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Sandia National Laboratories

Operated for the U.S. Department of Energy's
National Nuclear Security Administration
by **Sandia Corporation**

P.O. Box 5800, MS-0143
Albuquerque, NM 87185-0143

P.O. Box 969
Livermore, CA 94551-0969

Phone: (505) 284-3191
Fax: (505) 284-1790
Email: mwhazen@sandia.gov

Michael W. Hazen
Vice President
Infrastructure Operations
Chief Security Officer

Mr. James W. Todd
Assistant Manager for Engineering
U. S. Department of Energy
National Nuclear Security Administration
Sandia Field Office
P. O. Box 5400
Albuquerque, NM 87185

Dear Mr. Todd:

Subject: ***Submittal of Chemical Waste Landfill (CWL) Annual Post-Closure Care Report, Calendar Year (CY) 2016, Chemical Waste Landfill Post-Closure Care Permit for Sandia National Laboratories/New Mexico (SNL/NM), Environmental Protection Agency Identification Number NM5890110518***

The CWL Annual Post-Closure Care Report for CY2016 is being provided to the Department of Energy (DOE) for submittal to the New Mexico Environment Department (NMED). This submittal is required by Part 2, Section 2.6.3, of the CWL Post-Closure Care Permit and includes information for monitoring and inspection activities conducted at the CWL during CY2016. The report and supporting documentation satisfy requirements listed in Permit Attachment 1, Sections 1.9 and 1.12.

I have signed the certification to be sent to the NMED as the Operator at SNL/NM. If you agree, please sign the certification as the Owner. If you have any questions regarding the enclosed document, please contact Jaime Moya, Director, at (505) 844-7955, Johnathon Huff, Senior Manager, at (505) 844-1046, or Pam Puissant, Manager, at (505) 844-3185.

Sincerely,

Enclosures:
1. Enclosure A – Chemical Waste Landfill Annual Post-Closure Care Report Calendar Year 2016 for Sandia National Laboratories/New Mexico, March 2017
2. Enclosure B – Submittal of Chemical Waste Landfill Post-Closure Care Report Calendar Year 2016, Certification Statement

Copy to w/enclosures:
Oden, Karen DOE/NNSA/SFO karen.oden@nnsa.doe.gov
Wimberly, Cynthia DOE/NNSA/SFO cynthia.wimberly@nnsa.doe.gov

Blind copy w/enclosures:

CFRC	(09532)	cfrc@sandia.gov

Blind copy w/o enclosures:

Blumberg, Amy	(11100)	ajblumb@sandia.gov
Green, Catherine	(04020)	cegreen@sandia.gov
Huff, Johnathon	(04130)	jhuff@sandia.gov
Mitchell, Michael	(06234)	mmmitch@sandia.gov
Moya, Jaime	(04100)	jlmoya@sandia.gov
Puissant, Pam	(04131)	pmpuiss@sandia.gov
Reiser, Anita	(04144)	asreise@sandia.gov

Submittal of Chemical Waste Landfill Annual Post-Closure Care Report
Calendar Year 2016
Chemical Waste Landfill Post-Closure Care Permit

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

CERTIFICATION STATEMENT

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

_____ _____

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

Date signed

_____ _____

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

Date signed



CHEMICAL WASTE LANDFILL
ANNUAL POST-CLOSURE CARE REPORT
CALENDAR YEAR 2016

SANDIA NATIONAL LABORATORIES, NEW MEXICO
LONG-TERM STEWARDSHIP

MARCH 2017





United States Department of Energy
Sandia Field Office

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ANNUAL CHEMICAL WASTE LANDFILL POST-CLOSURE CARE REPORT CALENDAR YEAR 2016

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.

Owner: United States Department of Energy
Sandia Field Office
Technical Contact: Ms. Karen Oden, Long-Term Stewardship
U.S. Department of Energy, Sandia Field Office
P.O. Box 5400/MS 0184
Albuquerque, NM 87185-5400
(505) 845-5162
Karen.Oden@nnsa.doe.gov

Operator: Sandia Corporation
Technical Contact: Ms. Pamela Puissant, Manager
Analytical Services Department
Sandia National Laboratories
P.O. Box 5800/MS 1103
Albuquerque, NM 87185-5800
(505) 844-3185
pmpuiss@sandia.gov

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Annex C Chemical Waste Landfill CY 2016 Post-Closure Inspection Forms

Annex D Chemical Waste Landfill CY 2016 Biology Report

ACRONYMS AND ABBREVIATIONS

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

EXECUTIVE SUMMARY

The Chemical Waste Landfill (CWL) at SNL/New Mexico (SNL/NM) is a remediated hazardous waste landfill that underwent 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 (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 as modified, defines all post-closure requirements. This sixth CWL Annual Post-Closure Care Report documents all activities and results as required by the PCCP Attachment 1, Section 1.12.

Two semi-annual groundwater events were conducted in Calendar Year (CY) 2016. There were no variances or non-conformances and analytical and statistical assessment results were consistent with previous years. No hazardous constituent concentration limits were exceeded and there was no statistically significant evidence of increasing contamination.

One annual soil-gas monitoring event was conducted in January 2016. Two minor variances from PCCP requirements were identified for the January 2016 soil-gas monitoring activities (i.e., no impact to data quality) and are being addressed through a PCCP modification request that will be submitted to the New Mexico Environment Department (NMED) in early CY 2017. Analytical and statistical assessment results are consistent with previous years and there were no exceedances of the established trigger level. Soil-gas monitoring results continue to confirm stability and three dimensional diffusion of the residual VOC soil-gas plume beneath the CWL in the vadose zone.

Inspections of the CWL final cover system, storm-water diversion structures, compliance monitoring system, and security fence were performed in accordance with PCCP requirements. Required repairs were minor and were generally performed during the inspections.

The Evapotranspirative (ET) Cover continues to meet successful revegetation criteria and is in excellent condition with even coverage of mature, native perennial grasses. Maintenance was performed in CY 2016 as a best management practice for ET Cover vegetation, and included a lower level of effort relative to previous years. The purpose of ongoing maintenance efforts is to promote the growth and health of the desired native grass species on the ET Cover by reducing competition with weedy species for limited moisture and nutrients.

Regulatory activities in CY 2016 included submittal of the Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2015 (SNL/NM March 2016) and two submittals of updated reference documents cited in the PCCP. There were no PCCP modifications in CY 2016.

All PCCP requirements have been met for CY 2016. Industrial land use is being maintained for the CWL consistent with PCCP requirements. Based upon monitoring, inspection, and maintenance results, the ET Cover is functioning as designed and site conditions remain protective of human health and the environment.

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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 hazardous waste landfill that underwent 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 as modified, defines all post-closure requirements. There were no PCCP modifications in CY 2016. The modification history of the PCCP through calendar year (CY) 2016 is documented in Chapter 7, along with a summary of documents submitted to the New Mexico Environment Department (NMED) associated with the PCCP through CY 2016.

All PCCP monitoring, inspection, and maintenance/repair requirements have been met for CY 2016. This CWL Annual Post-Closure Care Report documents all activities and results as required by the PCCP Attachment 1, Section 1.12. Based upon monitoring, inspection, and maintenance results, the Evapotranspirative (ET) Cover is functioning as designed and site conditions remain protective of human health and the environment. No groundwater or soil-vapor monitoring hazardous constituent and trigger levels were exceeded. Industrial land use is being maintained for the CWL consistent with PCCP requirements.

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 2016 in accordance with PCCP Attachment 1 (NMED October 2009 and subsequent revisions). This annual report documents post-closure care activities conducted from January through December 2016 and fulfills the PCCP requirement for annual reporting to the NMED.

The PCCP requires monitoring, inspection, and maintenance/repair activities that must be documented and reported for each CY. Monitoring activities include semi-annual groundwater monitoring for specific volatile organic compounds (VOCs) and metals, and annual vadose zone soil-gas monitoring for specific VOCs. Inspection, maintenance, and repair 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 ET Cover.

The scope of this report includes documentation of all CY 2016 monitoring, inspection, and maintenance/repair activities. Monitoring and inspections performed include:

- 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 and specific biological parameters), storm-water diversion structures, fence, locks, gates, signs, and survey monuments.
- Maintenance and repair as needed to ensure adequate performance of the ET Cover system and monitoring networks.

This CY 2016 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 2016 reporting period.
- Chapter 9 lists the references cited in this report.

Annexes are provided that include CY 2016 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 hazardous waste landfill located in the southeastern corner of SNL/NM Technical Area III (Figures 2-1 and 2-2) undergoing post-closure care in accordance with the PCCP (NMED October 2009 and subsequent revisions). From 1962 until 1981, the CWL was used for the disposal of chemical and solid waste generated by SNL/NM research activities. Additionally, a small amount of radioactive waste was disposed of during the operational years. Disposal of liquid waste in unlined pits and trenches ended in 1981, and after 1982 all liquid waste disposal was terminated. From 1982 through 1985, only solid waste was disposed of at the CWL, and after 1985 all waste disposal ended. The CWL was also used as a hazardous waste drum-storage facility from 1981 to 1989. A summary of the CWL disposal history is presented in the Closure Plan (SNL/NM December 1992) along with a waste inventory based upon available disposal records and information.

2.1 Background

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

Additional information on the VCMs, other closure activities, and CWL current conditions can be found in the CWL Final Resource Conservation and Recovery Act Closure Report for the CWL (SNL/NM September 2010), the PCCP, the CWL Corrective Measures Study Report (SNL/NM December 2004), and previous annual reports. Detailed information on residual soil contamination at the CWL can be found in PCCP Part 3, Section 3.1 and Table 3-1.

2.2 Final Cover System

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

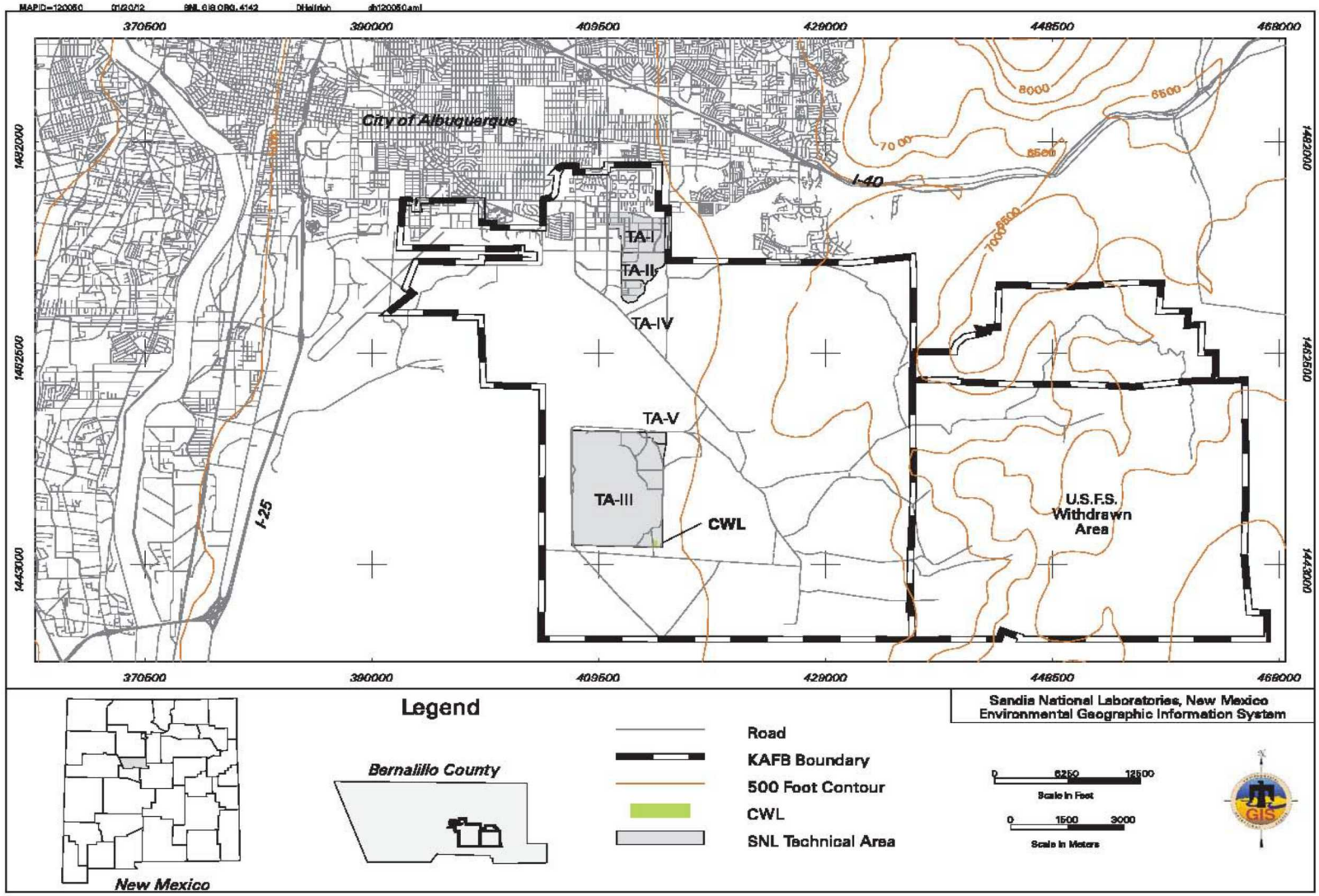


Figure 2-1
Location of the Chemical Waste Landfill with respect to Kirtland Air Force Base and the City of Albuquerque

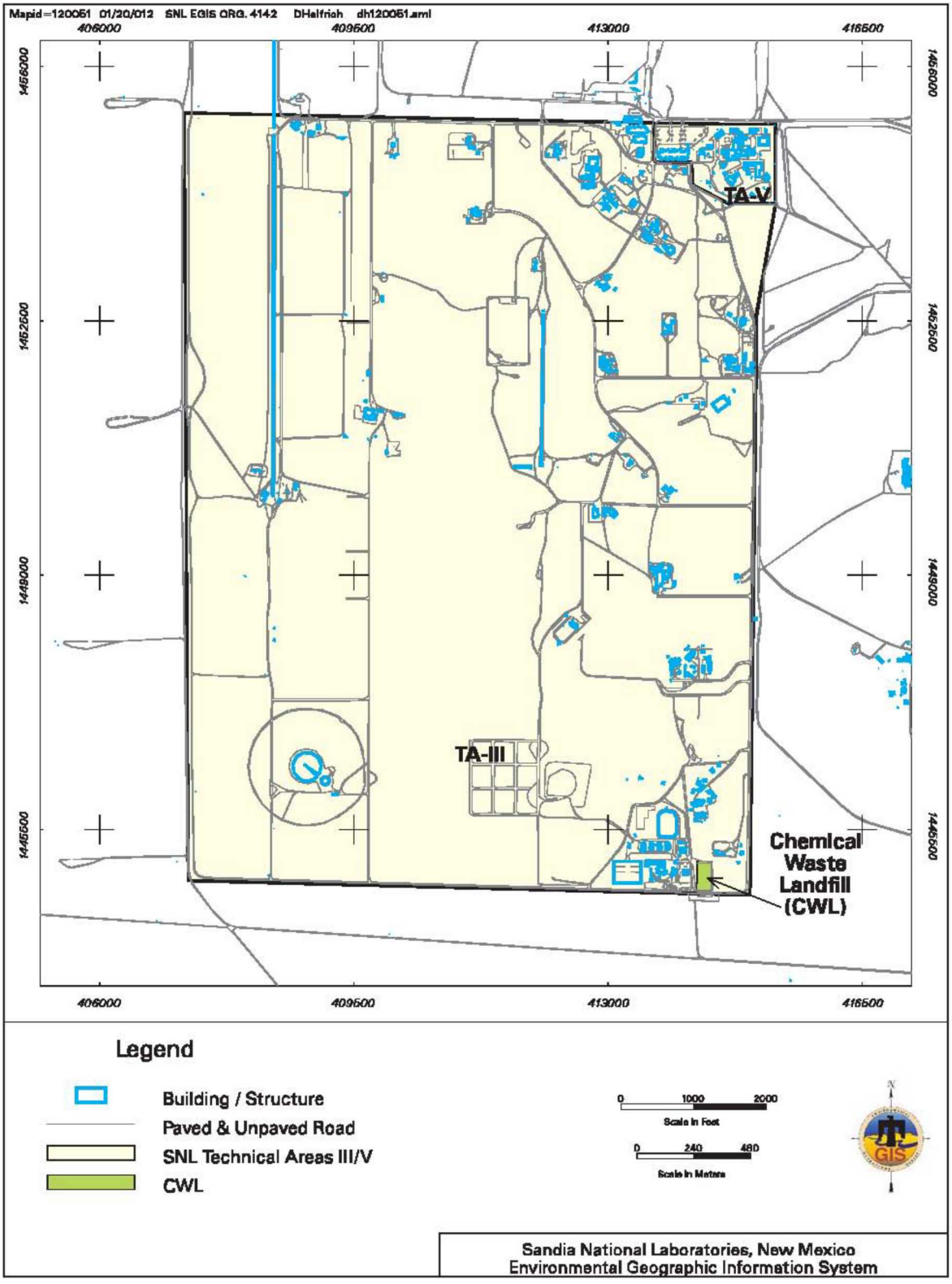


Figure 2-2
Location of the Chemical Waste Landfill within Technical Area III

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

2.3 Compliance Monitoring System

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

2.3.1 Groundwater Monitoring Network

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

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

Well-completion diagrams for the groundwater monitoring wells are provided in PCCP Attachment 2.

2.3.2 Soil-Gas Monitoring Network

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

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

Well-completion diagrams for all of the soil-gas monitoring wells are provided in PCCP Attachment 3.

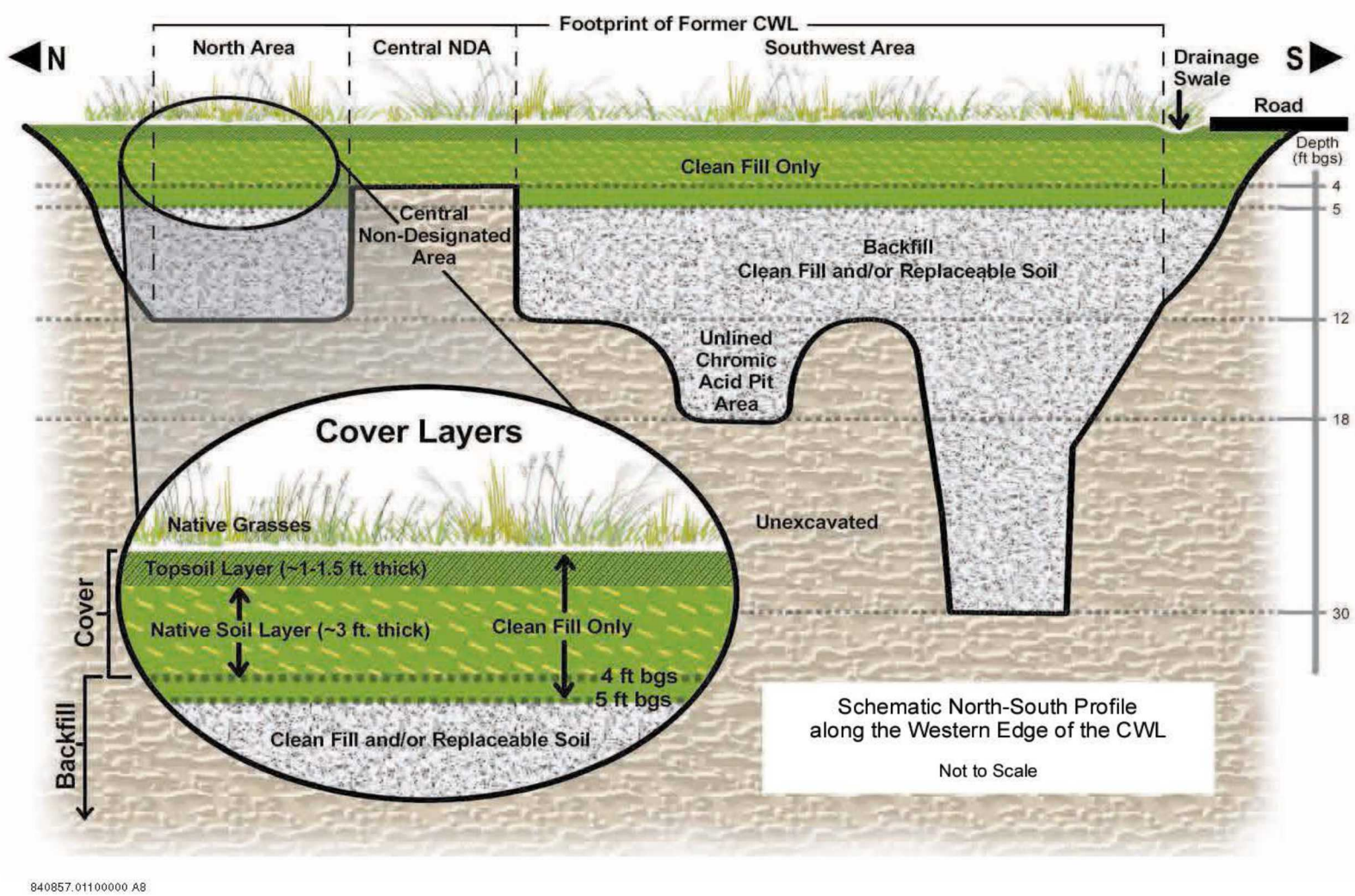


Figure 2-3
Schematic Profile of the Chemical Waste Landfill Evapotranspirative Cover

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

2.4 Storm-Water Diversion Structures

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

2.5 Security Fence

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

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3.0 MONITORING AND INSPECTION REQUIREMENTS

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

Monitoring, inspection, and maintenance/repair activities were conducted in CY 2016 in accordance with PCCP Attachment 1, Sections 1.8 through 1.10. Results of CY 2016 monitoring, inspection, and repair activities are presented in Chapters 4.0, 5.0, and 6.0 of this report. 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 2.3.1 and 2.3.2 respectively. The groundwater and soil-gas monitoring requirements are detailed in PCCP Attachment 1, Section 1.8. Sampling and analysis plans (SAPs) in PCCP Attachments 2 and 3, respectively, describe the procedures, methods, and analytical protocols for collecting and analyzing groundwater and soil-gas samples.

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 (commonly known as Freon 113), tetrachloroethene (PCE), 1,1-dichloroethene, chloroform, and trichlorofluoromethane (commonly known as 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 annually.

Soil-gas monitoring must be performed annually in accordance with the Soil-Gas SAP (PCCP Attachment 3) using U.S. Environmental Protection Agency (EPA) Compendium Method TO-14 (EPA January 1999a) or equivalent (e.g., method TO-15 [EPA January 1999b]) to ensure the collection of data in a manner consistent with historic soil-gas monitoring. Consistency in sampling and analysis is necessary so that results can be evaluated over time to determine changes/trends in soil-gas concentrations. As part of Sandia's commitment to process improvement, EPA Method TO-15 has been used since CY 2013. This method provides lower detection limits and enhanced quality assurance; quality control measures relative to the EPA Method TO-14.

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

Monitoring System	Monitoring Frequency	Monitoring Parameters/ Constituents of Concern	Monitoring Method
Groundwater	Semi-Annual[a]	TCE by EPA Method 8260[b] and Cr and Ni by EPA Method 6020[b]	Sampling and Analysis per PCCP Attachment 2
Soil-Gas	Annual	VOCs[c] by EPA Compendium Method TO-15 or equivalent[d]	Sampling and Analysis per PCCP Attachment 3

Notes:
[a]Semi-Annual: An enhanced list of constituents must be analyzed on an annual basis (see Section 1.8.1.1 of PCCP Attachment 1).
[b]EPA November 1986.
[c]See Table 1-5 in PCCP Attachment 1 for the required list of 50 VOCs.
[d]Use of Method TO-15, or equivalent, was approved by NMED in February 2012 as part of a PCCP modification (Kieling February 2012).
Cr = Chromium.
EPA = U.S. Environmental Protection Agency.
Ni = Nickel.
PCCP = Post-Closure Care Permit.
TCE = Trichloroethene (also trichloroethylene).
VOC = Volatile organic compound.

3.2 Inspection, Maintenance, and Repair Requirements

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

3.2.1 Final Cover System Inspection/Maintenance/Repair Requirements

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

3.2.1.1 Vegetation Inspection and Monitoring

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

Cover vegetation monitoring is to be accomplished in a two-phase approach. The first phase concentrates on establishing the vegetation on the ET Cover from seed to a mature plant

community such that successful revegetation criteria (defined in PCCP Attachment 1 Section 1.9) are met. These criteria are provided below.

- Total percent foliar coverage equals 20 percent (i.e., 20 percent of the land surface is covered with living plants versus 80 percent bare surface area);
- Of the 20 percent total foliar coverage, 50 percent or greater comprises native perennial species, and 50 percent or less comprises annual species; and
- No contiguous bare spots greater than 200 square feet (approximately 14 by 14 feet).

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

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

3.2.1.2 Cover Inspection Requirements

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

3.2.1.3 Cover Repairs

Cover damage exceeding PCCP specifications must be repaired within 60 days to a condition that meets or exceeds the original design. However, repairs to fix inadequate cover vegetation may be delayed until the appropriate growing season if approved by NMED in advance, and if measures are taken as needed to prevent excessive erosion of the ET Cover during the delay period. Repairs to the cover are to be completed using materials consistent with the cover installation specifications in accordance with PCCP Attachment 1, Section 1.9.1.3.

3.2.2 Storm-Water Diversion Structure Inspection Requirements

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

3.2.3 Monitoring Well Network Inspection Requirements

Inspection of monitoring wells and sampling equipment is required at the same frequency as the associated monitoring, and is to be performed concurrently with all groundwater and soil-gas monitoring events. Inspections must be documented on the Post-Closure Inspection Form/Inspection Checklist (PCCP Attachment 4 or equivalent) and must 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, project experience, 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 the material removed within 60 days.

3.2.4 Security Fence Inspection Requirements

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

3.2.5 Emergency Equipment Inspection Requirements

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

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4.0 GROUNDWATER MONITORING RESULTS

This chapter presents groundwater monitoring activities (i.e., sampling and analysis), analytical results, and data evaluation for CY 2016 in accordance with PCCP Attachment 1, Sections 1.8 and 1.12, and Attachment 2 (NMED October 2009 and subsequent revisions). Groundwater sampling field activities are described in Section 4.1, analytical laboratory results and a discussion of data quality are presented in Section 4.2, data evaluation requirements and results are presented in Section 4.3, and hydrogeologic information on the regional aquifer is presented in Section 4.4. A summary of groundwater monitoring activities and results is provided in Section 8.1. Monitoring wells are shown in Figure 2-4.

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, 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 beneath 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 2016.

- The first sampling event was conducted January 11-18, 2016. Groundwater samples were collected from monitoring wells CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11, and a duplicate sample was collected from CWL-BW5. Samples collected from all wells were analyzed for TCE, chromium, nickel, and the enhanced list of VOCs. The enhanced list of VOCs includes 1,1-dichloroethene, 1,1,2-trichloro-1 2,2-trifluoroethane (commonly known as Freon 113), chloroform, PCE, and trichlorofluoromethane (commonly known as Freon 11) in addition to TCE.

- The second sampling event was conducted July 12-18, 2016. Groundwater samples were collected from monitoring wells CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11, and a duplicate sample was collected from CWL-MW9. Samples collected from all wells were analyzed for TCE, chromium, and nickel.

4.1.1 Well Purging

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

continued after meeting the minimum purge volume requirement 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 to be 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 the water quality parameters described above were collected using a YSI EXO1 Water Quality Meter and a HACH™ Model 2100Q portable turbidity meter. Additional water quality measurements included oxidation-reduction potential (ORP) and dissolved oxygen.

A portable Bennett Company groundwater sampling system was used to purge and collect groundwater samples from all wells. Consistent with historic monitoring results, minimum purge requirements were satisfied at all monitoring wells except CWL-MW10. In accordance with PCCP Attachment 2, Section 2.12, this monitoring well was purged to dryness, allowed to recover, and then sampled to collect the most representative groundwater sample possible given the low yield of this well. In an effort to decrease the 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 (i.e., 0.25-inch inside diameter). During the purging process at CWL-MW10, the flow rate was continually adjusted to achieve as low a flow rate as possible without causing the pump to fail. This represents a “best faith effort” to purge the wells at the slowest rate possible, given equipment limitations, as specified in PCCP Attachment 2, Section 2.12.

During January approximately 16 gallons were purged from monitoring well CWL-MW10 prior to the well going dry (purge volume requirement was approximately 27 gallons). The average estimated flow rate was 0.17 gallons per minute (gpm), and the estimated flow rate was 0.13 gpm during the final three gallons (equivalent to 0.63 and 0.47 liters per minute, respectively). During July approximately 15 gallons were purged from CWL-MW10 prior to the well going dry (purge volume requirement was approximately 26 gallons). The average flow rate was 0.096 gpm, and the estimated flow rate was 0.010 gpm during the final three gallons (equivalent to 0.36 and 0.04 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 rinsate blank) samples were collected prior to collection of an environmental sample to verify the equipment decontamination process. Trip blank samples were used to evaluate potential contamination by VOCs during sampling, shipment, and the laboratory process. Field blank

samples are used to evaluate potential sample contamination by VOCs resulting from ambient field conditions.

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

First Semi-Annual Sampling Event – January 11-18, 2016

A duplicate environmental sample was collected from CWL-BW5. One equipment blank sample was collected prior to sampling CWL-MW5. The samples were submitted for all analyses. A total of five trip blank samples were submitted with the January 2016 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-MW11 sampling locations to simulate the transfer of environmental samples from the sampling system to the sample container. One additional field blank sample was collected from the deionized water source used for the equipment decontamination process.

Second Semi-Annual Sampling Event – July 12-18, 2016

A duplicate environmental sample was collected from CWL-MW9. One equipment blank sample was collected prior to sampling CWL-MW9. The samples were submitted for all analyses. A total of five trip blank samples were submitted with the July 2016 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-BW5 and CWL-MW9 sampling locations to simulate the transfer of environmental samples from the sampling system to the sample container. A third field blank sample was collected from the deionized water source used for the equipment decontamination process.

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 255 gallons of wastewater were generated during the January sampling event and approximately 247 gallons of wastewater were generated during the July sampling event (total of 502 gallons). Separate waste characterization samples were collected from purge and decontamination water and analyzed for discharge parameters. All wastewater was discharged to the sanitary sewer in accordance with Albuquerque Bernalillo County Water Utility Authority requirements after waste characterization data were compared to discharge limits and determined to meet these requirements.

Personal protective equipment and other solid waste generated during January and July 2016 monitoring activities were packaged into 5-gallon plastic buckets and managed as hazardous waste in accordance with all applicable requirements. All solid waste was disposed at a permitted off-site facility.

4.2 Laboratory Results

Groundwater and field QC samples were submitted to GEL Laboratories for analyses. Samples were analyzed in accordance with applicable EPA analytical methods. For comparison, hazardous constituent concentration limits from the PCCP are included in the analytical results tables. Analytical results that are above the analytical laboratory method detection limit (MDL) but below the practical quantitation limit (PQL) are qualified as estimated values by the analytical laboratory 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 2016 groundwater sampling events. Table 4-3 summarizes results for the additional VOCs (enhanced list) included in the January 2016 event. Table 4-4 summarizes field water quality measurements collected prior to sampling for both events. 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 11-18, 2016

TCE was detected above the laboratory MDL in the CWL-MW10 sample at a concentration of 0.810 µg/L. There were no other detections of TCE or the additional enhanced list of VOCs.

Chromium was detected only in the CWL-MW11 sample at a concentration of 0.00292 milligrams per liter (mg/L). Nickel was detected above the laboratory MDL in the CWL-MW10 groundwater sample at a concentration of 0.000501 mg/L.

Second Semi-Annual Sampling Event – July 6-13, 2016

TCE was detected above the laboratory MDL in the CWL-MW10 sample at a concentration of 0.430 µg/L. There were no other detections of TCE.

Chromium was not detected above the laboratory MDL in any of the groundwater samples. Nickel was detected in all samples at concentrations from 0.000626 mg/L to 0.00271 mg/L.

Table 4-1
Summary of TCE Results
Chemical Waste Landfill Groundwater Monitoring
Analytical Method SW846-8260B[a]
Calendar Year 2016

Well ID	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	Laboratory Qualifier[b]	Validation Qualifier[b]
January 2016 Sampling Event					
CWL-BW5	ND	0.300	1.00	U	--
CWL-BW5 (Duplicate)	ND	0.300	1.00	U	--
CWL-MW9	ND	0.300	1.00	U	--
CWL-MW10	0.810	0.300	1.00	J	--
CWL-MW11	ND	0.300	1.00	U	--
July 2016 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	0.430	0.300	1.00	J	--
CWL-MW11	ND	0.300	1.00	U	--

Notes:
All results are in parts per million by volume basis.
[a]EPA November 1986.
[b]Laboratory/Validation Qualifier - If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted samples. See explanation for "J" and "U" laboratory qualifiers below.
EPA = U.S. Environmental Protection Agency.
J = Amount detected is below the PQL.
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 MDL.
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 is not present or concentration is below the MDL.

Table 4-2
Summary of Chromium and Nickel Results
Chemical Waste Landfill Groundwater Monitoring
Analytical Method SW846-6020[a]
Calendar Year 2016

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	Laboratory Qualifier[b]	Validation Qualifier[b]
January 2016 Sampling Event						
CWL-BW5	Chromium	ND	0.002	0.010	U	--
	Nickel	ND	0.0005	0.002	U	UJ
CWL-BW5 (Duplicate)	Chromium	ND	0.002	0.010	U	--
	Nickel	ND	0.0005	0.002	U	UJ
CWL-MW9	Chromium	ND	0.002	0.010	U	--
	Nickel	ND	0.0005	0.002	U	UJ
CWL-MW10	Chromium	ND	0.002	0.010	U	--
	Nickel	0.000501	0.0005	0.002	J	J-
CWL-MW11	Chromium	0.00292	0.002	0.010	J	--
	Nickel	ND	0.0005	0.002	U	UJ
July 2016 Sampling Event						
CWL-BW5	Chromium	ND	0.002	0.010	U	--
	Nickel	0.00271	0.0005	0.002	--	J+
CWL-MW9	Chromium	ND	0.002	0.010	U	--
	Nickel	0.00238	0.0005	0.002	--	J+
CWL-MW9 (Duplicate)	Chromium	ND	0.002	0.010	U	--
	Nickel	0.00238	0.0005	0.002	--	J+
CWL-MW10	Chromium	ND	0.002	0.010	U	--
	Nickel	0.000626	0.0005	0.002	J	--
CWL-MW11	Chromium	ND	0.002	0.010	U	--
	Nickel	ND	0.0005	0.002	U	--

Notes:
[a]EPA November 1986.
[b]Laboratory/Validation Qualifier - If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted sample. See explanation for "J," "J-," "J+," "U," and "UJ" qualifiers below.
EPA = U.S. Environmental Protection Agency.
J = Amount detected is below the PQL.
J- = The associated numerical value is an estimated quantity with a suspected negative bias.
J+ = The associated numerical value is an estimated quantity with a suspected positive bias.
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 MDL.
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 is not present or concentration is below the MDL.
UJ = The analyte was not detected. The associated MDL is an estimated value.

Table 4-3
Summary of Additional Volatile Organic Compound Results
Chemical Waste Landfill Groundwater Monitoring
Analytical Method SW846-8260B[a]
January 2016

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	2.00	5.00	U	--
CWL-BW5 (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	2.00	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	2.00	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	2.00	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	2.00	5.00	U	--

Refer to footnotes at end of table.

Table 4-3 (Concluded)
Summary of Additional Volatile Organic Compound Results
Chemical Waste Landfill Groundwater Monitoring
Analytical Method SW846-8260B[a]
January 2016

Notes:
[a]EPA November1986,
[b]Laboratory/Validation Qualifier - If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted samples.
EPA = U.S. Environmental Protection Agency.
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 MDL.
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 is not present or concentration is below the MDL.

Table 4-4
Summary of Field Water Quality Measurements[a]
Chemical Waste Landfill Groundwater Monitoring
Calendar Year 2016

Well ID	Temperature (°C)	SC (µmho/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (% Sat)	DO (mg/L)
January 2016 Sampling Event							
CWL-BW5	17.61	1028.9	185.5	6.86	0.36	77.8	7.38
CWL-MW9	16.11	892.9	174.1	6.93	0.15	42.8	4.23
CWL-MW10	16.97	897.9	2.1	7.02	3.26	21.8	2.07
CWL-MW11	17.28	948.9	172.5	6.91	0.32	62.1	5.95
July 2016 Sampling Event							
CWL-BW5	24.17	1080.0	196.5	7.04	0.59	85.5	7.15
CWL-MW9	23.61	945.3	133.4	7.13	0.53	43.5	3.68
CWL-MW10	24.64	972.4	9.8	7.14	2.85	30.2	2.51
CWL-MW11	27.63	1089.0	198.8	7.13	0.75	64.9	5.13

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.
NTU = Nephelometric turbidity units.
ORP = Oxidation-reduction potential.
pH = Potential of hydrogen (negative logarithm of the hydrogen ion concentration).
SC = Specific conductance.

4.2.2 Field Quality Control Sample Results

Table 4-5 summarizes results of duplicate sample analyses and the calculated relative percent difference (RPD) values between the environmental and duplicate sample results for the January (CWL-BW5) and July (CWL-MW9) sample pairs. For the environmental-duplicate sample pair collected at CWL-BW5 in January, no VOCs or metals were detected. Therefore, RPD values were not calculated. For the environmental-duplicate sample pair collected at CWL-MW9 in July, nickel was the only analyte detected in both samples. The RPD value for nickel was < 1 and shows good agreement (i.e., RPD value < 35 for metals).

One equipment blank sample was collected in January prior to sampling monitoring well CWL-BW5 and analyzed for all constituents. Chloroform was detected in the equipment blank sample above the associated laboratory MDL at concentration of 1.36 µg/L. No corrective action was necessary since chloroform was not detected above the laboratory MDL in the associated environmental or duplicate sample (i.e., CWL-BW5 samples). No constituents were detected in the equipment blank sample collected in July prior to sampling CWL-MW9.

Table 4-5
Summary of Duplicate Sample Results
Chemical Waste Landfill Groundwater Monitoring
Calendar Year 2016

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD[a]
July 2016 Sampling Event (CWL-MW9)			
Nickel (mg/L)	0.00238	0.00238	< 1

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

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

where: R_1 = environmental sample result.
R_2 = duplicate sample result.

mg/L = Milligram(s) per liter.

Of the three field blank samples associated with the January sampling event, only chloroform was detected above the laboratory MDL in all samples. No corrective action was required since chloroform was not detected in any environmental or duplicate samples. For the three field blank samples collected in July, TCE was not detected above the MDL in any of the samples.

No VOCs were detected in the five trip blank samples associated with the January VOC environmental samples. For the five trip blank samples associated with the July VOC environmental sampling event, TCE was not detected above the laboratory MDL.

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 laboratory control sample results met PCCP requirements (PCCP Attachment 2). All chemical data were reviewed and qualified in accordance with SNL/NM Administrative Operating Procedure (AOP) AOP 00-03, “Data Validation Procedure for Chemical and Radiochemical Data” (SNL/NM June 2014).

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. 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

Variances and non-conformances are defined in the PCCP Attachment 2, Section 2.22 for groundwater monitoring. No variances or non-conformances were identified during the January and July 2016 semi-annual groundwater sampling events.

4.3 Data Evaluation

Groundwater monitoring is required to determine whether constituent concentrations in the groundwater beneath the CWL are 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 all wells is required after 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, historic groundwater sampling results are used to augment the data sets and increase the amount of data available for statistical analysis. Historic groundwater data is limited to data obtained no earlier than May 1998 (i.e., near the completion of the VE VCM).

Statistical evaluation of the groundwater data includes results from CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11. Wells CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11 were installed in 2010 and have been sampled twelve times as of July 2016 (November-December 2010, July-August 2011, January and July 2012, January and July 2013, January and July 2014, January and July 2015, and January and July 2016). Statistical evaluation of the results from these wells was first presented in the CY 2013 Annual Report. CWL-BW5 is a replacement well for CWL-BW4A; therefore, historic data for CWL-BW4A is included in the statistical evaluation of results from well CWL-BW5.

4.3.1 Statistical Assessment Requirements

Groundwater monitoring data are statistically evaluated on a well-by-well basis for each of the three hazardous constituents in accordance with the requirements stated in PCCP Attachment 1, Section 1.8.1.2. The hazardous constituents and their respective concentration limits are listed in Table 4-6. Prediction and confidence intervals are calculated and used to evaluate groundwater monitoring results. In addition, the cumulative percentage of sample results that are greater than the median (i.e., Median Test) is calculated to determine whether there is statistically significant evidence of increased contamination. If a result is below the analytical laboratory detection limits, the MDL for the constituent is used for statistical analysis. For duplicate analyses, only the highest detection is used for statistical analysis. If a detection is qualified as “not detected” during data validation due to blank contamination, the original result reported by the laboratory is used for statistical analysis. More detailed information regarding statistical assessment requirements is provided below. Statistical assessment results for CY 2016 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.
SNL/NM = Sandia National Laboratories/New Mexico.

Prediction and Confidence Intervals

The probability that each semi-annual sample result for a given hazardous constituent falls within the range of previous sample results is determined using prediction intervals. The prediction interval for a given hazardous constituent is the range between the 95% upper confidence limit (UCL) and the 95% lower confidence limit (LCL) of the mean. Therefore, the probability of a sample result for a given hazardous constituent falling within the range of previous sample results (i.e., between the LCL and the UCL) is 90%. Strictly for comparison, CY 2016 sample results are also compared to the historic range (minimum and maximum result derived from historic results not including CY 2016 results) to determine whether they fall within, below, or above the range of previous sample results.

The 95% LCL is also used to determine statistically significant evidence that the concentration limit for the particular hazardous constituent has been exceeded as specified in PCCP Attachment 1, Section 1.8.1.2. The calculated 95% LCL is compared to the concentration limit in Table 4-6. If it exceeds the concentration limit, this is considered statistically significant evidence that the concentration limit has been exceeded, and it triggers corrective action in accordance with PCCP Attachment 1, Section 1.8.3. Individual sample results are not directly compared to concentration limits, and if an individual result exceeds the concentration limit this does not constitute an exceedance requiring corrective action.

Median Test

The median value is calculated using all historic data prior to the sampling event(s) being evaluated. For example, the median values against which the July 2016 CWL-BW5/4A sample results are compared were calculated using all historic results obtained since May 1998 (i.e., completion of the VE VCM) not including the July 2016 sample results. For the next groundwater monitoring event, the median values will be recalculated and will include the July 2016 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, in accordance with PCCP Attachment 1, Section 1.8.1.2, no action is required in the case of statistically significant evidence of increasing contamination unless the 95% LCL of the mean for a given constituent exceeds the respective concentration limit.

4.3.2 Statistical Assessment Results

No hazardous waste concentration limits were exceeded and there was no evidence of increasing contamination based on the statistical assessment performed in accordance with PCCP Attachment 1, Section 1.8.1. CY 2016 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 when all results for the data set were non-detections. The statistical analysis presented for wells CWL-MW9, CWL-MW10, and CWL-MW11 is significantly impacted by the small data set (each contains twelve data points for each constituent), the very low concentrations, and in several cases the large number of non-detect results. Because the evaluation process uses the laboratory MDL in the case of laboratory non-detections, the statistical results are also affected by changes in the MDL over time. In general, the laboratory MDLs have decreased over time, which impacts the CWL-BW5/4A statistical evaluation results as the historic data set for this well includes results from 1998 through the present. For laboratory detections that are qualified during the data validation process as “not detected” (i.e., “U” qualified) due to blank contamination, the original result reported by the laboratory is used. Results qualified by the laboratory and/or data validation as estimated (i.e., “J” qualified) are used as reported. Statistical results are presented below for all cases where evaluation was possible.

Prediction Intervals Results

Monitoring Well CWL-BW5/4A

CY 2016 CWL-BW5 chromium and TCE sample results were all non-detections, and the corresponding MDLs were lower than their respective 95% LCLs, thus are below the prediction interval (range of 95% LCL to 95% UCL). This is due to the decrease in the laboratory detection limits over time and the fact that chromium and TCE were often not detected. Results for chromium and TCE (using the MDL) fell within the historic range. Of the three CY 2016 nickel results (two environmental samples and one duplicate), only one result was a detection (July environmental sample, 0.00271 mg/L). The July result was below the 95% LCL, but was within the historic range. The MDL for the two non-detections (January environmental and duplicate samples, 0.0005 mg/L) was below the 95% LCL and equal to the historic minimum.

Monitoring Well CWL-MW9

Chromium and TCE have not been detected in any CWL-MW9 samples (CY 2010 through 2016, twelve environmental and four duplicate samples). Therefore, statistical evaluation of these constituents is not presented. Of the three CY 2016 nickel results (two environmental samples and one duplicate), two were detections above the laboratory MDL (July environmental and duplicate samples, both 0.00238 mg/L). Both July results fell between the 95% LCL and 95% UCL and were within the historic range. The January result was a non-detect, and the MDL (0.0005 mg/L) was less than the 95% LCL and less than the historic minimum.

Table 4-7
Statistical Assessment Results Summary
Chemical Waste Landfill
Calendar Year 2016 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	0.00315	0.00297	0.00232	0.00398	Normal	38%	No
Nickel (mg/L)	0.0005	0.049	0.00502	0.00793	0.00282	0.00722	Normal	41%	No
TCE (µg/L)	0.1	0.78	0.344	0.127	0.308	0.38	Normal	3%	No
CWL-MW9									
Chromium (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	No
Nickel (mg/L)	0.000523	0.00435	0.00253	0.00131	0.00186	0.0032	Normal	22%	No
TCE (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	No
CWL-MW10									
Chromium (mg/L)	0.002	0.00325	0.00221	0.00047885	0.00197	0.00245	Normal	11%	No
Nickel (mg/L)	0.00135	0.00707	0.0028	0.00178	0.00187	0.00373	Normal	11%	No
TCE (µg/L)	0.45	4.68	2.07	1.617	1.232	2.908	Normal	22%	No
CWL-MW11									
Chromium (mg/L)	0.002	0.00304	0.00226	0.00039999	0.00206	0.00246	Normal	33%	No
Nickel (mg/L)	0.0005	0.00449	0.00212	0.00129	0.00145	0.00279	Normal	11%	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 historic data not including 2016 sample results.
[c]Mean, LCL, UCL, Standard Deviation, and Distribution Type determined using ProUCL statistical program.
[d] Median Test is the cumulative percentage of sample results that are greater than the median.
[e]Exceedance determined by comparing the sample result (Tables 4-1, 4-2, and 4-3) against the concentration limit in CWL Permit Attachment 1, Table 1-2 (Table 4-6 of this report).
CWL = Chemical Waste Landfill.
LCL = Lower confidence limit.
µg/L = Micrograms per liter.
mg/L = Milligrams per liter.
NA = Not Applicable; constituent has not been detected in any samples from this monitoring well.
TCE = Trichloroethene.
UCL = Upper confidence limit.

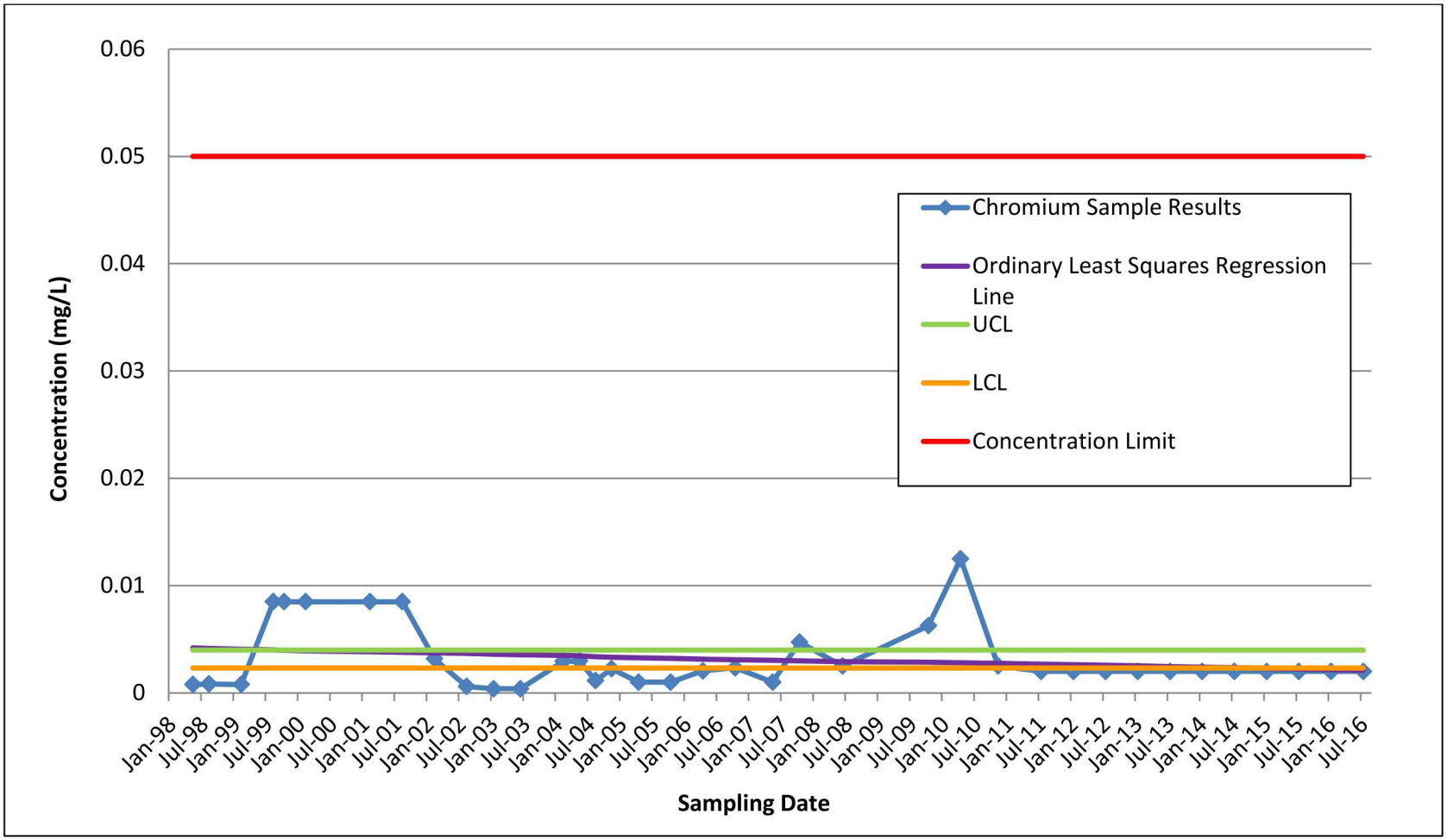


Figure 4-1
Chromium Control Chart for CWL-BW5/4A

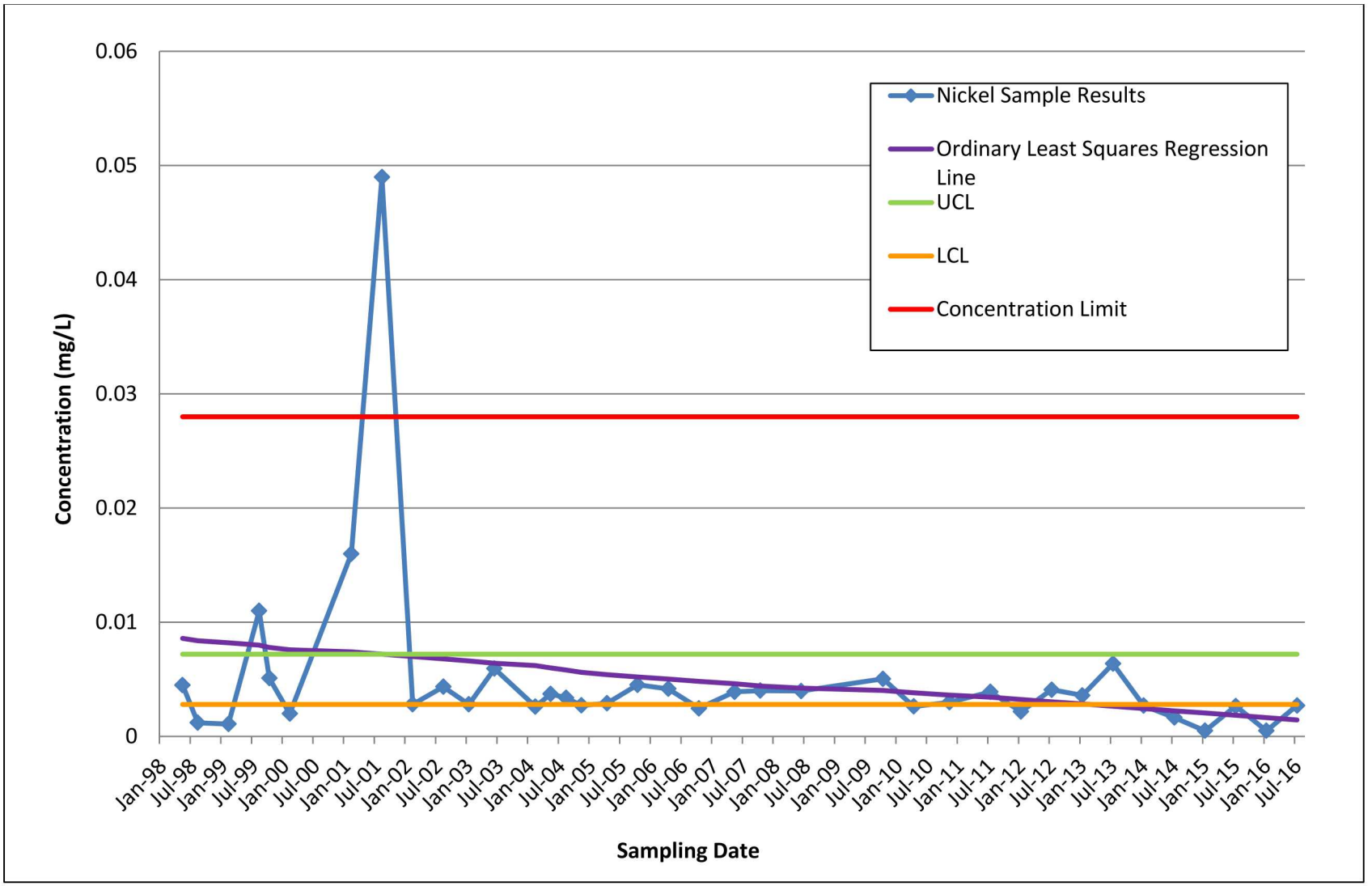


Figure 4-2
Nickel Control Chart for CWL-BW5/4A

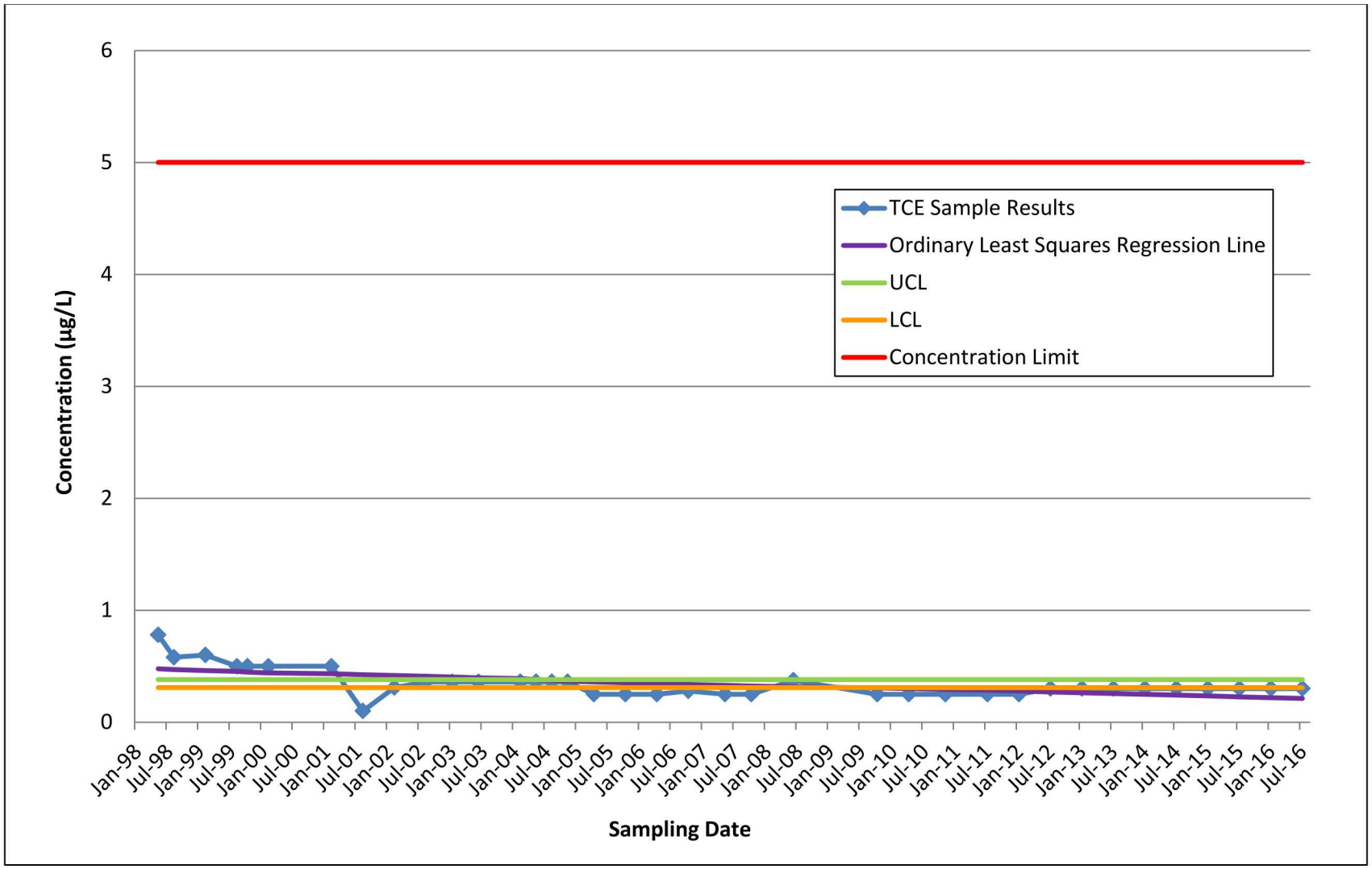


Figure 4-3
TCE Control Chart for CWL-BW5/4A

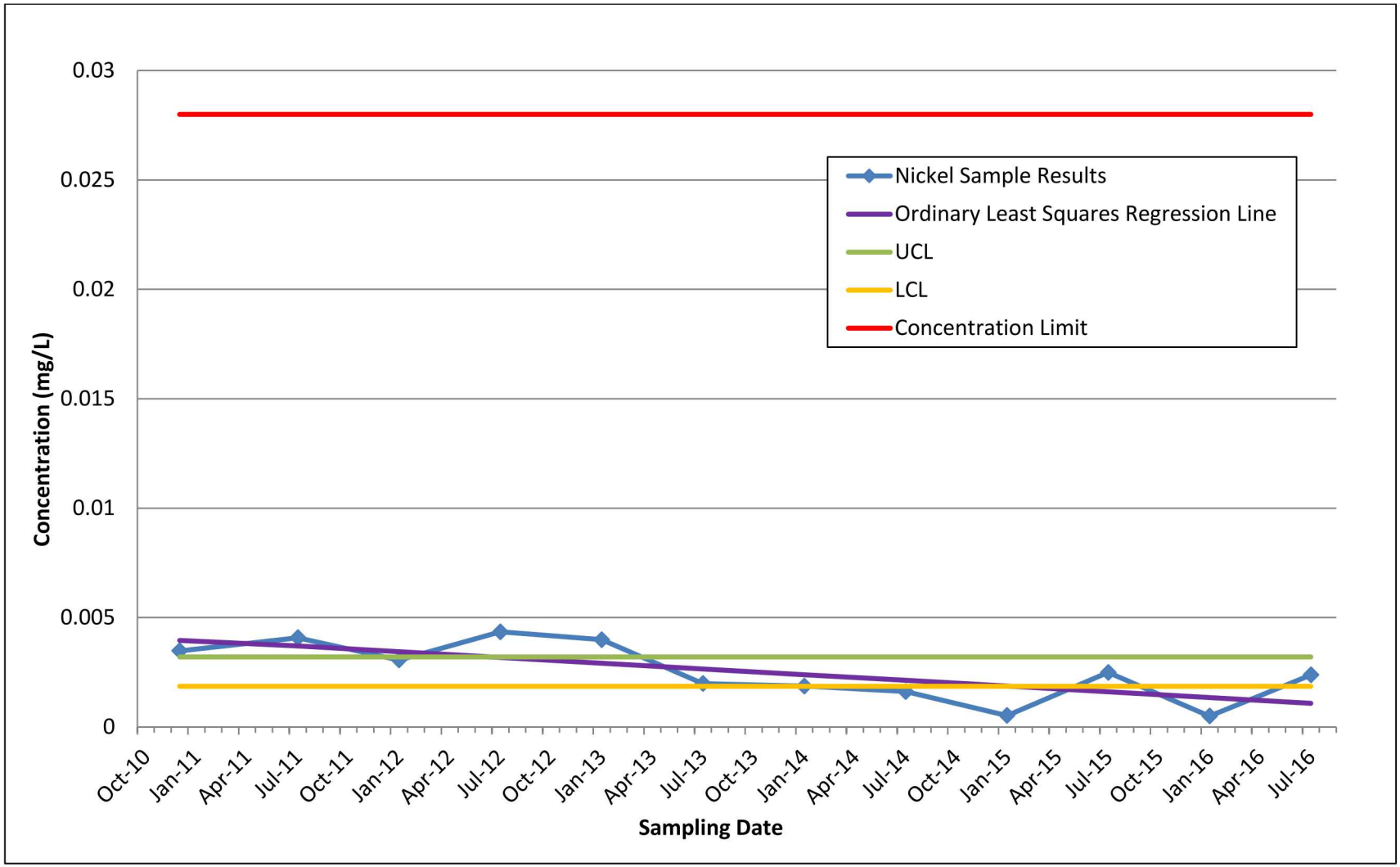


Figure 4-4
Nickel Control Chart for CWL-MW9

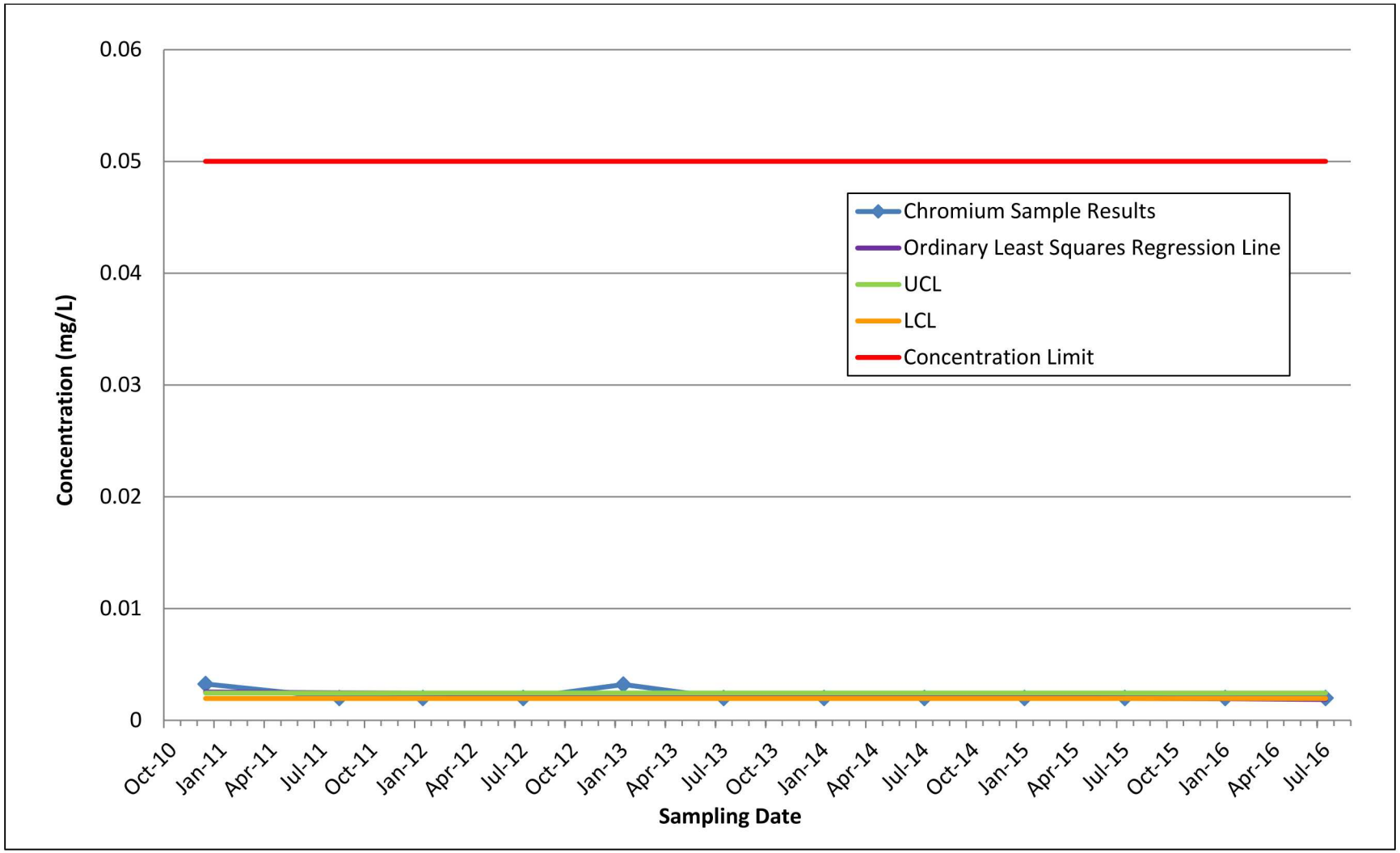


Figure 4-5
Chromium Control Chart for CWL-MW10

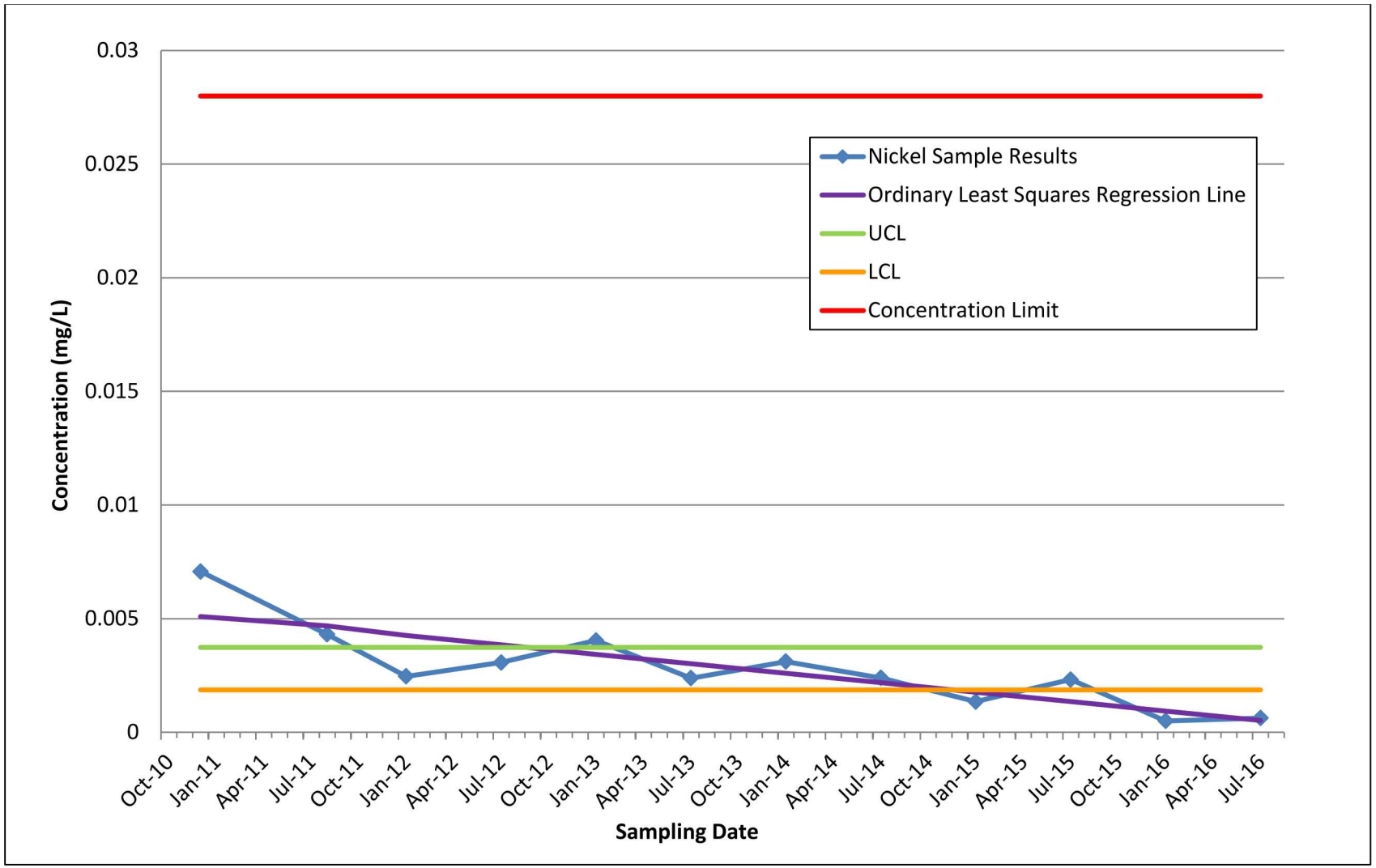


Figure 4-6
Nickel Control Chart for CWL-MW10

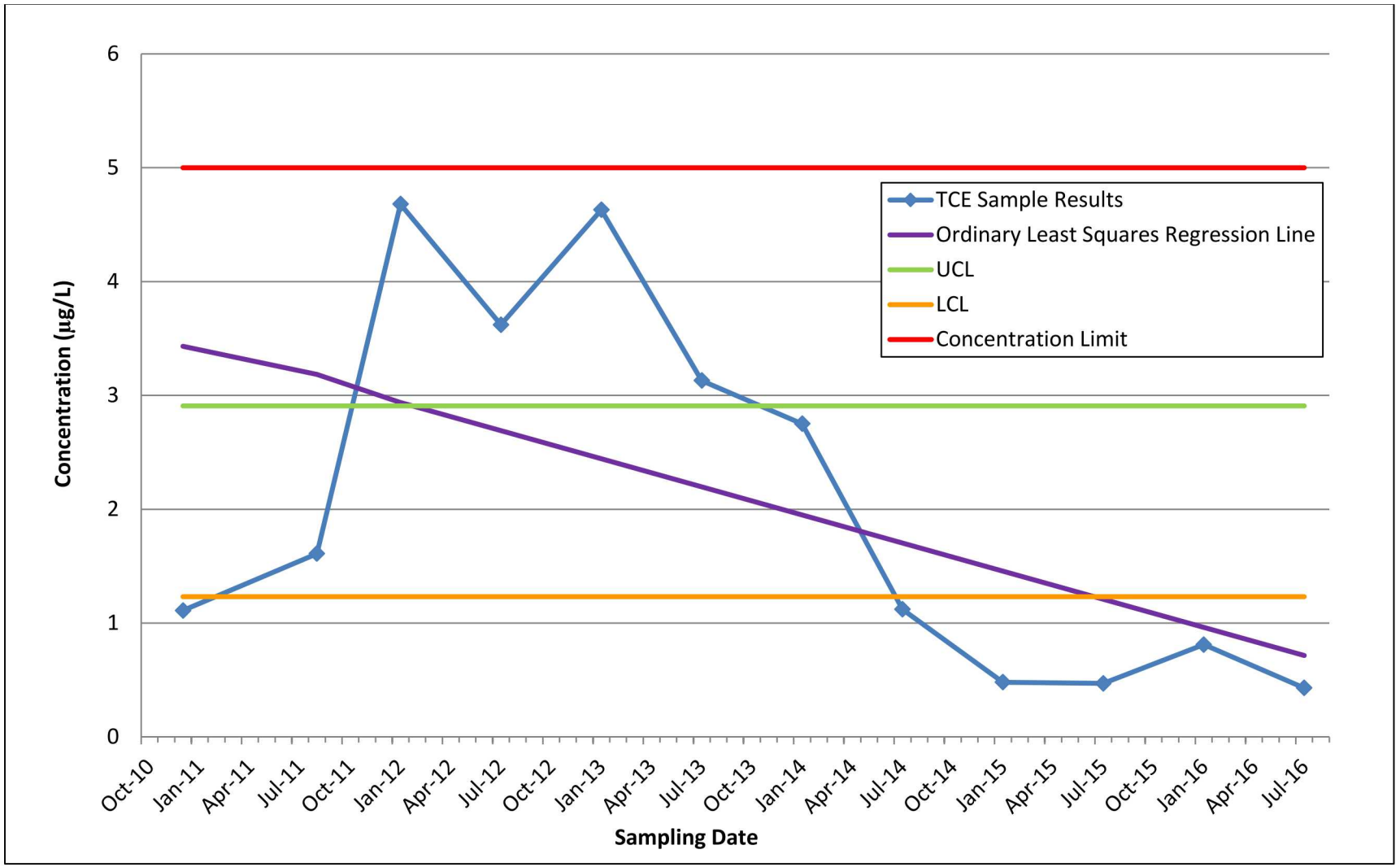


Figure 4-7
TCE Control Chart for CWL-MW10

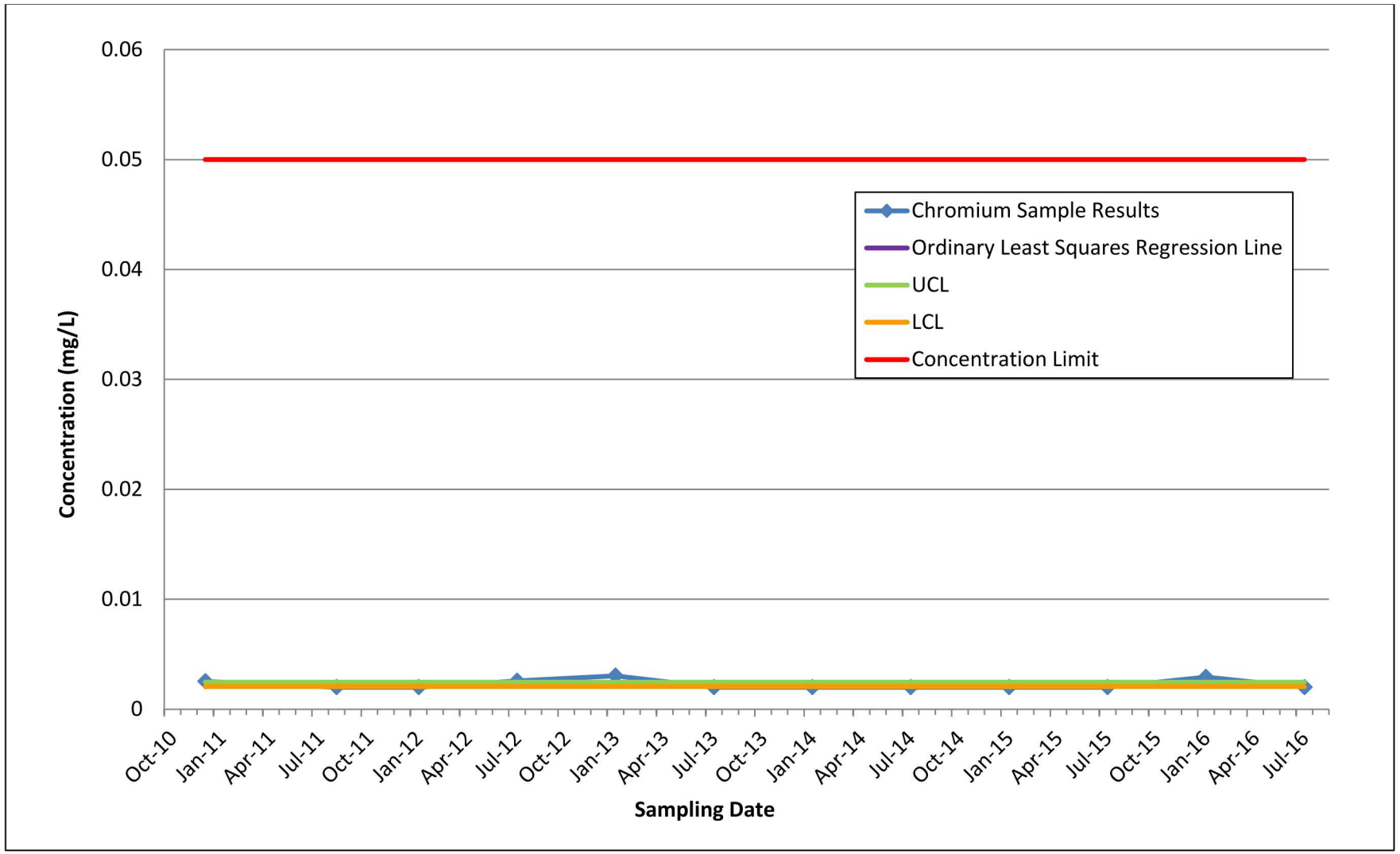


Figure 4-8
Chromium Control Chart for CWL-MW11

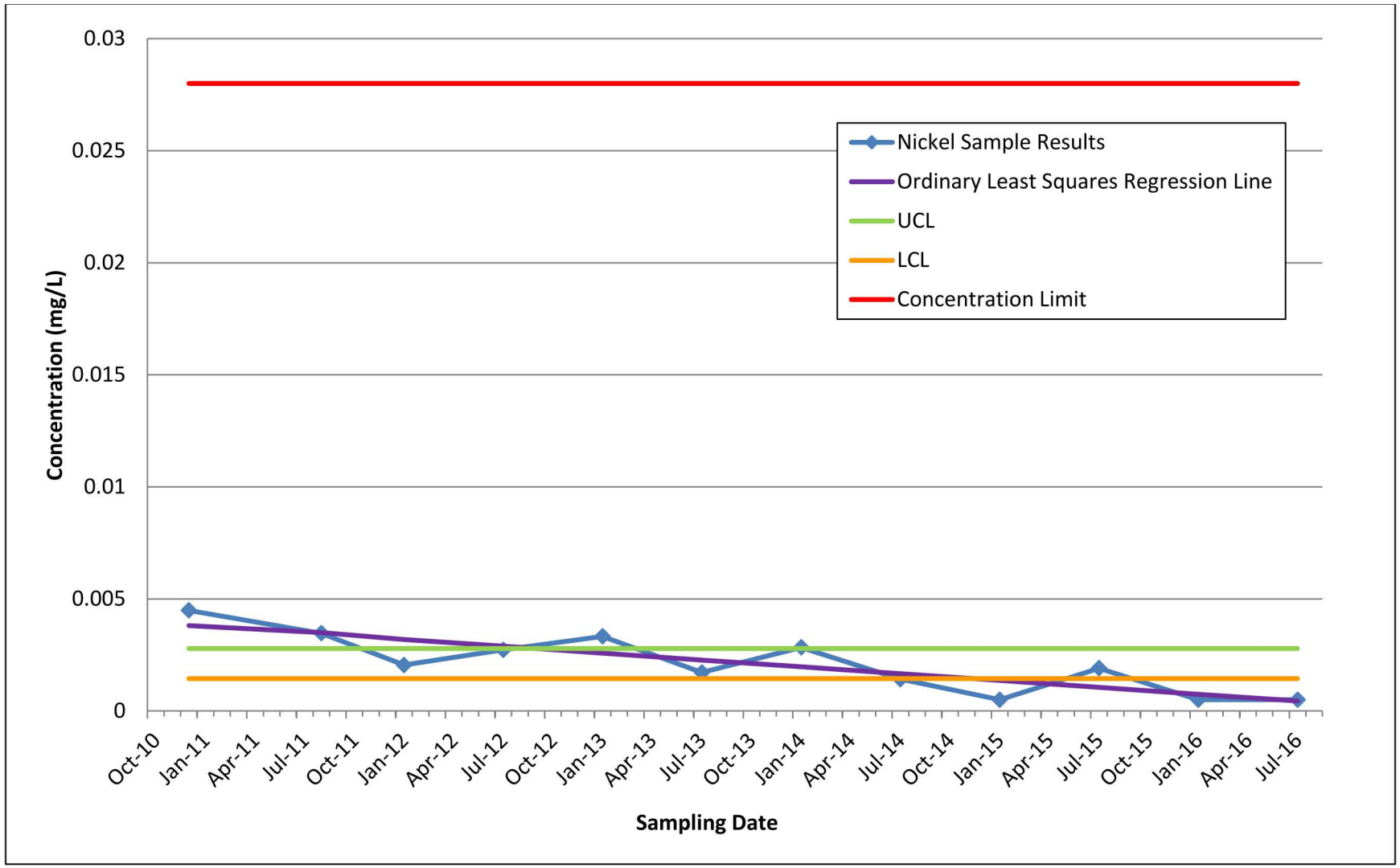


Figure 4-9
Nickel Control Chart for CWL-MW11

Monitoring Well CWL-MW10

CY 2016 CWL-MW10 chromium sample results were both non-detects, and the laboratory MDL (0.002 mg/L) fell within the range of the 95% LCL and 95% UCL and the historic range. The nickel results for both the January and July samples (0.000501 and 0.000626 mg/L, respectively) were below the 95% LCL and were less than the historic minimum. For the TCE results, both January and July results (0.810 and 0.430 µg/L, respectively) were below the 95% LCL. The January result was within the historic range, but the July result was less than the historic minimum.

Monitoring Well CWL-MW11

CY 2016 CWL-MW11 chromium sample results included one detection above the MDL (January sample, 0.00292 mg/L) and one non-detect (July sample, MDL of 0.002 mg/L). The January result exceeded the 95% UCL but was within the historic range. The July MDL was less than the 95% LCL, but equal to the historic minimum. Nickel was not detected in both the January and July environmental samples, and the MDL (0.0005 mg/L) was below the 95% LCL and equal to the historic minimum. TCE has not been detected in any CWL-MW11 samples (CY 2010 through 2016, twelve environmental and two duplicate samples). Therefore, statistical evaluation of TCE is not presented.

Confidence Intervals Results

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

Median Test Results

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 41% for nickel (CWL-BW5/4A); the one CY 2016 CWL-BW5/4A nickel result that was a detection above the MDL was below the 95% LCL. The low median test results for TCE in CWL-BW5/4A (3%) reflects a data set influenced by non-detection results and an analytical laboratory detection limit that has decreased over time.

In addition, the ordinary least squares regression line is shown on Figures 4-1 through 4-9. This line provides a visual representation of the overall trend of the sample results. As shown in Figures 4-1 through 4-9, all three hazardous constituents show a decreasing trend in each well, consistent with the Median Test results. The ordinary least squares regression line

shown in Figure 4-7 for CWL-MW10 TCE results shows a stronger decreasing trend as a result of the consistent decreases during the last seven sampling events (July 2013 through July 2016). The variation shown in Figure 4-7 is typical of very low concentrations (low parts per billion) that are fluctuating over time.

4.4 Hydrogeologic Assessment

The regional aquifer in the area of the CWL is located within the Santa Fe Group alluvial sediments at a depth of approximately 485 to 500 feet bgs. Regional groundwater beneath Kirtland Air Force Base (KAFB) flows generally westward away from the mountains toward the Rio Grande. Pumping by the City of Albuquerque and KAFB have modified the natural groundwater flow regime and resulted in a steady decline of the upper surface of the regional aquifer. Water levels at the CWL have been declining since monitoring began in 1985. The average rate of decline has been somewhat variable over time, but has typically been in the range of 0.4 to 0.8 feet per year. The groundwater elevation decline between October 2015 and October 2016 ranged from 0.14 (CWL-MW9) to 0.33 (CWL-BW5) feet, with an average decline rate of 0.21 feet. This rate of decline has significantly decreased from the 2014 to 2015 average decline rate, which was 0.72 feet.

In CY 2016, 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 2016 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 2016). Localized variations in the water table reflect site-specific geologic controls (i.e., vertical and lateral variability in permeability of the saturated Santa Fe Group alluvial sediments).

Measured orthogonally from the potentiometric surface contours on Figure 4-10, the horizontal gradient did not change significantly from CY 2015 and is approximately 0.013 feet/feet. Groundwater velocities were calculated using (a) the current potentiometric surface gradient, (b) the hydraulic conductivity range from the four groundwater monitoring wells (i.e., high and low values from 2012 slug tests), and (c) a porosity of 29 percent as determined from the laboratory analyses of CWL soil samples (SNL/NM October 1995). The calculated velocities are the same as those reported for CY 2014 and 2015, and 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.

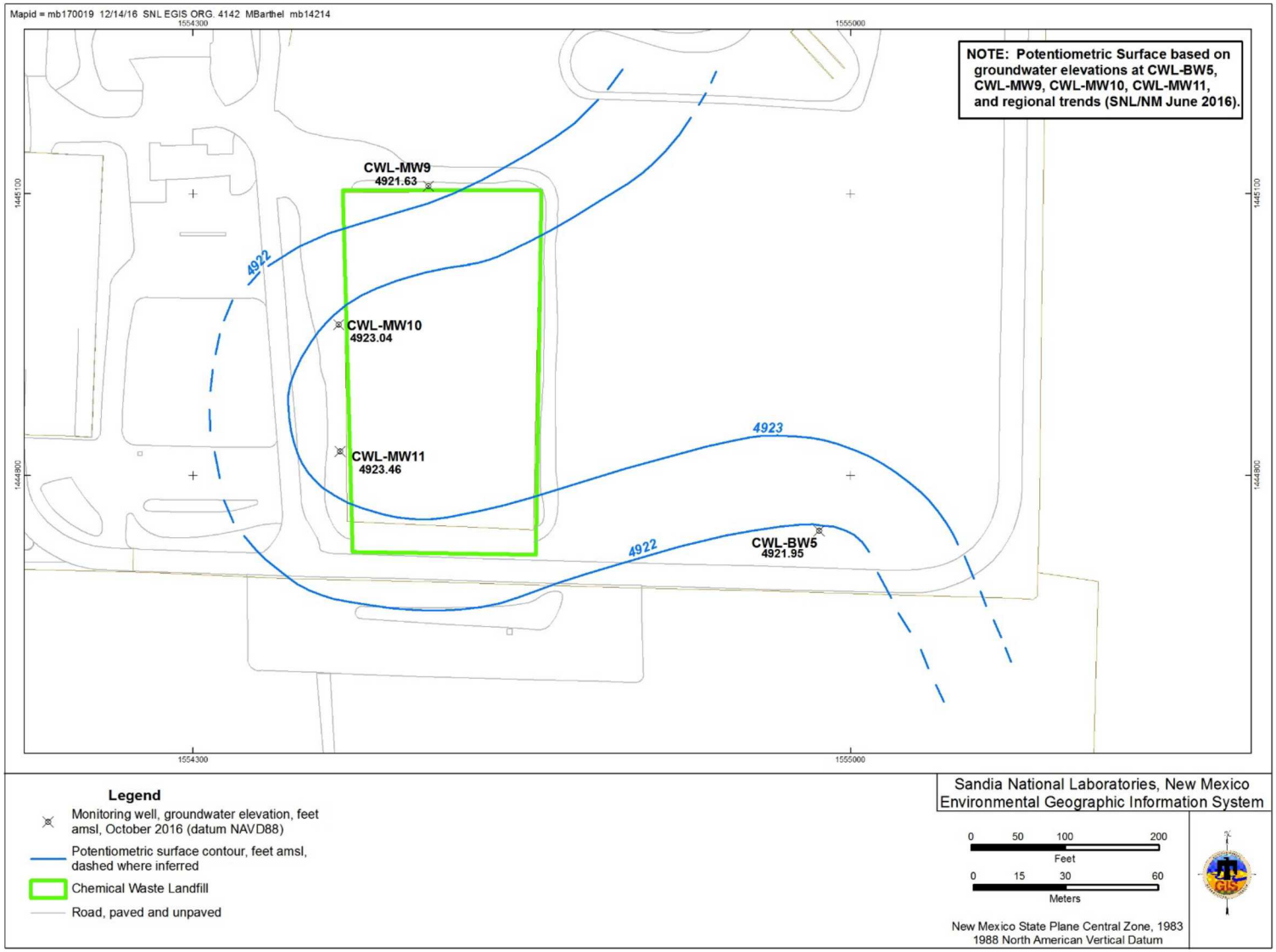


Figure 4-10
Potentiometric Surface of the Regional Aquifer at the Chemical Waste Landfill, October 2016

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 2016 in accordance with PCCP Attachment 1, Sections 1.8 and 1.12, and Attachment 3 (NMED October 2009 and subsequent revisions). The CY 2016 annual soil-gas sampling event was the fifth 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. Monitoring well locations are shown in Figure 2-4.

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 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 20, 2016. All samples were analyzed using the EPA Method TO-15 (EPA January 1999b) for the 50 VOCs listed in PCCP Attachment 1, Table 1-5. CY 2016 soil-gas sampling activities and results are described in the following sections.

5.1.1 Well Evacuation

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

The CWL soil-gas sampling equipment includes a vacuum pump, a sampling manifold assembly, a duplicate 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.

During the January 2016 monitoring event, a duplicate environmental sample was collected immediately after the original environmental sample at the CWL-D3-170 sample port and the duplicate pair for the CWL-D3-350 sampling port was collected using a manifold system that allows for the simultaneous collection of the environmental and duplicate sample. The two duplicate samples were submitted for analysis with the January 2016 environmental samples. The 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 in SUMMA® canisters. Results are used to assess whether contamination of the samples may have resulted from ambient field conditions. A total of six field blank samples were submitted for analysis with CY 2016 environmental samples.

5.1.3 Waste Management

Only a small volume of solid waste (personal protective equipment, less than one cubic foot) was generated during the January 2016 soil-gas monitoring event. This waste was combined with the groundwater monitoring solid waste and managed as hazardous waste in accordance with all applicable requirements. The waste was disposed at a permitted off-site facility.

5.2 Laboratory Results

Soil-gas samples were submitted to Test America, Inc. for chemical analyses by EPA Method TO-15 (EPA January 1999b) in accordance with PCCP Attachment 1, Section 1.8. Analytical reports (i.e., certificates of analyses), analytical methods, MDLs, reporting limits, 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 2016. The results are presented in Table 5-1.

Table 5-1
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15[a]
January 2016

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-UI1-40	Chloroform	730	25	80	--	--
20-Jan-16	1,1-Dichloroethene	220	35	210	--	--
	Methylene chloride	20	19	110	B, J	--
	Tetrachloroethene	2500	14	110	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	710	44	110	--	--
	1,1,1-Trichloroethane	48	17	80	J	--
	Trichloroethene	4700	28	110	--	--
	Trichlorofluoromethane	210	53	110	--	--
	Total Organics[c]	9138	NA	NA	NA	NA
CWL-UI1-80	Chloroform	550	32	100	--	--
20-Jan-16	1,1-Dichloroethene	380	44	270	--	--
	Methylene chloride	86	25	140	B, J	--
	Tetrachloroethene	710	17	140	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	810	56	140	--	--
	1,1,1-Trichloroethane	42	22	100	J	--
	Trichloroethene	5800	36	140	--	--
	Trichlorofluoromethane	250	67	140	--	--
	Total Organics[c]	8628	NA	NA	NA	NA
CWL-UI1-120	Chloroform	440	32	100	--	--
20-Jan-16	1,1-Dichloroethene	450	44	270	--	--
	Methylene chloride	240	25	140	B	--
	Tetrachloroethene	510	17	140	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	900	56	140	--	--
	1,1,1-Trichloroethane	39	22	100	J	--
	Trichloroethene	7300	36	140	--	--
	Trichlorofluoromethane	270	67	140	--	--
	Total Organics[c]	10149	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]
January 2016

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-UI2-36	Carbon tetrachloride	9.7	6.4	80	J	--
20-Jan-16	Chloroform	900	9.5	30	--	--
	Dichlorodifluoromethane	39	14	40	J	--
	1,1-Dichloroethene	71	13	80	J	--
	1,2-Dichloropropane	54	24	40	--	--
	Methylene chloride	12	7.2	40	J	--
	Tetrachloroethene	260	5.1	40	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	810	16	40	--	--
	1,1,1-Trichloroethane	47	6.5	30	--	--
	Trichloroethene	5200	10	40	--	--
	Trichlorofluoromethane	230	20	40	--	--
	Total Organics[c]	7632.7	NA	NA	NA	NA
CWL-UI2-76	Chloroform	880	3.2	10	--	--
20-Jan-16	Dichlorodifluoromethane	42	4.9	13	--	--
	1,1-Dichloroethane	9.4	2.4	10	J	--
	1,2-Dichloroethane	8.5	3.0	27	J	--
	1,1-Dichloroethene	150	4.3	27	--	--
	1,2-Dichloropropane	110	8.1	13	--	--
	Methylene chloride	9.7	2.4	13	J	--
	Tetrachloroethene	260	1.7	13	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	950	5.5	13	--	--
	1,1,1-Trichloroethane	40	2.2	10	--	--
	1,1,2-Trichloroethane	3.2	2.3	13	J	--
	Trichloroethene	5600	18	68	--	--
	Trichlorofluoromethane	260	6.6	13	--	--
	Total Organics[c]	8322.8	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]
January 2016

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-UI2-136	Carbon tetrachloride	13	11	130	J	--
20-Jan-16	Chloroform	650	16	50	--	--
	Dichlorodifluoromethane	45	24	67	J	--
	1,1-Dichloroethene	210	22	130	--	--
	1,2-Dichloropropane	160	40	67	--	--
	Methylene chloride	21	12	67	J	--
	Tetrachloroethene	220	8.6	67	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	980	27	67	--	--
	1,1,1-Trichloroethane	30	11	50	J	--
	Trichloroethene	7300	18	67	--	--
	Trichlorofluoromethane	260	33	67	--	--
	Total Organics[c]	9889	NA	NA	NA	NA
CWL-D1-100	Carbon tetrachloride	23	19	240	J	--
20-Jan-16	Chloroform	660	28	89	--	--
	Dichlorodifluoromethane	66	43	120	J	--
	1,1-Dichloroethane	24	21	89	J	--
	1,1-Dichloroethene	520	38	240	--	--
	1,2-Dichloropropane	130	72	120	--	--
	Methylene chloride	35	21	120	J	--
	Tetrachloroethene	950	15	120	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1500	49	120	--	--
	1,1,1-Trichloroethane	57	19	89	J	--
	Trichloroethene	12000	31	120	--	--
	Trichlorofluoromethane	390	58	120	--	--
	Total Organics[c]	16355	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]
January 2016

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-D1-160	Carbon tetrachloride	29	28	350	J	--
20-Jan-16	Chloroform	690	41	130	--	--
	Dichlorodifluoromethane	110	63	170	J	--
	1,1-Dichloroethene	1000	56	350	--	--
	1,2-Dichloropropane	210	100	170	--	--
	Methylene chloride	61	31	170	J	--
	Tetrachloroethene	750	22	170	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	2700	71	170	--	--
	1,1,1-Trichloroethane	71	28	130	J	--
	Trichloroethene	21000	46	170	--	--
	Trichlorofluoromethane	650	85	170	--	--
	Total Organics[c]	27271	NA	NA	NA	NA
CWL-D1-240	Carbon tetrachloride	66	30	370	J	--
20-Jan-16	Chloroform	630	44	140	--	--
	Dichlorodifluoromethane	130	67	180	J	--
	1,1-Dichloroethane	45	33	140	J	--
	1,1-Dichloroethene	1300	60	370	--	--
	1,2-Dichloropropane	230	110	180	--	--
	Methylene chloride	42	33	180	J	--
	Tetrachloroethene	630	24	180	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	3200	75	180	--	--
	1,1,1-Trichloroethane	64	30	140	J	--
	Trichloroethene	27000	49	180	--	--
	Trichlorofluoromethane	800	91	180	--	--
	Total Organics[c]	34137	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]
January 2016

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-D1-350	Chloroform	190	29	92	--	--
20-Jan-16	Dichlorodifluoromethane	75	44	120	J	--
	1,1-Dichloroethene	730	39	240	--	--
	Methylene chloride	58	22	120	J	--
	Tetrachloroethene	230	16	120	--	--
	Toluene	17	16	120	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1700	50	120	--	--
	Trichloroethene	12000	32	120	--	--
	Trichlorofluoromethane	440	60	120	--	--
	Total Organics[c]	15440	NA	NA	NA	NA
CWL-D1-470	Acetone	8.4	2.2	62	J	--
20-Jan-16	Carbon tetrachloride	1.9	0.79	9.9	J	--
	Chloroform	1.6	1.2	3.7	J	--
	Dichlorodifluoromethane	17	1.8	5.0	--	--
	1,1-Dichloroethene	35	1.6	9.9	--	--
	Methylene chloride	5.2	0.89	5.0	--	--
	Tetrachloroethene	7.4	0.63	5.0	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	280	2.0	5.0	--	--
	Trichloroethene	200	1.3	5.0	--	--
	Trichlorofluoromethane	71	2.4	5.0	--	--
	Total Organics[c]	627.5	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]
January 2016

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-D2-120	Chloroform	590	37	120	--	--
20-Jan-16	Dichlorodifluoromethane	77	56	160	J	--
	1,1-Dichloroethene	700	50	310	--	--
	1,2-Dichloropropane	120	93	160	J	--
	Methylene chloride	44	28	160	J	--
	Tetrachloroethene	510	20	160	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1800	63	160	--	--
	1,1,1-Trichloroethane	45	25	120	J	--
	Trichloroethene	11000	41	160	--	--
	Trichlorofluoromethane	480	76	160	--	--
	Total Organics[c]	15366	NA	NA	NA	NA
CWL-D2-240	Carbon tetrachloride	40	20	250	J	--
20-Jan-16	Chloroform	600	30	94	--	--
	Dichlorodifluoromethane	81	45	120	J	--
	1,1-Dichloroethene	870	40	250	--	--
	1,2-Dichloropropane	220	75	120	--	--
	Methylene chloride	38	22	120	J	--
	Tetrachloroethene	540	16	120	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	2100	51	120	--	--
	1,1,1-Trichloroethane	45	20	94	J	--
	Trichloroethene	14000	33	120	--	--
	Trichlorofluoromethane	550	61	120	--	--
	Total Organics[c]	19084	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]
January 2016

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-D2-350	Carbon tetrachloride	28	15	190	J	--
20-Jan-16	Chloroform	400	23	71	--	--
	Dichlorodifluoromethane	71	34	95	J	--
	1,1-Dichloroethene	690	31	190	--	--
	1,2-Dichloropropane	100	57	95	--	--
	Methylene chloride	73	17	95	J	--
	Tetrachloroethene	420	12	95	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1600	39	95	--	--
	1,1,1-Trichloroethane	31	15	71	J	--
	Trichloroethene	10000	25	95	--	--
	Trichlorofluoromethane	450	46	95	--	--
	Total Organics[c]	13863	NA	NA	NA	NA
CWL-D2-440	Acetone	12	0.84	24	J	--
20-Jan-16	2-Butanone	1.1	0.94	3.8	J	--
	Chloroform	3.2	0.45	1.4	--	--
	Dichlorodifluoromethane	1.4	0.68	1.9	J	--
	1,1-Dichloroethene	7.9	0.61	3.8	--	--
	Methylene chloride	1.7	0.34	1.9	J	--
	Tetrachloroethene	3.8	0.24	1.9	--	--
	Toluene	0.41	0.24	1.9	J	1.9U
	1,1,2-Trichloro-1,2,2-trifluoroethane	14	0.77	1.9	--	--
	Trichloroethene	100	0.50	1.9	--	--
	Trichlorofluoromethane	4.9	0.93	1.9	--	--
	Total Organics[c]	150.0	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]
January 2016

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-D2-470	Chloroform	300	22	70	--	--
20-Jan-16	1,1-Dichloroethene	210	30	190	--	--
	cis-1,2-Dichloroethene	49	21	93	J	--
	Tetrachloroethene	220	12	93	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	520	38	93	--	--
	1,1,1-Trichloroethane	29	15	70	J	--
	Trichloroethene	4400	24	93	--	--
	Trichlorofluoromethane	170	46	93	--	--
	Total Organics[c]	5898	NA	NA	NA	NA
CWL-D3-120	Carbon tetrachloride	12	7.1	89	J	--
20-Jan-16	Chloroform	170	11	33	--	--
	Dichlorodifluoromethane	29	16	44	J	--
	1,2-Dichloroethane	17	9.8	89	J	--
	1,1-Dichloroethene	210	14	89	--	--
	1,2-Dichloropropane	65	27	44	--	--
	Methylene chloride	13	8.0	44	J	--
	Tetrachloroethene	120	5.7	44	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	620	18	44	--	--
	1,1,1-Trichloroethane	13	7.2	33	J	--
	Trichloroethene	4100	12	44	--	--
	Trichlorofluoromethane	180	22	44	--	--
	Total Organics[c]	5549	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]
January 2016

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-D3-170	Carbon tetrachloride	21	13	170	J	--
20-Jan-16	Chloroform	230	20	63	--	--
	Dichlorodifluoromethane	48	30	84	J	--
	1,2-Dichloroethane	25	18	170	J	--
	1,1-Dichloroethene	340	27	170	--	--
	1,2-Dichloropropane	140	50	84	--	--
	Methylene chloride	27	15	84	J	--
	Tetrachloroethene	190	11	84	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	980	34	84	--	--
	1,1,1-Trichloroethane	15	14	63	J	--
	Trichloroethene	6800	22	84	--	--
	Trichlorofluoromethane	270	41	84	--	--
	Total Organics[c]	9086	NA	NA	NA	NA
CWL-D3-170 (Duplicate)	Carbon tetrachloride	25	14	170	J	--
20-Jan-16	Chloroform	280	20	65	--	--
	Dichlorodifluoromethane	56	31	86	J	--
	1,2-Dichloroethane	30	19	170	J	--
	1,1-Dichloroethene	430	28	170	--	--
	1,2-Dichloropropane	130	52	86	--	--
	Methylene chloride	29	15	86	J	--
	Tetrachloroethene	210	11	86	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1200	35	86	--	--
	1,1,1-Trichloroethane	18	14	65	J	--
	Trichloroethene	8500	23	86	--	--
	Trichlorofluoromethane	340	42	86	--	--
	Total Organics[c]	11248	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]
January 2016

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-D3-350	Carbon tetrachloride	22	14	180	J	--
20-Jan-16	Chloroform	210	21	66	--	--
	Dichlorodifluoromethane	56	32	88	J	--
	1,1-Dichloroethene	410	29	180	--	--
	1,2-Dichloropropane	120	53	88	--	--
	Methylene chloride	140	16	88	--	--
	Tetrachloroethene	200	11	88	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1100	36	88	--	--
	Trichloroethene	7800	23	88	--	--
	Trichlorofluoromethane	340	43	88	--	--
	Total Organics[c]	10398	NA	NA	NA	NA
CWL-D3-350 (Duplicate)	Acetone	23	5.3	150	J	R
20-Jan-16	Benzene	4.2	2.3	12	J	--
	Carbon tetrachloride	20	1.9	24	J	--
	Chloroform	150	2.8	8.9	--	--
	Dichlorodifluoromethane	42	4.3	12	--	--
	1,1-Dichloroethane	10	2.1	8.9	--	J
	1,2-Dichloroethane	18	2.6	24	J	--
	1,1-Dichloroethene	320	3.8	24	--	--
	1,2-Dichloropropane	110	7.1	12	--	--
	Methylene chloride	110	2.1	12	--	--
	Tetrachloroethene	130	1.5	12	--	--
	Toluene	2.1	1.5	12	J, B, *	J
	1,1,2-Trichloro-1,2,2-trifluoroethane	860	4.8	12	--	--
	1,1,1-Trichloroethane	10	1.9	8.9	--	--
	Trichloroethene	6800	12	45	--	--
	Trichlorofluoromethane	250	5.8	12	--	--
	Total Organics[c]	8836.3	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]
January 2016

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier[b]	Validation Qualifier[b]
CWL-D3-440	Carbon tetrachloride	20	15	190	J	--
20-Jan-16	Chloroform	190	23	71	--	--
	Dichlorodifluoromethane	41	35	95	J	--
	1,1-Dichloroethene	350	31	190	--	--
	1,2-Dichloropropane	87	57	95	J	--
	Methylene chloride	34	17	95	J	--
	Tetrachloroethene	160	12	95	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1100	39	95	--	--
	Trichloroethene	6300	25	95	--	--
	Trichlorofluoromethane	310	47	95	--	--
	Total Organics[c]	8592	NA	NA	NA	NA
CWL-D3-480	Acetone	1.9	0.18	5.0	J	--
20-Jan-16	2-Butanone	0.26	0.20	0.80	J, *	J
	Carbon tetrachloride	0.12	0.064	0.80	J	--
	Chloroform	1.1	0.095	0.30	--	--
	Chloromethane	0.32	0.20	0.80	J	--
	Dichlorodifluoromethane	0.65	0.15	0.40	--	--
	1,1-Dichloroethene	1.1	0.13	0.80	--	--
	1,2-Dichloropropane	0.53	0.24	0.40	--	--
	Methylene chloride	0.20	0.072	0.40	J	--
	Tetrachloroethene	0.75	0.051	0.40	--	--
	Toluene	0.066	0.051	0.40	J, B, *	0.4UJ
	1,1,2-Trichloro-1,2,2-trifluoroethane	3.1	0.16	0.40	--	--
	Trichloroethene	23	0.11	0.40	--	--
	Trichlorofluoromethane	1.1	0.20	0.40	--	--
	Total Organics[c]	34.13	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]
January 2016

Notes:
[a]EPA 1999b.
[b]Laboratory/Validation Qualifier - Blank (--) cell = all quality control samples met acceptance criteria. "B," "J," "R," "U," "UJ," and "*" see below.
[c]Total Organics -- sum of validated detected organic compounds.
B = Compound was detected in the associated blank sample.
EPA = U.S. Environmental Protection Agency.
J = Estimated value. When assigned by the analytical laboratory, the analyte concentration is below the practical quantitation limit or 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.
R = The result is unusable due to failed mass spectra acceptability criteria due to interference.
RL = Reporting limit. Minimum concentration that can be reported with a statistically established degree of confidence.
U = The analyte was analyzed for but was not detected. The associated value is the sample quantitation limit.
UJ = The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
* = The relative percent difference is greater than the criteria for the associated Laboratory Control Sample and Laboratory Control Sample Duplicate.

January 20, 2016 Soil-Gas Results

In general, the January 2016 soil-gas results were consistent with the 2015 data set, although fewer VOCs were detected (20 VOCs versus 22 VOCs in 2015). A total of 20 VOCs were detected in the January 2016 samples collected from the 21 sampling ports (21 environmental samples and 2 duplicate samples), and are listed below.

1,1-Dichloroethane	Benzene
1,1-Dichloroethene	Carbon tetrachloride
1,2-Dichloroethane	Chloroform
1,2-Dichloropropane	Chloromethane
1,1,2-Trichloro-1,2,2-trifluoroethane	Dichlorodifluoromethane
1,1,1-Trichloroethane	Methylene chloride
1,1,2-Trichloroethane	Tetrachloroethene (PCE)
cis-1,2-Dichloroethene	Toluene
2-Butanone	Trichloroethene (TCE)
Acetone	Trichlorofluoromethane

TCE is the primary VOC of concern at the CWL and was detected in all environmental samples (21 samples plus 2 duplicates, total of 23). TCE concentrations ranged from 23 parts per billion by volume (ppbv) to 27,000 ppbv (CWL-D3-480 and CWL-D1-240, respectively). PCE was also detected in all samples at concentrations ranging from 0.75 parts ppbv to 2,500 ppbv (CWL-D3-480 and CWL-UI1-40, respectively). Other VOCs detected in all samples, generally at lower concentrations, included chloroform, 1,1-dichloroethene, 1,1,2-trichloro-1,2,2-trifluoroethane (commonly known as Freon 113), and trichlorofluoromethane (commonly known as Freon 11). Total VOCs, as the sum of validated detected VOCs, were reported in all environmental samples at concentrations ranging from 34.13 ppbv at CWL-D3-480 to 34,137 ppbv at CWL-D1-240. Consistent with historic results, the maximum TCE and total VOC concentrations were reported in samples from the 240 foot bgs sampling port at monitoring well CWL-D1.

Other commonly detected VOCs included methylene chloride (22 detections), dichlorodifluoromethane (19 detections), 1,1,1-trichloroethane (17 detections), 1,2-dichloropropane (16 detections), and carbon tetrachloride (15 detections).

The maximum soil-gas concentration from the three deepest sampling ports (CWL-D1-470, CWL-D2-470, CWL-D3-480) was TCE at a concentration of 4,400 ppbv or 4.4 parts per million by volume (ppmv) from CWL-D2-470. Only two VOCs exceeded 0.5 ppmv at the three deepest sampling ports and all of these detections were from CWL-D2-470. The two VOCs were TCE (4.4 ppmv), and 1,1,2-trichloro-1,2,2-trifluoroethane (0.52 ppmv).

5.2.2 Field Quality Control Sample Results

Table 5-2 presents field duplicate results for environmental-duplicate sample pairs collected in 2016 from sample ports located at 170 and 350 feet bgs at monitoring well CWL-D3. In accordance with PCCP Attachment 3, Section 3.6, RPD calculations were performed for all detected compounds with concentrations exceeding five times the analytical laboratory reporting limit in both the environmental and duplicate sample. If a detected compound in one sample

Table 5-2
Summary of January 2016 Duplicate Samples
Chemical Waste Landfill Soil-Gas Monitoring

Well ID/Parameter	Environmental Sample (R1) (ppbv)	Duplicate Sample (R2) (ppbv)	RPD[a] (%)
CWL-D3-170 (in series)			
1,1,2-Trichloro-1,2,2-trifluoroethane	980	1200	20
Trichloroethene	6800	8500	22
CWL-D3-350 (with manifold)			
1,1,2-Trichloro-1,2,2-trifluoroethane	1100	860	24
Trichloroethene	7800	6800	14

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

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

where: R_1 = environmental sample result.
R_2 = duplicate sample result.

ppbv = Parts per billion by volume.

was not detected in the corresponding duplicate or environmental sample, no RPD was calculated. The duplicate sample results show good agreement with the January CWL-D3-170 and 350 sample sets (i.e., RPDs less than 50).

A total of six field blank samples were submitted with the 2016 samples. VOCs detected above laboratory MDLs in field blank samples included methylene chloride (1 sample), toluene (2 samples), 1,1-dichloroethane (1 sample), m,p-xylene (1 sample), and o-xylene (1 sample). No corrective action was required for methylene chloride, 1,1-dichloroethane, m,p-xylene, or o-xylene, since all associated environmental sample results were not detected or results were greater than five times the field blank sample concentration. Toluene in the sample from well CWL-D2 (440 feet bgs sample port) was qualified as not detected during data validation since the sample result was less than ten times the related field blank concentration.

5.2.3 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, including laboratory control samples (e.g., method blank samples), replicates, matrix spikes, matrix spike duplicates, and surrogate spike samples, were analyzed concurrently with CWL soil-gas samples. The data were reviewed and qualified in accordance with AOP 00-03, “Data Validation Procedure for Chemical and Radiochemical Data” (SNL/NM June 2014).

One data quality issue was noted for the CWL-D3-350 duplicate sample acetone result, which caused the result to be qualified as unusable during data validation. Acetone failed mass spectra acceptability criteria due to interference for this one sample. Corrective action included the laboratory confirming the result and evaluation of the associated environmental sample acetone result. Acetone was not detected in the environmental sample associated with this duplicate sample, so no further corrective action was necessary. All other data were determined to be acceptable and reported quality control measures were in compliance with analytical method and laboratory procedure requirements. 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

Two minor variances from PCCP requirements were identified for the January 2016 soil-gas monitoring activities that did not impact data quality. The first variance is that elevation and ambient pressure were not documented on the Analysis Request/Chain of Custody (AR/COC) form. In accordance with PCCP Attachment 3, Section 3.9.3, additional information including elevation and ambient pressure (i.e., vacuum pressure of SUMMA® canisters prior to sample collection) shall be included on AR/COC forms submitted to the laboratory. Copies of field forms, which include elevation and SUMMA® canister vacuum pressure measurements, were submitted to the laboratory and referenced on each AR/COC form. There were no adverse impacts to data quality as the elevation and ambient pressure information was included through reference on the AR/COC forms, does not impact analytical procedures or results, and is not required by the analytical laboratory.

The second variance is associated with the purging process. A PID with an 11.7 electron volts (eV) lamp was used to screen and determine stability of the soil-gas removed during the purging process instead of an 11.8 eV lamp as specified in the PCCP, Attachment 3, Section 3.9. 11.8 eV lamps are not available from the manufacturer or the distributors. The use of an 11.8 eV lamp was originally proposed based on the ionization potential for trichlorofluoromethane and 1,1,2-trichloro-1,2,2-trifluoroethane, two commonly detected VOCs at the CWL that have ionization potentials of 11.77 eV and 11.99, respectively. An 11.7 eV lamp or lower will not detect these VOCs. However, an 11.7 eV lamp will detect the other VOCs that were detected at all sampling ports with ionization potentials that are less than 11.7, including TCE (most prominent and highest concentration VOC), PCE, chloroform, and 1,1-dichloroethene. Of the 50 VOCs tested, only four have an ionization potential exceeding 11.7 eV (1,2-dichloro-1,1,2,2-tetrafluoroethane; dichlorodifluoromethane; trichlorofluoromethane; and 1,1,2-trichloro-1,2,2-trifluoroethane). Because the 11.7 eV lamp is suitable for detecting common VOCs during the purging process, there is no adverse impact to data quality.

DOE/Sandia will request a modification to the PCCP to address both issues discussed in Section 7.1. The status of the permit modification request will be included in the CY 2017 CWL Annual Report.

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), historic 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. Historic data were used for the statistical analysis presented in this report because soil-gas monitoring under the PCCP did not start until 2012. In the CY 2017 CWL Annual Report only data collected under the PCCP will be used, and six sampling event results will be available (January 2012 through January 2017). Historic soil-gas data used and presented in Section 5.4 includes results from June 1998, June 1999, August 2001, June 2004, September 2004, and October 2005. Although the VE VCM was not completed until July 1998, the June 1998 data set is included as it is representative of the conditions when the VE system was shut down a month later.

5.3.1 Statistical Assessment Requirements

Similar to CY 2015 results, 1,1,2-trichloro-1,2,2-trifluoroethane (0.52 ppmv), and TCE (4.40 ppmv) in the CWL-D2-470 sample were the only VOCs that exceeded the 0.5 ppmv threshold. In accordance with the PCCP Attachment 1, Section 1.8.2.2, 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 for the environmental-duplicate sample pair is used for statistical analysis.

5.3.2 Statistical Assessment Results

CY 2016 soil-gas statistical assessment results are presented in Table 5-3. The calculated LCLs for 1,1,2-trichloro-1,2,2-trifluoroethane and TCE were 0.4888 to 3.12 ppmv, respectively, and are below the trigger level of 20 ppmv.

Table 5-3
Chemical Waste Landfill Soil-Gas Monitoring
Statistical Assessment Results Summary
Calendar Year 2016

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]
1,1,2-Trichloro-1,2,2-trifluoroethane (0.52 ppmv)	0.001	1.2	0.6634	0.3368	0.4888	0.838	Normal	20	No
Trichloroethene (4.4 ppmv)	0.001	7.1	4.212	2.107	3.12	5.304	Normal	20	No

Notes:
[a]All maximum concentrations are from CWL-D2-470 January environmental sample. CWL Permit Attachment 1, Section 1.8.2.2, defines the threshold concentration (0.50 ppmv) and trigger level (20 ppmv). Both concentration limits apply only to soil-gas constituents detected in the three deepest sampling ports of wells CWL-D1 through CWL-D3.
[b]Minimum and maximum results determined from historic data, including the CY 2016 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.
CWL = Chemical Waste Landfill.
CY = Calendar year.
LCL = Lower confidence limit.
ppmv = Parts per million by volume.
UCL = Upper confidence limit.

5.4 Historic Data Evaluation

In accordance with PCCP Attachment 1, Section 1.12 and Attachment 3, Section 3.11, current soil-gas monitoring results are compared and evaluated with respect to historic results since completion of the VE VCM. This allows for long-term trends to be defined and provides for more meaningful interpretations of current results with respect to historic data. Tables 5-4 and 5-5 present TCE and total VOCs soil-gas monitoring results, respectively, for the post-closure care monitoring network. Data sets included in the analysis range from June 1998 (representative of the end of the VE VCM) to January 2016. To be consistent with historic soil-gas monitoring data sets and for a more technically sound historic comparison, the concentrations shown in Tables 5-4 and 5-5 for the 2012, 2013, and 2015 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 in May 2012, March 2013, and March 2015 were not incorporated into Tables 5-4 and 5-5.

Consistent with pre-VE VCM characterization data and the detailed conceptual site model presented in Annex E of the CWL Corrective Measures Study Report (SNL/NM December 2004), the highest CY 2016 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, 27.00 and 14.00 ppmv, respectively). The only other TCE result exceeding 20 ppmv in the CY 2016 data set was from well CWL-D1 at a depth of 160 feet bgs (21.00 ppmv).

In general, TCE and total VOC concentrations remain relatively stable throughout the vadose zone (Tables 5-4 and 5-5). When the January 2012 and January 2016 TCE results are compared (i.e., comparing results since monitoring began under the PCCP), 14 sampling ports show a small decrease, 6 sampling ports show a small increase, and 1 sampling port showed no change. When the January 2012 and January 2016 total VOC results are compared, 12 sampling ports show a small decrease and 9 sampling ports show a small increase. All CY 2016 TCE results below 240 feet bgs are low concentrations ranging from 12.00 ppmv (CWL-D1-350) to 0.02 ppmv (CWL-D3-480). All CY 2016 total VOC results below 240 feet bgs are also low concentrations ranging from 15.44 ppmv (CWL-D1-350) to 0.15 ppmv (CWL-D2-440).

Figures 5-1 through 5-5 show the concentration of TCE over time for each sampling port of each well. Figures 5-6 through 5-10 show the concentration of total VOCs over time for each sampling port of each well. The figures are graphical representations of the data presented in Tables 5-4 and 5-5. The total VOC plots for CWL-UI1 and CWL-UI2 (Figures 5-6 and 5-7) look very different than the corresponding TCE plots (Figures 5-1 and 5-2). This is because for these locations and the shallower depths represented (36 to 136 feet bgs), acetone used to occur at very high concentrations, especially at the shallowest two ports (36 and 40 feet bgs) (SNL/NM December 2004). Concentrations of total VOCs have decreased dramatically since August 2001 at the shallowest ports of CWL-UI1 and CWL-UI2, most likely due to upward diffusion to the surface and the LE VCM completed in February 2002. TCE concentrations have generally increased in the shallow ports of CWL-UI2 as shown in Figure 5-2, but remain low (i.e., less than 10 ppmv).

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

Well ID & Sample Port Depth[b]	June 1998	June 1999	August 2001	June 2004	September 2004	October 2005	January[c] 2012	January[c] 2013	January 2014	January[c] 2015	January 2016
CWL-UI1-40	4.5	16.0	7.9	3.8	4.0	4.5	5.20	7.30	4.80	4.20	4.70
CWL-UI1-80	0.19	4.9	6.7	5.9	6.1	6.8	6.50	9.70	6.30	5.10	5.80
CWL-UI1-120	3.0	5.9	9.1	6.0	14.0	13.0	7.70	11.00	7.60	8.20	7.30
CWL-UI2-36	0.037	0.70	ND	1.6	ND	1.2	3.10	3.50	2.80	3.00	5.20
CWL-UI2-76	0.091	1.0	2.4	3.4	4.1	3.7	5.60	7.80	3.70	3.70	5.60
CWL-UI2-136	5.5	1.9	4.6	3.0	1.9	3.0	8.50	6.60	6.20	5.40	7.30
CWL-D1-100	0.220	2.5	7.1	9.8	13.0	12.0	10.00	12.00	9.90	11.00	12.00
CWL-D1-160	120.0	14.0	21.0	25.0	29.0	22.0	14.00	16.00	16.00	16.00	21.00
CWL-D1-240	160.0	44.0	44.0	34.0	34.0	24.0	22.00	23.00	19.00	17.00	27.00
CWL-D1-350	0.013	11.0	19.0	13.0	22.0	2.8	13.00	13.00	8.50	13.00	12.00
CWL-D1-470	0.077	0.17	0.25	0.25	0.27	0.34	0.51	0.08	0.16	0.11	0.20
CWL-D2-120	3.1	21.0	20.0	22.0	25.0	16.0	16.00	19.00	13.00	13.00	11.00
CWL-D2-240	ND	40.0	38.0	26.0	13.0	17.0	18.00	23.00	16.00	13.00	14.00
CWL-D2-350	0.064	12.0	18.0	11.0	17.0	5.0	11.00	13.00	9.90	8.10	10.00
CWL-D2-440	0.082	1.0	7.6	2.5	5.9	2.8	1.80	0.11	0.14	3.90	0.10
CWL-D2-470	ND	0.94	5.8	3.1	4.6	4.3	4.10	7.00	4.70	4.50	4.40
CWL-D3-120	0.009	1.1	4.0	6.0	4.9	4.5	7.00	5.30	4.10	5.20	4.10
CWL-D3-170	ND	2.5	9.9	4.5	6.6	4.4	7.90	7.20	5.40	6.40	8.50
CWL-D3-350	ND	1.6	2.4	2.2	1.5	1.4	8.80	7.80	5.30	6.60	7.80
CWL-D3-440	ND	1.8	0.26	0.75	3.4	3.3	6.80	13.00	8.20	6.80	6.30
CWL-D3-480	ND	1.9	1.2	0.2	2.1	4.1	0.21	0.03	0.04	0.30	0.02

Notes:
All results are in ppmv.
January 2012 – 2016 concentrations have been rounded for significant digit consistency; they may not exactly match the reported concentrations corresponding data tables.
[a]June 1998 through January 2012 are EPA Method TO-14 results (EPA 1999a). January 2013 – 2016 are EPA Method TO-15 results (EPA 1999b). 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), March (2013 data set), and March (2015 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.
EPA = U.S. Environmental Protection Agency.
ND = Not detected.
ppmv = Parts per million by volume.
ND = Not detected.
TCE = Trichloroethene.

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

Well ID & Sample Port Depth[b]	June 1998	June 1999	August 2001	June 2004	September 2004	October 2005	January[c] 2012	January[c] 2013	January 2014	January[c] 2015	January 2016
CWL-UI1-40	112	246	141	11.78	11.47	13.15	11.76	14.68	9.54	9.27	9.14
CWL-UI1-80	0.22	9.63	13	10.61	10.67	11.61	10.18	13.74	9.43	8.74	8.63
CWL-UI1-120	6.32	9.94	45.42	9.36	21.41	19.18	11.07	14.64	11.20	13.29	10.15
CWL-UI2-36	17.6	2117	1800	813.7	850.0	391.78	4.64	5.02	4.81	5.37	7.63
CWL-UI2-76	0.126	1.65	4.37	5.52	6.90	5.96	7.85	10.74	6.04	6.28	8.32
CWL-UI2-136	10.5	4.21	7.98	4.42	2.85	4.89	11.45	9.12	9.31	9.16	9.89
CWL-D1-100	0.248	4.93	11.9	14.59	18.22	17.25	13.84	15.90	14.25	17.41	16.36
CWL-D1-160	167	21.4	30.1	33.32	38.41	29.28	18.48	20.33	21.45	20.78	27.27
CWL-D1-240	261	78.4	61.5	45.27	44.74	32.60	22.46	28.71	25.32	26.04	34.14
CWL-D1-350	0.02	20.7	31.7	18.73	30.53	4.07	16.56	16.31	11.61	19.29	15.44
CWL-D1-470	0.105	0.231	0.921	0.612	0.82	0.603	0.87	0.13	0.39	0.44	0.63
CWL-D2-120	5.4	33.0	29.4	29.26	34.23	22.31	20.70	24.05	18.49	18.81	15.37
CWL-D2-240	0.047	101	52.9	34.72	17.62	22.83	22.90	28.38	22.11	18.27	19.08
CWL-D2-350	0.091	22.9	25.9	15.42	23.41	7.50	13.31	16.01	16.04	12.64	13.86
CWL-D2-440	0.453	4.38	11.8	3.85	9.29	4.17	2.60	0.15	0.22	6.15	0.15
CWL-D2-470	0.058	6.95	8.40	4.17	6.60	6.40	5.78	8.49	10.14	8.14	5.90
CWL-D3-120	0.009	2.17	6.20	8.39	7.10	6.23	9.19	6.80	6.92	8.83	5.55
CWL-D3-170	0.037	5.01	15.0	6.11	9.40	6.12	10.57	9.18	8.83	10.38	11.25
CWL-D3-350	0.106	2.76	3.98	3.39	2.34	2.27	12.90	10.44	9.12	11.15	10.40
CWL-D3-440	0.017	4.04	0.519	0.96	5.14	4.64	9.69	17.73	12.60	11.12	8.59
CWL-D3-480	0.001	4.47	1.85	0.31	3.30	5.71	0.30	0.06	0.05	0.43	0.34

Notes:
All results are in ppmv.
January 2012 - 2016 concentrations have been rounded for significant digit consistency; they may not exactly match the reported concentrations corresponding data tables.
[a]The total VOC concentration is the sum of all detected constituents. June 1998 through January 2012 are EPA Method TO-14 results (EPA 1999a). January 2013 – 2016 are EPA Method TO-15 results (EPA 1999b). 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), March (2013 data set), and March (2015) 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.
EPA = U.S. Environmental Protection Agency.
ND = Not detected.
ppmv = Parts per million by volume.
ND = Not detected.
TCE = Trichloroethene.

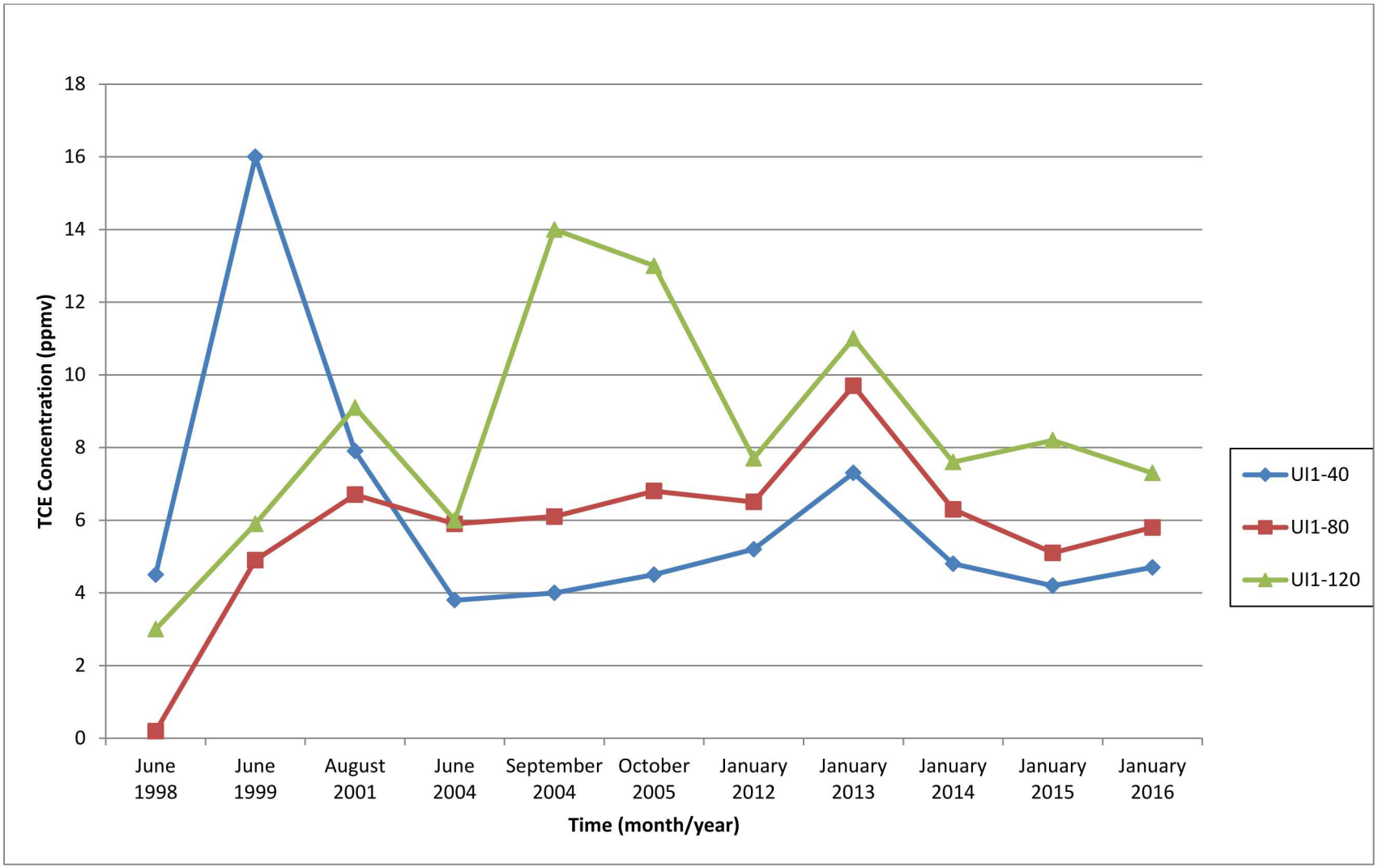


Figure 5-1
Historic TCE Concentrations vs. Time
Chemical Waste Landfill Well UI-1 Ports

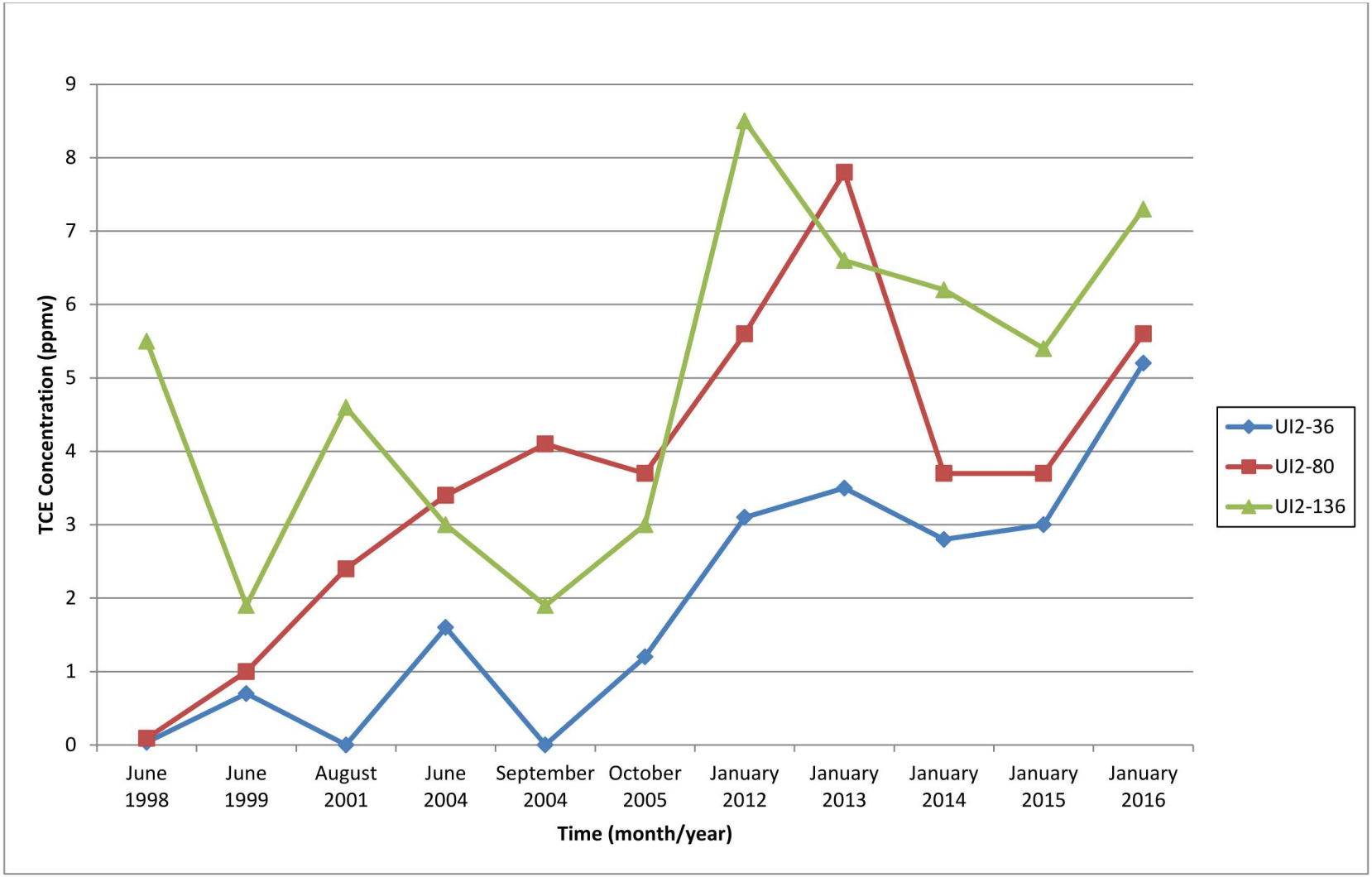


Figure 5-2
Historic TCE Concentrations vs. Time
Chemical Waste Landfill Well UI-2 Ports

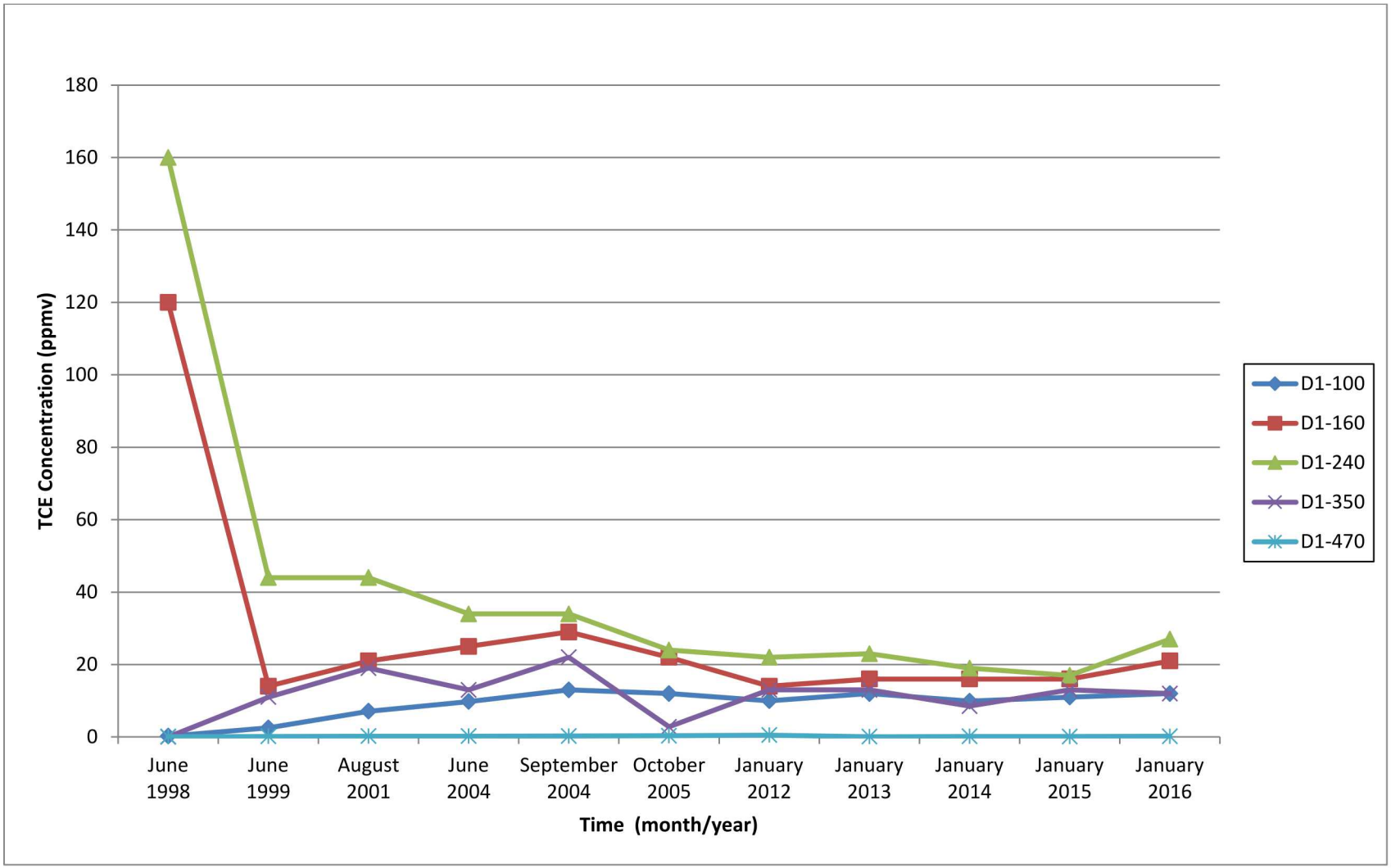


Figure 5-3
Historic TCE Concentrations vs. Time
Chemical Waste Landfill Well D1 Ports

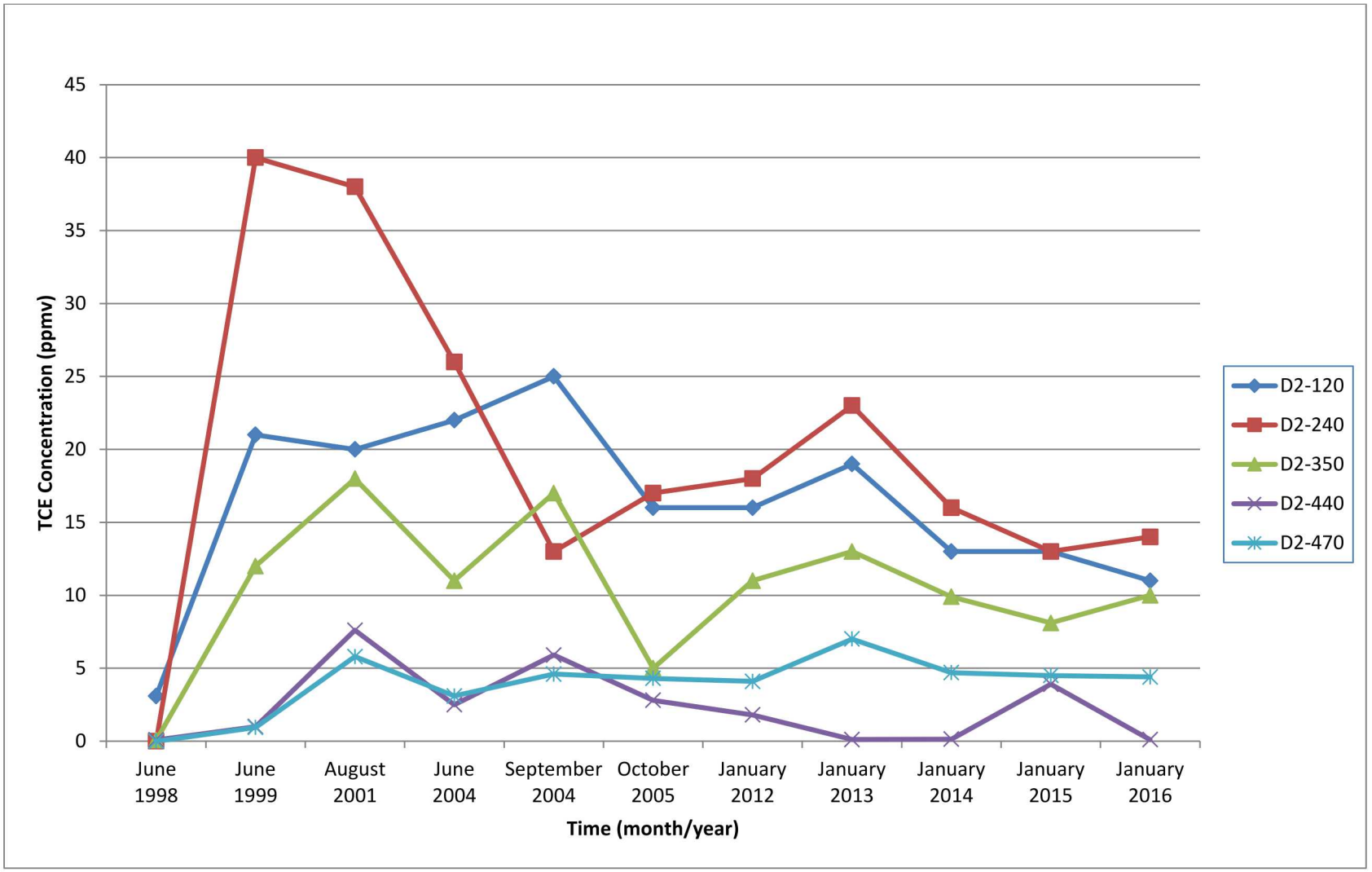


Figure 5-4
Historic TCE Concentrations vs. Time
Chemical Waste Landfill Well D2 Ports

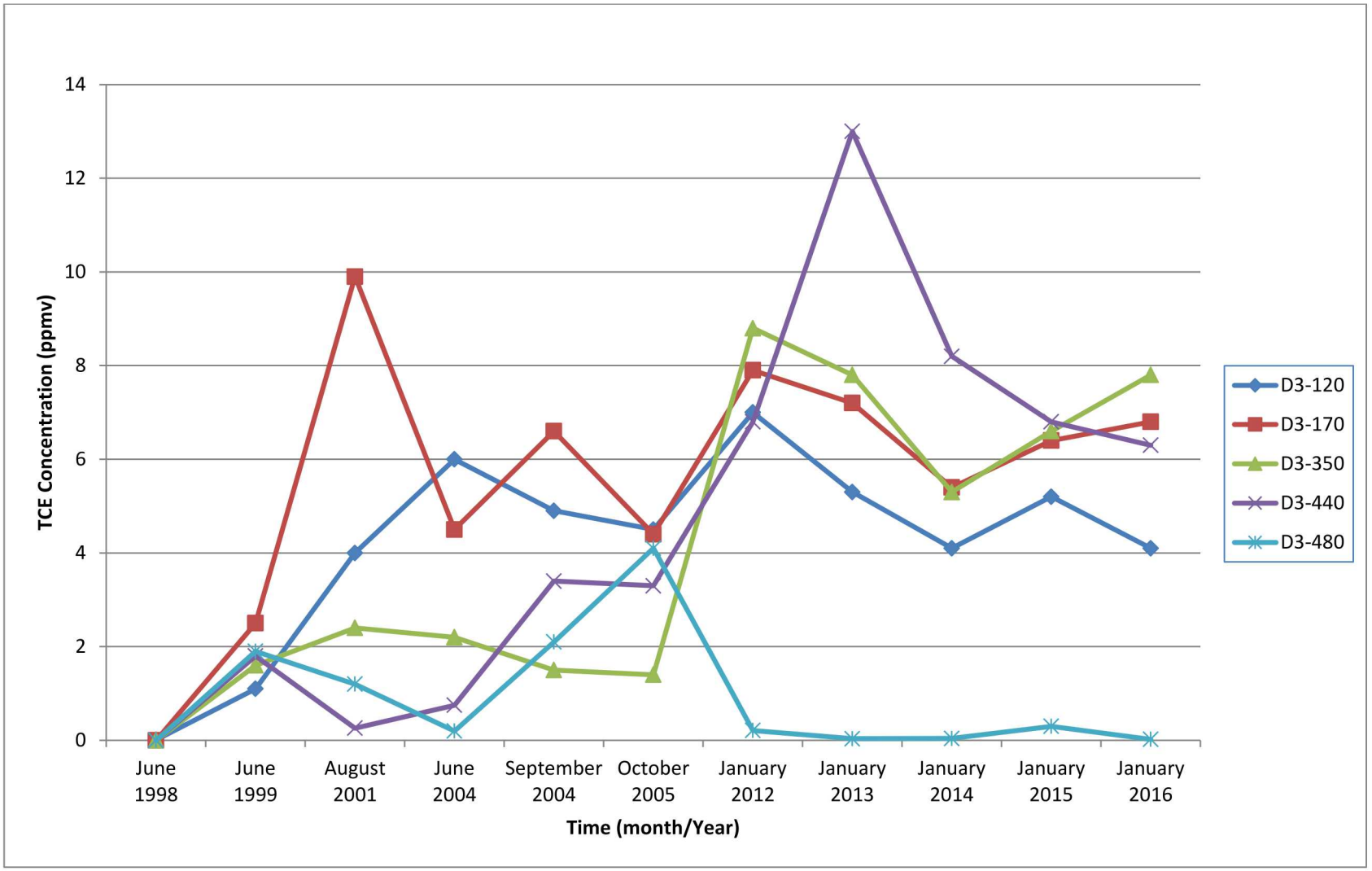


Figure 5-5
Historic TCE Concentrations vs. Time
Chemical Waste Landfill Well D3 Ports

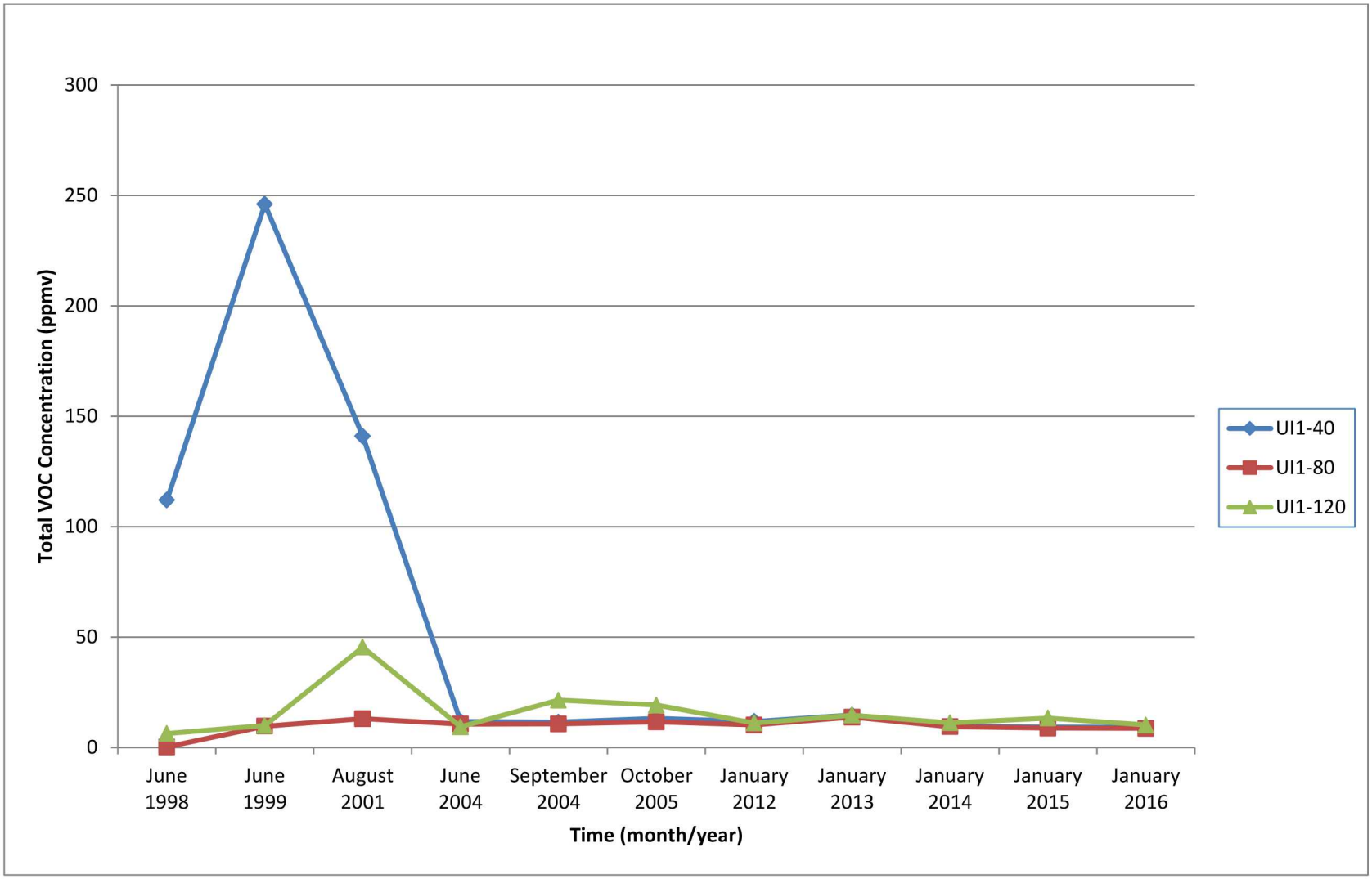


Figure 5-6
Historic Total VOC Concentrations vs. Time
Chemical Waste Landfill Well UI-1 Ports

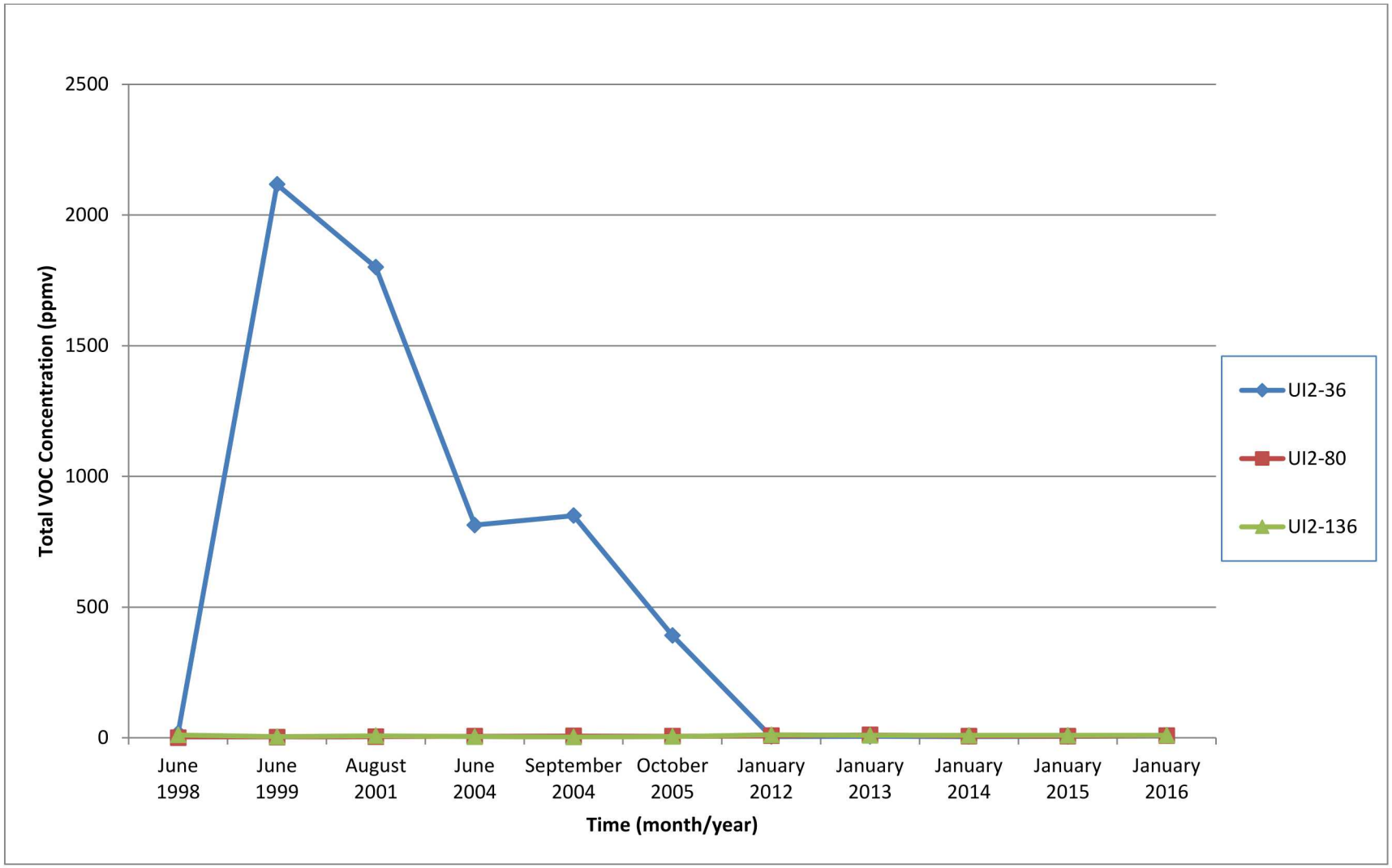


Figure 5-7
Historic Total VOC Concentrations vs. Time
Chemical Waste Landfill Well UI-2 Ports

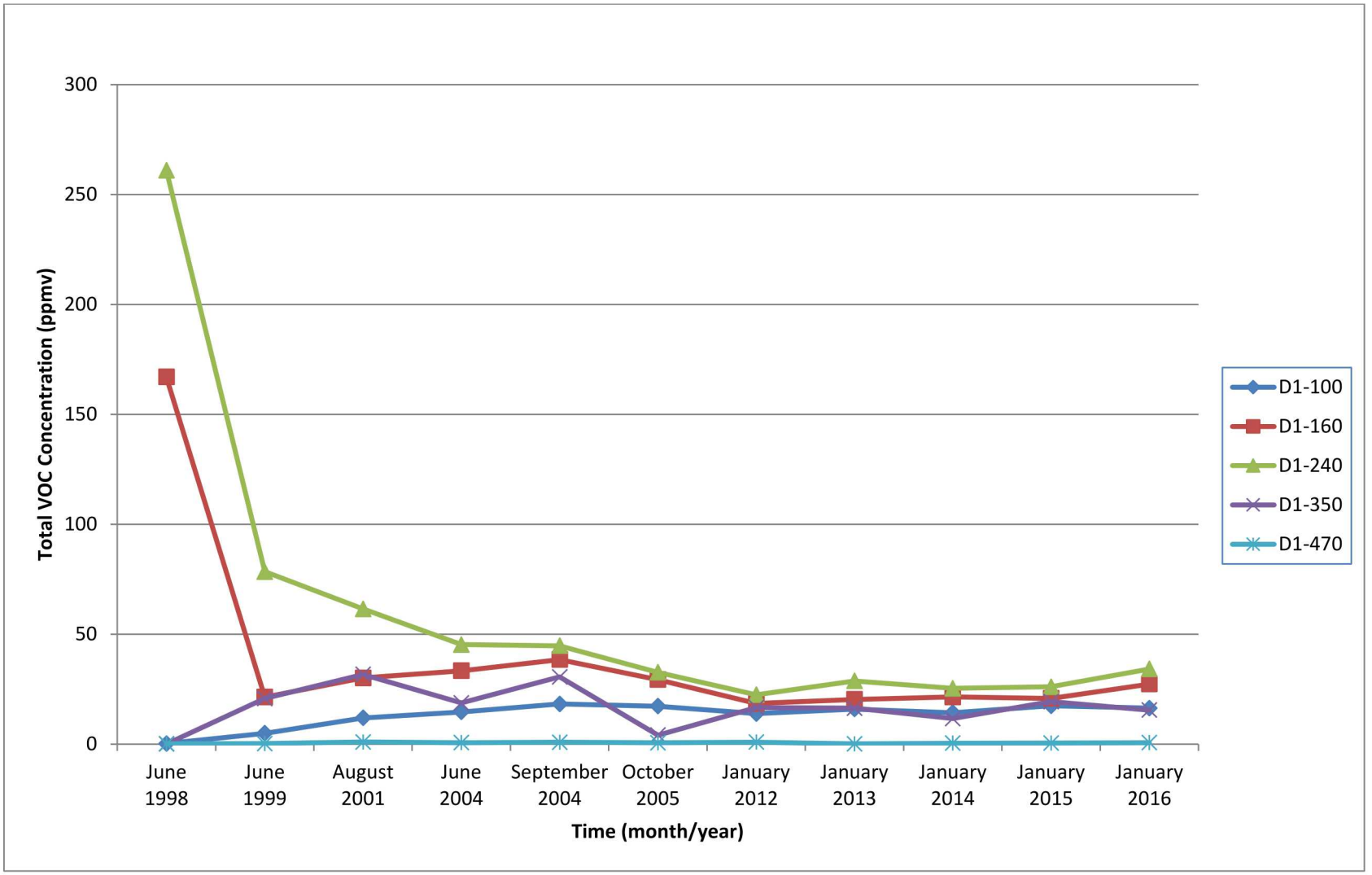


Figure 5-8
Historic Total VOC Concentrations vs. Time
Chemical Waste Landfill Well D1 Ports

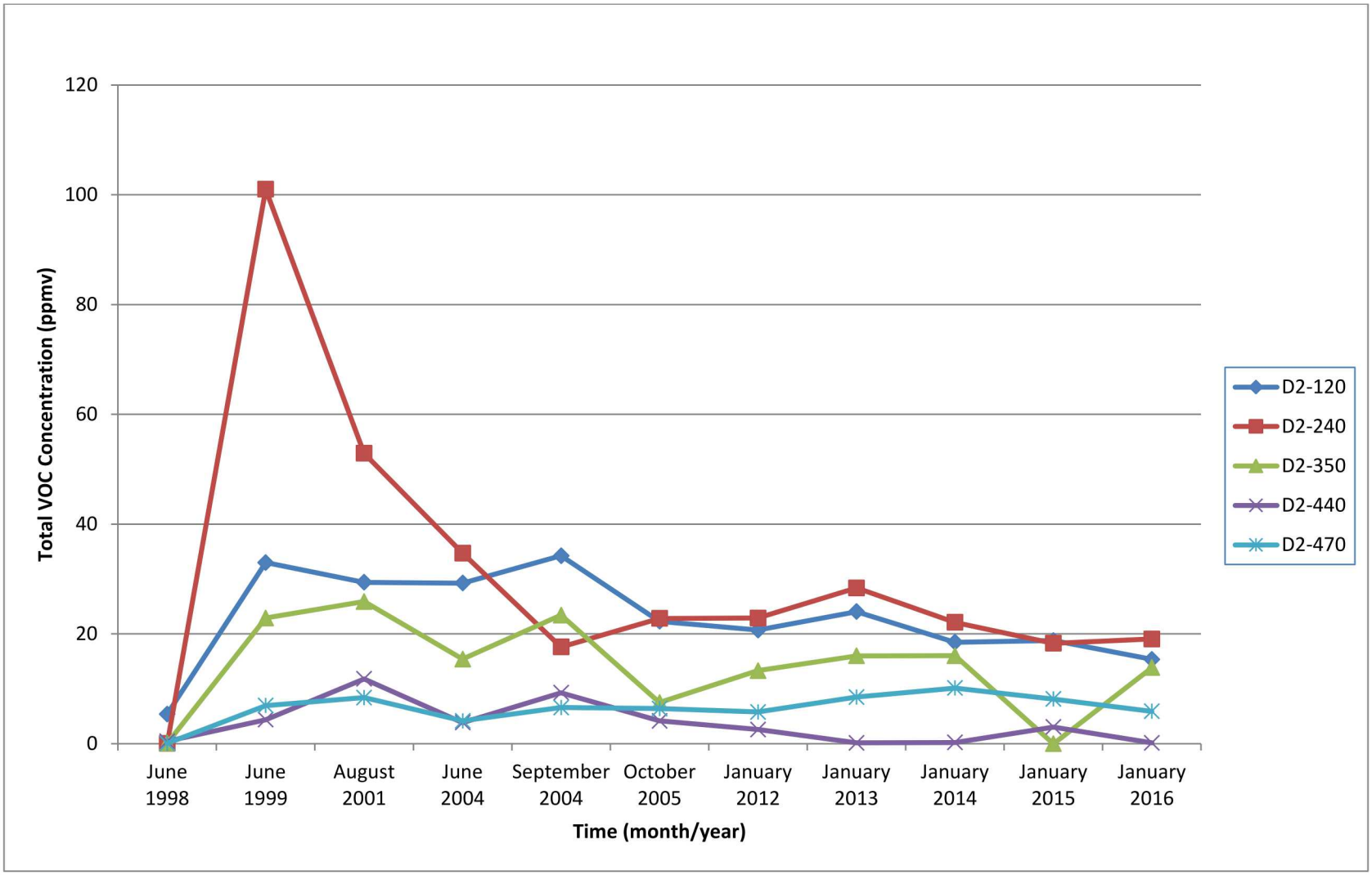


Figure 5-9
Historic Total VOC Concentrations vs. Time
Chemical Waste Landfill Well D2 Ports

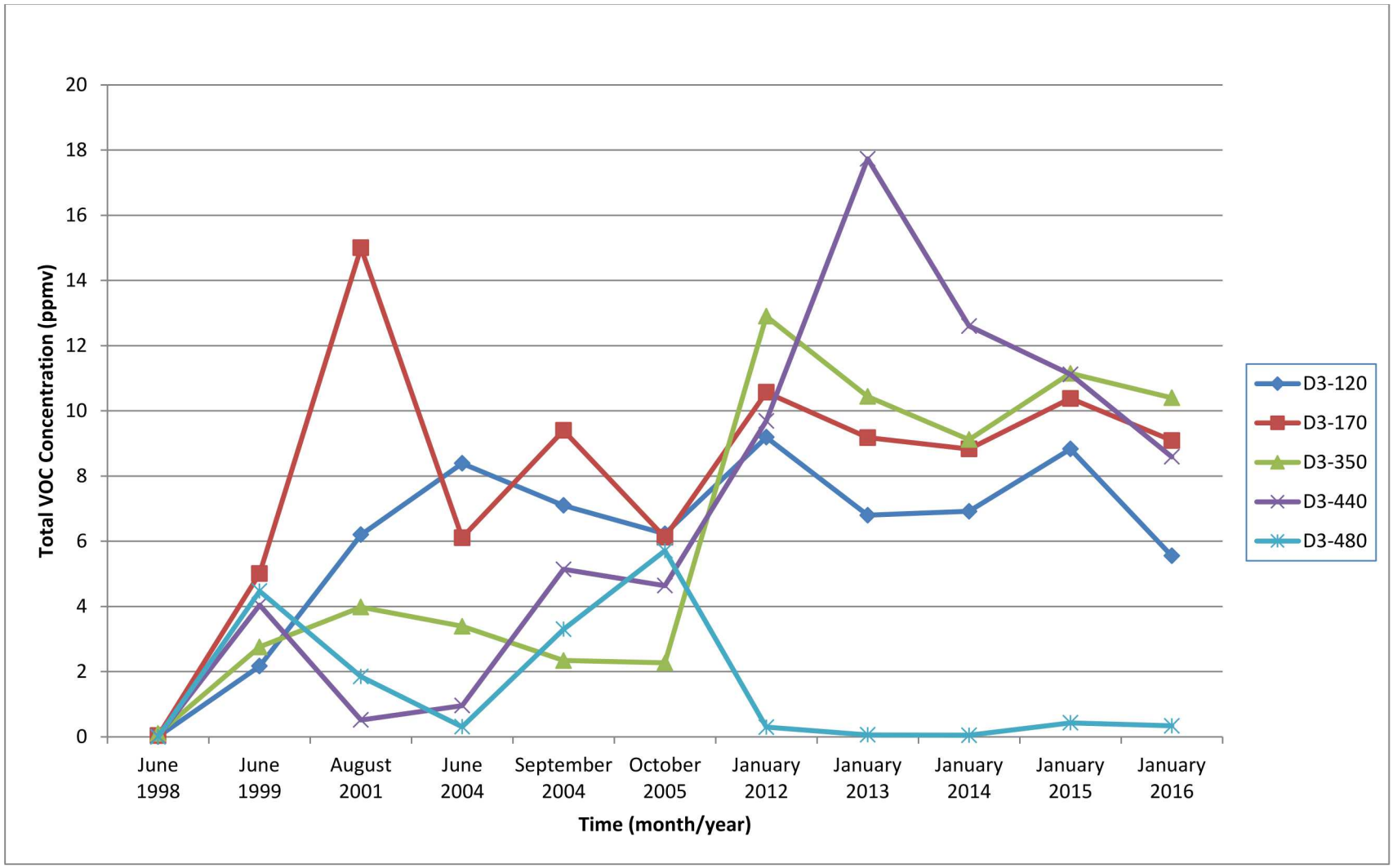


Figure 5-10
Historic Total VOC Concentrations vs. Time
Chemical Waste Landfill Well D3 Ports

The majority of the CWL residual soil-gas plume is represented by the CWL-D1 through D3 wells that have significantly deeper sampling ports, ranging from 110 to 480 feet bgs. TCE is the primary VOC of concern, although trichlorofluoromethane, 1,1,2-trichloro-1,2,2-trifluoroethane, PCE, 1,1-dichloroethene, and chloroform were also 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). Results collected at CWL-D3 since the PCCP was implemented (January 2012 through January 2016 results) are generally stable with most ports showing 2016 concentrations that are less than 2012 concentrations (4 out of 5 ports for TCE, and 3 out of 5 ports for Total VOCs). Over the historic monitoring period, the highest TCE and total VOC concentrations in the deepest ports have been consistently observed at the CWL-D2 location (one to two orders of magnitude higher).

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 and contaminate groundwater samples through the upper unsaturated portion of the well screen or at casing joints that may not be air-tight, 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 2016 and were inspected during the sampling events. As discussed in Chapter 4, TCE concentrations in groundwater samples from CWL-MW10 have decreased since January 2013 (see Figure 4-7). It is unlikely that the current residual VOC soil-gas plume will directly impact groundwater due to the very low residual VOC soil-gas concentrations and the declining surface of the regional aquifer beneath the CWL (Section 4.4 and Annex E of the CWL Corrective Measures Study Report [SNL/NM December 2004]). This conclusion is supported by historic groundwater monitoring results and statistical evaluation of more recent results (Section 4.3) since implementation of the PCCP in June 2011.

Five years of soil-gas monitoring under the PCCP and previous monitoring conducted since completion of the VE VCM in July 1998 have established a clear picture of the CWL VOC soil-gas plume. Overall, the CY 2016 data set is consistent with historic post-VE VCM soil-gas monitoring results and confirms the residual VOC soil-gas plume beneath the CWL is stable and 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 2016 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); and
- Emergency equipment.

A schedule for implementing inspections and prescribed maintenance is provided in PCCP Attachment 1, Section 1.10, Table 1-6. CY 2016 inspections are summarized in Sections 6.1 through 6.5 and results are documented on the CWL Post-Closure Inspection Forms/Checklists provided in Annex C of this report, in conformance with the requirements in PCCP Attachment 1, Section 1.9 and 1.10 (NMED October 2009 and subsequent revisions). ET Cover maintenance and/or repair work performed by the ET Cover maintenance contractor in response to the inspections and/or as best management practice (i.e., beneficial maintenance and/or repair work not required by the PCCP) is described in Section 6.6.

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 annually, documented on the Biology Inspection Form/Checklist for the CWL Cover, and summarized in Section 6.1.1. The ET Cover surface is inspected quarterly by a field technician, documented on the Post-Closure Inspection Form/Inspection Checklist, and summarized in Section 6.1.2.

6.1.1 Vegetation Monitoring and Inspection

Based upon results from ET Cover vegetation inspection conducted in CY 2011, it was determined that the three criteria for successful revegetation had been met (PCCP Attachment 1, Section 1.9). This determination changed the required frequency of cover vegetation inspection to an annual basis. In addition to the annual inspection, ET Cover vegetation was monitored throughout CY 2016 by the staff biologist during the quarterly ET Cover surface inspections.

The annual Biology Inspection of the ET Cover vegetation was conducted on September 1, 2016 by the SNL/NM staff biologist (Inspection Form in Annex C). 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. The ET Cover continues to meet PCCP requirements for successful revegetation, with 43% total foliar coverage, of which 99% is comprised of native species. The PCCP requirement is 20% total foliar coverage, of which 50% or more must be comprised of native species. No barren areas exceeding 200 square feet or large mammal burrows (i.e., greater than four inches in diameter) were observed during the annual biology inspection, but ant hills/burrows and small mammal burrows were observed at frequencies and locations similar to previous inspections. In general, the level of weedy plant species present on the ET Cover was very low.

The 2016 Chemical Waste Landfill Biology Report is presented in Annex D of this report and provides additional information on the annual biology inspection along with background information on previous ET Cover revegetation efforts. This report includes a summary of local climate trends and the successional development of the native grasses, ET Cover photographs, a summary of 2016 cover maintenance activities, and staff biologist recommendations.

6.1.2 Cover Inspection

Quarterly cover surface inspections were performed by a field technician in March, June, September, and December of 2016. During all but the September inspection, a staff biologist supported the field technician performing the cover inspections. During September the annual ET Cover biology inspection (see section 6.1.1) and a quarterly cover inspection were performed independently. The ET Cover was in good condition throughout CY 2016. Minor maintenance and/or repairs performed during the quarterly cover inspections based on PCCP requirements are summarized below. Cover and site maintenance performed during CY 2016 by the ET Cover maintenance contractor is summarized in Section 6.6. No additional inspection items or issues required repairs.

March 2, 2016 Inspection

On March 3, 2016, the staff biologist performed a video inspection of one small animal burrow, approximately 4 inches in diameter, located close to the midpoint of the eastern perimeter fence. The burrow was identified during the December 2015 inspection and, at that time, appeared to be in use as a winter shelter. During the March 2016 video inspection the staff biologist determined the burrow was no longer active. The burrow was backfilled with local soil immediately following the video inspection and determination. No other maintenance and/or repairs were required on the ET Cover surface. However, on April 27, 2016 live and dead weeds (mostly tumbleweeds) were removed from the ET Cover and perimeter as a best management practice (see Section 6.6).

June 2, 2016 Inspection

No maintenance and/or repairs were required. As a best management practice that was recommended by the staff biologist, live and dead weed removal and herbicide application was performed in August 2016 (see Section 6.6).

September 22, 2016 Inspection

No maintenance and/or repairs were required.

December 2, 2016 Inspection

No maintenance and/or repairs were required.

6.2 Storm-Water Diversion Structure Inspection

Quarterly inspections of storm-water diversion structures were performed by a field technician in March, June, September, and December of 2016 at the same time as the cover surface inspections. Minor maintenance and/or repairs performed during or after the inspections based on PCCP requirements are summarized below. No additional storm-water diversion structure inspection items or issues required repairs.

During the March, June, and December inspections, windblown tumbleweeds were identified in the drainage culverts along the southern perimeter. Tumbleweed debris observed during the March and December inspections was removed by the ET Cover maintenance contractor within 60 days of the inspection in April and December 2016, respectively (see Section 6.6). Tumbleweed debris observed during the June inspection was removed by field technician during the inspection.

6.3 Monitoring Well Network Inspection

Semi-annual inspection of the groundwater monitoring network and sampling equipment was performed by a field technician during the January and July 2016 monitoring events. In January the annual inspection for the soil-gas monitoring wells and sampling equipment was also performed. No inspection items or issues required repairs. Baroball™ passive venting devices remain on all soil-gas and groundwater monitoring wells, and are in good condition.

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 2016 at the same time as the cover surface inspections. Minor maintenance and/or repairs performed during or after the inspections based on PCCP requirements are summarized below. No additional inspection items or issues required repairs.

During the March, June, and December inspections, windblown tumbleweeds were identified in the perimeter fence. Tumbleweeds observed during the March and December inspections were removed from the fence by the ET cover maintenance contractor within 60 days of the inspection in April and December 2016, respectively (see Section 6.6). Tumbleweed debris observed during the June inspection was removed by the field technician during the inspection. Survey monuments were cleared of windblown sediment and tumbleweeds by the field technician during the June, September, and December inspections.

6.5 Emergency Equipment Inspection

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

6.6 Cover and Site Maintenance

Cover and site maintenance performed during CY 2016 by the ET Cover maintenance contractor is summarized below. Maintenance was performed in response to inspections to address PCCP requirements, and as preventive, best management practice. In all cases work on the ET Cover was performed manually; no equipment was operated on the ET Cover. Overall, minimal ET Cover maintenance was required in 2016, which reflects significant progress in establishing healthy, self-sustaining native grasses on the CWL ET Cover and perimeter areas. Most 2016 maintenance involved clearing the perimeter fence and storm-water diversion features of windblown, dead tumbleweeds. Three maintenance events were conducted in April, August, and December 2016. No supplemental watering was performed in CY 2016 to augment natural precipitation.

April 26-27, 2016

Dead and live weeds identified during the March 2, 2016 quarterly inspection were removed from the ET Cover, storm-water diversion features, and perimeter fence. Two half-days were required for this effort, which resulted in the removal of one trailer load of highly compressed weeds (~15 cubic yards) that were disposed at the KAFB Landfill.

August 2-8, 2016

The August weed removal event was the most significant ET Cover maintenance event of 2016 and was conducted over a five-day period on August 2 – 5, and 8. This work was performed during the 2016 growing season as recommended by the staff biologist based on the June quarterly inspection. The purpose of this best management practice effort was to promote the growth and health of the desired native grass species on the ET Cover by reducing competition with weedy species for limited moisture and nutrients. Removal of dead weed material and the

application of pre-emergent herbicide to the western perimeter area also helps reduce the availability of weed seeds, future weed growth, and future maintenance efforts.

Live weeds, dead weed material, and small shrubs (e.g., Four-wing saltbush) were manually removed from the ET Cover, perimeter fence, and surrounding perimeter areas (including from storm-water diversion features). A total of 6 trailer loads of highly compressed weeds (~90 cubic yards) were removed and disposed at the KAFB Landfill. In addition, a pre-emergent herbicide was applied to the perimeter area between the west fence and the road in accordance with manufacturers' specifications after live and dead weeds/shrubs were removed from the area.

December 20-21, 2016

Windblown, dead, weedy vegetation (primarily tumbleweeds) identified during the December 2, 2016 quarterly inspection was removed from the perimeter fence and the surrounding perimeter storm-water diversion features. Two days were required for this effort, which resulted in two trailer loads of highly compressed weeds (~30 cubic yards) disposed at the KAFB Landfill.

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7.0 REGULATORY ACTIVITIES

On June 2, 2011, the NMED approved closure of the CWL and the PCCP took effect (Kieling June 2011). NMED-approved permit modifications and DOE/Sandia submittals since the PCCP became effective are summarized in Chapter 1. Regulatory activities in CY 2016 consisted of two submittals of updated reference documents cited in the PCCP and submittal of the Calendar Year 2015 Chemical Waste Landfill Annual Post-Closure Care Report (SNL/NM March 2016). These activities are summarized below in Sections 7.1 through 7.3, respectively.

7.1 2016 Permit Modification Requests

There were no Permit modification requests submitted to NMED in CY 2016. The DOE and Sandia will request a modification in early 2017. If approved by the NMED, the PCCP modification request will affect PCCP Parts 1 and 2 and PCCP Attachments 1, 2, 3, and 6 as briefly summarized below.

- Part 1 General Permit Conditions: revise requirement for number of copies and distribution of documents associated with submittals to the NMED.
- Part 2 General Facility Conditions: update facilities and agencies with whom the DOE/NNSA maintains coordination agreements to be consistent with the list in Permit Attachment 6, Table 6-1.
- Attachment 1 Post-Closure Care Plan for the Chemical Waste Landfill: update reference to test methods.
- Attachment 2 Groundwater Sampling and Analysis Plan: revise certain laboratory quality control requirements to align with requirements in the EPA analytical method, remove an unneeded reference to an SNL/NM Statement of Work, and update references to an operating procedure to incorporate a recent name change.
- Attachment 3 Soil-Gas Sampling and Analysis Plan: revise certain laboratory quality control requirements to align with requirements in the EPA analytical method; modify the requirement to screen extracted soil gas with a photoionization detector during purging; allow alternative forms of documenting sample information; and update references to an operating procedure to incorporate a recent name change.
- Attachment 6 Contingency Plan: revise text in two sections to include references to Figure 13, for clarity.

7.2 2016 Permit Submittals

On March 25, 2016, DOE and Sandia submitted the Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2015 to NMED (SNL/NM March 2016).

On May 20, 2016, DOE and Sandia submitted two updated reference documents cited in the PCCP in accordance with requirements of PCCP Attachments 2 and 3 (Todd May 2016). 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 April 22, 2016.

On November 4, 2016, DOE and Sandia submitted two updated reference documents cited in the PCCP in accordance with requirements of PCCP Attachments 2 and 3 (Todd November 2016). 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 October 17, 2016.

7.3 2016 Technical Communication

On November 1, 2016 DOE, Sandia, and NMED personnel informally discussed the forthcoming request for PCCP modification discussed in Section 7.1. DOE and Sandia personnel presented the changes that will be proposed and the associated technical rationale prior to the planned, formal submittal in early CY 2017.

7.4 Permit Modification and Submittal History

Table 7-1 summarizes the modification history of the PCCP through CY 2016. Table 7-2 summarizes all submittals associated with the PCCP through CY 2016, not including routine annual reports.

Table 7-1
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.
PCCP = Post-Closure Care Permit.
QAPP = Quality Assurance Project Plan.
SMO = Sample Management Office.
SNL/NM = Sandia National Laboratories/New Mexico.
SOW = Statement of Work.

Table 7-2
Chemical Waste Landfill Post-Closure Care Permit Document Submittal History[a]

Date of Submittal[b]	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 were updated to include minor changes that do not affect sampling procedures or protocols. Two title changes to procedures incorporated into the November 2011 Class 1 permit modification request.
January 24, 2013	Permit Attachments 2 & 3	Updates to reference document (SNL/NM Statement of Work for Analytical Laboratories) related to groundwater and soil-gas monitoring to reflect ongoing modifications and improvements in industry practices.
December 9, 2013	Permit Attachments 2 & 3	Revisions to three procedures related to sample management, shipping, and data review that were revised to keep the documents current and reflecting ongoing modifications and improvements in industry practices.
July 8, 2014	Permit Attachments 2 & 3	Two operating procedures cited in the PCCP used by SNL/NM personnel to validate analytical data from contract laboratories and conduct activities related to sampling CWL soil-gas wells.
February 18, 2015	Permit Attachment 2	Four operating procedures related to groundwater monitoring activities were updated to include minor changes that do not affect sampling procedures or protocols.
May 20, 2016	Permit Attachments 2 & 3	Two operating procedures cited in the PCCP used by SNL/NM personnel to package and ship CWL monitoring event samples and to complete contract verification reviews of laboratory analytical results.
November 4, 2016	Permit Attachments 2 & 3	Two operating procedures cited in the PCCP used by SNL/NM personnel to conduct activities related to sampling at the CWL and process soil-gas and groundwater samples.

Notes:
[a]This table does not include the submittal of routine CWL Annual Post-Closure Care Reports.
[b]Date represents the date stamp on the DOE transmittal letter for the submittal.
CWL = Chemical Waste Landfill.
DOE = U.S. Department of Energy.
PCCP = Post-Closure Care Permit.
SNL/NM = Sandia National Laboratories/New Mexico.

8.0 SUMMARY AND CONCLUSIONS

A summary of CY 2016 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 2016. There were no variances or non-conformances. Analytical and statistical assessment results are consistent with previous years. There was no statistically significant evidence of increasing contamination and no hazardous constituent concentration limits were exceeded. Groundwater surface elevation, hydraulic gradient, flow direction, and groundwater flow rate have been determined and are consistent with historic results.

One annual soil-gas monitoring event was conducted in January 2016. Two minor variances from PCCP requirements were identified for the January 2016 soil-gas monitoring activities and are being addressed through a PCCP modification request that will be submitted to NMED in early CY 2017. Analytical and statistical assessment results are consistent with previous years. There were no exceedances of the 20 ppmv trigger level. Five years of soil-gas monitoring under the PCCP and previous monitoring conducted since completion of the VE VCM in July 1998 have established a clear picture of the CWL VOC soil-gas plume. CY 2016 soil-gas monitoring results continue to confirm the residual VOC soil-gas plume beneath the CWL is stable and slowly dissipating in three dimensions through diffusion in the vadose zone.

8.2 Inspections and Maintenance

Inspections of the CWL final cover system, storm-water diversion structures, compliance monitoring system, and security fence were performed in accordance with PCCP requirements. Required repairs were minor and generally performed during the inspections. Repairs included removal of tumbleweeds from the storm-water diversion structures and perimeter fence and clearing tumbleweeds and soil from survey monuments.

The ET Cover continues to meet successful revegetation criteria. As documented in the September annual inspection, the ET Cover is in excellent condition with even coverage of mature, native perennial grasses. CY 2016 ET Cover maintenance was performed in August as best management practice for the ET Cover vegetation, and included a lower level of effort relative to previous years. CY 2016 ET Cover maintenance included removal of small shrubs, dead and live weeds, and the application of a pre-emergent herbicide to the western perimeter area. The purpose of ongoing maintenance efforts is to promote the growth and health of the desired native grass species on the ET Cover by reducing competition with weedy species for limited moisture and nutrients. Removal of dead weed material and the application of pre-emergent herbicide also helps reduce the availability of weed seeds, future weed growth, and future maintenance efforts.

8.3 Regulatory Activities

Regulatory activities in CY 2016 included submittal of the Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2015 (SNL/NM March 2016) and two submittals of updated reference documents cited in the PCCP (May and November, 2016).

8.4 Conclusions

All PCCP monitoring, inspection, and maintenance/repair requirements have been met for CY 2016. This CWL Annual Post-Closure Care Report documents all activities and results as required by PCCP Attachment 1, Section 1.12. Based upon monitoring, inspection, and maintenance results, the ET Cover is functioning as designed and site conditions remain protective of human health and the environment. Industrial land use is being maintained for the CWL consistent with PCCP requirements.

9.0 REFERENCES

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

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

ANNEX A
Chemical Waste Landfill
CY 2016 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 2016 GROUNDWATER MONITORING

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-BW5 Date: 1/12/16 Time: 0805

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: 32.1 °F Wind Speed: 0-10 MPH Humidity: 19.4 %

Chemicals Used: _____
Other: Be aware of possible UXO

Safety Topics Presented

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

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

Attendees

Printed Name	Signature
Robert Lynch	
ALFRED SANTILLANES	
William Gibson	
Gilbert L. Quintana	

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-MW9 Date: 01/13/16 Time: 0806

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: 34.4°F Wind Speed: 0-5 MPH Humidity: 22 %

Chemicals Used: _____
Other: Be aware of possible UXO

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 Gibson
ALFRED SANTILLANES	Alfred Santillanes

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), 4100 Controlled Documents home page.

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-MW 11 Date: 01/14/16 Time: 0806

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: 38.7 °F Wind Speed: 0-5 MPH Humidity: 17.6 %

Chemicals Used: _____
Other: Be aware of possible UXO

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 Gibson
ALFRED SANTILLANES	Alfred Santillanes
Gilbert L. Quintana	Gilbert L. Quintana

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TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL-MW10 Date: 01/15/16 Time: 0801 / 08:24

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.)

01/15/16 Weather Conditions:
Temp: 27 °F Wind Speed: ~2 MPH Humidity: 72 %
01/18/16 27 3 49
Chemicals Used:
Other: Be aware of possible UXO

Safety Topics Presented

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

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

Attendees

Printed Name	Signature
Robert Lynch	Robert Lynch
ALFRED SANTILLANES	Alfred Santillanes
William Gibson	William Gibson
Gilbert L. Quintana	Gilbert L. Quintana
1-18-16 → William Gibson	William Gibson
ALFRED SANTILLANES	Alfred Santillanes
Gilbert L. Quintana	Gilbert L. Quintana

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL

Calibrations done by: R Lynch Date: 1/12/16

Make & Model: EXO1

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

Other (S/N): NA

pH Calibration/Check

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	4.03	20.7	7.00	20.7	10.01	20.7
2. Time: 1111	4.03	20.9	7.00	20.9	10.02	20.9
3. Time:						
4. Time:						
Standard lot no.:	5GE740		5AD829		5GE556	
Expiration date:	5/17		4/17		5/17	

SC Calibration/Check

Reference Value: 1413 uS Standard Lot No.: 5AD820

Expiration Date: 5/17

	Value	Temp
1. Time: 0637	1413.1	20.7
2. Time: 1110	1413.3	20.9
3. Time:		
4. Time:		

ORP Calibration/Check

Reference Value: 220 mV Standard Lot No. 5AD891

Expiration Date: 5/16

	Value	Temp
1. Time: 0640	220.2	20.7
2. Time: 1113	220.4	20.9
3. Time:		
4. Time:		

DO Calibration/Check

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0636	82.0	24.83
2. Time: 1109	83.1	24.83
3. Time:		
4. Time:		

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch		Date: 1/12/16		
TURBIDIMETER				
Make & Model: HACH 2100Q		Serial No. S/N 14060C033238		
Reference Value	0.1	20	100	800
Standard Lot No.	A5162	A5247	A5251	A5246
1. Time 0808	.13	20.1	103	798
2. Time 1023	.11	20.3	101	796
3. Time				
4. Time				
Comments:				

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL

Calibrations done by: R Lynch Date: 01/13/16

Make & Model: EXO1

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

Other (S/N): NA

pH Calibration/Check

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

Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0642	4.02	20.4	7.01	20.4	10.01	20.4
2. Time: 1316	4.03	20.7	7.01	20.7	10.02	20.7
3. Time:						
4. Time:						
Standard lot no.:	5GE740		5AD829		5GE556	
Expiration date:	5/17		4/17		5/17	

SC Calibration/Check

Reference Value: 1413 uS Standard Lot No.: 5AD820

Expiration Date: 5/17

	Value	Temp
1. Time: 0641	1413.2	20.4
2. Time: 1315	1412.8	20.7
3. Time:		
4. Time:		

ORP Calibration/Check

Reference Value: 220 mV Standard Lot No. 5AD891

Expiration Date: 5/16

	Value	Temp
1. Time: 0644	219.7	20.4
2. Time: 1319	220.3	20.7
3. Time:		
4. Time:		

DO Calibration/Check

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0640	81.9	24.75
2. Time: 1314	82.1	24.79
3. Time:		
4. Time:		

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch		Date: 01/13/16		
TURBIDIMETER				
Make & Model: HACH 2100Q		Serial No. S/N 14060C033238		
Reference Value	0.1	20	100	800
Standard Lot No.	A5162	A5247	A5251	A5246
1. Time 0809	.12	19.9	103	802
2. Time 1109	.11	20.1	105	804
3. Time				
4. Time				

Comments:

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL

Calibrations done by: R Lynch Date: 01/14/16

Make & Model: EXO1

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

Other (S/N): NA

pH Calibration/Check

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: 0630	4.03	20.5	7.01	20.5	10.00	20.5
2. Time: 1322	4.02	20.7	7.01	20.7	10.02	20.7
3. Time:						
4. Time:						
Standard lot no.:	5GE740		5AD829		5GE556	
Expiration date:	5/17		4/17		5/17	

SC Calibration/Check

Reference Value: 1413 uS Standard Lot No.: 5AD820

	Value	Temp	Expiration Date: 5/17
1. Time: 0629	1411.9	20.5	
2. Time: 1321	1413.3	20.9	
3. Time:			
4. Time:			

ORP Calibration/Check

Reference Value: 220 mV Standard Lot No. 5AD891

	Value	Temp	Expiration Date: 5/16
1. Time: 0632	220.2	20.5	
2. Time: 1324	220.1	20.9	
3. Time:			
4. Time:			

DO Calibration/Check

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0628	81.6	24.56
2. Time: 1320	81.9	24.59
3. Time:		
4. Time:		

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch		Date: 01/14/16		
TURBIDIMETER				
Make & Model: HACH 2100Q		Serial No. S/N 14060C033238		
Reference Value	0.1	20	100	800
Standard Lot No.	A5162	A5247	A5251	A5246
1. Time 0813	.09	20.1	99.8	802
2. Time 1058	.14	20.3	102	807
3. Time				
4. Time				

Comments:

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL

Calibrations done by: R Lynch W. Gibson Date: 01/15/16, 01-18-16

Make & Model: EXO1

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

Other (S/N): NA

pH Calibration/Check

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: 0647	4.02	20.1	7.00	20.1	9.99	20.1
2. Time: 1122	4.03	20.6	7.01	20.6	10.01	20.6
01/18/16 3. Time: 0807	4.01	20.2	7.01	20.2	9.97	20.2
4. Time: 1121	4.02	20.5	7.01	20.5	9.98	20.5
Standard lot no.:	5GE740		5AD829		5GE556	
Expiration date:	5/17		4/17		5/17	

SC Calibration/Check

Reference Value: 1413 uS Standard Lot No.: 5AD820

Expiration Date: 5/17

	Value	Temp
1. Time: 0646	1413.3	20.1
2. Time: 1121	1413.6	20.6
01/18/16 3. Time: 0805	1413.3	20.2
4. Time: 1119	1413.5	20.6

ORP Calibration/Check

Reference Value: 220 mV Standard Lot No. 5AD891

Expiration Date: 5/16

	Value	Temp
1. Time: 0649	220.4	20.1
2. Time: 1124	220.1	20.6
01/18/16 3. Time: 0802	219.8	20.2
4. Time: 1115	220.1	20.6

DO Calibration/Check

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0645	82.1	24.48
2. Time: 1120	81.9	24.46
01/18/16 3. Time: 0759	81.7	24.81
4. Time: 1113	81.6	24.75

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch, W. Gibson		Date: 01/15/16, 01-18-16		
TURBIDIMETER				
Make & Model: HACH 2100Q		Serial No. S/N 14060C033238		
Reference Value	0.1	20	100	800
Standard Lot No.	A5162	A5247	A5251	A5246
1. Time 0805	.11	19.8	103	796
2. Time 1013	.14	20.2	101	797
1/18/16 3. Time 0847	.13	19.7	101	796
4. Time 1054	.14	19.8	101	798

Comments:

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL	
Well I.D.: CWL-BW5	Date: 01/12/16
Method: Portable pump X	Dedicated pump _____ Pump depth: 522'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO (mg/L)
512.78	0825	Start							
515.11	0900	5	16.58	1004.4	228.1	6.85	0.41	76.5	7.44
515.71	0924	10	17.17	1021.4	208.5	6.83	0.40	77.0	7.38
515.82	0934	12	17.20	1021.2	203.5	6.85	1.01	76.8	7.36
515.92	0944	14	17.12	1019.8	200.0	6.86	0.34	76.7	7.36
516.01	0953	16	17.02	1016.6	196.5	6.86	0.43	76.6	7.38
516.04	0959	17	17.39	1024.8	192.7	6.86	0.39	77.2	7.38
516.06	1004	18	17.60	1026.6	187.5	6.86	0.63	77.4	7.36
516.07	1008	19	17.60	1029.9	185.7	6.86	0.27	77.5	7.37
516.08	1012	20	17.61	1028.9	185.5	6.86	0.36	77.8	7.38
	1013		Sampling						

Comments: ~1.5 gals purged from tubing 0835

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL	
Well I.D.: CWL-MW 9	Date: 01/13/16
Method: Portable pump X	Dedicated pump _____ Pump depth: 517'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO (mg/L)
504.62	0824	Start →							
506.86	0904	5	16.37	848.0	244.5	6.90	0.25	38.3	3.74
507.44	0930	10	15.43	840.1	205.2	6.94	0.14	37.7	3.76
507.66	0957	14	15.44	826.9	191.3	6.91	0.14	38.1	3.79
507.68	1002	16	15.55	847.5	185.3	6.94	0.32	39.9	3.96
507.68	1014	18	16.00	867.8	180.6	6.93	0.20	40.0	3.94
507.54	1027	20	16.70	892.6	175.6	6.92	0.19	41.9	3.99
507.37	1039	22	16.56	894.6	174.0	6.92	0.16	43.1	4.10
507.28	1051	24	16.15	893.7	173.7	6.93	0.19	43.4	4.25
507.29	1103	26	16.11	892.9	174.1	6.93	0.15	42.8	4.23
	1104	↗	sampling →						

Comments: ~1.5 gals purged from tubing 0836

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL		
Well I.D.: CWL-MW 10	Date: 01/15/16 , 01/18/16	
Method: Portable pump X	Dedicated pump _____	Pump depth: 515'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO (mg/L)
501.32	0823	Start →							
505.43	0856	4	16.72	860.6	129.3	6.99	2.98	15.3	1.49
507.03	0907	6	16.66	862.1	105.9	7.01	2.77	13.2	1.28
508.70	0919	8	17.07	869.2	85.8	7.01	2.30	11.8	1.13
510.50	0931	10	17.65	880.8	71.6	7.07	3.87	10.9	1.04
511.49	0941	12	17.70	881.6	65.0	7.02	3.65	10.5	0.99
513.32	0955	14	17.97	887.2	56.1	7.02	5.26	9.8	0.92
514.45	1002	15	18.22	894.9	52.0	7.02	9.27	9.6	0.90
515.16	1009	16	18.00	887.8	57.3	7.03	8.30	9.5	0.88
515.16	1009	/	Well	DRY →					
501.98	0845	/	start →						
503.71	0907	1	16.53	884.9	51.4	7.10	2.14	34.3	3.31
504.51	0915	2	16.89	893.2	2.9	7.05	2.65	27.7	2.67
505.4	0924	3	16.97	897.9	2.1	7.02	3.26	21.8	2.07
	0925	/	Sample						

Comments: ~1.5 gals purged from tubing 0833 / 0900

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL	
Well I.D.: CWL-MW 11	Date: 01/14/16
Method: Portable pump X	Dedicated pump _____ Pump depth: 513'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO (mg/L)
499.83	0829	Start →							→
504.18	0901	5	17.72	964.0	260.2	6.86	0.29	61.8	5.86
506.57	0923	10	17.95	967.5	223.0	6.87	0.33	60.9	5.76
508.82	0946	15	18.12	972.2	203.6	6.91	0.43	60.5	5.69
510.38	1003	19	18.38	977.1	194.4	6.90	0.68	60.3	5.64
511.38	1014	21	18.42	976.2	188.2	6.91	1.17	59.8	5.59
512.34	1026	23	18.66	979.0	182.6	6.91	0.59	54.5	5.08
512.35	1033	24	17.63	949.6	169.9	6.91	0.44	58.9	5.58
512.49	1039	25	17.26	949.4	170.7	6.91	0.37	61.5	5.90
512.57	1046	26	17.24	949.3	175.8	6.91	0.36	63.0	5.99
512.61	1053	27	17.28	948.9	172.5	6.91	0.32	62.1	5.95
	1054	/	Sampling →						→

Comments: ~1.5 gals purged from tubing 0839

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Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL GWM	**Monitoring Well ID # :** CWL-EB1	**Date:** 1/11/16

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 #:** N/A

Personnel Performing Decontamination:

Robert Lynch — Print Name: — Initial: RL

Alfred Santillanes — Print Name: — Initial:

Condition of Equipment

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

List of Decontamination Materials

Deonized Water	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 120415/COC 616461 CWL EB1	**UN #:** 2031
	Manufacturer: ACROC
	Lot Number: A0316863

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Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL	**Monitoring Well ID # :** CWL-BW5	**Date:** 01-12-16

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

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

Personnel Performing Decontamination:

Alfred Santillanes — Print Name: — Initial:

William Gibson — Print Name: — Initial:

Condition of Equipment

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

List of Decontamination Materials

Deonized Water	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 12-04-15	**UN #:** 2031 TT 1/12/16
	Manufacturer: ACROS
	Lot Number: A0316863

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Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL GWM	**Monitoring Well ID # :** CWL-MW9	**Date:** 01/13/2016

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

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

Personnel Performing Decontamination:

William J. Gibson — Print Name: — Initial:

Robert Lynch — Print Name: — Initial:

Condition of Equipment

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

List of Decontamination Materials

Deonized Water	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 121515	**UN #:** 2031
	Manufacturer: ACROC
	Lot Number: A0316863

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Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL-GWM	**Monitoring Well ID # :** CWL-MW11	**Date:** 01-14-16

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

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

Personnel Performing Decontamination:

Gilbert Quintana
Print Name: Initial: GQ

Alfred Santillanes
Print Name: Initial: AS

Condition of Equipment

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

List of Decontamination Materials

Deonized Water	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 01-05-16	**UN #:** 2031
	Manufacturer: ACROS TT 1/22/16
	Lot Number: A0316863

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Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL-GWM	Monitoring Well ID # : CWL- MW10	Date: 01-18-16

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

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

Personnel Performing Decontamination:

Alfred Santillanes — Initial:

Print Name:

William Gibson — Initial:

Print Name:

Condition of Equipment

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

List of Decontamination Materials

Deonized Water	HNO_3
Source: Culligan	Grade: Reagent
Lot Number: 01-05-16	UN #: 2031
	Manufacturer: ACROS 1/22/16
	Lot Number: A0316863

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SUMMARY SHEET FOR JANUARY 2016 SAMPLES

Sample Summary for CWL GWM
January 2016

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 327-16								
Environmental Samples								
CWL-BW5	12-Jan-16	616462	098673	Environmental	616461 / 098670	616462 / 098675	616462 / 098672	
CWL-BW5	12-Jan-16	616462	098674	Duplicate	616461 / 098670	616462 / 098675	616462 / 098672	
CWL-MW9	13-Jan-16	616464	098678	Environmental	n/a	616464 / 098679	n/a	
CWL-MW10	18-Jan-16	616468	098687	Environmental	n/a	616468 / 098688	n/a	
CWL-MW11	14-Jan-16	616466	098683	Environmental	n/a	616466 / 098684	616466 / 098682	
CWL-EB1	11-Jan-16	616461	098670	Equipment Blank	n/a	616461 / 098671	n/a	Decon prior to CWL-BW5
CWL-FB2	12-Jan-16	616462	098672	Field Blank	n/a	616462 / 098675	n/a	at CWL-BW5
CWL-FB3	14-Jan-16	616466	098682	Field Blank	n/a	616466 / 098684	n/a	at CWL-MW11
QA/QC-DIW	11-Jan-16	616461	098669	QC-DIW	n/a	616461 / 098671	n/a	DI source water - used for EB1
Waste Characterization Samples								
CWL-BW5	12-Jan-16	616463	098676	Waste	n/a	616463 / 098677	n/a	No data validation required
CWL-MW9	13-Jan-16	616465	098680	Waste	n/a	616465 / 098681	n/a	No data validation required
CWL-MW10	15-Jan-16	616469	098689	Waste	n/a	616469 / 098690	n/a	No data validation required
CWL-MW11	14-Jan-16	616467	098685	Waste	n/a	616467 / 098686	n/a	No data validation required

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

GROUNDWATER MONITORING

JANUARY 2016

AR/COC NUMBERS 616461, 616462, 616464, and 616466

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

Memorandum

Date: February 22, 2016

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 616461, 616462, 616464 and 616466
SDG: 389034
Laboratory: GEL
Project/Task: 146422.10.11.03
Analysis: VOCs

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

Summary

Twelve samples were prepared and analyzed with accepted procedures using method SW846 8260B (VOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

Blanks

No target analytes were detected in the blanks with the following exceptions. Chloroform was detected at > the PQL in the EB, sample 389034002 and FB, sample -005, both associated with samples -006 and -008,

and the FB, sample -014, associated with sample -015. All associated sample results were non-detects and will not be qualified.

Chloroform was detected at > the PQL in DI source water, sample -001, which was not associated with any field samples. No sample data were qualified as a result.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Four TBs were submitted, one for each ARCOC. A DIW FB was submitted with ARCOC 616461 and was not associated with any samples. FBs were submitted with ARCOCs 616462 and 616466 and were associated with the samples from their respective ARCOCs. An EB was submitted with ARCOC 616461 and was associated with the samples from ARCOC 616462. A field duplicate pair was submitted with ARCOC 616462. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 02/22/16

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

Memorandum

Date: February 22, 2016

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 616461, 616462, 616464 and 616466
SDG: 389034
Laboratory: GEL
Project/Task: 146422.10.11.03
Analysis: Metals

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

Summary

Five samples were prepared and analyzed with approved procedures for Ni and Cr using method SW846 6020 (ICP-MS). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. The calcium results for samples 389034007, -009, -012 and -016 were > the ICS spike amount. Ni was detected in the ICS A at a negative result with the absolute value ≤2X the MDL. All associated sample results were non-detects and will be qualified UJ,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 instrument tune met QC acceptance criteria.

Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria.

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

Blanks

No target analytes were detected in the blanks.

ICP -MS Internal Standards

Internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria. It should be noted that the MS analysis was performed on an SNL sample of similar matrix from another SDG. Data will not be qualified as a result.

Laboratory Replicate

The replicate met all QC acceptance criteria. It should be noted that the replicate analysis was performed on an SNL sample of similar matrix from another SDG. Data will not be qualified as a result.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

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

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were not evaluated because the sample concentrations of Ca, Mg, Al and Fe were < that in the ICS solution except as noted above in the Summary section.

ICP Serial Dilution

The serial dilution met all QC acceptance criteria. It should be noted that the serial dilution analysis was performed on an SNL sample of similar matrix from another SDG. Data will not be qualified as a result.

Other QC

An EB was submitted with ARCOC 616461 and was associated with the samples from ARCOC 616462. A field duplicate pair was submitted with ARCOC 616462. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 02/22/16

Sample Findings Summary

AR/COC: 616461, 616462, 616464, 616466

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	098673-015/CWL-BW5	Nickel (7440-02-0)	UJ, CK3
	098674-015/CWL-BW5	Nickel (7440-02-0)	UJ, CK3
	098678-015/CWL-MW9	Nickel (7440-02-0)	UJ, CK3
	098683-015/CWL-MW11	Nickel (7440-02-0)	UJ, CK3

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

Sandia Data Validation Summary Worksheet

ARCOC#: 616461, 616462, 616464 and 616466	Site/Project: CWL GWM		Validation Date: 02/22/2016
SDG #:389034	Laboratory: GEL		Validator: Linda Thal
Matrix: Aqueous	# of Samples: 17	CVR present: Yes	
ARCOC(s) present: Yes	Sample Container Integrity: OK		
Analysis Type: ☒ Organic ☒ Metals ☐ Genchem ☐ Rad			

Requested Analyses Not Reported

Client Sample ID	Lab Sample ID	Analysis	Comments
none			

Hold Time/Preservation Outliers

Client Sample ID	Lab Sample ID	Analysis	Pres.	Collection Date	Preparation Date	Analysis Date	Analysis <2X HT	Analysis ≥2X HT
none								

Comments: Sampled 01/11 through 01/14/2016

Validated by: L Thal

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #:616461, 616462, 616464 and 616466	SDG:389034	Matrix: Aqueous
Laboratory Sample IDs:389034001, -002, -004, -005, -006, -008, -010, -011, -013, -014, -015, -017		
Method/Batch #s:SW846 8260B/1539609	Tuning (pass/fail):Pass	TICs Required? (yes/no):No

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	EB -002	TBs -004 -010 -013 -017	FB2 -005[1] FB3 -014[2]	FB1 DIW
	Int.	RF/ Slope	RSD/r^2	(ICV)/CCV %D										
Chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	1.36	✓	1.56[1] 1.40[2]	1.54

Surrogate Recovery Outliers

Sample ID	1,2-DCA-d4 %R	Toluene-d8 %R	BFB %R		Sample ID	1,2-DCA-d4 %R	Toluene-d8 %R	BFB %R	
none									

IS Outliers

	FBZ		Chl-d5		1,4-DCB-d4							
Sample ID	Area	RT	Area	RT	Area	RT						
none												

Comments: 6 TAL; HTs OK; MS/MSD on -015; VOA6.I 12/13/2015
.

Sandia Inorganic Metals Worksheet

ARCOC #(s): 616461, 616462, 616464 and 616466	SDG #(s):389034	Matrix: Aqueous
Laboratory Sample IDs:389034003, -007, -009, -012, -016		
Method/Batch #s:SW846 3005A/6020/1537865(prep)/1537866		

ICPMS Mass Cal: ☐ Pass ☐ Fail ☐ NA ICPMS %RSD: ☐ Pass ☐ Fail ☐ NA

Analyte (outliers)	**Calibration**						**MB mg/L**	**5X Blank (5X MDL) mg/L**	**LCS %R**	**MS %R**	**Lab Rep RPD**	**Serial Dil. %D**	**ICS AB %R**	**ICS A ±MDL ug/L (x50)**	**CRA CRI %R**	**EB -003**			
	Int. mg/L	**R^2**	**ICV**	**CCV**	**ICB ug/L**	**CCB ug/L**													
Ni	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	-0.535	✓	✓			

IS Outliers *60-125%*				**IS Outliers** *80-120%*			
Sample ID	**%Recovery**	**%Recovery**	**%Recovery**	**CCV/CCB ID**	**%Recovery**	**%Recovery**	**%Recovery**
none				none			

Comments: HTs OK; Matrix QC 389109002 from another SNL SDG
-007, -009, -012, -016 Ca >100 000

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 616461

Project Name:	CWL GWM	Date Samples Shipped:	1/11/16	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	243025	SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.03	Lab Contact:	Edie Kent/843-556-8171	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Stephanie Montano/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 389034

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
098669	-001	QA/QC DIW	NA	1/11/16 9:20	DIW	G	3x40 ml	HCL	G	FB	VOCs (SW846-8260)	001
098670	-001	CWL-EB1	NA	1/11/16 9:20	GW	G	3x40 ml	HCL	G	SA	VOCs (SW846-8260)	002
098670	-015	CWL-EB1	NA	1/11/16 9:22	GW	P	500 ml	HNO3	G	SA	Chrominum,Nickel (SW846-6020)	003
098671	-001	CWL-TB1	NA	1/11/16 9:20	DIW	G	3x40 ml	HCL	G	TB	VOCs (SW846-8260)	004

Last Chain:	☐ Yes	Sample Tracking SMO Use	Special Instructions/QC Requirements:
Validation Req'd:	☑ Yes	Date Entered:	EDD ☑ Yes ☐ No
Background:	☐ Yes	Entered by:	Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day
Confirmatory:	☐ Yes	QC inits.:	Negotiated TAT ☐
			Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Conditions on Receipt

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch	Rob Lynch	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	Alfred Santillanes	AS	SNL/4142/505-284-6870/505-228-0710
	William Gibson	William J Gibson	WJG	SNL/4142/505-284-3307/505-239-7367
				1-11-16

Return Samples By:

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

VOCs: Report CWL enhanced list of compounds (chloroform,1,1-DCE,PCE,TCE,Freon 11, and Freon 13.)

Lab Use

1.Relinquished by	William Gibson	Org. 4142	Date ~~1-11-16~~ 1-11-16	Time 1007	3.Relinquished by		Org.	Date	Time
1. Received by		Org. 4142	Date ~~1-11-16~~ 1-11-16	Time 1007	3. Received by		Org.	Date	Time
2.Relinquished by		Org. 4142	Date 1-11-16	Time 1640	4.Relinquished by		Org.	Date	Time
2. Received by		Org. GEL	Date 1-12-16	Time 0800	4. Received by		Org.	Date	Time

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

SMO 2012-ARCOC (4-2012)

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AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No.

SMO Use

AR/COC 616462

Project Name:	CWL GWM	Date Samples Shipped:	1/12/16	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	243177	SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.03	Lab Contact:	Edie Kent/843-556-8171	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Stephanie Montano/505-284-2553	Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 389634
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
098672	-001	CWL-FB2	NA	1/12/16 10:13	DIW	G	3x40 ml	HCL	G	FB	VOCs (SW846-8260)	005
098673	-001	CWL-BW5	521	1/12/16 10:13	GW	G	3x40 ml	HCL	G	SA	VOCs (SW846-8260)	006
098673	-015	CWL-BW5	521	1/12/16 10:15	GW	P	500 ml	HNO3	G	SA	Chrominum,Nickel (SW846-6020)	007
098674	-001	CWL-BW5	521	1/12/16 10:13	GW	G	3x40 ml	HCL	G	DU	VOCs (SW846-8260)	008
098674	-015	CWL-BW5	521	1/12/16 10:15	GW	P	500 ml	HNO3	G	DU	Chrominum,Nickel (SW846-6020)	009
098675	-001	CWL-TB2	NA	1/12/16 10:13	DIW	G	3x40 ml	HCL	G	TB	VOCs (SW846-8260)	010

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	Robert Lynch	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	Alfred Santillanes	AS	SNL/4142/505-284-6870/505-228-0710
	William Gibson	William Gibson	WG	SNL/4142/505-284-3307/505-239-7367
	Gilbert Quintana	Gilbert Quintana	GQ	SNL/4143/505-844-2507/ 505-228-2606

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

Comments: Send report to Tim Jackson/4142/MS 0729/284-2547
VOCs: Report CWL enhanced list of compounds (chloroform,1,1-DCE,PCE,TCE,Freon 11, and Freon 13.)

Lab Use

1.Relinquished by	Alfred Santillanes	Org.	4142	Date	1/12/16	Time	11:00	3.Relinquished by	Org. Date Time
1. Received by	Tom Cook	Org.	4142	Date	1/12/16	Time	11:00	3. Received by	Org. Date Time
2.Relinquished by	Dan Walker	Org.	4142	Date	1/12/16	Time	11:30	4.Relinquished by	Org. Date Time
2. Received by		Org.	GEL	Date	1-13-16	Time	0745	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

Page 1 of 1

Batch No. N/A

SMO Use

AR/COC 616464

Project Name:	CWL GWM	Date Samples Shipped:	1/13/16	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	243123	SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.03	Lab Contact:	Edie Kent/843-556-8171	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Stephanie Montano/505-284-2553	Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 389034
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
098678	-001	CWL-MW9	516	1/13/16 11:04	GW	G	3x40 ml	HCL	G	SA	VOCs (SW846-8260)	011
098678	-015	CWL-MW9	516	1/13/16 11:05	GW	P	500 ml	HNO3	G	SA	Chrominum,Nickel (SW846-6020)	012
098679	-001	CWL-TB4	NA	1/13/16 11:04	DIW	G	3x40 ml	HCL	G	TB	VOCs (SW846-8260)	013

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	Robert Lynch	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	Alfred Santillanes	AS	SNL/4142/505-284-6870/505-228-0710
	William Gibson	William Gibson	WJG	SNL/4142/505-284-3307/505-239-7367

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

VOCs: Report CWL enhanced list of compounds (chloroform,1,1-DCE,PCE,TCE,Freon 11, and Freon 13.)

Lab Use

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 1/13/16	Time 1113	3.Relinquished by	Robert Lynch GWD	Org. 4142	Date 1/13/16	Time 1140
1. Received by	T=Fedex	Org. 4142	Date 1/13/16	Time 1113	3. Received by	Jac Wan	Org.	Date 1-14-16	Time 0735
2.Relinquished by	T=Fedex	Org. 4142	Date 1/13/16	Time 1130	4.Relinquished by		Org.	Date	Time
2. Received by	Robert Lynch GWD	Org. 4142	Date 1/13/16	Time 1130	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

Page 1 of 1

Batch No.

SMO Use

AR/COC 616466

Project Name:	CWL GWM	Date Samples Shipped:	1/14/16	SMO Authorization:	Don Hoggard
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	243315	SMO Contact Phone:	Wendy Palencia/505-844-3132
Project/Task Number:	146422.10.11.03	Lab Contact:	Edie Kent/843-556-8171		
Service Order:	CF327-16	Lab Destination:	GEL	Send Report to SMO:	Stephanie Montano/505-284-2553
		Contract No.:	PO 1303873		
Tech Area:					
Building:	Room:	Operational Site:			

☐ Waste Characterization ☐ RMMA ☐ Released by COC No.

☑ 4° Celsius

Bill to:Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 389034

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
098682	-001	CWL-FB3	NA	1/14/16 10:54	DIW	G	3x40 ml	HCL	G	FB	VOCs (SW846-8260)	014
098683	-001	CWL-MW11	513	1/14/16 10:54	GW	G	3x40 ml	HCL	G	SA	VOCs (SW846-8260)	015
098683	-015	CWL-MW11	513	1/14/16 10:55	GW	P	500 ml	HNO3	G	SA	Chrominum,Nickel (SW846-6020)	016
098684	-001	CWL-TB6	NA	1/14/16 10:54	DIW	G	3x40 ml	HCL	G	TB	VOCs (SW846-8260)	017

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

VOCs: Report CWL enhanced list of compounds (chloroform,1,1-DCE,PCE,TCE,Freon 11, and Freon 13.)

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch	Robert Lynch	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	Alfred Santillanes	AS	SNL/4142/505-284-6870/505-228-0710
	William Gibson	William Gibson	WJG	SNL/4142/505-284-3307/505-239-7367
	Gilbert Quintana	Gilbert Quintana	GQ	SNL/4143/505-844-2507/505-228-2606

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 1/14/16	Time 11:19	3.Relinquished by		Org.	Date	Time
1. Received by	[signature]	Org. 4142	Date 1-14-16	Time 11:19	3. Received by		Org.	Date	Time
2.Relinquished by	[signature]	Org. 4142	Date 1/14/16	Time 1130	4.Relinquished by		Org.	Date	Time
2. Received by	[signature]	Org. GEL	Date 1-15-16	Time 0735	4. Received by		Org.	Date	Time

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

AR/COC NUMBER 616468

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

Memorandum

Date: February 24, 2016

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 616468
SDG: 389576
Laboratory: GEL
Project/Task: 146422.10.11.03
Analysis: VOCs

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

Summary

Two samples were prepared and analyzed with accepted procedures using method SW846 8260B (VOCs). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met. It should be noted that the MS/MSD was performed on an SNL sample of similar matrix from another SDG. Data will not be qualified as a result.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

A TB was submitted on the ARCOC.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 02/24/16

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

Memorandum

Date: February 24, 2016

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 616468
SDG: 389576
Laboratory: GEL
Project/Task: 146422.10.11.03
Analysis: Metals

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

Summary

One sample was prepared and analyzed with approved procedures for Ni and Cr using method SW846 6020 (ICP-MS). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

1. The calcium result for sample 389576002 was > the ICS spike amount. Ni was detected in the ICS A at a negative result with an absolute value ≤2X the MDL. The associated sample result was a detect <50X the absolute value of the ICS A result and will be **qualified J-,CK3**.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The instrument tune met QC acceptance criteria.

Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

Reporting Limit Verification

All CRA/CRI recoveries met QC acceptance criteria.

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

Blanks

No target analytes were detected in the blanks.

ICP -MS Internal Standards

Internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria. It should be noted that the MS analysis was performed on an SNL sample of similar matrix from another SDG. Data will not be qualified as a result.

Laboratory Replicate

The replicate met all QC acceptance criteria. It should be noted that the replicate analysis was performed on an SNL sample of similar matrix from another SDG. Data will not be qualified as a result.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

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

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were not evaluated because the sample concentrations of Ca, Mg, Al and Fe were < that in the ICS solution except as noted above in the Summary section.

ICP Serial Dilution

The serial dilution met all QC acceptance criteria. It should be noted that the serial dilution analysis was performed on an SNL sample of similar matrix from another SDG. Data will not be qualified as a result.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 02/24/16

Sample Findings Summary

AR/COC: 616468

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	098687-015/CWL-MW10	Nickel (7440-02-0)	J-, CK3

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

Sandia Data Validation Summary Worksheet

ARCOC#: 616468	Site/Project: CWL GWM		Validation Date: 02/24/2016
SDG #:389576	Laboratory: GEL		Validator: Linda Thal
Matrix: Aqueous	# of Samples: 3	CVR present: Yes	
ARCOC(s) present: Yes	Sample Container Integrity: OK		
Analysis Type: ☒ Organic ☒ Metals ☐ Genchem ☐ Rad			

Requested Analyses Not Reported

Client Sample ID	Lab Sample ID	Analysis	Comments
none			

Hold Time/Preservation Outliers

Client Sample ID	Lab Sample ID	Analysis	Pres.	Collection Date	Preparation Date	Analysis Date	Analysis <2X HT	Analysis ≥2X HT
none								

Comments: Sampled 01/18/2016

Validated by: L Thal

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #:616468	SDG:389576	Matrix: Aqueous
Laboratory Sample IDs:389576001, -003		
Method/Batch #s:SW846 8260B/1539925	Tuning (pass/fail):Pass	TICs Required? (yes/no):No

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	TB -003			
	Int.	RF/ Slope	RSD/r^2	(ICV)/CCV %D										
none														

Surrogate Recovery Outliers

Sample ID	1,2-DCA-d4 %R	Toluene-d8 %R	BFB %R		Sample ID	1,2-DCA-d4 %R	Toluene-d8 %R	BFB %R	
none									

IS Outliers

	FBZ		Chl-d5		1,4-DCB-d4							
Sample ID	Area	RT	Area	RT	Area	RT						
none												

Comments: 6 TAL; HTs OK; MS/MSD SNL sample from another SDG; VOA6.I 12/13/2015
.

Sandia Inorganic Metals Worksheet

ARCOC #(s): 616468	SDG #(s):389576	Matrix: Aqueous
Laboratory Sample IDs:389576002		
Method/Batch #s:SW846 3005A/6020/1539500(prep)/1539501		

ICPMS Mass Cal: ☐ Pass ☐ Fail ☐ NA ICPMS %RSD: ☐ Pass ☐ Fail ☐ NA

Analyte (outliers)	**Calibration**						**MB mg/L**	**5X Blank (5X MDL) mg/L**	**LCS %R**	**MS %R**	**Lab Rep RPD**	**Serial Dil. %D**	**ICS AB %R**	**ICS A ±MDL ug/L (x50)**	**CRA CRI %R**				
	Int. mg/L	**R^2**	**ICV**	**CCV**	**ICB ug/L**	**CCB ug/L**													
Ni	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	-0.535 (26.8)	✓				

IS Outliers *60-125%*				**IS Outliers** *80-120%*			
Sample ID	**%Recovery**	**%Recovery**	**%Recovery**	**CCV/CCB ID**	**%Recovery**	**%Recovery**	**%Recovery**
none				none			

Comments: HTs OK; Matrix QC from another SNL SDG
-002 Ca >100 000

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC 616468

Project Name:	CWL GWM	Date Samples Shipped:	1/18/16	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	243256	SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.03	Lab Contact:	Edie Kent/843-556-8171	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	PO 1303873	Stephanie Montano/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 389576

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
098687	-001	CWL-MW10	515	1/18/16 9:25	GW	G	3x40 ml	HCL	G	SA	VOCs (SW846-8260)	001
098687	-015	CWL-MW10	515	1/18/16 9:26	GW	P	500 ml	HNO3	G	SA	Chrominum,Nickel (SW846-6020)	002
098688	-001	CWL-TB8	NA	1/18/16 9:25	DIW	G	3x40 ml	HCL	G	TB	VOCs (SW846-8260)	003

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
	Gilbert Quintana			SNL/4143/505-844-2507/505-228-2606
	Alfred Santillanes			SNL/4142/505-284-6870/505-228-0710
	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

VOCs: Report CWL enhanced list of compounds (chloroform,1,1-DCE,PCE,TCE,Freon 11, and Freon 13.)

Conditions on Receipt

Lab Use

1.Relinquished by		Org. 4142	Date 1/18/16	Time 10:02	3.Relinquished by	Org.	Date	Time
1. Received by		Org. 4142	Date 1/18/16	Time 10:02	3. Received by	Org.	Date	Time
2.Relinquished by		Org. 4142	Date 1/18/16	Time 1035	4.Relinquished by	Org.	Date	Time
2. Received by		Org. CEL	Date 1-19-16	Time 0735	4. Received by	Org.	Date	Time

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

CONTRACT VERIFICATION REVIEW FORMS

GROUNDWATER MONITORING

JANUARY 2016

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
616461	Environmental*
616462	Environmental*
616463	Waste Characterization
616464	Environmental*
616465	Waste Characterization
616466	Environmental*
616467	Waste Characterization
616468	Environmental*
616469	Waste Characterization

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

Contract Verification Form (CVR)

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

ARCOC No. 616461, 616462, 616463, 616464, 616465, 616466 & 616467 **Analytical Lab** GEL **SDG No.** 389034

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

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	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 Lc	X		
2.6	QC batch numbers provided	X		
2.7	Dilution factors provided and all dilution levels reported	X		
2.8	Data reported in appropriate units and using correct significant figures	X		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	N/A		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

3.0 Data Quality Evaluation

Line No.	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 sample accuracy reported and met for all samples		X	1,2,3-Trichlorobenzene and 1,2,4-Trichlorobenzene failed recovery limit for LCS (QC1203475389)
	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		

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.5	Blank data a) Method or reagent blank data reported and met for all samples		X	Sodium and thallium detected in method blank (QC1203469877). 1,2,3-Trichlorobenzene detected in method blank (QC1203475388). 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene and methylene chloride detected in method blank (QC1203488118). Phenols detected in method blank (QC1203468618).
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Chloroform detected in CWL-EB1, CWL-FB2 and CWL-FB3. Chloroform and acetone detected in CWL-TB7.
3.6	Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits	X		
3.7	Narrative addresses planchet flaming for gross alpha/beta	N/A		
3.8	Narrative included, correct, and complete	X		
3.9	Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151.	N/A		

4.0 Calibration and Validation Documentation

Line No.	Item	Yes	No	Comments
4.1	GC/MS (8260 and 8270) a) 12-hour tune check provided	X		
	b) Initial calibration provided	X		
	c) Continuing calibration provided	X		
	d) Internal standard performance data provided	X		
	e) Instrument run logs provided	X		
4.2	GC/HPLC (8330, 8082, 9070A, and 8010) a) Initial calibration provided	N/A		
	b) Continuing calibration provided	N/A		
	c) Instrument run logs provided	N/A		
4.3	HRGC/HRMS (1668) a) 12-hour tune check provided	N/A		
	b) Initial calibration provided	N/A		
	c) Continuing calibration provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Labeled compound recovery data provided	N/A		
	f) RRTs for samples and standards provided	N/A		
	g) Ion abundance ratios for samples and standards provided	N/A		

Line No.	Item	Yes	No	Comments
	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		Manganese, cadmium, barium, thallium and lead were 2 times higher than the MDL in ICS
	d) ICP serial dilution provided	X		
	e) Instrument run logs provided	X		
4.6	Radiochemistry and General Chemistry a) Instrument run logs provided	X		

5.0 Data Anomaly Report

Line No.	Item	Yes	No	If no, explain
5.1	DAR completed for monitoring and surveillance sample data	N/A		
5.2	Problems or outliers noted	N/A		
5.3	Verification or reanalysis requested from lab	N/A		

6.0 Problem Resolution

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

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions

Were deficiencies unresolved? ○ Yes ◉ No

Based on the review, this data package is complete. ◉ Yes ○ No

Reviewed by: Wendy Palencia Date: 02-17-2016 08:27:00

Closed by: Wendy Palencia Date: 02-17-2016 08:27:00

Contract Verification Form (CVR)

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

ARCOC No. 616468 & 616469 **Analytical Lab** GEL **SDG No.** 389576

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

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	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 Lc	X		
2.6	QC batch numbers provided	X		
2.7	Dilution factors provided and all dilution levels reported	X		
2.8	Data reported in appropriate units and using correct significant figures	X		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	N/A		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

3.0 Data Quality Evaluation

Line No.	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 sample accuracy reported and met for all samples	X		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	X		
3.4	Precision 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	Thallium detected in method blank (QC1203474199). Cyanide detected in method blank (QC1203474602). 1,2,3-Trichlorobenzene, 1,2,4-trichlorobenzene and methylene chloride detected in method blank (QC1203488118).

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	X		
3.6	Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits	X		
3.7	Narrative addresses planchet flaming for gross alpha/beta	N/A		
3.8	Narrative included, correct, and complete	X		
3.9	Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151.	N/A		

4.0 Calibration and Validation Documentation

Line No.	Item	Yes	No	Comments
4.1	GC/MS (8260 and 8270) a) 12-hour tune check provided	X		
	b) Initial calibration provided	X		
	c) Continuing calibration provided	X		

Line No.	Item	Yes	No	Comments
	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		

Line No.	Item	Yes	No	Comments
	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		Manganese, cadmium, barium, thallium and lead were 2 times higher than the MDL in ICS
	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		

5.0 Data Anomaly Report

Line No.	Item	Yes	No	If no, explain
5.1	DAR completed for monitoring and surveillance sample data	N/A		
5.2	Problems or outliers noted	N/A		

Line No.	Item	Yes	No	If no, explain
5.3	Verification or reanalysis requested from lab	N/A		

6.0 Problem Resolution

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

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions

Were deficiencies unresolved? ○ Yes ◉ No

Based on the review, this data package is complete. ◉ Yes ○ No

Reviewed by: Wendy Palencia Date: 02-22-2016 09:35:00

Closed by: Wendy Palencia Date: 02-22-2016 09:35:00

FIELD SAMPLING FORMS

JULY 2016 GROUNDWATER MONITORING

TAILGATE SAFETY MEETING FORM

Dept: 4141 Well Location: CWL-BW 5 Date: 07/12/16 Time: 0817

Activities: Groundwater monitoring and Sampling

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

Weather Conditions:
Temp: 84.6 °F Wind Speed: 5-20 MPH Humidity: 14.2 %

Chemicals Used: Preservatives in sample bottles

Other: Be aware of possible UXO's

Safety Topics Presented

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

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

Attendees

Printed Name	Signature
Robert Lynch	
ALFRED SANTILLANES	
Gilbert L. Quintana	
Chris Armijo	
Sue Collins	
Tim Jackson	

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), 4100 Controlled Documents home page.*

TAILGATE SAFETY MEETING FORM

Dept: 4141 Well Location: CWL- MW 9 Date: 07/13/16 Time: 0809

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

Weather Conditions:
Temp: 80.7 °F Wind Speed: 0-5 MPH Humidity: 18.7 %

Chemicals Used: Preservatives in sample bottles
Other: Be aware of possible UXO's

Safety Topics Presented

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

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

Attendees

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

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TAILGATE SAFETY MEETING FORM

Dept: 4141 Well Location: CWL-MW11 Date: 07/14/16 Time: 0810

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

Weather Conditions:
Temp: 95.5 °F Wind Speed: 0-5 MPH Humidity: 11.9 %

Chemicals Used: Preservatives in sample bottles
Other: Be aware of possible UXO's

Safety Topics Presented

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

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

Attendees

Printed Name	Signature
Robert Lynch	Robert Lynch
ALFRED SANTILLANES	Alfred Santillanes
Gilbert L. Quintana	Gilbert L. Quintana

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TAILGATE SAFETY MEETING FORM

Dept: 4141 Well Location: CWL-MW10 Date: 07/15/16 Time: 0811

Activities: Groundwater monitoring and Sampling 07/18/16 0818

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

Weather Conditions:
Temp: 79.5 °F Wind Speed: 0-5 MPH Humidity: 31.2 %

Chemicals Used: Preservatives in sample bottles

Other: Be aware of possible UXO's

Safety Topics Presented

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

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

Attendees

Printed Name	Signature
Robert Lynch	Robert Lynch
ALFRED SANTILLANES	Alfred Santillanes
William Gibson	William Gibson
07/18/16 Robert Lynch	Robert Lynch
ALFRED SANTILLANES	Alfred Santillanes
William Gibson	William Gibson
G. Bent L. Qualtrans	[illegible]

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL

Calibrations done by: R Lynch Date: 07/12/16

Make & Model: EXO 1

Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 16D101840

Other (S/N): NA

pH Calibration/Check

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: 0635	4.01	24.20	6.99	24.09	10.02	24.16
2. Time: 1306	4.02	24.24	7.00	24.20	10.01	24.21
3. Time:						
4. Time:						
Standard lot no.:	5GE740		5AD829		5GE556	
Expiration date:	5/17		4/17		5/17	

SC Calibration/Check

Reference Value: 1413 uS Standard Lot No.: 5AD820

Expiration Date: 4/17

	Value	Temp
1. Time: 0633	1413.0	24.33
2. Time: 1304	1413.1	24.36
3. Time:		
4. Time:		

ORP Calibration/Check

Reference Value: 220 mV Standard Lot No. 6GD136

Expiration Date: 1/17

	Value	Temp
1. Time: 0637	220.0	24.20
2. Time: 1309	220.1	24.27
3. Time:		
4. Time:		

DO Calibration/Check

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0632	81.6	24.41
2. Time: 1303	81.7	24.60
3. Time:		
4. Time:		

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch		Date: 07/12/16		
TURBIDIMETER				
Make & Model: 2100Q		Serial No. S/N 16040C049087		
Reference Value	10	20	100	800
Standard Lot No.	A6055	A6056	A6064	A6104
1. Time 0820	10.1	20.2	102	804
2. Time 1121	9.99	20.3	104	798
3. Time				
4. Time				
Comments:				

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL

Calibrations done by: R Lynch Date: 07/13/16

Make & Model: EXO 1

Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 16D101840

Other (S/N): NA

pH Calibration/Check

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: 0629	4.01	23.1	7.01	23.1	10.02	23.3
2. Time: 1311	4.02	23.3	7.01	23.3	10.01	23.5
3. Time:						
4. Time:						
Standard lot no.:	5GE740		5AD829		5GE556	
Expiration date:	5/17		4/17		5/17	

SC Calibration/Check

Reference Value: 1413 uS Standard Lot No.: 5AD820

Expiration Date: 4/17

	Value	Temp
1. Time: 0628	1412.8	23.3
2. Time: 1310	1413.3	24.1
3. Time:		
4. Time:		

ORP Calibration/Check

Reference Value: 220 mV Standard Lot No. 6GD136

Expiration Date: 1/17

	Value	Temp
1. Time: 0631	220.1	23.2
2. Time: 1313	220.4	23.5
3. Time:		
4. Time:		

DO Calibration/Check

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0626	81.8	24.77
2. Time: 1309	81.7	24.79
3. Time:		
4. Time:		

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch		Date: 07/13/16		
TURBIDIMETER				
Make & Model: 2100Q		Serial No. S/N 16040C049087		
Reference Value	10	20	100	800
Standard Lot No.	A6055	A6056	A6064	A6104
1. Time 0812	10.3	19.8	103	799
2. Time 1111	10.1	20.2	101	803
3. Time				
4. Time				

Comments:

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL

Calibrations done by: R Lynch | Date: 07/14/16

Make & Model: EXO 1

Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 16D101840

Other (S/N): NA

pH Calibration/Check

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: 0635	4.02	22.2	7.01	22.5	10.01	22.3
2. Time: 1424	4.01	23.1	7.01	23.2	10.02	23.2
3. Time:						
4. Time: RL 7/14/16						
Standard lot no.:	5GE740		5AD829		5GE556	
Expiration date:	5/17		4/17		5/17	

SC Calibration/Check

Reference Value: 1413 uS | Standard Lot No.: 5AD820

	Value	Temp	Expiration Date: 4/17
1. Time: 0633	1412.7	22.4	
2. Time: 1422	1413.9	23.1	
3. Time:			
4. Time:			

ORP Calibration/Check

Reference Value: 220 mV | Standard Lot No. 6GD136

	Value	Temp	Expiration Date: 1/17
1. Time: 0637	220.1	22.2	
2. Time: 1426	221.1	23.4	
3. Time:			
4. Time:			

DO Calibration/Check

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0631	81.8	24.76
2. Time: 1420	81.9	24.73
3. Time:		
4. Time:		

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch		Date: 07/14/16		
TURBIDIMETER				
Make & Model: 2100Q		Serial No. S/N 16040C049087		
Reference Value	10	20	100	800
Standard Lot No.	A6055	A6056	A6064	A6104
1. Time 0815	9.98	20.4	102	798
2. Time 1339	10.4	20.1	103	802
3. Time				
4. Time				

Comments:

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

SNL/NM Project Name: CWL

Calibrations done by: R Lynch Date: 07/15/16

Make & Model: EXO 1

Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 16D101840

Other (S/N): NA

pH Calibration/Check

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: 0684	4.02	23.1	7.01	23.2	10.01	22.9
2. Time: 1247	4.03	23.4	7.00	23.5	10.02	23.3
3. Time: 0639	4.02	22.5	7.01	22.6	10.01	22.6
4. Time: 1042	4.02	22.6	7.01	22.6	10.02	22.6
Standard lot no.:	5GE740		5AD829		5GE556	
Expiration date:	5/17		4/17		5/17	

SC Calibration/Check

Reference Value: 1413 uS Standard Lot No.: 5AD820

Expiration Date: 4/17

	Value	Temp
1. Time: 0622	1412.9	22.9
2. Time: 1245	1414.1	23.4
3. Time: 0637	1413.8	22.6
4. Time: 1041	1413.1	22.6

ORP Calibration/Check

Reference Value: 220 mV Standard Lot No. 6GD136

Expiration Date: 1/17

	Value	Temp
1. Time: 0626	221.1	23.0
2. Time: 1249	221.3	23.3
3. Time: 0641	220.7	22.5
4. Time: 1044	221.0	22.6

DO Calibration/Check

Calibration Value:	81% air saturation @ 5200 ft.	Atmospheric Pressure in Hg
1. Time: 0620	82.1	24.72
2. Time: 1244	82.2	24.77
3. Time: 0635	82.1	24.82
4. Time: 1040	82.0	24.80

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch		Date: 07/15/16 07/18/16		
TURBIDIMETER				
Make & Model: 2100Q		Serial No. S/N 16040C049087		
Reference Value	10	20	100	800
Standard Lot No.	A6055	A6056	A6064	A6104
1. Time 0816	10.4	20.1	99.8	797
2. Time 1133	10.1	20.2	103	796
3. Time 0820	10.3	20.1	102	799
4. Time 0914	10.5	20.4	101	803

Comments:

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL		
Well I.D.: CWL-BW 5	Date: 07/12/16	
Method: Portable pump X	Dedicated pump _____	Pump depth: 522'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO (mg/L)
512.82	0837	Start →							→
514.16	0911	3	22.28	1039.2	175.1	7.05	1.09	82.8	7.18
514.79	0925	5	22.15	1035.1	176.6	7.05	0.74	82.2	7.14
514.97	0938	7	22.17	1034.6	179.5	7.06	0.82	82.5	7.17
515.21	0953	9	22.57	1042.9	183.2	7.05	0.80	82.3	7.10
515.24	1007	11	22.36	1036.8	186.8	7.05	0.68	82.6	7.15
515.26	1024	13	23.03	1055.0	190.1	7.05	0.68	83.0	7.10
515.20	1041	15	23.42	1069.9	192.9	7.05	0.72	83.5	7.09
515.12	1053	17	24.13	1080.1	195.4	7.04	0.69	85.0	7.13
515.09	1101	18	24.14	1079.1	196.7	7.04	0.58	85.1	7.13
515.07	1109	19	24.17	1080.0	196.5	7.04	0.59	85.5	7.15
	1110		SAMPLING						

Comments: ~1.5 gals purged from tubing 0853

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL	
Well I.D.: CWL-MW9	Date: 07/13/16
Method: Portable pump X	Dedicated pump _____ Pump depth: 517'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO (mg/L)
504.65	0833	Start							
506.86	0915	5	22.11	814.0	110.0	7.15	0.59	37.9	3.30
507.33	0944	10	22.46	900.0	114.4	7.15	0.68	38.2	3.30
507.58	0959	13	22.13	908.4	118.7	7.14	0.66	38.5	3.35
507.68	1009	15	22.53	915.7	120.8	7.14	0.88	39.4	3.40
507.74	1019	17	22.94	926.3	123.7	7.14	0.52	40.6	3.47
507.80	1029	19	22.95	930.0	126.8	7.14	0.51	41.1	3.52
507.82	1039	21	23.96	934.0	129.8	7.14	0.47	41.6	3.56
507.81	1044	22	23.21	945.8	131.4	7.14	0.41	42.1	3.59
507.81	1050	23	23.49	945.5	132.0	7.13	0.42	42.6	3.61
507.79	1054	24	23.49	945.9	133.2	7.13	0.68	43.1	3.65
507.77	1100	25	23.61	945.3	133.4	7.13	0.53	43.5	3.68
	1101		sampling						

Comments: ~1.5 gals purged from tubing 0845

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL		
Well I.D.: CWL-MW 10	Date: 07/15/16 07/18/16	
Method: Portable pump X	Dedicated pump ____	Pump depth: 514'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO (mg/L)
501.62	0829	Start →							→
504.16	0911	2	25.15	956.2	169.1	7.20	3.21	33.6	2.76
505.93	0938	4	25.47	963.2	163.6	7.20	1.48	22.1	1.80
507.61	1000	6	25.36	961.1	150.7	7.20	1.52	16.5	1.35
509.13	1019	8	24.16	935.5	131.4	7.20	1.82	11.9	1.00
510.68	1034	10	24.16	934.4	113.6	7.20	2.07	10.0	0.83
512.56	1052	12	24.34	938.4	101.9	7.20	2.99	8.7	0.73
513.02	1115	14	24.60	935.2	95.6	7.20	4.79	13.4	0.99
513.97	1124	15	24.23	937.8	89.7	7.21	6.90	18.6	1.54
514.11	1125	→	well	DRY	→				→
7/18/16 502.09	0835	→	START	→					→
503.72	0852	0.5	25.25	986.5	42.7	7.14	2.76	47.9	3.90
504.17	0857	1	24.82	978.4	19.8	7.14	2.71	37.3	3.07
504.64	0902	1.5	24.64	972.4	9.8	7.14	2.85	30.2	2.51
	0903	→	sampling	→					→

Comments: ~1.5 gals purged from tubing 0848

0847 7/18/16

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL		
Well I.D.: CWL-MW 11	Date: 07/14/16	
Method: Portable pump X	Dedicated pump	Pump depth: 513'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO (mg/L)
499.88	0828	Start							
503.84	0942	5	24.54	1024.4	172.6	7.14	0.62	69.6	5.78
506.17	1032	10	25.79	1051.9	181.3	7.14	0.61	69.0	5.60
507.70	1117	14	26.52	1066.2	188.5	7.13	0.58	69.6	5.58
508.39	1139	16	26.97	1077.0	191.1	7.13	0.93	69.3	5.51
509.11	1206	18	27.95	1098.4	193.8	7.13	0.60	69.7	5.44
509.71	1226	20	27.35	1086.2	195.7	7.13	0.67	68.6	5.41
510.41	1246	22	27.86	1095.4	197.8	7.13	0.75	68.7	5.37
510.82	1256	23	27.89	1092.4	198.6	7.13	0.70	68.1	5.34
511.17	1307	24	27.72	1089.8	198.7	7.13	0.71	65.4	5.13
511.51	1316	25	27.62	1085.5	198.8	7.13	0.74	64.3	5.05
511.78	1326	26	27.63	1089.0	198.8	7.13	0.75	64.9	5.13
	1327		Sampling						

Comments: ~1.5 gals purged from tubing 0845

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Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL GWM	**Monitoring Well ID # :** CWL-BW5	**Date:** 7/12/16

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 #:** 210270

Personnel Performing Decontamination:

Gilbert Quintana — Initial: GQ
Print Name:

Robert Lynch — Initial: RL
Print Name:

Condition of Equipment

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

List of Decontamination Materials

Deonized Water	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 061616	**UN #:** 2031
	Manufacturer: ACROS
	Lot Number: A0316863

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Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL-GWM	Monitoring Well ID # : CWL-MW9	Date: 07/13/16

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 #: 210270

Personnel Performing Decontamination:

William Gibson — Print Name: — Initial: WJG

Alfred Santillanes — Print Name: — Initial: AS

Condition of Equipment

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

List of Decontamination Materials

Deonized Water	HNO_3
Source: Culligan	Grade: Reagent
Lot Number: 06/16/16	UN #: 2031
	Manufacturer: ACROS
	Lot Number: A0316863

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Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL-GWM	**Monitoring Well ID # :** CWL-MW11	**Date:** 07/14/16

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 #:** 210270

Personnel Performing Decontamination:

Alfred Santillanes — Print Name: — Initial:

Robert Lynch — Print Name: — Initial:

Condition of Equipment

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

List of Decontamination Materials

Deonized Water	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 6/16/16	**UN #:** 2031
	Manufacturer: ACROS
	Lot Number: A0316863

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Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: CWL GWM	**Monitoring Well ID # :** CWL-MW10	**Date:** 7/18/16

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 #:** 210270

Personnel Performing Decontamination:

Gilbert Quintana — Print Name: — Initial: GQ

William Gibson — Print Name: — Initial: WJG

Condition of Equipment

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

List of Decontamination Materials

Deonized Water	**HNO_3**
Source: Culligan	**Grade:** Reagent
Lot Number: 061616	**UN #:** 2031
	Manufacturer: ACROS
	Lot Number: A0316863

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SUMMARY SHEET FOR JULY 2016 SAMPLES

Sample Summary for CWL GWM
July 2016

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 # 195122.10.11.03. Service Order # CF 327-16								
Environmental Samples								
CWL-BW5	12-Jul-16	617117	099976	Environmental	n/a	617117 / 099977	617117 / 099975	
CWL-MW9	13-Jul-16	617120	099983	Environmental	617119 / 099980	617120 / 099985	617120 / 099982	
CWL-MW9	13-Jul-16	617120	099984	Duplicate	617119 / 099980	617120 / 099985	617120 / 099982	
CWL-MW10	18-Jul-16	617124	099992	Environmental	n/a	617124 / 099993	n/a	
CWL-MW11	14-Jul-16	617122	099988	Environmental	n/a	617122 / 099989	n/a	
CWL-EB1	12-Jul-16	617119	099980	Equipment Blank	n/a	617119 / 099981	n/a	Decon prior to CWL-MW9
CWL-FB1	12-Jul-16	617117	099975	Field Blank	n/a	617117 / 099977	n/a	at CWL-BW5
CWL-FB2	12-Jul-16	617119	099979	QC-DIW	n/a	617119 / 099981	n/a	DI source water - used for EB1
CWL-FB3	13-Jul-16	617120	099982	Field Blank	n/a	617120 / 099985	n/a	at CWL-MW9
Waste Characterization Samples								
CWL-BW5	12-Jul-16	617118	099978	Waste	n/a	617118 / 099996	n/a	No data validation required
CWL-MW9	13-Jul-16	617121	099986	Waste	n/a	617121 / 099987	n/a	No data validation required
CWL-MW10	18-Jul-16	617125	099994	Waste	n/a	617125 / 099995	n/a	No data validation required
CWL-MW11	14-Jul-16	617123	099990	Waste	n/a	617123 / 099991	n/a	No data validation required

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

GROUNDWATER MONITORING

JULY 2016

AR/COC NUMBERS 617117, 617118, 617119, 617120, and 617121

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

Memorandum

Date: August 17, 2016

To: File

From: Mary Donivan

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM/SVM
ARCOC: 617117, 617119 and 617120
SDG: 401508
Laboratory: GEL
Project/Task: 195122.10.11.03
Analysis: VOCs

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

Summary

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

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

Blanks

No target analytes were detected in the blanks

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Three TBs were submitted, one for each ARCOC. FBs were submitted with ARCOCs 617117 and 617120 and were associated with the field samples on the respective ARCOC. A QC/DIW sample was submitted as CWL-FB3 with ARCOC 617119 and was not associated with any field samples. An EB was submitted with ARCOC 617119 and was associated with samples on ARCOC 617120. A field duplicate pair was submitted with ARCOC 617120. 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: Linda Thal **Level I** **Date:** 08/22/2016

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

Memorandum

Date: August 17, 2016

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM/SVM
ARCOC: 617117, 617119 and 617120
SDG: 401508
Laboratory: GEL
Project/Task: 195122.10.11.03
Analysis: Metals

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

Summary

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

1. The Ca concentration for samples 401508003, -014 and -016 was above the ICS level for the ICP-MS analysis. Ni was detected in the ICS A at a positive value > the MDL. The associated sample results were detects <50X the ICS A value and will be **qualified J+,CK2**.

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tune met QC acceptance criteria.

Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

Reporting Limit Verification

All 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 not evaluated except as noted above in the Summary section.

ICP Serial Dilution

The serial dilutions met all QC acceptance criteria.

Other QC

An EB was submitted with ARCOC 617119 and was associated with the samples on ARCOC 617120. A field duplicate pair was submitted with ARCOC 617120. 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: Linda Thal **Level I** **Date:** 08/22/2016

Sample Findings Summary

AR/COC: 617117, 617119, 617120

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005/6020 DOE-AL			
	099976-002/CWL-BW5	Nickel (7440-02-0)	J+, CK2
	099983-002/CWL-MW9	Nickel (7440-02-0)	J+, CK2
	099984-002/CWL-MW9	Nickel (7440-02-0)	J+, CK2

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

Sandia Data Validation Summary Worksheet

ARCOC#: 617117, 617119 and 617120	Site/Project: CWL GWM/SVM		Validation Date: 08/17/16
SDG #: 401508	Laboratory: GEL Laboratories, LLC		Validator: Mary Donivan
Matrix: Aqueous	# of Samples: 14	CVR present: Yes	
ARCOC(s) present: Yes	Sample Container Integrity: OK		
Analysis Type: ☒ Organic ☒ Metals ☐ Genchem ☐ Rad			

Requested Analyses Not Reported

Client Sample ID	Lab Sample ID	Analysis	Comments
None			

Hold Time/Preservation Outliers

Client Sample ID	Lab Sample ID	Analysis	Pres.	Collection Date	Preparation Date	Analysis Date	Analysis <2X HT	Analysis ≥2X HT
None								

Comments: Collected: 07/12-13/2016

Validated by:

Mary A. Donivan

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #:617117, 617119 and 617120	SDG: 401508	Matrix: Aqueous
Laboratory Sample IDs: 401508001, -002, -004, -008, -009, -011, -012, -013, -015 and -017		
Method/Batch #s:**8260B**/1584172	Tuning (pass/fail):pass	TICs Required? (yes/no):no

Analyte (outliers)	**Calibration**				**MB**	**5X (10X) MB**	**LCS %R**	**MS %R**	**MSD %R**	**MS/ MSD RPD**	**TB1 -004 TB3 -011 TB4 -017**	**EB1 -009**	**FB1 -001 FB3 -012**	**QC/ DIW -008**
	Int.	**RF/ Slope**	**RSD/r^2**	**(ICV)/ CCV %D**										
None														

Surrogate Recovery Outliers

Sample ID	**1,2-DCA-d4 %R**	**Toluene-d8 %R**	**BFB %R**		**Sample ID**	**1,2-DCA-d4 %R**	**Toluene-d8 %R**	**BFB %R**	
None									

IS Outliers

	FBZ		**Chl-d5**		**1,4-DCB-d4**							
Sample ID	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**						
None												

Comments: HTs OK. VOA9.I 07/15/16
MS/MSD performed on sample -013

Sandia Inorganic Metals Worksheet

ARCOC #(s): 617117, 617119 and 617120	SDG #(s): 401508	Matrix: Aqueous
Laboratory Sample IDs: 401508003, -010, -014 and -016		
Method/Batch #s: **3005A/6020** 1582584/1582585		

ICPMS Mass Cal: ☒ Pass ☐ Fail ☐ NA ICPMS Resolution: ☒ Pass ☐ Fail ☐ NA

Analyte (outliers)	**Calibration**						**MB mg/L**	**5X Blank (5X MDL) mg/L**	**LCS %R**	**MS %R**	**Lab Rep RPD**	**Serial Dil. %D**	**ICS AB %R**	**ICS A ±MDL ug/L (x50)**	**CRI %R**	**EB1 -010**	
	Int. mg/L	**R^2**	**ICV**	**CCV**	**ICB ug/L**	**CCB ug/L**											
Ni	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	1.14(57)	✓	✓	

IS Outliers *60-125%*				**IS Outliers** *80-120%*			
Sample ID	**%Recovery**	**%Recovery**	**%Recovery**	**CCV/CCB ID**	**%Recovery**	**%Recovery**	**%Recovery**
None				None			

Comments: HTs OK; Matrix QC performed on sample -003

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

SMO Use

Page 1 of 1

AR/COC 617117

Project Name:	CWL GWM/SVM	Date Samples Shipped:	7/13/16	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.	855229	SMO Contact Phone:	☐ RMA
Project/Task Number:	195122.10.11.03	Lab Contact:	Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	1303873	Stephanie Montaño/505.284.2553	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 401508
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
099975	001	CWL-FB1	NA	7/12/16 11:10	DIW	G	3x40 ml	HCl	G	FB	VOC-TCE (SW846-8260B)	001
099976	001	CWL-BW5	522	7/12/16 11:10	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	002
099976	002	CWL-BW5	522	7/12/16 11:12	GW	P	500 ml	HNO3	G	SA	METALS (SW846-6020): Cr, Ni	003
099977	001	CWL-TB1	NA	7/12/16 11:10	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	004

Last Chain:	☐ Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd:	☑ Yes	Date Entered:		EDD ☑ Yes	
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	Alfred Santillanes	AS	SNL/04141/505-284-6870/505-228-0710
	Gilbert Quintana	Gilbert Quintana	GQ	SNL/04141/505-844-2507/505-228-2606
	Robert Lynch	Robert Lynch	RL	SNL/04141/505-844-4013/505-250-7090

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

Comments:

Lab Use

Relinquished by	Alfred Santillanes	Org. 4141	Date 7/12/16	Time 1142	Relinquished by	Org.	Date	Time
Received by	Cynthia Lyon GWM	Org. 4131	Date 7/12/16	Time 1142	Received by	Org.	Date	Time
Relinquished by	[illegible]	Org. 4131	Date 7/13/16	Time 0800	Relinquished by	Org.	Date	Time
Received by	[illegible]	Org. GEL	Date 7-14-16	Time 0730	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

AOP 95-16

Internal Lab

Batch No. N/A

SMO Use

AR/COC 617118

Project Name:	CWL GWM/SVM	Date Samples Shipped:	7/13/16	SMO Authorization:	☑ Waste Characterization
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.	251279	SMO Contact Phone:	☐ RMA
Project/Task Number:	195122.10.11.03	Lab Contact:	Edie Kent/843-769-7385	Wendy Palencia/505-844-3132 SMO	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	1303873	Stephanie Montaño/505.284.2553	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

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
099978	001	CWL-BW5	NA	7/12/16 10:02	PW	G	3x40 ml	HCl	G	WC	VOC, TCL (SW846-8260B)	401511 001
099978	002	CWL-BW5	NA	7/12/16 10:03	PW	P	500 ml	HNO3	G	WC	METALS,TAL (SW846-6020/7470): Mo	002
099978	003	CWL-BW5	NA	7/12/16 10:04	PW	P	125 ml	None	G	WC	ANIONS-Br,Cl,F,SO4 (SW846-9056)	401508 005
099978	004	CWL-BW5	NA	7/12/16 10:05	PW	AG	250 ml	H2SO4	G	WC	PHENOLICS, TOTAL RECOVERABLE (SW846-9066)	006
099978	005	CWL-BW5	NA	7/12/16 10:06	PW	P	250 ml	NaOH	G	WC	CYANIDE, TOTAL (SW846-9012)	007
099996	001	CWL-TB2	NA	7/12/16 10:02	DIW	G	3x40 ml	HCl	G	TB	VOC, TCL (SW846-8260B)	401511 003

Last Chain:	☐ Yes	Sample Tracking SMO Use	Special Instructions/QC Requirements:
Validation Req'd:	☐ Yes	Date Entered:	EDD ☑ Yes
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:

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Alfred Santillanes	Alfred Santillanes	AS	SNL/04141/505-284-6870/505-228-0710
	Gilbert Quintana	Gilbert Quintana	GQ	SNL/04141/505-844-2507/505-228-2606
	Robert Lynch	Robert Lynch	RL	SNL/04141/505-844-4013/505-250-7090

Relinquished by	Alfred Santillanes	Org.	4141	Date	7/12/16	Time	1145	Relinquished by	Org. Date Time
Received by	Edie Kent SMO	Org.	4131	Date	7/12/16	Time	1145	Received by	Org. Date Time
Relinquished by		Org.	4131	Date	7/13/16	Time	0800	Relinquished by	Org. Date Time
Received by		Org.	GEL	Date	7-14-16	Time	0730	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

AOP 95-16

Internal Lab

Batch No. | SMO Use | AR/COC 617119-

Project Name:	CWL GWM/SVM	Date Samples Shipped:	7-13-16	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.	251279	SMO Contact Phone:	☐ RMA
Project/Task Number:	195122.10.11.03	Lab Contact:	Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	1303873	Stephanie Montaño/505.284.2553	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 401568
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
099979	001	CWL-FB2	NA	7/12/16 13:50	DIW	G	3x40 ml	HCl	G	FB	VOC-TCE (SW846-8260B) 7WB	008 009
099980	001	CWL-EB1	NA	7/12/16 13:50	DIW	G	3x40 ml	HCl	G	EB	VOC-TCE (SW846-8260B)	007 016
099980	002	CWL-EB1	NA	7/12/16 13:52	DIW	P	500 ml	HNO3	G	EB	METALS (SW846-6020): Cr, Ni 7/6/16	010 017
099981	001	CWL-TB3	NA	7/12/16 13:50	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	011

Last Chain:	☐ Yes	Sample Tracking SMO Use	Special Instructions/QC Requirements:
Validation Req'd:	☑ Yes	Date Entered:	EDD ☑ Yes
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:

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Gilbert Quintana		GQ	SNL/04141/505-844-2507/505-228-2606
	Robert Lynch		RL	SNL/04141/505-844-4013/505-250-7090
	Alfred Santillanes		AS	SNL/04141/505-284-6870/505-228-0710

Relinquished by		Org. 4141	Date 7/12/16	Time 14:19	Relinquished by	Org.	Date	Time
Received by		Org. 4131	Date 7/12/16	Time 1419	Received by	Org.	Date	Time
Relinquished by	TC	Org. 4131	Date 7/13/16	Time 1800	Relinquished by	Org.	Date	Time
Received by		Org. GEL	Date 7-14-16	Time 0730	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

AOP 95-16

Internal Lab

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Batch No. | SMO Use | AR/COC 617119-

Project Name:	CWL GWM/SVM	Date Samples Shipped:	7-13-16	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.	251279	SMO Contact Phone:	☐ RMA
Project/Task Number:	195122.10.11.03	Lab Contact:	Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	1303873	Stephanie Montaño/505.284.2553	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 401568
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
099979	001	CWL-FB2	NA	7/12/16 13:50	DIW	G	3x40 ml	HCl	G	FB	VOC-TCE (SW846-8260B)	009
099980	001	CWL-EB1	NA	7/12/16 13:50	DIW	G	3x40 ml	HCl	G	EB	VOC-TCE (SW846-8260B)	010
099980	002	CWL-EB1	NA	7/12/16 13:52	DIW	P	500 ml	HNO3	G	EB	METALS (SW846-6020): Cr, Ni	011
099981	001	CWL-TB3	NA	7/12/16 13:50	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	

Last Chain:	☐ Yes	Sample Tracking SMO Use	Special Instructions/QC Requirements:
Validation Req'd:	☑ Yes	Date Entered:	EDD ☑ Yes
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
	Gilbert Quintana			SNL/04141/505-844-2507/505-228-2606
	Robert Lynch			SNL/04141/505-844-4013/505-250-7090
	Alfred Santillanes			SNL/04141/505-284-6870/505-228-0710

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

Comments:

Conditions on Receipt

Lab Use

Relinquished by		Org. 4141	Date 7/12/16	Time 14:19	Relinquished by	Org.	Date	Time
Received by		Org. 4131	Date 7/12/16	Time 1419	Received by	Org.	Date	Time
Relinquished by		Org. 4131	Date 7/13/16	Time 0800	Relinquished by	Org.	Date	Time
Received by		Org.	Date 7-14-16	Time 0730	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

AOP 95-16

Internal Lab

Page 1 of 1

Batch No. N/A

SMO Use

AR/COC 617120

Project Name:	CWL GWM/SVM	Date Samples Shipped:	7/14/16	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.	25363	SMO Contact Phone:	☐ RMA
Project/Task Number:	195122.10.11.03	Lab Contact:	Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	1303873	Stephanie Montaño/505.284.2553	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 401508
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
099982	001	CWL-FB3	NA	7/13/16 11:01	DIW	G	3x40 ml	HCl	G	FB	VOC-TCE (SW846-8260B)	012
099983	001	CWL-MW9	517	7/13/16 11:01	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	013
099983	002	CWL-MW9	517	7/13/16 11:03	GW	P	500 ml	HNO3	G	SA	METALS (SW846-6020): Cr, Ni	014
099984	001	CWL-MW9	517	7/13/16 11:01	GW	G	3x40 ml	HCl	G	DU	VOC-TCE (SW846-8260B)	015
099984	002	CWL-MW9	517	7/13/16 11:03	GW	P	500 ml	HNO3	G	DU	METALS (SW846-6020): Cr, Ni	016
099985	001	CWL-TB4	NA	7/13/16 11:01	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	017

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			
Turnaround Time	☐ 7-Day*	☐ 15-Day*	☑ 30-Day	
Negotiated TAT	☐			
Sample Disposal	☐ Return to Client	☑ Disposal by Lab		
Return Samples By:				
Comments:				

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Gilbert Quintana		GQ	SNL/04141/505-844-2507/505-228-2606
	Robert Lynch		RL	SNL/04141/505-844-4013/505-250-7090
	William Gibson		WG	SNL/04141/505-239-7367/505-239-7367
	Alfred Santillanes		AS	SNL/04141/505-284-6870/505-228-0710

Relinquished by		Org. 4141	Date 7/13/16	Time 1130	Relinquished by	Org.	Date	Time
Received by		Org. 4131	Date 7/13/16	Time 1130	Received by	Org.	Date	Time
Relinquished by		Org. 4131	Date 7/14/16	Time 0800	Relinquished by	Org.	Date	Time
Received by		Org. GEL	Date 7-15-16	Time 0725	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

AOP 95-16

Internal Lab

Batch No. N/A

SMO Use

AR/COC 617121

Project Name:	CWL GWM/SVM	Date Samples Shipped:	7/14/16	SMO Authorization:	☑ Waste Characterization
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.	251363	SMO Contact Phone: SMO	☐ RMA
Project/Task Number:	195122.10.11.03	Lab Contact:	Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	1303873	Stephanie Montaño/505.284.2553	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

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
099986	001	CWL-MW9	NA	7/13/16 10:30	PW	G	3x40 ml	HCl	G	WC	VOC, TCL (SW846-8260B)	401514 004
099986	002	CWL-MW9	NA	7/13/16 10:31	PW	P	500 ml	HNO3	G	WC	METALS,TAL (SW846-6020/7470): Mo	005
099986	003	CWL-MW9	NA	7/13/16 10:32	PW	P	125 ml	None	G	WC	ANIONS-Br,Cl,F,SO4 (SW846-9056)	401508 018
099986	004	CWL-MW9	NA	7/13/16 10:33	PW	AG	250 ml	H2SO4	G	WC	PHENOLICS, TOTAL RECOVERABLE (SW846-9066)	019
099986	005	CWL-MW9	NA	7/13/16 10:34	PW	P	250 ml	NaOH	G	WC	CYANIDE, TOTAL (SW846-9012)	020
099987	001	CWL-TB5	NA	7/13/16 10:30	DIW	G	3x40 ml	HCl	G	TB	VOC, TCL (SW846-8260B)	401514 006

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			
Turnaround Time	☐ 7-Day*	☐ 15-Day*	☑ 30-Day	
Negotiated TAT	☐			
Sample Disposal	☐ Return to Client	☑ Disposal by Lab		
Return Samples By:				
Comments:				

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Gilbert Quintana			SNL/04141/508-844-2507/505-228-2606
	Robert Lynch			SNL/04141/505-844-4013/505-250-7090
	William Gibson			SNL/04141/505-239-7367/505-239-7367
	Alfred Santillanes			SNL/04141/505-284-6870/505-228-0710

Relinquished by		Org. 4141	Date 7/13/16	Time 1132	Relinquished by	Org.	Date	Time
Received by		Org. 4131	Date 7/13/16	Time 1132	Received by	Org.	Date	Time
Relinquished by		Org. 4131	Date 7/14/16	Time 0800	Relinquished by	Org.	Date	Time
Received by		Org. Ger	Date 7-15-16	Time 0725	Received by	Org.	Date	Time

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

AR/COC NUMBERS 617122, 617123, 617124, and 617125

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

Memorandum

Date: August 23, 2016

To: File

From: Mary Donivan

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM/SVM
ARCOC: 617122 and 617124
SDG: 401833
Laboratory: GEL
Project/Task: 195122.10.11.03
Analysis: VOCs

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

Summary

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

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

Blanks

No target analytes were detected in the blanks

Surrogates

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: August 23, 2016

To: File

From: Mary Donivan

Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM/SVM
ARCOC: 617122 and 617124
SDG: 401833
Laboratory: GEL
Project/Task: 195122.10.11.03
Analysis: Metals

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

Summary

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

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tune met QC acceptance criteria.

Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

Reporting Limit Verification

All 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.

Sample Findings Summary

AR/COC: 617122, 617124

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

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

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)

The Ca concentration for samples 401833002 and -005 was above the ICS level for the ICP-MS analysis. The ICS A and AB met all QC acceptance criteria.

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: Linda Thal **Level I** **Date:** 08/25/2016

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 an SNL sample from another SDG. 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

No other specific issues that affect data quality were identified.

Reviewed by: Linda Thal **Level I** **Date:** 08/25/2016

Sandia Data Validation Summary Worksheet

ARCOC#: 617122 and 617124	Site/Project: CWL GWM/SVM	Validation Date: 08/23/16
SDG #: 401833	Laboratory: GEL Laboratories, LLC	Validator: Mary Donivan
Matrix: Aqueous	# of Samples: 6	CVR present: Yes
ARCOC(s) present: Yes	Sample Container Integrity: OK	

Analysis Type:
☒ Organic ☒ Metals ☐ Genchem ☐ Rad

Requested Analyses Not Reported

Client Sample ID	Lab Sample ID	Analysis	Comments
None			

Hold Time/Preservation Outliers

Client Sample ID	Lab Sample ID	Analysis	Pres.	Collection Date	Preparation Date	Analysis Date	Analysis <2X HT	Analysis ≥2X HT
None								

Comments: Collected: 07/14 and 18/2016

Validated by:

Mary A. Donivan

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #:617122 and 617124	SDG: 401833	Matrix: Aqueous
Laboratory Sample IDs: 401833001, -003, -004 and -006		
Method/Batch #s:**8260B**/1584588	Tuning (pass/fail):pass	TICs Required? (yes/no):no

Analyte (outliers)	**Calibration**				**MB**	**5X (10X) MB**	**LCS %R**	**MS %R**	**MSD %R**	**MS/ MSD RPD**	**TB6 -003 TB8 -006**			
	Int.	**RF/ Slope**	**RSD/r^2**	**(ICV)/ CCV %D**										
None														

Surrogate Recovery Outliers

Sample ID	**1,2-DCA-d4 %R**	**Toluene-d8 %R**	**BFB %R**		**Sample ID**	**1,2-DCA-d4 %R**	**Toluene-d8 %R**	**BFB %R**	
None									

IS Outliers

	FBZ		**Chl-d5**		**1,4-DCB-d4**							
Sample ID	**Area**	**RT**	**Area**	**RT**	**Area**	**RT**						
None												

Comments: HTs OK. VOA1.I 07/11/16
MS/MSD performed on SNL sample from another SDG

Sandia Inorganic Metals Worksheet

ARCOC #(s): 617122 and 617124	SDG #(s): 401833	Matrix: Aqueous
Laboratory Sample IDs: 401833002 and -005		
Method/Batch #s: **3005A/6020** 1584302/1584303		

ICPMS Mass Cal: ☒ Pass ☐ Fail ☐ NA ICPMS Resolution: ☒ Pass ☐ Fail ☐ NA

Analyte (outliers)	**Calibration**						**MB mg/L**	**5X Blank (5X MDL) mg/L**	**LCS %R**	**MS %R**	**Lab Rep RPD**	**Serial Dil. %D**	**ICS AB %R**	**ICS A ±MDL ug/L (x50)**	**CRI %R**		
	Int. mg/L	**R^2**	**ICV**	**CCV**	**ICB ug/L**	**CCB ug/L**											
None																	

IS Outliers *60-125%*				**IS Outliers** *80-120%*			
Sample ID	**%Recovery**	**%Recovery**	**%Recovery**	**CCV/CCB ID**	**%Recovery**	**%Recovery**	**%Recovery**
None				None			

Comments: HTs OK; Matrix QC performed on sample -002
Ca > ICSA concentration in samples -002 and -005

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Batch No. N/A

SMO Use

AR/COC 617122

Project Name:	CWL GWM/SVM	Date Samples Shipped:	7/18/16	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.	251498	SMO Contact Phone:	☐ RMA
Project/Task Number:	195122.10.11.03	Lab Contact:	Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	1303873	Stephanie Montaño/505.284.2553	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 401833
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
099988	001	CWL-MW11	512	7/14/16 13:27	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	001
099988	002	CWL-MW11	512	7/14/16 13:28	GW	P	500 ml	HNO3	G	SA	METALS (SW846-6020): Cr, Ni	002
099989	001	CWL-TB6	NA	7/14/16 13:27	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	003

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

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

Negotiated TAT ☐

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

Comments:

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Gilbert Quintana		GQ	SNL/04141/505-844-2507/505-228-2606
	Robert Lynch		RL	SNL/04141/505-844-4013/505-250-7090
	Alfred Santillanes		AS	SNL/04141/505-284-6870/505-228-0710

Relinquished by		Org. 4141	Date 7/14/16	Time 14:03	Relinquished by	Org.	Date	Time
Received by		Org. 4113 1	Date 7/14/16	Time 14:03	Received by	Org.	Date	Time
Relinquished by		Org. 4113 1	Date 7/18/16	Time 1145	Relinquished by	Org.	Date	Time
Received by		Org. Ger	Date 7-19-16	Time 0805	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

AOP 95-16

Internal Lab

Page 1 of 1

Batch No. NA

SMO Use

AR/COC 617124

Project Name:	CWL GWM/SVM	Date Samples Shipped:	7/18/16	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.	251498	SMO Contact Phone:	☐ RMA
Project/Task Number:	195122.10.11.03	Lab Contact:	Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	1303873	Stephanie Montaño/505.284.2553	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 401833
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
099992	001	CWL-MW10	514	7/18/16 09:03	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	004
099992	002	CWL-MW10	514	7/18/16 09:05	GW	P	500 ml	HNO3	G	SA	METALS (SW846-6020): Cr, Ni	005
099993	001	CWL-TB8	NA	7/18/16 09:03	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	006

Last Chain:	☑ Yes	Sample Tracking SMO Use	Special Instructions/QC Requirements:
Validation Req'd:	☑ Yes	Date Entered:	EDD ☑ Yes
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:

Conditions on Receipt

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Gilbert Quintana		GQ	SNL/04141/505-844-2507/505-228-2606
	Robert Lynch		RL	SNL/04141/505-844-4013/505-250-7090
	William Gibson		WG	SNL/04141/505-239-7367/505-239-7367
	Alfred Santillanes		AS	SNL/04141/505-284-6870/505-228-0710

Comments:

Lab Use

Relinquished by		Org. 4141	Date 7/18/16	Time 09:35	Relinquished by	Org.	Date	Time
Received by		Org. 4131	Date 7/18/16	Time 0935	Received by	Org.	Date	Time
Relinquished by		Org. 4131	Date 7/18/16	Time 1135	Relinquished by	Org.	Date	Time
Received by		Org. CEC	Date 7-19-16	Time 0805	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

AOP 95-16

Internal Lab

Page 1 of 1

Batch No. N/A

SMO Use

AR/COC 617123

Project Name:	CWL GWM/SVM	Date Samples Shipped:	7/18/16	SMO Authorization:	☑ Waste Characterization
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.	251498	SMO Contact Phone:	☐ RMA
Project/Task Number:	195122.10.11.03	Lab Contact:	Edie Kent/843-769-7385	Wendy Palencia/505-844-3132 SMO	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	1303873	Stephanie Montaño/505.284.2553	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 401834
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
099990	001	CWL-MW11	NA	7/14/16 12:20	PW	G	3x40 ml	HCl	G	WC	VOC, TCL (SW846-8260B)	001
099990	002	CWL-MW11	NA	7/14/16 12:21	PW	P	500 ml	HNO3	G	WC	METALS,TAL (SW846-6020/7470): Mo	002
099990	003	CWL-MW11	NA	7/14/16 12:22	PW	P	125 ml	None	G	WC	ANIONS-Br,Cl,F,SO4 (SW846-9056)	003
099990	004	CWL-MW11	NA	7/14/16 12:23	PW	AG	250 ml	H2SO4	G	WC	PHENOLICS, TOTAL RECOVERABLE (SW846-9066)	004
099990	005	CWL-MW11	NA	7/14/16 12:24	PW	P	250 ml	NaOH	G	WC	CYANIDE, TOTAL (SW846-9012)	005
099991	001	CWL-TB7	NA	7/14/16 12:20	DIW	G	3x40 ml	HCl	G	TB	VOC, TCL (SW846-8260B)	006

Last Chain:	☐ Yes	**Sample Tracking** SMO Use	**Special Instructions/QC Requirements:**
Validation Req'd:	☐ Yes	Date Entered:	EDD ☑ Yes
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
	Gilbert Quintana			SNL/04141/505-844-2507/505-228-2606
	Robert Lynch			SNL/04141/505-844-4013/505-250-7090
	William Gibson			SNL/04141/505-239-7367/505-239-7367
	Alfred Santillanes			SNL/04141/505-284-6870/505-228-0710

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

Comments:

Conditions on Receipt

Lab Use

Relinquished by		Org. 4141	Date 7/14/16	Time 14:05	Relinquished by	Org.	Date	Time
Received by		Org. 4131	Date 7/14/16	Time 1405	Received by	Org.	Date	Time
Relinquished by		Org. 4131	Date 7-18-16	Time 1142	Relinquished by	Org.	Date	Time
Received by		Org. GEL	Date 7-19-16	Time 0805	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

AOP 95-16

Internal Lab

Batch No. NA

SMO Use

AR/COC 617125

Project Name:	CWL GWM/SVM	Date Samples Shipped:	7/18/16	SMO Authorization:	☑ Waste Characterization
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.	251448	SMO Contact Phone:	☐ RMA
Project/Task Number:	195122.10.11.03	Lab Contact:	Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	GEL	Send Report to SMO:	☑ 4° Celsius
		Contract No.:	1303873	Stephanie Montaño/505.284.2553	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 401834
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
099994	001	CWL-MW10	NA	7/18/16 08:50	PW	G	3x40 ml	HCl	G	WC	VOC, TCL (SW846-8260B)	007
099994	002	CWL-MW10	NA	7/18/16 08:51	PW	P	500 ml	HNO3	G	WC	METALS,TAL (SW846-6020/7470): Mo	008
099994	003	CWL-MW10	NA	7/18/16 08:52	PW	P	125 ml	None	G	WC	ANIONS-Br,Cl,F,SO4 (SW846-9056)	009
099994	004	CWL-MW10	NA	7/18/16 08:53	PW	AG	250 ml	H2SO4	G	WC	PHENOLICS, TOTAL RECOVERABLE (SW846-9066)	010
099994	005	CWL-MW10	NA	7/18/16 08:54	PW	P	250 ml	NaOH	G	WC	CYANIDE, TOTAL (SW846-9012)	011
099995	001	CWL-TB9	NA	7/18/16 08:50	DIW	G	3x40 ml	HCl	G	TB	VOC, TCL (SW846-8260B)	012

Last Chain:	☑ Yes	Sample Tracking SMO Use	Special Instructions/QC Requirements:
Validation Req'd:	☐ Yes	Date Entered:	EDD ☑ Yes
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:

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Gilbert Quintana			SNL/04141/505-844-2507/505-228-2606
	Robert Lynch			SNL/04141/505-844-4013/505-250-7090
	William Gibson			SNL/04141/505-239-7367/505-239-7367
	Alfred Santillanes			SNL/04141/505-284-6870/505-228-0710

Relinquished by		Org. 4141	Date 7/18/16	Time 0938	Relinquished by	Org.	Date	Time
Received by		Org. 4131	Date 7/18/16	Time 0438	Received by	Org.	Date	Time
Relinquished by		Org. 4131	Date 7-18-16	Time 1136	Relinquished by	Org.	Date	Time
Received by		Org. CCL	Date 7-19-16	Time 0805	Received by	Org.	Date	Time

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

CONTRACT VERIFICATION REVIEW FORMS

GROUNDWATER MONITORING

JULY 2016

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
617117	Environmental*
617118	Waste Characterization
617119	Environmental*
617120	Environmental*
617121	Waste Characterization
617122	Environmental*
617123	Waste Characterization
617124	Environmental*
617125	Waste Characterization

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

Contract Verification Form (CVR)

Project Leader Jackson **Project Name** CWL GWM **Project/Task No.** 195122_10.11.03

ARCOC No. 617117, 617118, 617119, 617120 & 617121 **Analytical Lab** GEL **SDG No.** 401508

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

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	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 Lc	X		
2.6	QC batch numbers provided	X		
2.7	Dilution factors provided and all dilution levels reported	X		
2.8	Data reported in appropriate units and using correct significant figures	X		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	N/A		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

3.0 Data Quality Evaluation

Line No.	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 sample accuracy reported and met for all samples	X		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	X		
3.4	Precision 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	Calcium detected in method blank (QC1203586984)
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	X		

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.6	Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits	X		
3.7	Narrative addresses planchet flaming for gross alpha/beta	N/A		
3.8	Narrative included, correct, and complete	X		
3.9	Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151.	N/A		

4.0 Calibration and Validation Documentation

Line No.	Item	Yes	No	Comments
4.1	GC/MS (8260 and 8270) a) 12-hour tune check provided	X		
	b) Initial calibration provided	X		
	c) Continuing calibration provided	X		
	d) Internal standard performance data provided	X		

Line No.	Item	Yes	No	Comments
	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		

Line No.	Item	Yes	No	Comments
	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		The ICSA contained manganese, cobalt, nickel, copper, barium, thallium, and lead concentrations greater than two times the MDL.
	d) ICP serial dilution provided	X		
	e) Instrument run logs provided	X		
4.6	Radiochemistry and General Chemistry a) Instrument run logs provided	X		

5.0 Data Anomaly Report

Line No.	Item	Yes	No	If no, explain
5.1	DAR completed for monitoring and surveillance sample data	N/A		
5.2	Problems or outliers noted	N/A		
5.3	Verification or reanalysis requested from lab	N/A		

6.0 Problem Resolution

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

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions

Were deficiencies unresolved? ○ Yes ◉ No

Based on the review, this data package is complete. ◉ Yes ○ No

Reviewed by: Wendy Palencia Date: 08-17-2016 07:46:00

Closed by: Wendy Palencia Date: 08-17-2016 07:46:00

Contract Verification Form (CVR)

Project Leader Jackson **Project Name** CWL GWM **Project/Task No.** 195122_10.11.03

ARCOC No. 617122, 617123, 617124 & 617125 **Analytical Lab** GEL **SDG No.** 401833

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

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	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 Lc	X		
2.6	QC batch numbers provided	X		
2.7	Dilution factors provided and all dilution levels reported	X		
2.8	Data reported in appropriate units and using correct significant figures	X		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	N/A		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

3.0 Data Quality Evaluation

Line No.	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 sample accuracy reported and met for all samples	X		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	X		
3.4	Precision 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	Vanadium detected in method blank (QC1203591168). Sulfate detected in method blank (QC1203595910).
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	X		

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.6	Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits	X		
3.7	Narrative addresses planchet flaming for gross alpha/beta	N/A		
3.8	Narrative included, correct, and complete	X		
3.9	Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151.	N/A		

4.0 Calibration and Validation Documentation

Line No.	Item	Yes	No	Comments
4.1	GC/MS (8260 and 8270) a) 12-hour tune check provided	X		
	b) Initial calibration provided	X		
	c) Continuing calibration provided	X		
	d) Internal standard performance data provided	X		

Line No.	Item	Yes	No	Comments
	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		

Line No.	Item	Yes	No	Comments
	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		The ICSA contained manganese, cadmium, barium, thallium and lead concentrations greater than two times the MDL.
	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		

5.0 Data Anomaly Report

Line No.	Item	Yes	No	If no, explain
5.1	DAR completed for monitoring and surveillance sample data	N/A		
5.2	Problems or outliers noted	N/A		
5.3	Verification or reanalysis requested from lab	N/A		

6.0 Problem Resolution

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

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions

Were deficiencies unresolved? ○ Yes ◉ No

Based on the review, this data package is complete. ◉ Yes ○ No

Reviewed by: Wendy Palencia Date: 08-22-2016 09:11:00

Closed by: Wendy Palencia Date: 08-22-2016 09:11:00

ANNEX B
Chemical Waste Landfill
CY 2016 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

JANUARY 2016 SOIL-GAS MONITORING

TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: CWL Date: 01/20/16 Time: 0820

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

Weather Conditions:
Temp: 33 °F Wind Speed: 25 MPH Humidity: 79 %

Chemicals Used: Nitrogen Gas
Other: Be aware of possible UXO

Safety Topics Presented

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

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

Attendees

Printed Name	Signature
Robert Lynch	
William Gibson	
Tim Jackson	
ALFRED SANTILLANES	

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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	
FB	34001204	1/13/16	1/20/16	-25	1/20/16	-8	1/20/16	
	1418	↓	↓	-26	↓	-5	↓	
	1329			-26		-5		
	0154			-26		-8		
	8100			-26	↓	-5		
	8425			-17	Not used	NA	N	lot failed
	34000094			-26	1/20/16	-8		
FB	34000786			-25		-8		
	0920			-26		-5		
	0492			-26		-8		
	8436			-26		-8		
FB	34001591			-25		-8		
	1390			-26		-5		
SA	8177			-26		-8		
DU	34008774			-26		-8		three days?
SA	34000016			-24		-8		
	8085			-26		-8		three days?
DU	34002025			-24		-8		
1/20/16	~~3400~~ 8033			-26		-6		
FB	34001306			-27		-8		
	34001785			-27		-8		
	8154			-26		-8		
	8012			-27		-8		
	8049			-27		-8		
	7856			-26		-5		
FB	7904			-27		-8		
	34000169			-27		-8		
	1147			-26		-8		
	0101	↓	↓	-26	↓	-8	↓	

SUMMA® Canister Log completed by:

Tim Jackson
Printed Name

T Jackson
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
CWL-D1-FB	1/20/16	835	34001204	0.30	-25	-8	D1 - FB Sample
CWL-D1-100		840	NA	0.20	NA	NA	
↓		842	34001418	NA	-26	-8	
CWL-D1-160		843	NA	0.20	NA	NA	
↓		844	NA	0.20	↓	↓	
↓		845	34001324	NA	-26	-8	
CWL-D1-240		846	NA	0.20	NA	NA	
↓		847	NA	0.20	↓	↓	
↓		848	34001054	NA	-26	-8	
CWL-D1-350		849	NA	0.20	NA	NA	
↓		851	NA	↓	↓	↓	
↓		852	8100	NA	-26	-8	
CWL-D1-470		853	NA	0.30	NA	NA	
↓		856	↓	0.30	↓	↓	
↓		859	34000814 8425 1/20/16 TP	NA	-26	-8	OB split + DUP
CWL-U1-2-FB		923	34000786	NA	-25	-8	U1-2 - FB Sample
CWL-U1-2-36		924	NA	0.30	NA	NA	
↓		926	34001070	NA	-26	-8	
CWL-U1-2-76		927	NA	0.30	NA	NA	
↓		928	34001492	NA	-26	-8	
CWL-U1-2-136		930	NA	0.30	NA	NA	
↓		932	8436	NA	-26	-8	
CWL-D3-FB		944	34001591	NA	-25	-8	D3 - FB
CWL-D3-120		949	NA	0.20	NA	NA	
↓		950	34001390	NA	-26	-8	
CWL-D3-170		951	NA	0.20	NA	NA	
↓		953	8177	NA	-26	-8	
↓	↓	957	34001774	NA	-26	-8	Splits - NA

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NOTE:
1/20/16 - Background = 0.30 ppm
- continuous PID measurements during purge

Soil Vapor Sampling Log

Location	Date	Time	Canister #	PID (ppm)	Starting Vacuum (in. Hg)	Ending Vacuum (in. Hg)	Location Comments
CWL-D3-350	11/20/16	959	NA	0.40	NA	NA	
↓	↓	1000	↓	0.40	↓	↓	
↓	↓	1005	34000016	NA	-24	-8	
↓	↓	↓	34000028	↓	-24	-8	
CWL-D3-440		1006	NA	0.40	NA	NA	
↓	↓	1007	↓	0.40	↓	↓	
↓	↓	1013	8085	NA	-26	-8	Slow sample flow
CWL-D3-480		1014	NA	0.50	NA	NA	
↓	↓	1015	↓	0.50	↓	↓	
↓	↓	1018	8033	NA	-26	-6	NMEB OB Split SA
CWL-D2-FB		1040	34001306	NA	-27	-8	D2-FB Sample
CWL-D2-20		1047	NA	0.30	NA	NA	
↓	↓	1049	34001785	NA	-27	-8	
CWL-D2-240		1050	NA	0.30	NA	NA	
↓	↓	1052	8186	NA	-26	-8	
CWL-D2-350		1054	NA	0.20	NA	NA	
↓	↓	1057	8012	NA	-27	-8	
CWL-D2-440		1058	NA	0.20	NA	NA	
↓	↓	1100	~~8044~~ NA	~~0.2~~ 0	NA	NA	
↓	↓	1101	8044	NA	-27	-8	
CWL-D2-470		1102	NA	0.20	NA	NA	
↓	↓	1104	NA	0.20	NA	NA	
↓	↓	1105	7856	NA	-26	-8	OB split (No sample - open valve)
CWL-U1-1-FB		1125	7904	ND	-27	-8	U1-1 FB sample
CWL-U1-1-40		1128	NA	0.0	NA	NA	
↓	↓	1129	34000169	NA	-27	-8	
CWL-U1-1-80		1130	NA	0.0	NA	NA	
↓	↓	1131	34001147	NA	-26	-8	
CWL-U1-1-120		1132	NA	0.0	NA	NA	
↓	↓	1134	34000101	NA	-26	-8	

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SUMMARY SHEET FOR JANUARY 2016 SAMPLES

Sample Summary for CWL Soil Vapor Monitoring
FY16

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 327-15										
CWL-UI1	20-Jan-16	**CWL-UI1-40**	34000169	616473	098696	Environmental	n/a	n/a	616473 / 098695	
		CWL-UI1-80	34001147		098697	Environmental				
		CWL-UI1-120	34000101		098698	Environmental				
		CWL-SV-FB1	7904		098695	Field QC	n/a	n/a	n/a	Ultra Pure N2
CWL-UI2	20-Jan-16	**CWL-UI2-36**	34000920	616474	098700	Environmental	n/a	n/a	616474 / 098699	
		CWL-UI2-76	34000492		098701	Environmental				
		CWL-UI2-136	8436		098702	Environmental				
		CWL-SV-FB2	34000786		098699	Field QC	n/a	n/a	n/a	Ultra Pure N2
CWL-D1	20-Jan-16	**CWL-D1-100**	34001418	616475	098704	Environmental	n/a	n/a	616475 / 098703	
		CWL-D1-160	34001329		098705	Environmental				
		CWL-D1-240	34000154		098706	Environmental				
		CWL-D1-350	8100		098707	Environmental				
		CWL-D1-470	34000094		098708	Environmental				
		CWL-SV-FB3	34001204		098703	Field QC	n/a	n/a	n/a	Ultra Pure N2
CWL-D2	20-Jan-16	**CWL-D2-120**	34001785	616476	098710	Environmental	n/a	n/a	616476 / 098709	
		CWL-D2-240	8186		098711	Environmental				
		CWL-D2-350	8012		098712	Environmental				
		CWL-D2-440	8049		098713	Environmental				
		CWL-D2-470	7856		098714	Environmental				
		CWL-SV-FB4	34001306		098709	Field QC	n/a	n/a	n/a	Ultra Pure N2
CWL-D3	20-Jan-16	**CWL-D3-120**	34001390	616477	098716	Environmental	n/a	n/a	616477 / 098715	
		CWL-D3-170	8177		098717	Environmental				
		CWL-D3-170	34000774		098718	Duplicate				
		CWL-D3-350	34000016		098719	Environmental				
		CWL-D3-350	34002028		098720	Duplicate				
		CWL-D3-440	8085		098721	Environmental				
		CWL-D3-480	8033		098722	Environmental				
		CWL-SV-FB5	34001591		098715	Field QC	n/a	n/a	n/a	Ultra Pure N2

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

ANALYTICAL QUALITY ASSOCIATES, INC.

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

Memorandum

Date: February 28, 2016

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL-SVM
AR/COC: 616473, 616474, 616475, 616476 and 616477
SDG: 320-16959-1
Laboratory: TestAmerica Laboratories, Inc. -West Sacramento
Project/Task: 146422.10.11.03
Analysis: VOCs by method TO-15

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

Summary

Twenty-eight samples were prepared and analyzed with accepted procedures using method EPA TO-15 (Determination of VOCs in Air collected in specially prepared canisters and analyzed by GC-MS). All compounds were successfully analyzed. Problems were identified with the data package that resulted in the qualification of data.

1. The acetone result for sample 320-16959-16 was **qualified R,Z1** due to failed mass spectra acceptability criteria due to interference.

2. The 1,1-dichloroethane result for sample -16 was **qualified J,Z1,** based on professional judgment, due to poor ion intensity ratios.

3. Toluene was detected at < PQL in the MB associated with samples -11 through -18. The associated result for sample -18 was a detect < the PQL and ≤10X the MB result and will be **qualified 0.4U,B** at the PQL.

4. Toluene was detected at < the PQL in FB4, sample -19, associated with samples -20 through -24. The associated result for sample -23 was a detect < the PQL and <10X the FB value and will be **qualified 1.9U,B2** at the PQL.

5. The toluene and 2-butanone RPDs were > acceptance criteria for the LCS/LCSD associated with samples -11 through -18. The toluene result for sample -16 and the 2-butanone result for sample -18 were detects and will be **qualified J,L5**. All remaining associated sample results were non-detects or qualified non-detect 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

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 1,2,4-trichlorobenzene %RSD was >30% but ≤45% for the ICAL associated with samples -11 through -23. The associated sample results were non-detects and since no other calibration infraction occurred, will not be qualified.

Blanks

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

Toluene was detected at < PQL in the MB associated with samples -11 through -18. The associated result for sample -16 was a detect < the PQL but >10X the MB result and will not be qualified. The associated results for samples -11, -12, -13, -14, -15 and -17 were non-detects and will not be qualified.

m,p-Xylene was detected at < the PQL in the MB associated with samples -11 through -18. All associated sample results were non-detects and will not be qualified.

Styrene; 1,2-dichlorobenzene; methylene chloride, m,p-xylene and o-Xylene were detected at < the PQLs in the MB associated with samples -24 through -28. The methylene chloride results for samples -26 and -27 were detects < the PQL and sample -28 was a detect > the PQL; all were >10X the MB value and will not be qualified. All remaining associated sample results were non-detects and will not be qualified.

Toluene and methylene chloride were detected at < the PQLs in FB3, sample -1, associated with samples -2 through -6. The associated sample results for methylene chloride and the toluene result for sample -5 were detects 10X > the FB concentrations and will not be qualified. The remaining associated sample results for toluene were non-detects and will not be qualified.

Toluene; 1,1-dichloroethane; m,p-xylene and o-xylene were detected at < the PQLs in FB4, sample -19, associated with samples -20 through -24. All associated sample results, excluding the toluene result for sample -23, were non-detects and will not be qualified.

Surrogates

All surrogate acceptance criteria were met.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

An MS/MSD was not performed.

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

The LCS/LCSD met all QC acceptance criteria except as noted above in the Summary section.

Detection Limits/Dilutions

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

Sample -2 (298X), sample -3 (436X); sample 4 (462X); sample -5 (305X); sample -6 (12.4X); sample -8 (99.8X); sample -9 (33.7X and 169X for trichloroethene); sample -10 (168X); sample -12 (111X); sample -13 (210X); sample -14 (215X); sample -15 (221X); sample -16 (29.5X and 113X for trichloroethene); sample -17 (238X); sample -20 (388X); sample -21 (312X); sample -22 (237X); sample -23 (4.72X); sample -24 (233X); sample -26 (268X); sample -27 (342X) and sample -28 (342X).

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Mass spectra acceptability were verified during data validation and met QC acceptance criteria except as noted above in the Summary section. Samples with missing ions or poor ratios that were qualified J by the laboratory were not further qualified during data validation.

FBs were submitted, one with each AR/COC. Two field duplicate pairs were submitted with ARCOC 616477. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan **Level:** I **Date:** 02/29/16

Sample Findings Summary

AR/COC: 616473, 616474, 616475, 616476, 616477

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
TO15			
	098713-001/CWL-D2-440	TOLUENE (108-88-3)	1.9U, B2
	098715-001/CWL-SV FB5	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	098715-001/CWL-SV FB5	TOLUENE (108-88-3)	UJ, L5
	098716-001/CWL-D3-120	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	098716-001/CWL-D3-120	TOLUENE (108-88-3)	UJ, L5
	098717-001/CWL-D3-170	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	098717-001/CWL-D3-170	TOLUENE (108-88-3)	UJ, L5
	098718-001/CWL-D3-170	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	098718-001/CWL-D3-170	TOLUENE (108-88-3)	UJ, L5
	098719-001/CWL-D3-350	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	098719-001/CWL-D3-350	TOLUENE (108-88-3)	UJ, L5
	098720-001/CWL-D3-350	1,1-DICHLOROETHANE (75-34-3)	J, Z1
	098720-001/CWL-D3-350	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	098720-001/CWL-D3-350	ACETONE (67-64-1)	R, Z1
	098720-001/CWL-D3-350	TOLUENE (108-88-3)	J, L5
	098721-001/CWL-D3-440	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	098721-001/CWL-D3-440	TOLUENE (108-88-3)	UJ, L5
	098722-001/CWL-D3-480	2-BUTANONE (MEK) (78-93-3)	J, L5
	098722-001/CWL-D3-480	TOLUENE (108-88-3)	0.4UJ, B,L5

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

Sandia Data Validation Summary Worksheet

ARCOC#: 616473, 616474, 616475, 616476 and 616477	Site/Project: CWL SVM		Validation Date: 02/25/2016
SDG #:320-16959-1	Laboratory: TA Laboratories Inc. - West Sacramento, CA		Validator: Linda Thal
Matrix: Air	# of Samples: 28	CVR present: Yes	
ARCOC(s) present: Yes	Sample Container Integrity: OK		
Analysis Type: ☒ Organic ☐ Metals ☐ Genchem ☐ Rad			

Requested Analyses Not Reported

Client Sample ID	Lab Sample ID	Analysis	Comments
none			

Hold Time/Preservation Outliers

Client Sample ID	Lab Sample ID	Analysis	Pres.	Collection Date	Preparation Date	Analysis Date	Analysis <2X HT	Analysis ≥2X HT
none								

Comments: Collected 01/20/2016

Validated by: L Thal

Organic Worksheet (GC/MS)

AR/COC #: 616473, 616474, 616475, 616476 and 616477 SDG #: 320-16959-1 Matrix: Air

Laboratory Sample IDs: 320-16959-1 through -28

Method/Batch #s: EPA TO-15/99478 Tuning (pass/fail): Pass TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	LCSD %R	LCS LCSD RPD	FB3 -1	5X (10X) FB	FB2 -7	5X (10X) FB	
	Int.	RF	RSD/ R^2	(ICV) CCV %D										
99478 -1 thru -10 All target analytes *except* carbon tetrachloride and vinyl acetate and TCE for sample -9														
Carbon tetrachloride	NA	✓	✓	-32.2	✓	NA	61	62	✓	✓	NA	✓	NA	
Vinyl acetate	NA	✓	✓	-32.2	✓	NA	✓	✓	✓	✓	NA	✓	NA	
Toluene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.059J	(.59)	✓	NA	
Methylene chloride	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.1J	(1.0)	✓	NA	

Surrogate Recovery Outliers

Sample ID						
NA						

IS Outliers

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None												

Comments: HTs OK. Mass spectra validated. MDLs and RLS reported. Instrument ATMS 9 01/12/2016

Cannister Certifications were provided in the data package.

Organic Worksheet (GC/MS)

AR/COC #: 616473, 616474, 616475, 616476 and 616477 SDG #: 320-16959-1 Matrix: Air

Laboratory Sample IDs: 320-16959-1 through -28

Method/Batch #s: EPA TO-15/99642 Tuning (pass/fail): Pass TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	LCSD %R	LCS LCSD RPD	FB3 -1	5X (10X) FB	FB2 -7	5X (10X) FB	
	Int.	RF	RSD/ R^2	(ICV) CCV %D										
99642 -1 thru -8 and -10 RA carbon tetrachloride and vinyl acetate (-9DL TCE)														
1,2,4-Trichlorobenzene	NA	✓	34.4	✓	✓	NA	✓	✓	✓	✓	NA	✓	NA	

Surrogate Recovery Outliers

Sample ID						
NA						

IS Outliers

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None												

Comments: HTs OK. RA Mass spectra validated. MDLs and RLS reported. Instrument ATMS 11 01/27/2016

Cannister Certifications were provided in the data package.

Organic Worksheet (GC/MS)

AR/COC #: 616473, 616474, 616475, 616476 and 616477 SDG #: 320-16959-1 Matrix: Air

Laboratory Sample IDs: 320-16959-1 through -28

Method/Batch #s: EPA TO-15/ 99749 Tuning (pass/fail): Pass TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	LCSD %R	LCS LCSD RPD	FB5 -11	5X (10X) FB			
	Int.	RF	RSD/ R^2	(ICV) CCV %D										
99749 -11 thru -18 (and -16DL TCE)														
Toluene	NA	✓	✓	✓	0.0654J	(.645)	✓	✓	34	✓	NA			
m,p-Xylene	NA	✓	✓	✓	0.123J	.615	✓	✓	✓	✓	NA			
2-Butanone	NA	✓	✓	✓	✓	NA	✓	✓	26	✓	NA			
1,2,4-Trichlorobenzene	NA	✓	34.4	✓	✓	NA	✓	✓	✓	✓	NA			

Surrogate Recovery Outliers

Sample ID						
NA						

IS Outliers

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None												

Comments: HTs OK. Mass spectra validated. MDLs and RLS reported. Instrument ATMS 11 01/27/2016

Cannister Certifications were provided in the data package.

-16 mass spectra for acetone does not prove the presence of acetone, interference- reject; 1,1-DCA missing 83 ion – qual J

Organic Worksheet (GC/MS)

AR/COC #: 616473, 616474, 616475, 616476 and 616477 SDG #: 320-16959-1 Matrix: Air

Laboratory Sample IDs: 320-16959-1 through -28

Method/Batch #s: EPA TO-15/99879 Tuning (pass/fail): Pass TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	LCSD %R	LCS LCSD RPD	FB1 -25	5X (10X) FB			
	Int.	RF	RSD/ R^2	(ICV) CCV %D										
99879 -24 thru -28														
1,2-Dichlorobenzene	NA	✓	✓	✓	.134J	.67	✓	✓	✓	✓	NA			
Styrene	NA	✓	✓	✓	.0765J	0.38	✓	✓	✓	✓	NA			
Methylene chloride	NA	✓	✓	✓	.209J	(2.09)	✓	✓	✓	✓	NA			
m,p-Xylene	NA	✓	✓	✓	.122J	0.61	✓	✓	✓	✓	NA			
o-Xylene	NA	✓	✓	✓	.0701J	0.35	✓	✓	✓	✓	NA			

Surrogate Recovery Outliers

Sample ID						
NA						

IS Outliers

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None												

Comments: HTs OK. Mass spectra validated. MDLs and RLS reported. Instrument ATMS7 01/14/2016

Cannister Certifications were provided in the data package.

Organic Worksheet (GC/MS)

AR/COC #: 616473, 616474, 616475, 616476 and 616477 SDG #: 320-16959-1 Matrix: Air

Laboratory Sample IDs: 320-16959-1 through -28

Method/Batch #s: EPA TO-15/99886 Tuning (pass/fail): Pass TICs Required? (yes/no): No

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	LCSD %R	LCS LCSD RPD	FB4 -19	5X (10X) FB			
	Int.	RF	RSD/ R^2	(ICV) CCV %D										
99886 (-19 thru -23)														
1,1-Dichloroethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	1.1	5.5			
Toluene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.071J	(.71)			
m,p-Xylene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.12J	0.6			
o-Xylene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.059J	.295			
1,2,4-Trichlorobenzene	NA	✓	34.4	✓	✓	NA	✓	✓	✓	✓	NA			

Surrogate Recovery Outliers

Sample ID						
NA						

IS Outliers

Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None												

Comments: HTs OK. Mass spectra validated. MDLs and RLS reported. Instrument ATMS 11 01/27/2016

Cannister Certifications were provided in the data package.

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC 616473

Project Name:	CWL SVM	Date Samples Shipped:	1/21/16	SMO Authorization	GMO
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	239855	SMO Contact Phone:	Wendy Palencia/505-844-3132
Project/Task Number:	146422.10.11.03	Lab Contact:	Beth Riley		
Service Order	CF327-16	Lab Destination	TA/West Sacramento	Send Report to SMO:	Stephanie Montano/505-284-2553
		Contract No	PO 691437		
Tech Area:					
Building:	Room:	Operational Site:			

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

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
098695	-001	CWL-SV FB1		1/20/16 11:25	UPN	SC	6 L	None	G	FB	VOC-TO15	
098696	-001	CWL-UI1-40		1/20/16 11;29	SG	SC	6 L	None	G	SA	VOC-TO15	
098697	-001	CWL-UI1-80		1/20/16 11:31	SG	SC	6 L	None	G	SA	VOC-TO15	
098698	-001	CWL-UI1-120		1/20/16 11:34	SG	SC	6 L	None	G	SA	VOC-TO15	

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
Elevation and ambient pressure information provided with attached field forms.

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch		RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes		AS	SNL/4142/505-284-6870/505-228-0710
	William Gibson		WJG	SNL/4142/505-284-3307/505-239-7367
	Tim Jackson		TJ	SNL/4142/505-284-2547/505-263-6639

1.Relinquished by		Org. 4142	Date 1/20/16	Time 14:15	3 Relinquished by	Org.	Date	Time
1. Received by		Org. 4142	Date 1/20/16	Time 1415	3. Received by	Org.	Date	Time
2.Relinquished by		Org. 4142	Date 1/21/16	Time 0815	4.Relinquished by	Org.	Date	Time
2. Received by		Org.	Date 1/21/16	Time 915	4. Received by	Org.	Date	Time

Prior confirmation with SMO required for 7 and 15 day TAT

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02/15/2016

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. N/A

SMO Use

AR/COC 616474

Project Name:	CWL SVM	Date Samples Shipped.	1/21/16	SMO Authorization:	☐ Waste Characterization ☐ RMMA ☐ Released by COC No. ☐ 4° Celsius
Project/Task Manager:	Tim Jackson	Carrier/Waybill No	239855	SMO Contact Phone:	
Project/Task Number:	146422.10.11.03	Lab Contact:	Beth RILEY	Wendy Palencia/505-844-3132	
Service Order:	CF327-16	Lab Destination:	TA/West Sacramento	Send Report to SMO:	
		Contract No .	PO 691437	Stephanie Montano/505-284-2553	Bill to.Sandia National Laboratories (Accounts Payable), P O Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

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
098699	-001	CWL-SV FB2		1/20/16 9:23	UPN	SC	6 L	None	G	FB	VOC-TO15	
098700	-001	CWL-UI2-36		1/20/16 9:26	SG	SC	6 L	None	G	SA	VOC-TO15	
098701	-001	CWL-UI2-76		1/20/16 9:28	SG	SC	6 L	None	G	SA	VOC-TO15	
098702	-001	CWL-UI2-136		1/20/16 9:32	SG	SC	6 L	None	G	SA	VOC-TO15	

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Last Chain:	☐ Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd:	☑ Yes	Date Entered:		EDD ☑ Yes ☐ No	
Background:	☐ Yes	Entered by.		Turnaround Time ☐ 7 Day* ☐ 15 Day* ☑ 30 Day	
Confirmatory:	☐ Yes	QC inits..		Negotiated TAT ☐	
				Sample Disposal ☐ Return to Client ☑ Disposal by Lab	
				Return Samples By:	
				Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 Elevation and ambient pressure information provided with attached field forms.	

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch	Robert Lynch	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	Alfred Santillanes	AS	SNL/4142/505-284-6870/505-228-0710
	William Gibson	William Gibson	WG	SNL/4142/505-284-3307/505-239-7367
	Tim Jackson	T-9 MS	TJ	SNL/4142/505-284-2547/505-263-6639

Lab Use

1.Relinquished by	Alfred Santillanes	Org. 4142	Date 1/20/16	Time 14:15	3.Relinquished by	Org.	Date	Time
2. Received by	Beth Riley	Org. 4142	Date 1/20/16	Time 1415	3. Received by	Org.	Date	Time
2.Relinquished by	Beth Riley	Org. 4142	Date 1/21/16	Time 0815	4.Relinquished by	Org.	Date	Time
3. Received by		Org.	Date 1/26/16	Time 915	4. Received by	Org	Date	Time

Prior confirmation with SMO required for 7 and 15 day TAT

02/15/2016

SMO 2012-ARCOC (4-2012)

CONTRACT LABORATO
ANALYSIS REQUEST AND CHAIN

320-16959 Chain of Custody

AOP 95-16

Internal Lab

Page 1 of 1

Batch No N/A

SMO Use

AR/COC 616475

Project Name	CWL SVM	Date Samples Shipped:	1/21/16	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Tim Jackson	Carrier/Waybill No	239855	SMO Contact Phone:	☐ RMMA
Project/Task Number:	146422.10.11.03	Lab Contact:	BETH RILEY	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	TA/West Sacramento	Send Report to SMO:	☐ 4° Celsius
		Contract No.	PO 691437	Stephanie Montano/505-284-2553	Bill to Sandia National Laboratories (Accounts Payable), P O Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

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
098703	-001	CWL-SV FB3		1/20/16 8:35	UPN	SC	6 L	None	G	FB	VOC-TO15	
098704	-001	CWL-D1-100		1/20/16 8:42	SG	SC	6 L	None	G	SA	VOC-TO15	
098705	-001	CWL-D1-160		1/20/16 8:45	SG	SC	6 L	None	G	SA	VOC-TO15	
098706	-001	CWL-D1-240		1/20/16 8:48	SG	SC	6 L	None	G	SA	VOC-TO15	
098707	-001	CWL-D1-350		1/20/16 8:52	SG	SC	6 L	None	G	SA	VOC-TO15	
098708	-001	CWL-D1-470		1/20/16 8:59	SG	SC	6 L	None	G	SA	VOC-TO15	

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

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

Elevation and ambient pressure information provided with attached field forms.

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	Robert Lynch	Robert Lynch	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	Alfred Santillanes	AS	SNL/4142/505-284-6870/505-228-0710
	William Gibson	William Gibson	WG	SNL/4142/505-284-3307/505-239-7367
	Tim Jackson	Tim Jackson	TJ	SNL/4142/505-284-2547/505-263-6639

1. Relinquished by	Alfred Santillanes	Org. 4142	Date 1/20/16	Time 14:15	3. Relinquished by	Org.	Date	Time
1. Received by	Tim Jackson	Org. 4142	Date 1/20/16	Time 1415	3. Received by	Org.	Date	Time
2. Relinquished by	Tim Jackson	Org. 4142	Date 1/21/16	Time 0815	4. Relinquished by	Org.	Date	Time
2. Received by		Org.	Date 1/26/16	Time 915	4. Received by	Org.	Date	Time

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

2-25-16

SMO 2012-ARCOC (4-2012)

CONTRACT ANALYSIS REQUEST /

AOP 95-16

Internal Lab

Batch No. N/A

SMO Use

AR/COC 616476

Project Name:	CWL SVM	Date Samples Shipped:	1/21/16	SMO Authorization:	☐ Waste Characterization
Project/Task Manager:	Tim Jackson	Carrier/Waybill No	239855	SMO Contact Phone.	☐ RMMA
Project/Task Number.	146422.10.11.03	Lab Contact:	BETH RILEY	Wendy Palencia/505-844-3132	☐ Released by COC No.
Service Order:	CF327-16	Lab Destination:	TA/West Sacramento	Send Report to SMO:	☐ 4° Celsius
		Contract No.	PO 691437	Stephanie Montano/505-284-2553	Bill to: Sandia National Laboratories (Accounts Payable), P.O Box 5800, MS-0154 Albuquerque, NM 87185-0154
Tech Area:					
Building:	Room:	Operational Site:			

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
098709	-001	CWL-SV FB4		1/20/16 10:40	UPN	SC	6 L	None	G	FB	VOC-TO15	
098710	-001	CWL-D2-120		1/20/16 10:49	SG	SC	6 L	None	G	SA	VOC-TO15	
098711	-001	CWL-D2-240		1/20/16 10:52	SG	SC	6 L	None	G	SA	VOC-TO15	
098712	-001	CWL-D2-350		1/20/16 10:57	SG	SC	6 L	None	G	SA	VOC-TO15	
098713	-001	CWL-D2-440		1/20/16 11:01	SG	SC	6 L	None	G	SA	VOC-TO15	
098714	-001	CWL-D2-470		1/20/16 11:05	SG	SC	6 L	None	G	SA	VOC-TO15	

Page 1942 of 1944

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	Robert Lynch	RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes	Alfred Santillanes	AS	SNL/4142/505-284-6870/505-228-0710
	William Gibson	William Gibson	WG	SNL/4142/505-284-3307/505-239-7367
	Tim Jackson	T-1 Jackson	TJ	SNL/4142/505-284-2547/505-263-6639

Sample Disposal ☐ Return to Client ☑ Disposal by Lab

Return Samples By:

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

Elevation and ambient pressure information provided with attached field forms.

Lab Use

1.Relinquished by	Alfred Santillanes	Org.	4142	Date	1/20/16	Time	14:15	3.Relinquished by	Org.	Date	Time
2. Received by	Beth Riley	Org.	4142	Date	1/20/16	Time	1415	3. Received by	Org.	Date	Time
2.Relinquished by	Beth Riley	Org.	4142	Date	1/21/16	Time	0815	4.Relinquished by	Org	Date	Time
3. Received by		Org.		Date	1/21/16	Time	915	4. Received by	Org	Date	Time

Prior confirmation with SMO required for 7 and 15 day TAT

02/15/2016

SMO 2012-ARCOC (4-2012)

AOP 95-16

CONTF
ANALYSIS REQUE ...Y

Internal Lab

Batch No N/A

SMO Use

AR/COC 616477

Project Name:	CWL SVM	Date Samples Shipped:	1/21/16	SMO Authorization	
Project/Task Manager:	Tim Jackson	Carrier/Waybill No	239855	SMO Contact Phone:	Wendy Palencia/505-844-3132
Project/Task Number:	146422.10.11.03	Lab Contact:	Beth Riley	Send Report to SMO:	Stephanie Montano/505-284-2553
Service Order:	CF327-16	Lab Destination:	TA/West Sacramento		
		Contract No.:	PO 691437		

☐ 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	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
098715	-001	CWL-SV FB5		1/20/16 9:44	UPN	SC	6 L	None	G	FB	VOC-TO15	
098716	-001	CWL-D3-120		1/20/16 9:50	SG	SC	6 L	None	G	SA	VOC-TO15	
098717	-001	CWL-D3-170		1/20/16 9:53	SG	SC	6 L	None	G	SA	VOC-TO15	
098718	-001	CWL-D3-170		1/20/16 9:54	SG	SC	6 L	None	G	DU	VOC-TO15	
098719	-001	CWL-D3-350		1/20/16 10:05	SG	SC	6 L	None	G	SA	VOC-TO15	
098720	-001	CWL-D3-350		1/20/16 10:05	SG	SC	6 L	None	G	DU	VOC-TO15	
098721	-001	CWL-D3-440		1/20/16 10:13	SG	SC	6 L	None	G	SA	VOC-TO15	
098722	-001	CWL-D3-480		1/20/16 10:18	SG	SC	6 L	None	G	SA	VOC-TO15	

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
Elevation and ambient pressure information provided with attached field forms.

Conditions on Receipt

Lab Use

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cell
	Robert Lynch		RL	SNL/4142/505-844-4013/505-250-7090
	Alfred Santillanes		AS	SNL/4142/505-284-6870/505-228-0710
	William Gibson		WG	SNL/4142/505-284-3307/505-239-7367
	Tim Jackson		TJ	SNL/4142/505-284-2547/505-263-6639

1.Relinquished by		Org 4142	Date 1/20/16	Time 14:15	3.Relinquished by	Org	Date	Time
2. Received by	GMD	Org. 4142	Date 1/20/16	Time 1715	3. Received by	Org	Date	Time
2.Relinquished by	GMD	Org. 4142	Date 1/21/16	Time 0815	4 Relinquished by	Org.	Date	Time
3. Received by		Org.	Date 1/21/16	Time 915	4. Received by	Org.	Date	Time

Prior confirmation with SMO required for 7 and 15 day TAT

1/21/2016

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
616473	Environmental*
616474	Environmental*
616475	Environmental*
616476	Environmental*
616477	Environmental*

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

Contract Verification Form (CVR)

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

ARCOC No. 616473, 616474, 616475, 616476 & 613477 **Analytical Lab** TAL-WS **SDG No.** 320-16959-1

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

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	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 Lc	X		
2.6	QC batch numbers provided	X		
2.7	Dilution factors provided and all dilution levels reported	X		
2.8	Data reported in appropriate units and using correct significant figures	X		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	N/A		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

3.0 Data Quality Evaluation

Line No.	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 sample accuracy reported and met for all samples		X	Carbon tetrachloride below recovery limits for LCS/LCSD (320-99478/16/5). RPD for 2-Butanone and toluene outside acceptance range (320-99749/5).
	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	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	Toluene and m,p-xylene detected in method blank (320-99749/9). 1,2-Dichlorobenzene, methylene chloride, styrene, m,p-xylene and o-xylene detected in method blank (320-99879/7).

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Methylene chloride and toluene detected in CWL-SV FB3. 1,1-Dichloroethane, toluene, m,p-xylene and o-xylene detected in CWL-SV FB4.
3.6	Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits	X		
3.7	Narrative addresses planchet flaming for gross alpha/beta	N/A		
3.8	Narrative included, correct, and complete	X		
3.9	Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151.	N/A		

4.0 Calibration and Validation Documentation

Line No.	Item	Yes	No	Comments
4.1	GC/MS (8260 and 8270) a) 12-hour tune check provided	X		
	b) Initial calibration provided	X		

Line No.	Item	Yes	No	Comments
	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		

Line No.	Item	Yes	No	Comments
	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		

5.0 Data Anomaly Report

Line No.	Item	Yes	No	If no, explain
5.1	DAR completed for monitoring and surveillance sample data	N/A		
5.2	Problems or outliers noted	N/A		

Line No.	Item	Yes	No	If no, explain
5.3	Verification or reanalysis requested from lab	N/A		

6.0 Problem Resolution

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

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions

Were deficiencies unresolved? ○ Yes ◉ No

Based on the review, this data package is complete. ◉ Yes ○ No

Reviewed by: Wendy Palencia Date: 02-23-2016 09:34:00

Closed by: Wendy Palencia Date: 02-23-2016 09:34:00

SOIL-GAS SAMPLING RESULTS
CERTIFICATES OF ANALYSIS

Chemical Waste Landfill

January 2016 – Soil-Gas Samples

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

SOIL-GAS SAMPLING RESULTS
CERTIFICATES OF ANALYSIS

Chemical Waste Landfill

January 2016 – Soil-Gas Samples

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

Client Sample ID: 098703-001/CWL-SV FB3

Lab Sample ID: 320-16959-1

Date Collected: 01/20/16 08:35
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			01/29/16 18:44	1
Benzene	ND		0.40	0.079	ppb v/v			01/29/16 18:44	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			01/29/16 18:44	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			01/29/16 18:44	1
Bromoform	ND		0.40	0.070	ppb v/v			01/29/16 18:44	1
Bromomethane	ND		0.80	0.34	ppb v/v			01/29/16 18:44	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			01/29/16 18:44	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			01/29/16 18:44	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			01/29/16 18:44	1
Chloroethane	ND		0.80	0.31	ppb v/v			01/29/16 18:44	1
Chloroform	ND		0.30	0.095	ppb v/v			01/29/16 18:44	1
Chloromethane	ND		0.80	0.20	ppb v/v			01/29/16 18:44	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			01/29/16 18:44	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			01/29/16 18:44	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			01/29/16 18:44	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			01/29/16 18:44	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			01/29/16 18:44	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			01/29/16 18:44	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			01/29/16 18:44	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			01/29/16 18:44	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			01/29/16 18:44	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			01/29/16 18:44	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			01/29/16 18:44	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			01/29/16 18:44	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			01/29/16 18:44	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			01/29/16 18:44	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			01/29/16 18:44	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			01/29/16 18:44	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			01/29/16 18:44	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			01/29/16 18:44	1
2-Hexanone	ND		0.40	0.087	ppb v/v			01/29/16 18:44	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			01/29/16 18:44	1
Methylene Chloride	**0.10**	**J**	0.40	0.072	ppb v/v			01/29/16 18:44	1
Styrene	ND		0.40	0.059	ppb v/v			01/29/16 18:44	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			01/29/16 18:44	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			01/29/16 18:44	1
Toluene	**0.059**	**J**	0.40	0.051	ppb v/v			01/29/16 18:44	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			01/29/16 18:44	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			01/29/16 18:44	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			01/29/16 18:44	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			01/29/16 18:44	1
Trichloroethene	ND		0.40	0.11	ppb v/v			01/29/16 18:44	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			01/29/16 18:44	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			01/29/16 18:44	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			01/29/16 18:44	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			01/29/16 18:44	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			01/29/16 18:44	1
o-Xylene	ND		0.40	0.054	ppb v/v			01/29/16 18:44	1

Client Sample ID: 098703-001/CWL-SV FB3

Lab Sample ID: 320-16959-1

Date Collected: 01/20/16 08:35
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*70 - 130*		*01/29/16 18:44*	*1*
1,2-Dichloroethane-d4 (Surr)	*101*		*70 - 130*		*01/29/16 18:44*	*1*
Toluene-d8 (Surr)	*100*		*70 - 130*		*01/29/16 18:44*	*1*

Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			02/02/16 10:46	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			02/02/16 10:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*101*		*70 - 130*		*02/02/16 10:46*	*1*
1,2-Dichloroethane-d4 (Surr)	*96*		*70 - 130*		*02/02/16 10:46*	*1*
Toluene-d8 (Surr)	*105*		*70 - 130*		*02/02/16 10:46*	*1*

Client Sample ID: 098704-001/CWL-D1-100

Lab Sample ID: 320-16959-2

Date Collected: 01/20/16 08:42
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1500	53	ppb v/v			01/29/16 21:21	298
Benzene	ND		120	24	ppb v/v			01/29/16 21:21	298
Benzyl chloride	ND		240	49	ppb v/v			01/29/16 21:21	298
Bromodichloromethane	ND		89	20	ppb v/v			01/29/16 21:21	298
Bromoform	ND		120	21	ppb v/v			01/29/16 21:21	298
Bromomethane	ND		240	100	ppb v/v			01/29/16 21:21	298
2-Butanone (MEK)	ND		240	59	ppb v/v			01/29/16 21:21	298
Carbon disulfide	ND		240	23	ppb v/v			01/29/16 21:21	298
Chlorobenzene	ND		89	19	ppb v/v			01/29/16 21:21	298
Chloroethane	ND		240	92	ppb v/v			01/29/16 21:21	298
Chloroform	**660**		89	28	ppb v/v			01/29/16 21:21	298
Chloromethane	ND		240	59	ppb v/v			01/29/16 21:21	298
Dibromochloromethane	ND		120	24	ppb v/v			01/29/16 21:21	298
1,2-Dibromoethane (EDB)	ND		240	22	ppb v/v			01/29/16 21:21	298
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		120	46	ppb v/v			01/29/16 21:21	298
1,2-Dichlorobenzene	ND		120	39	ppb v/v			01/29/16 21:21	298
1,3-Dichlorobenzene	ND		120	33	ppb v/v			01/29/16 21:21	298
1,4-Dichlorobenzene	ND		120	44	ppb v/v			01/29/16 21:21	298
Dichlorodifluoromethane	**66**	**J**	120	43	ppb v/v			01/29/16 21:21	298
1,1-Dichloroethane	**24**	**J**	89	21	ppb v/v			01/29/16 21:21	298
1,2-Dichloroethane	ND		240	26	ppb v/v			01/29/16 21:21	298
1,1-Dichloroethene	**520**		240	38	ppb v/v			01/29/16 21:21	298
cis-1,2-Dichloroethene	ND		120	27	ppb v/v			01/29/16 21:21	298
trans-1,2-Dichloroethene	ND		120	30	ppb v/v			01/29/16 21:21	298
1,2-Dichloropropane	**130**		120	72	ppb v/v			01/29/16 21:21	298
cis-1,3-Dichloropropene	ND		120	31	ppb v/v			01/29/16 21:21	298
trans-1,3-Dichloropropene	ND		120	26	ppb v/v			01/29/16 21:21	298
Ethylbenzene	ND		120	19	ppb v/v			01/29/16 21:21	298
4-Ethyltoluene	ND		120	56	ppb v/v			01/29/16 21:21	298

Client Sample ID: 098704-001/CWL-D1-100

Lab Sample ID: 320-16959-2

Date Collected: 01/20/16 08:42
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexachlorobutadiene	ND		600	130	ppb v/v			01/29/16 21:21	298
2-Hexanone	ND		120	26	ppb v/v			01/29/16 21:21	298
4-Methyl-2-pentanone (MIBK)	ND		120	40	ppb v/v			01/29/16 21:21	298
Methylene Chloride	**35**	**J**	120	21	ppb v/v			01/29/16 21:21	298
Styrene	ND		120	18	ppb v/v			01/29/16 21:21	298
1,1,2,2-Tetrachloroethane	ND		120	21	ppb v/v			01/29/16 21:21	298
Tetrachloroethene	**950**		120	15	ppb v/v			01/29/16 21:21	298
Toluene	ND		120	15	ppb v/v			01/29/16 21:21	298
1,1,2-Trichloro-1,2,2-trifluoroethane	**1500**		120	49	ppb v/v			01/29/16 21:21	298
1,2,4-Trichlorobenzene	ND		600	130	ppb v/v			01/29/16 21:21	298
1,1,1-Trichloroethane	**57**	**J**	89	19	ppb v/v			01/29/16 21:21	298
1,1,2-Trichloroethane	ND		120	20	ppb v/v			01/29/16 21:21	298
Trichloroethene	**12000**		120	31	ppb v/v			01/29/16 21:21	298
Trichlorofluoromethane	**390**		120	58	ppb v/v			01/29/16 21:21	298
1,2,4-Trimethylbenzene	ND		240	48	ppb v/v			01/29/16 21:21	298
1,3,5-Trimethylbenzene	ND		120	37	ppb v/v			01/29/16 21:21	298
Vinyl chloride	ND		120	36	ppb v/v			01/29/16 21:21	298
m,p-Xylene	ND		240	30	ppb v/v			01/29/16 21:21	298
o-Xylene	ND		120	16	ppb v/v			01/29/16 21:21	298

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*70 - 130*		*01/29/16 21:21*	*298*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 130*		*01/29/16 21:21*	*298*
Toluene-d8 (Surr)	*99*		*70 - 130*		*01/29/16 21:21*	*298*

Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	**23**	**J**	240	19	ppb v/v			02/02/16 01:17	298
Vinyl acetate	ND		240	43	ppb v/v			02/02/16 01:17	298

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*92*		*70 - 130*		*02/02/16 01:17*	*298*
1,2-Dichloroethane-d4 (Surr)	*98*		*70 - 130*		*02/02/16 01:17*	*298*
Toluene-d8 (Surr)	*88*		*70 - 130*		*02/02/16 01:17*	*298*

Client Sample ID: 098705-001/CWL-D1-160

Lab Sample ID: 320-16959-3

Date Collected: 01/20/16 08:45
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		2200	78	ppb v/v			01/29/16 22:10	436
Benzene	ND		170	34	ppb v/v			01/29/16 22:10	436
Benzyl chloride	ND		350	71	ppb v/v			01/29/16 22:10	436
Bromodichloromethane	ND		130	29	ppb v/v			01/29/16 22:10	436
Bromoform	ND		170	31	ppb v/v			01/29/16 22:10	436
Bromomethane	ND		350	150	ppb v/v			01/29/16 22:10	436
2-Butanone (MEK)	ND		350	87	ppb v/v			01/29/16 22:10	436

Client Sample ID: 098705-001/CWL-D1-160
Date Collected: 01/20/16 08:45
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Lab Sample ID: 320-16959-3
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon disulfide	ND		350	34	ppb v/v			01/29/16 22:10	436
Chlorobenzene	ND		130	28	ppb v/v			01/29/16 22:10	436
Chloroethane	ND		350	130	ppb v/v			01/29/16 22:10	436
Chloroform	**690**		130	41	ppb v/v			01/29/16 22:10	436
Chloromethane	ND		350	86	ppb v/v			01/29/16 22:10	436
Dibromochloromethane	ND		170	34	ppb v/v			01/29/16 22:10	436
1,2-Dibromoethane (EDB)	ND		350	33	ppb v/v			01/29/16 22:10	436
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		170	68	ppb v/v			01/29/16 22:10	436
1,2-Dichlorobenzene	ND		170	57	ppb v/v			01/29/16 22:10	436
1,3-Dichlorobenzene	ND		170	48	ppb v/v			01/29/16 22:10	436
1,4-Dichlorobenzene	ND		170	65	ppb v/v			01/29/16 22:10	436
Dichlorodifluoromethane	**110**	**J**	170	63	ppb v/v			01/29/16 22:10	436
1,1-Dichloroethane	ND		130	31	ppb v/v			01/29/16 22:10	436
1,2-Dichloroethane	ND		350	38	ppb v/v			01/29/16 22:10	436
1,1-Dichloroethene	**1000**		350	56	ppb v/v			01/29/16 22:10	436
cis-1,2-Dichloroethene	ND		170	39	ppb v/v			01/29/16 22:10	436
trans-1,2-Dichloroethene	ND		170	44	ppb v/v			01/29/16 22:10	436
1,2-Dichloropropane	**210**		170	100	ppb v/v			01/29/16 22:10	436
cis-1,3-Dichloropropene	ND		170	45	ppb v/v			01/29/16 22:10	436
trans-1,3-Dichloropropene	ND		170	38	ppb v/v			01/29/16 22:10	436
Ethylbenzene	ND		170	27	ppb v/v			01/29/16 22:10	436
4-Ethyltoluene	ND		170	82	ppb v/v			01/29/16 22:10	436
Hexachlorobutadiene	ND		870	190	ppb v/v			01/29/16 22:10	436
2-Hexanone	ND		170	38	ppb v/v			01/29/16 22:10	436
4-Methyl-2-pentanone (MIBK)	ND		170	59	ppb v/v			01/29/16 22:10	436
Methylene Chloride	**61**	**J**	170	31	ppb v/v			01/29/16 22:10	436
Styrene	ND		170	26	ppb v/v			01/29/16 22:10	436
1,1,2,2-Tetrachloroethane	ND		170	30	ppb v/v			01/29/16 22:10	436
Tetrachloroethene	**750**		170	22	ppb v/v			01/29/16 22:10	436
Toluene	ND		170	22	ppb v/v			01/29/16 22:10	436
1,1,2-Trichloro-1,2,2-trifluoroethane	**2700**		170	71	ppb v/v			01/29/16 22:10	436
1,2,4-Trichlorobenzene	ND		870	190	ppb v/v			01/29/16 22:10	436
1,1,1-Trichloroethane	**71**	**J**	130	28	ppb v/v			01/29/16 22:10	436
1,1,2-Trichloroethane	ND		170	29	ppb v/v			01/29/16 22:10	436
Trichloroethene	**21000**		170	46	ppb v/v			01/29/16 22:10	436
Trichlorofluoromethane	**650**		170	85	ppb v/v			01/29/16 22:10	436
1,2,4-Trimethylbenzene	ND		350	71	ppb v/v			01/29/16 22:10	436
1,3,5-Trimethylbenzene	ND		170	55	ppb v/v			01/29/16 22:10	436
Vinyl chloride	ND		170	52	ppb v/v			01/29/16 22:10	436
m,p-Xylene	ND		350	44	ppb v/v			01/29/16 22:10	436
o-Xylene	ND		170	24	ppb v/v			01/29/16 22:10	436

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*96*		*70 - 130*		*01/29/16 22:10*	*436*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 130*		*01/29/16 22:10*	*436*
Toluene-d8 (Surr)	*100*		*70 - 130*		*01/29/16 22:10*	*436*

Client Sample ID: 098705-001/CWL-D1-160
Lab Sample ID: 320-16959-3

Date Collected: 01/20/16 08:45
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	**29**	**J**	350	28	ppb v/v			02/02/16 02:02	436
Vinyl acetate	ND		350	63	ppb v/v			02/02/16 02:02	436

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*92*		*70 - 130*		*02/02/16 02:02*	*436*
1,2-Dichloroethane-d4 (Surr)	*99*		*70 - 130*		*02/02/16 02:02*	*436*
Toluene-d8 (Surr)	*104*		*70 - 130*		*02/02/16 02:02*	*436*

Client Sample ID: 098706-001/CWL-D1-240
Lab Sample ID: 320-16959-4

Date Collected: 01/20/16 08:48
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		2300	82	ppb v/v			01/29/16 22:59	462
Benzene	ND		180	36	ppb v/v			01/29/16 22:59	462
Benzyl chloride	ND		370	75	ppb v/v			01/29/16 22:59	462
Bromodichloromethane	ND		140	30	ppb v/v			01/29/16 22:59	462
Bromoform	ND		180	32	ppb v/v			01/29/16 22:59	462
Bromomethane	ND		370	150	ppb v/v			01/29/16 22:59	462
2-Butanone (MEK)	ND		370	92	ppb v/v			01/29/16 22:59	462
Carbon disulfide	ND		370	36	ppb v/v			01/29/16 22:59	462
Chlorobenzene	ND		140	30	ppb v/v			01/29/16 22:59	462
Chloroethane	ND		370	140	ppb v/v			01/29/16 22:59	462
Chloroform	**630**		140	44	ppb v/v			01/29/16 22:59	462
Chloromethane	ND		370	91	ppb v/v			01/29/16 22:59	462
Dibromochloromethane	ND		180	36	ppb v/v			01/29/16 22:59	462
1,2-Dibromoethane (EDB)	ND		370	35	ppb v/v			01/29/16 22:59	462
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		180	72	ppb v/v			01/29/16 22:59	462
1,2-Dichlorobenzene	ND		180	60	ppb v/v			01/29/16 22:59	462
1,3-Dichlorobenzene	ND		180	51	ppb v/v			01/29/16 22:59	462
1,4-Dichlorobenzene	ND		180	69	ppb v/v			01/29/16 22:59	462
Dichlorodifluoromethane	**130**	**J**	180	67	ppb v/v			01/29/16 22:59	462
1,1-Dichloroethane	**45**	**J**	140	33	ppb v/v			01/29/16 22:59	462
1,2-Dichloroethane	ND		370	41	ppb v/v			01/29/16 22:59	462
1,1-Dichloroethene	**1300**		370	60	ppb v/v			01/29/16 22:59	462
cis-1,2-Dichloroethene	ND		180	41	ppb v/v			01/29/16 22:59	462
trans-1,2-Dichloroethene	ND		180	46	ppb v/v			01/29/16 22:59	462
1,2-Dichloropropane	**230**		180	110	ppb v/v			01/29/16 22:59	462
cis-1,3-Dichloropropene	ND		180	48	ppb v/v			01/29/16 22:59	462
trans-1,3-Dichloropropene	ND		180	41	ppb v/v			01/29/16 22:59	462
Ethylbenzene	ND		180	29	ppb v/v			01/29/16 22:59	462
4-Ethyltoluene	ND		180	86	ppb v/v			01/29/16 22:59	462
Hexachlorobutadiene	ND		920	200	ppb v/v			01/29/16 22:59	462
2-Hexanone	ND		180	40	ppb v/v			01/29/16 22:59	462
4-Methyl-2-pentanone (MIBK)	ND		180	62	ppb v/v			01/29/16 22:59	462
Methylene Chloride	**42**	**J**	180	33	ppb v/v			01/29/16 22:59	462
Styrene	ND		180	27	ppb v/v			01/29/16 22:59	462

Client Sample ID: 098706-001/CWL-D1-240
Lab Sample ID: 320-16959-4

Date Collected: 01/20/16 08:48
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	ND		180	32	ppb v/v			01/29/16 22:59	462
Tetrachloroethene	**630**		180	24	ppb v/v			01/29/16 22:59	462
Toluene	ND		180	24	ppb v/v			01/29/16 22:59	462
1,1,2-Trichloro-1,2,2-trifluoroethane	**3200**		180	75	ppb v/v			01/29/16 22:59	462
1,2,4-Trichlorobenzene	ND		920	200	ppb v/v			01/29/16 22:59	462
1,1,1-Trichloroethane	**64**	**J**	140	30	ppb v/v			01/29/16 22:59	462
1,1,2-Trichloroethane	ND		180	31	ppb v/v			01/29/16 22:59	462
Trichloroethene	**27000**		180	49	ppb v/v			01/29/16 22:59	462
Trichlorofluoromethane	**800**		180	91	ppb v/v			01/29/16 22:59	462
1,2,4-Trimethylbenzene	ND		370	75	ppb v/v			01/29/16 22:59	462
1,3,5-Trimethylbenzene	ND		180	58	ppb v/v			01/29/16 22:59	462
Vinyl chloride	ND		180	55	ppb v/v			01/29/16 22:59	462
m,p-Xylene	ND		370	46	ppb v/v			01/29/16 22:59	462
o-Xylene	ND		180	25	ppb v/v			01/29/16 22:59	462

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*96*		*70 - 130*		*01/29/16 22:59*	*462*
1,2-Dichloroethane-d4 (Surr)	*99*		*70 - 130*		*01/29/16 22:59*	*462*
Toluene-d8 (Surr)	*98*		*70 - 130*		*01/29/16 22:59*	*462*

Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	**66**	**J**	370	30	ppb v/v			02/02/16 02:47	462
Vinyl acetate	ND		370	67	ppb v/v			02/02/16 02:47	462

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*93*		*70 - 130*		*02/02/16 02:47*	*462*
1,2-Dichloroethane-d4 (Surr)	*93*		*70 - 130*		*02/02/16 02:47*	*462*
Toluene-d8 (Surr)	*107*		*70 - 130*		*02/02/16 02:47*	*462*

Client Sample ID: 098707-001/CWL-D1-350
Lab Sample ID: 320-16959-5

Date Collected: 01/20/16 08:52
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1500	54	ppb v/v			01/29/16 23:48	305
Benzene	ND		120	24	ppb v/v			01/29/16 23:48	305
Benzyl chloride	ND		240	50	ppb v/v			01/29/16 23:48	305
Bromodichloromethane	ND		92	20	ppb v/v			01/29/16 23:48	305
Bromoform	ND		120	21	ppb v/v			01/29/16 23:48	305
Bromomethane	ND		240	100	ppb v/v			01/29/16 23:48	305
2-Butanone (MEK)	ND		240	61	ppb v/v			01/29/16 23:48	305
Carbon disulfide	ND		240	24	ppb v/v			01/29/16 23:48	305
Chlorobenzene	ND		92	20	ppb v/v			01/29/16 23:48	305
Chloroethane	ND		240	94	ppb v/v			01/29/16 23:48	305
Chloroform	**190**		92	29	ppb v/v			01/29/16 23:48	305
Chloromethane	ND		240	60	ppb v/v			01/29/16 23:48	305

Client Sample ID: 098707-001/CWL-D1-350

Date Collected: 01/20/16 08:52
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Lab Sample ID: 320-16959-5

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromochloromethane	ND		120	24	ppb v/v			01/29/16 23:48	305
1,2-Dibromoethane (EDB)	ND		240	23	ppb v/v			01/29/16 23:48	305
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		120	47	ppb v/v			01/29/16 23:48	305
1,2-Dichlorobenzene	ND		120	40	ppb v/v			01/29/16 23:48	305
1,3-Dichlorobenzene	ND		120	34	ppb v/v			01/29/16 23:48	305
1,4-Dichlorobenzene	ND		120	45	ppb v/v			01/29/16 23:48	305
Dichlorodifluoromethane	**75**	**J**	120	44	ppb v/v			01/29/16 23:48	305
1,1-Dichloroethane	ND		92	22	ppb v/v			01/29/16 23:48	305
1,2-Dichloroethane	ND		240	27	ppb v/v			01/29/16 23:48	305
1,1-Dichloroethene	**730**		240	39	ppb v/v			01/29/16 23:48	305
cis-1,2-Dichloroethene	ND		120	27	ppb v/v			01/29/16 23:48	305
trans-1,2-Dichloroethene	ND		120	31	ppb v/v			01/29/16 23:48	305
1,2-Dichloropropane	ND		120	73	ppb v/v			01/29/16 23:48	305
cis-1,3-Dichloropropene	ND		120	32	ppb v/v			01/29/16 23:48	305
trans-1,3-Dichloropropene	ND		120	27	ppb v/v			01/29/16 23:48	305
Ethylbenzene	ND		120	19	ppb v/v			01/29/16 23:48	305
4-Ethyltoluene	ND		120	57	ppb v/v			01/29/16 23:48	305
Hexachlorobutadiene	ND		610	130	ppb v/v			01/29/16 23:48	305
2-Hexanone	ND		120	27	ppb v/v			01/29/16 23:48	305
4-Methyl-2-pentanone (MIBK)	ND		120	41	ppb v/v			01/29/16 23:48	305
Methylene Chloride	**58**	**J**	120	22	ppb v/v			01/29/16 23:48	305
Styrene	ND		120	18	ppb v/v			01/29/16 23:48	305
1,1,2,2-Tetrachloroethane	ND		120	21	ppb v/v			01/29/16 23:48	305
Tetrachloroethene	**230**		120	16	ppb v/v			01/29/16 23:48	305
Toluene	**17**	**J**	120	16	ppb v/v			01/29/16 23:48	305
1,1,2-Trichloro-1,2,2-trifluoroethane	**1700**		120	50	ppb v/v			01/29/16 23:48	305
1,2,4-Trichlorobenzene	ND		610	130	ppb v/v			01/29/16 23:48	305
1,1,1-Trichloroethane	ND		92	20	ppb v/v			01/29/16 23:48	305
1,1,2-Trichloroethane	ND		120	20	ppb v/v			01/29/16 23:48	305
Trichloroethene	**12000**		120	32	ppb v/v			01/29/16 23:48	305
Trichlorofluoromethane	**440**		120	60	ppb v/v			01/29/16 23:48	305
1,2,4-Trimethylbenzene	ND		240	49	ppb v/v			01/29/16 23:48	305
1,3,5-Trimethylbenzene	ND		120	38	ppb v/v			01/29/16 23:48	305
Vinyl chloride	ND		120	37	ppb v/v			01/29/16 23:48	305
m,p-Xylene	ND		240	31	ppb v/v			01/29/16 23:48	305
o-Xylene	ND		120	16	ppb v/v			01/29/16 23:48	305

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*70 - 130*		*01/29/16 23:48*	*305*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 130*		*01/29/16 23:48*	*305*
Toluene-d8 (Surr)	*101*		*70 - 130*		*01/29/16 23:48*	*305*

Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	ND		240	20	ppb v/v			02/02/16 03:32	305
Vinyl acetate	ND		240	44	ppb v/v			02/02/16 03:32	305

Client Sample ID: 098707-001/CWL-D1-350
Lab Sample ID: 320-16959-5

Date Collected: 01/20/16 08:52
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*70 - 130*		*02/02/16 03:32*	*305*
1,2-Dichloroethane-d4 (Surr)	*94*		*70 - 130*		*02/02/16 03:32*	*305*
Toluene-d8 (Surr)	*105*		*70 - 130*		*02/02/16 03:32*	*305*

Client Sample ID: 098708-001/CWL-D1-470
Lab Sample ID: 320-16959-6

Date Collected: 01/20/16 08:59
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	**8.4**	**J**	62	2.2	ppb v/v			01/29/16 19:34	12.4
Benzene	ND		5.0	0.98	ppb v/v			01/29/16 19:34	12.4
Benzyl chloride	ND		9.9	2.0	ppb v/v			01/29/16 19:34	12.4
Bromodichloromethane	ND		3.7	0.82	ppb v/v			01/29/16 19:34	12.4
Bromoform	ND		5.0	0.87	ppb v/v			01/29/16 19:34	12.4
Bromomethane	ND		9.9	4.2	ppb v/v			01/29/16 19:34	12.4
2-Butanone (MEK)	ND		9.9	2.5	ppb v/v			01/29/16 19:34	12.4
Carbon disulfide	ND		9.9	0.97	ppb v/v			01/29/16 19:34	12.4
Chlorobenzene	ND		3.7	0.79	ppb v/v			01/29/16 19:34	12.4
Chloroethane	ND		9.9	3.8	ppb v/v			01/29/16 19:34	12.4
Chloroform	**1.6**	**J**	3.7	1.2	ppb v/v			01/29/16 19:34	12.4
Chloromethane	ND		9.9	2.4	ppb v/v			01/29/16 19:34	12.4
Dibromochloromethane	ND		5.0	0.98	ppb v/v			01/29/16 19:34	12.4
1,2-Dibromoethane (EDB)	ND		9.9	0.93	ppb v/v			01/29/16 19:34	12.4
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		5.0	1.9	ppb v/v			01/29/16 19:34	12.4
1,2-Dichlorobenzene	ND		5.0	1.6	ppb v/v			01/29/16 19:34	12.4
1,3-Dichlorobenzene	ND		5.0	1.4	ppb v/v			01/29/16 19:34	12.4
1,4-Dichlorobenzene	ND		5.0	1.8	ppb v/v			01/29/16 19:34	12.4
Dichlorodifluoromethane	**17**		5.0	1.8	ppb v/v			01/29/16 19:34	12.4
1,1-Dichloroethane	ND		3.7	0.89	ppb v/v			01/29/16 19:34	12.4
1,2-Dichloroethane	ND		9.9	1.1	ppb v/v			01/29/16 19:34	12.4
1,1-Dichloroethene	**35**		9.9	1.6	ppb v/v			01/29/16 19:34	12.4
cis-1,2-Dichloroethene	ND		5.0	1.1	ppb v/v			01/29/16 19:34	12.4
trans-1,2-Dichloroethene	ND		5.0	1.2	ppb v/v			01/29/16 19:34	12.4
1,2-Dichloropropane	ND		5.0	3.0	ppb v/v			01/29/16 19:34	12.4
cis-1,3-Dichloropropene	ND		5.0	1.3	ppb v/v			01/29/16 19:34	12.4
trans-1,3-Dichloropropene	ND		5.0	1.1	ppb v/v			01/29/16 19:34	12.4
Ethylbenzene	ND		5.0	0.78	ppb v/v			01/29/16 19:34	12.4
4-Ethyltoluene	ND		5.0	2.3	ppb v/v			01/29/16 19:34	12.4
Hexachlorobutadiene	ND		25	5.4	ppb v/v			01/29/16 19:34	12.4
2-Hexanone	ND		5.0	1.1	ppb v/v			01/29/16 19:34	12.4
4-Methyl-2-pentanone (MIBK)	ND		5.0	1.7	ppb v/v			01/29/16 19:34	12.4
Methylene Chloride	**5.2**		5.0	0.89	ppb v/v			01/29/16 19:34	12.4
Styrene	ND		5.0	0.73	ppb v/v			01/29/16 19:34	12.4
1,1,2,2-Tetrachloroethane	ND		5.0	0.86	ppb v/v			01/29/16 19:34	12.4
Tetrachloroethene	**7.4**		5.0	0.63	ppb v/v			01/29/16 19:34	12.4
Toluene	ND		5.0	0.63	ppb v/v			01/29/16 19:34	12.4

Client Sample ID: 098708-001/CWL-D1-470
Lab Sample ID: 320-16959-6

Date Collected: 01/20/16 08:59
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloro-1,2,2-trifluoroethane	**280**		5.0	2.0	ppb v/v			01/29/16 19:34	12.4
1,2,4-Trichlorobenzene	ND		25	5.4	ppb v/v			01/29/16 19:34	12.4
1,1,1-Trichloroethane	ND		3.7	0.81	ppb v/v			01/29/16 19:34	12.4
1,1,2-Trichloroethane	ND		5.0	0.83	ppb v/v			01/29/16 19:34	12.4
Trichloroethene	**200**		5.0	1.3	ppb v/v			01/29/16 19:34	12.4
Trichlorofluoromethane	**71**		5.0	2.4	ppb v/v			01/29/16 19:34	12.4
1,2,4-Trimethylbenzene	ND		9.9	2.0	ppb v/v			01/29/16 19:34	12.4
1,3,5-Trimethylbenzene	ND		5.0	1.6	ppb v/v			01/29/16 19:34	12.4
Vinyl chloride	ND		5.0	1.5	ppb v/v			01/29/16 19:34	12.4
m,p-Xylene	ND		9.9	1.2	ppb v/v			01/29/16 19:34	12.4
o-Xylene	ND		5.0	0.67	ppb v/v			01/29/16 19:34	12.4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*70 - 130*		*01/29/16 19:34*	*12.4*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 130*		*01/29/16 19:34*	*12.4*
Toluene-d8 (Surr)	*100*		*70 - 130*		*01/29/16 19:34*	*12.4*

Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	**1.9**	**J**	9.9	0.79	ppb v/v			02/01/16 23:40	12.4
Vinyl acetate	ND		9.9	1.8	ppb v/v			02/01/16 23:40	12.4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*95*		*70 - 130*		*02/01/16 23:40*	*12.4*
1,2-Dichloroethane-d4 (Surr)	*98*		*70 - 130*		*02/01/16 23:40*	*12.4*
Toluene-d8 (Surr)	*102*		*70 - 130*		*02/01/16 23:40*	*12.4*

Client Sample ID: 098699-001/CWL-SV FB2
Lab Sample ID: 320-16959-7

Date Collected: 01/20/16 09:23
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			01/29/16 20:31	1
Benzene	ND		0.40	0.079	ppb v/v			01/29/16 20:31	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			01/29/16 20:31	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			01/29/16 20:31	1
Bromoform	ND		0.40	0.070	ppb v/v			01/29/16 20:31	1
Bromomethane	ND		0.80	0.34	ppb v/v			01/29/16 20:31	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			01/29/16 20:31	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			01/29/16 20:31	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			01/29/16 20:31	1
Chloroethane	ND		0.80	0.31	ppb v/v			01/29/16 20:31	1
Chloroform	ND		0.30	0.095	ppb v/v			01/29/16 20:31	1
Chloromethane	ND		0.80	0.20	ppb v/v			01/29/16 20:31	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			01/29/16 20:31	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			01/29/16 20:31	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			01/29/16 20:31	1

Client Sample ID: 098699-001/CWL-SV FB2

Date Collected: 01/20/16 09:23
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Lab Sample ID: 320-16959-7

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			01/29/16 20:31	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			01/29/16 20:31	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			01/29/16 20:31	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			01/29/16 20:31	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			01/29/16 20:31	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			01/29/16 20:31	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			01/29/16 20:31	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			01/29/16 20:31	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			01/29/16 20:31	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			01/29/16 20:31	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			01/29/16 20:31	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			01/29/16 20:31	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			01/29/16 20:31	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			01/29/16 20:31	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			01/29/16 20:31	1
2-Hexanone	ND		0.40	0.087	ppb v/v			01/29/16 20:31	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			01/29/16 20:31	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			01/29/16 20:31	1
Styrene	ND		0.40	0.059	ppb v/v			01/29/16 20:31	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			01/29/16 20:31	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			01/29/16 20:31	1
Toluene	ND		0.40	0.051	ppb v/v			01/29/16 20:31	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			01/29/16 20:31	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			01/29/16 20:31	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			01/29/16 20:31	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			01/29/16 20:31	1
Trichloroethene	ND		0.40	0.11	ppb v/v			01/29/16 20:31	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			01/29/16 20:31	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			01/29/16 20:31	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			01/29/16 20:31	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			01/29/16 20:31	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			01/29/16 20:31	1
o-Xylene	ND		0.40	0.054	ppb v/v			01/29/16 20:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*70 - 130*		*01/29/16 20:31*	*1*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 130*		*01/29/16 20:31*	*1*
Toluene-d8 (Surr)	*100*		*70 - 130*		*01/29/16 20:31*	*1*

Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			02/02/16 00:32	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			02/02/16 00:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*89*		*70 - 130*		*02/02/16 00:32*	*1*
1,2-Dichloroethane-d4 (Surr)	*102*		*70 - 130*		*02/02/16 00:32*	*1*
Toluene-d8 (Surr)	*103*		*70 - 130*		*02/02/16 00:32*	*1*

Client Sample ID: 098700-001/CWL-UI2-36

Date Collected: 01/20/16 09:26
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Lab Sample ID: 320-16959-8

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		500	18	ppb v/v			01/30/16 00:38	99.8
Benzene	ND		40	7.9	ppb v/v			01/30/16 00:38	99.8
Benzyl chloride	ND		80	16	ppb v/v			01/30/16 00:38	99.8
Bromodichloromethane	ND		30	6.6	ppb v/v			01/30/16 00:38	99.8
Bromoform	ND		40	7.0	ppb v/v			01/30/16 00:38	99.8
Bromomethane	ND		80	33	ppb v/v			01/30/16 00:38	99.8
2-Butanone (MEK)	ND		80	20	ppb v/v			01/30/16 00:38	99.8
Carbon disulfide	ND		80	7.8	ppb v/v			01/30/16 00:38	99.8
Chlorobenzene	ND		30	6.4	ppb v/v			01/30/16 00:38	99.8
Chloroethane	ND		80	31	ppb v/v			01/30/16 00:38	99.8
Chloroform	**900**		30	9.5	ppb v/v			01/30/16 00:38	99.8
Chloromethane	ND		80	20	ppb v/v			01/30/16 00:38	99.8
Dibromochloromethane	ND		40	7.9	ppb v/v			01/30/16 00:38	99.8
1,2-Dibromoethane (EDB)	ND		80	7.5	ppb v/v			01/30/16 00:38	99.8
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		40	15	ppb v/v			01/30/16 00:38	99.8
1,2-Dichlorobenzene	ND		40	13	ppb v/v			01/30/16 00:38	99.8
1,3-Dichlorobenzene	ND		40	11	ppb v/v			01/30/16 00:38	99.8
1,4-Dichlorobenzene	ND		40	15	ppb v/v			01/30/16 00:38	99.8
Dichlorodifluoromethane	**39**	**J**	40	14	ppb v/v			01/30/16 00:38	99.8
1,1-Dichloroethane	ND		30	7.2	ppb v/v			01/30/16 00:38	99.8
1,2-Dichloroethane	ND		80	8.8	ppb v/v			01/30/16 00:38	99.8
1,1-Dichloroethene	**71**	**J**	80	13	ppb v/v			01/30/16 00:38	99.8
cis-1,2-Dichloroethene	ND		40	8.9	ppb v/v			01/30/16 00:38	99.8
trans-1,2-Dichloroethene	ND		40	10	ppb v/v			01/30/16 00:38	99.8
1,2-Dichloropropane	**54**		40	24	ppb v/v			01/30/16 00:38	99.8
cis-1,3-Dichloropropene	ND		40	10	ppb v/v			01/30/16 00:38	99.8
trans-1,3-Dichloropropene	ND		40	8.8	ppb v/v			01/30/16 00:38	99.8
Ethylbenzene	ND		40	6.3	ppb v/v			01/30/16 00:38	99.8
4-Ethyltoluene	ND		40	19	ppb v/v			01/30/16 00:38	99.8
Hexachlorobutadiene	ND		200	43	ppb v/v			01/30/16 00:38	99.8
2-Hexanone	ND		40	8.7	ppb v/v			01/30/16 00:38	99.8
4-Methyl-2-pentanone (MIBK)	ND		40	13	ppb v/v			01/30/16 00:38	99.8
Methylene Chloride	**12**	**J**	40	7.2	ppb v/v			01/30/16 00:38	99.8
Styrene	ND		40	5.9	ppb v/v			01/30/16 00:38	99.8
1,1,2,2-Tetrachloroethane	ND		40	6.9	ppb v/v			01/30/16 00:38	99.8
Tetrachloroethene	**260**		40	5.1	ppb v/v			01/30/16 00:38	99.8
Toluene	ND		40	5.1	ppb v/v			01/30/16 00:38	99.8
1,1,2-Trichloro-1,2,2-trifluoroethane	**810**		40	16	ppb v/v			01/30/16 00:38	99.8
1,2,4-Trichlorobenzene	ND		200	43	ppb v/v			01/30/16 00:38	99.8
1,1,1-Trichloroethane	**47**		30	6.5	ppb v/v			01/30/16 00:38	99.8
1,1,2-Trichloroethane	ND		40	6.7	ppb v/v			01/30/16 00:38	99.8
Trichloroethene	**5200**		40	10	ppb v/v			01/30/16 00:38	99.8
Trichlorofluoromethane	**230**		40	20	ppb v/v			01/30/16 00:38	99.8
1,2,4-Trimethylbenzene	ND		80	16	ppb v/v			01/30/16 00:38	99.8
1,3,5-Trimethylbenzene	ND		40	12	ppb v/v			01/30/16 00:38	99.8
Vinyl chloride	ND		40	12	ppb v/v			01/30/16 00:38	99.8
m,p-Xylene	ND		80	10	ppb v/v			01/30/16 00:38	99.8
o-Xylene	ND		40	5.4	ppb v/v			01/30/16 00:38	99.8

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*70 - 130*		*01/30/16 00:38*	*99.8*
1,2-Dichloroethane-d4 (Surr)	*98*		*70 - 130*		*01/30/16 00:38*	*99.8*
Toluene-d8 (Surr)	*99*		*70 - 130*		*01/30/16 00:38*	*99.8*

Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	**9.7**	**J**	80	6.4	ppb v/v			02/02/16 04:16	99.8
Vinyl acetate	ND		80	14	ppb v/v			02/02/16 04:16	99.8

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*70 - 130*		*02/02/16 04:16*	*99.8*
1,2-Dichloroethane-d4 (Surr)	*97*		*70 - 130*		*02/02/16 04:16*	*99.8*
Toluene-d8 (Surr)	*106*		*70 - 130*		*02/02/16 04:16*	*99.8*

Client Sample ID: 098701-001/CWL-UI2-76

Lab Sample ID: 320-16959-9
Date Collected: 01/20/16 09:28
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		170	6.0	ppb v/v			01/30/16 01:27	33.7
Benzene	ND		13	2.7	ppb v/v			01/30/16 01:27	33.7
Benzyl chloride	ND		27	5.5	ppb v/v			01/30/16 01:27	33.7
Bromodichloromethane	ND		10	2.2	ppb v/v			01/30/16 01:27	33.7
Bromoform	ND		13	2.4	ppb v/v			01/30/16 01:27	33.7
Bromomethane	ND		27	11	ppb v/v			01/30/16 01:27	33.7
2-Butanone (MEK)	ND		27	6.7	ppb v/v			01/30/16 01:27	33.7
Carbon disulfide	ND		27	2.6	ppb v/v			01/30/16 01:27	33.7
Chlorobenzene	ND		10	2.2	ppb v/v			01/30/16 01:27	33.7
Chloroethane	ND		27	10	ppb v/v			01/30/16 01:27	33.7
Chloroform	**880**		10	3.2	ppb v/v			01/30/16 01:27	33.7
Chloromethane	ND		27	6.6	ppb v/v			01/30/16 01:27	33.7
Dibromochloromethane	ND		13	2.7	ppb v/v			01/30/16 01:27	33.7
1,2-Dibromoethane (EDB)	ND		27	2.5	ppb v/v			01/30/16 01:27	33.7
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		13	5.2	ppb v/v			01/30/16 01:27	33.7
1,2-Dichlorobenzene	ND		13	4.4	ppb v/v			01/30/16 01:27	33.7
1,3-Dichlorobenzene	ND		13	3.7	ppb v/v			01/30/16 01:27	33.7
1,4-Dichlorobenzene	ND		13	5.0	ppb v/v			01/30/16 01:27	33.7
Dichlorodifluoromethane	**42**		13	4.9	ppb v/v			01/30/16 01:27	33.7
1,1-Dichloroethane	**9.4**	**J**	10	2.4	ppb v/v			01/30/16 01:27	33.7
1,2-Dichloroethane	**8.5**	**J**	27	3.0	ppb v/v			01/30/16 01:27	33.7
1,1-Dichloroethene	**150**		27	4.3	ppb v/v			01/30/16 01:27	33.7
cis-1,2-Dichloroethene	ND		13	3.0	ppb v/v			01/30/16 01:27	33.7
trans-1,2-Dichloroethene	ND		13	3.4	ppb v/v			01/30/16 01:27	33.7
1,2-Dichloropropane	**110**		13	8.1	ppb v/v			01/30/16 01:27	33.7
cis-1,3-Dichloropropene	ND		13	3.5	ppb v/v			01/30/16 01:27	33.7
trans-1,3-Dichloropropene	ND		13	3.0	ppb v/v			01/30/16 01:27	33.7
Ethylbenzene	ND		13	2.1	ppb v/v			01/30/16 01:27	33.7
4-Ethyltoluene	ND		13	6.3	ppb v/v			01/30/16 01:27	33.7
Hexachlorobutadiene	ND		67	15	ppb v/v			01/30/16 01:27	33.7
2-Hexanone	ND		13	2.9	ppb v/v			01/30/16 01:27	33.7
4-Methyl-2-pentanone (MIBK)	ND		13	4.5	ppb v/v			01/30/16 01:27	33.7
Methylene Chloride	**9.7**	**J**	13	2.4	ppb v/v			01/30/16 01:27	33.7
Styrene	ND		13	2.0	ppb v/v			01/30/16 01:27	33.7

Client Sample ID: 098701-001/CWL-UI2-76

Lab Sample ID: 320-16959-9

Date Collected: 01/20/16 09:28
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	ND		13	2.3	ppb v/v			01/30/16 01:27	33.7
Tetrachloroethene	**260**		13	1.7	ppb v/v			01/30/16 01:27	33.7
Toluene	ND		13	1.7	ppb v/v			01/30/16 01:27	33.7
1,1,2-Trichloro-1,2,2-trifluoroethane	**950**		13	5.5	ppb v/v			01/30/16 01:27	33.7
1,2,4-Trichlorobenzene	ND		67	15	ppb v/v			01/30/16 01:27	33.7
1,1,1-Trichloroethane	**40**		10	2.2	ppb v/v			01/30/16 01:27	33.7
1,1,2-Trichloroethane	**3.2**	**J**	13	2.3	ppb v/v			01/30/16 01:27	33.7
Trichlorofluoromethane	**260**		13	6.6	ppb v/v			01/30/16 01:27	33.7
1,2,4-Trimethylbenzene	ND		27	5.5	ppb v/v			01/30/16 01:27	33.7
1,3,5-Trimethylbenzene	ND		13	4.2	ppb v/v			01/30/16 01:27	33.7
Vinyl chloride	ND		13	4.0	ppb v/v			01/30/16 01:27	33.7
m,p-Xylene	ND		27	3.4	ppb v/v			01/30/16 01:27	33.7
o-Xylene	ND		13	1.8	ppb v/v			01/30/16 01:27	33.7

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*70 - 130*		*01/30/16 01:27*	*33.7*
1,2-Dichloroethane-d4 (Surr)	*99*		*70 - 130*		*01/30/16 01:27*	*33.7*
Toluene-d8 (Surr)	*99*		*70 - 130*		*01/30/16 01:27*	*33.7*

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	ND		140	11	ppb v/v			02/02/16 05:01	169
Trichloroethene	**5600**		68	18	ppb v/v			02/02/16 05:01	169
Vinyl acetate	ND		140	25	ppb v/v			02/02/16 05:01	169

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*93*		*70 - 130*		*02/02/16 05:01*	*169*
1,2-Dichloroethane-d4 (Surr)	*96*		*70 - 130*		*02/02/16 05:01*	*169*
Toluene-d8 (Surr)	*105*		*70 - 130*		*02/02/16 05:01*	*169*

Client Sample ID: 098702-001/CWL-UI2-136

Lab Sample ID: 320-16959-10

Date Collected: 01/20/16 09:32
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		840	30	ppb v/v			01/30/16 02:17	168
Benzene	ND		67	13	ppb v/v			01/30/16 02:17	168
Benzyl chloride	ND		130	27	ppb v/v			01/30/16 02:17	168
Bromodichloromethane	ND		50	11	ppb v/v			01/30/16 02:17	168
Bromoform	ND		67	12	ppb v/v			01/30/16 02:17	168
Bromomethane	ND		130	56	ppb v/v			01/30/16 02:17	168
2-Butanone (MEK)	ND		130	33	ppb v/v			01/30/16 02:17	168
Carbon disulfide	ND		130	13	ppb v/v			01/30/16 02:17	168
Chlorobenzene	ND		50	11	ppb v/v			01/30/16 02:17	168
Chloroethane	ND		130	52	ppb v/v			01/30/16 02:17	168
Chloroform	**650**		50	16	ppb v/v			01/30/16 02:17	168
Chloromethane	ND		130	33	ppb v/v			01/30/16 02:17	168

Client Sample ID: 098702-001/CWL-UI2-136
Date Collected: 01/20/16 09:32
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Lab Sample ID: 320-16959-10
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromochloromethane	ND		67	13	ppb v/v			01/30/16 02:17	168
1,2-Dibromoethane (EDB)	ND		130	13	ppb v/v			01/30/16 02:17	168
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		67	26	ppb v/v			01/30/16 02:17	168
1,2-Dichlorobenzene	ND		67	22	ppb v/v			01/30/16 02:17	168
1,3-Dichlorobenzene	ND		67	18	ppb v/v			01/30/16 02:17	168
1,4-Dichlorobenzene	ND		67	25	ppb v/v			01/30/16 02:17	168
Dichlorodifluoromethane	**45**	**J**	67	24	ppb v/v			01/30/16 02:17	168
1,1-Dichloroethane	ND		50	12	ppb v/v			01/30/16 02:17	168
1,2-Dichloroethane	ND		130	15	ppb v/v			01/30/16 02:17	168
1,1-Dichloroethene	**210**		130	22	ppb v/v			01/30/16 02:17	168
cis-1,2-Dichloroethene	ND		67	15	ppb v/v			01/30/16 02:17	168
trans-1,2-Dichloroethene	ND		67	17	ppb v/v			01/30/16 02:17	168
1,2-Dichloropropane	**160**		67	40	ppb v/v			01/30/16 02:17	168
cis-1,3-Dichloropropene	ND		67	17	ppb v/v			01/30/16 02:17	168
trans-1,3-Dichloropropene	ND		67	15	ppb v/v			01/30/16 02:17	168
Ethylbenzene	ND		67	11	ppb v/v			01/30/16 02:17	168
4-Ethyltoluene	ND		67	31	ppb v/v			01/30/16 02:17	168
Hexachlorobutadiene	ND		340	73	ppb v/v			01/30/16 02:17	168
2-Hexanone	ND		67	15	ppb v/v			01/30/16 02:17	168
4-Methyl-2-pentanone (MIBK)	ND		67	23	ppb v/v			01/30/16 02:17	168
Methylene Chloride	**21**	**J**	67	12	ppb v/v			01/30/16 02:17	168
Styrene	ND		67	9.9	ppb v/v			01/30/16 02:17	168
1,1,2,2-Tetrachloroethane	ND		67	12	ppb v/v			01/30/16 02:17	168
Tetrachloroethene	**220**		67	8.6	ppb v/v			01/30/16 02:17	168
Toluene	ND		67	8.6	ppb v/v			01/30/16 02:17	168
1,1,2-Trichloro-1,2,2-trifluoroethane	**980**		67	27	ppb v/v			01/30/16 02:17	168
1,2,4-Trichlorobenzene	ND		340	73	ppb v/v			01/30/16 02:17	168
1,1,1-Trichloroethane	**30**	**J**	50	11	ppb v/v			01/30/16 02:17	168
1,1,2-Trichloroethane	ND		67	11	ppb v/v			01/30/16 02:17	168
Trichloroethene	**7300**		67	18	ppb v/v			01/30/16 02:17	168
Trichlorofluoromethane	**260**		67	33	ppb v/v			01/30/16 02:17	168
1,2,4-Trimethylbenzene	ND		130	27	ppb v/v			01/30/16 02:17	168
1,3,5-Trimethylbenzene	ND		67	21	ppb v/v			01/30/16 02:17	168
Vinyl chloride	ND		67	20	ppb v/v			01/30/16 02:17	168
m,p-Xylene	ND		130	17	ppb v/v			01/30/16 02:17	168
o-Xylene	ND		67	9.1	ppb v/v			01/30/16 02:17	168

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*70 - 130*		*01/30/16 02:17*	*168*
1,2-Dichloroethane-d4 (Surr)	*98*		*70 - 130*		*01/30/16 02:17*	*168*
Toluene-d8 (Surr)	*99*		*70 - 130*		*01/30/16 02:17*	*168*

Method: TO-15 - Volatile Organic Compounds in Ambient Air - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	**13**	**J**	130	11	ppb v/v			02/02/16 05:46	168
Vinyl acetate	ND		130	24	ppb v/v			02/02/16 05:46	168

Client Sample ID: 098702-001/CWL-UI2-136
Lab Sample ID: 320-16959-10

Date Collected: 01/20/16 09:32
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*93*		*70 - 130*		*02/02/16 05:46*	*168*
1,2-Dichloroethane-d4 (Surr)	*98*		*70 - 130*		*02/02/16 05:46*	*168*
Toluene-d8 (Surr)	*103*		*70 - 130*		*02/02/16 05:46*	*168*

Client Sample ID: 098715-001/CWL-SV FB5
Lab Sample ID: 320-16959-11

Date Collected: 01/20/16 09:44
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			02/02/16 22:16	1
Benzene	ND		0.40	0.079	ppb v/v			02/02/16 22:16	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			02/02/16 22:16	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			02/02/16 22:16	1
Bromoform	ND		0.40	0.070	ppb v/v			02/02/16 22:16	1
Bromomethane	ND		0.80	0.34	ppb v/v			02/02/16 22:16	1
2-Butanone (MEK)	ND	*	0.80	0.20	ppb v/v			02/02/16 22:16	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			02/02/16 22:16	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			02/02/16 22:16	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			02/02/16 22:16	1
Chloroethane	ND		0.80	0.31	ppb v/v			02/02/16 22:16	1
Chloroform	ND		0.30	0.095	ppb v/v			02/02/16 22:16	1
Chloromethane	ND		0.80	0.20	ppb v/v			02/02/16 22:16	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			02/02/16 22:16	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			02/02/16 22:16	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			02/02/16 22:16	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			02/02/16 22:16	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			02/02/16 22:16	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			02/02/16 22:16	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			02/02/16 22:16	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			02/02/16 22:16	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			02/02/16 22:16	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			02/02/16 22:16	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			02/02/16 22:16	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			02/02/16 22:16	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			02/02/16 22:16	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			02/02/16 22:16	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			02/02/16 22:16	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			02/02/16 22:16	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			02/02/16 22:16	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			02/02/16 22:16	1
2-Hexanone	ND		0.40	0.087	ppb v/v			02/02/16 22:16	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			02/02/16 22:16	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			02/02/16 22:16	1
Styrene	ND		0.40	0.059	ppb v/v			02/02/16 22:16	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			02/02/16 22:16	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			02/02/16 22:16	1
Toluene	ND	*	0.40	0.051	ppb v/v			02/02/16 22:16	1

Client Sample ID: 098715-001/CWL-SV FB5

Lab Sample ID: 320-16959-11

Date Collected: 01/20/16 09:44
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			02/02/16 22:16	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			02/02/16 22:16	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			02/02/16 22:16	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			02/02/16 22:16	1
Trichloroethene	ND		0.40	0.11	ppb v/v			02/02/16 22:16	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			02/02/16 22:16	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			02/02/16 22:16	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			02/02/16 22:16	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			02/02/16 22:16	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			02/02/16 22:16	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			02/02/16 22:16	1
o-Xylene	ND		0.40	0.054	ppb v/v			02/02/16 22:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*83*		*70 - 130*		*02/02/16 22:16*	*1*
1,2-Dichloroethane-d4 (Surr)	*97*		*70 - 130*		*02/02/16 22:16*	*1*
Toluene-d8 (Surr)	*103*		*70 - 130*		*02/02/16 22:16*	*1*

Client Sample ID: 098716-001/CWL-D3-120

Lab Sample ID: 320-16959-12

Date Collected: 01/20/16 09:50
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		560	20	ppb v/v			02/02/16 23:01	111
Benzene	ND		44	8.8	ppb v/v			02/02/16 23:01	111
Benzyl chloride	ND		89	18	ppb v/v			02/02/16 23:01	111
Bromodichloromethane	ND		33	7.3	ppb v/v			02/02/16 23:01	111
Bromoform	ND		44	7.8	ppb v/v			02/02/16 23:01	111
Bromomethane	ND		89	37	ppb v/v			02/02/16 23:01	111
2-Butanone (MEK)	ND	*	89	22	ppb v/v			02/02/16 23:01	111
Carbon disulfide	ND		89	8.7	ppb v/v			02/02/16 23:01	111
Carbon tetrachloride	**12**	**J**	89	7.1	ppb v/v			02/02/16 23:01	111
Chlorobenzene	ND		33	7.1	ppb v/v			02/02/16 23:01	111
Chloroethane	ND		89	34	ppb v/v			02/02/16 23:01	111
Chloroform	**170**		33	11	ppb v/v			02/02/16 23:01	111
Chloromethane	ND		89	22	ppb v/v			02/02/16 23:01	111
Dibromochloromethane	ND		44	8.8	ppb v/v			02/02/16 23:01	111
1,2-Dibromoethane (EDB)	ND		89	8.3	ppb v/v			02/02/16 23:01	111
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		44	17	ppb v/v			02/02/16 23:01	111
1,2-Dichlorobenzene	ND		44	14	ppb v/v			02/02/16 23:01	111
1,3-Dichlorobenzene	ND		44	12	ppb v/v			02/02/16 23:01	111
1,4-Dichlorobenzene	ND		44	17	ppb v/v			02/02/16 23:01	111
Dichlorodifluoromethane	**29**	**J**	44	16	ppb v/v			02/02/16 23:01	111
1,1-Dichloroethane	ND		33	8.0	ppb v/v			02/02/16 23:01	111
1,2-Dichloroethane	**17**	**J**	89	9.8	ppb v/v			02/02/16 23:01	111
1,1-Dichloroethene	**210**		89	14	ppb v/v			02/02/16 23:01	111
cis-1,2-Dichloroethene	ND		44	9.9	ppb v/v			02/02/16 23:01	111

Client Sample ID: 098716-001/CWL-D3-120
Lab Sample ID: 320-16959-12

Date Collected: 01/20/16 09:50
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,2-Dichloroethene	ND		44	11	ppb v/v			02/02/16 23:01	111
1,2-Dichloropropane	**65**		44	27	ppb v/v			02/02/16 23:01	111
cis-1,3-Dichloropropene	ND		44	12	ppb v/v			02/02/16 23:01	111
trans-1,3-Dichloropropene	ND		44	9.8	ppb v/v			02/02/16 23:01	111
Ethylbenzene	ND		44	7.0	ppb v/v			02/02/16 23:01	111
4-Ethyltoluene	ND		44	21	ppb v/v			02/02/16 23:01	111
Hexachlorobutadiene	ND		220	48	ppb v/v			02/02/16 23:01	111
2-Hexanone	ND		44	9.7	ppb v/v			02/02/16 23:01	111
4-Methyl-2-pentanone (MIBK)	ND		44	15	ppb v/v			02/02/16 23:01	111
Methylene Chloride	**13**	**J**	44	8.0	ppb v/v			02/02/16 23:01	111
Styrene	ND		44	6.5	ppb v/v			02/02/16 23:01	111
1,1,2,2-Tetrachloroethane	ND		44	7.7	ppb v/v			02/02/16 23:01	111
Tetrachloroethene	**120**		44	5.7	ppb v/v			02/02/16 23:01	111
Toluene	ND	*	44	5.7	ppb v/v			02/02/16 23:01	111
1,1,2-Trichloro-1,2,2-trifluoroethane	**620**		44	18	ppb v/v			02/02/16 23:01	111
1,2,4-Trichlorobenzene	ND		220	48	ppb v/v			02/02/16 23:01	111
1,1,1-Trichloroethane	**13**	**J**	33	7.2	ppb v/v			02/02/16 23:01	111
1,1,2-Trichloroethane	ND		44	7.4	ppb v/v			02/02/16 23:01	111
Trichloroethene	**4100**		44	12	ppb v/v			02/02/16 23:01	111
Trichlorofluoromethane	**180**		44	22	ppb v/v			02/02/16 23:01	111
1,2,4-Trimethylbenzene	ND		89	18	ppb v/v			02/02/16 23:01	111
1,3,5-Trimethylbenzene	ND		44	14	ppb v/v			02/02/16 23:01	111
Vinyl acetate	ND		89	16	ppb v/v			02/02/16 23:01	111
Vinyl chloride	ND		44	13	ppb v/v			02/02/16 23:01	111
m,p-Xylene	ND		89	11	ppb v/v			02/02/16 23:01	111
o-Xylene	ND		44	6.0	ppb v/v			02/02/16 23:01	111

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*91*		*70 - 130*		*02/02/16 23:01*	*111*
1,2-Dichloroethane-d4 (Surr)	*94*		*70 - 130*		*02/02/16 23:01*	*111*
Toluene-d8 (Surr)	*105*		*70 - 130*		*02/02/16 23:01*	*111*

Client Sample ID: 098717-001/CWL-D3-170
Lab Sample ID: 320-16959-13

Date Collected: 01/20/16 09:53
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1100	37	ppb v/v			02/02/16 23:45	210
Benzene	ND		84	17	ppb v/v			02/02/16 23:45	210
Benzyl chloride	ND		170	34	ppb v/v			02/02/16 23:45	210
Bromodichloromethane	ND		63	14	ppb v/v			02/02/16 23:45	210
Bromoform	ND		84	15	ppb v/v			02/02/16 23:45	210
Bromomethane	ND		170	70	ppb v/v			02/02/16 23:45	210
2-Butanone (MEK)	ND	*	170	42	ppb v/v			02/02/16 23:45	210
Carbon disulfide	ND		170	16	ppb v/v			02/02/16 23:45	210
Carbon tetrachloride	**21**	**J**	170	13	ppb v/v			02/02/16 23:45	210

Client Sample ID: 098717-001/CWL-D3-170

Date Collected: 01/20/16 09:53
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Lab Sample ID: 320-16959-13

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	ND		63	13	ppb v/v			02/02/16 23:45	210
Chloroethane	ND		170	65	ppb v/v			02/02/16 23:45	210
Chloroform	**230**		63	20	ppb v/v			02/02/16 23:45	210
Chloromethane	ND		170	41	ppb v/v			02/02/16 23:45	210
Dibromochloromethane	ND		84	17	ppb v/v			02/02/16 23:45	210
1,2-Dibromoethane (EDB)	ND		170	16	ppb v/v			02/02/16 23:45	210
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		84	33	ppb v/v			02/02/16 23:45	210
1,2-Dichlorobenzene	ND		84	27	ppb v/v			02/02/16 23:45	210
1,3-Dichlorobenzene	ND		84	23	ppb v/v			02/02/16 23:45	210
1,4-Dichlorobenzene	ND		84	31	ppb v/v			02/02/16 23:45	210
Dichlorodifluoromethane	**48**	**J**	84	30	ppb v/v			02/02/16 23:45	210
1,1-Dichloroethane	ND		63	15	ppb v/v			02/02/16 23:45	210
1,2-Dichloroethane	**25**	**J**	170	18	ppb v/v			02/02/16 23:45	210
1,1-Dichloroethene	**340**		170	27	ppb v/v			02/02/16 23:45	210
cis-1,2-Dichloroethene	ND		84	19	ppb v/v			02/02/16 23:45	210
trans-1,2-Dichloroethene	ND		84	21	ppb v/v			02/02/16 23:45	210
1,2-Dichloropropane	**140**		84	50	ppb v/v			02/02/16 23:45	210
cis-1,3-Dichloropropene	ND		84	22	ppb v/v			02/02/16 23:45	210
trans-1,3-Dichloropropene	ND		84	18	ppb v/v			02/02/16 23:45	210
Ethylbenzene	ND		84	13	ppb v/v			02/02/16 23:45	210
4-Ethyltoluene	ND		84	39	ppb v/v			02/02/16 23:45	210
Hexachlorobutadiene	ND		420	91	ppb v/v			02/02/16 23:45	210
2-Hexanone	ND		84	18	ppb v/v			02/02/16 23:45	210
4-Methyl-2-pentanone (MIBK)	ND		84	28	ppb v/v			02/02/16 23:45	210
Methylene Chloride	**27**	**J**	84	15	ppb v/v			02/02/16 23:45	210
Styrene	ND		84	12	ppb v/v			02/02/16 23:45	210
1,1,2,2-Tetrachloroethane	ND		84	14	ppb v/v			02/02/16 23:45	210
Tetrachloroethene	**190**		84	11	ppb v/v			02/02/16 23:45	210
Toluene	ND	*	84	11	ppb v/v			02/02/16 23:45	210
1,1,2-Trichloro-1,2,2-trifluoroethane	**980**		84	34	ppb v/v			02/02/16 23:45	210
1,2,4-Trichlorobenzene	ND		420	91	ppb v/v			02/02/16 23:45	210
1,1,1-Trichloroethane	**15**	**J**	63	14	ppb v/v			02/02/16 23:45	210
1,1,2-Trichloroethane	ND		84	14	ppb v/v			02/02/16 23:45	210
Trichloroethene	**6800**		84	22	ppb v/v			02/02/16 23:45	210
Trichlorofluoromethane	**270**		84	41	ppb v/v			02/02/16 23:45	210
1,2,4-Trimethylbenzene	ND		170	34	ppb v/v			02/02/16 23:45	210
1,3,5-Trimethylbenzene	ND		84	26	ppb v/v			02/02/16 23:45	210
Vinyl acetate	ND		170	30	ppb v/v			02/02/16 23:45	210
Vinyl chloride	ND		84	25	ppb v/v			02/02/16 23:45	210
m,p-Xylene	ND		170	21	ppb v/v			02/02/16 23:45	210
o-Xylene	ND		84	11	ppb v/v			02/02/16 23:45	210

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*92*		*70 - 130*		*02/02/16 23:45*	*210*
1,2-Dichloroethane-d4 (Surr)	*96*		*70 - 130*		*02/02/16 23:45*	*210*
Toluene-d8 (Surr)	*105*		*70 - 130*		*02/02/16 23:45*	*210*

Client Sample ID: 098718-001/CWL-D3-170
Lab Sample ID: 320-16959-14

Date Collected: 01/20/16 09:54
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1100	38	ppb v/v			02/03/16 00:30	215
Benzene	ND		86	17	ppb v/v			02/03/16 00:30	215
Benzyl chloride	ND		170	35	ppb v/v			02/03/16 00:30	215
Bromodichloromethane	ND		65	14	ppb v/v			02/03/16 00:30	215
Bromoform	ND		86	15	ppb v/v			02/03/16 00:30	215
Bromomethane	ND		170	72	ppb v/v			02/03/16 00:30	215
2-Butanone (MEK)	ND	*	170	43	ppb v/v			02/03/16 00:30	215
Carbon disulfide	ND		170	17	ppb v/v			02/03/16 00:30	215
Carbon tetrachloride	**25**	**J**	170	14	ppb v/v			02/03/16 00:30	215
Chlorobenzene	ND		65	14	ppb v/v			02/03/16 00:30	215
Chloroethane	ND		170	66	ppb v/v			02/03/16 00:30	215
Chloroform	**280**		65	20	ppb v/v			02/03/16 00:30	215
Chloromethane	ND		170	42	ppb v/v			02/03/16 00:30	215
Dibromochloromethane	ND		86	17	ppb v/v			02/03/16 00:30	215
1,2-Dibromoethane (EDB)	ND		170	16	ppb v/v			02/03/16 00:30	215
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		86	33	ppb v/v			02/03/16 00:30	215
1,2-Dichlorobenzene	ND		86	28	ppb v/v			02/03/16 00:30	215
1,3-Dichlorobenzene	ND		86	24	ppb v/v			02/03/16 00:30	215
1,4-Dichlorobenzene	ND		86	32	ppb v/v			02/03/16 00:30	215
Dichlorodifluoromethane	**56**	**J**	86	31	ppb v/v			02/03/16 00:30	215
1,1-Dichloroethane	ND		65	15	ppb v/v			02/03/16 00:30	215
1,2-Dichloroethane	**30**	**J**	170	19	ppb v/v			02/03/16 00:30	215
1,1-Dichloroethene	**430**		170	28	ppb v/v			02/03/16 00:30	215
cis-1,2-Dichloroethene	ND		86	19	ppb v/v			02/03/16 00:30	215
trans-1,2-Dichloroethene	ND		86	22	ppb v/v			02/03/16 00:30	215
1,2-Dichloropropane	**130**		86	52	ppb v/v			02/03/16 00:30	215
cis-1,3-Dichloropropene	ND		86	22	ppb v/v			02/03/16 00:30	215
trans-1,3-Dichloropropene	ND		86	19	ppb v/v			02/03/16 00:30	215
Ethylbenzene	ND		86	14	ppb v/v			02/03/16 00:30	215
4-Ethyltoluene	ND		86	40	ppb v/v			02/03/16 00:30	215
Hexachlorobutadiene	ND		430	93	ppb v/v			02/03/16 00:30	215
2-Hexanone	ND		86	19	ppb v/v			02/03/16 00:30	215
4-Methyl-2-pentanone (MIBK)	ND		86	29	ppb v/v			02/03/16 00:30	215
Methylene Chloride	**29**	**J**	86	15	ppb v/v			02/03/16 00:30	215
Styrene	ND		86	13	ppb v/v			02/03/16 00:30	215
1,1,2,2-Tetrachloroethane	ND		86	15	ppb v/v			02/03/16 00:30	215
Tetrachloroethene	**210**		86	11	ppb v/v			02/03/16 00:30	215
Toluene	ND	*	86	11	ppb v/v			02/03/16 00:30	215
1,1,2-Trichloro-1,2,2-trifluoroethane	**1200**		86	35	ppb v/v			02/03/16 00:30	215
1,2,4-Trichlorobenzene	ND		430	93	ppb v/v			02/03/16 00:30	215
1,1,1-Trichloroethane	**18**	**J**	65	14	ppb v/v			02/03/16 00:30	215
1,1,2-Trichloroethane	ND		86	14	ppb v/v			02/03/16 00:30	215
Trichloroethene	**8500**		86	23	ppb v/v			02/03/16 00:30	215
Trichlorofluoromethane	**340**		86	42	ppb v/v			02/03/16 00:30	215
1,2,4-Trimethylbenzene	ND		170	35	ppb v/v			02/03/16 00:30	215
1,3,5-Trimethylbenzene	ND		86	27	ppb v/v			02/03/16 00:30	215
Vinyl acetate	ND		170	31	ppb v/v			02/03/16 00:30	215
Vinyl chloride	ND		86	26	ppb v/v			02/03/16 00:30	215

Client Sample ID: 098718-001/CWL-D3-170

Lab Sample ID: 320-16959-14
Matrix: Air
Date Collected: 01/20/16 09:54
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		170	22	ppb v/v			02/03/16 00:30	215
o-Xylene	ND		86	12	ppb v/v			02/03/16 00:30	215

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*90*		*70 - 130*		*02/03/16 00:30*	*215*
1,2-Dichloroethane-d4 (Surr)	*95*		*70 - 130*		*02/03/16 00:30*	*215*
Toluene-d8 (Surr)	*114*		*70 - 130*		*02/03/16 00:30*	*215*

Client Sample ID: 098719-001/CWL-D3-350

Lab Sample ID: 320-16959-15
Matrix: Air
Date Collected: 01/20/16 10:05
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1100	39	ppb v/v			02/03/16 01:15	221
Benzene	ND		88	17	ppb v/v			02/03/16 01:15	221
Benzyl chloride	ND		180	36	ppb v/v			02/03/16 01:15	221
Bromodichloromethane	ND		66	15	ppb v/v			02/03/16 01:15	221
Bromoform	ND		88	15	ppb v/v			02/03/16 01:15	221
Bromomethane	ND		180	74	ppb v/v			02/03/16 01:15	221
2-Butanone (MEK)	ND	*	180	44	ppb v/v			02/03/16 01:15	221
Carbon disulfide	ND		180	17	ppb v/v			02/03/16 01:15	221
Carbon tetrachloride	**22**	**J**	180	14	ppb v/v			02/03/16 01:15	221
Chlorobenzene	ND		66	14	ppb v/v			02/03/16 01:15	221
Chloroethane	ND		180	68	ppb v/v			02/03/16 01:15	221
Chloroform	**210**		66	21	ppb v/v			02/03/16 01:15	221
Chloromethane	ND		180	44	ppb v/v			02/03/16 01:15	221
Dibromochloromethane	ND		88	17	ppb v/v			02/03/16 01:15	221
1,2-Dibromoethane (EDB)	ND		180	17	ppb v/v			02/03/16 01:15	221
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		88	34	ppb v/v			02/03/16 01:15	221
1,2-Dichlorobenzene	ND		88	29	ppb v/v			02/03/16 01:15	221
1,3-Dichlorobenzene	ND		88	24	ppb v/v			02/03/16 01:15	221
1,4-Dichlorobenzene	ND		88	33	ppb v/v			02/03/16 01:15	221
Dichlorodifluoromethane	**56**	**J**	88	32	ppb v/v			02/03/16 01:15	221
1,1-Dichloroethane	ND		66	16	ppb v/v			02/03/16 01:15	221
1,2-Dichloroethane	ND		180	19	ppb v/v			02/03/16 01:15	221
1,1-Dichloroethene	**410**		180	29	ppb v/v			02/03/16 01:15	221
cis-1,2-Dichloroethene	ND		88	20	ppb v/v			02/03/16 01:15	221
trans-1,2-Dichloroethene	ND		88	22	ppb v/v			02/03/16 01:15	221
1,2-Dichloropropane	**120**		88	53	ppb v/v			02/03/16 01:15	221
cis-1,3-Dichloropropene	ND		88	23	ppb v/v			02/03/16 01:15	221
trans-1,3-Dichloropropene	ND		88	19	ppb v/v			02/03/16 01:15	221
Ethylbenzene	ND		88	14	ppb v/v			02/03/16 01:15	221
4-Ethyltoluene	ND		88	41	ppb v/v			02/03/16 01:15	221
Hexachlorobutadiene	ND		440	95	ppb v/v			02/03/16 01:15	221
2-Hexanone	ND		88	19	ppb v/v			02/03/16 01:15	221
4-Methyl-2-pentanone (MIBK)	ND		88	30	ppb v/v			02/03/16 01:15	221
Methylene Chloride	**140**		88	16	ppb v/v			02/03/16 01:15	221

Client Sample ID: 098719-001/CWL-D3-350
Lab Sample ID: 320-16959-15
Date Collected: 01/20/16 10:05
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		88	13	ppb v/v			02/03/16 01:15	221
1,1,2,2-Tetrachloroethane	ND		88	15	ppb v/v			02/03/16 01:15	221
Tetrachloroethene	**200**		88	11	ppb v/v			02/03/16 01:15	221
Toluene	ND	*	88	11	ppb v/v			02/03/16 01:15	221
1,1,2-Trichloro-1,2,2-trifluoroethane	**1100**		88	36	ppb v/v			02/03/16 01:15	221
1,2,4-Trichlorobenzene	ND		440	96	ppb v/v			02/03/16 01:15	221
1,1,1-Trichloroethane	ND		66	14	ppb v/v			02/03/16 01:15	221
1,1,2-Trichloroethane	ND		88	15	ppb v/v			02/03/16 01:15	221
Trichloroethene	**7800**		88	23	ppb v/v			02/03/16 01:15	221
Trichlorofluoromethane	**340**		88	43	ppb v/v			02/03/16 01:15	221
1,2,4-Trimethylbenzene	ND		180	36	ppb v/v			02/03/16 01:15	221
1,3,5-Trimethylbenzene	ND		88	28	ppb v/v			02/03/16 01:15	221
Vinyl acetate	ND		180	32	ppb v/v			02/03/16 01:15	221
Vinyl chloride	ND		88	27	ppb v/v			02/03/16 01:15	221
m,p-Xylene	ND		180	22	ppb v/v			02/03/16 01:15	221
o-Xylene	ND		88	12	ppb v/v			02/03/16 01:15	221

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*86*		*70 - 130*		*02/03/16 01:15*	*221*
1,2-Dichloroethane-d4 (Surr)	*96*		*70 - 130*		*02/03/16 01:15*	*221*
Toluene-d8 (Surr)	*105*		*70 - 130*		*02/03/16 01:15*	*221*

Client Sample ID: 098720-001/CWL-D3-350
Lab Sample ID: 320-16959-16
Date Collected: 01/20/16 10:05
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	**23**	**J**	150	5.3	ppb v/v			02/03/16 02:00	29.5
Benzene	**4.2**	**J**	12	2.3	ppb v/v			02/03/16 02:00	29.5
Benzyl chloride	ND		24	4.8	ppb v/v			02/03/16 02:00	29.5
Bromodichloromethane	ND		8.9	1.9	ppb v/v			02/03/16 02:00	29.5
Bromoform	ND		12	2.1	ppb v/v			02/03/16 02:00	29.5
Bromomethane	ND		24	9.9	ppb v/v			02/03/16 02:00	29.5
2-Butanone (MEK)	ND	*	24	5.9	ppb v/v			02/03/16 02:00	29.5
Carbon disulfide	ND		24	2.3	ppb v/v			02/03/16 02:00	29.5
Carbon tetrachloride	**20**	**J**	24	1.9	ppb v/v			02/03/16 02:00	29.5
Chlorobenzene	ND		8.9	1.9	ppb v/v			02/03/16 02:00	29.5
Chloroethane	ND		24	9.1	ppb v/v			02/03/16 02:00	29.5
Chloroform	**150**		8.9	2.8	ppb v/v			02/03/16 02:00	29.5
Chloromethane	ND		24	5.8	ppb v/v			02/03/16 02:00	29.5
Dibromochloromethane	ND		12	2.3	ppb v/v			02/03/16 02:00	29.5
1,2-Dibromoethane (EDB)	ND		24	2.2	ppb v/v			02/03/16 02:00	29.5
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		12	4.6	ppb v/v			02/03/16 02:00	29.5
1,2-Dichlorobenzene	ND		12	3.8	ppb v/v			02/03/16 02:00	29.5
1,3-Dichlorobenzene	ND		12	3.2	ppb v/v			02/03/16 02:00	29.5
1,4-Dichlorobenzene	ND		12	4.4	ppb v/v			02/03/16 02:00	29.5

Client Sample ID: 098720-001/CWL-D3-350
Date Collected: 01/20/16 10:05
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Lab Sample ID: 320-16959-16
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	**42**		12	4.3	ppb v/v			02/03/16 02:00	29.5
1,1-Dichloroethane	**10**		8.9	2.1	ppb v/v			02/03/16 02:00	29.5
1,2-Dichloroethane	**18**	**J**	24	2.6	ppb v/v			02/03/16 02:00	29.5
1,1-Dichloroethene	**320**		24	3.8	ppb v/v			02/03/16 02:00	29.5
cis-1,2-Dichloroethene	ND		12	2.6	ppb v/v			02/03/16 02:00	29.5
trans-1,2-Dichloroethene	ND		12	3.0	ppb v/v			02/03/16 02:00	29.5
1,2-Dichloropropane	**110**		12	7.1	ppb v/v			02/03/16 02:00	29.5
cis-1,3-Dichloropropene	ND		12	3.1	ppb v/v			02/03/16 02:00	29.5
trans-1,3-Dichloropropene	ND		12	2.6	ppb v/v			02/03/16 02:00	29.5
Ethylbenzene	ND		12	1.9	ppb v/v			02/03/16 02:00	29.5
4-Ethyltoluene	ND		12	5.5	ppb v/v			02/03/16 02:00	29.5
Hexachlorobutadiene	ND		59	13	ppb v/v			02/03/16 02:00	29.5
2-Hexanone	ND		12	2.6	ppb v/v			02/03/16 02:00	29.5
4-Methyl-2-pentanone (MIBK)	ND		12	4.0	ppb v/v			02/03/16 02:00	29.5
Methylene Chloride	**110**		12	2.1	ppb v/v			02/03/16 02:00	29.5
Styrene	ND		12	1.7	ppb v/v			02/03/16 02:00	29.5
1,1,2,2-Tetrachloroethane	ND		12	2.0	ppb v/v			02/03/16 02:00	29.5
Tetrachloroethene	**130**		12	1.5	ppb v/v			02/03/16 02:00	29.5
Toluene	**2.1**	**J B ***	12	1.5	ppb v/v			02/03/16 02:00	29.5
1,1,2-Trichloro-1,2,2-trifluoroethane	**860**		12	4.8	ppb v/v			02/03/16 02:00	29.5
1,2,4-Trichlorobenzene	ND		59	13	ppb v/v			02/03/16 02:00	29.5
1,1,1-Trichloroethane	**10**		8.9	1.9	ppb v/v			02/03/16 02:00	29.5
1,1,2-Trichloroethane	ND		12	2.0	ppb v/v			02/03/16 02:00	29.5
Trichlorofluoromethane	**250**		12	5.8	ppb v/v			02/03/16 02:00	29.5
1,2,4-Trimethylbenzene	ND		24	4.8	ppb v/v			02/03/16 02:00	29.5
1,3,5-Trimethylbenzene	ND		12	3.7	ppb v/v			02/03/16 02:00	29.5
Vinyl acetate	ND		24	4.3	ppb v/v			02/03/16 02:00	29.5
Vinyl chloride	ND		12	3.5	ppb v/v			02/03/16 02:00	29.5
m,p-Xylene	ND		24	3.0	ppb v/v			02/03/16 02:00	29.5
o-Xylene	ND		12	1.6	ppb v/v			02/03/16 02:00	29.5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*90*		*70 - 130*		*02/03/16 02:00*	*29.5*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 130*		*02/03/16 02:00*	*29.5*
Toluene-d8 (Surr)	*102*		*70 - 130*		*02/03/16 02:00*	*29.5*

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	**6800**		45	12	ppb v/v			02/03/16 08:25	113

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*92*		*70 - 130*		*02/03/16 08:25*	*113*
1,2-Dichloroethane-d4 (Surr)	*98*		*70 - 130*		*02/03/16 08:25*	*113*
Toluene-d8 (Surr)	*105*		*70 - 130*		*02/03/16 08:25*	*113*

Client Sample ID: 098721-001/CWL-D3-440
Lab Sample ID: 320-16959-17

Date Collected: 01/20/16 10:13
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1200	42	ppb v/v			02/03/16 02:45	238
Benzene	ND		95	19	ppb v/v			02/03/16 02:45	238
Benzyl chloride	ND		190	39	ppb v/v			02/03/16 02:45	238
Bromodichloromethane	ND		71	16	ppb v/v			02/03/16 02:45	238
Bromoform	ND		95	17	ppb v/v			02/03/16 02:45	238
Bromomethane	ND		190	80	ppb v/v			02/03/16 02:45	238
2-Butanone (MEK)	ND	*	190	47	ppb v/v			02/03/16 02:45	238
Carbon disulfide	ND		190	19	ppb v/v			02/03/16 02:45	238
Carbon tetrachloride	**20**	**J**	190	15	ppb v/v			02/03/16 02:45	238
Chlorobenzene	ND		71	15	ppb v/v			02/03/16 02:45	238
Chloroethane	ND		190	73	ppb v/v			02/03/16 02:45	238
Chloroform	**190**		71	23	ppb v/v			02/03/16 02:45	238
Chloromethane	ND		190	47	ppb v/v			02/03/16 02:45	238
Dibromochloromethane	ND		95	19	ppb v/v			02/03/16 02:45	238
1,2-Dibromoethane (EDB)	ND		190	18	ppb v/v			02/03/16 02:45	238
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		95	37	ppb v/v			02/03/16 02:45	238
1,2-Dichlorobenzene	ND		95	31	ppb v/v			02/03/16 02:45	238
1,3-Dichlorobenzene	ND		95	26	ppb v/v			02/03/16 02:45	238
1,4-Dichlorobenzene	ND		95	35	ppb v/v			02/03/16 02:45	238
Dichlorodifluoromethane	**41**	**J**	95	35	ppb v/v			02/03/16 02:45	238
1,1-Dichloroethane	ND		71	17	ppb v/v			02/03/16 02:45	238
1,2-Dichloroethane	ND		190	21	ppb v/v			02/03/16 02:45	238
1,1-Dichloroethene	**350**		190	31	ppb v/v			02/03/16 02:45	238
cis-1,2-Dichloroethene	ND		95	21	ppb v/v			02/03/16 02:45	238
trans-1,2-Dichloroethene	ND		95	24	ppb v/v			02/03/16 02:45	238
1,2-Dichloropropane	**87**	**J**	95	57	ppb v/v			02/03/16 02:45	238
cis-1,3-Dichloropropene	ND		95	25	ppb v/v			02/03/16 02:45	238
trans-1,3-Dichloropropene	ND		95	21	ppb v/v			02/03/16 02:45	238
Ethylbenzene	ND		95	15	ppb v/v			02/03/16 02:45	238
4-Ethyltoluene	ND		95	45	ppb v/v			02/03/16 02:45	238
Hexachlorobutadiene	ND		480	100	ppb v/v			02/03/16 02:45	238
2-Hexanone	ND		95	21	ppb v/v			02/03/16 02:45	238
4-Methyl-2-pentanone (MIBK)	ND		95	32	ppb v/v			02/03/16 02:45	238
Methylene Chloride	**34**	**J**	95	17	ppb v/v			02/03/16 02:45	238
Styrene	ND		95	14	ppb v/v			02/03/16 02:45	238
1,1,2,2-Tetrachloroethane	ND		95	16	ppb v/v			02/03/16 02:45	238
Tetrachloroethene	**160**		95	12	ppb v/v			02/03/16 02:45	238
Toluene	ND	*	95	12	ppb v/v			02/03/16 02:45	238
1,1,2-Trichloro-1,2,2-trifluoroethane	**1100**		95	39	ppb v/v			02/03/16 02:45	238
1,2,4-Trichlorobenzene	ND		480	100	ppb v/v			02/03/16 02:45	238
1,1,1-Trichloroethane	ND		71	15	ppb v/v			02/03/16 02:45	238
1,1,2-Trichloroethane	ND		95	16	ppb v/v			02/03/16 02:45	238
Trichloroethene	**6300**		95	25	ppb v/v			02/03/16 02:45	238
Trichlorofluoromethane	**310**		95	47	ppb v/v			02/03/16 02:45	238
1,2,4-Trimethylbenzene	ND		190	39	ppb v/v			02/03/16 02:45	238
1,3,5-Trimethylbenzene	ND		95	30	ppb v/v			02/03/16 02:45	238
Vinyl acetate	ND		190	35	ppb v/v			02/03/16 02:45	238
Vinyl chloride	ND		95	29	ppb v/v			02/03/16 02:45	238

Client Sample ID: 098721-001/CWL-D3-440
Lab Sample ID: 320-16959-17

Date Collected: 01/20/16 10:13
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		190	24	ppb v/v			02/03/16 02:45	238
o-Xylene	ND		95	13	ppb v/v			02/03/16 02:45	238

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*93*		*70 - 130*		*02/03/16 02:45*	*238*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 130*		*02/03/16 02:45*	*238*
Toluene-d8 (Surr)	*104*		*70 - 130*		*02/03/16 02:45*	*238*

Client Sample ID: 098722-001/CWL-D3-480
Lab Sample ID: 320-16959-18

Date Collected: 01/20/16 10:18
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	**1.9**	**J**	5.0	0.18	ppb v/v			02/03/16 03:37	1
Benzene	ND		0.40	0.079	ppb v/v			02/03/16 03:37	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			02/03/16 03:37	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			02/03/16 03:37	1
Bromoform	ND		0.40	0.070	ppb v/v			02/03/16 03:37	1
Bromomethane	ND		0.80	0.34	ppb v/v			02/03/16 03:37	1
2-Butanone (MEK)	**0.26**	**J ***	0.80	0.20	ppb v/v			02/03/16 03:37	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			02/03/16 03:37	1
Carbon tetrachloride	**0.12**	**J**	0.80	0.064	ppb v/v			02/03/16 03:37	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			02/03/16 03:37	1
Chloroethane	ND		0.80	0.31	ppb v/v			02/03/16 03:37	1
Chloroform	**1.1**		0.30	0.095	ppb v/v			02/03/16 03:37	1
Chloromethane	**0.32**	**J**	0.80	0.20	ppb v/v			02/03/16 03:37	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			02/03/16 03:37	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			02/03/16 03:37	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			02/03/16 03:37	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			02/03/16 03:37	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			02/03/16 03:37	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			02/03/16 03:37	1
Dichlorodifluoromethane	**0.65**		0.40	0.15	ppb v/v			02/03/16 03:37	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			02/03/16 03:37	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			02/03/16 03:37	1
1,1-Dichloroethene	**1.1**		0.80	0.13	ppb v/v			02/03/16 03:37	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			02/03/16 03:37	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			02/03/16 03:37	1
1,2-Dichloropropane	**0.53**		0.40	0.24	ppb v/v			02/03/16 03:37	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			02/03/16 03:37	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			02/03/16 03:37	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			02/03/16 03:37	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			02/03/16 03:37	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			02/03/16 03:37	1
2-Hexanone	ND		0.40	0.087	ppb v/v			02/03/16 03:37	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			02/03/16 03:37	1
Methylene Chloride	**0.20**	**J**	0.40	0.072	ppb v/v			02/03/16 03:37	1

Client Sample ID: 098722-001/CWL-D3-480

Lab Sample ID: 320-16959-18

Date Collected: 01/20/16 10:18
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		0.40	0.059	ppb v/v			02/03/16 03:37	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			02/03/16 03:37	1
Tetrachloroethene	**0.75**		0.40	0.051	ppb v/v			02/03/16 03:37	1
Toluene	**0.066**	**J B ***	0.40	0.051	ppb v/v			02/03/16 03:37	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**3.1**		0.40	0.16	ppb v/v			02/03/16 03:37	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			02/03/16 03:37	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			02/03/16 03:37	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			02/03/16 03:37	1
Trichloroethene	**23**		0.40	0.11	ppb v/v			02/03/16 03:37	1
Trichlorofluoromethane	**1.1**		0.40	0.20	ppb v/v			02/03/16 03:37	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			02/03/16 03:37	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			02/03/16 03:37	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			02/03/16 03:37	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			02/03/16 03:37	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			02/03/16 03:37	1
o-Xylene	ND		0.40	0.054	ppb v/v			02/03/16 03:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*95*		*70 - 130*		*02/03/16 03:37*	*1*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 130*		*02/03/16 03:37*	*1*
Toluene-d8 (Surr)	*103*		*70 - 130*		*02/03/16 03:37*	*1*

Client Sample ID: 098709-001-CWL-SV FB4

Lab Sample ID: 320-16959-19

Date Collected: 01/20/16 10:40
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			02/03/16 18:56	1
Benzene	ND		0.40	0.079	ppb v/v			02/03/16 18:56	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			02/03/16 18:56	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			02/03/16 18:56	1
Bromoform	ND		0.40	0.070	ppb v/v			02/03/16 18:56	1
Bromomethane	ND		0.80	0.34	ppb v/v			02/03/16 18:56	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			02/03/16 18:56	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			02/03/16 18:56	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			02/03/16 18:56	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			02/03/16 18:56	1
Chloroethane	ND		0.80	0.31	ppb v/v			02/03/16 18:56	1
Chloroform	ND		0.30	0.095	ppb v/v			02/03/16 18:56	1
Chloromethane	ND		0.80	0.20	ppb v/v			02/03/16 18:56	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			02/03/16 18:56	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			02/03/16 18:56	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			02/03/16 18:56	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			02/03/16 18:56	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			02/03/16 18:56	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			02/03/16 18:56	1

Client Sample ID: 098709-001-CWL-SV FB4

Lab Sample ID: 320-16959-19

Date Collected: 01/20/16 10:40
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			02/03/16 18:56	1
1,1-Dichloroethane	**1.1**		0.30	0.072	ppb v/v			02/03/16 18:56	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			02/03/16 18:56	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			02/03/16 18:56	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			02/03/16 18:56	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			02/03/16 18:56	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			02/03/16 18:56	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			02/03/16 18:56	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			02/03/16 18:56	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			02/03/16 18:56	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			02/03/16 18:56	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			02/03/16 18:56	1
2-Hexanone	ND		0.40	0.087	ppb v/v			02/03/16 18:56	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			02/03/16 18:56	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			02/03/16 18:56	1
Styrene	ND		0.40	0.059	ppb v/v			02/03/16 18:56	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			02/03/16 18:56	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			02/03/16 18:56	1
Toluene	**0.071**	**J**	0.40	0.051	ppb v/v			02/03/16 18:56	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			02/03/16 18:56	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			02/03/16 18:56	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			02/03/16 18:56	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			02/03/16 18:56	1
Trichloroethene	ND		0.40	0.11	ppb v/v			02/03/16 18:56	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			02/03/16 18:56	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			02/03/16 18:56	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			02/03/16 18:56	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			02/03/16 18:56	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			02/03/16 18:56	1
m,p-Xylene	**0.12**	**J**	0.80	0.10	ppb v/v			02/03/16 18:56	1
o-Xylene	**0.059**	**J**	0.40	0.054	ppb v/v			02/03/16 18:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*92*		*70 - 130*		*02/03/16 18:56*	*1*
1,2-Dichloroethane-d4 (Surr)	*99*		*70 - 130*		*02/03/16 18:56*	*1*
Toluene-d8 (Surr)	*93*		*70 - 130*		*02/03/16 18:56*	*1*

Client Sample ID: 098710-001/CWL-D2-120

Lab Sample ID: 320-16959-20

Date Collected: 01/20/16 10:49
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1900	69	ppb v/v			02/03/16 19:41	388
Benzene	ND		160	31	ppb v/v			02/03/16 19:41	388
Benzyl chloride	ND		310	63	ppb v/v			02/03/16 19:41	388
Bromodichloromethane	ND		120	26	ppb v/v			02/03/16 19:41	388
Bromoform	ND		160	27	ppb v/v			02/03/16 19:41	388

Client Sample ID: 098710-001/CWL-D2-120

Date Collected: 01/20/16 10:49
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Lab Sample ID: 320-16959-20

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromomethane	ND		310	130	ppb v/v			02/03/16 19:41	388
2-Butanone (MEK)	ND		310	77	ppb v/v			02/03/16 19:41	388
Carbon disulfide	ND		310	30	ppb v/v			02/03/16 19:41	388
Carbon tetrachloride	ND		310	25	ppb v/v			02/03/16 19:41	388
Chlorobenzene	ND		120	25	ppb v/v			02/03/16 19:41	388
Chloroethane	ND		310	120	ppb v/v			02/03/16 19:41	388
Chloroform	**590**		120	37	ppb v/v			02/03/16 19:41	388
Chloromethane	ND		310	76	ppb v/v			02/03/16 19:41	388
Dibromochloromethane	ND		160	31	ppb v/v			02/03/16 19:41	388
1,2-Dibromoethane (EDB)	ND		310	29	ppb v/v			02/03/16 19:41	388
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		160	60	ppb v/v			02/03/16 19:41	388
1,2-Dichlorobenzene	ND		160	50	ppb v/v			02/03/16 19:41	388
1,3-Dichlorobenzene	ND		160	43	ppb v/v			02/03/16 19:41	388
1,4-Dichlorobenzene	ND		160	58	ppb v/v			02/03/16 19:41	388
Dichlorodifluoromethane	**77**	**J**	160	56	ppb v/v			02/03/16 19:41	388
1,1-Dichloroethane	ND		120	28	ppb v/v			02/03/16 19:41	388
1,2-Dichloroethane	ND		310	34	ppb v/v			02/03/16 19:41	388
1,1-Dichloroethene	**700**		310	50	ppb v/v			02/03/16 19:41	388
cis-1,2-Dichloroethene	ND		160	35	ppb v/v			02/03/16 19:41	388
trans-1,2-Dichloroethene	ND		160	39	ppb v/v			02/03/16 19:41	388
1,2-Dichloropropane	**120**	**J**	160	93	ppb v/v			02/03/16 19:41	388
cis-1,3-Dichloropropene	ND		160	40	ppb v/v			02/03/16 19:41	388
trans-1,3-Dichloropropene	ND		160	34	ppb v/v			02/03/16 19:41	388
Ethylbenzene	ND		160	24	ppb v/v			02/03/16 19:41	388
4-Ethyltoluene	ND		160	73	ppb v/v			02/03/16 19:41	388
Hexachlorobutadiene	ND		780	170	ppb v/v			02/03/16 19:41	388
2-Hexanone	ND		160	34	ppb v/v			02/03/16 19:41	388
4-Methyl-2-pentanone (MIBK)	ND		160	52	ppb v/v			02/03/16 19:41	388
Methylene Chloride	**44**	**J**	160	28	ppb v/v			02/03/16 19:41	388
Styrene	ND		160	23	ppb v/v			02/03/16 19:41	388
1,1,2,2-Tetrachloroethane	ND		160	27	ppb v/v			02/03/16 19:41	388
Tetrachloroethene	**510**		160	20	ppb v/v			02/03/16 19:41	388
Toluene	ND		160	20	ppb v/v			02/03/16 19:41	388
1,1,2-Trichloro-1,2,2-trifluoroethane	**1800**		160	63	ppb v/v			02/03/16 19:41	388
1,2,4-Trichlorobenzene	ND		780	170	ppb v/v			02/03/16 19:41	388
1,1,1-Trichloroethane	**45**	**J**	120	25	ppb v/v			02/03/16 19:41	388
1,1,2-Trichloroethane	ND		160	26	ppb v/v			02/03/16 19:41	388
Trichloroethene	**11000**		160	41	ppb v/v			02/03/16 19:41	388
Trichlorofluoromethane	**480**		160	76	ppb v/v			02/03/16 19:41	388
1,2,4-Trimethylbenzene	ND		310	63	ppb v/v			02/03/16 19:41	388
1,3,5-Trimethylbenzene	ND		160	49	ppb v/v			02/03/16 19:41	388
Vinyl acetate	ND		310	56	ppb v/v			02/03/16 19:41	388
Vinyl chloride	ND		160	47	ppb v/v			02/03/16 19:41	388
m,p-Xylene	ND		310	39	ppb v/v			02/03/16 19:41	388
o-Xylene	ND		160	21	ppb v/v			02/03/16 19:41	388

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*70 - 130*		*02/03/16 19:41*	*388*

Client Sample ID: 098710-001/CWL-D2-120
Lab Sample ID: 320-16959-20

Date Collected: 01/20/16 10:49
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*70 - 130*		*02/03/16 19:41*	*388*
Toluene-d8 (Surr)	*104*		*70 - 130*		*02/03/16 19:41*	*388*

Client Sample ID: 098711-001/CWL-D2-240
Lab Sample ID: 320-16959-21

Date Collected: 01/20/16 10:52
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1600	56	ppb v/v			02/03/16 20:26	312
Benzene	ND		120	25	ppb v/v			02/03/16 20:26	312
Benzyl chloride	ND		250	51	ppb v/v			02/03/16 20:26	312
Bromodichloromethane	ND		94	21	ppb v/v			02/03/16 20:26	312
Bromoform	ND		120	22	ppb v/v			02/03/16 20:26	312
Bromomethane	ND		250	100	ppb v/v			02/03/16 20:26	312
2-Butanone (MEK)	ND		250	62	ppb v/v			02/03/16 20:26	312
Carbon disulfide	ND		250	24	ppb v/v			02/03/16 20:26	312
Carbon tetrachloride	**40**	**J**	250	20	ppb v/v			02/03/16 20:26	312
Chlorobenzene	ND		94	20	ppb v/v			02/03/16 20:26	312
Chloroethane	ND		250	96	ppb v/v			02/03/16 20:26	312
Chloroform	**600**		94	30	ppb v/v			02/03/16 20:26	312
Chloromethane	ND		250	61	ppb v/v			02/03/16 20:26	312
Dibromochloromethane	ND		120	25	ppb v/v			02/03/16 20:26	312
1,2-Dibromoethane (EDB)	ND		250	23	ppb v/v			02/03/16 20:26	312
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		120	48	ppb v/v			02/03/16 20:26	312
1,2-Dichlorobenzene	ND		120	41	ppb v/v			02/03/16 20:26	312
1,3-Dichlorobenzene	ND		120	34	ppb v/v			02/03/16 20:26	312
1,4-Dichlorobenzene	ND		120	46	ppb v/v			02/03/16 20:26	312
Dichlorodifluoromethane	**81**	**J**	120	45	ppb v/v			02/03/16 20:26	312
1,1-Dichloroethane	ND		94	22	ppb v/v			02/03/16 20:26	312
1,2-Dichloroethane	ND		250	27	ppb v/v			02/03/16 20:26	312
1,1-Dichloroethene	**870**		250	40	ppb v/v			02/03/16 20:26	312
cis-1,2-Dichloroethene	ND		120	28	ppb v/v			02/03/16 20:26	312
trans-1,2-Dichloroethene	ND		120	31	ppb v/v			02/03/16 20:26	312
1,2-Dichloropropane	**220**		120	75	ppb v/v			02/03/16 20:26	312
cis-1,3-Dichloropropene	ND		120	32	ppb v/v			02/03/16 20:26	312
trans-1,3-Dichloropropene	ND		120	27	ppb v/v			02/03/16 20:26	312
Ethylbenzene	ND		120	20	ppb v/v			02/03/16 20:26	312
4-Ethyltoluene	ND		120	58	ppb v/v			02/03/16 20:26	312
Hexachlorobutadiene	ND		620	130	ppb v/v			02/03/16 20:26	312
2-Hexanone	ND		120	27	ppb v/v			02/03/16 20:26	312
4-Methyl-2-pentanone (MIBK)	ND		120	42	ppb v/v			02/03/16 20:26	312
Methylene Chloride	**38**	**J**	120	22	ppb v/v			02/03/16 20:26	312
Styrene	ND		120	18	ppb v/v			02/03/16 20:26	312
1,1,2,2-Tetrachloroethane	ND		120	22	ppb v/v			02/03/16 20:26	312
Tetrachloroethene	**540**		120	16	ppb v/v			02/03/16 20:26	312
Toluene	ND		120	16	ppb v/v			02/03/16 20:26	312

Client Sample ID: 098711-001/CWL-D2-240
Lab Sample ID: 320-16959-21

Date Collected: 01/20/16 10:52
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloro-1,2,2-trifluoroethane	**2100**		120	51	ppb v/v			02/03/16 20:26	312
1,2,4-Trichlorobenzene	ND		620	140	ppb v/v			02/03/16 20:26	312
1,1,1-Trichloroethane	**45**	**J**	94	20	ppb v/v			02/03/16 20:26	312
1,1,2-Trichloroethane	ND		120	21	ppb v/v			02/03/16 20:26	312
Trichloroethene	**14000**		120	33	ppb v/v			02/03/16 20:26	312
Trichlorofluoromethane	**550**		120	61	ppb v/v			02/03/16 20:26	312
1,2,4-Trimethylbenzene	ND		250	51	ppb v/v			02/03/16 20:26	312
1,3,5-Trimethylbenzene	ND		120	39	ppb v/v			02/03/16 20:26	312
Vinyl acetate	ND		250	45	ppb v/v			02/03/16 20:26	312
Vinyl chloride	ND		120	37	ppb v/v			02/03/16 20:26	312
m,p-Xylene	ND		250	31	ppb v/v			02/03/16 20:26	312
o-Xylene	ND		120	17	ppb v/v			02/03/16 20:26	312

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*93*		*70 - 130*		*02/03/16 20:26*	*312*
1,2-Dichloroethane-d4 (Surr)	*96*		*70 - 130*		*02/03/16 20:26*	*312*
Toluene-d8 (Surr)	*122*		*70 - 130*		*02/03/16 20:26*	*312*

Client Sample ID: 098712-001/CWL-D2-350
Lab Sample ID: 320-16959-22

Date Collected: 01/20/16 10:57
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1200	42	ppb v/v			02/03/16 21:11	237
Benzene	ND		95	19	ppb v/v			02/03/16 21:11	237
Benzyl chloride	ND		190	39	ppb v/v			02/03/16 21:11	237
Bromodichloromethane	ND		71	16	ppb v/v			02/03/16 21:11	237
Bromoform	ND		95	17	ppb v/v			02/03/16 21:11	237
Bromomethane	ND		190	79	ppb v/v			02/03/16 21:11	237
2-Butanone (MEK)	ND		190	47	ppb v/v			02/03/16 21:11	237
Carbon disulfide	ND		190	18	ppb v/v			02/03/16 21:11	237
Carbon tetrachloride	**28**	**J**	190	15	ppb v/v			02/03/16 21:11	237
Chlorobenzene	ND		71	15	ppb v/v			02/03/16 21:11	237
Chloroethane	ND		190	73	ppb v/v			02/03/16 21:11	237
Chloroform	**400**		71	23	ppb v/v			02/03/16 21:11	237
Chloromethane	ND		190	47	ppb v/v			02/03/16 21:11	237
Dibromochloromethane	ND		95	19	ppb v/v			02/03/16 21:11	237
1,2-Dibromoethane (EDB)	ND		190	18	ppb v/v			02/03/16 21:11	237
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		95	37	ppb v/v			02/03/16 21:11	237
1,2-Dichlorobenzene	ND		95	31	ppb v/v			02/03/16 21:11	237
1,3-Dichlorobenzene	ND		95	26	ppb v/v			02/03/16 21:11	237
1,4-Dichlorobenzene	ND		95	35	ppb v/v			02/03/16 21:11	237
Dichlorodifluoromethane	**71**	**J**	95	34	ppb v/v			02/03/16 21:11	237
1,1-Dichloroethane	ND		71	17	ppb v/v			02/03/16 21:11	237
1,2-Dichloroethane	ND		190	21	ppb v/v			02/03/16 21:11	237
1,1-Dichloroethene	**690**		190	31	ppb v/v			02/03/16 21:11	237

Client Sample ID: 098712-001/CWL-D2-350

Lab Sample ID: 320-16959-22

Date Collected: 01/20/16 10:57
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		95	21	ppb v/v			02/03/16 21:11	237
trans-1,2-Dichloroethene	ND		95	24	ppb v/v			02/03/16 21:11	237
1,2-Dichloropropane	**100**		95	57	ppb v/v			02/03/16 21:11	237
cis-1,3-Dichloropropene	ND		95	25	ppb v/v			02/03/16 21:11	237
trans-1,3-Dichloropropene	ND		95	21	ppb v/v			02/03/16 21:11	237
Ethylbenzene	ND		95	15	ppb v/v			02/03/16 21:11	237
4-Ethyltoluene	ND		95	44	ppb v/v			02/03/16 21:11	237
Hexachlorobutadiene	ND		470	100	ppb v/v			02/03/16 21:11	237
2-Hexanone	ND		95	21	ppb v/v			02/03/16 21:11	237
4-Methyl-2-pentanone (MIBK)	ND		95	32	ppb v/v			02/03/16 21:11	237
Methylene Chloride	**73**	**J**	95	17	ppb v/v			02/03/16 21:11	237
Styrene	ND		95	14	ppb v/v			02/03/16 21:11	237
1,1,2,2-Tetrachloroethane	ND		95	16	ppb v/v			02/03/16 21:11	237
Tetrachloroethene	**420**		95	12	ppb v/v			02/03/16 21:11	237
Toluene	ND		95	12	ppb v/v			02/03/16 21:11	237
1,1,2-Trichloro-1,2,2-trifluoroethane	**1600**		95	39	ppb v/v			02/03/16 21:11	237
1,2,4-Trichlorobenzene	ND		470	100	ppb v/v			02/03/16 21:11	237
1,1,1-Trichloroethane	**31**	**J**	71	15	ppb v/v			02/03/16 21:11	237
1,1,2-Trichloroethane	ND		95	16	ppb v/v			02/03/16 21:11	237
Trichloroethene	**10000**		95	25	ppb v/v			02/03/16 21:11	237
Trichlorofluoromethane	**450**		95	46	ppb v/v			02/03/16 21:11	237
1,2,4-Trimethylbenzene	ND		190	38	ppb v/v			02/03/16 21:11	237
1,3,5-Trimethylbenzene	ND		95	30	ppb v/v			02/03/16 21:11	237
Vinyl acetate	ND		190	34	ppb v/v			02/03/16 21:11	237
Vinyl chloride	ND		95	28	ppb v/v			02/03/16 21:11	237
m,p-Xylene	ND		190	24	ppb v/v			02/03/16 21:11	237
o-Xylene	ND		95	13	ppb v/v			02/03/16 21:11	237

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*70 - 130*		*02/03/16 21:11*	*237*
1,2-Dichloroethane-d4 (Surr)	*92*		*70 - 130*		*02/03/16 21:11*	*237*
Toluene-d8 (Surr)	*109*		*70 - 130*		*02/03/16 21:11*	*237*

Client Sample ID: 098713-001/CWL-D2-440

Lab Sample ID: 320-16959-23

Date Collected: 01/20/16 11:01
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	**12**	**J**	24	0.84	ppb v/v			02/03/16 21:58	4.72
Benzene	ND		1.9	0.37	ppb v/v			02/03/16 21:58	4.72
Benzyl chloride	ND		3.8	0.77	ppb v/v			02/03/16 21:58	4.72
Bromodichloromethane	ND		1.4	0.31	ppb v/v			02/03/16 21:58	4.72
Bromoform	ND		1.9	0.33	ppb v/v			02/03/16 21:58	4.72
Bromomethane	ND		3.8	1.6	ppb v/v			02/03/16 21:58	4.72
2-Butanone (MEK)	**1.1**	**J**	3.8	0.94	ppb v/v			02/03/16 21:58	4.72
Carbon disulfide	ND		3.8	0.37	ppb v/v			02/03/16 21:58	4.72

Client Sample ID: 098713-001/CWL-D2-440
Lab Sample ID: 320-16959-23
Date Collected: 01/20/16 11:01
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	ND		3.8	0.30	ppb v/v			02/03/16 21:58	4.72
Chlorobenzene	ND		1.4	0.30	ppb v/v			02/03/16 21:58	4.72
Chloroethane	ND		3.8	1.5	ppb v/v			02/03/16 21:58	4.72
Chloroform	**3.2**		1.4	0.45	ppb v/v			02/03/16 21:58	4.72
Chloromethane	ND		3.8	0.93	ppb v/v			02/03/16 21:58	4.72
Dibromochloromethane	ND		1.9	0.37	ppb v/v			02/03/16 21:58	4.72
1,2-Dibromoethane (EDB)	ND		3.8	0.35	ppb v/v			02/03/16 21:58	4.72
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.9	0.73	ppb v/v			02/03/16 21:58	4.72
1,2-Dichlorobenzene	ND		1.9	0.61	ppb v/v			02/03/16 21:58	4.72
1,3-Dichlorobenzene	ND		1.9	0.52	ppb v/v			02/03/16 21:58	4.72
1,4-Dichlorobenzene	ND		1.9	0.70	ppb v/v			02/03/16 21:58	4.72
Dichlorodifluoromethane	**1.4**	**J**	1.9	0.68	ppb v/v			02/03/16 21:58	4.72
1,1-Dichloroethane	ND		1.4	0.34	ppb v/v			02/03/16 21:58	4.72
1,2-Dichloroethane	ND		3.8	0.42	ppb v/v			02/03/16 21:58	4.72
1,1-Dichloroethene	**7.9**		3.8	0.61	ppb v/v			02/03/16 21:58	4.72
cis-1,2-Dichloroethene	ND		1.9	0.42	ppb v/v			02/03/16 21:58	4.72
trans-1,2-Dichloroethene	ND		1.9	0.47	ppb v/v			02/03/16 21:58	4.72
1,2-Dichloropropane	ND		1.9	1.1	ppb v/v			02/03/16 21:58	4.72
cis-1,3-Dichloropropene	ND		1.9	0.49	ppb v/v			02/03/16 21:58	4.72
trans-1,3-Dichloropropene	ND		1.9	0.42	ppb v/v			02/03/16 21:58	4.72
Ethylbenzene	ND		1.9	0.30	ppb v/v			02/03/16 21:58	4.72
4-Ethyltoluene	ND		1.9	0.88	ppb v/v			02/03/16 21:58	4.72
Hexachlorobutadiene	ND		9.4	2.0	ppb v/v			02/03/16 21:58	4.72
2-Hexanone	ND		1.9	0.41	ppb v/v			02/03/16 21:58	4.72
4-Methyl-2-pentanone (MIBK)	ND		1.9	0.64	ppb v/v			02/03/16 21:58	4.72
Methylene Chloride	**1.7**	**J**	1.9	0.34	ppb v/v			02/03/16 21:58	4.72
Styrene	ND		1.9	0.28	ppb v/v			02/03/16 21:58	4.72
1,1,2,2-Tetrachloroethane	ND		1.9	0.33	ppb v/v			02/03/16 21:58	4.72
Tetrachloroethene	**3.8**		1.9	0.24	ppb v/v			02/03/16 21:58	4.72
Toluene	**0.41**	**J**	1.9	0.24	ppb v/v			02/03/16 21:58	4.72
1,1,2-Trichloro-1,2,2-trifluoroethane	**14**		1.9	0.77	ppb v/v			02/03/16 21:58	4.72
1,2,4-Trichlorobenzene	ND		9.4	2.0	ppb v/v			02/03/16 21:58	4.72
1,1,1-Trichloroethane	ND		1.4	0.31	ppb v/v			02/03/16 21:58	4.72
1,1,2-Trichloroethane	ND		1.9	0.32	ppb v/v			02/03/16 21:58	4.72
Trichloroethene	**100**		1.9	0.50	ppb v/v			02/03/16 21:58	4.72
Trichlorofluoromethane	**4.9**		1.9	0.93	ppb v/v			02/03/16 21:58	4.72
1,2,4-Trimethylbenzene	ND		3.8	0.76	ppb v/v			02/03/16 21:58	4.72
1,3,5-Trimethylbenzene	ND		1.9	0.59	ppb v/v			02/03/16 21:58	4.72
Vinyl acetate	ND		3.8	0.68	ppb v/v			02/03/16 21:58	4.72
Vinyl chloride	ND		1.9	0.57	ppb v/v			02/03/16 21:58	4.72
m,p-Xylene	ND		3.8	0.47	ppb v/v			02/03/16 21:58	4.72
o-Xylene	ND		1.9	0.25	ppb v/v			02/03/16 21:58	4.72

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*103*		*70 - 130*		*02/03/16 21:58*	*4.72*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 130*		*02/03/16 21:58*	*4.72*
Toluene-d8 (Surr)	*103*		*70 - 130*		*02/03/16 21:58*	*4.72*

Client Sample ID: 098714-001/CWL-D2-470
Lab Sample ID: 320-16959-24

Date Collected: 01/20/16 11:05
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1200	41	ppb v/v			02/03/16 20:42	233
Benzene	ND		93	18	ppb v/v			02/03/16 20:42	233
Benzyl chloride	ND		190	38	ppb v/v			02/03/16 20:42	233
Bromodichloromethane	ND		70	15	ppb v/v			02/03/16 20:42	233
Bromoform	ND		93	16	ppb v/v			02/03/16 20:42	233
Bromomethane	ND		190	78	ppb v/v			02/03/16 20:42	233
2-Butanone (MEK)	ND		190	46	ppb v/v			02/03/16 20:42	233
Carbon disulfide	ND		190	18	ppb v/v			02/03/16 20:42	233
Carbon tetrachloride	ND		190	15	ppb v/v			02/03/16 20:42	233
Chlorobenzene	ND		70	15	ppb v/v			02/03/16 20:42	233
Chloroethane	ND		190	72	ppb v/v			02/03/16 20:42	233
Chloroform	**300**		70	22	ppb v/v			02/03/16 20:42	233
Chloromethane	ND		190	46	ppb v/v			02/03/16 20:42	233
Dibromochloromethane	ND		93	18	ppb v/v			02/03/16 20:42	233
1,2-Dibromoethane (EDB)	ND		190	17	ppb v/v			02/03/16 20:42	233
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		93	36	ppb v/v			02/03/16 20:42	233
1,2-Dichlorobenzene	ND		93	30	ppb v/v			02/03/16 20:42	233
1,3-Dichlorobenzene	ND		93	26	ppb v/v			02/03/16 20:42	233
1,4-Dichlorobenzene	ND		93	35	ppb v/v			02/03/16 20:42	233
Dichlorodifluoromethane	ND		93	34	ppb v/v			02/03/16 20:42	233
1,1-Dichloroethane	ND		70	17	ppb v/v			02/03/16 20:42	233
1,2-Dichloroethane	ND		190	21	ppb v/v			02/03/16 20:42	233
1,1-Dichloroethene	**210**		190	30	ppb v/v			02/03/16 20:42	233
cis-1,2-Dichloroethene	**49**	**J**	93	21	ppb v/v			02/03/16 20:42	233
trans-1,2-Dichloroethene	ND		93	23	ppb v/v			02/03/16 20:42	233
1,2-Dichloropropane	ND		93	56	ppb v/v			02/03/16 20:42	233
cis-1,3-Dichloropropene	ND		93	24	ppb v/v			02/03/16 20:42	233
trans-1,3-Dichloropropene	ND		93	21	ppb v/v			02/03/16 20:42	233
Ethylbenzene	ND		93	15	ppb v/v			02/03/16 20:42	233
4-Ethyltoluene	ND		93	44	ppb v/v			02/03/16 20:42	233
Hexachlorobutadiene	ND		470	100	ppb v/v			02/03/16 20:42	233
2-Hexanone	ND		93	20	ppb v/v			02/03/16 20:42	233
4-Methyl-2-pentanone (MIBK)	ND		93	31	ppb v/v			02/03/16 20:42	233
Methylene Chloride	ND		93	17	ppb v/v			02/03/16 20:42	233
Styrene	ND		93	14	ppb v/v			02/03/16 20:42	233
1,1,2,2-Tetrachloroethane	ND		93	16	ppb v/v			02/03/16 20:42	233
Tetrachloroethene	**220**		93	12	ppb v/v			02/03/16 20:42	233
Toluene	ND		93	12	ppb v/v			02/03/16 20:42	233
1,1,2-Trichloro-1,2,2-trifluoroethane	**520**		93	38	ppb v/v			02/03/16 20:42	233
1,2,4-Trichlorobenzene	ND		470	100	ppb v/v			02/03/16 20:42	233
1,1,1-Trichloroethane	**29**	**J**	70	15	ppb v/v			02/03/16 20:42	233
1,1,2-Trichloroethane	ND		93	16	ppb v/v			02/03/16 20:42	233
Trichloroethene	**4400**		93	24	ppb v/v			02/03/16 20:42	233
Trichlorofluoromethane	**170**		93	46	ppb v/v			02/03/16 20:42	233
1,2,4-Trimethylbenzene	ND		190	38	ppb v/v			02/03/16 20:42	233
1,3,5-Trimethylbenzene	ND		93	29	ppb v/v			02/03/16 20:42	233
Vinyl acetate	ND		190	34	ppb v/v			02/03/16 20:42	233
Vinyl chloride	ND		93	28	ppb v/v			02/03/16 20:42	233

Client Sample ID: 098714-001/CWL-D2-470

Lab Sample ID: 320-16959-24
Matrix: Air
Date Collected: 01/20/16 11:05
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		190	23	ppb v/v			02/03/16 20:42	233
o-Xylene	ND		93	13	ppb v/v			02/03/16 20:42	233

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*70 - 130*		*02/03/16 20:42*	*233*
1,2-Dichloroethane-d4 (Surr)	*116*		*70 - 130*		*02/03/16 20:42*	*233*
Toluene-d8 (Surr)	*105*		*70 - 130*		*02/03/16 20:42*	*233*

Client Sample ID: 098695-001/CWL-SV FB1

Lab Sample ID: 320-16959-25
Matrix: Air
Date Collected: 01/20/16 11:25
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			02/03/16 21:40	1
Benzene	ND		0.40	0.079	ppb v/v			02/03/16 21:40	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			02/03/16 21:40	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			02/03/16 21:40	1
Bromoform	ND		0.40	0.070	ppb v/v			02/03/16 21:40	1
Bromomethane	ND		0.80	0.34	ppb v/v			02/03/16 21:40	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			02/03/16 21:40	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			02/03/16 21:40	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			02/03/16 21:40	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			02/03/16 21:40	1
Chloroethane	ND		0.80	0.31	ppb v/v			02/03/16 21:40	1
Chloroform	ND		0.30	0.095	ppb v/v			02/03/16 21:40	1
Chloromethane	ND		0.80	0.20	ppb v/v			02/03/16 21:40	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			02/03/16 21:40	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			02/03/16 21:40	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			02/03/16 21:40	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			02/03/16 21:40	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			02/03/16 21:40	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			02/03/16 21:40	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			02/03/16 21:40	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			02/03/16 21:40	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			02/03/16 21:40	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			02/03/16 21:40	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			02/03/16 21:40	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			02/03/16 21:40	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			02/03/16 21:40	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			02/03/16 21:40	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			02/03/16 21:40	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			02/03/16 21:40	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			02/03/16 21:40	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			02/03/16 21:40	1
2-Hexanone	ND		0.40	0.087	ppb v/v			02/03/16 21:40	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			02/03/16 21:40	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			02/03/16 21:40	1

Client Sample ID: 098695-001/CWL-SV FB1

Lab Sample ID: 320-16959-25
Matrix: Air
Date Collected: 01/20/16 11:25
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		0.40	0.059	ppb v/v			02/03/16 21:40	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			02/03/16 21:40	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			02/03/16 21:40	1
Toluene	ND		0.40	0.051	ppb v/v			02/03/16 21:40	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			02/03/16 21:40	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			02/03/16 21:40	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			02/03/16 21:40	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			02/03/16 21:40	1
Trichloroethene	ND		0.40	0.11	ppb v/v			02/03/16 21:40	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			02/03/16 21:40	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			02/03/16 21:40	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			02/03/16 21:40	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			02/03/16 21:40	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			02/03/16 21:40	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			02/03/16 21:40	1
o-Xylene	ND		0.40	0.054	ppb v/v			02/03/16 21:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*92*		*70 - 130*		*02/03/16 21:40*	*1*
1,2-Dichloroethane-d4 (Surr)	*120*		*70 - 130*		*02/03/16 21:40*	*1*
Toluene-d8 (Surr)	*106*		*70 - 130*		*02/03/16 21:40*	*1*

Client Sample ID: 098696-001/CWL-UI1-40

Lab Sample ID: 320-16959-26
Matrix: Air
Date Collected: 01/20/16 11:29
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1300	48	ppb v/v			02/03/16 22:33	268
Benzene	ND		110	21	ppb v/v			02/03/16 22:33	268
Benzyl chloride	ND		210	44	ppb v/v			02/03/16 22:33	268
Bromodichloromethane	ND		80	18	ppb v/v			02/03/16 22:33	268
Bromoform	ND		110	19	ppb v/v			02/03/16 22:33	268
Bromomethane	ND		210	90	ppb v/v			02/03/16 22:33	268
2-Butanone (MEK)	ND		210	53	ppb v/v			02/03/16 22:33	268
Carbon disulfide	ND		210	21	ppb v/v			02/03/16 22:33	268
Carbon tetrachloride	ND		210	17	ppb v/v			02/03/16 22:33	268
Chlorobenzene	ND		80	17	ppb v/v			02/03/16 22:33	268
Chloroethane	ND		210	83	ppb v/v			02/03/16 22:33	268
Chloroform	**730**		80	25	ppb v/v			02/03/16 22:33	268
Chloromethane	ND		210	53	ppb v/v			02/03/16 22:33	268
Dibromochloromethane	ND		110	21	ppb v/v			02/03/16 22:33	268
1,2-Dibromoethane (EDB)	ND		210	20	ppb v/v			02/03/16 22:33	268
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		110	42	ppb v/v			02/03/16 22:33	268
1,2-Dichlorobenzene	ND		110	35	ppb v/v			02/03/16 22:33	268
1,3-Dichlorobenzene	ND		110	29	ppb v/v			02/03/16 22:33	268
1,4-Dichlorobenzene	ND		110	40	ppb v/v			02/03/16 22:33	268
Dichlorodifluoromethane	ND		110	39	ppb v/v			02/03/16 22:33	268

Client Sample ID: 098696-001/CWL-UI1-40

Lab Sample ID: 320-16959-26

Date Collected: 01/20/16 11:29
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	ND		80	19	ppb v/v			02/03/16 22:33	268
1,2-Dichloroethane	ND		210	24	ppb v/v			02/03/16 22:33	268
1,1-Dichloroethene	**220**		210	35	ppb v/v			02/03/16 22:33	268
cis-1,2-Dichloroethene	ND		110	24	ppb v/v			02/03/16 22:33	268
trans-1,2-Dichloroethene	ND		110	27	ppb v/v			02/03/16 22:33	268
1,2-Dichloropropane	ND		110	64	ppb v/v			02/03/16 22:33	268
cis-1,3-Dichloropropene	ND		110	28	ppb v/v			02/03/16 22:33	268
trans-1,3-Dichloropropene	ND		110	24	ppb v/v			02/03/16 22:33	268
Ethylbenzene	ND		110	17	ppb v/v			02/03/16 22:33	268
4-Ethyltoluene	ND		110	50	ppb v/v			02/03/16 22:33	268
Hexachlorobutadiene	ND		540	120	ppb v/v			02/03/16 22:33	268
2-Hexanone	ND		110	23	ppb v/v			02/03/16 22:33	268
4-Methyl-2-pentanone (MIBK)	ND		110	36	ppb v/v			02/03/16 22:33	268
Methylene Chloride	**20**	**J B**	110	19	ppb v/v			02/03/16 22:33	268
Styrene	ND		110	16	ppb v/v			02/03/16 22:33	268
1,1,2,2-Tetrachloroethane	ND		110	18	ppb v/v			02/03/16 22:33	268
Tetrachloroethene	**2500**		110	14	ppb v/v			02/03/16 22:33	268
Toluene	ND		110	14	ppb v/v			02/03/16 22:33	268
1,1,2-Trichloro-1,2,2-trifluoroethane	**710**		110	44	ppb v/v			02/03/16 22:33	268
1,2,4-Trichlorobenzene	ND		540	120	ppb v/v			02/03/16 22:33	268
1,1,1-Trichloroethane	**48**	**J**	80	17	ppb v/v			02/03/16 22:33	268
1,1,2-Trichloroethane	ND		110	18	ppb v/v			02/03/16 22:33	268
Trichloroethene	**4700**		110	28	ppb v/v			02/03/16 22:33	268
Trichlorofluoromethane	**210**		110	53	ppb v/v			02/03/16 22:33	268
1,2,4-Trimethylbenzene	ND		210	43	ppb v/v			02/03/16 22:33	268
1,3,5-Trimethylbenzene	ND		110	34	ppb v/v			02/03/16 22:33	268
Vinyl acetate	ND		210	39	ppb v/v			02/03/16 22:33	268
Vinyl chloride	ND		110	32	ppb v/v			02/03/16 22:33	268
m,p-Xylene	ND		210	27	ppb v/v			02/03/16 22:33	268
o-Xylene	ND		110	14	ppb v/v			02/03/16 22:33	268

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*70 - 130*		*02/03/16 22:33*	*268*
1,2-Dichloroethane-d4 (Surr)	*118*		*70 - 130*		*02/03/16 22:33*	*268*
Toluene-d8 (Surr)	*100*		*70 - 130*		*02/03/16 22:33*	*268*

Client Sample ID: 098697-001/CWL-UI1-80

Lab Sample ID: 320-16959-27

Date Collected: 01/20/16 11:31
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1700	61	ppb v/v			02/03/16 23:24	342
Benzene	ND		140	27	ppb v/v			02/03/16 23:24	342
Benzyl chloride	ND		270	56	ppb v/v			02/03/16 23:24	342
Bromodichloromethane	ND		100	23	ppb v/v			02/03/16 23:24	342
Bromoform	ND		140	24	ppb v/v			02/03/16 23:24	342

Client Sample ID: 098697-001/CWL-UI1-80
Date Collected: 01/20/16 11:31
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Lab Sample ID: 320-16959-27
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromomethane	ND		270	110	ppb v/v			02/03/16 23:24	342
2-Butanone (MEK)	ND		270	68	ppb v/v			02/03/16 23:24	342
Carbon disulfide	ND		270	27	ppb v/v			02/03/16 23:24	342
Carbon tetrachloride	ND		270	22	ppb v/v			02/03/16 23:24	342
Chlorobenzene	ND		100	22	ppb v/v			02/03/16 23:24	342
Chloroethane	ND		270	110	ppb v/v			02/03/16 23:24	342
Chloroform	**550**		100	32	ppb v/v			02/03/16 23:24	342
Chloromethane	ND		270	67	ppb v/v			02/03/16 23:24	342
Dibromochloromethane	ND		140	27	ppb v/v			02/03/16 23:24	342
1,2-Dibromoethane (EDB)	ND		270	26	ppb v/v			02/03/16 23:24	342
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		140	53	ppb v/v			02/03/16 23:24	342
1,2-Dichlorobenzene	ND		140	44	ppb v/v			02/03/16 23:24	342
1,3-Dichlorobenzene	ND		140	38	ppb v/v			02/03/16 23:24	342
1,4-Dichlorobenzene	ND		140	51	ppb v/v			02/03/16 23:24	342
Dichlorodifluoromethane	ND		140	50	ppb v/v			02/03/16 23:24	342
1,1-Dichloroethane	ND		100	25	ppb v/v			02/03/16 23:24	342
1,2-Dichloroethane	ND		270	30	ppb v/v			02/03/16 23:24	342
1,1-Dichloroethene	**380**		270	44	ppb v/v			02/03/16 23:24	342
cis-1,2-Dichloroethene	ND		140	30	ppb v/v			02/03/16 23:24	342
trans-1,2-Dichloroethene	ND		140	34	ppb v/v			02/03/16 23:24	342
1,2-Dichloropropane	ND		140	82	ppb v/v			02/03/16 23:24	342
cis-1,3-Dichloropropene	ND		140	36	ppb v/v			02/03/16 23:24	342
trans-1,3-Dichloropropene	ND		140	30	ppb v/v			02/03/16 23:24	342
Ethylbenzene	ND		140	22	ppb v/v			02/03/16 23:24	342
4-Ethyltoluene	ND		140	64	ppb v/v			02/03/16 23:24	342
Hexachlorobutadiene	ND		680	150	ppb v/v			02/03/16 23:24	342
2-Hexanone	ND		140	30	ppb v/v			02/03/16 23:24	342
4-Methyl-2-pentanone (MIBK)	ND		140	46	ppb v/v			02/03/16 23:24	342
Methylene Chloride	**86**	**J B**	140	25	ppb v/v			02/03/16 23:24	342
Styrene	ND		140	20	ppb v/v			02/03/16 23:24	342
1,1,2,2-Tetrachloroethane	ND		140	24	ppb v/v			02/03/16 23:24	342
Tetrachloroethene	**710**		140	17	ppb v/v			02/03/16 23:24	342
Toluene	ND		140	17	ppb v/v			02/03/16 23:24	342
1,1,2-Trichloro-1,2,2-trifluoroethane	**810**		140	56	ppb v/v			02/03/16 23:24	342
1,2,4-Trichlorobenzene	ND		680	150	ppb v/v			02/03/16 23:24	342
1,1,1-Trichloroethane	**42**	**J**	100	22	ppb v/v			02/03/16 23:24	342
1,1,2-Trichloroethane	ND		140	23	ppb v/v			02/03/16 23:24	342
Trichloroethene	**5800**		140	36	ppb v/v			02/03/16 23:24	342
Trichlorofluoromethane	**250**		140	67	ppb v/v			02/03/16 23:24	342
1,2,4-Trimethylbenzene	ND		270	55	ppb v/v			02/03/16 23:24	342
1,3,5-Trimethylbenzene	ND		140	43	ppb v/v			02/03/16 23:24	342
Vinyl acetate	ND		270	50	ppb v/v			02/03/16 23:24	342
Vinyl chloride	ND		140	41	ppb v/v			02/03/16 23:24	342
m,p-Xylene	ND		270	34	ppb v/v			02/03/16 23:24	342
o-Xylene	ND		140	18	ppb v/v			02/03/16 23:24	342

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*89*		*70 - 130*		*02/03/16 23:24*	*342*

Client Sample ID: 098697-001/CWL-UI1-80
Lab Sample ID: 320-16959-27

Date Collected: 01/20/16 11:31
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*117*		*70 - 130*		*02/03/16 23:24*	*342*
Toluene-d8 (Surr)	*101*		*70 - 130*		*02/03/16 23:24*	*342*

Client Sample ID: 098698-001/CWL-UI1-120
Lab Sample ID: 320-16959-28

Date Collected: 01/20/16 11:34
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1700	61	ppb v/v			02/04/16 00:16	342
Benzene	ND		140	27	ppb v/v			02/04/16 00:16	342
Benzyl chloride	ND		270	56	ppb v/v			02/04/16 00:16	342
Bromodichloromethane	ND		100	23	ppb v/v			02/04/16 00:16	342
Bromoform	ND		140	24	ppb v/v			02/04/16 00:16	342
Bromomethane	ND		270	110	ppb v/v			02/04/16 00:16	342
2-Butanone (MEK)	ND		270	68	ppb v/v			02/04/16 00:16	342
Carbon disulfide	ND		270	27	ppb v/v			02/04/16 00:16	342
Carbon tetrachloride	ND		270	22	ppb v/v			02/04/16 00:16	342
Chlorobenzene	ND		100	22	ppb v/v			02/04/16 00:16	342
Chloroethane	ND		270	110	ppb v/v			02/04/16 00:16	342
Chloroform	**440**		100	32	ppb v/v			02/04/16 00:16	342
Chloromethane	ND		270	67	ppb v/v			02/04/16 00:16	342
Dibromochloromethane	ND		140	27	ppb v/v			02/04/16 00:16	342
1,2-Dibromoethane (EDB)	ND		270	26	ppb v/v			02/04/16 00:16	342
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		140	53	ppb v/v			02/04/16 00:16	342
1,2-Dichlorobenzene	ND		140	44	ppb v/v			02/04/16 00:16	342
1,3-Dichlorobenzene	ND		140	38	ppb v/v			02/04/16 00:16	342
1,4-Dichlorobenzene	ND		140	51	ppb v/v			02/04/16 00:16	342
Dichlorodifluoromethane	ND		140	50	ppb v/v			02/04/16 00:16	342
1,1-Dichloroethane	ND		100	25	ppb v/v			02/04/16 00:16	342
1,2-Dichloroethane	ND		270	30	ppb v/v			02/04/16 00:16	342
1,1-Dichloroethene	**450**		270	44	ppb v/v			02/04/16 00:16	342
cis-1,2-Dichloroethene	ND		140	30	ppb v/v			02/04/16 00:16	342
trans-1,2-Dichloroethene	ND		140	34	ppb v/v			02/04/16 00:16	342
1,2-Dichloropropane	ND		140	82	ppb v/v			02/04/16 00:16	342
cis-1,3-Dichloropropene	ND		140	36	ppb v/v			02/04/16 00:16	342
trans-1,3-Dichloropropene	ND		140	30	ppb v/v			02/04/16 00:16	342
Ethylbenzene	ND		140	22	ppb v/v			02/04/16 00:16	342
4-Ethyltoluene	ND		140	64	ppb v/v			02/04/16 00:16	342
Hexachlorobutadiene	ND		680	150	ppb v/v			02/04/16 00:16	342
2-Hexanone	ND		140	30	ppb v/v			02/04/16 00:16	342
4-Methyl-2-pentanone (MIBK)	ND		140	46	ppb v/v			02/04/16 00:16	342
Methylene Chloride	**240**	**B**	140	25	ppb v/v			02/04/16 00:16	342
Styrene	ND		140	20	ppb v/v			02/04/16 00:16	342
1,1,2,2-Tetrachloroethane	ND		140	24	ppb v/v			02/04/16 00:16	342
Tetrachloroethene	**510**		140	17	ppb v/v			02/04/16 00:16	342
Toluene	ND		140	17	ppb v/v			02/04/16 00:16	342

Client Sample ID: 098698-001/CWL-UI1-120
Lab Sample ID: 320-16959-28
Date Collected: 01/20/16 11:34
Matrix: Air
Date Received: 01/26/16 09:15
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloro-1,2,2-trifluoroethane	**900**		140	56	ppb v/v			02/04/16 00:16	342
1,2,4-Trichlorobenzene	ND		680	150	ppb v/v			02/04/16 00:16	342
1,1,1-Trichloroethane	**39**	**J**	100	22	ppb v/v			02/04/16 00:16	342
1,1,2-Trichloroethane	ND		140	23	ppb v/v			02/04/16 00:16	342
Trichloroethene	**7300**		140	36	ppb v/v			02/04/16 00:16	342
Trichlorofluoromethane	**270**		140	67	ppb v/v			02/04/16 00:16	342
1,2,4-Trimethylbenzene	ND		270	55	ppb v/v			02/04/16 00:16	342
1,3,5-Trimethylbenzene	ND		140	43	ppb v/v			02/04/16 00:16	342
Vinyl acetate	ND		270	50	ppb v/v			02/04/16 00:16	342
Vinyl chloride	ND		140	41	ppb v/v			02/04/16 00:16	342
m,p-Xylene	ND		270	34	ppb v/v			02/04/16 00:16	342
o-Xylene	ND		140	18	ppb v/v			02/04/16 00:16	342

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*90*		*70 - 130*		*02/04/16 00:16*	*342*
1,2-Dichloroethane-d4 (Surr)	*119*		*70 - 130*		*02/04/16 00:16*	*342*
Toluene-d8 (Surr)	*103*		*70 - 130*		*02/04/16 00:16*	*342*

ANNEX C
Chemical Waste Landfill
CY 2016 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 3/2/2016
2. Time of Inspection 11:07 - 11:50
3. Name of Inspector Robert Zöck

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		
B. Erosion of the soil cover in excess of 6 inches deep.	yes		
C. Evidence of water ponding on the CWL cover surface in excess of 100 square feet.	yes		
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	yes	1
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		

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	2

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (continued)

III. SECURITY FENCE [Quarterly]			
Inspection Parameters	***Parameter Inspected (Yes or No)***	***Action Required (Yes or No)***	***Note Number***
A. Accumulation of wind-blown plants and debris.	yes	yes	3
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	One animal burrow with an ~4 inch diameter entrance is located ~3 feet off the midway point of the east fence line. This burrow was identified during the December 2, 2015 inspection. At that time the biologist determined that the burrow was active and being used as a winter shelter and possible hibernation. The biologist recommended that it be reinvestigated during the March 2016 (this) inspection.
2	Tumbleweed debris accumulation identified in the drainage culverts on the south side of the site.
3	Tumbleweed debris accumulation indentified along the site fence line.

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (continued)

Action (Note Number) 1 assigned to Robert Zick Date action completed March 3, 2016

Action (Note Number) 2 assigned to Robert Zick Date action completed April 26, 2016

Action (Note Number) 3 assigned to Robert Zick Date action completed April 26, 2016

Action (Note Number) _____ assigned to _____ Date action completed _____

Action (Note Number) _____ assigned to _____ Date action completed _____

Additional Comments:

#1 On March 3, 2016 a video inspection of the burrow was made. Prior to inserting the camera, spider webs and debris were visible at the entrance of the burrow indicating it had not been used lately. The video inspection revealed no animals. The biologist determined the burrow was abandoned. It was backfilled with soil from the cover immediately following the video inspection.

#2 Tumbleweed debris was removed from the 3 drainage culverts by Sequoia Landscaping on April 26, 2016.

#3 Tumbleweed debris was removed from the fence line on by Sequoia Landscaping on April 26, 2016.

Additional work performed on April 27, 2016 by Sequoia Landscaping included the removal of dead vegetation from the evapotranspirative cover.

Inspector's Signature Robert Zick

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 6/2/2016
2. Time of Inspection 10:30
3. Name of Inspector Robert Zack

Mandatory requirement:
The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: (*Inspector must initial box before proceeding with the inspection.*) RZ
Training records maintained at CAMU Administrative Trailer.

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

I. COVER SYSTEM [Quarterly]			
Inspection Parameter	***Parameter Inspected (Yes or No)***	***Action Required (Yes or No)***	***Note Number***
A. Visible settlement of the soil cover in excess of 6 inches.	Yes	No	
B. Erosion of the soil cover in excess of 6 inches deep.	Yes	No	
C. Evidence of water ponding on the CWL cover surface in excess of 100 square feet.	Yes	No	
D. Animal intrusion burrows in excess of 4 inches in diameter. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	Yes	No	
E. Contiguous areas of no vegetation greater than 200 ft^2. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	Yes	No	

II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]			
Inspection Parameters	***Parameter Inspected (Yes or No)***	***Action Required (Yes or No)***	***Note Number***
A. Channel or sidewall erosion in excess of 6 inches deep.	Yes	No	
B. Channel sediment accumulation in excess of 6 inches deep.	Yes	No	
C. Debris that blocks more than 1/3 of the channel width.	Yes	Yes	1

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (continued)

III. SECURITY FENCE [Quarterly]			
Inspection Parameters	***Parameter Inspected (Yes or No)***	***Action Required (Yes or No)***	***Note Number***
A. Accumulation of wind-blown plants and debris.	yes	yes	2
B. Fence wires and posts in need of repair/maintenance.	yes	No	
C. Gates in need of oiling/repair/maintenance.	yes	No	
D. Locks in need of cleaning or replacement.	yes	No	
E. Warning signs in need of repair or replacement.	yes	No	
F. Survey monuments in vicinity of CWL visible.	yes	yes	3

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.	There is some tumbleweed debris blocking the drainage culverts located on the south side of the CWL.
2.	There is some tumbleweed debris accumulated on the site fence.
3.	There is sediment and tumbleweed debris covering the western most survey monument.

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (continued)

Action (Note Number) 1 assigned to Robert Zick Date action completed 6/2/2016

Action (Note Number) 2 assigned to Robert Zick Date action completed 6/2/2016

Action (Note Number) 3 assigned to Robert Zick Date action completed 6/2/2016

Action (Note Number) _____ assigned to _____ Date action completed _____

Action (Note Number) _____ assigned to _____ Date action completed _____

Additional Comments:

1. Tumbleweed debris removed from drainage culverts at time of the inspection. RZ

2. Tumbleweed debris removed from site fence line at time of the inspection. RZ

3. Sediment and tumbleweed debris removed from western most survey monument at time of the inspection. RZ

Note: On June 2, 2016 the staff biologist performed an inspection of the ET Cover biological parameters to supplement this inspection. A summary of the biology inspection is attached to this inspection form. RZ

Inspector's Signature [signature]

Original to: Chemical Waste Landfill Operating Record

Copy to: Environmental Safety and Health (ES&H) and Security Records Center

CWL Biology Quarterly Inspection
June 2, 2016

Observations

The vegetation on the CWL ET cover appears to be in good condition. Mature native perennial grasses are distributed across the entire cover. There are no large bare areas nor are there any large areas devoid of native perennial vegetation.

The middle and northern areas of the cover have a fairly high density of annual weedy species intermixed with the native perennial grasses. These areas are likely to contain an associated high density of weed seeds in the soil.

The southern portion of the cover has a lower density of annual weedy species intermixed with the perennial grasses.

Russian thistle was scattered across the cover, growing at medium to low levels across the cover.

Tumbleweeds were present along the fence line.

No burrows in excess of 4 inches were observed.

Recommendations

1. The native perennial grasses would benefit from reduced weed competition. Broad leaf pre-emergent herbicide is recommended applied across the entire site in March and June 2017 to reduce competition by weeds for water and nutrient resources.

   Applying a pre-emergent at these key times during the growing season will aid in reducing both the spring and summer annual weed species. There is currently no concern about pre-emergent effects on the desired perennial grasses or seeds. Based on this June 2016 inspection, the CWL ET Cover does not need new establishment of native grasses from seed; but the existing native grasses could benefit from reduced competition with annual weed species during the 2017 growing season. This would benefit the established native grasses through increased availability of soil moisture and nutrients.

2. Weeds (live and dead) should be removed from the ET Cover and perimeter fence during the 2016 growing season.

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence

1. Date of Inspection 9/22/16
2. Time of Inspection 0813 - 0847
3. Name of Inspector Robert Zick

Mandatory requirement:
The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: (*Inspector must initial box before proceeding with the inspection.*) RZ
Training records maintained at CAMU Administrative Trailer.

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

I. COVER SYSTEM [Quarterly]

Inspection Parameter	*Parameter Inspected (Yes or No)*	*Action Required (Yes or No)*	*Note Number*
A. Visible settlement of the soil cover in excess of 6 inches.	yes	No	
B. Erosion of the soil cover in excess of 6 inches deep.	yes	No	
C. Evidence of water ponding on the CWL cover surface in excess of 100 square feet.	yes	No	
D. Animal intrusion burrows in excess of 4 inches in diameter. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	yes	No	
E. Contiguous areas of no vegetation greater than 200 ft². Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	yes	No	

II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]

Inspection Parameters	*Parameter Inspected (Yes or No)*	*Action Required (Yes or No)*	*Note Number*
A. Channel or sidewall erosion in excess of 6 inches deep.	yes	No	
B. Channel sediment accumulation in excess of 6 inches deep.	yes	No	
C. Debris that blocks more than 1/3 of the channel width.	yes	No	

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (continued)

III. SECURITY FENCE [Quarterly]			
Inspection Parameters	*Parameter Inspected (Yes or No)*	*Action Required (Yes or No)*	*Note Number*
A. Accumulation of wind-blown plants and debris.	yes	No	
B. Fence wires and posts in need of repair/maintenance.	yes	No	
C. Gates in need of oiling/repair/maintenance.	yes	No	
D. Locks in need of cleaning or replacement.	yes	No	
E. Warning signs in need of repair or replacement.	yes	No	
F. Survey monuments in vicinity of CWL visible.	yes	yes	1

IV. PREVIOUS DEFICIENCIES			
Inspection Parameter	*Parameter Inspected (Yes or No)*	*Action Required (Yes or No)*	*Note Number*
Uncorrected/undocumented previous deficiencies.	NA	NA	

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (continued)

NOTES

Note Number	Description
1	Survey monuments covered with dirt at all four locations.

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (continued)

Action (Note Number) 1 assigned to Robert Zak Date action completed 9/22/2016

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:

1. The survey monuments were cleared of the dirt at time of the inspection. RZ 9/22/16

The staff biologist performed the annual biology inspection of the cover on September 1, 2016; therefore, no supplemental biology documentation is provided with this inspection. RZ 9/22/16

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 12/2/2016
2. Time of Inspection 0932 - 0954
3. Name of Inspector Robert Zock, Bruce Reavis

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.)* BR 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 (continned)

III. SECURITY FENCE [Quarterly]			
Inspection Parameters	*Parameter Inspected (Yes or No)*	*Action Required (Yes or No)*	*Note Number*
A. Accumulation of wind-blown plants and debris.	yes	yes	1
B. Fence wires and posts in need of repair/maintenance.	yes	No	
C. Gates in need of oiling/repair/maintenance.	yes	No	
D. Locks in need of cleaning or replacement.	yes	No	
E. Warning signs in need of repair or replacement.	yes	No	
F. Survey monuments in vicinity of CWL visible.	yes	yes	2

IV. PREVIOUS DEFICIENCIES			
Inspection Parameter	*Parameter Inspected (Yes or No)*	*Action Required (Yes or No)*	*Note Number*
Uncorrected/undocumented previous deficiencies.	NA	NA	

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (continued)

NOTES

Note Number	Description
1	Accumulation of windblown plant debris along perimeter fence and in drainage culverts on south side of site.
2.	Sediment was removed from the 2 far eastern survey monuments 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 Don Schofield Date action completed 12/21/16

Action (Note Number) 2 assigned to Robert Zock Date action completed 12/21/16

Action (Note Number) ____ assigned to _____ Date action completed _____

Action (Note Number) ____ assigned to _____ Date action completed _____

Action (Note Number) ____ assigned to _____ Date action completed _____

Additional Comments:

1. Wind blown plant debris along the perimeter fence and in the drainage culverts was removed by the cover system landscaping/maintenance contractor from December 20th through the 21st. RZ 12/21/16

2. Sediment was removed from the 2 far eastern survey monuments at time of the inspection. RZ 12/21/16

Note: On December 13, 2016 the staff biologist performed an inspection of ET Cover biological parameters to supplement this inspection form. The were no issues identified. A summary of the biology inspection is attached to this inspection form.

Inspector's Signature Robert Zock, Bruce Davis

Original to: Chemical Waste Landfill Operating Record

Copy to: Environmental Safety and Health (ES&H) and Security Records Center

CWL Biology Quarterly Inspection
December 13, 2016

Observations

The vegetation on the CWL ET Cover appears to be in good condition. Mature native perennial grasses are distributed across the entire cover. There are no large bare areas nor are there any large areas devoid of native perennial vegetation.

No four-wing saltbush were observed to be growing on the cover.

A low level of tumbleweeds was observed across the cover.

A low level of tumbleweeds was present along the north, east, and south fence lines; a moderate level along the western fence line.

A few small diameter burrow entrances (less than 1.5 inches) were observed near the eastern fence line.

No burrows in excess of 4 inches were observed.

Recommendations

1.) The native perennial grasses would benefit from reduced weed competition. To achieve this, application of a broad leaf pre-emergent herbicide across the entire site in the March and June 2017 timeframe is recommended for consideration. This approach should reduce competition by weeds for water and nutrient resources.

    Applying a pre-emergent at these key times during the growing season will aid in reducing both the spring and summer annual weed species. There is currently no concern about pre-emergent herbicide effects on the desired perennial native grass seeds. Based on this December 2016 inspection, the CWL ET Cover does not need new establishment of native grasses from seed, but the existing native grasses could benefit from reduced competition with annual weedy species during the 2017 growing season. This would benefit the established native grasses through increased availability of soil moisture and nutrients.

GROUNDWATER/SOIL-VAPOR EQUIPMENT INSPECTIONS

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Groundwater Monitoring Locations / Sampling Equipment

1. Date of Inspection 01/12/16
2. Time of Inspection 0750
3. Name of Inspector RobertTLynch

Mandatory requirement:
The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: (*Inspector must initial box before proceeding with the inspection.*) RL

Training records maintained at CAMU Administrative Trailer.

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

I. GROUNDWATER MONITORING LOCATIONS [Semi-annually]			
Inspection Parameter	*Parameter Inspected (Yes or No)*	*Action Required (Yes or No)*	*Note Number*
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	YES	NO	
B. Well cover caps (e.g., PVC caps, J-Plug, or equivalent) in need of repair/maintenance.	YES	NO	
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.	NA	NA	1

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 system installed on all wells

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Groundwater Monitoring Locations / Sampling Equipment
(continued)

Action (Note Number) _____ assigned to _____Date action completed_____

Action (Note Number) _____ assigned to _____Date action completed_____

Action (Note Number) _____ assigned to _____Date action completed_____

Action (Note Number) _____ assigned to _____Date action completed_____

Action (Note Number) _____ assigned to _____Date action completed_____

Additional Comments:

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Inspector's Signature _____

Original to: Chemical Waste Landfill Operating Record

Copy to: Environmental Safety and Health (ES&H) and Security Records Center

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Soil-Gas Monitoring Locations / Sampling Equipment

1. Date of Inspection 01/20/16
2. Time of Inspection 0800
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.*) RC

Training records maintained at CAMU Administrative Trailer.

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

I. SOIL–GAS MONITORING LOCATIONS [Annually]

Inspection Parameter	*Parameter Inspected (Yes or No)*	*Action Required (Yes or No)*	*Note Number*
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	YES	NO	
B. Well cover caps (e.g., PVC caps, J-Plug , Swagelok® dust caps, passive venting Baroballs™, or equivalent) in need of repair/maintenance.	YES	NO	
C. Well casing or sampling ports in need of repair/maintenance.	YES	NO	
D. Monitoring location and sampling ports properly labeled.	YES	NO	
E. Locks in need of cleaning or replacement.	NA	NA	1

II. SAMPLING EQUIPMENT [Annually]

Inspection Parameters	*Parameter Inspected (Yes or No)*	*Action Required (Yes or No)*	*Note Number*
A. Sampling pump in need of repair/maintenance.	YES	NO	
B. Sampling assembly (e.g., tubing, gauges, and valves) in need of repair/maintenance.	YES	NO	

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Soil-Gas Monitoring Locations / Sampling Equipment
(continued)

III. PREVIOUS DEFICIENCIES			
Inspection Parameter	*Parameter Inspected (Yes or No)*	*Action Required (Yes or No)*	*Note Number*
Uncorrected/undocumented previous deficiencies.	NA	NA	

NOTES

Note Number	Description
1	baroball system install on all wells

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 07/12/16
2. Time of Inspection 0825
3. Name of Inspector Robert Lynch

Mandatory requirement:
The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: (*Inspector must initial box before proceeding with the inspection.*) RL

Training records maintained at CAMU Administrative Trailer.

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

I. GROUNDWATER MONITORING LOCATIONS [Semi-annually]			
Inspection Parameter	*Parameter Inspected (Yes or No)*	*Action Required (Yes or No)*	*Note Number*
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	YES	NO	
B. Well cover caps (e.g., PVC caps, J-Plug, or equivalent) in need of repair/maintenance.	YES	NO	1
C. Well casing in need of repair/maintenance.	YES	NO	
D. Monitoring well properly labeled.	YES	NO	
E. Locks in need of cleaning or replacement.	YES	NO	

II. GROUNDWATER SAMPLING EQUIPMENT [Semi-annually]			
Inspection Parameters	*Parameter Inspected (Yes or No)*	*Action Required (Yes or No)*	*Note Number*
A. Sampling pump in need of repair/maintenance.	YES	NO	
B. Sampling assembly (e.g., tubing, gauges, and valves) in need of repair/maintenance.	YES	NO	

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Groundwater Monitoring Locations / Sampling Equipment
(continued)

III. PREVIOUS DEFICIENCIES			
Inspection Parameter	*Parameter Inspected (Yes or No)*	*Action Required (Yes or No)*	*Note Number*
Uncorrected/undocumented previous deficiencies.	NA	NA	

NOTES

Note Number	Description
1	Baraball assembly installed on all wells

Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Groundwater Monitoring Locations / Sampling Equipment
(continued)

Action (Note Number) _____ assigned to _____ Date action completed_____

Action (Note Number) _____ assigned to _____ Date action completed_____

Action (Note Number) _____ assigned to _____ Date action completed_____

Action (Note Number) _____ assigned to _____ Date action completed_____

Action (Note Number) _____ assigned to _____ Date action completed_____

Additional Comments:

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Inspector's Signature _____

Original to: Chemical Waste Landfill Operating Record

Copy to: Environmental Safety and Health (ES&H) and Security Records Center

BIOLOGY INSPECTION

Chemical Waste Landfill
Post-Closure Inspection Form
Biology Inspection Checklist for the CWL Cover

Mandatory requirement:

The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: (*Inspector must initial box before proceeding with the inspection.*) [✓]

Approximate vegetative coverage (i.e., living plants): 43%[1]

Approximate percent native vegetation of the total vegetative cover: 99%

Listed below are the main plant species identified growing on the CWL cover and the approximate percent cover for each species.

Scientific Name	Common Name (optional)	%Total cover
Sporobolus cryptandrus	Sand dropseed	23%
Bouteloua gracilis	Blue grama	14%
Pleuraphis jamesii	Galleta grass	6%
Solanum elaeagnifolium	Silverleaf nightshade	<0.5%
Sporobolus contractus	Spike dropseed	<0.5%
Atriplex canescens	Four-wing saltbush	<0.5%
Salsola tragus	Russian thistle	<0.5%
Xanthisma spinulosum	Spiny goldenweed	<0.5%
Sphaeralcea hastulata	Wrinkled globemallow	<0.5%

Note: [1]All species observed to be present at less than one-half of one-percent are not calculated into the total vegetative coverage

Chemical Waste Landfill
Biology Inspection Checklist for the CWL Cover (Continued)

Permit Requirements:

1) Is the total foliar coverage (i.e., land surface covered with living plants) greater than or equal to 20%? Yes If "No," explain below.

   Notes: _____

2) Of the 20% total foliar coverage, is 50% or greater comprised of native perennial species, and 50% or less comprised of annual species? Yes If "No," explain below.

   Notes: _____

3) 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. Describe area(s) and plans to actively improve/repair area(s) as detailed in Permit Attachment 1, Section 1.9.1.3 below.

   Notes: _____

4) Are there any animal burrow entrances on the cover in excess of 4 inches in diameter? No If "Yes," mark such areas on a map and provide additional information below.

   Notes: _____

General Cover Information:

Are any burrows smaller than 4 inches in diameter present on the cover? Yes

Does any burrow(s) appear to be active? Yes

Animal Burrow Notes: One cluster of three small mammal burrow entrances (approximately 1-1.5 inch diameter) were observed. Twenty ant burrows were observed, distributed fairly evenly across the cover. No map is attached because there are no burrow entrances in excess of 4 inches in diameter. No repair is required.

Are there any potentially deep-rooted plants (roots greater than 8 feet deep at maturity) or other undesirable plants (i.e., weeds) present on the cover? Yes If "Yes," describe below.

Plant Notes: Very few juvenile four-wing saltbush and annual weedy species are present across the cover. Four-wing saltbush is a shrub species that can develop deep roots at maturity, but the shrubs present on the cover are very small. Shrubs and weedy species (i.e. Russian thistle) were removed during maintenance activities performed August 2 – 8, 2016 as a best management practice to facilitate the growth of native perennial species (there is no requirement to remove potentially deep-rooted plants or weedy species in Permit Attachment 1, Section 1.9.1). Very few shrubs and weeds were observed during the September 1 inspection, and all are very small.

Chemical Waste Landfill
Biology Inspection Checklist for the CWL Cover (Concluded)

General Observations:

The CWL cover is in excellent shape. Good, even coverage of mature native perennial clump grasses are present across the cover, as well as lesser-developed clump grasses. Grasses are currently displaying a mix of green actively photosynthesizing leaves and dried leaves from previous growing seasons.

The CWL ET area has received almost exactly the historical average growing season (summer) precipitation. Overall 2016 precipitation has been below average, receiving 4.87 inches January-August 2016, approximately one inch below the historical average for the period.

Biological Aspects Map – [note: sketch map to locate specific features described above is attached if needed – see notes above]

Survey Biologist Name: Jennifer Payne Date: Sept. 1, 2016

Original to: Chemical Waste Landfill Operating Record

ANNEX D
CY 2016 Chemical Waste Landfill Biology Report

2016 Chemical Waste Landfill Biology Report

Introduction

As required by the Chemical Waste Landfill (CWL) Post-Closure Care Permit (PCCP) (NMED October 2009), Attachment 1, Section 1.9.1.1, this summary report for Calendar Year (CY) 2016 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 2016 growing season, expand on the inspection results, and provide recommendations for future ET Cover vegetation monitoring and maintenance. The annual CWL Biology Inspection of the ET Cover (Biology Inspection) for CY 2016 was conducted on September 1, 2016. The inspection observations are documented on the "Chemical Waste Landfill Post-Closure Inspection Form Biology Inspection Checklist for the CWL Cover" (Annex C). The inspection was conducted during the 2016 growing season to most accurately determine the coverage of living plants. In addition, the staff biologist monitored the ET Cover vegetation and biological parameters during the 2016 quarterly inspections of the ET Cover surface, storm water diversion structures, security fence, and survey benchmarks.

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 (approximately 5,400 feet above sea level) 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 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 better withstand drought conditions, provide additional 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 first seeded in September 2005 after cover construction was completed. To meet the criteria for successful revegetation in the timeframe specified in the PCCP (i.e., within 5 years of the PCCP becoming effective), the CWL was weeded, reseeded, and supplemental watering was conducted for approximately two months during the end of the 2009 growing season. Based on the results of the September 2011 CWL Biology Inspection, the ET Cover met the criteria for successful revegetation as defined in Attachment 1, Section 1.9 of the PCCP (NMED October 2009).

The 2012 through 2016 CWL Biology Inspections document cover conditions that continued to meet the criteria for successful revegetation. CWL cover vegetation during the 2012 and 2013 inspections was characterized by small and tightly spaced native juvenile clump grasses, with an increased diversity of native grasses in 2013. As the cover has developed into a more mature plant community, the native species composition has

changed from blue grama as the dominant grass species (through 2013) to sand dropseed becoming the dominant grass species (since 2014). As documented in the August 2015 CWL Biology Inspection, the ET Cover displayed healthy, even coverage of mixed-age native perennial clump grasses.

Local Climate Trends for 2016 Growing Season

Climate trends for north-central New Mexico are presented in this section as they have a significant impact on the cover vegetation. Since the reseeding effort in August 2009, the local climate has generally experienced below average precipitation with temperature extremes across the seasons.

Vegetation during the growing season is directly affected by the summer meteorological conditions, and it is also strongly influenced by the conditions during the preceding autumn, winter and spring. Soil moisture during the dormant seasons can significantly stress or assist the root systems, which compose the bulk of each native plant. An extended period of very low soil moisture can severely injure root systems during the dormant season, whereas ample soil moisture during the dormant season can promote vigorous above ground growth during the growing season.

Precipitation, Relative Humidity and Winds

Tables 1 and 2 provide meteorological data for the period preceding and including the CY 2016 growing season. A 20-year data set (1995-2014) provides the reference mean monthly meteorological data and will be the reference mean data set until 2019, when a 25-year data set will be created for the 1994-2018 time period.

Drought conditions have been the norm in the CWL area since 2008. As of November 29, 2016 the CWL area was still classified as "Abnormally Dry" according to the U.S. Drought Monitor (November 2016). However, total annual precipitation for the 2016 growing season and preceding winter-to-spring timeframe (October 2015-September 2016) was 8.85 inches, almost exactly the 20-year mean of 8.72 inches. June through August 2016 received 3.76 inches of precipitation, nearly the exact growing season historical mean of 3.70 inches. Importantly, the months of October through December 2015 had above average precipitation, providing good soil moisture and aiding vegetative root health. This soil moisture assisted the vegetation during the very dry months of February and March 2016, which barely received any measureable precipitation.

Relative humidity was slightly above the average for the 2016 growing season. October 2015-September 2016 relative humidity was 41.2%, above the 20-year annual mean of 40.6%.

Winds were very close to average for the same period. All months recorded average wind speeds that were within 1.0 mile per hour of the respective historical monthly mean.

Table 1
October-December 2015 Meteorological Data Summary for the Chemical Waste Landfill[a]

Month	October	November	December	
Temperature (°F)				3-Month Avg
Monthly Mean	59.7	44.6	35.9	46.7
20-year Temp Means	57.9	46.4	37.0	47.1
Precipitation (Inches)				3-Month Total
Monthly Total	1.29	.84	1.16	3.29
20-year Precip Means	0.93	0.41	0.57	1.91
Relative Humidity (%)				3-Month Avg
Monthly Mean	51.8	53.1	56.1	53.7
20-year RH Means	46.6	47.6	48.6	47.6
Wind (Miles/hour)				3-Month Avg
Monthly Mean	8.1	8.2	6.8	7.7
20-year Wind Means	7.8	7.1	6.8	7.2

[a]Information Source: SNL/NM Meteorological Monitoring Program.

Table 2
2016 Meteorological Data Summary for the Chemical Waste Landfill[a]

Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	
Year	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	
Temperature (°F)													Annual[b]
Monthly Mean	35.5	44.5	51.1	54.5	62.8	77.4	80.1	71.4	69.1	63.0	47.7	38.7	58.0
20-year Temp Means	37	41.7	48.8	55.8	66.1	75.4	76.7	74.8	68.9	57.9	46.4	37.0	57.3
Precipitation (Inches)													Annual[c]
Monthly Total	0.45	0.06	0.01	0.48	0.11	0.95	0.95	1.86	0.69	1.23	0.98	0.65	8.42
20-year Precip Means	0.34	0.45	0.56	0.50	0.26	0.49	1.64	1.57	1.00	0.93	0.41	0.57	8.72
Relative Humidity (%)													Annual[b]
Monthly Mean	56.7	37.2	25.7	38.3	29.3	27.0	29.2	48.0	41.8	35.6	51.4	55.9	39.7
20-year RH Means	49.9	44.9	36.4	30.3	26.3	24.9	40.9	44.6	45.6	46.6	47.6	48.6	40.6
Wind (Miles/hour)													Annual[b]
Monthly Mean	6.6	7.3	9.7	9.6	10.5	9.2	8.5	8.0	8.5	7.4	8.0	7.0	8.4
20-year Wind Means	6.94	8.13	9.10	10.47	9.96	9.76	8.42	7.91	7.99	7.81	7.08	6.77	8.36

[a]Information Source: SNL/NM Meteorological Monitoring Program.

[b]Values provided are averages of the monthly data.

[c]Values provided are totals of the monthly data.

Temperature

The CWL experienced 94 degrees of temperature variability during CY 2016, with a low of 7.9°F in February 2016 and a high of 102.2°F in June 2016. The annual mean and monthly mean temperatures were normal for the year.

Cover Development and Maintenance

The successional development of the native grasses on the CWL ET Cover has been significant in the past few growing seasons. Less robust individual native grass clumps died off in large numbers in 2013, creating barren interspaces for the remaining, more resilient grass clumps to expand their root systems and grow. In addition, other native grass species also grew in these open areas. In 2014 and 2015 native vegetation development on the CWL ET Cover was assisted by weeding, and in 2014 by supplemental watering. No supplemental watering was performed at the CWL in 2015 and 2016.

CWL ET Cover maintenance activities performed by the ET Cover maintenance contractor are intended to address PCCP requirements and promote the growth and health of the desired native perennial grasses. 2016 activities are presented in Section 6.6 of this 2016 CWL Annual Post-Closure Care Report and are briefly summarized below. In general, minimal ET Cover maintenance was required in 2016, which reflects significant progress in establishing healthy, self-sustaining native grasses on the CWL ET Cover and perimeter areas. Most 2016 maintenance involved routine work related to clearing the perimeter fence and storm-water diversion features of windblown, dead tumbleweeds.

Three maintenance events were conducted in April, August, and December 2016. The April and December events involved the removal of windblown weeds (primarily tumbleweeds) from the perimeter fence and storm-water diversion features. These two events involved 1 to 2-day efforts and resulted in the removal of a total of approximately 45 cubic yards of highly compressed, dead weed material that was disposed of at the Kirtland Air Force Base (KAFB) Landfill.

The August weed removal event was the most significant ET Cover maintenance event of 2016. It was conducted over a 5-day period (August 2 – 8) and included the manual removal of live weeds, dead weeds, and shrubs (e.g., Fourwing salt bush) from the ET Cover, perimeter fence, and surrounding perimeter areas. A total of 6 trailer loads of weeds (~90 cubic yards) were removed and disposed at the KAFB Landfill. In addition, a pre-emergent herbicide was applied to the perimeter area between the west fence and the road in accordance with manufacturers' specifications after live and dead weeds/shrubs were removed from the area.

The purpose of this best management practice effort was to promote the growth and health of the desired native grass species on the ET Cover by reducing competition with weedy species for limited moisture and nutrients. Removal of dead weed material and the application of pre-emergent herbicide to the western perimeter area also helps reduce the availability of weed seeds, future weed growth, and future maintenance efforts.

September 2016 Inspection Results

The September biology inspection determined the CWL ET Cover continues to meet or exceed all permit requirements related to biological parameters.

- Total foliar coverage equal to or greater than 20%
- Of the total foliar coverage, 50% or greater comprised of native perennial species
- No areas devoid of vegetation greater than 200 square feet
- No animal burrows in excess of 4 inches in diameter.

The CWL ET Cover foliar coverage was approximately 43%, of which approximately 99% was native perennial grasses (Figure 1). Sand dropseed was the dominant grass species (23% total foliar coverage) along with Blue grama (14% total foliar coverage) and Galleta grass (6% total foliar coverage). Foliar coverage of the three native grass species varied only slightly from 2015. As the cover changes into a mature plant community, the native species composition will likely continue to gradually change.

Good, even coverage of mature native perennial clump grasses were present across the cover, as well as developing clump grasses. Very few small four-wing saltbush shrubs and annual weedy species were present on the cover at the time of the inspection. Shrubs and weedy species present on the ET Cover were removed from August 2 --8.

One cluster of three small mammal burrow entrances was observed, approximately 1 to 1.5 inches in diameter. Twenty ant burrows were observed, distributed fairly evenly across the cover. All of the small mammal burrow entrances were less than 4 inches in diameter and no repair was required.

Recommendations

Based on vegetation inspection and monitoring conducted during CY 2016, the existing native grasses could benefit from reduced competition with annual weedy species. This would benefit the established native grasses through increased availability of soil moisture and nutrients, and assist development of native perennial grasses in the open spaces on the CWL ET Cover. To achieve this, weed removal and/or application of a broad leaf pre-emergent herbicide across the entire site in the months of March and June 2017 is recommended. Applying a pre-emergent herbicide at these key times during the growing season would aid in reducing both the spring and summer annual weedy species and should not have any adverse effects on the desired perennial native grasses or seeds.

Late spring supplemental watering should be considered if adequate winter precipitation is not received. Supplemental watering should also be considered in the autumn of 2017 if the monsoon rains and previous 12-month precipitation total are below normal.



Southwest portion of the cover



Northwest portion of the cover



Southeast portion of the cover



Northeast portion of the cover

Figure 1 September 1, 2016 CWL ET Cover Photos

References

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

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http://droughtmonitor.unl.edu/