Standard Lot No. 2AD404
	Value	Temp	Expiration Date: JAN-13
1. Time: 0737	219.8	17.9	
2. Time: 1050	221.1	19.4	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0735	81.9	24.53
2. Time: 1048	81.8	24.52
3. Time:		
4. Time:		

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

SNL/NM Project Name: CWL		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 04/09/13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10050C002897		
Reference Value	~~8~~ 10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0814	10.3	20.4	103	800
2. Time 1003	10.1	19.9	101	804
3. Time				
4. Time				

Comments:

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R. Lynch	Date: 01/10/13

Make & Model: YSI 6920 V2

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033

YSI 650 MDS (S/N): N/A

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: 0638	3.98	17.7	7.00	17.7	9.99	17.7
2. Time: 1241	3.99	18.6	7.02	18.6	10.01	18.6
3. Time:						
4. Time:						
Standard lot no.:	2AG653		2AH113		2AF557	
Expiration date:	JUL-14		AUG-14		JUL-14	

SC Calibration

Reference Value: 1278 uS			Standard Lot No.: 2AG086
	Value	Temp	Expiration Date: JUL-13
1. Time: 0640	1274	17.8	
2. Time: 1243	1276	18.6	
3. Time:			
4. Time:			

ORP Calibration

Reference Value:	220mV		Standard Lot No. 2AD404
	Value	Temp	Expiration Date: JAN-13
1. Time: 0639	218.9	17.7	
2. Time: 1242	219.3	18.6	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0637	80.8	24.24
2. Time: 1240	80.7	24.23
3. Time:		
4. Time:		

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

SNL/NM Project Name: CWL	Project No.: 146422.10.11.01
Calibration done by: R Lynch	Date: 01/10/13

TURBIDIMETER

Make & Model: HACH 2100P HACH 2100Q	Serial No. S/N 10050C002897

Reference Value	RL ~~1~~ 10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0800	10.1	19.8	101	796
2. Time 1135	10.3	20.1	102	798
3. Time				
4. Time				

Comments:

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R. Lynch	Date: 01-11-13 01-14-13

Make & Model: YSI 6920 V2

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033

YSI 650 MDS (S/N): N/A

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	4.00	19.7	7.01	19.7	10.00	19.7
2. Time: 1118	3.98	19.9	7.00	19.9	10.00	19.9
3. Time: 0650	3.99	18.2	7.00	18.2	9.99	18.2
4. Time: 1107	4.01	18.6	7.02	18.6	9.99	18.6
Standard lot no.:	2AG653		2AH113		2AF557	
Expiration date:	JUL-14		AUG-14		JUL-14	

SC Calibration

Reference Value: 1278 uS			Standard Lot No.: 2AG086
	Value	Temp	Expiration Date: JUL-13
1. Time: 0641	1277	19.7	
2. Time: 1120	1279	19.9	
3. Time: 0652	1274	18.2	
4. Time: 1109	1275	18.6	

ORP Calibration

Reference Value:	220mV		Standard Lot No. 2AD404
	Value	Temp	Expiration Date: JAN-13
1. Time: 0640	221.1	19.7	
2. Time: 1119	220.7	19.9	
3. Time: 0651	219.6	18.2	
4. Time: 1108	220.4	18.6	

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0638	80.2	24.00
2. Time: 1117	80.3	23.98
3. Time: 0649	80.4	23.99
4. Time: 1106	80.1	24.01

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

SNL/NM Project Name: CWL	Project No.: 146422.10.11.01
Calibration done by: R Lynch	Date: 01-11-13 . 01-14-13

TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10050C002897		
Reference Value	~~2~~ 10	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0803	10.3	20.2	99.8	801
2. Time 1036	10.1	20.4	101	806
3. Time 0909	10.4	20.3	104	803
4. Time 0940	10.2	20.4	103	801

Comments:

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL	**Monitoring Well ID # :** CWL-BW5	**Date:** 01/08/13

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

Pump and Tubing Bundle ID #: 1806-586	**Water Level Indicator ID #:** 62088
Personnel Performing Decontamination: Robert Lynch Print Name: Initial: RL William Gibson Print Name: Initial: WJG	**Personnel Performing Decontamination:** Robert Lynch Print Name: Initial: RL William Gibson Print Name: Initial: WJG

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: 122712	**Manufacturer:** Fisher
	Lot Number: 002735

Portable Pnmp and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL	**Monitoring Well ID # :** CWL-MW9	**Date:** 01/09/13

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

Pump and Tubing Bundle ID #: 1806-586	**Water Level Indicator ID #:** 62088
Personnel Performing Decontamination:	**Personnel Performing Decontamination:**
Robert Lynch Print Name: RL Initial:	Robert Lynch Print Name: RL Initial:
William Gibson Print Name: WJG Initial:	William Gibson Print Name: WJG Initial:

Condition of Equipment

Pnmp: Good **Tubing Bnndle:** Good **Water Level Indicator:** Good

List of Decontamination Materials

Distilled or **Deonized** (circle one)	**HNO_3**
	Grade: Reagent
Source: Culligan	**UN #:** 2031
Lot Number: 122712	**Manufacturer:** Fisher
	Lot Number: 002735

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL	**Monitoring Well ID # :** N/A	**Date:** 01/09/13

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 #:** 62088
Personnel Performing Decontamination: Print Name: Robert Lynch Initial: RL Print Name: Initial:	**Personnel Performing Decontamination:** Print Name: Robert Lynch Initial: RL 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**
	Grade: Reagent
Source: Culligan	**UN #:** 2031
Lot Number: 122712	**Manufacturer:** Fisher
	Lot Number: 002735

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL	**Monitoring Well ID # :** CWL-MW11	**Date:** 01/10/13

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 #:** 62088
Personnel Performing Decontamination: Print Name: Robert Lynch Initial: RL Print Name: Initial:	**Personnel Performing Decontamination:** Print Name: Robert Lynch Initial: RL 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: 122712	**UN #:** 2031
	Manufacturer: Fisher
	Lot Number: 002735

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL	**Monitoring Well ID # :** CWL-MW10	**Date:** 01/14/13

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 #:** 62088
Personnel Performing Decontamination: Print Name: Robert Lynch Initial: RL Print Name: Initial:	**Personnel Performing Decontamination:** Print Name: Robert Lynch Initial: RL 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**
	Grade: Reagent
Source: Culligan	**UN #:** 2031
Lot Number: 122712	**Manufacturer:** Fisher
	Lot Number: 002735

SUMMARY SHEET FOR JANUARY 2013 SAMPLES

Sample Summary for CWL GWM
January 2013

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: Environmental Samples 146422.10.11.01								
CWL-BW5	8-Jan-13	614549	093275	Environmental	n/a	614549 / 093276	614549 / 093277	
CWL-MW9	9-Jan-13	614552	093282	Environmental	614551 / 093280	614552 / 093284	n/a	
CWL-MW9	9-Jan-13	614552	093283	Duplicate	614551 / 093280	614552 / 093284	n/a	
CWL-MW10	14-Jan-13	614554	093287	Environmental	n/a	614554 / 093288	614554 / 093289	
CWL-MW11	10-Jan-13	614556	093292	Environmental	n/a	614556 / 093293	n/a	
CWL-EB1	8-Jan-13	614551	093280	Equipment Blank	n/a	614551 / 093281	n/a	Decon prior to CWL-MW9
CWL GWM: Waste Characterization Samples								
CWL-BW5	8-Jan-13	614550	093278	Waste	n/a	614550 / 093279	n/a	No data validation required
CWL-MW9	9-Jan-13	614553	093285	Waste	n/a	614553 / 093286	n/a	No data validation required
CWL-MW10	14-Jan-13	614555	093290	Waste	n/a	614555 / 093291	n/a	No data validation required
CWL-MW11	10-Jan-13	614557	093294	Waste	n/a	614557 / 093295	n/a	No data validation required

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

GROUNDWATER MONITORING

JANUARY 2013

AR/COC NUMBERS 614549, 614551, 614552, and 614556

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

Memorandum

Date: February 14, 2013

To: File

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 614549 through -553, -556, -557
SDG: 318159
Laboratory: GEL
Project/Task: 14622.10.11.01
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

Ten 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 except as noted above, and reported QC measures appear to be adequate. The following sections discuss the data review and validation.

It should be noted that, per client instruction, data from samples on COCs 614550, -553, and -557 were not validated.

Holding Times

The samples were analyzed within the prescribed holding times 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 exceptions. Chloroform was detected in the EB and the FB. All associated sample results were 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 trichlorotrifluoroethane was not present in the MS solution. No sample data were 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

Four TBs, one EB, one FB, and one field duplicate pair were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 02/15/13

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

Memorandum

Date: February 14, 2013

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 614549 through -553, -556, -557
SDG: 318159
Laboratory: GEL
Project/Task: 14622.10.11.01
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

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

ICP-MS:

1. Ni was detected in the MB at > MDL and < PQL. All associated sample results were detects < 5X the MB concentration and will be **qualified 0.0048U,B** at 5X the MB value**.**

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

All instrument tune requirements were met.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows.

ICP-MS:
Cr was detected in the EB at > MDL and < PQL. All associated sample results were ND and will not be qualified.

Ni was detected in the EB. This result was U,B qualified and therefore was not applied to associated field samples.

ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria.

Laboratory Replicate

All replicates met QC acceptance criteria.

Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported. No samples were diluted.

ICP Interference Check Sample (ICS A and AB)

The Ca concentration of samples -002, -006, -008, and -014 were comparable to ICS levels for the ICP-MS analysis. All ICS analysis results met QC acceptance criteria.

ICP Serial Dilution

The serial dilution analyses met all QC acceptance criteria.

Other QC

One EB and one field duplicate pair were submitted on the AR/COCs. There are no required evaluation criteria for field duplicate analyses.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 02/15/13

Sample Findings Summary

AR/COC: 614549, 614551, 614552, 614556

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	093275-015/CWL-BW5	Nickel (7440-02-0)	0.0048U, B
	093280-015/CWL-EB1	Nickel (7440-02-0)	0.0048U, B
	093282-015/CWL-MW9	Nickel (7440-02-0)	0.0048U, B
	093283-015/CWL-MW9	Nickel (7440-02-0)	0.0048U, B
	093292-015/CWL-MW11	Nickel (7440-02-0)	0.0048U, B

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

Data Validation Summary Worksheet

AR/COC #: 614549-7-553-556, -557 Site/Project: Chl Cam Validation Date: 2/14/13

SDG #: 312156 + 318159 Laboratory: GEL Validator: M. Hickey

Matrix: aq. # of Samples: 33 CVR present: yes Analysis Type: ~~☐~~ Organic ~~☐~~ Metals

AR/COC(s) present: yes Sample Container Integrity: ok ☐ Rad ☐ Gen Chem

Requested Analyses Not Reported none

Sample Number	Laboratory ID	organic	genchem	metals	rad	Comments

Hold Time/Preservation Outliers none

Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT

Comments: no DV for COCs: -550, -553, -557

Revised 7/2007

Validated By: [signature]

Inorganic Metals Worksheet

AR/COC #: 614549, -552, -551, -556 SDG #: 312159 Matrix: aq.

Laboratory Sample IDs: -002, -006, -008 dup, -011 EB, -014

Method/Batch #s: ICPMS 6020 1275904/1275906

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

Analyte (outliers)	Calibration: Int.	Calibration: R²	Calibration: ICV	Calibration: CCV	Calibration: ICB	Calibration: CCB	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	CB 5x		
Cr							✓									0.00203	0.001		
Ni							0.000947	0.004785								0.000743	n/a		

IS Outliers none				IS Outliers none			
Sample ID	%Recovery	%Recovery	%Recovery	CCV/CCB ID	%Recovery	%Recovery	%Recovery

Comments: EB: -006, -008

Revised 7/2007

Organic Worksheet (GC/MS) VOC

AR/COC #: 618549, -552, -551, -558 SDG #: 318159 Matrix: aq

Laboratory Sample IDs: -001, -003 TB, -004 FB, -005, -007 dup, -009 TB, -010 EB, -012 TB, -013, -015 TB

Method/Batch #s: 8260B VOC shortlist Tuning (pass/fail): pass TICs Required? (yes/no) no

Analyte (outliers)	Calibration Int. n/a	Calibration RF	Calibration RSD/ R^2	Calibration CCV %D	Method Blank ✓	5X (10X) Blank	LCS %R ✓	MS %R ✓	MSD %R ✓	MS/ MSD RPD ✓	FB	5x FB	EB1	5x EB
chloroform		✓	✓	✓							2.31	11.55	2.62	13.1

Surrogate Recovery Outliers none

Sample ID						

IS Outliers none

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT

Comments: FB1: -001

EB1: -005, -007

Revised 7/2007

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab Batch No. NA

SMO Use

Page 1 of 1

AR/COC **614549**

Project Name:	CWL GWM	Date Samples Shipped:	1/8/2013	SMO Authorization:	[signature]
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	150463	SMO Contact Phone:	
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199
Service Order:	CF025-13	Lab Destination:	GEL	Send Report to SMO:	
		Contract No.:	PO 691436		Lorraine Herrera/505-844-3199

☐ 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 318159

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
093275	-001	CWL-BW5	521	1/8/13	10:15	GW	G	3x40ml	HCL	G	SA	VOC (SW846-8260)	001
093275	-015	CWL-BW5	521	1/8/13	10:16	GW	P	500 ml	HNO3	G	SA	Chromium Nickel (SW846-6020)	002
093276	-001	CWL-TB1	NA	1/8/13	10:15	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260)	003
093277	-001	CWL-FB1	NA	1/8/13	9:53	DIW	G	3x40ml	HCL	G	FB	VOC (SW846-8260)	004

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

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
	Robert Lynch	[signature]	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	[signature]	AS	SNL/4142/505-844-5130/505-228-0710
	William Gibson	[signature]	WG	SNL/4142/505-284-3307/505-239-7367

	Org.	Date	Time		Org.	Date	Time
1.Relinquished by [signature]	4142	1/8/13	1055	3.Relinquished by			
1. Received by [signature]	4142	1/8/13	1055	3. Received by			
2.Relinquished by [signature]	4142	1/8/13	1200	4.Relinquished by			
2. Received by [signature]		1-9-13	9:05	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. NA

SMO Use

Page 1 of 1

AR/COC 614551

Project Name:	CWL GWM	Date Samples Shipped:	1/9/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	150536	SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF025-13	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 691436	Lorraine Herrera/505-844-3199	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154
Tech Area:					Albuquerque, NM 87185-0154
Building:	Room:	Operational Site:			318159

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
093280	-001	CWL-EB1	NA	1/8/13 13:10	DIW	G	3x40ml	HCL	G	EB	VOC (SW846-8260)	010
093280	-015	CWL-EB1	NA	1/8/13 13:11	DIW	P	500 ml	HNO3	G	EB	Chromium Nickel (SW846-6020)	011
093281	-001	CWL-TB3	NA	1/8/13 13:10	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260)	012

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	[signature]	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	[signature]	AS	SNL/4142/505-844-5130/505-228-0710
	William Gibson	[signature]	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

VOC's: Report CWL enhanced list of compounds (Chloroform,1,1-DCE,PCE,TCE,Freon 11, and Freon 113)

Lab Use

1.Relinquished by [signature]	Org. 4142	Date 1/9/13	Time 1018	3.Relinquished by	Org.	Date	Time
1. Received by [signature]	Org. 4142	Date 1/9/13	Time 1018	3. Received by	Org.	Date	Time
2.Relinquished by [signature]	Org. 4142	Date 1/9/13	Time 1100	4.Relinquished by	Org.	Date	Time
2. Received by [signature]	Org.	Date 1-10-13	Time 10:00	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. NA

SMO Use

Page 1 of 1

AR/COC **614552**

Project Name:	CWL GWM	Date Samples Shipped:	1/9/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	150536	SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF025-13	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 691436	Lorraine Herrera/505-844-3199	Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					318159
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
093282	-001	CWL-MW9	516	1/9/13	9:46	GW	G	3x40ml	HCL	G	SA	VOC (SW846-8260)	005
093282	-015	CWL-MW9	516	1/9/13	9:48	GW	P	500 ml	HNO3	G	SA	Chromium Nickel (SW846-6020)	006
093283	-001	CWL-MW9	516	1/9/13	9:46	GW	G	3x40ml	HCL	G	DU	VOC (SW846-8260)	007
093283	-015	CWL-MW9	516	1/9/13	9:48	GW	P	500 ml	HNO3	G	DU	Chromium Nickel (SW846-6020)	008
093284	-001	CWL-TB4	NA	1/9/13	9:46	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260)	009

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 ☐

Conditions on Receipt

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		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

VOC's: Report CWL enhanced list of compounds (Chloroform,1,1-DCE,PCE,TCE,Freon 11, and Freon 113)

Lab Use

	Org.	Date	Time		Org.	Date	Time
1.Relinquished by	4142	1/9/13	1020	3.Relinquished by			
1. Received by	4142	1/9/13	1020	3. Received by			
2.Relinquished by	4142	1/9/13	1100	4.Relinquished by			
2. Received by		1-10-13	10:00	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

Page 1 of 1

Batch No. NA

SMO Use

AR/COC **614556**

Project Name:	**CWL GWM**	Date Samples Shipped:	1/10/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	150609	SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF025-13	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 691436	Lorraine Herrera/505-844-3199	Bill to:Sandia National Laboratories (Accounts Payable),
Tech Area:					P.O. Box 5800, MS-0154
Building:	**Room:**	**Operational Site:**			Albuquerque, NM 87185-0154 318159

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
093292	-001	CWL-MW11	513	1/10/13 11:27	GW	G	3x40ml	HCL	G	SA	VOC (SW846-8260)	013
093292	-015	CWL-MW11	513	1/10/13 11:29	GW	P	500 ml	HNO3	G	SA	Chromium Nickel (SW846-6020)	014
093293	-001	CWL-TB8	NA	1/10/13 11:27	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260)	015

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** ☐

Conditions on Receipt

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	A. Santillanes	AS	SNL/4142/505-844-5130/505-228-0710
	William Gibson	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

VOC's: Report CWL enhanced list of compounds (Chloroform,1,1-DCE,PCE,TCE,Freon 11, and Freon 113)

Lab Use

1.Relinquished by A. Santillanes	Org. 4142	Date 1/10/13	Time 1156	3.Relinquished by	Org.	Date	Time
1. Received by [signature]	Org. 4142	Date 1/10/13	Time 1156	3. Received by	Org.	Date	Time
2.Relinquished by [signature]	Org. 4142	Date 1/10/13	Time 1200	4.Relinquished by	Org.	Date	Time
2. Received by [signature]	Org.	Date 1/11/13	Time 1040	4. Received by	Org.	Date	Time

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

AR/COC NUMBERS 614554

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

Memorandum

Date: February 26, 2013

To: File

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 614554, -555
SDG: 318341 and 318342
Laboratory: GEL
Project/Task: 146422.10.11.01
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. A problem was identified with the data package that resulted in the qualification of data.

1. The MS and MSD %Rs for acetone were < LAL. The associated sample results were ND and will be **qualified UJ,MS3**.

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 times 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 for acetone; 1,2-dichloroethane; 2-hexanone; and 1,2,3-trichlorobenzene were >20% with negative bias and no other associated calibration infractions. ICV and/or CCV %Ds for 2-hexanone and carbon disulfide were > 20% but < 40% with positive bias. All associated results were ND and will not be qualified.

Blanks

No target analytes were detected in the blanks with the following exception.

Chloroform was detected in the FB associated with sample 318342-001. 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 except as noted above in the Summary section. It should be noted that target analyte trichlorotrifluoroethane was included in the MS/MSD solution. 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 and one FB were submitted on the AR/COCs.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 02/28/13

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: February 26, 2013

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 614554, -555
SDG: 318341 and 318342
Laboratory: GEL
Project/Task: 146422.10.11.01
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 methods EPA 6020 (ICP-MS), EPA 6010 (ICP-AES), and EPA 7471/7470B (CVAA). 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.

CVAA:

1. Hg was reported at a negative value with absolute value > MDL in the ICB and CCBs. The associated result was ND and will be **qualified UJ,B4**.

ICP-MS:

1. Cu and Cr were detected in the MB. The Cu and Cr results for sample 318341-002, and the Cr result for sample 318342-002 were detects < 5X the MB concentration and will be **qualified U,B** at 5X the associated MB values**.**

2. The serial dilution %Ds were > 10% and the parent sample results were > 50X MDL for Mg and Zn. Both associated sample results were detects and will be **qualified J,D1**.

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

All instrument tune requirements were met.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria with the following exceptions.

The CRI %Rs for Mg and Na were > 130%. Both associated sample results were > 5X PQL and will not be qualified.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows.

ICP-MS:
Mo and Ni were detected in the MB at > MDL and < PQL. Associated sample results were detects >5X the MB concentration and will not be qualified. Mo was detected in a CCB at > MDL and < PQL. The associated sample result was >5X the CCB concentration and will not be qualified.

ICP -MS Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike (MS)

All MS recoveries met QC acceptance criteria except as follows.

ICP-MS:
The parent sample concentrations for Ca, Mg, K, and Na were >4X the spike. However, an MS analysis is not required for these analytes. Therefore, no sample data will be qualified.

The MS analysis for SDG 318341 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

All replicates met QC acceptance criteria.

The replicate analysis for SDG 318341 was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Control Sample (LCS)

All LCS QC acceptance criteria were met.

Detection Limits/Dilutions

All detection limits were properly reported.

ICP-MS:
Sample 318341-002 was diluted 5X for Ba, Ca, Na, and Zn; and 10X for Mn.

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were not evaluated because the concentrations of Al, Ca, Fe, and Mg in the samples were < those in the ICS solutions. No sample data will be qualified as a result.

ICP Serial Dilution

The serial dilution analyses met all QC acceptance criteria except as noted above in the Summary section.

The serial dilution analysis for SDG 318341 was performed on a sample of similar matrix from another SNL SDG. 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:** 02/28/13

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

Memorandum

Date: February 28, 2013

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 614554, -555
SDG: 318341
Laboratory: GEL
Project/Task: 146422.10.11.01
Analysis: General Chemistry

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 accepted procedures using methods EPA 9056 (anions by IC), EPA 9066 (total phenol), and EPA 9012A (total cyanide). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:
Total cyanide was reported in a CCB at a negative value, with absolute value > MDL. The associated sample result was ND and will be **qualified UJ,B4**.

Total phenol:
Total phenol was reported in the ICB and a CCB at negative values, with absolute values > MDL. The associated sample result was ND and will be **qualified UJ,B4**.

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.

Calibration

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

Anions:
The ICAL intercepts for chloride and sulfate were > the MDL and < 3X MDL. All associated sample results were > 3X the intercept value and will not be qualified.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Total cyanide and Anions:
The MS analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Total cyanide and Anions:
The replicate analysis was performed on a sample of similar matrix from another SNL SDG. No sample data will be qualified as a result.

Detection Limits/Dilutions

All detection limits were properly reported.

Anions:
The sample was diluted 10X for chloride analysis.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 02/28/13

Sample Findings Summary

AR/COC: 614554, 614555

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	093287-015/CWL-MW10	Chromium (7440-47-3)	0.018U, B
	093290-009/CWL-MW10	Chromium (7440-47-3)	0.018U, B
	093290-009/CWL-MW10	Copper (7440-50-8)	0.0019U, B
	093290-009/CWL-MW10	Magnesium (7439-95-4)	J, D1
	093290-009/CWL-MW10	Zinc (7440-66-6)	J, D1
SW846 7470A			
	093290-009/CWL-MW10	Mercury (7439-97-6)	UJ, B4
SW846 8260B DOE-AL			
	093290-001/CWL-MW10	Acetone (67-64-1)	UJ, MS3
	093291-001/CWL-TB7	Acetone (67-64-1)	UJ, MS3
SW846 9012B			
	093290-027/CWL-MW10	Cyanide, Total (57-12-5)	UJ, B4
SW846 9066			
	093290-026/CWL-MW10	Total Phenol (N/A)	UJ, B4

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

Data Validation Summary Worksheet

AR/COC #: 614557-555 Site/Project: Cul Cum Validation Date: 2/26/13

SDG #: 318341 -342 Laboratory: GEL Validator: M Hilchey

Matrix: aq # of Samples: 10 CVR present: yes Analysis Type: ☒ Organic ☒ Metals

AR/COC(s) present: yes Sample Container Integrity: OK ☐ Rad ☒ Gen Chem

Requested Analyses Not Reported none

Sample Number	Laboratory ID	organic	genchem	metals	rad	Comments

Hold Time/Preservation Outliers none

Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT

Comments:

Revised 7/2007

Validated By: [signature]

Organic Worksheet (GC/MS) VOC

AR/COC #: 614555, -557 SDG #: 318341 / 318342 Matrix: aq

Laboratory Sample IDs: 318341-001, -006 (TB) 318342-001, -003 (TB), -004 (FB)

Method/Batch #s: 8260B VOC 1278789 Tuning (pass/fail): pass TICs Required? (yes/no) no

Analyte (outliers)	Calibration Int.	RF	RSD/ R^2	ICV/ CCV %D	Method Blank ✓	5X (10X) Blank	LCS %R ✓	MS %R	MSD %R	MS/ MSD RPD ✓	FB	5X FB		
chloroform	✓	✓	✓	✓				✓	✓		2.08	10.4		
acetone				✓/-37.1				29.7	28.3		✓			
1,2-dichloroethane				✓/-21.6				✓	✓					
2-hexanone				23.1/-20.5										
1,2,3-trichlorobenzene				✓/-24.2										
carbondisulfide				23.6/✓										

Surrogate Recovery Outliers none

Sample ID						

IS Outliers none

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT

Comments: QC other SDG: both SDGs PB/PSO

MS soln missing trichlorofluoromethane

Inorganic Metals Worksheet

AR/COC #: 614557 -535 SDG #: 318341 + 318342 Matrix: aq.

Laboratory Sample IDs: 318341-002 318342-002

Method/Batch #s: ICPMS 6020 1277164/1277163 ICPAES 6010B 1277162/1277161 CVAA 7470A 1277238/1277236

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

Analyte (outliers)	Calibration Int.	Calibration R^2	Calibration ICV	Calibration CCV	Calibration ICB mg/l	Calibration CCB mg/l	Method Blank mg/l	5X Blank mg/l or (5X MDL)	LCS %R	MS %R	Lab Rep. RPD	Serial Dil. %D	~~ICS AB %R~~	~~ICS A ± MDL~~	CRA/CRI %R				
K	✓	✓	✓	✓	✓	✓	✓		✓	138	✓	✓			✓				
Mg										☆		23.7			135.1				
Na										☆		✓			134.1				
Cu							0.000324	0.0019		✓					✓				
Mo						0.258	0.000294	0.0015		✓									
Ni						✓	0.000695	0.0035		✓									
Ba							✓			☆ ✓									
Ca										☆									
Mn										☆ ✓									
Zn										✓		69.7							
Cr							0.0036	0.018				✓							
Hg					-0.079	-0.115	✓	(0.00034)				✓							

IS Outliers none				IS Outliers none			
Sample ID	%Recovery	%Recovery	%Recovery	CCV/CCB ID	%Recovery	%Recovery	%Recovery

Comments: QC other SMSOG: 318341 ICPMS dup/ms/sd CVAA dp/ms

☆ parent > 4x spike

General Chemistry Worksheet

AR/COC #: 614557 - 555 SDG #: 318341 Matrix: aq

Laboratory Sample IDs: -005 9012A total cyanide

Method/Batch #s: -004 9066 total phenols

Method/Batch #s: -003 9056 anions

Method/Batch #s:

Method/Batch #s:

Analyte (outliers)	Calibration						Method Blank	5X Blank or (5X MDL)	LCS %R	MS %R	MSD %R	MS/MSD RPD	Lab Rep. RPD	Partial/Total RPD		
	Int.	R^2	ICV	CCV	ICB	mg/L CCB								n/a		
total cyanide	✓	✓	✓	✓	✓	-0.00176	✓	0.0034 (~~0.0084~~)	✓	✓			✓			
total phenol	✓				-0.0018	-0.0023		(0.0084)								
sulfate	.144				✓	✓										
chloride	.127				✓	✓										

Comments: QC other SDG: TCN dup/ms; anions dup/ms

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. NA

SMO Use

Page 1 of 1

AR/COC 614554

Project Name:	CWL GWM	Date Samples Shipped:	1/14/13	SMO Authorization:	[signature]
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	150252	SMO Contact Phone:	See Bottle end
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199
Service Order:	CF025-13	Lab Destination:	GEL	Send Report to SMO:	
		Contract No.:	PO 691436		Lorraine Herrera/505-844-3199
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

318342

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
093287	-001	CWL-MW10	515	1/14/13 9:31	GW	G	3x40ml	HCL	G	SA	VOC (SW846-8260)	001
093287	-015	CWL-MW10	515	1/14/13 9:32	GW	P	500 ml	HNO3	G	SA	Chromium Nickel (SW846-6020)	002
093288	-001	CWL-TB6	NA	1/14/13 9:31	DIW	G	3x40ml	HCL	G	TB	VOC (SW846-8260)	003
093289	-001	CWL-FB2	NA	1/14/13 9:25	DIW	G	3x40ml	HCL	G	FB	VOC (SW846-8260)	004

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
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
Robert Lynch	[signature]	RL	SNL/4142/505-844-4013/505-250-7090
Alfred Santillanes	[signature]	AS	SNL/4142/505-844-5130/505-228-0710

1.Relinquished by [signature]	Org. 4142	Date 1/14/13	Time 1053	3.Relinquished by	Org.	Date	Time
1. Received by [signature]	Org. 4142	Date 1/14/13	Time 1050	3. Received by	Org.	Date	Time
2.Relinquished by [signature]	Org. 4142	Date 1/14/13	Time 1130	4.Relinquished by	Org.	Date	Time
2. Received by [signature]	Org.	Date 1-15-13	Time 0835	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 nk

Page 1 of 1

Batch No.

SMO Use

AR/COC 614555

Project Name:	CWL GWM	Date Samples Shipped:	1/14/13	SMO Authorization:	
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	150252	SMO Contact Phone:	see Bottle and
Project/Task Number:	146422.10.11.01	Lab Contact:	Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199
Service Order:	CF025-13	Lab Destination:	GEL	Send Report to SMO:	
		Contract No.:	PO 691436		Lorraine Herrera/505-844-3199
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 318341

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
093290	-001	CWL-MW10	515	1/14/13	9:19	~~WC~~ PW	G	3x40ml	HCL	G	~~SA~~ WC	TCL VOC (SW846-8260)	001
093290	-009	CWL-MW10	515	1/14/13	9:20	~~WC~~	P	500 ml	HNO3	G	~~SA~~	TAL Metals+Mo (SW846-6020/7470)	002
093290	-016	CWL-MW10	515	1/14/13	9:21	~~WC~~	P	125 ml	None	G	~~SA~~	Anions (SW846-9056)	003
093290	-026	CWL-MW10	515	1/14/13	9:22	~~WC~~	AG	250 ml	H2SO4	G	~~SA~~	Total Phenolics (SW846-9066)	004
093290	-027	CWL-MW10	515	1/14/13	9:23	~~WC~~	P	250 ml	NaOH	G	~~SA~~	Total Cyanide (SW846-9012)	005
093291	-001	CWL-TB7	NA	1/14/13	9:19	DIW	G	3x40ml	HCL	G	TB	TCL VOC (SW846-8260)	006

Err 1/15/13

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
Anions as Br,Cl,F,SO4

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch	[signature]	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	[signature]	AS	SNL/4142/505-844-5130/505-228-0710

1.Relinquished by [signature]	Org. 4142	Date 1/14/13	Time 11:00	3.Relinquished by	Org.	Date	Time
1. Received by [signature]	Org. 4142	Date 1/14/13	Time 1100	3. Received by	Org.	Date	Time
2.Relinquished by [signature]	Org. 4142	Date 1/14/13	Time 1130	4.Relinquished by	Org.	Date	Time
2. Received by [signature]	Org.	Date 1-15-13	Time 8:35	4. Received by	Org.	Date	Time

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

CONTRACT VERIFICATION REVIEW FORMS

GROUNDWATER MONITORING

JANUARY 2013

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
614549	Environmental*
614550	Waste
614551	Environmental*
614552	Environmental*
614553	Waste
614554	Environmental*
614555	Waste
614556	Environmental*
614557	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_10.11.01

AR/COC No. 614549, 614550, 614551, 614552, 614553, 614556, 614557
Analytical Lab GEL
SDG No. 318156

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	Resolved? Yes	Resolved? No
1.1	All items on COC 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	Resolved? Yes	Resolved? No
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	Hold 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 a) Laboratory control samples 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 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 a) Method or reagent blank data reported and met for all samples		X	Nickel detected in Metals Method Blank
b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Detected in FB1: Chloroform ((093277-001 Detected in EB1: Chloroform (093280-001):Chromium, Nickel (093280-015)
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	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) and pesticides/PCBs 8081 and 8082.	N/A		

Contract Verification Review (Continued)

4.0 Calibrations and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.) 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		
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) 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) 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 a) Instrument run logs provided	N/A		

Contract Verification Review (Continued)

5.0 Data Anomaly Report

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

Contract Verification Review (Concluded)

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
All	All	Sample Receipt & Review Forms missing ARCOC numbers

Were deficiencies unresolved? X Yes θ No

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

If no, provide: nonconformance report or correction request number ______ or date correction request was submitted: 02/13/2013

Reviewed by: ______ Date: 02/13/2013 Closed by: ______ Date 02.27.2013

Contract Verification Review (CVR)

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

AR/COC No. 614554, 614555 | Analytical Lab GEL | SDG No. 318341

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	Resolved? Yes	Resolved? No
1.1	All items on COC 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	Resolved? Yes	Resolved? No
2.1	Data reviewed, signature					
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	Hold 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 a) Laboratory control samples 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	VOC MS recovery failed for Acetone; Metals MS recovery failed for Potassium
3.4 Precision 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 a) Method or reagent blank data reported and met for all samples		X	Chromium, Copper, Molybdenum, Nickel detected in Metals Method Blank
b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Chloroform detected in FB2 (093289-001)
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	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) and pesticides/PCBs 8081 and 8082.	N/A		

Contract Verification Review (Continued)

4.0 Calibrations and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.) 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		
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) 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) 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 a) Instrument run logs provided	X		

Contract Verification Review (Continued)

5.0 Data Anomaly Report

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

Contract Verification Review (Concluded)

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 ______________ or date correction request was submitted: ________________

Reviewed by: ____________________ Date: 02/17/2013 Closed by: ____________________ Date______________

FIELD SAMPLING FORMS

JULY 2013 GROUNDWATER MONITORING

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-BW5 Date: 7/8/13 Time: 0815

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

Weather Conditions:
Temp: 78.2 °F Wind Speed: 0 MPH Humidity: 43.5 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU VAC ampules~~ RL
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
William Gibson	William J Gibson
ALFRED SANTILLANES	Alfred Santillanes

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-MW9 Date: 7-9-13 Time: 0826

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

Weather Conditions:
Temp: 81.5 °F Wind Speed: 0 MPH Humidity: 24.8 % Wind Chill N/A °F

Chemicals Used: Acids in sample containers, standard solutions. ~~Hach ACCU VAC ampules~~
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

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL - MW11 Date: 7-10-13 Time: ~~08 20??~~ 0757

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

Weather Conditions:
Temp: 81.9 °F Wind Speed: 0 MPH Humidity: 34.9 % Wind Chill NA °F

Chemicals Used: Acids in sample containers, standard solutions, ~~Hach ACCU VAC ampules~~ gl
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

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL- MW10 Date: 7-11-13 / 7-12-13 Time: 0800 / 0814

Activities: Groundwater Monitoring (purging, sampling, decon)

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

Weather Conditions:

Temp: 73.2 °F Wind Speed: 2.5 MPH Humidity: 62.4 % Wind Chill N/A °F

7/12 → 72.8 3.6 61.1 N/A

Chemicals Used: Acids in sample containers, standard solutions. ~~Hach ACCU VAC ampules~~

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	[signature]
ALFRED SANTILLANES	[signature]
7/12 William Gibson	[signature]
Robert Lynch	[signature]
ALFRED SANTILLANES	[signature]

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL GWM	Project No.: 146422.10.11.01
Well I.D.: CWL-BW 5	Date: 07/08/13
Well Condition:	Weather Condition:
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
510.65	0832		START						
514.31	0859	5	23.09	1202	108.6	6.77	0.95	83.9	7.16
515.22	0913	10	22.74	1201	98.8	6.81	1.10	81.1	6.97
515.66	0925	14	22.59	1201	98.2	6.83	1.03	77.2	6.66
515.81	0931	16	22.37	1199	99.3	6.83	1.08	80.7	6.98
515.93	0938	18	22.43	1199	100.4	6.84	0.93	78.8	6.81
516.02	0945	20	22.46	1198	103.0	6.85	0.94	78.8	6.83
516.03	0951	22	22.71	1201	103.1	6.85	0.86	78.1	6.72
516.04	0958	24	22.62	1200	104.1	6.85	0.78	77.6	6.61
	0959		sampling						
									~4.00 gals purged
									from tubing
									0844

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL GWM	Project No.: 146422.10.11.01
Well I.D.: CWL-MW 9	Date: 07/09/13
Well Condition:	Weather Condition:
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
502.97	0836		Start						
506.68	0913	5	20.94	1040	154.7	6.90	1.96	19.9	1.77
508.11	0925	10	21.22	1040	105.7	6.92	1.80	18.0	1.59
508.98	0937	15	21.35	1053	64.4	6.92	1.53	18.3	1.62
509.48	0949	20	21.36	1057	36.4	6.92	~~1.76~~ 0.83	19.9	1.76
509.58	0955	22	21.37	1064	28.1	6.92	0.94	20.3	1.79
509.66	1003	24	21.53	1065	20.3	6.91	0.89	23.1	2.07
509.67	1008	26	21.54	1066	17.5	6.91	0.89	24.4	2.15
509.67	1014	28	21.60	1066.	15.1	6.91	0.87	26.0	2.28
509.69	1019	30	21.64	1066	14.5	6.91	0.71	26.4	2.32
	1020		Sample						
									0856
									~ 4.00 gal purged
									prior measurement.

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL GWM	Project No.: 146422.10.11.01
Well I.D.: CWL-MW 10	Date: 07/11/13
Well Condition:	Weather Condition:
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
	500.03	0813		Start						
	505.78	0851	5	20.84	938	133.5	7.06	1.55	13.7	1.22
	509.70	0917	10	20.91	938	122.2	7.05	9.69	12.0	1.07
	511.42	0929	12	21.06	944	118.6	7.05	11.4	11.5	1.02
	512.09	0935	13	21.28	947	117.7	7.05	11.0	11.8	1.04
	513.13	0943	14	21.38	951	115.7	7.04	13.2	11.8	1.04
clear pump stop →	514.10	0953	15	21.69	952	84.5	7.04	11.9	15.4	1.34
	514.81	1010	16	22.70	953	66.6	7.03	12.0	18.2	1.59
	515.04	1013		Dry						
7/12/13	503.76	0830	~~.5~~	start						
	506.12	0848	1	21.82	965	114.6	7.20	2.48	24.8	2.16
	506.65	0852	1.5	21.91	966	88.3	7.17	2.77	22.2	1.94
	507.07	0855	2	22.04	966	60.8	7.16	2.70	21.1	1.84
		0856		Sampling						
										0840 7/12
										0825
										~1.75 purged prior
										to measurement

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL GWM	Project No.: 146422.10.11.01
Well I.D.: CWL-MW 11	Date: 07/10/13
Well Condition:	Weather Condition:
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
498.71	0809		Start						
503.15	0901	5	23.88	1118	149.2	6.86	0.49	68.5	5.76
505.98	0924	10	24.13	1118	139.4	6.87	0.79	64.4	5.38
508.53	0946	15	24.29	1118	133.7	6.88	0.97	61.6	5.14
511.29	1008	20	24.52	1113	127.1	6.88	0.99	49.8	4.13
511.87	1014	22	24.76	1114	121.8	6.88	1.03	53.4	4.41
512.12	1020	24	25.01	1115	117.3	6.88	1.13	51.9	4.37
512.13	1031	26	26.23	1116	116.6	6.89	1.21	50.8	3.96
512.13	1035	27	26.82	1116	117.2	6.88	1.17	51.0	3.97
512.38	1045	28	26.65	1118	119.3	6.88	1.29	54.3	4.53
512.83	1049	29	26.73	1119	120.4	6.88	1.25	55.6	4.96
	1050		Sample						
									0828
									~1.75 gal purged
									prior to measurement

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL GWM	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: R Lynch	Date: 7/8/13

Make & Model: YSI 6920V2

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033

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	3.99	22.3	7.01	22.3	10.02	22.3
2. Time: 1105	4.01	22.5	7.01	22.6	10.01	22.6
3. Time:						
4. Time:						
Standard lot no.:	2AG653		2AH113		2AF557	
Expiration date:	JUL-14		AUG-14		JUL-14	

SC Calibration

Reference Value: 1413 uS			Standard Lot No.: 2AG086
	Value	Temp	Expiration Date: JUL-13
1. Time: 0648	1411	22.3	
2. Time: 1108	1417	22.6	
3. Time:			
4. Time:			

ORP Calibration

Reference Value:	200 mV		Standard Lot No. 1301187
	Value	Temp	Expiration Date: OCT-13
1. Time: 0647	199.8	22.3	
2. Time: 1107	201.2	22.6	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0644	81.7	24.43
2. Time: 1104	81.6	24.41
3. Time:		
4. Time:		

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

SNL/NM Project Name: CWL GWM		Project No.: 146422.10.11.01		
Calibration done by: R Lynch		Date: 7/8/13		
TURBIDIMETER				
Make & Model: ~~HACH 2100P~~ HACH 2100Q		Serial No. S/N 10050C002897		
Reference Value	~~1~~ RL 10	20	100	800
Standard Lot No.	0161	0163	0162	0161
1. Time 0821	10.1	19.7	99.8	803
2. Time 1006	10.3	19.9	101	799
3. Time				
4. Time				

Comments:

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL GWM	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: ~~R Lynch~~ William Gibson	Date: 7-9-13

Make & Model: YSI 6920V2

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033

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: 0749	3.98	23.46	7.01	23.46	10.01	23.46
2. Time: 1116	3.99	23.63	7.01	23.63	10.03	23.63
3. Time:						
4. Time:						
Standard lot no.:	2AG653		2AH113		2AF557	
Expiration date:	JUL-14		AUG-14		JUL-14	

SC Calibration

Reference Value: 1413 uS			Standard Lot No.: 2AG086
	Value	Temp	Expiration Date: JUL-13
1. Time: 0745	1411	23.43	
2. Time: 1113	1412	23.63	
3. Time:			
4. Time:			

ORP Calibration

Reference Value:	200 mV		Standard Lot No. 1301187
	Value	Temp	Expiration Date: OCT-13
1. Time: 0742	199.7	23.41	
2. Time: 1109	199.9	23.63	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0738	81.9	24.52
2. Time: 1105	82.1	24.79
3. Time:		
4. Time:		

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

SNL/NM Project Name: CWL GWM	Project No.: 146422.10.11.01
Calibration done by: ~~R Lynch~~ William Gibson	Date: 7-9-13
TURBIDIMETER	
Make & Model: HACH 2100P HACH 2100Q	Serial No. S/N 10050C002897

Reference Value	.1	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0840	.10	19.9	101	799
2. Time 1125	.10	19.8	101	799
3. Time				
4. Time				

Comments:

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL GWM	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: ~~R Lynch~~ William Gibson	Date: 7-10-13

Make & Model: YSI 6920V2

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033

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: 0745	3.99	21.93	7.00	21.93	10.01	21.93
2. Time: 1459	3.99	25.43	7.01	25.43	10.01	25.43
3. Time:						
4. Time:						
Standard lot no.:	2AG653		2AH113		2AF557	
Expiration date:	JUL-14		AUG-14		JUL-14	

SC Calibration

Reference Value: 1413 uS			Standard Lot No.: 2AG086
	Value	Temp	Expiration Date: JUL-13
1. Time: 0743	1412	21.93	
2. Time: 1455	1411	25.43	
3. Time:			
4. Time:			

ORP Calibration

Reference Value:	200 mV		Standard Lot No. 1301187
	Value	Temp	Expiration Date: OCT-13
1. Time: 0740	1999	21.93	
2. Time: 1450	1998	25.43	
3. Time:			
4. Time:			

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0736	81.7	24.49
2. Time: 14.47	81.7	24.45
3. Time:		
4. Time:		

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

SNL/NM Project Name: CWL GWM		Project No.: 146422.10.11.01		
Calibration done by: ~~R Lynch~~ William Gibson		Date: 7-10-13		
TURBIDIMETER				
Make & Model: HACH 2100P HACH 2100Q		Serial No. S/N 10050C002897		
Reference Value	.1	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0817	.10	19.8	99.9	802
2. Time 1245	.10	19.9	101	801
3. Time				
4. Time				

Comments:

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL GWM	SNL/NM Project No.: 146422.10.11.01
Calibrations done by: ~~R Lynch~~ William Gibson	Date: 7-11-13 / 7-12-13

Make & Model: YSI 6920V2

YSI 6820 Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 08H100033

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: 0742	4.01	23.07	6.98	23.08	10.01	23.08
2. Time: 1503	4.01	25.31	7.01	25.31	10.01	25.31
7/12 3. Time: 0729	4.01	23.14	6.99	23.14	9.99	23.14
4. Time: 1520	4.01	24.93	7.00	24.92	10.02	24.92
Standard lot no.:	2AG653		2AH113		2AF557	
Expiration date:	JUL-14		AUG-14		JUL-14	

SC Calibration

Reference Value: 1413 uS			Standard Lot No.: 2AG086
	Value	Temp	Expiration Date: JUL-13
1. Time: 0737	1412	23.07	
2. Time: 1459	1411	25.31	
7/12 3. Time: 0724	1411	23.14	
4. Time: 1517	1411	24.93	

ORP Calibration

Reference Value:	200 mV		Standard Lot No. 1301187
	Value	Temp	Expiration Date: OCT-13
1. Time: 0733	199.7	23.07	
2. Time: 1454	199.8	25.31	
7/12 3. Time: 0720	199.8	23.14	
4. Time: 1513	199.8	24.93	

DO Calibration

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0728	81.9	24.52
2. Time: 1450	81.7	wjf ~~[illegible]~~ 24.49
7/12 3. Time: 0716	81.7	24.42
4. Time: 1509	81.4	24.40

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

SNL/NM Project Name: CWL GWM	Project No.: 146422.10.11.01
Calibration done by: ~~R Lynch~~ William Gibson	Date: 7-11-13

TURBIDIMETER

Make & Model: HACH 2100P HACH 2100Q	Serial No. S/N 10050C002897

Reference Value	.I	20	100	800
Standard Lot No.	0161	0168	0162	0161
1. Time 0815	.10	19.9	101	799
2. Time 1510	.10	19.8	100	798
3. Time 0730	.09	19.9	99.7	799
4. Time 1041	.10	19.8	99.8	798

Comments:

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWLGWM	**Monitoring Well ID #:** CWL-BW5	**Date:** 7/8/13

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

Pump and Tubing Bundle ID #: 1807-32	**Water Level Indicator ID #:** 62187
Personnel Performing Decontamination: Robert Lynch — Initial: RL Print Name: Initial: Print Name: Initial:	**Personnel Performing Decontamination:** Robert Lynch — Initial: RL Print Name: Initial: 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**
	Grade: Reagent
Source: Culligan	**UN #:** 2031
Lot Number: 06/20/13	**Manufacturer:** AROC
	Lot Number: A0305629

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL	**Monitoring Well ID # :** CWL-MW9	**Date:** 7-9-13

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

Pump and Tubing Bundle ID #: 1807-32	**Water Level Indicator ID #:** 62089
Personnel Performing Decontamination: William Gibson — Print Name; Initial: WJG Alfred Santillanes — Print Name; Initial: AS	**Personnel Performing Decontamination:** William Gibson — Print Name; Initial: WJG Alfred Santillanes — Print Name; Initial: AS

Condition of Equipment

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

List of Decontamination Materials

Distilled or **Deonized** (circle one)	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 6-17-13	**UN #:** 2031
	Manufacturer: AROC
	Lot Number: A0305629

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL	**Monitoring Well ID # :** CWL-MW11	**Date:** 7-10-13

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

Pump and Tubing Bundle ID #: 1806-840	**Water Level Indicator ID #:** 62089
Personnel Performing Decontamination: William Gibson Print Name: Initial: WG Alfred Santillanes Print Name: Initial: AS	**Personnel Performing Decontamination:** William Gibson Print Name: Initial: WG Alfred Santillanes Print Name: Initial: AS

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: 06- 17 -13	**UN #:** 2031
	Manufacturer: AROC
	Lot Number: A0305629

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL	**Monitoring Well ID # :** CWL-MW10	**Date:** 7-12-13

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

Pump and Tubing Bundle ID #: 1806-840	**Water Level Indicator ID #:** 62089
Personnel Performing Decontamination: Alfred Santillanes Print Name: Initial: AS William Gibson Print Name: Initial: WJG	**Personnel Performing Decontamination:** Alfred Santillanes Print Name: Initial: AS William Gibson Print Name: Initial: WJG

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: 7-9-13	**Manufacturer:** AROC
	Lot Number: AO305629

SUMMARY SHEET FOR JULY 2013 SAMPLES

Sample Summary for CWL GWM
July 2013

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 327-13								
Environmental Samples								
CWL-BW5	8-Jul-13	614872	094278	Environmental	n/a	614872 / 094279	n/a	
CWL-MW9	9-Jul-13	614874	094282	Environmental	n/a	614874 / 094283	614874 / 094284	
CWL-MW10	12-Jul-13	614879	094294	Environmental	614878 / 094292	614879 / 094296	n/a	
CWL-MW10	12-Jul-13	614879	094295	Duplicate	614878 / 094292	614879 / 094296	n/a	
CWL-MW11	10-Jul-13	614876	094287	Environmental	n/a	614876 / 094288	614876 / 094289	
CWL-EB1	10-Jul-13	614878	094292	Equipment Blank	n/a	614878 / 094293	n/a	Decon prior to CWL-MW10
Waste Characterization Samples								
CWL-BW5	8-Jul-13	614873	094280	Waste	n/a	614873 / 094281	n/a	No data validation required
CWL-MW9	9-Jul-13	614875	094285	Waste	n/a	614875 / 094286	n/a	No data validation required
CWL-MW10	12-Jul-13	614880	094297	Waste	n/a	614880 / 094298	n/a	No data validation required
CWL-MW11	10-Jul-13	614877	094290	Waste	n/a	614877 / 094291	n/a	No data validation required

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

GROUNDWATER MONITORING

JULY 2013

AR/COC NUMBERS 614872, 614874, and 614876

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: August 22, 2013

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 614872, 614874 and 614876
SDG: 329090
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

Eight samples were prepared and analyzed with accepted procedures using method EPA 8260B (trichloroethylene only). 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.

It should be noted that the MS/MSD was performed on a sample of similar matrix from another SNL 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

Three TBs were submitted, one with each AR/COC. Two FBs were submitted, one with AR/COC 614874 and one with AR/COC 614876.

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 08/22/13

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Memorandum

Date: August 22, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 614872, 614874 and 614876
SDG: 329090
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 for Ni and Cr 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.

ICP-MS:

1. Ni was detected in the ICS A at a negative value with an absolute value >2X the MDL. All associated sample results were detects <50X the absolute value of the ICS A 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 samples were prepared and analyzed within the prescribed holding times and properly preserved.

ICP-MS Instrument Tune

The ICP-MS tunes 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 replicates 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 and applied to samples 329090002, -005 and -009 It was not possible to determine if the results for Ca, Al, Mg and Fe were > those in the ICS solution and so it was assumed that one or more of these target analytes for the samples were > the ICS A solution. All QC acceptance criteria were met except as noted above in the Summary section.

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:** 08/22/13

ANALYTICAL QUALITY ASSOCIATES, INC.

PO Box 21987
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Memorandum

Date: August 20, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 614873, 614875 and 614877
SDG: 329085
Laboratory: GEL
Project/Task: 146422.10.11.03
Analysis: General Chemistry

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 accepted procedures using methods EPA 9056 (anions by IC), EPA 9066 (total phenols) and EPA 9010C/9012A (total cyanide). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

Total cyanide:

1. The intercept for total cyanide was negative with an absolute value > the MDL but ≤3X the MDL. The associated sample results were NDs and will be **qualified UJ,I5**.

2. Total cyanide was detected in the ICB/CCB at negative values with absolute values < the PQL. The associated sample results were NDs and will be **qualified UJ,B4**.

Total phenol:

1. The intercept for total phenol was negative with an absolute value > the MDL but ≤3X the MDL. The associated results for samples 329085004 and -016 were NDs and will be **qualified UJ,I5**.

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.

Calibration

All initial and continuing calibration met QC acceptance criteria except as noted above in the Summary section and as follows.

Total phenols:
The intercept for total phenol was negative with an absolute value > the MDL but ≤3X the MDL The associated result for sample -010 was a detect >3X the absolute value of the intercept and will not be qualified.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows.

Total phenol:
Total phenol was detected in the MB at < the PQL. The associated result for sample -010 was a detect >5X the MB value and will not be qualified. The remaining associated sample results were NDs and will not be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Matrix Spike (MS)

All MS/PS recoveries met QC acceptance criteria.

Laboratory Replicate

The replicate analyses met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were not diluted except as follows.

Anions:
The samples were diluted 50X for chloride and sulfate.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Monica Dymerski **Level I** **Date:** 08/21/13

Sample Findings Summary

AR/COC: 614872, 614874, 614876

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	094278-015/CWL-BW5	Nickel (7440-02-0)	J-, CK3
	094282-015/CWL-MW9	Nickel (7440-02-0)	J-, CK3
	094287-015/CWL-MW11	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 #: 614872, 614874and 614876 | Site/Project: CWL GWM | Validation Date: 08/22/2013

SDG #: 329090 | Laboratory: GEL | Validator: Linda Thal

Matrix: Aqueous | # of Samples: 11 CVR present: Yes | Analysis Type: X Organic X Metals

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

Requested Analyses Not Reported						
Sample Number	**Laboratory ID**	**organic**	**genchem**	**metals**	**rad**	**Comments**
None						

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: Sampled 7/08 – 7/10/2013

Validated by: L Thal

Organic Worksheet (GC/MS)

AR/COC #: 614872, 614874, 614876 SDG #: 329085-1 (329090) Matrix: Aqueous

Laboratory Sample IDs: 329090001, -003, -004, -006, -007, -008, -010 and -011

Method/Batch #s: 8260B: 1315625 (TCE only) 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	TBs	FBs		
	Int.	RF	RSD/ R^2	(ICV) CCV %D										
None														

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 VOA9.I 7/01/2013; MS/MSD from another SNL

Inorganic Metals Worksheet

AR/COC #: 614872, 614874 and 614876 SDG #: 329085-1 (329090) Cr and Ni only Matrix: Aqueous

Laboratory Sample IDs: 329090002, -005, and -009

Method/Batch #s: **6020**: 1315151

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

Analyte (outliers)	**Calibration**						**Method Blank mg/L mg/kg**	**5X Blank or (5X MDL) mg/kg**	**LCS %R**	**MS %R**	**Lab Rep RPD**	**Serial Dil. %D**	**ICS AB %R**	**ICS A ± MDL ug/L x50 (mg/kg)**	**CRA/ CRI %R**				
	Int. ug/L	**R^2**	**ICV**	**CCV**	**ICB ug/L**	**CCB ug/L**													
Ni	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	-1.26 (-.063)	✓				

IS Outliers *60-125%*				**IS Outliers** *60-125%*			
Sample ID	**%Recovery**	**%Recovery**	**%Recovery**	**CCV/CCB ID**	**%Recovery**	**%Recovery**	**%Recovery**
None				None			

Comments: HTs OK; Matrix QC -002; ICS applied to all samples even though it was not possible to determine the conc of Al, Ca, Mg or Fe.

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

Page 1 of 1

AR/COC 614872

Project Name: CWL GWM	Date Samples Shipped: 7/8/13	SMO Authorization:	Waste Characterization
Project/Task Manager: Tim Jackson	Carrier/Waybill No. 206655	SMO Contact Phone:	RMMA
Project/Task Number: 146422.10.11.01 03	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	Released by COC No.
Service Order: CF327-13	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
Tech Area:			
Building: Room:	Operational Site:		Albuquerque, NM 87185-0154 329090

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
094278	-001	CWL-BW5	521	7/8/13 9:59	GW	G	3x40ml	HCL	G	SA	TCE (SW846-8260)	001
094278	-015	CWL-BW5	521	7/8/13 10:00	GW	G	500 ml	HNO3	G	SA	Chromium,Nickel (SW846-6020)	002
094279	-001	CWL-TB1	NA	7/8/13 9:59	DIW	G	3x40ml	HCL	G	TB	TCE (SW846-8260)	003

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		AS	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

	Org.	Date	Time		Org.	Date	Time
1.Relinquished by	4142	7/8/13	10:28	3.Relinquished by			
1. Received by	4142	7/8/13	1028	3. Received by			
2.Relinquished by	4142	7/8/13	1100	4.Relinquished by			
2. Received by		7-9-13	0730	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.

Page 1 of 1

SMO Use

AR/COC 614874

Project Name:	CWL GWM	Date Samples Shipped:	7/9/13	SMO Authorization:	[signature]
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	206735	SMO Contact Phone:	Lorraine Herrera/505-844-3199
Project/Task Number:	146422.10.11.073	Lab Contact:	Edie Kent/803-556-8171		
Service Order:	CF327-13	Lab Destination:	GEL	Send Report to SMO:	
		Contract No.:	PO 1303873		Rita Kavanaugh/505-284-2553

☐ 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 329096

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
094282	-001	CWL-MW9	516	7/9/13	10:20	GW	G	3x40ml	HCL	G	SA	TCE (SW846-8260)	004
094282	-015	CWL-MW9	516	7/9/13	10:21	GW	G	500 ml	HNO3	G	SA	Chromium,Nickel (SW846-6020)	005
094283	-001	CWL-TB3	NA	7/9/13	10:20	DIW	G	3x40ml	HCL	G	TB	TCE (SW846-8260)	006
094284	-001	CWL-FB1	NA	7/9/13	10:07	DIW	G	3x40ml	HCL	G	FB	TCE (SW846-8260)	007

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 0729/284-2547

Conditions on Receipt

Lab Use

Sample Team Members

Name	Signature	Init.	Company/Organization/Phone/Cell
Alfred Santillanes	[signature]	AS	SNL/4142/505-844-5130/505-228-0710
William Gibson	[signature]	WJG	SNL/4142/505-284-3307/505-239-7367

		Org.	Date	Time		Org.	Date	Time
1.Relinquished by	[signature]	4142	7/9/13	11:10	3.Relinquished by			
1. Received by	[signature]	4142	7/9/13	1110	3. Received by			
2.Relinquished by	[signature]	4142	7/9/13	1130	4.Relinquished by			
2. Received by	[signature]	GEL	7-10-13	0740	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

Page 1 of 1

Batch No. N/A

SMO Use

AR/COC 614876

Project Name: CWL GWM	Date Samples Shipped: 7/11/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager: Tim Jackson	Carrier/Waybill No. 206848	SMO Contact Phone:	☐ RMMA
Project/Task Number: 146422.10.11.013	Lab Contact: Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order: CF327-13	Lab Destination: GEL	Send Report to SMO:	☑ 4º Celsius
	Contract No.: PO 1303873	Rita Kavanaugh/505-284-2553	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154
Tech Area:			Albuquerque, NM 87185-0154 329090
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
094287	-001	CWL-MW11	513	7/10/13	10:50	GW	G	3x40ml	HCL	G	SA	TCE (SW846-8260)	008
094287	-015	CWL-MW11	513	7/10/13	10:51	GW	G	500 ml	HNO3	G	SA	Chromium,Nickel (SW846-6020)	009
094288	-001	CWL-TB5	NA	7/10/13	10:50	DIW	G	3x40ml	HCL	G	TB	TCE (SW846-8260)	010
094289	-001	CWL-FB2	NA	7/10/13	10:46	DIW	G	3x40ml	HCL	G	FB	TCE (SW846-8260)	011

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
	Alfred Santillanes			SNL/4142/505-844-5130/505-228-0710
	William Gibson			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 7/10/13	Time 1150	3.Relinquished by	Org.	Date	Time
1. Received by	Org. 4142	Date 7/10/13	Time 1150	3. Received by	Org.	Date	Time
2.Relinquished by	Org. 4142	Date 7/11/13	Time 0600	4.Relinquished by	Org.	Date	Time
2. Received by	Org. Gel	Date 7-12-13	Time 0735	4. Received by	Org.	Date	Time

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

AR/COC NUMBERS 614878 and 614879

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

Memorandum

Date: August 22, 2013

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 614878 and 614879
SDG: 329489
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 (trichloroethylene only). 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.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met except as follows.

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. An EB was submitted with AR/COC 614878 to be applied to the samples on AR/COC 614879. A field duplicate pair was submitted with AR/COC 614879. 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:** 08/22/13

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Memorandum

Date: August 22, 2013

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 614878 and 614879
SDG: 329489
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 for Ni and Cr 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 tunes 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 not evaluated because the sample concentrations of Ca, Mg, Fe and Al were < those in the ICS solution.

ICP Serial Dilution

The serial dilutions met all QC acceptance criteria.

Other QC

An EB was submitted with AR/COC 614878 to be applied to the samples on AR/COC 614879. A field duplicate pair was submitted with AR/COC 614879. 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:** 08/22/13

Sample Findings Summary

AR/COC: 614872, 614874, 614876

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	094278-015/CWL-BW5	Nickel (7440-02-0)	J-, CK3
	094282-015/CWL-MW9	Nickel (7440-02-0)	J-, CK3
	094287-015/CWL-MW11	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 #: 614878 and 614879 | Site/Project: CWL GWM | Validation Date: 08/22/2013

SDG #: 329489 | Laboratory: GEL | Validator: Linda Thal

Matrix: Aqueous | # of Samples: 8 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						

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: Sampled 7/12/2013

Validated by: L Thal

Revised 7/2007

Organic Worksheet (GC/MS)

AR/COC #: 614878 and 614879 SDG #: 329489 Matrix: Aqueous

Laboratory Sample IDs: 329489001, -003, -005, -006 and -008 (TCE only)

Method/Batch #s: 8260B: 1317006 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 --005 TCE**	**TB --008 TCE**	**EB --006 TCE**
	Int.	**RF**	**RSD/ R^2**	**(ICV) CCV %D**										
None														

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 VOA4.I 7/18/2013; MS/MSD -001;

Revised 07/2007

Inorganic Metals Worksheet

AR/COC #: 614878 and 614879 SDG #: 329489 Matrix: Aqueous

Laboratory Sample IDs: 329489002, -004, -007 (Cr and Ni only)

Method/Batch #s: **6020**: 1315220

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

Analyte (outliers)	**Calibration**						**Method Blank mg/L 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**			
	Int. mg/L	**R^2**	**ICV**	**CCV**	**ICB ug/L**	**CCB ug/L**													
None																			

IS Outliers *60-125%*				**IS Outliers** *60-125%*			
Sample ID	**%Recovery**	**%Recovery**	**%Recovery**	**CCV/CCB ID**	**%Recovery**	**%Recovery**	**%Recovery**
None				None			

Comments: HTs OK; All Matrix QC 329489002; ICS NA for All.

Rev 07/2007

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 **614878**

Project Name: CWL GWM	Date Samples Shipped: 7/12/13	SMO Authorization:	☐ Waste Characterization	
Project/Task Manager: Tim Jackson	Carrier/Waybill No. 205651	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: CF327-13	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),	
Tech Area:			P.O. Box 5800, MS-0154	
Building: Room:	Operational Site:		Albuquerque, NM 87185-0154	329489

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
094292	-001	CWL-EB1	NA	7/10/13 13:35	DIW	G	3x40ml	HCL	G	EB	TCE (SW846-8260)	006
094292	-015	CWL-EB1	NA	7/10/13 13:36	DIW	G	500 ml	HNO3	G	EB	Chromium,Nickel (SW846-6020)	007
094293	-001	CWL-TB7	NA	7/10/13 13:35	DIW	G	3x40ml	HCL	G	TB	TCE (SW846-8260)	008

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		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

Lab Use

1.Relinquished by	Org. 4142	Date 7/12/13	Time 0930	3.Relinquished by	Org.	Date	Time
1. Received by SMO	Org. 4142	Date 7/12/13	Time 0930	3. Received by	Org.	Date	Time
2.Relinquished by SMO	Org. 4142	Date 7/12/13	Time 1035	4.Relinquished by	Org.	Date	Time
2. Received by	Org. GEL	Date 7-13-13	Time 0920	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

Page 1 of 1

AR/COC 614879

Project Name:	CWL GWM	Date Samples Shipped:	7/12/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	205651	SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.013	Lab Contact:	Edie Kent/803-556-8171	Lorraine Herrera/505-844-3199	☐ Released by COC No.
Service Order:	CF327-13	Lab Destination:	GEL	Send Report to SMO:	☑ 4º Celsius
		Contract No.:	PO 1303873	Rita Kavanaugh/505-284-2553	Bill to: Sandia National Laboratories (Accounts Payable),
Tech Area:					P.O. Box 5800, MS-0154
Building:	Room:	Operational Site:			Albuquerque, NM 87185-0154 329489

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
094294	-001	CWL-MW10	515	7/12/13 8:56	GW	G	3x40ml	HCL	G	SA	TCE (SW846-8260)	001
094294	-015	CWL-MW10	515	7/12/13 8:58	GW	G	500 ml	HNO3	G	SA	Chromium,Nickel (SW846-6020)	002
094295	-001	CWL-MW10	515	7/12/13 8:56	GW	G	3x40ml	HCL	G	DU	TCE (SW846-8260)	003
094295	-015	CWL-MW10	515	7/12/13 8:58	GW	G	500 ml	HNO3	G	DU	Chromium,Nickel (SW846-6020)	004
094296	-001	CWL-TB8	NA	7/12/13 8:56	DIW	G	3x40ml	HCL	G	TB	TCE (SW846-8260)	005

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		RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes			SNL/4142/505-844-5130/505-228-0710
	William Gibson			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

	Org.	Date	Time		Org.	Date	Time
1.Relinquished by	4142	7/12/13	0935	3.Relinquished by			
1. Received by	4142	7/12/13	0935	3. Received by			
2.Relinquished by	4142	7/12/13	1035	4.Relinquished by			
2. Received by	Gel	7-13-13	0920	4. Received by			

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

CONTRACT VERIFICATION REVIEW FORMS

GROUNDWATER MONITORING

JULY 2013

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
614872	Environmental*
614873	Waste
614874	Environmental*
614875	Waste
614876	Environmental*
614877	Waste
614878	Environmental*
614879	Environmental*
614880	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

AR/COC No.: 614872, 614873, 614874, 612875, 612876, 612877 | Analytical Lab: GEL | SDG No.: 329085

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	Resolved? Yes	Resolved? No
1.1	All items on COC 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	Resolved? Yes	Resolved? No
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	X				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold 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 a) Laboratory control samples 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	MS recovery failed for Mercury And Total Cyanide
3.4 Precision 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 a) Method or reagent blank data reported and met for all samples		X	Detected in Method Blank: Tetrachloroethylene (Batch 1315624); Molybdenum; Total Phenol
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	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) and pesticides/PCBs 8081 and 8082.	N/A		

Contract Verification Review (Continued)

4.0 Calibrations and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.) 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		
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) 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) 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 a) Instrument run logs provided	X		

Contract Verification Review (Continued)

5.0 Data Anomaly Report

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

Contract Verification Review (Concluded)

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
ARCOC-614875 samples	All	Missing Sample Receipt and Review Form
094280-009, 094285-009, 094290-009	Metals	Potassium incorrectly N qualified

Were deficiencies unresolved? θYes X No

Based on the review, this data package is complete. X Yes θNo

If no, provide: nonconformance report or correction request number 16830 or date correction request was submitted: 08/09/2013

Reviewed by: [signature] Date: 06/04/2013 Closed by: [signature] Date 08/13/2013

Contract Verification Review (CVR)

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

AR/COC No. 614878, 614879, 614880 | Analytical Lab GEL | SDG No. 329488

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	Resolved? Yes	Resolved? No
1.1	All items on COC 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	Resolved? Yes	Resolved? No
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	Hold 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 a) Laboratory control samples accuracy reported and met for all samples		X	VOC LCS recovery failed for1,2-Dibromo-3-chloropropane & Bromoform
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 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	MS recovery failed for Cyanide
3.5 Blank data 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		
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	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) and pesticides/PCBs 8081 and 8082.	N/X		

Contract Verification Review (Continued)

4.0 Calibrations and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.) 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		
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) 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) 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 a) Instrument run logs provided	X		

Contract Verification Review (Continued)

5.0 Data Anomaly Report

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

ARCOC: **614878, 614879 and 614880**

Contract Verification Review (Concluded)

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
094297-001, 094298-001	VOC	Missing N qualifier on CoAs for 1,2-Dibromo-3-chloropropane and Bromoform

Were deficiencies unresolved? X Yes θ No

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

If no, provide: nonconformance report or correction request number ___16871_ or date correction request was submitted: __08/14/2013______

Reviewed by: ______________________________ Date: ___08/14/2013_____Closed by: __________________________Date___08/21/2013____________

ANNEX B
Chemical Waste Landfill
CY 2013 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 2013 SOIL-GAS MONITORING

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL Date: 01/17/13 Time: 0810

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: ____ °F Wind Speed: ____ MPH Humidity: ____ % Wind Chill ____ °F

Chemicals Used: Acids in sample containers, standard solutions, Hach ACCU-VAC ampules

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
Tim Jackson	Tim Jackson
ALFRED SANTILLANES	Alfred Santillanes
Robert Lynch	Robert Lynch
William Gibson	William J Gibson

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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
UI 1	34001151	1-10-13	1-17-13	-26	1-17-13	-8	
	3400 0605			-26		-8	
	3400 0411			-26		-8	
	3400 1362			-26		-8	
	3400 1398			-26		-8	
D 1	3400 0158			-26		-8	
	3400 1299			-25		-8	
	3400 0071			-24		-8	
	3400 0705			-25		-8	
	3400 1043			-25		-8	
	3400 0174			-26		-8	
	3400 0178			-25		-8	
	3400 1593	TA		-26		-8	
	3400 1321			-26		-8	
	3400 1351			-25		-8	
	3400 0374			-25		-8	
	3400 0273			-25		-8	
	3400 0223			-26		-8	
	3400 1660			-25		-8	
	3400 1391			-25		-8	
	3400 0462			-25		-8	
	3400 1237			-26		-8	
	3400 0345			-25		-8	
	3400 0093			-25		-8	
	3400 1654			-25		-8	
	3400 0221			-26		-8	
	3400 6538			-25		-8	
	3400 0086			-26		-8	

SUMMA® Canister Log completed by:

ALFRED SANTILLANES
Printed Name

Alfred Santillanes
Signature

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Soil Vapor Sampling Log

Location	Date	Time	Canister #	PID (ppm)	Starting Vacuum (in. Hg)	Ending Vacuum (in. Hg)	Location Comments Flow(~~ft~~^{3}/hr) —
CWL-0I1-FB1	1/17/13	0818	34001151	N/A	-26	-8	
↓ -40	↓	0829	↓ 0605	0.0	-26	-8	8.0 21 sec
-80		0832	0411	0.0	-26	-8	10.0 27 sec
-120		0837	1362	0.0	-26	-8	10.0 37 sec
CWL-D1-100	1/17/13	0853	34001398	0.0	-26	-8	8.0
↓ -160	↓	0858	34000159	0.0	-26	-8	10.0
-240		0901	—	0.0	—	—	10.0
↓		0902	34001299	↓	-25	-8	↓
-350		0906	—	0.0	—	—	10.0
↓		0907	34000071	↓	-24	-8	↓
-470		0911	—	0.0	—	—	10.0
↓		0912	—	↓	—	—	↓
		0913	34000705	↓	-25	-8	↓
↓		0915	↓ 1043	—	-25	-8	Duplicate
-FB3		0918	0174	N/A	-26	-8	
CWL-D2-120	1/17/13	0939	34000178	0.0	-25	-8	10.0
↓ -240	↓	0945	—	0.0	—	—	10.0
↓		0946	34001593	↓	-26	-8	↓
-350		0951	—	0.0	—	—	10.0
↓		0952	34001321	↓	-26	-8	↓
-440		0955	—	0.0	—	—	10.0
↓		0956	—	↓	—	—	↓
↓		0957	34001351	↓	-25	-8	↓
-470		1001	—	0.0	—	—	10.0
↓		1002	—	↓	—	—	↓
		1003	34000374	↓	-25	-8	↓
↓	↓	1006	↓ 0273	—	-25	-8	Duplicate

Purge + Fine sample collection was slow.

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Note: Continuous PID readings ~~from~~ during purging of each well.

Soil Vapor Sampling Log

Location	Date	Time	Canister #	PID (ppm)	Starting Vacuum (in. Hg)	Ending Vacuum (in. Hg)	Location Comments
CWL-D2-FB4	1/17/13	1015	34000323	N/A	-26	-8	
CWL-D3-FB5	1/17/13	1023	34001660	N/A	-25	-8	~~Flow (ft3/hr)~~
-120	↓	1030	↓ 1391	0.0	-25	-8	8.0
-170		1035	↓ 0462	0.0	-25	-8	10.0
-350		1038	—	0.0	—	—	10.0
↓		1039	34001237	↓	-26	-8	↓
-440		1043	—	0.0	—	—	10.0
↓		1044	—		—	—	↓
↓		1045	34000345	↓	-25	-8	↓
-480		1049	—	0.0	—	—	10.0
↓		1050	—	↓	—	—	↓
↓	↓	1051	34000093	↓	-26	-8	↓
CWL-D12-36	1/17/13	1104	34000221	0.0	-26	-8	10.0
-76		1107	0588	0.0	-25	-8	10.0
-136		1110	0086	0.0	-26	-8	10.0
↓ -FB2	↓	1102	↓ 1654	N/A	-25	-8	

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: **Chemical Waste Landfill** Date: 3/27/12 Time: 0848

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

Weather Conditions:
Temp: ____ °F Wind Speed: ____ MPH Humidity: ____ % Wind Chill ____ °F

Chemicals Used: None
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
ALFRED SANTILLANES	Alfred Santillanes
Robert Lynch	[illegible]
William Gibson	William J Gibson
Tim Jackson	[illegible]

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
34001427	3/26/13	3/27/13	-26	3/27/13	-8	
34001412	↓	↓	-28	↓	-8	
34001453	↓	↓	-27	↓	-8	
34000106	3/26/13	3/27/13	-26	3/27/13	-8	
34000433	↓	↓	-28	↓	-8	
34000174	↓	↓	-27	↓	-8	

SUMMA® Canister Log completed by:

ALFRED SANTILLANES
Printed Name

Alfred Santillanes
Signature

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

Soil Vapor Sampling Log

Location	Date	Time	Canister #	PID (ppm)	Starting Vacuum (in. Hg)	Ending Vacuum (in. Hg)	Location Comments
CWL-D-FB1	3/27/13	0852	34001427	N/A	-26	-8	FB
CWL-D1-470	↓	0857	34001412	0.0	-28	-8	SA
CWL-D1-470	↓	0900	3400453	0.0	-27	-8	DU
CWL-D2-FB	3/27/13	0906	34000106	N/A	-26	-8	FB
CWL-D2-470	↓	0918	34000433	0.0	-28	-8	SA
CWL-D2-470	↓	0920	34000174	0.0	-27	-8	DU
		Note: Continuous PID ~~reading~~					
		measurements during purge					
		activities.					

SUMMARY SHEET FOR CALENDAR YEAR 2013 SAMPLES

Sample Summary for CWL Soil Vapor Monitoring
FY13

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 327-13										
CWL-UI1	17-Jan-13	**CWL-UI1-40**	34000605	614560	093306	Environmental	n/a	n/a	614560 / 093309	
		CWL-UI1-80	34000411		093307	Environmental				
		CWL-UI1-120	34001362		093308	Environmental				
		CWL-FB1	34001151		093309	Field QC	n/a	n/a	n/a	Ultra Pure N2
CWL-UI2	17-Jan-13	**CWL-UI2-36**	34000221	614561	093310	Environmental	n/a	n/a	614561 / 093313	
		CWL-UI2-76	34000588		093311	Environmental				
		CWL-UI2-136	34000086		093312	Environmental				
		CWL-FB2	34001654		093313	Field QC	n/a	n/a	n/a	Ultra Pure N2
CWL-D1	17-Jan-13	**CWL-D1-100**	34001398	614562	093314	Environmental	n/a	n/a	614562 / 093320	
		CWL-D1-160	34000158		093315	Environmental				
		CWL-D1-240	34001299		093316	Environmental				
		CWL-D1-350	34000071		093317	Environmental				
		CWL-D1-470	34000705		093318	Environmental				
		CWL-D1-470	34001043		093319	Duplicate				
		CWL-FB3	34000174		093320	Field QC	n/a	n/a	n/a	Ultra Pure N2
CWL-D2	17-Jan-13	**CWL-D2-120**	34000178	614563	093321	Environmental	n/a	n/a	614563 / 093327	
		CWL-D2-240	34001593		093322	Environmental				
		CWL-D2-350	34001321		093323	Environmental				
		CWL-D2-440	34001351		093324	Environmental				
		CWL-D2-470	34000374		093325	Environmental				
		CWL-D2-470	34000273		093326	Duplicate				
		CWL-FB4	34000223		093327	Field QC	n/a	n/a	n/a	Ultra Pure N2
CWL-D3	17-Jan-13	**CWL-D3-120**	34001391	614564	093328	Environmental	n/a	n/a	614564 / 093333	
		CWL-D3-170	34000462		093329	Environmental				
		CWL-D3-350	34001237		093330	Environmental				
		CWL-D3-440	34000345		093331	Environmental				
		CWL-D3-480	34000093		093332	Environmental				
		CWL-FB5	34001660		093333	Field QC	n/a	n/a	n/a	Ultra Pure N2
Re-Sample										
CWL-D1	27-Mar-13	**CWL-D1-470**	34001412	614665	093727	Environmental	n/a	n/a	614665 / 093729	re-sample
		CWL-D1-470	34001453		093728	Environmental				re-sample
		CWL-D1-FB1	34001427		093729	Field QC				Ultra Pure N2
CWL-D2	27-Mar-13	**CWL-D2-470**	34000433	614666	093730	Environmental	n/a	n/a	614666 / 093732	re-sample
		CWL-D2-470	34000174		093731	Environmental				re-sample
		CWL-D2-FB2	34000106		093732	Field QC				Ultra Pure N2

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

AR/COC NUMBERS 614560, 614561, 614562, 614563, 614564

ANALYTICAL QUALITY ASSOCIATES, INC

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

Memorandum

Date: March 4, 2013

To: File

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL SVM
AR/COC: 614560 through -564
SDG: 340-5922-1
Laboratory: TestAmerica – Costa Mesa
Project/Task: 146422.10.11.03
Analysis: VOCs by 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 (VOCs in air). Problems were identified with the data package that resulted in the qualification of data.

1. Toluene was detected in the FB associated with samples 5922-5 through -7. The associated result for sample -7 was a detect > the PQL and < 5X the FB concentration will be **qualified U,B2 at the reported value.**

2. The %RSD for acetone was >30% but < 45%. All associated detected results will be **qualified J,I3**.

3. Batch 4016
   The LCS/LCSD RPD for chloroethane was > UAL. All associated sample results were ND and will be **qualified UJ,L5**.

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

Holding Times/Preservation

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 noted above in the Summary section and as follows.

The %RSD for acetone was >30% but < 45%, with no other associated calibration infractions. All associated ND results will not be qualified.

The CCV %D for 1,2,4-trichlorobenzene in batch 4039, and the CCV%Ds for 1,2-dichloro-1,1,2,2-tetrafluoroethane in batch 4051 were >30% with positive bias. All associated sample results were ND and will not be qualified.

Blanks

No target analytes were detected in the blanks criteria except as noted above in the Summary section and as follows.

2-butanone, 2-hexanone, toluene, and/or acetone were detected in the FB samples. All associated ND results will not be qualified.

Internal Standards

All internal standards met QC acceptance criteria.

Surrogates

Surrogate analyses are not required by this method.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

All LCS/LCSD QC acceptance criteria were met except as follows.

The LCS %Rs for 1,2-dichloro-1,1,2,2-tetrafluoroethane in batch 4039 and for 1,2-dichloro-1,1,2,2-tetrafluoroethane and bromomethane in batch 4051 were > UAL. All associated sample results were ND and will not be qualified.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

No MS/MSD analyses are required by this method. The LCSD analyses were used as a measure laboratory precision. All precision acceptance criteria were met except as noted above in the Summary section.

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Detection Limits/Dilutions

All detection limits were properly reported. Samples were analyzed at various dilutions.

Other QC

Five FBs and two field duplicate pairs were submitted on the AR/COC(s). 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:** 03/05/13

Sample Findings Summary

AR/COC: 614560, 614561, 614562, 614563, 614564

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
TO15			
	093306-001/CWL-UI1-40	CHLOROETHANE (75-00-3)	UJ, L5
	093307-001/CWL-UI1-80	CHLOROETHANE (75-00-3)	UJ, L5
	093308-001/CWL-UI-120	CHLOROETHANE (75-00-3)	UJ, L5
	093309-001/CWL-FB1	CHLOROETHANE (75-00-3)	UJ, L5
	093312-001/CWL-UI2-136	CHLOROETHANE (75-00-3)	UJ, L5
	093312-001/CWL-UI2-136	TOLUENE (108-88-3)	U, B2
	093313-001/CWL-FB2	ACETONE (67-64-1)	J, I3
	093318-001/CWL-D1-470	ACETONE (67-64-1)	J, I3
	093324-001/CWL-D2-440	ACETONE (67-64-1)	J, I3
	093332-001/CWL-D3-480	ACETONE (67-64-1)	J, I3

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

Data Validation Summary Worksheet

AR/COC #: 614560-7.564 Site/Project: Chd SUM Validation Date: 3/4/13

SDG #: 340-5922 Laboratory: TA-CM Validator: M. Hilchey

Matrix: air # of Samples: 28 CVR present: yes Analysis Type: ☒ Organic ☐ Metals

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

Requested Analyses Not Reported none

Sample Number	Laboratory ID	organic	genchem	metals	rad	Comments

Hold Time/Preservation Outliers none

Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT

Comments:

Revised 7/2007

Validated By: [signature]

Organic Worksheet (GC/MS) TD-15

AR/COC #: 614560 → -564 SDG #: 340-5922 Matrix: air

Laboratory Sample IDs: -1 → -28 FB1 = -04 FB2 = -08 FB3 = -015 FB4 = -022 FB5 = -028

Method/Batch #s: TO-15 batch (1) 4016: 1,2,3,4,7 / (2) 4025: 5,6,7,8,9 / (3) 4031: 7,10,13, 16,18,19,21,23,24,27 Tuning (pass/fail): pass TICs Required? (yes/no) no

Analyte (outliers)	Calibration Int. n/a	Calibration RF n/a	Calibration RSD/ R^2	Calibration CCV %D	Method Blank ✓	5X (10X) Blank	LCS %R	~~MS~~ %R	LCSD ~~MSD~~ %R ✓	~~MS/MSD~~ LCS/LCSD RPD	FB1 ppb/v	FB2	FB3	FB4 + FB5 ✓
2-butanone			✓	✓			✓			✓	0.72J	✓	✓	
2-hexanone											0.42J	✓	✓	
toluene											0.28J	0.89	0.17J	
acetone			37								✓	0.64J	✓	
chloroethane			✓							27 (1)		✓		
1,2-dichloro-1,1,2,2-tetrafluoroethane				35.0 (5)			137 (5) 135 (1)			✓				
bromomethane				30.2 (5)			138 (5)							
1,2,4-trichlorobenzene				30.9 (4)			✓							

Surrogate Recovery Outliers n/a

Sample ID						

IS Outliers none

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT

Comments: batch (4) 4038: 14,15,17,18,20,25,26,28
(5) 4061: -22

TAL = 49

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

340-5922

Internal Lab Batch No. NA

SMO Use

AR/COC 614560

Project Name: CWL SVM	Date Samples Shipped: 1/22/13	SMO Authorization: [signature]	☐ Waste Characterization
Project/Task Manager: Tim Jackson	Carrier/Waybill No. 150941	SMO Contact Phone:	☐ RMMA
Project/Task Number: 146422.10.11.03	Lab Contact: Sonia Tabirara/714-258-8610	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order: CF327-13	Lab Destination: Test America, Costa Mesa CA	Send Report to SMO:	☐ 4° Celsius
	Contract No. PO 691437	Wendy Palencia/505-844-3132	Bill to: Sandia National Laboratories (Accounts Payable),
Tech Area:			P.O. Box 5800, MS-0154
Building: Room:	Operational Site:		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
093306	-001	CWL-UI1 40		1/17/13 8:29	SG	SC	6L	none	G	SA	VOC - TO15	1
093307	-001	CWL-UI1 80		1/17/13 8:32	SG	SC	6L	none	G	SA	VOC - TO15	2
093308	-001	CWL-UI1 120		1/17/13 8:37	SG	SC	6L	none	G	SA	VOC - TO15	3
093309	-001	CWL-FB1	NA	1/17/13 8;18	UPN	SC	6L	none	G	FB	VOC - TO15	4

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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 0729/284-2547	Lab Use

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

1. Relinquished by [signature]	Org. 4142	Date 1/21/13	Time 11:38	3. Relinquished by	Org.	Date	Time
1. Received by [signature]	Org. 4142	Date 1/21/13	Time 11:38	3. Received by	Org.	Date	Time
2. Relinquished by [signature]	Org. 4142	Date 1/22/13	Time 0700	4. Relinquished by	Org.	Date	Time
2. Received by [signature]	Org.	Date 1/25/13	Time 10:10	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

340-5922

Internal Lab Batch No. NA

SMO Use

Page 1 of 1

AR/COC 614561

Project Name:	CWL SVM	Date Samples Shipped:	1/22/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	150971	SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.03	Lab Contact:	Sonia Tabirara/714-258-8610	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order:	CF327-13	Lab Destination:	Test America, Costa Mesa CA	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
Tech Area:					
Building:	Room:	Operational Site:			Albuquerque, NM 87185-0154

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
093310	-001	CWL-UI2 36		1/17/13 11:04	SG	SC	6L	none	G	SA	VOC - TO15	5
093311	-001	CWL-UI2 76		1/17/13 11:07	SG	SC	6L	none	G	SA	VOC - TO15	6
093312	-001	CWL-UI2 136		1/17/13 11:10	SG	SC	6L	none	G	SA	VOC - TO15	7
093313	-001	CWL-FB2	NA	1/17/13 11:02	UPN	SC	6L	none	G	FB	VOC - TO15	8

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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 ☐

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			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

	Org.	Date	Time		Org.	Date	Time
1. Relinquished by	4142	1/21/13	11:38	3. Relinquished by			
1. Received by	4142	1/21/13	11:38	3. Received by			
2. Relinquished by	4142	1/22/13	0700	4. Relinquished by			
2. Received by		1/25/13	10:10	4. Received by			

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

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

340-5922

AOP 95-16

Internal Lab

Batch No. NA

SMO Use

Page 1 of 1

AR/COC 614562

Project Name: CWL SVM	Date Samples Shipped: 1/22/13	SMO Authorization: [signature]	☐ Waste Characterization
Project/Task Manager: Tim Jackson	Carrier/Waybill No. 13-0941	SMO Contact Phone:	☐ RMMA
Project/Task Number: 146422.10.11.03	Lab Contact: Sonia Tabrara/714-258-8610	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order: CF327-13	Lab Destination: Test America, Costa Mesa CA	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
Tech Area:			Albuquerque, NM 87185-0154
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
093314	-001	CWL-D1-100		1/17/13 8:53	SG	SC	6L	none	G	SA	VOC - TO15	9
093315	-001	CWL-D1-160		1/17/13 8:58	SG	SC	6L	none	G	SA	VOC - TO15	10
093316	-001	CWL-D1-240		1/17/13 9:02	SG	SC	6L	none	G	SA	VOC - TO15	11
093317	-001	CWL-D1-350		1/17/13 9:07	SG	SC	6L	none	G	SA	VOC - TO15	12
093318	-001	CWL-D1-470		1/17/13 9:13	SG	SC	6L	none	G	SA	VOC - TO15	13
093319	-001	CWL-D1-470		1/17/13 9:15	SG	SC	6L	none	G	DU	VOC - TO15	14
093320	-001	CWL-FB3	NA	1/17/13 9:18	UPN	SC	6L	none	G	FB	VOC - TO15	15

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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 0729/284-2547	Lab Use

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

1. Relinquished by [signature]	Org. 4142	Date 1/21/13	Time 11:38	3. Relinquished by	Org.	Date	Time
1. Received by [signature]	Org. 4142	Date 1/21/13	Time 11:38	3. Received by	Org.	Date	Time
2. Relinquished by [signature] SMO	Org. 4142	Date 1/22/13	Time 0700	4. Relinquished by	Org.	Date	Time
2. Received by [signature]	Org.	Date 1/25/13	Time 10:10	4. Received by	Org.	Date	Time

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

SMO 2012-ARCOC (4-2012) /

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

340-5922

AOP 95-16

Internal Lab Batch No. NA

SMO Use

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AR/COC 614563

Project Name: CWL SVM	Date Samples Shipped: 1/22/13	SMO Authorization: [signature]	☐ Waste Characterization
Project/Task Manager: Tim Jackson	Carrier/Waybill No. 150991	SMO Contact Phone:	☐ RMMA
Project/Task Number: 146422.10.11.03	Lab Contact: Sonia Tabirara/714-258-8610	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order: CF327-13	Lab Destination: Test America, Costa Mesa CA	Send Report to SMO:	☐ 4° Celsius
	Contract No.: PO 691437	Wendy Palencia/505-844-3132	Bill to: Sandia National Laboratories (Accounts Payable),
Tech Area:			P.O. Box 5800, MS-0154
Building: Room:	Operational Site:		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
093321	-001	CWL-D2-120		1/17/13	9:39	SG	SC	6L	none	G	SA	VOC - TO15	16
093322	-001	CWL-D2-240		1/17/13	9:46	SG	SC	6L	none	G	SA	VOC - TO15	17
093323	-001	CWL-D2-350		1/17/13	9:52	SG	SC	6L	none	G	SA	VOC - TO15	18
093324	-001	CWL-D2-440		1/17/13	9:57	SG	SC	6L	none	G	SA	VOC - TO15	19
093325	-001	CWL-D2-470		1/17/13	10:03	SG	SC	6L	none	G	SA	VOC - TO15	20
093326	-001	CWL-D2-470		1/17/13	10:06	SG	SC	6L	none	G	DU	VOC - TO15	21
093327	-001	CWL-FB4	NA	1/17/13	10:15	UPN	SC	6L	none	G	FB	VOC - TO15	22

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	[signature]	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	[signature]	AS	SNL/4142/505-844-5130/505-228-0710
	William Gibson	[signature]	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 [signature]	Org. 4142	Date 1/21/13	Time 11:38	3.Relinquished by	Org.	Date	Time
1. Received by [signature]	Org. 4142	Date 1/21/13	Time 11:38	3. Received by	Org.	Date	Time
2.Relinquished by [signature] SMO	Org. 4142	Date 1/22/13	Time 0700	4.Relinquished by	Org.	Date	Time
2. Received by [signature]	Org.	Date 1/25/13	Time 10:10	4. Received by	Org.	Date	Time

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

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

340-5922

AOP 95-16

Internal Lab

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Batch No. NA

SMO Use

AR/COC 614564

Project Name: CWL SVM	Date Samples Shipped: 1/22/13	SMO Authorization:	☐ Waste Characterization
Project/Task Manager: Tim Jackson	Carrier/Waybill No. 1SO941	SMO Contact Phone:	☐ RMMA
Project/Task Number: 146422.10.11.03	Lab Contact: Sonia Tabirara/714-258-8610	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order: CF327-13	Lab Destination: Test America, Costa Mesa CA	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
093328	-001	CWL-D3-120		1/17/13 10:30	SG	SC	6L	None	G	SA	VOC - TO15	23
093329	-001	CWL-D3-170		1/17/13 10:35	SG	SC	6L	None	G	SA	VOC - TO15	24
093330	-001	CWL-D3-350		1/17/13 10:39	SG	SC	6L	None	G	SA	VOC - TO15	25
093331	-001	CWL-D3-440		1/17/13 10:45	SG	SC	6L	None	G	SA	VOC - TO15	26
093332	-001	CWL-D3-480		1/17/13 10:51	SG	SC	6L	None	G	SA	VOC - TO15	27
093333	-001	CWL-FB5	na	1/17/13 10;23	UPN	SC	6L	None	G	FB	VOC - TO15	28

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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	[signature]	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	[signature]	AS	SNL/4142/505-844-5130/505-228-0710
	William Gibson	[signature]	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

Conditions on Receipt

Lab Use

	Org.	Date	Time		Org.	Date	Time
1. Relinquished by [signature]	4142	1/21/13	11:38	3. Relinquished by			
1. Received by [signature]	4142	1/21/13	11:38	3. Received by			
2. Relinquished by [signature]	4142	1/22/13	0700	4. Relinquished by			
2. Received by [signature]		1/25/13	10:10	4. Received by			

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

AR/COC NUMBERS 614665, 614666

ANALYTICAL QUALITY ASSOCIATES, INC

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

Memorandum

Date: April 17, 2013

To: File

From: Marcia Hilchey

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL SVM
AR/COC: 614665, -666
SDG: 340-6754-1
Laboratory: TestAmerica – Costa Mesa
Project/Task: 146422.10.11.03
Analysis: VOCs by 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

Six samples were prepared and analyzed with accepted procedures using method EPA TO-15 (VOCs in air). 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/Preservation

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 with the following exception. The CCV %D for bromoform was > 30% with positive bias. All associated sample results were ND and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Internal Standards

All internal standards met QC acceptance criteria.

Surrogates

Surrogate analyses are not required by this method.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

All LCS/LCSD QC acceptance criteria were met. It should be noted that total xylenes was not reported for the LCS/LCSD. No sample data will be qualified as a result.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

No MS/MSD analyses are required by this method. The LCSD analyses were used as a measure laboratory precision. All precision acceptance criteria were met.

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Detection Limits/Dilutions

All detection limits were properly reported. Samples were analyzed at various dilutions.

Other QC

Two FBs and two field duplicate pairs were submitted on the AR/COC(s). 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:** 04/17/13

Sample Findings Summary

AR/COC: 614665, 614666

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 #: 614665-666 Site/Project: CWL-SVM Validation Date: 4/18/13

SDG #: 340-6754-1 Laboratory: Validator: M Hibbey

Matrix: air # of Samples: 6 CVR present: yes Analysis Type: ☑ Organic ☐ Metals

AR/COC(s) present: yes Sample Container Integrity: ok ☐ Rad ☐ Gen Chem

Requested Analyses Not Reported none

Sample Number	Laboratory ID	organic	genchem	metals	rad	Comments

Hold Time/Preservation Outliers none

Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT

Comments:

Revised 7/2007

Validated By: [signature]

Organic Worksheet (GC/MS) TO-15

AR/COC #: 614665-666 SDG #: 340-6754-1 Matrix: air

Laboratory Sample IDs: -001 → -06

Method/Batch #s: TO-15 batch 4452 Tuning (pass/fail): pass TICs Required? (yes/no) no

Analyte (outliers)	Calibration Int.	Calibration RF	Calibration RSD/ R^2	ICV/ CCV %D	Method Blank ✓	5X (10X) Blank	LCS %R ✓	~~MS %R~~	LCSD ~~MSD~~ %R ✓	~~MS/ MSD~~ LCSD RPD ✓	FBs ✓			
bromoform	n/a	n/a	✓	✓ / 35.0										

Surrogate Recovery Outliers n/a

Sample ID							

IS Outliers none

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT

Comments: no total xylenes reported in LCS/LCSD or MB

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CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

340-6754

Internal Lab Batch No. N/A

SMO Use

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AR/COC 614665

Project Name:	CWL-SVM	Date Samples Shipped:	3/27/13	SMO Authorization:	[signature]
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	201703	SMO Contact Phone:	
Project/Task Number:	146422.10.11.03	Lab Contact:	Sonia Tabirara/714-258-8610		Wendy Palencia/505-844-3132
Service Order:	CF327-13	Lab Destination:	TACA	Send Report to SMO:	
		Contract No.:	PO 691437		Rita Kavanaugh/505-284-2553

☐ 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

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
093727	-001	CWL-D1-470		3/27/13 8:57	SG	SC	6 L	None	G	SA	VOC-TO15	1
093728	-001	CWL-D1-470		3/27/13 9:00	SG	SC	6 L	None	G	DU	VOC-TO15	2
093729	-001	CWL-D1-FB1		3/27/13 8:52	UPN	SC	6 L	None	G	FB	VOC-TO15	3

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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	[signature]	[initials]	SNL/4142/505-844-4013/505-250-7090
Alfred Santillanes	[signature]	[initials]	SNL/4142/505-844-5130/505-228-0710
William Gibson	[signature]	[initials]	SNL/4142/505-284-3307/505-239-7367

	Org.	Date	Time		Org.	Date	Time
1. Relinquished by [signature]	4142	3/27/13	10:35	3. Relinquished by			
1. Received by [signature]	4142	3/27/13	10:35	3. Received by			
2. Relinquished by [signature]	4142	3/27/13	1156	4. Relinquished by			
2. Received by [signature]		4/1/13	10:10	4. Received by			

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

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

340-6754

AOP 95-16"

Internal Lab Batch No. N/A

SMO Use

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AR/COC 614666

Project Name: CWL-SVM	Date Samples Shipped: 3/27/13	SMO Authorization: [signature]	☐ Waste Characterization
Project/Task Manager: Tim Jackson	Carrier/Waybill No. 201703	SMO Contact Phone:	☐ RMMA
Project/Task Number: 146422.10.11.03	Lab Contact: Sonia Tabirara/714-258-8610	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order: CF327-13	Lab Destination: TACA	Send Report to SMO:	☐ 4° Celsius
	Contract No.: PO 691437	Rita Kavanaugh/505-284-2553	Bill to: Sandia National Laboratories (Accounts Payable),
Tech Area:			P.O. Box 5800, MS-0154
Building: Room:	Operational Site:		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
093730	-001	CWL-D2-470		3/27/13 9:18	SG	SC	6 L	None	G	SA	VOC-TO15	4
093731	-001	CWL-D2-470		3/27/13 9:20	SG	SC	6 L	None	G	DU	VOC-TO15	5
093732	-001	CWL-D2-FB2		3/27/13 9:06	UPN	SC	6 L	None	G	FB	VOC-TO15	6

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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	[signature]	[initials]	SNL/4142/505-844-4013/505-250-7090
Alfred Santillanes	[signature]	[initials]	SNL/4142/505-844-5130/505-228-0710
William Gibson	[signature]	[initials]	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 [signature]	Org. 4142	Date 3/27/13	Time 10:35	3.Relinquished by	Org.	Date	Time
1. Received by [signature]	Org. 4142	Date 3/27/13	Time 1035	3. Received by	Org.	Date	Time
2.Relinquished by [signature] SMO	Org. 4142	Date 3/27/13	Time 1150	4.Relinquished by	Org.	Date	Time
2. Received by [signature]	Org.	Date 4/1/13	Time 10:10	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
614560	Environmental*
614561	Environmental*
614562	Environmental*
614563	Environmental*
614564	Environmental*
614565	Environmental*
614566	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

AR/COC No. 614560, 614561, 614562, 614563, 614564 | Analytical Lab TEST AMERICA – CA | SDG No. 340-5922-1

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	Complete? No	If no, explain	Resolved? Yes	Resolved? No
1.1	All items on COC 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	Resolved? Yes	Resolved? No
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	Hold 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 a) Laboratory control samples accuracy reported and met for all samples		X	RPD FOR CHLOROETHANE OUTSIDE ACCEPTANCE RANGE (BATCH 340-4016) 1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE OUTSIDE RECOVERY LIMITS FOR LCS (340-4039) BROMOMETHANE AND 1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE OUTSIDE RECOVERY LIMITS FOR LCS (340-4051)
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 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	N/A		
3.5 Blank data 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	2-BUTANONE, 2-HEXANONE AND TOLUENE DETECTED IN CWL-FB1 ACETONE AND TOLUENE DETECTED IN CWL-FB2 TOLUENE DETECTED IN CWL-FB3 CWL-FB4 WAS DILUTED
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	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) and pesticides/PCBs 8081 and 8082.	N/A		

Contract Verification Review (Continued)

4.0 Calibrations and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.) 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		
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) 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) 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 a) Instrument run logs provided	N/A		

Contract Verification Review (Continued)

5.0 Data Anomaly Report

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

Contract Verification Review (Concluded)

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 __________ or date correction request was submitted: __________

Reviewed by: W. Palencia Date: 2.26.2013 Closed by: __________ Date: __________

Contract Verification Review (CVR)

Project Leader JACKSON | Project Name CWL SVM | Project/Task No. 146422_10.11.03

AR/COC No. 614665 & 614666 | Analytical Lab TEST AMERICA – CA | SDG No. 340-6754-1

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	Complete? No	If no, explain	Resolved? Yes	Resolved? No
1.1	All items on COC 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	Resolved? Yes	Resolved? No
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	Hold 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 a) Laboratory control samples accuracy reported and met for all samples	X		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	N/A		
c) Matrix spike recovery data reported and met	N/A		
3.4 Precision 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 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		
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	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) and pesticides/PCBs 8081 and 8082.	N/A		

Contract Verification Review (Continued)

4.0 Calibrations and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.) 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		
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) 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) 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 a) Instrument run logs provided	N/A		

Contract Verification Review (Continued)

5.0 Data Anomaly Report

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

Contract Verification Review (Concluded)

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 ____________ or date correction request was submitted: ________________

Reviewed by: W. Palencia Date: 4.9.2013 Closed by: __________________ Date: _____________

SOIL-GAS SAMPLING RESULTS
CERTIFICATES OF ANALYSIS

January 2013 – Soil-Gas Samples

March 2013 – Well D1 – 470 ft port Samples
Well D2 – 470 ft port Samples

Note: Certificates of Analysis are provided on compact disc only, for printed copies of this report.

JANUARY 2013 SOIL-GAS SAMPLING RESULTS

CERTIFICATES OF ANALYSIS

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093306-001/CWL-UI1 40**

Lab Sample ID: 340-5922-1 | Date Sampled: 01/17/2013 0829
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4016	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0644.D
Dilution:	309			Initial Weight/Volume:	1.901 mL
Analysis Date:	02/09/2013 1733			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		190	370
Benzene	ND		62	120
Benzyl chloride	ND		62	250
Bromodichloromethane	ND		46	93
Bromoform	ND		62	250
Bromomethane	ND		62	250
2-Butanone (MEK)	ND		120	250
Carbon disulfide	ND		62	250
Carbon tetrachloride	ND		62	250
Chlorobenzene	ND		31	93
Chloroethane	ND	*	220	460
Chloroform	890		31	93
Chloromethane	ND		120	250
Dibromochloromethane	ND		31	120
1,2-Dibromoethane (EDB)	ND		62	250
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		46	120
1,2-Dichlorobenzene	ND		46	120
1,3-Dichlorobenzene	ND		46	120
1,4-Dichlorobenzene	ND		46	120
Dichlorodifluoromethane	ND		46	120
1,1-Dichloroethane	ND		46	93
1,2-Dichloroethane	ND		62	250
1,1-Dichloroethene	190	J	62	250
cis-1,2-Dichloroethene	ND		62	120
trans-1,2-Dichloroethene	ND		62	120
1,2-Dichloropropane	ND		46	120
cis-1,3-Dichloropropene	ND		46	120
trans-1,3-Dichloropropene	ND		46	120
Ethylbenzene	ND		46	120
4-Ethyltoluene	ND		46	120
Hexachlorobutadiene	ND		62	250
2-Hexanone	ND		62	250
4-Methyl-2-pentanone (MIBK)	ND		46	120
Methylene Chloride	ND		62	120
Styrene	ND		46	120
1,1,2,2-Tetrachloroethane	ND		31	120
Tetrachloroethene	5100		46	120
Toluene	ND		46	120
1,1,2-Trichloro-1,2,2-trifluoroethane	930		62	120
1,2,4-Trichlorobenzene	ND		220	770
1,1,1-Trichloroethane	ND		46	93
1,1,2-Trichloroethane	ND		46	120
Trichloroethene	7300		46	120
Trichlorofluoromethane	230		46	120
1,2,4-Trimethylbenzene	ND		62	250
1,3,5-Trimethylbenzene	ND		46	120

Client: Sandia National Laboratories

Job Number: 340-5922-1

Client Sample ID: **093306-001/CWL-UI1 40**

Lab Sample ID: 340-5922-1

Client Matrix: Air

Date Sampled: 01/17/2013 0829

Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4016	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0644.D
Dilution:	309			Initial Weight/Volume:	1.901 mL
Analysis Date:	02/09/2013 1733			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		62	250
Vinyl chloride	ND		46	120
m,p-Xylene	ND		62	250
o-Xylene	ND		46	120

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093307-001/CWL-UI1 80**

Lab Sample ID: 340-5922-2 | Date Sampled: 01/17/2013 0832
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4016	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0645.D
Dilution:	342			Initial Weight/Volume:	1.708 mL
Analysis Date:	02/09/2013 1812			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		210	410
Benzene	ND		68	140
Benzyl chloride	ND		68	270
Bromodichloromethane	ND		51	100
Bromoform	ND		68	270
Bromomethane	ND		68	270
2-Butanone (MEK)	ND		140	270
Carbon disulfide	ND		68	270
Carbon tetrachloride	ND		68	270
Chlorobenzene	ND		34	100
Chloroethane	ND	*	240	510
Chloroform	700		34	100
Chloromethane	ND		140	270
Dibromochloromethane	ND		34	140
1,2-Dibromoethane (EDB)	ND		68	270
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		51	140
1,2-Dichlorobenzene	ND		51	140
1,3-Dichlorobenzene	ND		51	140
1,4-Dichlorobenzene	ND		51	140
Dichlorodifluoromethane	ND		51	140
1,1-Dichloroethane	ND		51	100
1,2-Dichloroethane	ND		68	270
1,1-Dichloroethene	390		68	270
cis-1,2-Dichloroethene	ND		68	140
trans-1,2-Dichloroethene	ND		68	140
1,2-Dichloropropane	ND		51	140
cis-1,3-Dichloropropene	ND		51	140
trans-1,3-Dichloropropene	ND		51	140
Ethylbenzene	ND		51	140
4-Ethyltoluene	ND		51	140
Hexachlorobutadiene	ND		68	270
2-Hexanone	ND		68	270
4-Methyl-2-pentanone (MIBK)	ND		51	140
Methylene Chloride	72	J	68	140
Styrene	ND		51	140
1,1,2,2-Tetrachloroethane	ND		34	140
Tetrachloroethene	1500		51	140
Toluene	ND		51	140
1,1,2-Trichloro-1,2,2-trifluoroethane	1100		68	140
1,2,4-Trichlorobenzene	ND		240	860
1,1,1-Trichloroethane	ND		51	100
1,1,2-Trichloroethane	ND		51	140
Trichloroethene	9700		51	140
Trichlorofluoromethane	280		51	140
1,2,4-Trimethylbenzene	ND		68	270
1,3,5-Trimethylbenzene	ND		51	140

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093307-001/CWL-UI1 80**

Lab Sample ID: 340-5922-2 | Date Sampled: 01/17/2013 0832
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4016	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0645.D
Dilution:	342			Initial Weight/Volume:	1.708 mL
Analysis Date:	02/09/2013 1812			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		68	270
Vinyl chloride	ND		51	140
m,p-Xylene	ND		68	270
o-Xylene	ND		51	140

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093308-001/CWL-UI 120**

Lab Sample ID: 340-5922-3 | Date Sampled: 01/17/2013 0837
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4016	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0647.D
Dilution:	446			Initial Weight/Volume:	1.653 mL
Analysis Date:	02/09/2013 1937			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		270	540
Benzene	ND		89	180
Benzyl chloride	ND		89	360
Bromodichloromethane	ND		67	130
Bromoform	ND		89	360
Bromomethane	ND		89	360
2-Butanone (MEK)	ND		180	360
Carbon disulfide	ND		89	360
Carbon tetrachloride	ND		89	360
Chlorobenzene	ND		45	130
Chloroethane	ND	*	310	670
Chloroform	520		45	130
Chloromethane	ND		180	360
Dibromochloromethane	ND		45	180
1,2-Dibromoethane (EDB)	ND		89	360
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		67	180
1,2-Dichlorobenzene	ND		67	180
1,3-Dichlorobenzene	ND		67	180
1,4-Dichlorobenzene	ND		67	180
Dichlorodifluoromethane	ND		67	180
1,1-Dichloroethane	ND		67	130
1,2-Dichloroethane	ND		89	360
1,1-Dichloroethene	430		89	360
cis-1,2-Dichloroethene	ND		89	180
trans-1,2-Dichloroethene	ND		89	180
1,2-Dichloropropane	ND		67	180
cis-1,3-Dichloropropene	ND		67	180
trans-1,3-Dichloropropene	ND		67	180
Ethylbenzene	ND		67	180
4-Ethyltoluene	ND		67	180
Hexachlorobutadiene	ND		89	360
2-Hexanone	ND		89	360
4-Methyl-2-pentanone (MIBK)	ND		67	180
Methylene Chloride	240		89	180
Styrene	ND		67	180
1,1,2,2-Tetrachloroethane	ND		45	180
Tetrachloroethene	1000		67	180
Toluene	ND		67	180
1,1,2-Trichloro-1,2,2-trifluoroethane	1200		89	180
1,2,4-Trichlorobenzene	ND		310	1100
1,1,1-Trichloroethane	ND		67	130
1,1,2-Trichloroethane	ND		67	180
Trichloroethene	11000		67	180
Trichlorofluoromethane	290		67	180
1,2,4-Trimethylbenzene	ND		89	360
1,3,5-Trimethylbenzene	ND		67	180

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093308-001/CWL-UI 120**

Lab Sample ID: 340-5922-3 | Date Sampled: 01/17/2013 0837
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4016	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0647.D
Dilution:	446			Initial Weight/Volume:	1.653 mL
Analysis Date:	02/09/2013 1937			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		89	360
Vinyl chloride	ND		67	180
m,p-Xylene	ND		89	360
o-Xylene	ND		67	180

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093309-001/CWL-FB1**

Lab Sample ID: 340-5922-4 | Date Sampled: 01/17/2013 0818
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4016	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0646.D
Dilution:	1.0			Initial Weight/Volume:	571 mL
Analysis Date:	02/09/2013 1858			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		0.60	1.2
Benzene	ND		0.20	0.40
Benzyl chloride	ND		0.20	0.80
Bromodichloromethane	ND		0.15	0.30
Bromoform	ND		0.20	0.80
Bromomethane	ND		0.20	0.80
2-Butanone (MEK)	0.72	J	0.40	0.80
Carbon disulfide	ND		0.20	0.80
Carbon tetrachloride	ND		0.20	0.80
Chlorobenzene	ND		0.10	0.30
Chloroethane	ND	*	0.70	1.5
Chloroform	ND		0.10	0.30
Chloromethane	ND		0.40	0.80
Dibromochloromethane	ND		0.10	0.40
1,2-Dibromoethane (EDB)	ND		0.20	0.80
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.15	0.40
1,2-Dichlorobenzene	ND		0.15	0.40
1,3-Dichlorobenzene	ND		0.15	0.40
1,4-Dichlorobenzene	ND		0.15	0.40
Dichlorodifluoromethane	ND		0.15	0.40
1,1-Dichloroethane	ND		0.15	0.30
1,2-Dichloroethane	ND		0.20	0.80
1,1-Dichloroethene	ND		0.20	0.80
cis-1,2-Dichloroethene	ND		0.20	0.40
trans-1,2-Dichloroethene	ND		0.20	0.40
1,2-Dichloropropane	ND		0.15	0.40
cis-1,3-Dichloropropene	ND		0.15	0.40
trans-1,3-Dichloropropene	ND		0.15	0.40
Ethylbenzene	ND		0.15	0.40
4-Ethyltoluene	ND		0.15	0.40
Hexachlorobutadiene	ND		0.20	0.80
2-Hexanone	0.42	J	0.20	0.80
4-Methyl-2-pentanone (MIBK)	ND		0.15	0.40
Methylene Chloride	ND		0.20	0.40
Styrene	ND		0.15	0.40
1,1,2,2-Tetrachloroethane	ND		0.10	0.40
Tetrachloroethene	ND		0.15	0.40
Toluene	0.28	J	0.15	0.40
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.40
1,2,4-Trichlorobenzene	ND		0.70	2.5
1,1,1-Trichloroethane	ND		0.15	0.30
1,1,2-Trichloroethane	ND		0.15	0.40
Trichloroethene	ND		0.15	0.40
Trichlorofluoromethane	ND		0.15	0.40
1,2,4-Trimethylbenzene	ND		0.20	0.80
1,3,5-Trimethylbenzene	ND		0.15	0.40

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093309-001/CWL-FB1**

Lab Sample ID: 340-5922-4 | Date Sampled: 01/17/2013 0818
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4016	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0646.D
Dilution:	1.0			Initial Weight/Volume:	571 mL
Analysis Date:	02/09/2013 1858			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		0.20	0.80
Vinyl chloride	ND		0.15	0.40
m,p-Xylene	ND		0.20	0.80
o-Xylene	ND		0.15	0.40

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: 093310-001/CWL-UI2 36

Lab Sample ID: 340-5922-5 | Date Sampled: 01/17/2013 1104
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4023	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0668.D
Dilution:	109			Initial Weight/Volume:	6.108 mL
Analysis Date:	02/11/2013 1812			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		65	130
Benzene	ND		22	44
Benzyl chloride	ND		22	87
Bromodichloromethane	ND		16	33
Bromoform	ND		22	87
Bromomethane	ND		22	87
2-Butanone (MEK)	ND		44	87
Carbon disulfide	ND		22	87
Carbon tetrachloride	ND		22	87
Chlorobenzene	ND		11	33
Chloroethane	ND		76	160
Chloroform	540		11	33
Chloromethane	ND		44	87
Dibromochloromethane	ND		11	44
1,2-Dibromoethane (EDB)	ND		22	87
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		16	44
1,2-Dichlorobenzene	ND		16	44
1,3-Dichlorobenzene	ND		16	44
1,4-Dichlorobenzene	ND		16	44
Dichlorodifluoromethane	25	J	16	44
1,1-Dichloroethane	ND		16	33
1,2-Dichloroethane	ND		22	87
1,1-Dichloroethene	34	J	22	87
cis-1,2-Dichloroethene	ND		22	44
trans-1,2-Dichloroethene	ND		22	44
1,2-Dichloropropane	26	J	16	44
cis-1,3-Dichloropropene	ND		16	44
trans-1,3-Dichloropropene	ND		16	44
Ethylbenzene	ND		16	44
4-Ethyltoluene	ND		16	44
Hexachlorobutadiene	ND		22	87
2-Hexanone	ND		22	87
4-Methyl-2-pentanone (MIBK)	ND		16	44
Methylene Chloride	ND		22	44
Styrene	ND		16	44
1,1,2,2-Tetrachloroethane	ND		11	44
Tetrachloroethene	170		16	44
Toluene	ND		16	44
1,1,2-Trichloro-1,2,2-trifluoroethane	530		22	44
1,2,4-Trichlorobenzene	ND		76	270
1,1,1-Trichloroethane	38		16	33
1,1,2-Trichloroethane	ND		16	44
Trichloroethene	3500		16	44
Trichlorofluoromethane	160		16	44
1,2,4-Trimethylbenzene	ND		22	87
1,3,5-Trimethylbenzene	ND		16	44

Analytical Data

Client: Sandia National Laboratories

Job Number: 340-5922-1

Client Sample ID: **093310-001/CWL-UI2 36**

Lab Sample ID: 340-5922-5

Client Matrix: Air

Date Sampled: 01/17/2013 1104

Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4023	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0668.D
Dilution:	109			Initial Weight/Volume:	6.108 mL
Analysis Date:	02/11/2013 1812			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		22	87
Vinyl chloride	ND		16	44
m,p-Xylene	ND		22	87
o-Xylene	ND		16	44

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093311-001/CWL-UI2 76**

Lab Sample ID: 340-5922-6
Client Matrix: Air

Date Sampled: 01/17/2013 1107
Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4023	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0669.D
Dilution:	284			Initial Weight/Volume:	2.272 mL
Analysis Date:	02/11/2013 1851			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		170	340
Benzene	ND		57	110
Benzyl chloride	ND		57	230
Bromodichloromethane	ND		43	85
Bromoform	ND		57	230
Bromomethane	ND		57	230
2-Butanone (MEK)	ND		110	230
Carbon disulfide	ND		57	230
Carbon tetrachloride	ND		57	230
Chlorobenzene	ND		28	85
Chloroethane	ND		200	430
Chloroform	910		28	85
Chloromethane	ND		110	230
Dibromochloromethane	ND		28	110
1,2-Dibromoethane (EDB)	ND		57	230
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		43	110
1,2-Dichlorobenzene	ND		43	110
1,3-Dichlorobenzene	ND		43	110
1,4-Dichlorobenzene	ND		43	110
Dichlorodifluoromethane	52	J	43	110
1,1-Dichloroethane	ND		43	85
1,2-Dichloroethane	ND		57	230
1,1-Dichloroethene	140	J	57	230
cis-1,2-Dichloroethene	ND		57	110
trans-1,2-Dichloroethene	ND		57	110
1,2-Dichloropropane	99	J	43	110
cis-1,3-Dichloropropene	ND		43	110
trans-1,3-Dichloropropene	ND		43	110
Ethylbenzene	ND		43	110
4-Ethyltoluene	ND		43	110
Hexachlorobutadiene	ND		57	230
2-Hexanone	ND		57	230
4-Methyl-2-pentanone (MIBK)	ND		43	110
Methylene Chloride	ND		57	110
Styrene	ND		43	110
1,1,2,2-Tetrachloroethane	ND		28	110
Tetrachloroethene	280		43	110
Toluene	ND		43	110
1,1,2-Trichloro-1,2,2-trifluoroethane	1100		57	110
1,2,4-Trichlorobenzene	ND		200	710
1,1,1-Trichloroethane	50	J	43	85
1,1,2-Trichloroethane	ND		43	110
Trichloroethene	7800		43	110
Trichlorofluoromethane	310		43	110
1,2,4-Trimethylbenzene	ND		57	230
1,3,5-Trimethylbenzene	ND		43	110

Client: Sandia National Laboratories Job Number: 340-5922-1

Client Sample ID: **093311-001/CWL-UI2 76**

Lab Sample ID:	340-5922-6	Date Sampled:	01/17/2013 1107
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4023	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0669.D
Dilution:	284			Initial Weight/Volume:	2.272 mL
Analysis Date:	02/11/2013 1851			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		57	230
Vinyl chloride	ND		43	110
m,p-Xylene	ND		57	230
o-Xylene	ND		43	110

Analytical Data

Client: Sandia National Laboratories

Job Number: 340-5922-1

Client Sample ID: **093312-001/CWL-UI2 136**

Lab Sample ID:	340-5922-7	Date Sampled:	01/17/2013 1110
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4016	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0650.D
Dilution:	1.0			Initial Weight/Volume:	622 mL
Analysis Date:	02/09/2013 2142			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		0.60	1.2
Benzene	2.6		0.20	0.40
Benzyl chloride	ND		0.20	0.80
Bromodichloromethane	0.20	J	0.15	0.30
Bromoform	ND		0.20	0.80
Bromomethane	ND		0.20	0.80
2-Butanone (MEK)	1.4		0.40	0.80
Carbon disulfide	ND		0.20	0.80
Carbon tetrachloride	27		0.20	0.80
Chlorobenzene	1.4		0.10	0.30
Chloroethane	ND	*	0.70	1.5
Chloromethane	ND		0.40	0.80
Dibromochloromethane	ND		0.10	0.40
1,2-Dibromoethane (EDB)	ND		0.20	0.80
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.15	0.40
1,2-Dichlorobenzene	ND		0.15	0.40
1,3-Dichlorobenzene	ND		0.15	0.40
1,4-Dichlorobenzene	ND		0.15	0.40
Dichlorodifluoromethane	38		0.15	0.40
1,1-Dichloroethane	8.6		0.15	0.30
1,2-Dichloroethane	17		0.20	0.80
cis-1,2-Dichloroethene	0.43		0.20	0.40
trans-1,2-Dichloroethene	0.27	J	0.20	0.40
cis-1,3-Dichloropropene	ND		0.15	0.40
trans-1,3-Dichloropropene	ND		0.15	0.40
Ethylbenzene	ND		0.15	0.40
4-Ethyltoluene	ND		0.15	0.40
Hexachlorobutadiene	ND		0.20	0.80
2-Hexanone	ND		0.20	0.80
4-Methyl-2-pentanone (MIBK)	ND		0.15	0.40
Methylene Chloride	4.6		0.20	0.40
Styrene	ND		0.15	0.40
1,1,2,2-Tetrachloroethane	ND		0.10	0.40
Toluene	0.72		0.15	0.40
1,2,4-Trichlorobenzene	ND		0.70	2.5
1,1,2-Trichloroethane	5.0		0.15	0.40
1,2,4-Trimethylbenzene	ND		0.20	0.80
1,3,5-Trimethylbenzene	ND		0.15	0.40
Vinyl acetate	7.0		0.20	0.80
Vinyl chloride	0.36	J	0.15	0.40
m,p-Xylene	ND		0.20	0.80
o-Xylene	ND		0.15	0.40

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093312-001/CWL-UI2 136**

Lab Sample ID:	340-5922-7	Date Sampled:	01/17/2013 1110
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4023	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0671.D
Dilution:	89.2			Initial Weight/Volume:	6.978 mL
Analysis Date:	02/11/2013 2010			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Chloroform	620		8.9	27
1,1-Dichloroethene	180		18	71
1,2-Dichloropropane	130		13	36
Tetrachloroethene	220		13	36
1,1,2-Trichloro-1,2,2-trifluoroethane	970		18	36
1,1,1-Trichloroethane	38		13	27
Trichlorofluoromethane	250		13	36

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: 093312-001/CWL-UI2 136

Lab Sample ID:	340-5922-7	Date Sampled:	01/17/2013 1110
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0681.D
Dilution:	238			Initial Weight/Volume:	2.617 mL
Analysis Date:	02/12/2013 1624			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Trichloroethene	6600		36	95

Analytical Data

Client: Sandia National Laboratories

Job Number: 340-5922-1

Client Sample ID: **093313-001/CWL-FB2**

Lab Sample ID: 340-5922-8
Client Matrix: Air

Date Sampled: 01/17/2013 1102
Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4023	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0672.D
Dilution:	1.0			Initial Weight/Volume:	600 mL
Analysis Date:	02/11/2013 2057			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	0.64	J	0.60	1.2
Benzene	ND		0.20	0.40
Benzyl chloride	ND		0.20	0.80
Bromodichloromethane	ND		0.15	0.30
Bromoform	ND		0.20	0.80
Bromomethane	ND		0.20	0.80
2-Butanone (MEK)	ND		0.40	0.80
Carbon disulfide	ND		0.20	0.80
Carbon tetrachloride	ND		0.20	0.80
Chlorobenzene	ND		0.10	0.30
Chloroethane	ND		0.70	1.5
Chloroform	ND		0.10	0.30
Chloromethane	ND		0.40	0.80
Dibromochloromethane	ND		0.10	0.40
1,2-Dibromoethane (EDB)	ND		0.20	0.80
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.15	0.40
1,2-Dichlorobenzene	ND		0.15	0.40
1,3-Dichlorobenzene	ND		0.15	0.40
1,4-Dichlorobenzene	ND		0.15	0.40
Dichlorodifluoromethane	ND		0.15	0.40
1,1-Dichloroethane	ND		0.15	0.30
1,2-Dichloroethane	ND		0.20	0.80
1,1-Dichloroethene	ND		0.20	0.80
cis-1,2-Dichloroethene	ND		0.20	0.40
trans-1,2-Dichloroethene	ND		0.20	0.40
1,2-Dichloropropane	ND		0.15	0.40
cis-1,3-Dichloropropene	ND		0.15	0.40
trans-1,3-Dichloropropene	ND		0.15	0.40
Ethylbenzene	ND		0.15	0.40
4-Ethyltoluene	ND		0.15	0.40
Hexachlorobutadiene	ND		0.20	0.80
2-Hexanone	ND		0.20	0.80
4-Methyl-2-pentanone (MIBK)	ND		0.15	0.40
Methylene Chloride	ND		0.20	0.40
Styrene	ND		0.15	0.40
1,1,2,2-Tetrachloroethane	ND		0.10	0.40
Tetrachloroethene	ND		0.15	0.40
Toluene	0.89		0.15	0.40
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.40
1,2,4-Trichlorobenzene	ND		0.70	2.5
1,1,1-Trichloroethane	ND		0.15	0.30
1,1,2-Trichloroethane	ND		0.15	0.40
Trichloroethene	ND		0.15	0.40
Trichlorofluoromethane	ND		0.15	0.40
1,2,4-Trimethylbenzene	ND		0.20	0.80
1,3,5-Trimethylbenzene	ND		0.15	0.40

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093313-001/CWL-FB2**

Lab Sample ID:	340-5922-8	Date Sampled:	01/17/2013 1102
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4023	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0672.D
Dilution:	1.0			Initial Weight/Volume:	600 mL
Analysis Date:	02/11/2013 2057			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		0.20	0.80
Vinyl chloride	ND		0.15	0.40
m,p-Xylene	ND		0.20	0.80
o-Xylene	ND		0.15	0.40

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093314-001/CWL-D1-100**

Lab Sample ID: 340-5922-9 | Date Sampled: 01/17/2013 0853
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4023	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0673.D
Dilution:	961			Initial Weight/Volume:	0.6537 mL
Analysis Date:	02/11/2013 2135			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		580	1200
Benzene	ND		190	380
Benzyl chloride	ND		190	770
Bromodichloromethane	ND		140	290
Bromoform	ND		190	770
Bromomethane	ND		190	770
2-Butanone (MEK)	ND		380	770
Carbon disulfide	ND		190	770
Carbon tetrachloride	ND		190	770
Chlorobenzene	ND		96	290
Chloroethane	ND		670	1400
Chloroform	640		96	290
Chloromethane	ND		380	770
Dibromochloromethane	ND		96	380
1,2-Dibromoethane (EDB)	ND		190	770
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		140	380
1,2-Dichlorobenzene	ND		140	380
1,3-Dichlorobenzene	ND		140	380
1,4-Dichlorobenzene	ND		140	380
Dichlorodifluoromethane	ND		140	380
1,1-Dichloroethane	ND		140	290
1,2-Dichloroethane	ND		190	770
1,1-Dichloroethene	410	J	190	770
cis-1,2-Dichloroethene	ND		190	380
trans-1,2-Dichloroethene	ND		190	380
1,2-Dichloropropane	ND		140	380
cis-1,3-Dichloropropene	ND		140	380
trans-1,3-Dichloropropene	ND		140	380
Ethylbenzene	ND		140	380
4-Ethyltoluene	ND		140	380
Hexachlorobutadiene	ND		190	770
2-Hexanone	ND		190	770
4-Methyl-2-pentanone (MIBK)	ND		140	380
Methylene Chloride	ND		190	380
Styrene	ND		140	380
1,1,2,2-Tetrachloroethane	ND		96	380
Tetrachloroethene	1200		140	380
Toluene	ND		140	380
1,1,2-Trichloro-1,2,2-trifluoroethane	1300		190	380
1,2,4-Trichlorobenzene	ND		670	2400
1,1,1-Trichloroethane	ND		140	290
1,1,2-Trichloroethane	ND		140	380
Trichloroethene	12000		140	380
Trichlorofluoromethane	350	J	140	380
1,2,4-Trimethylbenzene	ND		190	770
1,3,5-Trimethylbenzene	ND		140	380

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093314-001/CWL-D1-100**

Lab Sample ID:	340-5922-9	Date Sampled:	01/17/2013 0853
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4023	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0673.D
Dilution:	961			Initial Weight/Volume:	0.6537 mL
Analysis Date:	02/11/2013 2135			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		190	770
Vinyl chloride	ND		140	380
m,p-Xylene	ND		190	770
o-Xylene	ND		140	380

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093315-001/CWL-D1-160**

Lab Sample ID: 340-5922-10 | Date Sampled: 01/17/2013 0858
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0682.D
Dilution:	588			Initial Weight/Volume:	1.051 mL
Analysis Date:	02/12/2013 1703			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		350	710
Benzene	ND		120	240
Benzyl chloride	ND		120	470
Bromodichloromethane	ND		88	180
Bromoform	ND		120	470
Bromomethane	ND		120	470
2-Butanone (MEK)	ND		240	470
Carbon disulfide	ND		120	470
Carbon tetrachloride	ND		120	470
Chlorobenzene	ND		59	180
Chloroethane	ND		410	880
Chloroform	530		59	180
Chloromethane	ND		240	470
Dibromochloromethane	ND		59	240
1,2-Dibromoethane (EDB)	ND		120	470
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		88	240
1,2-Dichlorobenzene	ND		88	240
1,3-Dichlorobenzene	ND		88	240
1,4-Dichlorobenzene	ND		88	240
Dichlorodifluoromethane	ND		88	240
1,1-Dichloroethane	ND		88	180
1,2-Dichloroethane	ND		120	470
1,1-Dichloroethene	630		120	470
cis-1,2-Dichloroethene	ND		120	240
trans-1,2-Dichloroethene	ND		120	240
1,2-Dichloropropane	ND		88	240
cis-1,3-Dichloropropene	ND		88	240
trans-1,3-Dichloropropene	ND		88	240
Ethylbenzene	ND		88	240
4-Ethyltoluene	ND		88	240
Hexachlorobutadiene	ND		120	470
2-Hexanone	ND		120	470
4-Methyl-2-pentanone (MIBK)	ND		88	240
Methylene Chloride	ND		120	240
Styrene	ND		88	240
1,1,2,2-Tetrachloroethane	ND		59	240
Tetrachloroethene	820		88	240
Toluene	ND		88	240
1,1,2-Trichloro-1,2,2-trifluoroethane	1900		120	240
1,2,4-Trichlorobenzene	ND		410	1500
1,1,1-Trichloroethane	ND		88	180
1,1,2-Trichloroethane	ND		88	240
Trichloroethene	16000		88	240
Trichlorofluoromethane	450		88	240
1,2,4-Trimethylbenzene	ND		120	470
1,3,5-Trimethylbenzene	ND		88	240

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093315-001/CWL-D1-160**

Lab Sample ID: 340-5922-10 | Date Sampled: 01/17/2013 0858

Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0682.D
Dilution:	588			Initial Weight/Volume:	1.051 mL
Analysis Date:	02/12/2013 1703			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		120	470
Vinyl chloride	ND		88	240
m,p-Xylene	ND		120	470
o-Xylene	ND		88	240

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: 093316-001/CWL-D1-240

Lab Sample ID: 340-5922-11 | Date Sampled: 01/17/2013 0902
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0683.D
Dilution:	733			Initial Weight/Volume:	1.009 mL
Analysis Date:	02/12/2013 1744			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		440	880
Benzene	ND		150	290
Benzyl chloride	ND		150	590
Bromodichloromethane	ND		110	220
Bromoform	ND		150	590
Bromomethane	ND		150	590
2-Butanone (MEK)	ND		290	590
Carbon disulfide	ND		150	590
Carbon tetrachloride	ND		150	590
Chlorobenzene	ND		73	220
Chloroethane	ND		510	1100
Chloroform	440		73	220
Chloromethane	ND		290	590
Dibromochloromethane	ND		73	290
1,2-Dibromoethane (EDB)	ND		150	590
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		110	290
1,2-Dichlorobenzene	ND		110	290
1,3-Dichlorobenzene	ND		110	290
1,4-Dichlorobenzene	ND		110	290
Dichlorodifluoromethane	ND		110	290
1,1-Dichloroethane	ND		110	220
1,2-Dichloroethane	ND		150	590
1,1-Dichloroethene	1100		150	590
cis-1,2-Dichloroethene	ND		150	290
trans-1,2-Dichloroethene	ND		150	290
1,2-Dichloropropane	180	J	110	290
cis-1,3-Dichloropropene	ND		110	290
trans-1,3-Dichloropropene	ND		110	290
Ethylbenzene	ND		110	290
4-Ethyltoluene	ND		110	290
Hexachlorobutadiene	ND		150	590
2-Hexanone	ND		150	590
4-Methyl-2-pentanone (MIBK)	ND		110	290
Methylene Chloride	ND		150	290
Styrene	ND		110	290
1,1,2,2-Tetrachloroethane	ND		73	290
Tetrachloroethene	530		110	290
Toluene	ND		110	290
1,1,2-Trichloro-1,2,2-trifluoroethane	2800		150	290
1,2,4-Trichlorobenzene	ND		510	1800
1,1,1-Trichloroethane	ND		110	220
1,1,2-Trichloroethane	ND		110	290
Trichloroethene	23000		110	290
Trichlorofluoromethane	660		110	290
1,2,4-Trimethylbenzene	ND		150	590
1,3,5-Trimethylbenzene	ND		110	290

Client: Sandia National Laboratories — Job Number: 340-5922-1

Client Sample ID: **093316-001/CWL-D1-240**

Lab Sample ID: 340-5922-11 — Date Sampled: 01/17/2013 0902
Client Matrix: Air — Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0683.D
Dilution:	733			Initial Weight/Volume:	1.009 mL
Analysis Date:	02/12/2013 1744			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		150	590
Vinyl chloride	ND		110	290
m,p-Xylene	ND		150	590
o-Xylene	ND		110	290

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: 093317-001/CWL-D1-350

Lab Sample ID: 340-5922-12
Client Matrix: Air

Date Sampled: 01/17/2013 0907
Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0684.D
Dilution:	480			Initial Weight/Volume:	1.232 mL
Analysis Date:	02/12/2013 1823			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		290	580
Benzene	ND		96	190
Benzyl chloride	ND		96	380
Bromodichloromethane	ND		72	140
Bromoform	ND		96	380
Bromomethane	ND		96	380
2-Butanone (MEK)	ND		190	380
Carbon disulfide	ND		96	380
Carbon tetrachloride	ND		96	380
Chlorobenzene	ND		48	140
Chloroethane	ND		340	720
Chloroform	150		48	140
Chloromethane	ND		190	380
Dibromochloromethane	ND		48	190
1,2-Dibromoethane (EDB)	ND		96	380
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		72	190
1,2-Dichlorobenzene	ND		72	190
1,3-Dichlorobenzene	ND		72	190
1,4-Dichlorobenzene	ND		72	190
Dichlorodifluoromethane	ND		72	190
1,1-Dichloroethane	ND		72	140
1,2-Dichloroethane	ND		96	380
1,1-Dichloroethene	700		96	380
cis-1,2-Dichloroethene	ND		96	190
trans-1,2-Dichloroethene	ND		96	190
1,2-Dichloropropane	ND		72	190
cis-1,3-Dichloropropene	ND		72	190
trans-1,3-Dichloropropene	ND		72	190
Ethylbenzene	ND		72	190
4-Ethyltoluene	ND		72	190
Hexachlorobutadiene	ND		96	380
2-Hexanone	ND		96	380
4-Methyl-2-pentanone (MIBK)	ND		72	190
Methylene Chloride	ND		96	190
Styrene	ND		72	190
1,1,2,2-Tetrachloroethane	ND		48	190
Tetrachloroethene	210		72	190
Toluene	ND		72	190
1,1,2-Trichloro-1,2,2-trifluoroethane	1800		96	190
1,2,4-Trichlorobenzene	ND		340	1200
1,1,1-Trichloroethane	ND		72	140
1,1,2-Trichloroethane	ND		72	190
Trichloroethene	13000		72	190
Trichlorofluoromethane	450		72	190
1,2,4-Trimethylbenzene	ND		96	380
1,3,5-Trimethylbenzene	ND		72	190

Analytical Data

Client: Sandia National Laboratories

Job Number: 340-5922-1

Client Sample ID: **093317-001/CWL-D1-350**

Lab Sample ID: 340-5922-12

Client Matrix: Air

Date Sampled: 01/17/2013 0907

Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0684.D
Dilution:	480			Initial Weight/Volume:	1.232 mL
Analysis Date:	02/12/2013 1823			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		96	380
Vinyl chloride	ND		72	190
m,p-Xylene	ND		96	380
o-Xylene	ND		72	190

Analytical Data

Client: Sandia National Laboratories

Job Number: 340-5922-1

Client Sample ID: **093318-001/CWL-D1-470**

Lab Sample ID: 340-5922-13
Client Matrix: Air

Date Sampled: 01/17/2013 0913
Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0685.D
Dilution:	2.58			Initial Weight/Volume:	250 mL
Analysis Date:	02/12/2013 1904			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	12		1.5	3.1
Benzene	ND		0.52	1.0
Benzyl chloride	ND		0.52	2.1
Bromodichloromethane	ND		0.39	0.77
Bromoform	ND		0.52	2.1
Bromomethane	ND		0.52	2.1
2-Butanone (MEK)	4.7		1.0	2.1
Carbon disulfide	ND		0.52	2.1
Carbon tetrachloride	ND		0.52	2.1
Chlorobenzene	ND		0.26	0.77
Chloroethane	ND		1.8	3.9
Chloroform	0.76	J	0.26	0.77
Chloromethane	ND		1.0	2.1
Dibromochloromethane	ND		0.26	1.0
1,2-Dibromoethane (EDB)	ND		0.52	2.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.39	1.0
1,2-Dichlorobenzene	ND		0.39	1.0
1,3-Dichlorobenzene	ND		0.39	1.0
1,4-Dichlorobenzene	ND		0.39	1.0
Dichlorodifluoromethane	1.4		0.39	1.0
1,1-Dichloroethane	ND		0.39	0.77
1,2-Dichloroethane	ND		0.52	2.1
1,1-Dichloroethene	4.5		0.52	2.1
cis-1,2-Dichloroethene	ND		0.52	1.0
trans-1,2-Dichloroethene	ND		0.52	1.0
1,2-Dichloropropane	ND		0.39	1.0
cis-1,3-Dichloropropene	ND		0.39	1.0
trans-1,3-Dichloropropene	ND		0.39	1.0
Ethylbenzene	ND		0.39	1.0
4-Ethyltoluene	ND		0.39	1.0
Hexachlorobutadiene	ND		0.52	2.1
2-Hexanone	0.53	J	0.52	2.1
4-Methyl-2-pentanone (MIBK)	ND		0.39	1.0
Methylene Chloride	0.80	J	0.52	1.0
Styrene	ND		0.39	1.0
1,1,2,2-Tetrachloroethane	ND		0.26	1.0
Tetrachloroethene	1.9		0.39	1.0
Toluene	ND		0.39	1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	16		0.52	1.0
1,2,4-Trichlorobenzene	ND		1.8	6.5
1,1,1-Trichloroethane	ND		0.39	0.77
1,1,2-Trichloroethane	ND		0.39	1.0
Trichloroethene	78		0.39	1.0
Trichlorofluoromethane	4.8		0.39	1.0
1,2,4-Trimethylbenzene	ND		0.52	2.1
1,3,5-Trimethylbenzene	ND		0.39	1.0

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093318-001/CWL-D1-470**

Lab Sample ID: 340-5922-13 | Date Sampled: 01/17/2013 0913
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0685.D
Dilution:	2.58			Initial Weight/Volume:	250 mL
Analysis Date:	02/12/2013 1904			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		0.52	2.1
Vinyl chloride	ND		0.39	1.0
m,p-Xylene	ND		0.52	2.1
o-Xylene	ND		0.39	1.0

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093319-001/CWL-D1-470**

Lab Sample ID: 340-5922-14 | Date Sampled: 01/17/2013 0915
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4039	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0703.D
Dilution:	2.51			Initial Weight/Volume:	250 mL
Analysis Date:	02/13/2013 1450			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		1.5	3.0
Benzene	ND		0.50	1.0
Benzyl chloride	ND		0.50	2.0
Bromodichloromethane	ND		0.38	0.75
Bromoform	ND		0.50	2.0
Bromomethane	ND		0.50	2.0
2-Butanone (MEK)	1.5	J	1.0	2.0
Carbon disulfide	ND		0.50	2.0
Carbon tetrachloride	ND		0.50	2.0
Chlorobenzene	ND		0.25	0.75
Chloroethane	ND		1.8	3.8
Chloroform	0.40	J	0.25	0.75
Chloromethane	ND		1.0	2.0
Dibromochloromethane	ND		0.25	1.0
1,2-Dibromoethane (EDB)	ND		0.50	2.0
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	0.38	1.0
1,2-Dichlorobenzene	ND		0.38	1.0
1,3-Dichlorobenzene	ND		0.38	1.0
1,4-Dichlorobenzene	ND		0.38	1.0
Dichlorodifluoromethane	2.2		0.38	1.0
1,1-Dichloroethane	ND		0.38	0.75
1,2-Dichloroethane	ND		0.50	2.0
1,1-Dichloroethene	5.2		0.50	2.0
cis-1,2-Dichloroethene	ND		0.50	1.0
trans-1,2-Dichloroethene	ND		0.50	1.0
1,2-Dichloropropane	ND		0.38	1.0
cis-1,3-Dichloropropene	ND		0.38	1.0
trans-1,3-Dichloropropene	ND		0.38	1.0
Ethylbenzene	ND		0.38	1.0
4-Ethyltoluene	ND		0.38	1.0
Hexachlorobutadiene	0.54	J	0.50	2.0
2-Hexanone	ND		0.50	2.0
4-Methyl-2-pentanone (MIBK)	ND		0.38	1.0
Methylene Chloride	1.8		0.50	1.0
Styrene	ND		0.38	1.0
1,1,2,2-Tetrachloroethane	ND		0.25	1.0
Tetrachloroethene	1.3		0.38	1.0
Toluene	ND		0.38	1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	24		0.50	1.0
1,2,4-Trichlorobenzene	ND		1.8	6.3
1,1,1-Trichloroethane	ND		0.38	0.75
1,1,2-Trichloroethane	ND		0.38	1.0
Trichloroethene	51		0.38	1.0
Trichlorofluoromethane	8.2		0.38	1.0
1,2,4-Trimethylbenzene	ND		0.50	2.0
1,3,5-Trimethylbenzene	ND		0.38	1.0

Analytical Data

Client: Sandia National Laboratories Job Number: 340-5922-1

Client Sample ID: 093319-001/CWL-D1-470

Lab Sample ID:	340-5922-14	Date Sampled:	01/17/2013 0915
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4039	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0703.D
Dilution:	2.51			Initial Weight/Volume:	250 mL
Analysis Date:	02/13/2013 1450			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		0.50	2.0
Vinyl chloride	ND		0.38	1.0
m,p-Xylene	ND		0.50	2.0
o-Xylene	ND		0.38	1.0

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: 093320-001/CWL--FB3

Lab Sample ID: 340-5922-15 | Date Sampled: 01/17/2013 0918
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4039	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0700.D
Dilution:	1.0			Initial Weight/Volume:	534 mL
Analysis Date:	02/13/2013 1246			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		0.60	1.2
Benzene	ND		0.20	0.40
Benzyl chloride	ND		0.20	0.80
Bromodichloromethane	ND		0.15	0.30
Bromoform	ND		0.20	0.80
Bromomethane	ND		0.20	0.80
2-Butanone (MEK)	ND		0.40	0.80
Carbon disulfide	ND		0.20	0.80
Carbon tetrachloride	ND		0.20	0.80
Chlorobenzene	ND		0.10	0.30
Chloroethane	ND		0.70	1.5
Chloroform	ND		0.10	0.30
Chloromethane	ND		0.40	0.80
Dibromochloromethane	ND		0.10	0.40
1,2-Dibromoethane (EDB)	ND		0.20	0.80
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	0.15	0.40
1,2-Dichlorobenzene	ND		0.15	0.40
1,3-Dichlorobenzene	ND		0.15	0.40
1,4-Dichlorobenzene	ND		0.15	0.40
Dichlorodifluoromethane	ND		0.15	0.40
1,1-Dichloroethane	ND		0.15	0.30
1,2-Dichloroethane	ND		0.20	0.80
1,1-Dichloroethene	ND		0.20	0.80
cis-1,2-Dichloroethene	ND		0.20	0.40
trans-1,2-Dichloroethene	ND		0.20	0.40
1,2-Dichloropropane	ND		0.15	0.40
cis-1,3-Dichloropropene	ND		0.15	0.40
trans-1,3-Dichloropropene	ND		0.15	0.40
Ethylbenzene	ND		0.15	0.40
4-Ethyltoluene	ND		0.15	0.40
Hexachlorobutadiene	ND		0.20	0.80
2-Hexanone	ND		0.20	0.80
4-Methyl-2-pentanone (MIBK)	ND		0.15	0.40
Methylene Chloride	ND		0.20	0.40
Styrene	ND		0.15	0.40
1,1,2,2-Tetrachloroethane	ND		0.10	0.40
Tetrachloroethene	ND		0.15	0.40
Toluene	0.17	J	0.15	0.40
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.40
1,2,4-Trichlorobenzene	ND		0.70	2.5
1,1,1-Trichloroethane	ND		0.15	0.30
1,1,2-Trichloroethane	ND		0.15	0.40
Trichloroethene	ND		0.15	0.40
Trichlorofluoromethane	ND		0.15	0.40
1,2,4-Trimethylbenzene	ND		0.20	0.80
1,3,5-Trimethylbenzene	ND		0.15	0.40

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093320-001/CWL--FB3**

Lab Sample ID:	340-5922-15	Date Sampled:	01/17/2013 0918
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4039	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0700.D
Dilution:	1.0			Initial Weight/Volume:	534 mL
Analysis Date:	02/13/2013 1246			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		0.20	0.80
Vinyl chloride	ND		0.15	0.40
m,p-Xylene	ND		0.20	0.80
o-Xylene	ND		0.15	0.40

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093321-001/CWL-D2-120**

Lab Sample ID: 340-5922-16 | Date Sampled: 01/17/2013 0939
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0689.D
Dilution:	603			Initial Weight/Volume:	0.9513 mL
Analysis Date:	02/12/2013 2149			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		360	720
Benzene	ND		120	240
Benzyl chloride	ND		120	480
Bromodichloromethane	ND		90	180
Bromoform	ND		120	480
Bromomethane	ND		120	480
2-Butanone (MEK)	ND		240	480
Carbon disulfide	ND		120	480
Carbon tetrachloride	ND		120	480
Chlorobenzene	ND		60	180
Chloroethane	ND		420	900
Chloroform	770		60	180
Chloromethane	ND		240	480
Dibromochloromethane	ND		60	240
1,2-Dibromoethane (EDB)	ND		120	480
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		90	240
1,2-Dichlorobenzene	ND		90	240
1,3-Dichlorobenzene	ND		90	240
1,4-Dichlorobenzene	ND		90	240
Dichlorodifluoromethane	ND		90	240
1,1-Dichloroethane	ND		90	180
1,2-Dichloroethane	ND		120	480
1,1-Dichloroethene	690		120	480
cis-1,2-Dichloroethene	ND		120	240
trans-1,2-Dichloroethene	ND		120	240
1,2-Dichloropropane	210	J	90	240
cis-1,3-Dichloropropene	ND		90	240
trans-1,3-Dichloropropene	ND		90	240
Ethylbenzene	ND		90	240
4-Ethyltoluene	ND		90	240
Hexachlorobutadiene	ND		120	480
2-Hexanone	ND		120	480
4-Methyl-2-pentanone (MIBK)	ND		90	240
Methylene Chloride	ND		120	240
Styrene	ND		90	240
1,1,2,2-Tetrachloroethane	ND		60	240
Tetrachloroethene	720		90	240
Toluene	ND		90	240
1,1,2-Trichloro-1,2,2-trifluoroethane	2100		120	240
1,2,4-Trichlorobenzene	ND		420	1500
1,1,1-Trichloroethane	ND		90	180
1,1,2-Trichloroethane	ND		90	240
Trichloroethene	19000		90	240
Trichlorofluoromethane	560		90	240
1,2,4-Trimethylbenzene	ND		120	480
1,3,5-Trimethylbenzene	ND		90	240

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093321-001/CWL-D2-120**

Lab Sample ID: 340-5922-16 | Date Sampled: 01/17/2013 0939
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0689.D
Dilution:	603			Initial Weight/Volume:	0.9513 mL
Analysis Date:	02/12/2013 2149			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		120	480
Vinyl chloride	ND		90	240
m,p-Xylene	ND		120	480
o-Xylene	ND		90	240

Analytical Data

Client: Sandia National Laboratories

Job Number: 340-5922-1

Client Sample ID: **093322-001/CWL-D2-240**

Lab Sample ID: 340-5922-17

Client Matrix: Air

Date Sampled: 01/17/2013 0946

Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4039	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0707.D
Dilution:	783			Initial Weight/Volume:	0.772 mL
Analysis Date:	02/13/2013 1734			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		470	940
Benzene	ND		160	310
Benzyl chloride	ND		160	630
Bromodichloromethane	ND		120	230
Bromoform	ND		160	630
Bromomethane	ND		160	630
2-Butanone (MEK)	ND		310	630
Carbon disulfide	ND		160	630
Carbon tetrachloride	ND		160	630
Chlorobenzene	ND		78	230
Chloroethane	ND		550	1200
Chloroform	640		78	230
Chloromethane	ND		310	630
Dibromochloromethane	ND		78	310
1,2-Dibromoethane (EDB)	ND		160	630
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	120	310
1,2-Dichlorobenzene	ND		120	310
1,3-Dichlorobenzene	ND		120	310
1,4-Dichlorobenzene	ND		120	310
Dichlorodifluoromethane	ND		120	310
1,1-Dichloroethane	ND		120	230
1,2-Dichloroethane	ND		160	630
1,1-Dichloroethene	880		160	630
cis-1,2-Dichloroethene	ND		160	310
trans-1,2-Dichloroethene	ND		160	310
1,2-Dichloropropane	260	J	120	310
cis-1,3-Dichloropropene	ND		120	310
trans-1,3-Dichloropropene	ND		120	310
Ethylbenzene	ND		120	310
4-Ethyltoluene	ND		120	310
Hexachlorobutadiene	ND		160	630
2-Hexanone	ND		160	630
4-Methyl-2-pentanone (MIBK)	ND		120	310
Methylene Chloride	ND		160	310
Styrene	ND		120	310
1,1,2,2-Tetrachloroethane	ND		78	310
Tetrachloroethene	580		120	310
Toluene	ND		120	310
1,1,2-Trichloro-1,2,2-trifluoroethane	2400		160	310
1,2,4-Trichlorobenzene	ND		550	2000
1,1,1-Trichloroethane	ND		120	230
1,1,2-Trichloroethane	ND		120	310
Trichloroethene	23000		120	310
Trichlorofluoromethane	620		120	310
1,2,4-Trimethylbenzene	ND		160	630
1,3,5-Trimethylbenzene	ND		120	310

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: 093322-001/CWL-D2-240

Lab Sample ID:	340-5922-17	Date Sampled:	01/17/2013 0946
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4039	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0707.D
Dilution:	783			Initial Weight/Volume:	0.772 mL
Analysis Date:	02/13/2013 1734			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		160	630
Vinyl chloride	ND		120	310
m,p-Xylene	ND		160	630
o-Xylene	ND		120	310

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093323-001/CWL-D2-350**

Lab Sample ID: 340-5922-18 | Date Sampled: 01/17/2013 0952

Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0690.D
Dilution:	209			Initial Weight/Volume:	2.656 mL
Analysis Date:	02/12/2013 2228			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		130	250
Benzene	ND		42	84
Benzyl chloride	ND		42	170
Bromodichloromethane	ND		31	63
Bromoform	ND		42	170
Bromomethane	ND		42	170
2-Butanone (MEK)	ND		84	170
Carbon disulfide	ND		42	170
Carbon tetrachloride	ND		42	170
Chlorobenzene	ND		21	63
Chloroethane	ND		150	310
Chloroform	250		21	63
Chloromethane	ND		84	170
Dibromochloromethane	ND		21	84
1,2-Dibromoethane (EDB)	ND		42	170
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		31	84
1,2-Dichlorobenzene	ND		31	84
1,3-Dichlorobenzene	ND		31	84
1,4-Dichlorobenzene	ND		31	84
Dichlorodifluoromethane	51	J	31	84
1,1-Dichloroethane	ND		31	63
1,2-Dichloroethane	ND		42	170
1,1-Dichloroethene	510		42	170
cis-1,2-Dichloroethene	ND		42	84
trans-1,2-Dichloroethene	ND		42	84
1,2-Dichloropropane	90		31	84
cis-1,3-Dichloropropene	ND		31	84
trans-1,3-Dichloropropene	ND		31	84
Ethylbenzene	ND		31	84
4-Ethyltoluene	ND		31	84
Hexachlorobutadiene	ND		42	170
2-Hexanone	ND		42	170
4-Methyl-2-pentanone (MIBK)	ND		31	84
Methylene Chloride	58	J	42	84
Styrene	ND		31	84
1,1,2,2-Tetrachloroethane	ND		21	84
Tetrachloroethene	300		31	84
Toluene	ND		31	84
1,1,2-Trichloro-1,2,2-trifluoroethane	1400		42	84
1,2,4-Trichlorobenzene	ND		150	520
1,1,1-Trichloroethane	ND		31	63
1,1,2-Trichloroethane	ND		31	84
Trichlorofluoromethane	350		31	84
1,2,4-Trimethylbenzene	ND		42	170
1,3,5-Trimethylbenzene	ND		31	84
Vinyl acetate	ND		42	170

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093323-001/CWL-D2-350**

Lab Sample ID:	340-5922-18	Date Sampled:	01/17/2013 0952
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0690.D
Dilution:	209			Initial Weight/Volume:	2.656 mL
Analysis Date:	02/12/2013 2228			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl chloride	ND		31	84
m,p-Xylene	ND		42	170
o-Xylene	ND		31	84

Analytical Data

Client: Sandia National Laboratories

Job Number: 340-5922-1

Client Sample ID: **093323-001/CWL-D2-350**

Lab Sample ID:	340-5922-18	Date Sampled:	01/17/2013 0952
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4039	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0701.D
Dilution:	460			Initial Weight/Volume:	1.206 mL
Analysis Date:	02/13/2013 1327			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Trichloroethene	13000		69	180

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093324-001/CWL-D2-440**

Lab Sample ID:	340-5922-19	Date Sampled:	01/17/2013 0957
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0691.D
Dilution:	5.77			Initial Weight/Volume:	100 mL
Analysis Date:	02/12/2013 2308			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	9.7		3.5	6.9
Benzene	ND		1.2	2.3
Benzyl chloride	ND		1.2	4.6
Bromodichloromethane	ND		0.87	1.7
Bromoform	ND		1.2	4.6
Bromomethane	ND		1.2	4.6
2-Butanone (MEK)	ND		2.3	4.6
Carbon disulfide	ND		1.2	4.6
Carbon tetrachloride	ND		1.2	4.6
Chlorobenzene	ND		0.58	1.7
Chloroethane	ND		4.0	8.7
Chloroform	2.8		0.58	1.7
Chloromethane	ND		2.3	4.6
Dibromochloromethane	ND		0.58	2.3
1,2-Dibromoethane (EDB)	ND		1.2	4.6
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.87	2.3
1,2-Dichlorobenzene	ND		0.87	2.3
1,3-Dichlorobenzene	ND		0.87	2.3
1,4-Dichlorobenzene	ND		0.87	2.3
Dichlorodifluoromethane	ND		0.87	2.3
1,1-Dichloroethane	ND		0.87	1.7
1,2-Dichloroethane	ND		1.2	4.6
1,1-Dichloroethene	5.7		1.2	4.6
cis-1,2-Dichloroethene	ND		1.2	2.3
trans-1,2-Dichloroethene	ND		1.2	2.3
1,2-Dichloropropane	1.0	J	0.87	2.3
cis-1,3-Dichloropropene	ND		0.87	2.3
trans-1,3-Dichloropropene	ND		0.87	2.3
Ethylbenzene	ND		0.87	2.3
4-Ethyltoluene	ND		0.87	2.3
Hexachlorobutadiene	ND		1.2	4.6
2-Hexanone	ND		1.2	4.6
4-Methyl-2-pentanone (MIBK)	ND		0.87	2.3
Methylene Chloride	1.2	J	1.2	2.3
Styrene	ND		0.87	2.3
1,1,2,2-Tetrachloroethane	ND		0.58	2.3
Tetrachloroethene	3.3		0.87	2.3
Toluene	ND		0.87	2.3
1,1,2-Trichloro-1,2,2-trifluoroethane	11		1.2	2.3
1,2,4-Trichlorobenzene	ND		4.0	14
1,1,1-Trichloroethane	ND		0.87	1.7
1,1,2-Trichloroethane	ND		0.87	2.3
Trichloroethene	110		0.87	2.3
Trichlorofluoromethane	3.4		0.87	2.3
1,2,4-Trimethylbenzene	ND		1.2	4.6
1,3,5-Trimethylbenzene	ND		0.87	2.3

Analytical Data

Client: Sandia National Laboratories Job Number: 340-5922-1

Client Sample ID: 093324-001/CWL-D2-440

Lab Sample ID:	340-5922-19	Date Sampled:	01/17/2013 0957
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0691.D
Dilution:	5.77			Initial Weight/Volume:	100 mL
Analysis Date:	02/12/2013 2308			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		1.2	4.6
Vinyl chloride	ND		0.87	2.3
m,p-Xylene	ND		1.2	4.6
o-Xylene	ND		0.87	2.3

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093325-001/CWL-D2-470**

Lab Sample ID: 340-5922-20
Client Matrix: Air

Date Sampled: 01/17/2013 1003
Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4039	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0702.D
Dilution:	224			Initial Weight/Volume:	2.768 mL
Analysis Date:	02/13/2013 1408			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		130	270
Benzene	ND		45	90
Benzyl chloride	ND		45	180
Bromodichloromethane	ND		34	67
Bromoform	ND		45	180
Bromomethane	ND		45	180
2-Butanone (MEK)	ND		90	180
Carbon disulfide	ND		45	180
Carbon tetrachloride	ND		45	180
Chlorobenzene	ND		22	67
Chloroethane	ND		160	340
Chloroform	360		22	67
Chloromethane	ND		90	180
Dibromochloromethane	ND		22	90
1,2-Dibromoethane (EDB)	ND		45	180
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	34	90
1,2-Dichlorobenzene	ND		34	90
1,3-Dichlorobenzene	ND		34	90
1,4-Dichlorobenzene	ND		34	90
Dichlorodifluoromethane	ND		34	90
1,1-Dichloroethane	ND		34	67
1,2-Dichloroethane	ND		45	180
1,1-Dichloroethene	130	J	45	180
cis-1,2-Dichloroethene	ND		45	90
trans-1,2-Dichloroethene	ND		45	90
1,2-Dichloropropane	99		34	90
cis-1,3-Dichloropropene	ND		34	90
trans-1,3-Dichloropropene	ND		34	90
Ethylbenzene	ND		34	90
4-Ethyltoluene	ND		34	90
Hexachlorobutadiene	ND		45	180
2-Hexanone	ND		45	180
4-Methyl-2-pentanone (MIBK)	ND		34	90
Methylene Chloride	ND		45	90
Styrene	ND		34	90
1,1,2,2-Tetrachloroethane	ND		22	90
Tetrachloroethene	340		34	90
Toluene	ND		34	90
1,1,2-Trichloro-1,2,2-trifluoroethane	390		45	90
1,2,4-Trichlorobenzene	ND		160	560
1,1,1-Trichloroethane	36	J	34	67
1,1,2-Trichloroethane	ND		34	90
Trichloroethene	7000		34	90
Trichlorofluoromethane	130		34	90
1,2,4-Trimethylbenzene	ND		45	180
1,3,5-Trimethylbenzene	ND		34	90

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093325-001/CWL-D2-470**

Lab Sample ID:	340-5922-20	Date Sampled:	01/17/2013 1003
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4039	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0702.D
Dilution:	224			Initial Weight/Volume:	2.768 mL
Analysis Date:	02/13/2013 1408			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		45	180
Vinyl chloride	ND		34	90
m,p-Xylene	ND		45	180
o-Xylene	ND		34	90

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: 093326-001/CWL-D2-470

Lab Sample ID: 340-5922-21 | Date Sampled: 01/17/2013 1006
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0693.D
Dilution:	171			Initial Weight/Volume:	3.525 mL
Analysis Date:	02/13/2013 0026			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		100	210
Benzene	ND		34	68
Benzyl chloride	ND		34	140
Bromodichloromethane	ND		26	51
Bromoform	ND		34	140
Bromomethane	ND		34	140
2-Butanone (MEK)	ND		68	140
Carbon disulfide	ND		34	140
Carbon tetrachloride	ND		34	140
Chlorobenzene	ND		17	51
Chloroethane	ND		120	260
Chloroform	250		17	51
Chloromethane	ND		68	140
Dibromochloromethane	ND		17	68
1,2-Dibromoethane (EDB)	ND		34	140
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		26	68
1,2-Dichlorobenzene	ND		26	68
1,3-Dichlorobenzene	ND		26	68
1,4-Dichlorobenzene	ND		26	68
Dichlorodifluoromethane	ND		26	68
1,1-Dichloroethane	ND		26	51
1,2-Dichloroethane	ND		34	140
1,1-Dichloroethene	97	J	34	140
cis-1,2-Dichloroethene	ND		34	68
trans-1,2-Dichloroethene	ND		34	68
1,2-Dichloropropane	62	J	26	68
cis-1,3-Dichloropropene	ND		26	68
trans-1,3-Dichloropropene	ND		26	68
Ethylbenzene	ND		26	68
4-Ethyltoluene	ND		26	68
Hexachlorobutadiene	ND		34	140
2-Hexanone	ND		34	140
4-Methyl-2-pentanone (MIBK)	ND		26	68
Methylene Chloride	ND		34	68
Styrene	ND		26	68
1,1,2,2-Tetrachloroethane	ND		17	68
Tetrachloroethene	220		26	68
Toluene	ND		26	68
1,1,2-Trichloro-1,2,2-trifluoroethane	270		34	68
1,2,4-Trichlorobenzene	ND		120	430
1,1,1-Trichloroethane	ND		26	51
1,1,2-Trichloroethane	ND		26	68
Trichloroethene	4400		26	68
Trichlorofluoromethane	84		26	68
1,2,4-Trimethylbenzene	ND		34	140
1,3,5-Trimethylbenzene	ND		26	68

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093326-001/CWL-D2-470**

Lab Sample ID: 340-5922-21 | Date Sampled: 01/17/2013 1006
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0693.D
Dilution:	171			Initial Weight/Volume:	3.525 mL
Analysis Date:	02/13/2013 0026			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		34	140
Vinyl chloride	ND		26	68
m,p-Xylene	ND		34	140
o-Xylene	ND		26	68

Analytical Data

Client: Sandia National Laboratories

Job Number: 340-5922-1

Client Sample ID: **093327-001/CWL-FB4**

Lab Sample ID: 340-5922-22

Client Matrix: Air

Date Sampled: 01/17/2013 1015

Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4051	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0718.D
Dilution:	5.92			Initial Weight/Volume:	100.8 mL
Analysis Date:	02/14/2013 1224			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		3.6	7.1
Benzene	ND		1.2	2.4
Benzyl chloride	ND		1.2	4.7
Bromodichloromethane	ND		0.89	1.8
Bromoform	ND		1.2	4.7
Bromomethane	ND	*	1.2	4.7
2-Butanone (MEK)	ND		2.4	4.7
Carbon disulfide	ND		1.2	4.7
Carbon tetrachloride	ND		1.2	4.7
Chlorobenzene	ND		0.59	1.8
Chloroethane	ND		4.1	8.9
Chloroform	ND		0.59	1.8
Chloromethane	ND		2.4	4.7
Dibromochloromethane	ND		0.59	2.4
1,2-Dibromoethane (EDB)	ND		1.2	4.7
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	0.89	2.4
1,2-Dichlorobenzene	ND		0.89	2.4
1,3-Dichlorobenzene	ND		0.89	2.4
1,4-Dichlorobenzene	ND		0.89	2.4
Dichlorodifluoromethane	ND		0.89	2.4
1,1-Dichloroethane	ND		0.89	1.8
1,2-Dichloroethane	ND		1.2	4.7
1,1-Dichloroethene	ND		1.2	4.7
cis-1,2-Dichloroethene	ND		1.2	2.4
trans-1,2-Dichloroethene	ND		1.2	2.4
1,2-Dichloropropane	ND		0.89	2.4
cis-1,3-Dichloropropene	ND		0.89	2.4
trans-1,3-Dichloropropene	ND		0.89	2.4
Ethylbenzene	ND		0.89	2.4
4-Ethyltoluene	ND		0.89	2.4
Hexachlorobutadiene	ND		1.2	4.7
2-Hexanone	ND		1.2	4.7
4-Methyl-2-pentanone (MIBK)	ND		0.89	2.4
Methylene Chloride	ND		1.2	2.4
Styrene	ND		0.89	2.4
1,1,2,2-Tetrachloroethane	ND		0.59	2.4
Tetrachloroethene	ND		0.89	2.4
Toluene	ND		0.89	2.4
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.2	2.4
1,2,4-Trichlorobenzene	ND		4.1	15
1,1,1-Trichloroethane	ND		0.89	1.8
1,1,2-Trichloroethane	ND		0.89	2.4
Trichloroethene	ND		0.89	2.4
Trichlorofluoromethane	ND		0.89	2.4
1,2,4-Trimethylbenzene	ND		1.2	4.7
1,3,5-Trimethylbenzene	ND		0.89	2.4

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093327-001/CWL-FB4**

Lab Sample ID: 340-5922-22 | Date Sampled: 01/17/2013 1015

Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4051	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0718.D
Dilution:	5.92			Initial Weight/Volume:	100.8 mL
Analysis Date:	02/14/2013 1224			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		1.2	4.7
Vinyl chloride	ND		0.89	2.4
m,p-Xylene	ND		1.2	4.7
o-Xylene	ND		0.89	2.4

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093328-001/CWL-D3-120**

Lab Sample ID: 340-5922-23 | Date Sampled: 01/17/2013 1030
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0695.D
Dilution:	183			Initial Weight/Volume:	3.247 mL
Analysis Date:	02/13/2013 0145			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		110	220
Benzene	ND		37	73
Benzyl chloride	ND		37	150
Bromodichloromethane	ND		27	55
Bromoform	ND		37	150
Bromomethane	ND		37	150
2-Butanone (MEK)	ND		73	150
Carbon disulfide	ND		37	150
Carbon tetrachloride	ND		37	150
Chlorobenzene	ND		18	55
Chloroethane	ND		130	270
Chloroform	160		18	55
Chloromethane	ND		73	150
Dibromochloromethane	ND		18	73
1,2-Dibromoethane (EDB)	ND		37	150
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		27	73
1,2-Dichlorobenzene	ND		27	73
1,3-Dichlorobenzene	ND		27	73
1,4-Dichlorobenzene	ND		27	73
Dichlorodifluoromethane	29	J	27	73
1,1-Dichloroethane	ND		27	55
1,2-Dichloroethane	ND		37	150
1,1-Dichloroethene	200		37	150
cis-1,2-Dichloroethene	ND		37	73
trans-1,2-Dichloroethene	ND		37	73
1,2-Dichloropropane	80		27	73
cis-1,3-Dichloropropene	ND		27	73
trans-1,3-Dichloropropene	ND		27	73
Ethylbenzene	ND		27	73
4-Ethyltoluene	ND		27	73
Hexachlorobutadiene	ND		37	150
2-Hexanone	ND		37	150
4-Methyl-2-pentanone (MIBK)	ND		27	73
Methylene Chloride	62	J	37	73
Styrene	ND		27	73
1,1,2,2-Tetrachloroethane	ND		18	73
Tetrachloroethene	110		27	73
Toluene	ND		27	73
1,1,2-Trichloro-1,2,2-trifluoroethane	670		37	73
1,2,4-Trichlorobenzene	ND		130	460
1,1,1-Trichloroethane	ND		27	55
1,1,2-Trichloroethane	ND		27	73
Trichloroethene	5300		27	73
Trichlorofluoromethane	190		27	73
1,2,4-Trimethylbenzene	ND		37	150
1,3,5-Trimethylbenzene	ND		27	73

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: 093328-001/CWL-D3-120

Lab Sample ID:	340-5922-23	Date Sampled:	01/17/2013 1030
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0695.D
Dilution:	183			Initial Weight/Volume:	3.247 mL
Analysis Date:	02/13/2013 0145			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		37	150
Vinyl chloride	ND		27	73
m,p-Xylene	ND		37	150
o-Xylene	ND		27	73

Analytical Data

Client: Sandia National Laboratories — Job Number: 340-5922-1

Client Sample ID: **093329-001/CWL-D3-170**

Lab Sample ID:	340-5922-24	Date Sampled:	01/17/2013 1035
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0696.D
Dilution:	266			Initial Weight/Volume:	2.248 mL
Analysis Date:	02/13/2013 0225			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		160	320
Benzene	ND		53	110
Benzyl chloride	ND		53	210
Bromodichloromethane	ND		40	80
Bromoform	ND		53	210
Bromomethane	ND		53	210
2-Butanone (MEK)	ND		110	210
Carbon disulfide	ND		53	210
Carbon tetrachloride	ND		53	210
Chlorobenzene	ND		27	80
Chloroethane	ND		190	400
Chloroform	180		27	80
Chloromethane	ND		110	210
Dibromochloromethane	ND		27	110
1,2-Dibromoethane (EDB)	ND		53	210
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		40	110
1,2-Dichlorobenzene	ND		40	110
1,3-Dichlorobenzene	ND		40	110
1,4-Dichlorobenzene	ND		40	110
Dichlorodifluoromethane	ND		40	110
1,1-Dichloroethane	ND		40	80
1,2-Dichloroethane	ND		53	210
1,1-Dichloroethene	290		53	210
cis-1,2-Dichloroethene	ND		53	110
trans-1,2-Dichloroethene	ND		53	110
1,2-Dichloropropane	110		40	110
cis-1,3-Dichloropropene	ND		40	110
trans-1,3-Dichloropropene	ND		40	110
Ethylbenzene	ND		40	110
4-Ethyltoluene	ND		40	110
Hexachlorobutadiene	ND		53	210
2-Hexanone	ND		53	210
4-Methyl-2-pentanone (MIBK)	ND		40	110
Methylene Chloride	71	J	53	110
Styrene	ND		40	110
1,1,2,2-Tetrachloroethane	ND		27	110
Tetrachloroethene	130		40	110
Toluene	ND		40	110
1,1,2-Trichloro-1,2,2-trifluoroethane	950		53	110
1,2,4-Trichlorobenzene	ND		190	670
1,1,1-Trichloroethane	ND		40	80
1,1,2-Trichloroethane	ND		40	110
Trichloroethene	7200		40	110
Trichlorofluoromethane	250		40	110
1,2,4-Trimethylbenzene	ND		53	210
1,3,5-Trimethylbenzene	ND		40	110

Client: Sandia National Laboratories Job Number: 340-5922-1

Client Sample ID: 093329-001/CWL-D3-170

Lab Sample ID: 340-5922-24 Date Sampled: 01/17/2013 1035
Client Matrix: Air Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0696.D
Dilution:	266			Initial Weight/Volume:	2.248 mL
Analysis Date:	02/13/2013 0225			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		53	210
Vinyl chloride	ND		40	110
m,p-Xylene	ND		53	210
o-Xylene	ND		40	110

Analytical Data

Client: Sandia National Laboratories — Job Number: 340-5922-1

Client Sample ID: **093330-001/CWL-D3-350**

Lab Sample ID: 340-5922-25 — Date Sampled: 01/17/2013 1039
Client Matrix: Air — Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4039	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0708.D
Dilution:	224			Initial Weight/Volume:	2.76 mL
Analysis Date:	02/13/2013 1816			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		130	270
Benzene	ND		45	90
Benzyl chloride	ND		45	180
Bromodichloromethane	ND		34	67
Bromoform	ND		45	180
Bromomethane	ND		45	180
2-Butanone (MEK)	ND		90	180
Carbon disulfide	ND		45	180
Carbon tetrachloride	ND		45	180
Chlorobenzene	ND		22	67
Chloroethane	ND		160	340
Chloroform	130		22	67
Chloromethane	ND		90	180
Dibromochloromethane	ND		22	90
1,2-Dibromoethane (EDB)	ND		45	180
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	34	90
1,2-Dichlorobenzene	ND		34	90
1,3-Dichlorobenzene	ND		34	90
1,4-Dichlorobenzene	ND		34	90
Dichlorodifluoromethane	46	J	34	90
1,1-Dichloroethane	ND		34	67
1,2-Dichloroethane	ND		45	180
1,1-Dichloroethene	320		45	180
cis-1,2-Dichloroethene	ND		45	90
trans-1,2-Dichloroethene	ND		45	90
1,2-Dichloropropane	100		34	90
cis-1,3-Dichloropropene	ND		34	90
trans-1,3-Dichloropropene	ND		34	90
Ethylbenzene	ND		34	90
4-Ethyltoluene	ND		34	90
Hexachlorobutadiene	ND		45	180
2-Hexanone	ND		45	180
4-Methyl-2-pentanone (MIBK)	ND		34	90
Methylene Chloride	540		45	90
Styrene	ND		34	90
1,1,2,2-Tetrachloroethane	ND		22	90
Tetrachloroethene	120		34	90
Toluene	ND		34	90
1,1,2-Trichloro-1,2,2-trifluoroethane	1100		45	90
1,2,4-Trichlorobenzene	ND		160	560
1,1,1-Trichloroethane	ND		34	67
1,1,2-Trichloroethane	ND		34	90
Trichloroethene	7800		34	90
Trichlorofluoromethane	280		34	90
1,2,4-Trimethylbenzene	ND		45	180
1,3,5-Trimethylbenzene	ND		34	90

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093330-001/CWL-D3-350**

Lab Sample ID:	340-5922-25	Date Sampled:	01/17/2013 1039
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4039	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0708.D
Dilution:	224			Initial Weight/Volume:	2.76 mL
Analysis Date:	02/13/2013 1816			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		45	180
Vinyl chloride	ND		34	90
m,p-Xylene	ND		45	180
o-Xylene	ND		34	90

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093331-001/CWL-D3-440**

Lab Sample ID: 340-5922-26 | Date Sampled: 01/17/2013 1045
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4039	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0709.D
Dilution:	405			Initial Weight/Volume:	1.428 mL
Analysis Date:	02/13/2013 1857			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		240	490
Benzene	ND		81	160
Benzyl chloride	ND		81	320
Bromodichloromethane	ND		61	120
Bromoform	ND		81	320
Bromomethane	ND		81	320
2-Butanone (MEK)	ND		160	320
Carbon disulfide	ND		81	320
Carbon tetrachloride	ND		81	320
Chlorobenzene	ND		41	120
Chloroethane	ND		280	610
Chloroform	250		41	120
Chloromethane	ND		160	320
Dibromochloromethane	ND		41	160
1,2-Dibromoethane (EDB)	ND		81	320
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	61	160
1,2-Dichlorobenzene	ND		61	160
1,3-Dichlorobenzene	ND		61	160
1,4-Dichlorobenzene	ND		61	160
Dichlorodifluoromethane	89	J	61	160
1,1-Dichloroethane	ND		61	120
1,2-Dichloroethane	ND		81	320
1,1-Dichloroethene	470		81	320
cis-1,2-Dichloroethene	ND		81	160
trans-1,2-Dichloroethene	ND		81	160
1,2-Dichloropropane	210		61	160
cis-1,3-Dichloropropene	ND		61	160
trans-1,3-Dichloropropene	ND		61	160
Ethylbenzene	ND		61	160
4-Ethyltoluene	ND		61	160
Hexachlorobutadiene	ND		81	320
2-Hexanone	ND		81	320
4-Methyl-2-pentanone (MIBK)	ND		61	160
Methylene Chloride	1200		81	160
Styrene	ND		61	160
1,1,2,2-Tetrachloroethane	ND		41	160
Tetrachloroethene	220		61	160
Toluene	ND		61	160
1,1,2-Trichloro-1,2,2-trifluoroethane	1800		81	160
1,2,4-Trichlorobenzene	ND		280	1000
1,1,1-Trichloroethane	ND		61	120
1,1,2-Trichloroethane	ND		61	160
Trichloroethene	13000		61	160
Trichlorofluoromethane	490		61	160
1,2,4-Trimethylbenzene	ND		81	320
1,3,5-Trimethylbenzene	ND		61	160

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: 093331-001/CWL-D3-440

Lab Sample ID:	340-5922-26	Date Sampled: 01/17/2013 1045
Client Matrix:	Air	Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4039	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0709.D
Dilution:	405			Initial Weight/Volume:	1.428 mL
Analysis Date:	02/13/2013 1857			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		81	320
Vinyl chloride	ND		61	160
m,p-Xylene	ND		81	320
o-Xylene	ND		61	160

Analytical Data

Client: Sandia National Laboratories — Job Number: 340-5922-1

Client Sample ID: **093332-001/CWL-D3-480**

Lab Sample ID: 340-5922-27 — Date Sampled: 01/17/2013 1051
Client Matrix: Air — Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0697.D
Dilution:	2.47			Initial Weight/Volume:	250 mL
Analysis Date:	02/13/2013 0306			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	6.5		1.5	3.0
Benzene	ND		0.49	0.99
Benzyl chloride	ND		0.49	2.0
Bromodichloromethane	ND		0.37	0.74
Bromoform	ND		0.49	2.0
Bromomethane	ND		0.49	2.0
2-Butanone (MEK)	1.6	J	0.99	2.0
Carbon disulfide	ND		0.49	2.0
Carbon tetrachloride	ND		0.49	2.0
Chlorobenzene	ND		0.25	0.74
Chloroethane	ND		1.7	3.7
Chloroform	0.67	J	0.25	0.74
Chloromethane	1.2	J	0.99	2.0
Dibromochloromethane	ND		0.25	0.99
1,2-Dibromoethane (EDB)	ND		0.49	2.0
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.37	0.99
1,2-Dichlorobenzene	ND		0.37	0.99
1,3-Dichlorobenzene	ND		0.37	0.99
1,4-Dichlorobenzene	ND		0.37	0.99
Dichlorodifluoromethane	0.78	J	0.37	0.99
1,1-Dichloroethane	ND		0.37	0.74
1,2-Dichloroethane	ND		0.49	2.0
1,1-Dichloroethene	1.2	J	0.49	2.0
cis-1,2-Dichloroethene	ND		0.49	0.99
trans-1,2-Dichloroethene	ND		0.49	0.99
1,2-Dichloropropane	0.52	J	0.37	0.99
cis-1,3-Dichloropropene	ND		0.37	0.99
trans-1,3-Dichloropropene	ND		0.37	0.99
Ethylbenzene	ND		0.37	0.99
4-Ethyltoluene	ND		0.37	0.99
Hexachlorobutadiene	ND		0.49	2.0
2-Hexanone	ND		0.49	2.0
4-Methyl-2-pentanone (MIBK)	ND		0.37	0.99
Methylene Chloride	2.8		0.49	0.99
Styrene	ND		0.37	0.99
1,1,2,2-Tetrachloroethane	ND		0.25	0.99
Tetrachloroethene	0.70	J	0.37	0.99
Toluene	ND		0.37	0.99
1,1,2-Trichloro-1,2,2-trifluoroethane	4.1		0.49	0.99
1,2,4-Trichlorobenzene	ND		1.7	6.2
1,1,1-Trichloroethane	ND		0.37	0.74
1,1,2-Trichloroethane	ND		0.37	0.99
Trichloroethene	34		0.37	0.99
Trichlorofluoromethane	1.2		0.37	0.99
1,2,4-Trimethylbenzene	ND		0.49	2.0
1,3,5-Trimethylbenzene	ND		0.37	0.99

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: 093332-001/CWL-D3-480

Lab Sample ID:	340-5922-27	Date Sampled:	01/17/2013 1051
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4031	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0697.D
Dilution:	2.47			Initial Weight/Volume:	250 mL
Analysis Date:	02/13/2013 0306			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		0.49	2.0
Vinyl chloride	ND		0.37	0.99
m,p-Xylene	ND		0.49	2.0
o-Xylene	ND		0.37	0.99

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093333-001/CWL-FB5**

Lab Sample ID:	340-5922-28	Date Sampled:	01/17/2013 1023
Client Matrix:	Air	Date Received:	01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4039	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0710.D
Dilution:	1.0			Initial Weight/Volume:	640 mL
Analysis Date:	02/13/2013 1943			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		0.60	1.2
Benzene	ND		0.20	0.40
Benzyl chloride	ND		0.20	0.80
Bromodichloromethane	ND		0.15	0.30
Bromoform	ND		0.20	0.80
Bromomethane	ND		0.20	0.80
2-Butanone (MEK)	ND		0.40	0.80
Carbon disulfide	ND		0.20	0.80
Carbon tetrachloride	ND		0.20	0.80
Chlorobenzene	ND		0.10	0.30
Chloroethane	ND		0.70	1.5
Chloroform	ND		0.10	0.30
Chloromethane	ND		0.40	0.80
Dibromochloromethane	ND		0.10	0.40
1,2-Dibromoethane (EDB)	ND		0.20	0.80
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	0.15	0.40
1,2-Dichlorobenzene	ND		0.15	0.40
1,3-Dichlorobenzene	ND		0.15	0.40
1,4-Dichlorobenzene	ND		0.15	0.40
Dichlorodifluoromethane	ND		0.15	0.40
1,1-Dichloroethane	ND		0.15	0.30
1,2-Dichloroethane	ND		0.20	0.80
1,1-Dichloroethene	ND		0.20	0.80
cis-1,2-Dichloroethene	ND		0.20	0.40
trans-1,2-Dichloroethene	ND		0.20	0.40
1,2-Dichloropropane	ND		0.15	0.40
cis-1,3-Dichloropropene	ND		0.15	0.40
trans-1,3-Dichloropropene	ND		0.15	0.40
Ethylbenzene	ND		0.15	0.40
4-Ethyltoluene	ND		0.15	0.40
Hexachlorobutadiene	ND		0.20	0.80
2-Hexanone	ND		0.20	0.80
4-Methyl-2-pentanone (MIBK)	ND		0.15	0.40
Methylene Chloride	ND		0.20	0.40
Styrene	ND		0.15	0.40
1,1,2,2-Tetrachloroethane	ND		0.10	0.40
Tetrachloroethene	ND		0.15	0.40
Toluene	ND		0.15	0.40
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.40
1,2,4-Trichlorobenzene	ND		0.70	2.5
1,1,1-Trichloroethane	ND		0.15	0.30
1,1,2-Trichloroethane	ND		0.15	0.40
Trichloroethene	ND		0.15	0.40
Trichlorofluoromethane	ND		0.15	0.40
1,2,4-Trimethylbenzene	ND		0.20	0.80
1,3,5-Trimethylbenzene	ND		0.15	0.40

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-5922-1

Client Sample ID: **093333-001/CWL-FB5**

Lab Sample ID: 340-5922-28 | Date Sampled: 01/17/2013 1023
Client Matrix: Air | Date Received: 01/25/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4039	Instrument ID:	MSC
	N/A	Prep Batch:	N/A	Lab File ID:	C0710.D
Dilution:	1.0			Initial Weight/Volume:	640 mL
Analysis Date:	02/13/2013 1943			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		0.20	0.80
Vinyl chloride	ND		0.15	0.40
m,p-Xylene	ND		0.20	0.80
o-Xylene	ND		0.15	0.40

DATA REPORTING QUALIFIERS

Client: Sandia National Laboratories

Job Number: 340-5922-1

Lab Section	Qualifier	Description
Air - GC/MS VOA		
	*	LCS or LCSD exceeds the control limits
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
	*	RPD of the LCS and LCSD exceeds the control limits

MARCH 2013 SOIL-GAS SAMPLING RESULTS

CERTIFICATES OF ANALYSIS

CWL Well D1
470-foot sampling port

CWL Well D2
470-foot sampling port

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-6754-1

Client Sample ID: **093727-001/CWL-D1-470**

Lab Sample ID: 340-6754-1 | Date Sampled: 03/27/2013 0857
Client Matrix: Air | Date Received: 04/01/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4452	Instrument ID:	MSG
	N/A	Prep Batch:	N/A	Lab File ID:	G4813.d
Dilution:	5.48			Initial Weight/Volume:	100 mL
Analysis Date:	04/02/2013 1748			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	3.3	J	3.3	6.6
Benzene	ND		1.1	2.2
Benzyl chloride	ND		1.1	4.4
Bromodichloromethane	ND		0.82	1.6
Bromoform	ND		1.1	4.4
Bromomethane	ND		1.1	4.4
2-Butanone (MEK)	ND		2.2	4.4
Carbon disulfide	ND		1.1	4.4
Carbon tetrachloride	1.5	J	1.1	4.4
Chlorobenzene	ND		0.55	1.6
Chloroethane	ND		3.8	8.2
Chloroform	1.1	J	0.55	1.6
Chloromethane	ND		2.2	4.4
Dibromochloromethane	ND		0.55	2.2
1,2-Dibromoethane (EDB)	ND		1.1	4.4
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.82	2.2
1,2-Dichlorobenzene	ND		0.82	2.2
1,3-Dichlorobenzene	ND		0.82	2.2
1,4-Dichlorobenzene	ND		0.82	2.2
Dichlorodifluoromethane	8.4		0.82	2.2
1,1-Dichloroethane	ND		0.82	1.6
1,2-Dichloroethane	ND		1.1	4.4
1,1-Dichloroethene	19		1.1	4.4
cis-1,2-Dichloroethene	ND		1.1	2.2
trans-1,2-Dichloroethene	ND		1.1	2.2
1,2-Dichloropropane	ND		0.82	2.2
cis-1,3-Dichloropropene	ND		0.82	2.2
trans-1,3-Dichloropropene	ND		0.82	2.2
Ethylbenzene	ND		0.82	2.2
4-Ethyltoluene	ND		0.82	2.2
Hexachlorobutadiene	ND		1.1	4.4
2-Hexanone	ND		1.1	4.4
4-Methyl-2-pentanone (MIBK)	ND		0.82	2.2
Methylene Chloride	4.3		1.1	2.2
Styrene	ND		0.82	2.2
1,1,2,2-Tetrachloroethane	ND		0.55	2.2
Tetrachloroethene	3.1		0.82	2.2
Toluene	ND		0.82	2.2
1,1,2-Trichloro-1,2,2-trifluoroethane	110		1.1	2.2
1,2,4-Trichlorobenzene	ND		3.8	14
1,1,1-Trichloroethane	ND		0.82	1.6
1,1,2-Trichloroethane	ND		0.82	2.2
Trichloroethene	130		0.82	2.2
Trichlorofluoromethane	32		0.82	2.2
1,2,4-Trimethylbenzene	ND		1.1	4.4
1,3,5-Trimethylbenzene	ND		0.82	2.2

Analytical Data

Client: Sandia National Laboratories Job Number: 340-6754-1

Client Sample ID: **093727-001/CWL-D1-470**

Lab Sample ID:	340-6754-1	Date Sampled:	03/27/2013 0857
Client Matrix:	Air	Date Received:	04/01/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4452	Instrument ID:	MSG
	N/A	Prep Batch:	N/A	Lab File ID:	G4813.d
Dilution:	5.48			Initial Weight/Volume:	100 mL
Analysis Date:	04/02/2013 1748			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		1.1	4.4
Vinyl chloride	ND		0.82	2.2
m,p-Xylene	ND		1.1	4.4
o-Xylene	ND		0.82	2.2

Client: Sandia National Laboratories | Job Number: 340-6754-1

Client Sample ID: 093728-001/CWL-D1-470

Lab Sample ID: 340-6754-2
Client Matrix: Air

Date Sampled: 03/27/2013 0900
Date Received: 04/01/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4452	Instrument ID:	MSG
	N/A	Prep Batch:	N/A	Lab File ID:	G4814.d
Dilution:	5.57			Initial Weight/Volume:	100 mL
Analysis Date:	04/02/2013 1829			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		3.3	6.7
Benzene	ND		1.1	2.2
Benzyl chloride	ND		1.1	4.5
Bromodichloromethane	ND		0.84	1.7
Bromoform	ND		1.1	4.5
Bromomethane	ND		1.1	4.5
2-Butanone (MEK)	ND		2.2	4.5
Carbon disulfide	ND		1.1	4.5
Carbon tetrachloride	2.7	J	1.1	4.5
Chlorobenzene	ND		0.56	1.7
Chloroethane	ND		3.9	8.4
Chloroform	2.0		0.56	1.7
Chloromethane	ND		2.2	4.5
Dibromochloromethane	ND		0.56	2.2
1,2-Dibromoethane (EDB)	ND		1.1	4.5
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.84	2.2
1,2-Dichlorobenzene	ND		0.84	2.2
1,3-Dichlorobenzene	ND		0.84	2.2
1,4-Dichlorobenzene	ND		0.84	2.2
Dichlorodifluoromethane	15		0.84	2.2
1,1-Dichloroethane	ND		0.84	1.7
1,2-Dichloroethane	ND		1.1	4.5
1,1-Dichloroethene	36		1.1	4.5
cis-1,2-Dichloroethene	ND		1.1	2.2
trans-1,2-Dichloroethene	ND		1.1	2.2
1,2-Dichloropropane	ND		0.84	2.2
cis-1,3-Dichloropropene	ND		0.84	2.2
trans-1,3-Dichloropropene	ND		0.84	2.2
Ethylbenzene	ND		0.84	2.2
4-Ethyltoluene	ND		0.84	2.2
Hexachlorobutadiene	ND		1.1	4.5
2-Hexanone	ND		1.1	4.5
4-Methyl-2-pentanone (MIBK)	ND		0.84	2.2
Methylene Chloride	7.5		1.1	2.2
Styrene	ND		0.84	2.2
1,1,2,2-Tetrachloroethane	ND		0.56	2.2
Tetrachloroethene	5.8		0.84	2.2
Toluene	ND		0.84	2.2
1,1,2-Trichloro-1,2,2-trifluoroethane	210		1.1	2.2
1,2,4-Trichlorobenzene	ND		3.9	14
1,1,1-Trichloroethane	ND		0.84	1.7
1,1,2-Trichloroethane	ND		0.84	2.2
Trichlorofluoromethane	58		0.84	2.2
1,2,4-Trimethylbenzene	ND		1.1	4.5
1,3,5-Trimethylbenzene	ND		0.84	2.2
Vinyl acetate	ND		1.1	4.5

Analytical Data

Client: Sandia National Laboratories

Job Number: 340-6754-1

Client Sample ID: **093728-001/CWL-D1-470**

Lab Sample ID: 340-6754-2

Client Matrix: Air

Date Sampled: 03/27/2013 0900

Date Received: 04/01/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4452	Instrument ID:	MSG
	N/A	Prep Batch:	N/A	Lab File ID:	G4814.d
Dilution:	5.57			Initial Weight/Volume:	100 mL
Analysis Date:	04/02/2013 1829			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl chloride	ND		0.84	2.2
m,p-Xylene	ND		1.1	4.5
o-Xylene	ND		0.84	2.2

Analytical Data

Client: Sandia National Laboratories

Job Number: 340-6754-1

Client Sample ID: **093728-001/CWL-D1-470**

Lab Sample ID:	340-6754-2	Date Sampled:	03/27/2013 0900
Client Matrix:	Air	Date Received:	04/01/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4452	Instrument ID:	MSG
	N/A	Prep Batch:	N/A	Lab File ID:	G4819.d
Dilution:	11.1			Initial Weight/Volume:	250 mL
Analysis Date:	04/03/2013 0934			Final Weight/Volume:	50 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Trichloroethene	230		1.7	4.4

Analytical Data

Client: Sandia National Laboratories — Job Number: 340-6754-1

Client Sample ID: **093729-001/CWL-D1-FB1**

Lab Sample ID:	340-6754-3	Date Sampled:	03/27/2013 0852
Client Matrix:	Air	Date Received:	04/01/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4452	Instrument ID:	MSG
	N/A	Prep Batch:	N/A	Lab File ID:	G4815.d
Dilution:	1.0			Initial Weight/Volume:	547 mL
Analysis Date:	04/02/2013 1914			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		0.60	1.2
Benzene	ND		0.20	0.40
Benzyl chloride	ND		0.20	0.80
Bromodichloromethane	ND		0.15	0.30
Bromoform	ND		0.20	0.80
Bromomethane	ND		0.20	0.80
2-Butanone (MEK)	ND		0.40	0.80
Carbon disulfide	ND		0.20	0.80
Carbon tetrachloride	ND		0.20	0.80
Chlorobenzene	ND		0.10	0.30
Chloroethane	ND		0.70	1.5
Chloroform	ND		0.10	0.30
Chloromethane	ND		0.40	0.80
Dibromochloromethane	ND		0.10	0.40
1,2-Dibromoethane (EDB)	ND		0.20	0.80
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.15	0.40
1,2-Dichlorobenzene	ND		0.15	0.40
1,3-Dichlorobenzene	ND		0.15	0.40
1,4-Dichlorobenzene	ND		0.15	0.40
Dichlorodifluoromethane	ND		0.15	0.40
1,1-Dichloroethane	ND		0.15	0.30
1,2-Dichloroethane	ND		0.20	0.80
1,1-Dichloroethene	ND		0.20	0.80
cis-1,2-Dichloroethene	ND		0.20	0.40
trans-1,2-Dichloroethene	ND		0.20	0.40
1,2-Dichloropropane	ND		0.15	0.40
cis-1,3-Dichloropropene	ND		0.15	0.40
trans-1,3-Dichloropropene	ND		0.15	0.40
Ethylbenzene	ND		0.15	0.40
4-Ethyltoluene	ND		0.15	0.40
Hexachlorobutadiene	ND		0.20	0.80
2-Hexanone	ND		0.20	0.80
4-Methyl-2-pentanone (MIBK)	ND		0.15	0.40
Methylene Chloride	ND		0.20	0.40
Styrene	ND		0.15	0.40
1,1,2,2-Tetrachloroethane	ND		0.10	0.40
Tetrachloroethene	ND		0.15	0.40
Toluene	ND		0.15	0.40
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.40
1,2,4-Trichlorobenzene	ND		0.70	2.5
1,1,1-Trichloroethane	ND		0.15	0.30
1,1,2-Trichloroethane	ND		0.15	0.40
Trichloroethene	ND		0.15	0.40
Trichlorofluoromethane	ND		0.15	0.40
1,2,4-Trimethylbenzene	ND		0.20	0.80
1,3,5-Trimethylbenzene	ND		0.15	0.40

Client: Sandia National Laboratories | Job Number: 340-6754-1

Client Sample ID: 093729-001/CWL-D1-FB1

Lab Sample ID:	340-6754-3	Date Sampled:	03/27/2013 0852
Client Matrix:	Air	Date Received:	04/01/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4452	Instrument ID:	MSG
	N/A	Prep Batch:	N/A	Lab File ID:	G4815.d
Dilution:	1.0			Initial Weight/Volume:	547 mL
Analysis Date:	04/02/2013 1914			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		0.20	0.80
Vinyl chloride	ND		0.15	0.40
m,p-Xylene	ND		0.20	0.80
o-Xylene	ND		0.15	0.40

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-6754-1

Client Sample ID: **093730-001/CWL-D2-470**

Lab Sample ID: 340-6754-4 | Date Sampled: 03/27/2013 0918
Client Matrix: Air | Date Received: 04/01/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4452	Instrument ID:	MSG
	N/A	Prep Batch:	N/A	Lab File ID:	G4816.d
Dilution:	228			Initial Weight/Volume:	2.5 mL
Analysis Date:	04/02/2013 2001			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	1300		140	270
Benzene	ND		46	91
Benzyl chloride	ND		46	180
Bromodichloromethane	ND		34	68
Bromoform	ND		46	180
Bromomethane	ND		46	180
2-Butanone (MEK)	120	J	91	180
Carbon disulfide	1000		46	180
Carbon tetrachloride	ND		46	180
Chlorobenzene	ND		23	68
Chloroethane	ND		160	340
Chloroform	330		23	68
Chloromethane	94	J	91	180
Dibromochloromethane	ND		23	91
1,2-Dibromoethane (EDB)	ND		46	180
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		34	91
1,2-Dichlorobenzene	ND		34	91
1,3-Dichlorobenzene	ND		34	91
1,4-Dichlorobenzene	ND		34	91
Dichlorodifluoromethane	80	J	34	91
1,1-Dichloroethane	ND		34	68
1,2-Dichloroethane	ND		46	180
1,1-Dichloroethene	300		46	180
cis-1,2-Dichloroethene	ND		46	91
trans-1,2-Dichloroethene	ND		46	91
1,2-Dichloropropane	110		34	91
cis-1,3-Dichloropropene	ND		34	91
trans-1,3-Dichloropropene	ND		34	91
Ethylbenzene	75	J	34	91
4-Ethyltoluene	ND		34	91
Hexachlorobutadiene	ND		46	180
2-Hexanone	ND		46	180
4-Methyl-2-pentanone (MIBK)	580		34	91
Methylene Chloride	2100		46	91
Styrene	51	J	34	91
1,1,2,2-Tetrachloroethane	ND		23	91
Tetrachloroethene	310		34	91
Toluene	290		34	91
1,1,2-Trichloro-1,2,2-trifluoroethane	760		46	91
1,2,4-Trichlorobenzene	ND		160	570
1,1,1-Trichloroethane	44	J	34	68
1,1,2-Trichloroethane	ND		34	91
Trichloroethene	7100		34	91
Trichlorofluoromethane	230		34	91
1,2,4-Trimethylbenzene	120	J	46	180
1,3,5-Trimethylbenzene	ND		34	91

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-6754-1

Client Sample ID: 093730-001/CWL-D2-470

Lab Sample ID:	340-6754-4	Date Sampled:	03/27/2013 0918
Client Matrix:	Air	Date Received:	04/01/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4452	Instrument ID:	MSG
	N/A	Prep Batch:	N/A	Lab File ID:	G4816.d
Dilution:	228			Initial Weight/Volume:	2.5 mL
Analysis Date:	04/02/2013 2001			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		46	180
Vinyl chloride	ND		34	91
m,p-Xylene	180		46	180
o-Xylene	140		34	91

Client: Sandia National Laboratories | Job Number: 340-6754-1

Client Sample ID: **093731-001/CWL-D2-470**

Lab Sample ID:	340-6754-5	Date Sampled:	03/27/2013 0920
Client Matrix:	Air	Date Received:	04/01/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4452	Instrument ID:	MSG
	N/A	Prep Batch:	N/A	Lab File ID:	G4817.d
Dilution:	228			Initial Weight/Volume:	2.5 mL
Analysis Date:	04/02/2013 2046			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	1000		140	270
Benzene	ND		46	91
Benzyl chloride	ND		46	180
Bromodichloromethane	ND		34	68
Bromoform	ND		46	180
Bromomethane	ND		46	180
2-Butanone (MEK)	120	J	91	180
Carbon disulfide	450		46	180
Carbon tetrachloride	ND		46	180
Chlorobenzene	ND		23	68
Chloroethane	ND		160	340
Chloroform	240		23	68
Chloromethane	ND		91	180
Dibromochloromethane	ND		23	91
1,2-Dibromoethane (EDB)	ND		46	180
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		34	91
1,2-Dichlorobenzene	ND		34	91
1,3-Dichlorobenzene	ND		34	91
1,4-Dichlorobenzene	ND		34	91
Dichlorodifluoromethane	ND		34	91
1,1-Dichloroethane	ND		34	68
1,2-Dichloroethane	ND		46	180
1,1-Dichloroethene	230		46	180
cis-1,2-Dichloroethene	ND		46	91
trans-1,2-Dichloroethene	ND		46	91
1,2-Dichloropropane	79	J	34	91
cis-1,3-Dichloropropene	ND		34	91
trans-1,3-Dichloropropene	ND		34	91
Ethylbenzene	130		34	91
4-Ethyltoluene	54	J	34	91
Hexachlorobutadiene	ND		46	180
2-Hexanone	ND		46	180
4-Methyl-2-pentanone (MIBK)	350		34	91
Methylene Chloride	360		46	91
Styrene	69	J	34	91
1,1,2,2-Tetrachloroethane	ND		23	91
Tetrachloroethene	220		34	91
Toluene	420		34	91
1,1,2-Trichloro-1,2,2-trifluoroethane	560		46	91
1,2,4-Trichlorobenzene	ND		160	570
1,1,1-Trichloroethane	ND		34	68
1,1,2-Trichloroethane	ND		34	91
Trichloroethene	4900		34	91
Trichlorofluoromethane	160		34	91
1,2,4-Trimethylbenzene	150	J	46	180
1,3,5-Trimethylbenzene	ND		34	91

Client: Sandia National Laboratories | Job Number: 340-6754-1

Client Sample ID: **093731-001/CWL-D2-470**

Lab Sample ID:	340-6754-5	Date Sampled:	03/27/2013 0920
Client Matrix:	Air	Date Received:	04/01/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4452	Instrument ID:	MSG
	N/A	Prep Batch:	N/A	Lab File ID:	G4817.d
Dilution:	228			Initial Weight/Volume:	2.5 mL
Analysis Date:	04/02/2013 2046			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		46	180
Vinyl chloride	ND		34	91
m,p-Xylene	270		46	180
o-Xylene	230		34	91

Analytical Data

Client: Sandia National Laboratories | Job Number: 340-6754-1

Client Sample ID: **093732-001/CWL-D2-FB2**

Lab Sample ID: 340-6754-6 | Date Sampled: 03/27/2013 0906
Client Matrix: Air | Date Received: 04/01/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4452	Instrument ID:	MSG
	N/A	Prep Batch:	N/A	Lab File ID:	G4818.d
Dilution:	1.0			Initial Weight/Volume:	539 mL
Analysis Date:	04/02/2013 2134			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Acetone	ND		0.60	1.2
Benzene	ND		0.20	0.40
Benzyl chloride	ND		0.20	0.80
Bromodichloromethane	ND		0.15	0.30
Bromoform	ND		0.20	0.80
Bromomethane	ND		0.20	0.80
2-Butanone (MEK)	ND		0.40	0.80
Carbon disulfide	ND		0.20	0.80
Carbon tetrachloride	ND		0.20	0.80
Chlorobenzene	ND		0.10	0.30
Chloroethane	ND		0.70	1.5
Chloroform	ND		0.10	0.30
Chloromethane	ND		0.40	0.80
Dibromochloromethane	ND		0.10	0.40
1,2-Dibromoethane (EDB)	ND		0.20	0.80
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.15	0.40
1,2-Dichlorobenzene	ND		0.15	0.40
1,3-Dichlorobenzene	ND		0.15	0.40
1,4-Dichlorobenzene	ND		0.15	0.40
Dichlorodifluoromethane	ND		0.15	0.40
1,1-Dichloroethane	ND		0.15	0.30
1,2-Dichloroethane	ND		0.20	0.80
1,1-Dichloroethene	ND		0.20	0.80
cis-1,2-Dichloroethene	ND		0.20	0.40
trans-1,2-Dichloroethene	ND		0.20	0.40
1,2-Dichloropropane	ND		0.15	0.40
cis-1,3-Dichloropropene	ND		0.15	0.40
trans-1,3-Dichloropropene	ND		0.15	0.40
Ethylbenzene	ND		0.15	0.40
4-Ethyltoluene	ND		0.15	0.40
Hexachlorobutadiene	ND		0.20	0.80
2-Hexanone	ND		0.20	0.80
4-Methyl-2-pentanone (MIBK)	ND		0.15	0.40
Methylene Chloride	ND		0.20	0.40
Styrene	ND		0.15	0.40
1,1,2,2-Tetrachloroethane	ND		0.10	0.40
Tetrachloroethene	ND		0.15	0.40
Toluene	ND		0.15	0.40
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20	0.40
1,2,4-Trichlorobenzene	ND		0.70	2.5
1,1,1-Trichloroethane	ND		0.15	0.30
1,1,2-Trichloroethane	ND		0.15	0.40
Trichloroethene	ND		0.15	0.40
Trichlorofluoromethane	ND		0.15	0.40
1,2,4-Trimethylbenzene	ND		0.20	0.80
1,3,5-Trimethylbenzene	ND		0.15	0.40

Client: Sandia National Laboratories | Job Number: 340-6754-1

Client Sample ID: **093732-001/CWL-D2-FB2**

Lab Sample ID:	340-6754-6	Date Sampled:	03/27/2013 0906
Client Matrix:	Air	Date Received:	04/01/2013 1010

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	340-4452	Instrument ID:	MSG
	N/A	Prep Batch:	N/A	Lab File ID:	G4818.d
Dilution:	1.0			Initial Weight/Volume:	539 mL
Analysis Date:	04/02/2013 2134			Final Weight/Volume:	250 mL
Prep Date:	N/A			Injection Volume:	

Analyte	Result (ppb v/v)	Qualifier	MDL	RL
Vinyl acetate	ND		0.20	0.80
Vinyl chloride	ND		0.15	0.40
m,p-Xylene	ND		0.20	0.80
o-Xylene	ND		0.15	0.40

DATA REPORTING QUALIFIERS

Client: Sandia National Laboratories | Job Number: 340-6754-1

Lab Section	Qualifier	Description
Air - GC/MS VOA		
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

ANNEX C
Chemical Waste Landfill
CY 2013 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 3/15/13
2. Time of Inspection 1125
3. Name of Inspector Robert Ziock

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.*) Training records maintained at CAMU Administrative Trailer.	RZ

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	No	

IV. PREVIOUS DEFICIENCIES			
Inspection Parameter	***Parameter Inspected (Yes or No)***	***Action Required (Yes or No)***	***Note Number***
Uncorrected/undocumented previous deficiencies.	NA		

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (continued)

NOTES

Note Number	Description

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (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:

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 6/3/13
2. Time of Inspection 1300
3. Name of Inspector Robert Zibck

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	No	

IV. PREVIOUS DEFICIENCIES			
Inspection Parameter	***Parameter Inspected (Yes or No)***	***Action Required (Yes or No)***	***Note Number***
Uncorrected/undocumented previous deficiencies.	NA		

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (continued)

NOTES

Note Number	Description

Chemical Waste Landfill
Post-Closnre Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (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:

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 9/13/13
2. Time of Inspection 0720
3. Name of Inspector Robert Zbck

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	No	

IV. PREVIOUS DEFICIENCIES			
Inspection Parameter	*Parameter Inspected (Yes or No)*	*Action Required (Yes or No)*	*Note Number*
Uncorrected/undocumented previous deficiencies.	NA		

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (continued)

NOTES

Note Number	Description

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (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:

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 12/2/13
2. Time of Inspection 1330 - 1447
3. Name of Inspector Robert Ziock

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	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	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	Tumbleweed debris has accumulated in the drainage sump located on the south side of the site/paved road. The debris
	was removed at time of the inspection.

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 12/2/13

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:

Inspector's Signature Robert Ziock

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 01-08-13
2. Time of Inspection 0750
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.*) Training records maintained at CAMU Administrative Trailer.	RL

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	2
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
2	A concrete pad associated with the P/A of
	CWL-MW2BU/L was observed to be
	damaged. The concrete well pad will be
	repaired as soon as possible

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Groundwater Monitoring Locations / Sampling Equipment
(continued)

Action (Note Number) 2 assigned to D. Schofield Date action completed 2/11/13 T[illegible]

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:

2/7/13 - Remove damage well pad at CWL-MW2B, and pour new concrete pad. New pad is reinforced with steel re-bar.

2/11/13 - Remove tarp all repairs completed.

Photographs are attached. T[illegible] - 2/12/13

Inspector's Signature [signature]

Original to: Chemical Waste Landfill Operating Record

Copy to: Environmental Safety and Health (ES&H) and Security Records Center

Repair of CWL-MW 2BU/L Concrete Pad
February 2013

Repair of CWL-MW 2BU/L Concrete Pad
February 2013

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Soil-Gas Monitoring Locations / Sampling Equipment

1. Date of Inspection 01/17/13
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.*) Training records maintained at CAMU Administrative Trailer.	RL

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.	N/A		

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.	N/A		

NOTES

Note Number	Description

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Soil-Gas 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 Groundwater Monitoring Locations / Sampling Equipment

1. Date of Inspection 7/8/13
2. Time of Inspection 0749
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.*) Training records maintained at CAMU Administrative Trailer.	RL

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		

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

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:

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.*)

JR

Approximate vegetative coverage (actively photosynthesizing*): 38 %

Approximate percent native vegetation of the total vegetative cover: 90 %

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)	% of Cover[1]
Bouteloua gracilis	Blue grama	18%
Bouteloua barbata	Six-weeks grama	4%
Salsola tragus	Russian thistle	trace
Pleuraphis jamesii	Galleta grass	8%
Sporobolus flexuosus	Mesa dropseed	3%
Kallstroemia parviflora	Warty caltrop	trace
Panicum capillare	Witchgrass	trace
Eragrostis cilianensis	Stinkgrass	4%
Aristida adscensionis	Six-weeks three-awn	1%
Setaria viridis	Green bristlegrass	trace
Chenopodium species	Goosefoot	trace
Chamaesyce species	Spurge	trace

* The intent of "Approximate vegetative coverage (actively photosynthesizing)" is to indicate the percent coverage of live plants on the CWL cover. This percent cover includes plants that are photosynthesizing at the time of inspection as well as live dormant plants that are poised to uptake soil moisture as soon as it becomes available and begin photosynthesizing.

Note: [1]Percentage of total CWL cover populated by actively-photosynthesizing plants of this 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? No

If "Yes," mark such areas on a map and attach to this checklist, and remove plant(s) from the cover.

Notes:

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: No mammal burrows were observed on the cover. Only 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.

No map necessary, please see "Notes"

Biological Aspects Map – [note: sketch map to locate specific features will be attached]

Survey Biologist Name: ____________________ Date: 9 Sept. 2013

Original to: Chemical Waste Landfill Operating Record

ANNEX D
CY 2013 Chemical Waste Landfill Biology Report

2013 CWL Biology Report

Introduction

As required by the Chemical Waste Landfill (CWL) Post-Closure Care Permit (PCCP) (NMED 2009), Attachment 1, Section 1.9.1.1, this summary report for Calendar Year (CY) 2013 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 2013 growing season, expand on the inspection results, and provide recommendations for future ET Cover vegetation monitoring and maintenance. The annual CWL Post-Closure Biology Inspection of the ET Cover vegetation for CY 2013 was conducted on September 9, 2013. The inspection observations are documented in the “Chemical Waste Landfill Post-Closure Inspection Form Biology Inspection Checklist for the CWL Cover.”

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 Permit 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 ET Cover 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 CY 2011 CWL Annual Report (SNL/NM March 2012).

The September 2012 CWL Biology Inspection documented cover conditions that continued to meet the criteria for successful revegetation. Three plant species were documented in 2012: four-wing saltbush (*Atriplex canescens*) was determined to cover approximately 2% of the surface area; Russian thistle (*Salsola tragus*), an annual weedy species, was present in trace amounts; and blue grama grass (*Bouteloua gracilis*) was the dominant species, covering approximately 45% of the ET Cover surface area. Although very little of the grass was green and actively photosynthesizing at the time of the 2012 inspection due to lack of soil moisture (a result of no significant wetting rains and a very dry previous winter season), the native blue grama grasses were determined to be dormant but alive. The CY 2012 Biology Report and Biology Inspection are included in the CY 2012 CWL Annual Report (SNL/NM March 2013).

The small and tightly spaced juvenile clump grasses present across the ET Cover in 2011 and 2012 provided very good and relatively uniform coverage. Anticipated future successional change under conditions of normal climatic stress included the more genetically fit grass clumps developing into larger, more mature clumps as space becomes available due to less fit grass clumps dying. As the native clump grasses mature and grow in size their root systems expand, which enhances their ability to withstand significant climate stresses (i.e., extended drought, extreme temperature variations, etc.) much better than the small, juvenile grass clumps observed in 2011 and 2012.

Local Climate Trends for 2013 Growing Season

Climate trends for north-central New Mexico are presented in this section as they have a significant impact on the ET Cover vegetation. Since the reseeding effort in August 2009, the local climate has been dominated by an intense drought with temperature extremes across the seasons. In 2013 the winter and spring seasons were very dry, followed by heavy monsoonal rains during July and September. Table 1 provides meteorological data for the 12-month period preceding and including the CY 2013 growing season. The CY2013 annual Biology Inspection was performed in September at the end of the growing season.

Precipitation, Relative Humidity and Winds

More than two years of drought preceded the 2013 growing season, with 2010 being the only year with close to average precipitation since 2008. Only 1.45 inches of precipitation occurred in the 9-month time span from October 2012 through June 2013. The relative humidity was also well below average at the CWL during these months. Below average relative humidity increases the rate of water loss from the surface of plants and from the soil, compounding the stress on plants. The winds throughout the year were near-normal; with stronger winds in April, May and June contributing to extremely dry soil

Table 1 Summary of 2013 Growing Season Meteorological Data at the CWL[a]

	Oct 2012	Nov 2012	Dec 2012	Jan 2013	Feb 2013	Mar 2013	Apr 2013	May 2013	Jun 2013	Jul 2013	Aug 2013	Sep 2013	Annual
Temperature (°F)													
Monthly Mean	**60.82**	**49.24**	37.30	**32.68**	**38.15**	**51.08**	56.48	66.24	**79.61**	74.79	75.48	69.32	57.60
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	0.00	0.17	0.23	0.16	0.14	0.16	0.08	0.06	0.45	**4.75**	0.50	**4.12**	10.82
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	**26.6**	**35.5**	**47.0**	**47.0**	**40.7**	**27.1**	**23.8**	**20.4**	**19.3**	**49.4**	44.2	**49.7**	**35.9**
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	1.56	1.20	1.30	1.34	1.76	1.73	**2.01**	**2.03**	**2.05**	1.65	1.47	1.51	1.63
17-year Wind Means	1.56	1.42	1.37	1.38	1.61	1.81	**2.12**	**1.98**	**1.95**	1.68	1.59	1.60	3.65

[a]Information Source: SNL/NM meteorological monitoring program.

and plant conditions prior to the 2013 growing season. The 2013 monsoonal rains brought well above-average moisture, 9.37 inches during July-September, and raised the relative humidity considerably. However, the precipitation received during these months was not enough to end the current drought according to the National Drought Mitigation Center.

Temperature

The CWL experienced nearly one-hundred degrees of temperature variability in 2013, with a low of 5.59°F in January and a high of 104.05°F in June. Mean temperatures for two winter months, January and February, were well below normal. January had four consecutive days at or below freezing which is a substantial and prolonged temperature departure of 16°F below normal based on data available from the National Weather Service (NOAA 2013). Conversely, temperatures in October and November of 2012 and, March and June of 2013 were significantly above normal.

Cover Development and Maintenance

The successional development of the native grasses on the CWL ET Cover was pronounced in 2013, with the less robust blue grama grass clumps dying and creating barren interspaces for the remaining, better adapted grass clumps to expand their root systems and grow. The succession involved a much greater die-off of juvenile clump grasses than anticipated due to extreme climatic conditions as outlined in the previous climate section. Forty-percent or more of the native grass clumps were estimated to have died. This unusually abrupt die-off created significant unoccupied interspaces which became filled with weedy annual plant species when the monsoon rains began. Weeds were removed in August, prior to the annual inspection. Native grass seed was then applied and the ET Cover was watered to provide consistent moisture in order to facilitate germination and seedling development. A post-inspection weeding event occurred in October to support new seedling development.

Maintenance activities performed on the CWL ET Cover in 2013 had a significant impact on addressing the negative impacts of the drought on ET Cover vegetation. These activities are summarized below; more information on Cover maintenance activities is presented in Section 6.1.2 of the 2013 CWL Annual Post-Closure Care Report.

February: Four-wing saltbush shrubs were clipped by hand at ground level and removed from the site. The perimeter fence was cleared of dead vegetation.

August: All non-grass species were removed; all weeds greater than 3 inches tall and 6-8 inches wide were pulled by hand and all smaller weeds were spot-sprayed with a commercial herbicide. After the site was weeded a native grass seed mixture (Table 2) was applied to the CWL ET cover at a rate exceeding 60 pounds of pure live seed per acre.

Table 2 Seed Mix Applied in August 2013

Common Name	Pure Live Seed (PLS), Pounds/Acre	% of Mix
"Paloma" Indian rice grass:	23	38%
"Viva" Galleta grass:	12	20%
"Hatchita" Black grama:	17	28%
Sand Dropseed:	4	7%
Alkali sacaton:	4	7%
Approximate Total:	60	100%

A drop-spreader applied the seed, which was then settled down through the gravel by a chain drag attached behind the drop spreader. A light 5-0-5 fertilizer was then applied at a rate of approximately 1 pound per 200 square feet by walk-behind rotary spreaders to give the native grasses and new seed a nitrogen boost without overloading the soil, considering the application was late in the growing season.

September: Four supplemental watering events occurred. Each event applied the equivalent of 0.5-inches of water on September 5, 10, 19 & 24. Water was applied by a large-scale commercial sprinkler.

October: One weeding event and one final 0.5-inch supplemental watering event occurred. The weeding event removed all non-grass weeds from the ET Cover and surrounding perimeter by hand and also included spot spraying of smaller weeds that could not be effectively pulled by hand with a commercial herbicide. On the west side of the ET Cover, between the road and perimeter fence, a pre-emergent granular herbicide was applied to control future growth of annual invasive weedy species.

September 2013 Inspection Results

The September biology inspection determined the CWL ET Cover to have approximately 38% coverage, approximately 90% of which is native vegetation (Figure 1). Blue grama was the dominant grass species, and along with other native grasses comprised the majority of the ET Cover vegetation. No four-wing saltbush was observed. Many weedy species, including weedy grasses, were present that have not previously been documented on the cover.

The northwest corner of the ET Cover had the least amount of native grass coverage (Figure 1). This is the only access point to the ET Cover so the more sparse coverage in this area is anticipated and not of concern from a ET Cover performance standpoint.

A greater diversity of native grasses was observed in 2013 than in 2012. Potential reasons for this increased diversity include: species may have been present in very low amounts in 2012 but overlooked because the grasses were not green and lacking seed heads for positive identification, species respond differently to climate influences, and/or as niches opened up across the cover in 2013 some species may have been better able to quickly occupy the open spaces. Every vegetation community is dynamic and is most resilient when a variety of native species and their seed bank are present. Wet growing seasons such as 2013 will typically enhance the diversity of vegetation, which is positive for the ET Cover.

Although many native grass clumps died due to the prolonged drought, the open spaces left behind allowed for more resilient clumps to begin their development into bigger and more mature grasses. The open spaces also allowed for many annual weeds to grow, but two weed-removal events were conducted to reduce weed seed dispersal and reduce competition by weeds with the desired native grasses. The seeding event and the robust development of seed heads on the existing native grasses late in the 2013 growing season should facilitate native grass species growth in these open spaces. In addition, weedy grass species will also likely continue to grow and fill in sparse areas. This is part of the natural succession and over time these species should be outcompeted by the more desirable native grasses. The active maintenance of the ET Cover, including weed removal and supplemental watering, had a significant, positive impact on the native ET Cover vegetation in CY2013.

Southwest portion of the cover

Northwest portion of the cover

Southeast portion of the cover

Northeast portion of the cover

Figure 1 September 9, 2013 CWL ET Cover Photos

Recommendations

Weeding events should be conducted in 2014 to continue to reduce weeds and further assist establishment of native perennial grasses in the open spaces on the CWL ET Cover.

As of January 2014 Bernalillo County, where Sandia National Laboratories is located, remains in moderate to severe drought. At this time the National Drought Mitigation Center predicts that drought conditions are anticipated to persist or intensify across most of New Mexico into the spring of 2014 (NOAA 2014). If this forecast is accurate, early season supplemental watering of the CWL ET Cover starting as early as May 2014 is recommended. This will assist maturation of the larger bunch grasses and potentially assist in germination and/or seedling development.

The CWL ET Cover will continue to be inspected annually as required under the PCCP. Additionally, the northwest corner of the ET Cover should be monitored periodically by the staff biologist during the CY2014 growing season. This portion of the cover has the lowest percentage of foliar coverage due to the unavoidable impact of site entry and exit for all required monitoring, maintenance, inspection, and repair/weeding activities. Based upon this monitoring, additional maintenance and/or repair work may be recommended.

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