



**Sandia
National
Laboratories**

**CHEMICAL WASTE LANDFILL
ANNUAL POST-CLOSURE CARE REPORT
CALENDAR YEAR 2017**

**SANDIA NATIONAL LABORATORIES, NEW MEXICO
LONG-TERM STEWARDSHIP**

MARCH 2018



**U.S. DEPARTMENT OF
ENERGY**



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

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA-0003525.

**ANNUAL CHEMICAL WASTE LANDFILL
POST-CLOSURE CARE REPORT
CALENDAR YEAR 2017**

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: Mr. Steven Black, Water Quality Program Manager
U.S. Department of Energy, Sandia Field Office
P.O. Box 5400/MS 0184
Albuquerque, NM 87185-5400
(505) 845-6885
Steven.Black@nnsa.doe.gov

Operator: National Technology & Engineering Solutions of Sandia, LLC
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

TABLE OF CONTENTS

LIST OF FIGURES	iv
LIST OF TABLES.....	vi
LIST OF ANNEXES	vii
ACRONYMS AND ABBREVIATIONS	viii
EXECUTIVE SUMMARY	ES-1
1.0 INTRODUCTION.....	1-1
1.1 Purpose and Scope	1-1
2.0 CHEMICAL WASTE LANDFILL POST-CLOSURE CARE CONDITIONS.....	2-1
2.1 Background.....	2-1
2.2 Final Cover System.....	2-1
2.3 Compliance Monitoring System.....	2-4
2.3.1 Groundwater Monitoring Network	2-4
2.3.2 Soil-Gas Monitoring Network	2-4
2.4 Storm-Water Diversion Structures.....	2-7
2.5 Security Fence.....	2-7
3.0 MONITORING AND INSPECTION REQUIREMENTS.....	3-1
3.1 Monitoring Requirements.....	3-1
3.2 Inspection, Maintenance, and Repair Requirements.....	3-2
3.2.1 Final Cover System Inspection/Maintenance/Repair Requirements.....	3-2
3.2.2 Storm-Water Diversion Structure Inspection Requirements.....	3-4
3.2.3 Monitoring Well Network Inspection Requirements.....	3-4
3.2.4 Security Fence Inspection Requirements	3-4
3.2.5 Emergency Equipment Inspection Requirements	3-5
4.0 GROUNDWATER MONITORING RESULTS	4-1
4.1 Groundwater Sampling Field Activities.....	4-1
4.1.1 Well Purging.....	4-1
4.1.2 Field Quality Control.....	4-2
4.1.3 Waste Management	4-3
4.2 Laboratory Results.....	4-4
4.2.1 Environmental Sample Results.....	4-4

TABLE OF CONTENTS (Continued)

4.2.2	Field Quality Control Sample Results	4-9
4.2.3	Data Quality	4-10
4.2.4	Variances and Non-Conformances.....	4-11
4.3	Data Evaluation	4-11
4.3.1	Statistical Assessment Requirements.....	4-11
4.3.2	Statistical Assessment Results.....	4-13
4.4	Hydrogeologic Assessment.....	4-25
5.0	SOIL-GAS MONITORING RESULTS	5-1
5.1	Soil-Gas Sampling Field Activities.....	5-1
5.1.1	Well Evacuation.....	5-1
5.1.2	Field Quality Control.....	5-2
5.1.3	Waste Management	5-2
5.2	Laboratory Results.....	5-2
5.2.1	Environmental Sample Results.....	5-2
5.2.2	Field Quality Control Sample Results	5-15
5.2.3	Data Quality	5-16
5.2.4	Variances	5-17
5.3	Data Evaluation	5-17
5.3.1	Statistical Assessment Requirements.....	5-18
5.3.2	Statistical Assessment Results.....	5-18
5.4	Historic Data Evaluation.....	5-20
6.0	INSPECTION, MAINTENANCE, AND REPAIR RESULTS	6-1
6.1	Final Cover System.....	6-1
6.1.1	Vegetation Monitoring and Inspection.....	6-1
6.1.2	Cover Inspection	6-2
6.2	Storm-Water Diversion Structure Inspection	6-2
6.3	Monitoring Well Network Inspection	6-3
6.4	Security Fence Inspection.....	6-3
6.5	Emergency Equipment Inspection.....	6-3
6.6	Cover and Site Maintenance	6-3

TABLE OF CONTENTS (Concluded)

7.0	REGULATORY ACTIVITIES	7-1
7.1	2017 Permit Modification Requests.....	7-1
7.2	2017 Permit Submittals.....	7-1
7.3	2017 Technical Communication.....	7-1
7.4	Permit Modification and Submittal History.....	7-2
8.0	SUMMARY AND CONCLUSIONS.....	8-1
8.1	Groundwater and Soil-Gas Monitoring	8-1
8.2	Inspections and Maintenance	8-1
8.3	Regulatory Activities	8-2
8.4	Conclusions	8-2
9.0	REFERENCES.....	9-1

LIST OF FIGURES

Figure		Page
2-1	Location of the Chemical Waste Landfill with respect to Kirtland Air Force Base and the City of Albuquerque	2-2
2-2	Location of the Chemical Waste Landfill within Technical Area III	2-3
2-3	Schematic Profile of the Chemical Waste Landfill Evapotranspirative Cover	2-5
2-4	Chemical Waste Landfill Surface Drainage Patterns and Monitoring Networks	2-6
4-1	Chromium Control Chart for CWL-BW5/4A	4-15
4-2	Nickel Control Chart for CWL-BW5/4A	4-16
4-3	TCE Control Chart for CWL-BW5/4A	4-17
4-4	Nickel Control Chart for CWL-MW9	4-18
4-5	Chromium Control Chart for CWL-MW10	4-19
4-6	Nickel Control Chart for CWL-MW10	4-20
4-7	TCE Control Chart for CWL-MW10	4-21
4-8	Chromium Control Chart for CWL-MW11	4-22
4-9	Nickel Control Chart for CWL-MW11	4-23
4-10	Potentiometric Surface of the Regional Aquifer at the Chemical Waste Landfill, October 2017	4-26
5-1	Historic TCE Concentrations vs. Time, Chemical Waste Landfill Well UI-1 Ports	5-23
5-2	Historic TCE Concentrations vs. Time, Chemical Waste Landfill Well UI-2 Ports	5-24
5-3	Historic TCE Concentrations vs. Time, Chemical Waste Landfill Well D1 Ports	5-25
5-4	Historic TCE Concentrations vs. Time, Chemical Waste Landfill Well D2 Ports	5-26

LIST OF FIGURES (Concluded)

Figure		Page
5-5	Historic TCE Concentrations vs. Time, Chemical Waste Landfill Well D3 Ports	5-27
5-6	Historic Total Volatile Organic Compound Concentrations vs. Time, Chemical Waste Landfill Well UI-1 Ports.....	5-28
5-7	Historic Total Volatile Organic Compound Concentrations vs. Time, Chemical Waste Landfill Well UI-2 Ports.....	5-29
5-8	Historic Total Volatile Organic Compound Concentrations vs. Time, Chemical Waste Landfill Well D1 Ports.....	5-30
5-9	Historic Total Volatile Organic Compound Concentrations vs. Time, Chemical Waste Landfill Well D2 Ports.....	5-31
5-10	Historic Total Volatile Organic Compound Concentrations vs. Time, Chemical Waste Landfill Well D3 Ports.....	5-32

LIST OF TABLES

Table	Page
3-1 Chemical Waste Landfill Groundwater and Soil-Gas Monitoring Frequency, Parameters, and Methods.....	3-2
4-1 Summary of TCE Results, Chemical Waste Landfill Groundwater Monitoring, Analytical Method SW846-8260B, Calendar Year 2017	4-5
4-2 Summary of Chromium and Nickel Results, Chemical Waste Landfill Groundwater Monitoring, Analytical Method SW846-6020, Calendar Year 2017.....	4-6
4-3 Summary of Additional Volatile Organic Compound Results, Chemical Waste Landfill Groundwater Monitoring, Analytical Method SW846-8260B, January 2017	4-7
4-4 Summary of Field Water Quality Measurements, Chemical Waste Landfill Groundwater Monitoring, Calendar Year 2017	4-9
4-5 Summary of Duplicate Sample Results, Chemical Waste Landfill Groundwater Monitoring, Calendar Year 2017.....	4-10
4-6 Concentration Limits for the Hazardous Constituents of Concern at the Chemical Waste Landfill	4-12
4-7 Statistical Assessment Results Summary, Chemical Waste Landfill, Calendar Year 2017 Sampling Results	4-14
5-1 Summary of Detected Volatile Organic Compounds, Chemical Waste Landfill Soil-Gas Monitoring, Analytical Method TO-15, January 2017	5-3
5-2 Summary of January 2017 Duplicate Samples, Chemical Waste Landfill Soil-Gas Monitoring	5-16
5-3 Chemical Waste Landfill Soil-Gas Monitoring, Statistical Assessment Results Summary, Calendar Year 2017.....	5-19
5-4 Historic Soil-Gas Monitoring Summary – TCE Concentrations, Chemical Waste Landfill	5-21
5-5 Historic Soil-Gas Monitoring Summary – Total Volatile Organic Compound Concentrations, Chemical Waste Landfill.....	5-22
7-1 Chemical Waste Landfill Post-Closure Care Permit Modification History	7-2
7-2 Chemical Waste Landfill Post-Closure Care Permit Document Submittal History ...	7-3

LIST OF ANNEXES

Annex

- Annex A Chemical Waste Landfill Calendar Year 2017 Groundwater Monitoring Forms and Reports
- Annex B Chemical Waste Landfill Calendar Year 2017 Soil-Gas Monitoring Forms and Reports
- Annex C Chemical Waste Landfill Calendar Year 2017 Post-Closure Inspection Forms
- Annex D Chemical Waste Landfill Calendar Year 2017 Biology Report

ACRONYMS AND ABBREVIATIONS

AOP	administrative operating procedure
AR/COC	analysis request chain of custody
ATV	all-terrain vehicle
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
NTESS	National Technology & Engineering Solutions of Sandia, LLC
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 conductivity
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 groundwater sampling events, scheduled semi-annually, were conducted in Calendar Year (CY) 2017. 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 2017. Two minor variances from PCCP requirements were identified for the January 2017 soil-gas monitoring activities (i.e., no impact to data quality) and were addressed through a PCCP modification request that was approved by the New Mexico Environment Department (NMED) in February 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 good condition with even coverage of mature, native perennial grasses. Maintenance was performed in CY 2017 in response to the inspections and as best practice for ET Cover vegetation. 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 2017 included submittal of two modification requests to the PCCP, the Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2016 (SNL/NM March 2017) and one submittal of an updated reference document cited in the PCCP.

All PCCP requirements have been met for CY 2017. 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.

This page intentionally left blank.

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. Between January 1, 2017 and April 30, 2017, SNL was managed and operated by Sandia Corporation (Sandia), a wholly-owned subsidiary of Lockheed Martin Corporation. On May 1, 2017, the name of the management and operating contractor of SNL transitioned to National Technology & Engineering Solutions of Sandia, LLC (NTESS), a wholly owned subsidiary of Honeywell International Inc.

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 (Kielling June 2011) and as modified, defines all post-closure requirements. There were two PCCP modifications in CY 2017. The modification history of the PCCP through calendar year (CY) 2017 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 2017.

All PCCP monitoring, inspection, and maintenance/repair requirements have been met for CY 2017. 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 2017 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 2017 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 2017 monitoring, inspection, and maintenance/repair activities. Monitoring and inspections performed include:

- Two semiannual groundwater monitoring events.
- One annual soil-gas monitoring event.
- Two inspections of the groundwater monitoring network and sampling equipment performed in conjunction with semi-annual monitoring events.
- 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 2017 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 2017 reporting period.
- Chapter 9 lists the references cited in this report.

Annexes are provided that include CY 2017 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

This page intentionally left blank.

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 ($\mu\text{g/L}$). TCE concentrations in groundwater have been below 5 $\mu\text{g/L}$ 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

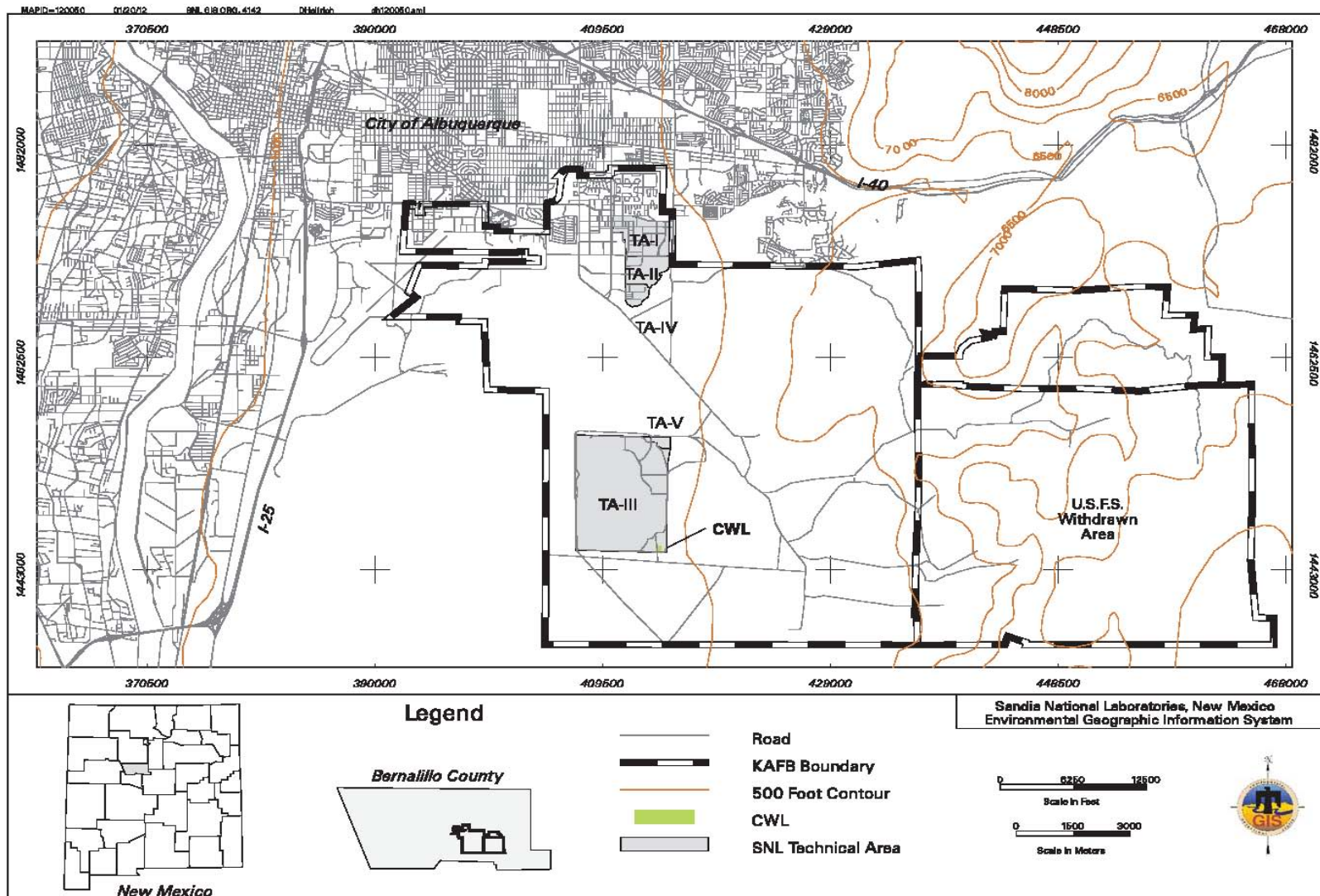


Figure 2-1
 Location of the Chemical Waste Landfill with respect to Kirtland Air Force Base and the City of Albuquerque

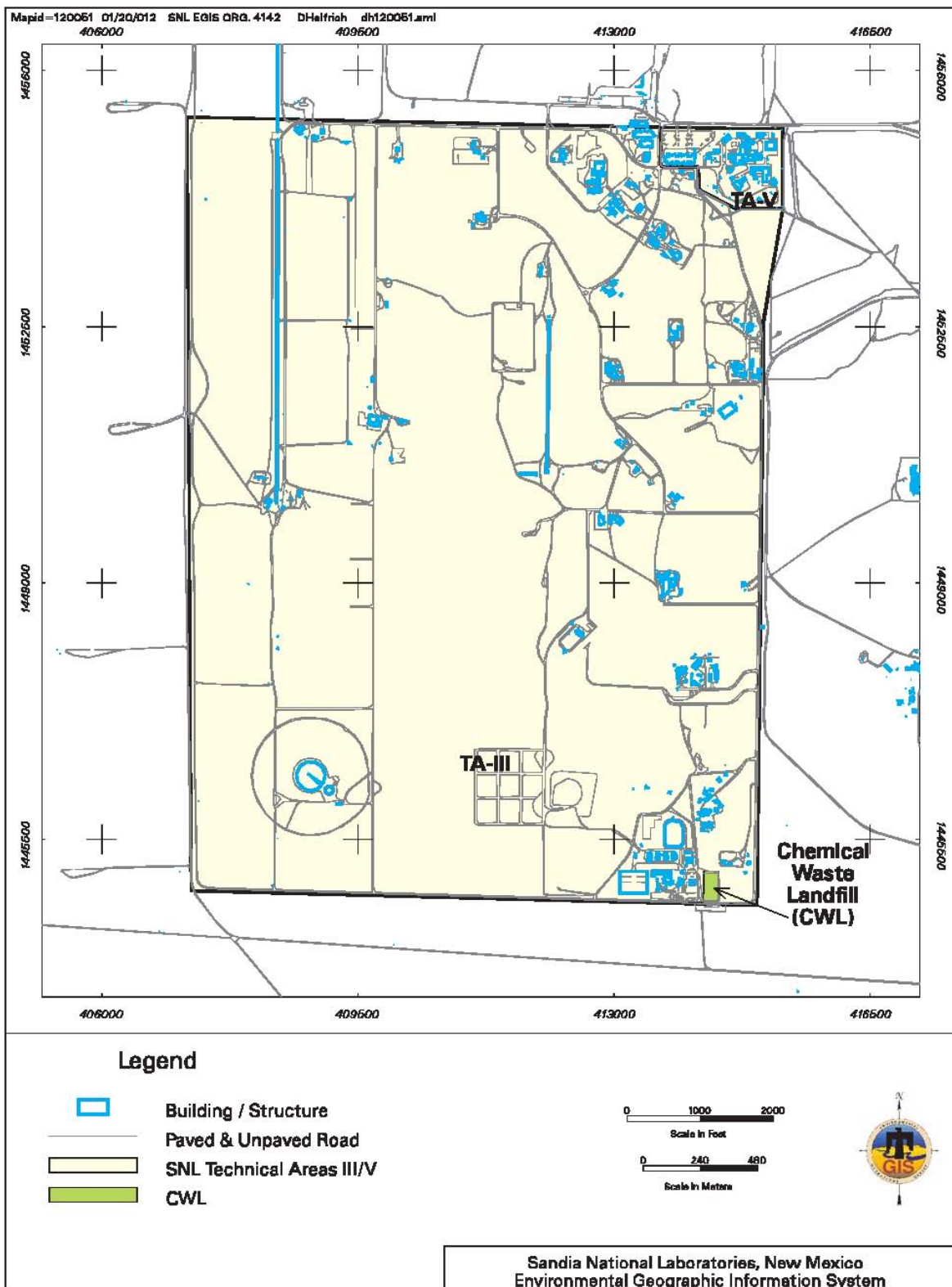


Figure 2-2
Location of the Chemical Waste Landfill within Technical Area III

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-MW11.

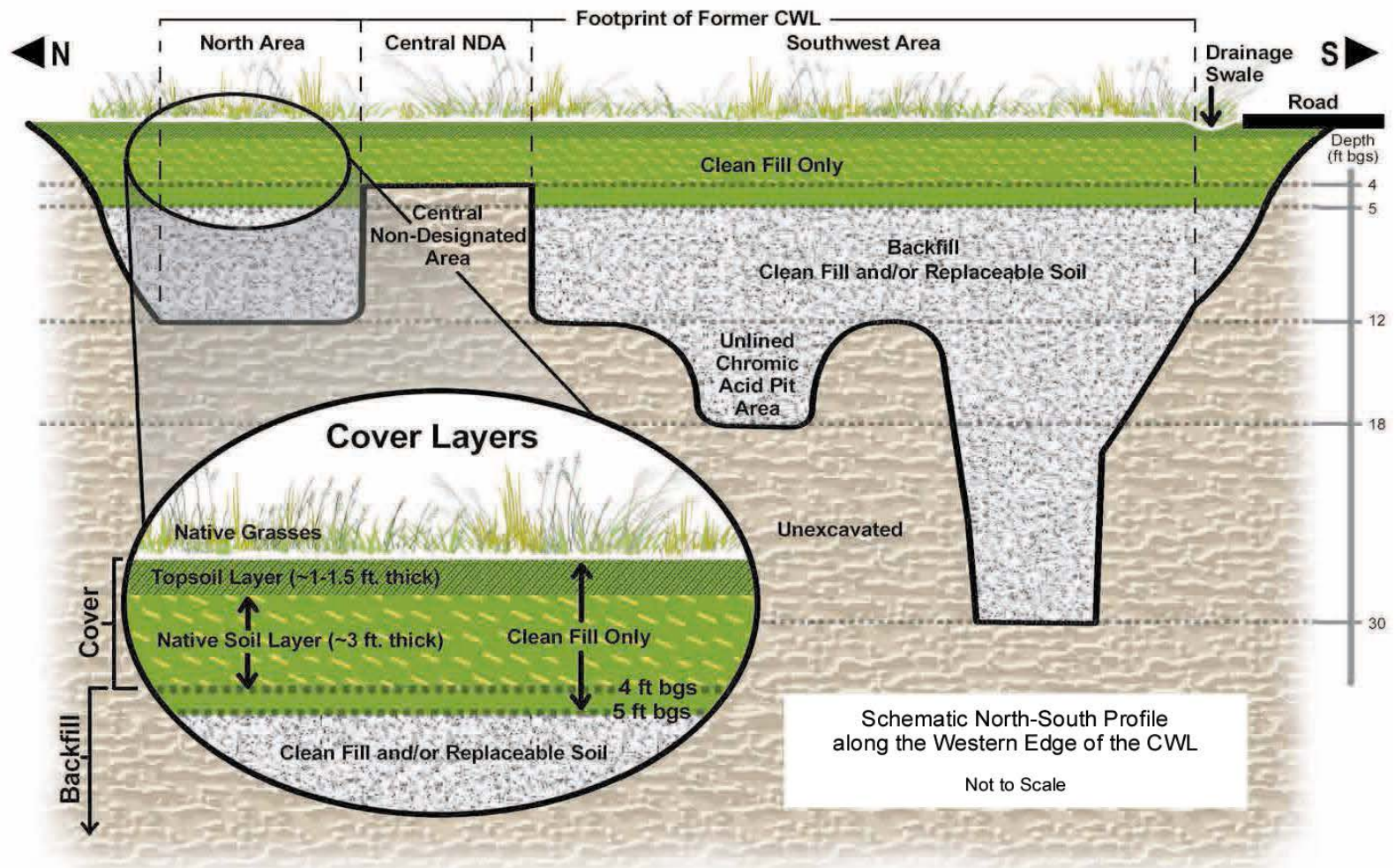
Well-completion diagrams for the groundwater monitoring wells are provided in PCCP Attachment 2.

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.



840857.01100000 A8

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

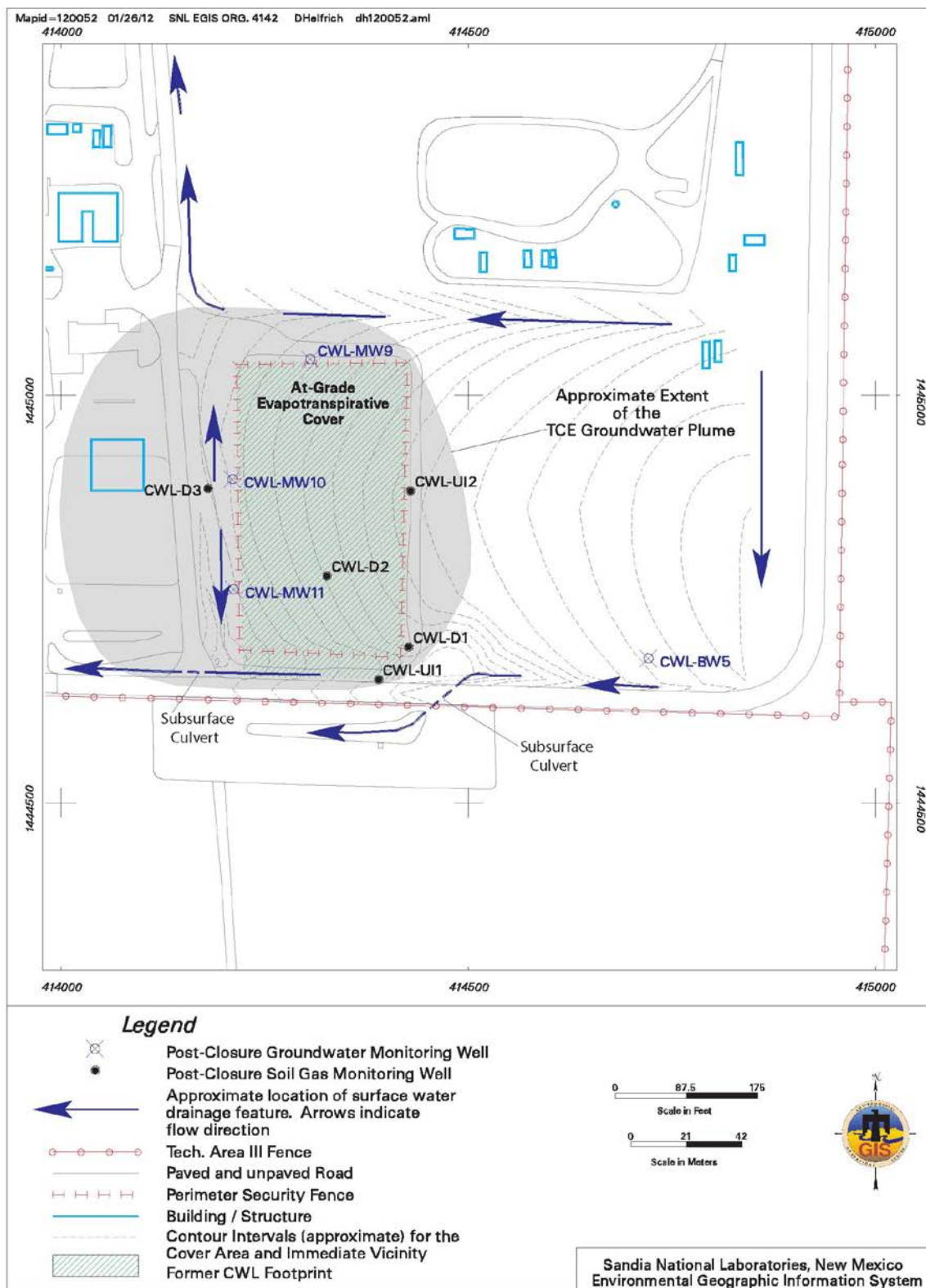


Figure 2-4
 Chemical Waste Landfill Surface Drainage Patterns and Monitoring Networks

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.

This page intentionally left blank.

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 2017 in accordance with PCCP Attachment 1, Sections 1.8 through 1.10. Results of CY 2017 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 the Sandia/NTESS 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:

^aSemi-Annual: An enhanced list of constituents must be analyzed on an annual basis (see Section 1.8.1.1 of PCCP Attachment 1).

^bEPA November 1986.

^cSee Table 1-5 in PCCP Attachment 1 for the required list of 50 VOCs.

^dUse 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 known as 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.

This page intentionally left blank.

4.0 GROUNDWATER MONITORING RESULTS

This chapter presents groundwater monitoring activities (i.e., sampling and analysis), analytical results, and data evaluation for CY 2017 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 well locations 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 groundwater sampling events, scheduled semi-annually, were conducted in CY 2017.

- The first sampling event was conducted January 11-17, 2017. Groundwater samples were collected from monitoring wells CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11, and a duplicate sample was collected from CWL-MW11. 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 18-24, 2017. Groundwater samples were collected from monitoring wells CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11, and a duplicate sample was collected from CWL-MW10. Samples collected from all wells were analyzed for TCE, chromium, and nickel.

4.1.1 Well Purging

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

continued after meeting the minimum purge volume requirement until four stable field measurements for temperature, specific conductivity (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 15 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 0.14 gallons per minute (gpm), and the estimated flow rate was 0.10 gpm during the final three gallons (equivalent to 0.52 and 0.38 liters per minute, respectively). During July, approximately 14 gallons were purged from CWL-MW10 prior to the well going dry (purge volume requirement was approximately 26 gallons). The average flow rate was 0.09 gpm, and the estimated flow rate was 0.08 gpm during the final three gallons (equivalent to 0.34 and 0.30 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 11-17, 2017

A duplicate environmental sample was collected from CWL-MW11. One equipment blank sample was collected prior to sampling CWL-MW11. The samples were submitted for all analyses. A total of five trip blank samples were submitted with the January 2017 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-MW9 and CWL-MW11 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.

Second Semi-Annual Sampling Event – July 18-24, 2017

A duplicate environmental sample was collected from CWL-MW10. One equipment blank sample was also collected prior to sampling CWL-MW10. The samples were submitted for all analyses. A total of six trip blank samples were submitted with the July 2017 groundwater samples and analyzed for TCE. Two field blank samples were collected for TCE analysis by pouring deionized water into sample containers at the CWL-MW9 and CWL-MW11 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 219 gallons of wastewater were generated during the January sampling event and approximately 240 gallons of wastewater were generated during the July sampling event (total of 459 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 2017 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 2017 groundwater sampling events. Table 4-3 summarizes results for the additional VOCs (enhanced list) included in the January 2017 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 11-17, 2017

TCE was detected above the laboratory MDL in the CWL-MW10 sample at a concentration of 0.780 µg/L. There were no other detections of TCE or enhanced list VOCs.

Chromium was not detected above the laboratory MDL in any of the groundwater samples. Nickel was detected above the laboratory MDL in the CWL-MW10 groundwater sample at a concentration of 0.000503 mg/L.

Second Semi-Annual Sampling Event – July 18-24, 2017

TCE was detected above the laboratory MDL in the CWL-MW10 environmental and duplicate samples at concentrations of 0.490 µg/L and 0.530 µg/L, respectively. 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 samples from wells CWL-BW5, CWL-MW9, and CWL-MW11 at concentrations from 0.00207 mg/L to 0.00276 mg/L.

Table 4-1
 Summary of TCE Results
 Chemical Waste Landfill Groundwater Monitoring
 Analytical Method SW846-8260B^a
 Calendar Year 2017

Well ID	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	Laboratory Qualifier ^b	Validation Qualifier ^b
January 2017 Sampling Event					
CWL-BW5	ND	0.300	1.00	U	--
CWL-MW9	ND	0.300	1.00	U	--
CWL-MW10	0.780	0.300	1.00	J	--
CWL-MW11	ND	0.300	1.00	U	--
CWL-MW11 (Duplicate)	ND	0.300	1.00	U	--
July 2017 Sampling Event					
CWL-BW5	ND	0.300	1.00	U	--
CWL-MW9	ND	0.300	1.00	U	--
CWL-MW10	0.490	0.300	1.00	J	--
CWL-MW10 (Duplicate)	0.530	0.300	1.00	J	--
CWL-MW11	ND	0.300	1.00	U	--

Notes:

^aEPA November 1986.

^bLaboratory/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.

TCE = Trichloroethene (trichloroethylene)

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 2017

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	Laboratory Qualifier ^b	Validation Qualifier ^b
January 2017 Sampling Event						
CWL-BW5	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0005	0.002	U	--
CWL-MW9	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0005	0.002	U	--
CWL-MW10	Chromium	ND	0.003	0.010	U	--
	Nickel	0.000503	0.0005	0.002	J	--
CWL-MW11	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0005	0.002	U	--
CWL-MW11 (Duplicate)	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0005	0.002	U	--
July 2017 Sampling Event						
CWL-BW5	Chromium	ND	0.003	0.010	U	--
	Nickel	0.00276	0.0006	0.002	--	--
CWL-MW9	Chromium	ND	0.003	0.010	U	--
	Nickel	0.00246	0.0006	0.002	--	--
CWL-MW10	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0006	0.002	U	--
CWL-MW10 (Duplicate)	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0006	0.002	U	--
CWL-MW11	Chromium	ND	0.003	0.010	U	--
	Nickel	0.00207	0.0006	0.002	--	--

Notes:

^aEPA November 1986.

^bLaboratory/Validation Qualifier - If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted sample. See explanation for "J," and "U" 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.

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.

Table 4-3
 Summary of Additional Volatile Organic Compound Results
 Chemical Waste Landfill Groundwater Monitoring
 Analytical Method SW846-8260B^a
 January 2017

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-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	--
CWL-MW11 (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	--

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 2017

Notes:

^aEPA November 1986.

^bLaboratory/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 2017

Well ID	Temperature (°C)	SC (µmho/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (% Sat)	DO (mg/L)
January 2017 Sampling Event							
CWL-BW5	17.39	1022.4	199.4	7.03	0.23	77.6	7.20
CWL-MW9	18.94	943.2	163.8	7.12	0.22	43.5	3.99
CWL-MW10	17.98	917.6	-7.3	7.21	2.78	29.5	2.78
CWL-MW11	15.81	928.1	200.2	7.13	0.59	56.5	5.54
July 2017 Sampling Event							
CWL-BW5	23.51	1101.0	-89.5	6.82	0.65	82.9	6.83
CWL-MW9	23.85	983.3	198.9	7.10	0.25	49.9	4.30
CWL-MW10	23.10	954.8	1.1	7.26	2.89	29.9	2.55
CWL-MW11	27.07	1099.0	241.2	7.13	0.36	64.7	5.16

Notes:

^aField 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 conductivity.

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-MW11) and July (CWL-MW10) sample pairs. For the environmental-duplicate sample pair collected at CWL-MW11 in January, no VOCs or metals were detected. Therefore, RPD values were not calculated. For the environmental-duplicate sample pair collected at CWL-MW10 in July, TCE was the only analyte detected in both samples. The RPD value for TCE was 8 and shows good agreement (i.e., RPD value < 20 for organics).

One equipment blank sample was collected in January prior to sampling monitoring well CWL-MW11 and analyzed for all constituents. No constituents were detected in the January equipment blank sample. One equipment blank sample was collected in July prior to sampling monitoring well CWL-MW10 and analyzed for all constituents. No constituents were detected in the July equipment blank sample.

Table 4-5
 Summary of Duplicate Sample Results
 Chemical Waste Landfill Groundwater Monitoring
 Calendar Year 2017

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a
July 2017 Sampling Event (CWL-MW10)			
Trichloroethene (µg/L)	0.490	0.530	8

Notes:

^aRPD = 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: R₁ = environmental sample result.
 R₂ = duplicate sample result.

µg/L = Microgram(s) per liter.

VOCs were not detected above the associated laboratory MDLs in the three field blank samples associated with the January sampling event. 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 six 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, SNL/NM June 2017a).

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 2017 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 fourteen times as of July 2017 (November-December 2010, July-August 2011, January and July 2012 through 2017). 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. Results qualified by the laboratory and/or data validation as estimated (i.e., "J" qualified) are used as reported. For laboratory detections that are qualified during the data validation process as "not detected" (i.e., "U" qualified) due to blank contamination or some other quality issue, 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 2017 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 2017 sample results are also compared to the historic range (minimum and maximum result derived from historic results not including CY 2017 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 2017 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 2017 sample results. For the next groundwater monitoring event, the median values will be recalculated and will include the July 2017 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 2017 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 fourteen 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. Statistical results are presented below for all cases where evaluation was possible.

Prediction Intervals Results

Monitoring Well CWL-BW5/4A

CY 2017 CWL-BW5 chromium and TCE sample results were all non-detections, and the corresponding MDL for TCE was lower than the 95% LCL. Thus, the TCE result is 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 most TCE results were non-detections. Results for chromium and TCE (using the MDL) fell within the historic range. The one CY 2017 nickel result (July environmental sample, 0.00276 mg/L) was equal to the 95% LCL and within the historic range. The MDL for the one non-detection (January environmental sample, 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 2017, fourteen environmental and four duplicate samples). Therefore, statistical evaluation of these constituents is not presented. Of the two CY 2017 nickel results (two environmental samples), one was a detection above the laboratory MDL (July environmental sample, 0.00246 mg/L). The July result fell between the 95% LCL and 95% UCL and was 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 equal to the historic minimum.

Table 4-7
Statistical Assessment Results Summary
Chemical Waste Landfill
Calendar Year 2017 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	0.00314	0.00289	0.00236	0.00392	Normal	42%	No
Nickel (mg/L)	0.0005	0.049	0.00485	0.00776	0.00276	0.00694	Normal	39%	No
TCE (µg/L)	0.1	0.78	0.342	0.124	0.308	0.376	Normal	3%	No
CWL-MW9									
Chromium (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	No
Nickel (mg/L)	0.0005	0.00435	0.00238	0.00132	0.00176	0.003	Normal	27%	No
TCE (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	No
CWL-MW10									
Chromium (mg/L)	0.002	0.00325	0.00232	0.00052666	0.00207	0.00257	Normal	27%	No
Nickel (mg/L)	0.000501	0.00707	0.00248	0.00183	0.00161	0.00335	Normal	9%	No
TCE (µg/L)	0.43	4.68	1.868	1.574	1.123	2.613	Normal	18%	No
CWL-MW11									
Chromium (mg/L)	0.002	0.00304	0.00236	0.00045651	0.00214	0.00258	Normal	45%	No
Nickel (mg/L)	0.0005	0.00449	0.002	0.00126	0.0014	0.0026	Normal	18%	No
TCE (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	No

Notes:

^aHazardous Constituents from CWL Permit Attachment 1, Section 1.4.1, Table 1-2 (Table 4-6 of this report).

^bMinimum and maximum result determined from historic data not including 2017 sample results.

^cMean, LCL, UCL, Standard Deviation, and Distribution Type determined using ProUCL statistical program.

^dMedian Test is the cumulative percentage of sample results that are greater than the median.

^eExceedance determined by comparing the sample result (Tables 4-1, 4-2, and 4-3 of this report) 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.

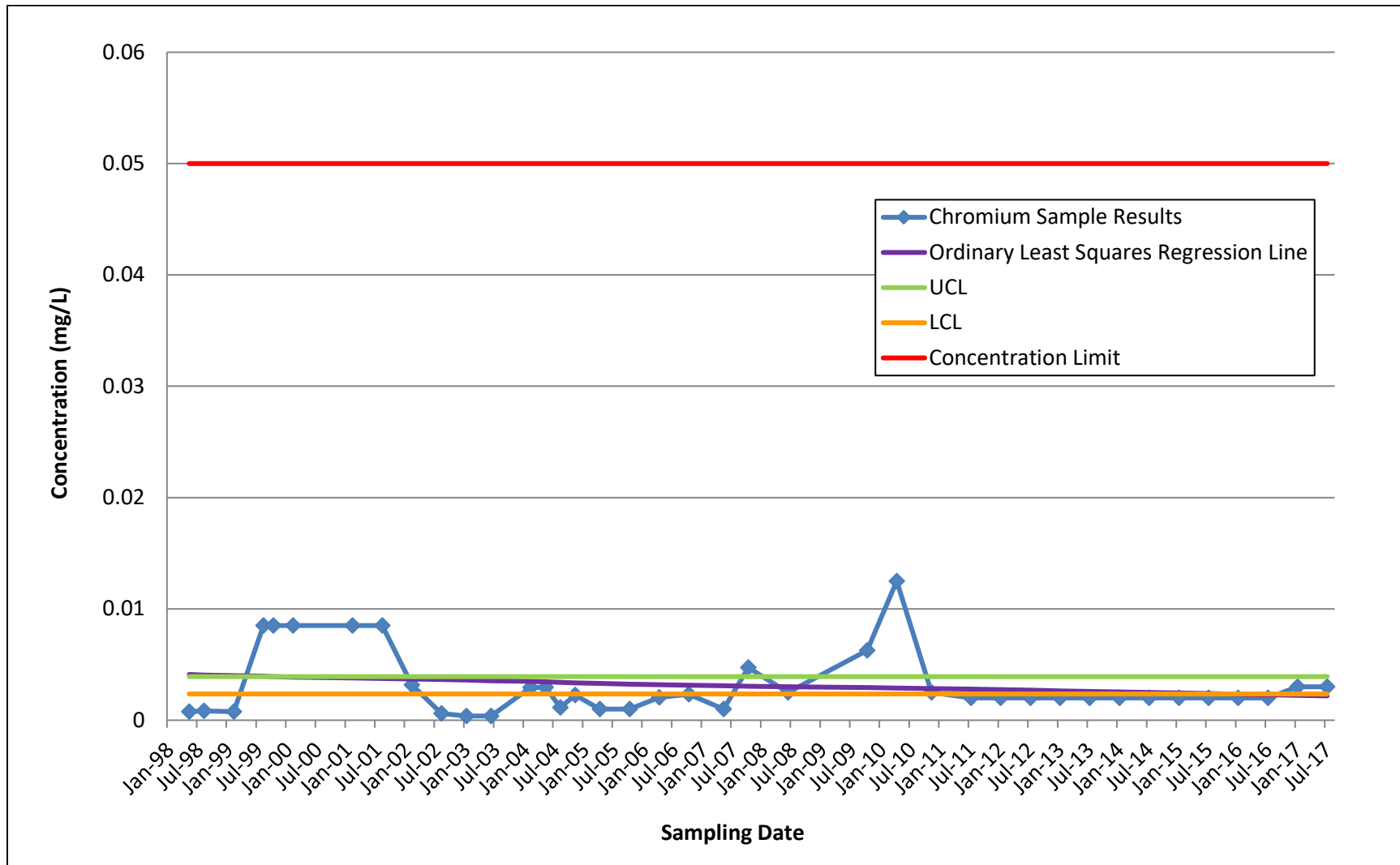


Figure 4-1
Chromium Control Chart for CWL-BW5/4A

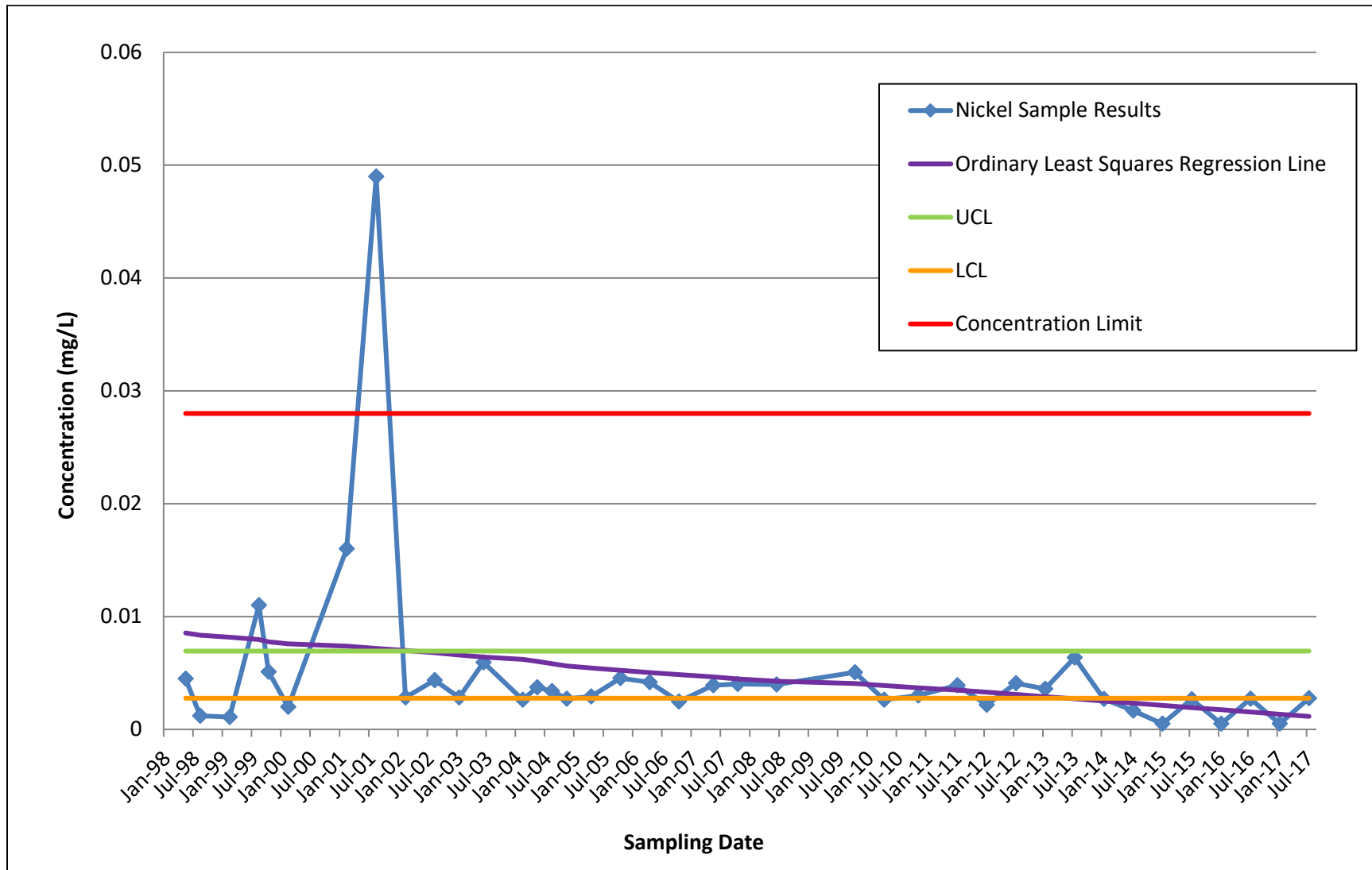


Figure 4-2
 Nickel Control Chart for CWL-BW5/4A

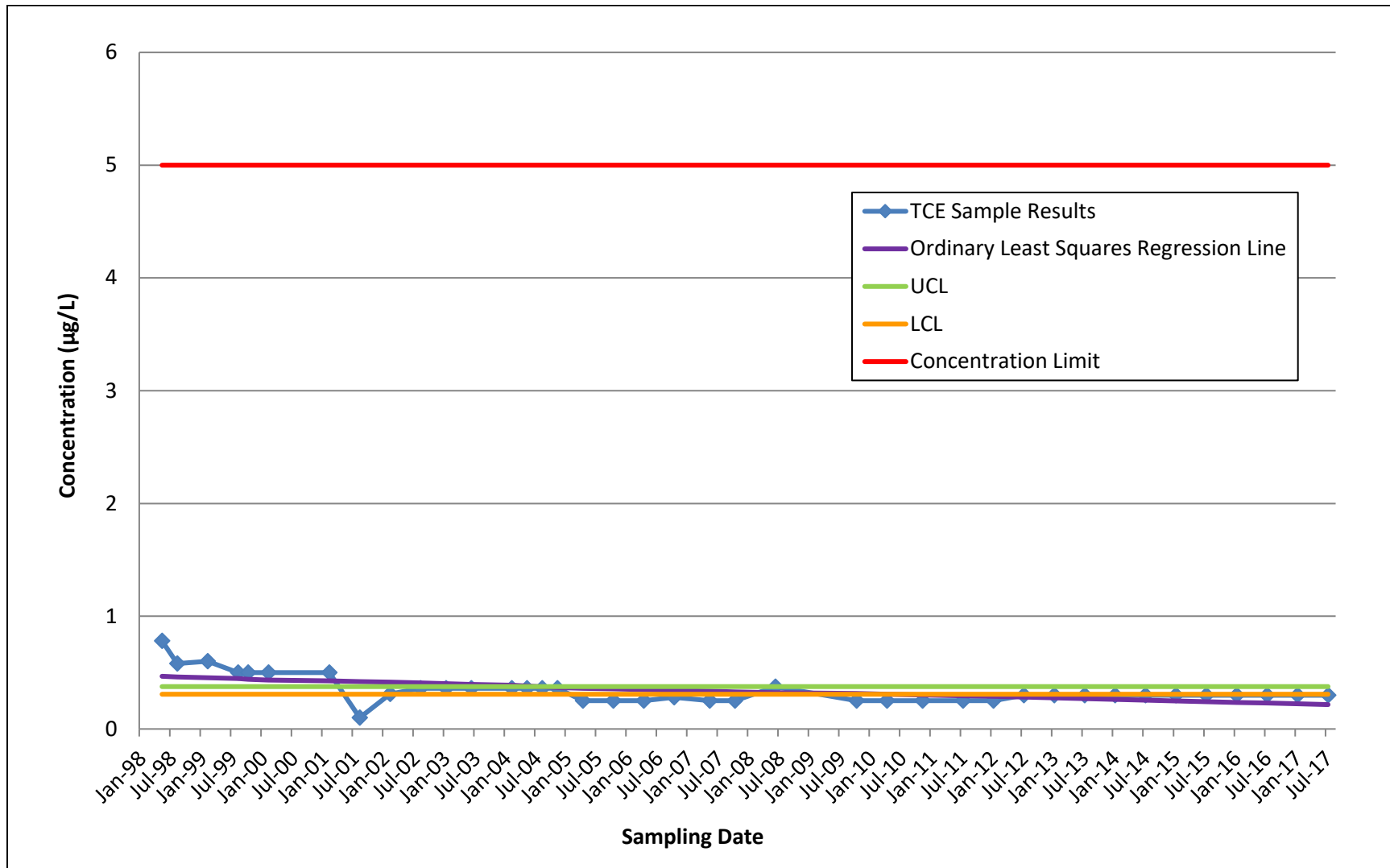


Figure 4-3
TCE Control Chart for CWL-BW5/4A

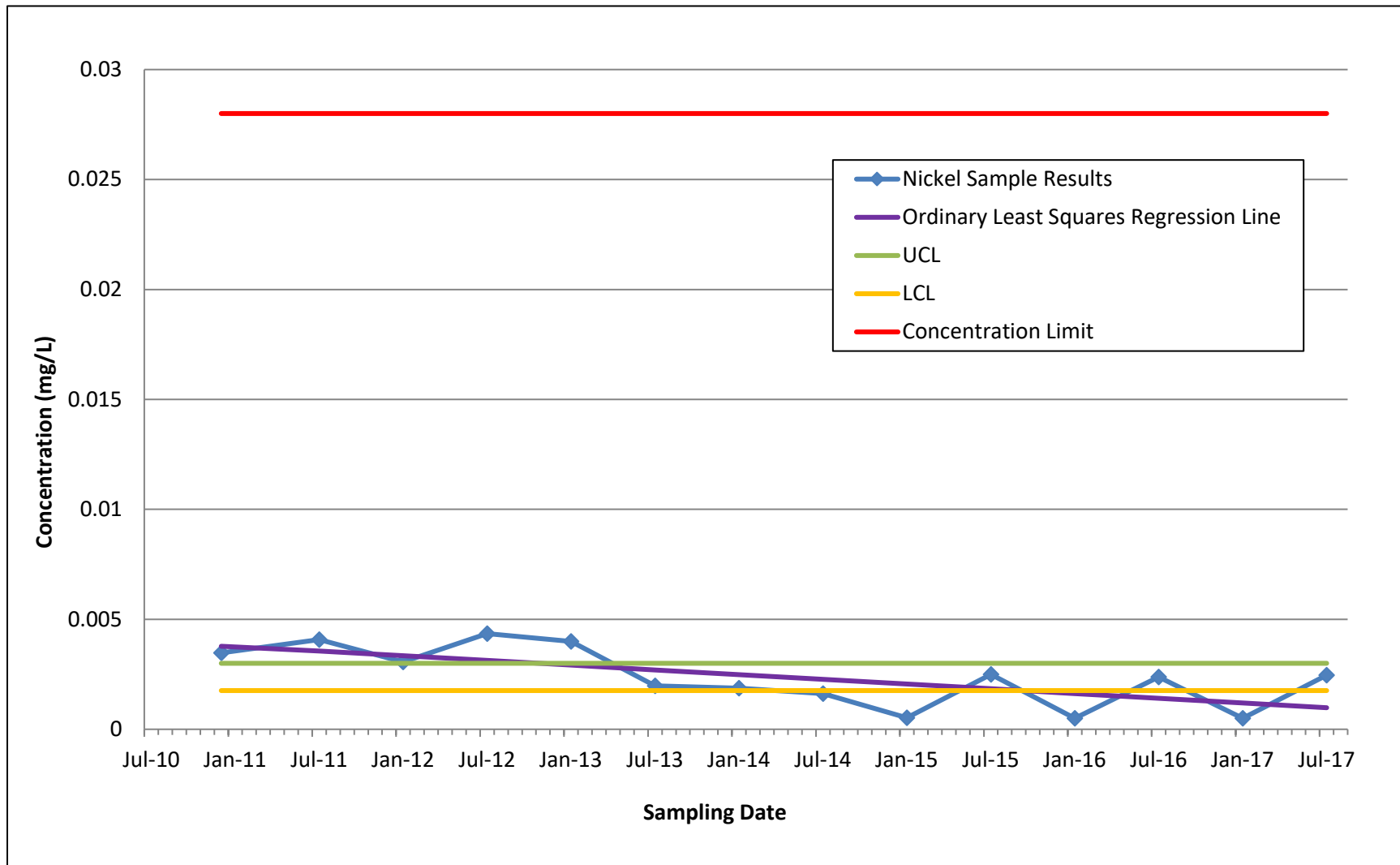


Figure 4-4
Nickel Control Chart for CWL-MW9

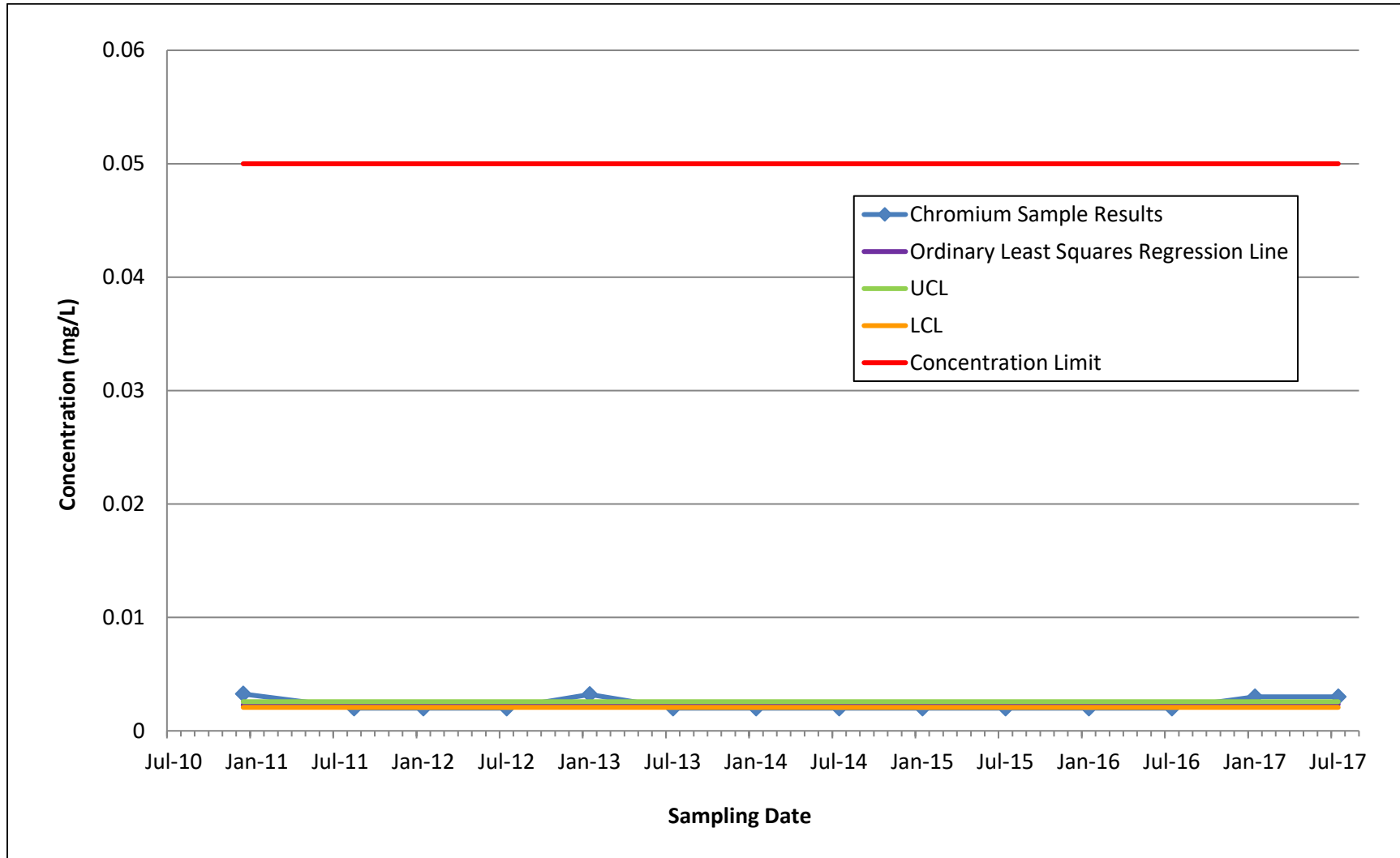


Figure 4-5
Chromium Control Chart for CWL-MW10

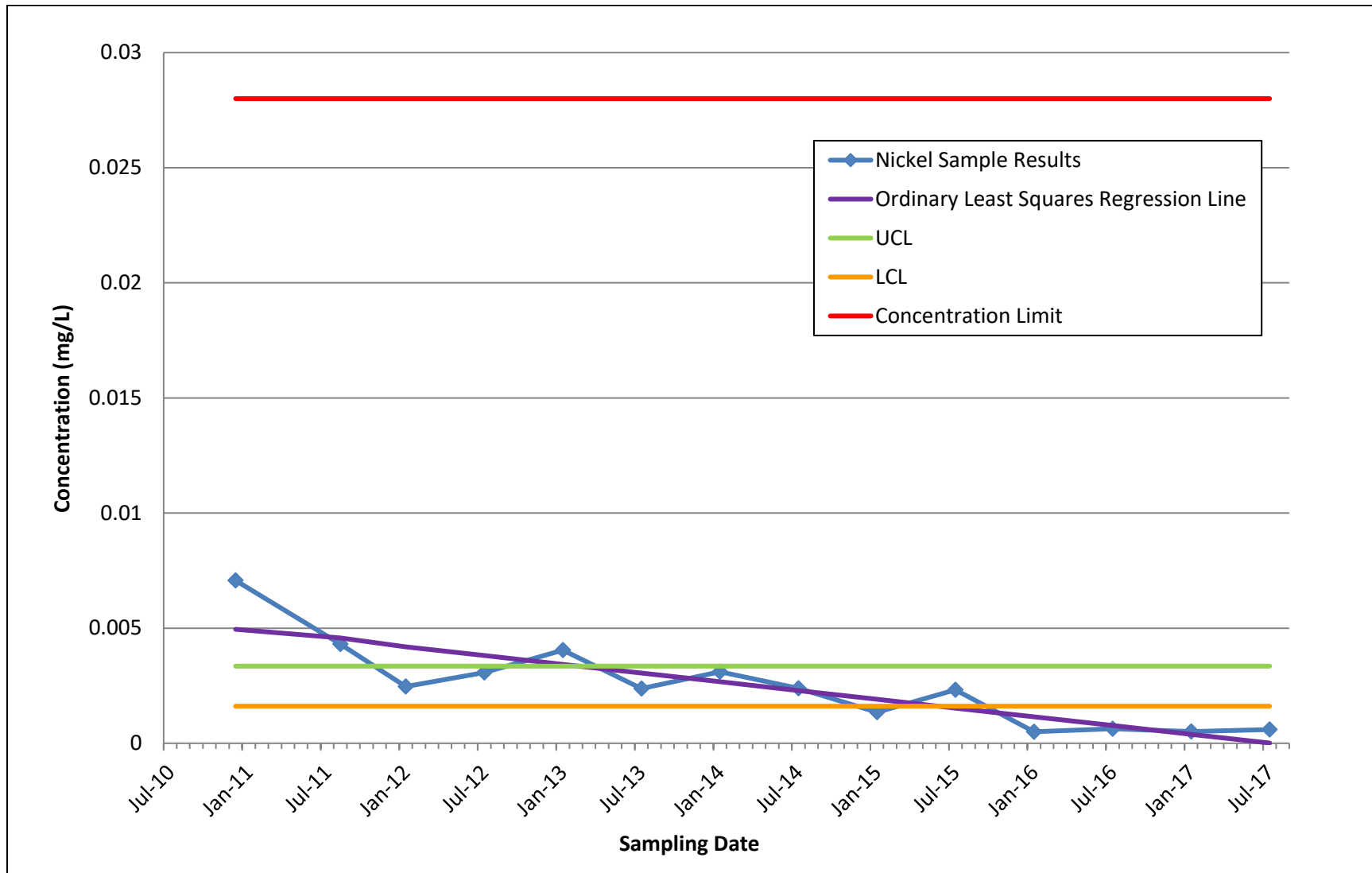


Figure 4-6
Nickel Control Chart for CWL-MW10

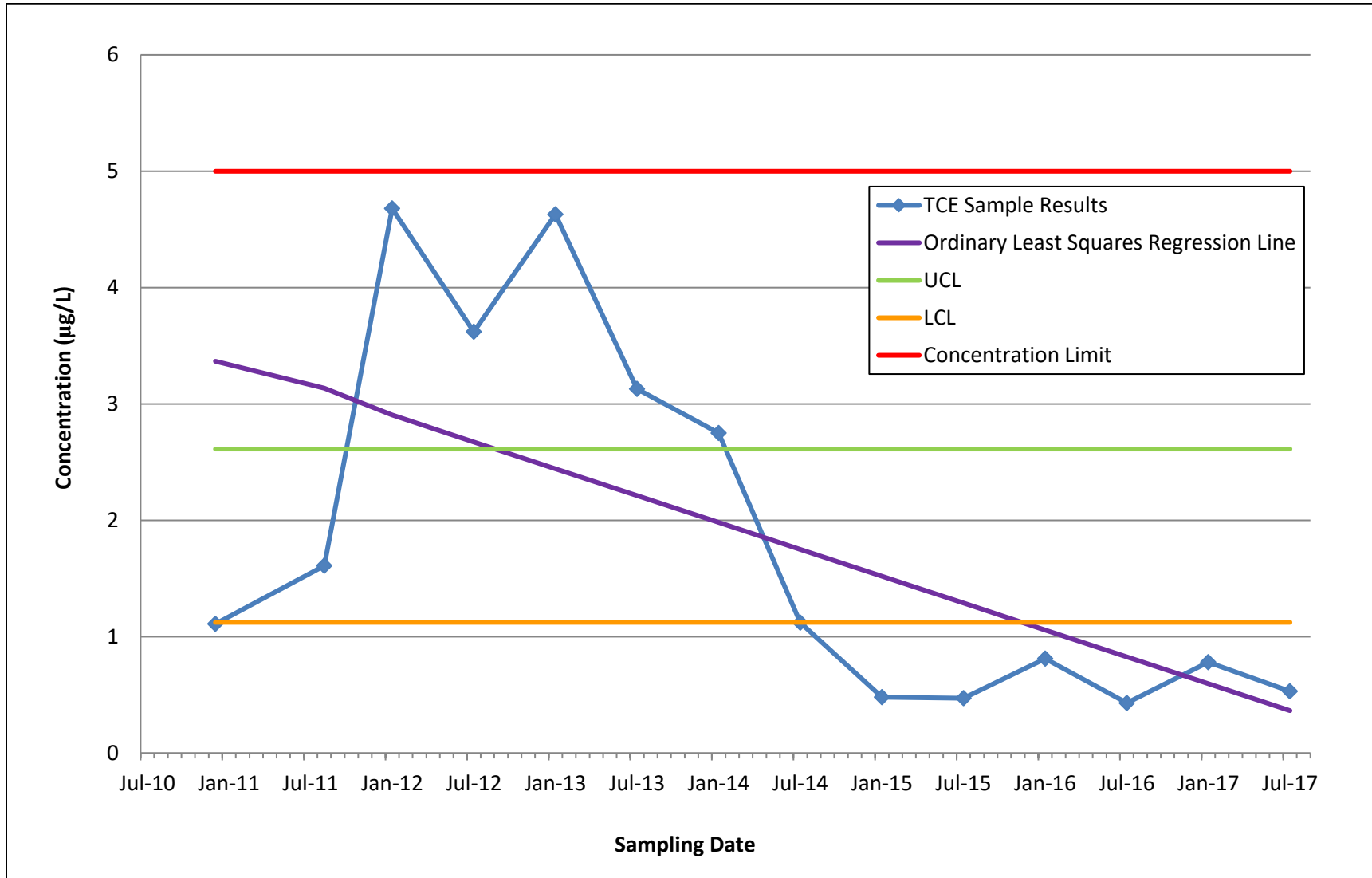


Figure 4-7
TCE Control Chart for CWL-MW10

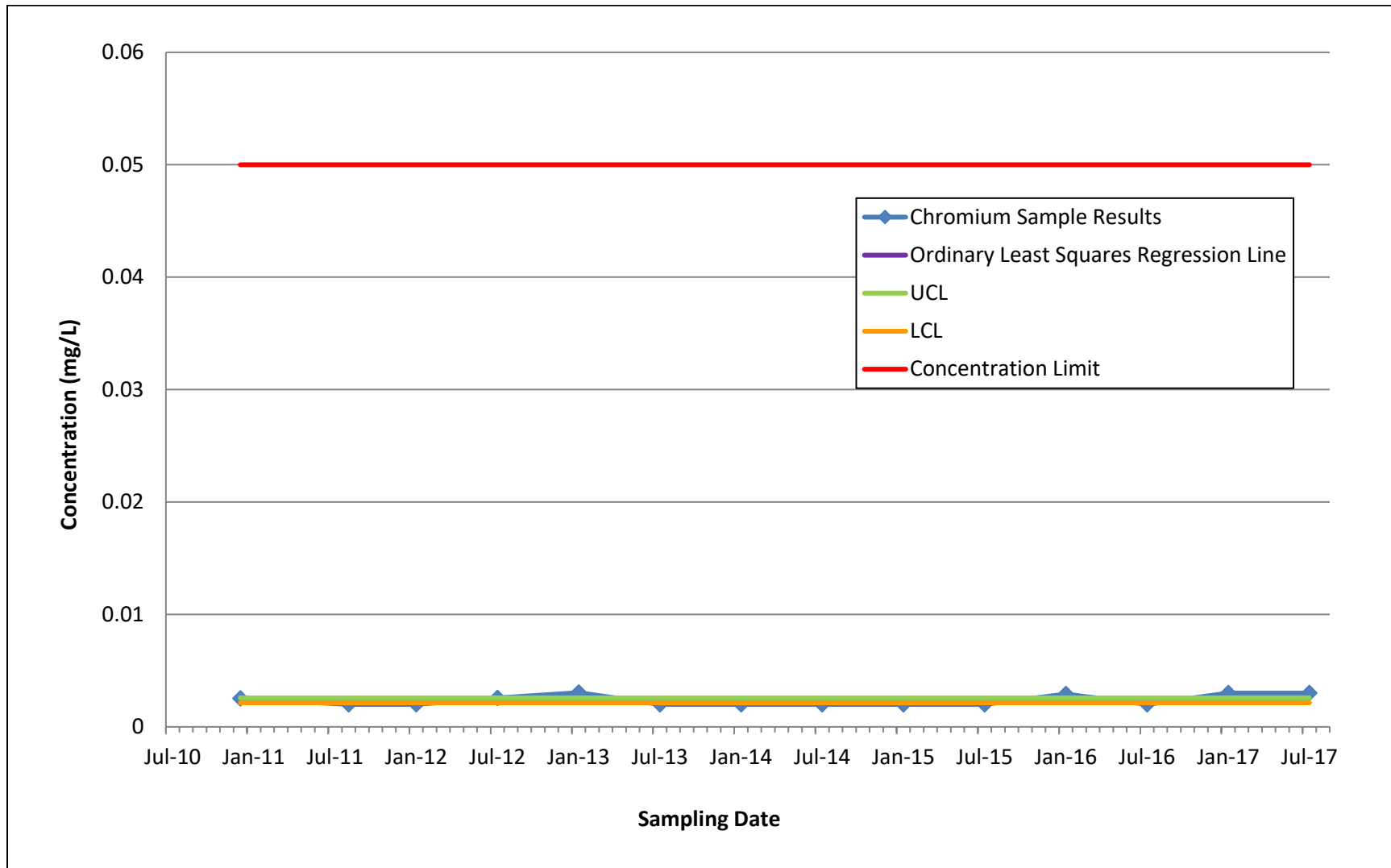


Figure 4-8
Chromium Control Chart for CWL-MW11

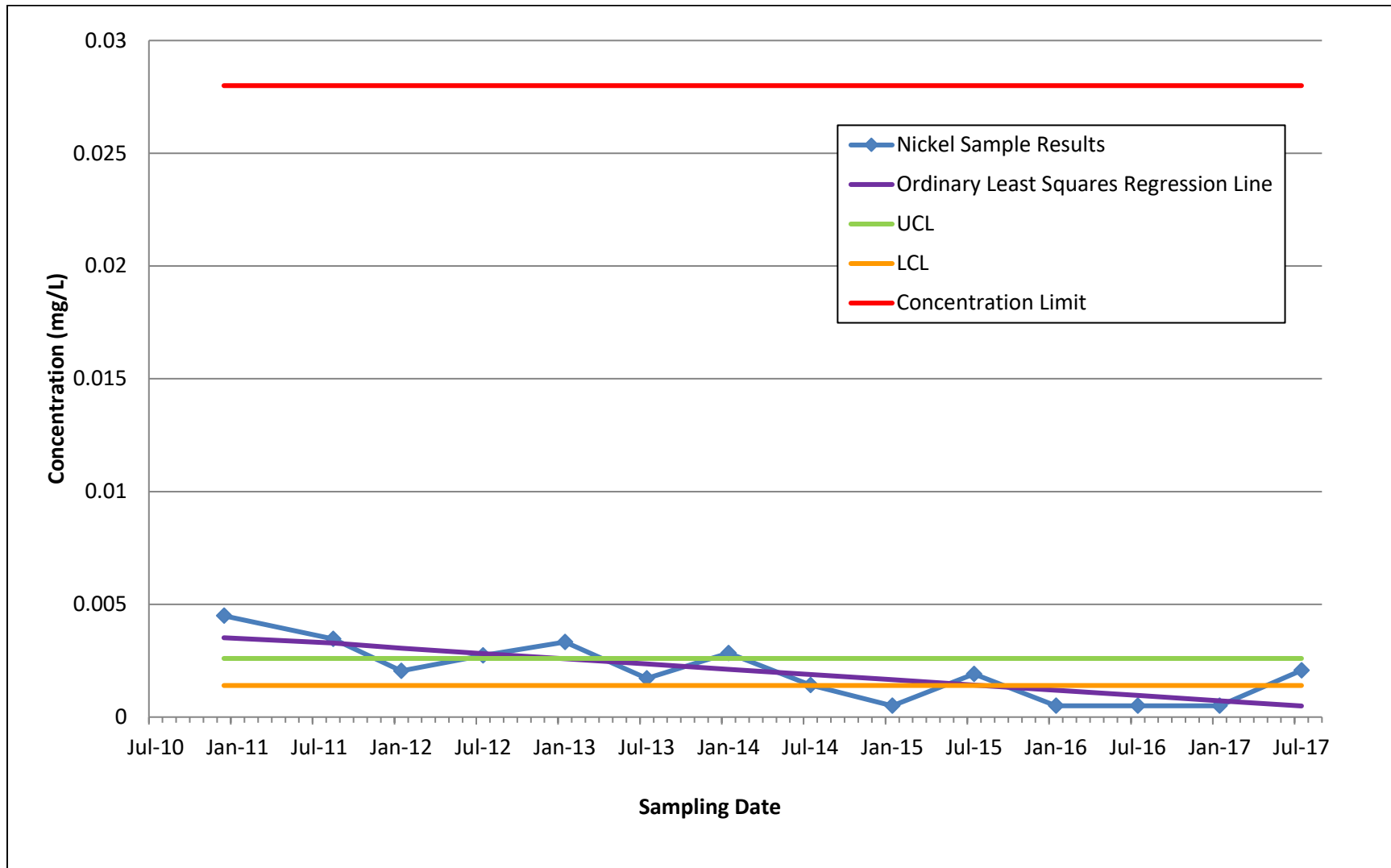


Figure 4-9
Nickel Control Chart for CWL-MW11

Monitoring Well CWL-MW10

CY 2017 CWL-MW10 chromium sample results were all non-detects, and the laboratory MDL (0.003 mg/L) was greater than the 95% UCL and fell within the historic range. The nickel results for the January environmental sample detection (0.000503 mg/L) was below the 95% LCL and within the historic range. The July environmental and duplicate samples were both non-detects; the MDL (0.006 mg/L) was less than the 95% LCL but within the historic range. For the TCE results, all January (0.780 µg/L) and July (0.490 and 0.530 µg/L) results were below the 95% LCL and within the historic range.

Monitoring Well CWL-MW11

CY 2017 CWL-MW11 chromium sample results were all non-detects; the MDL (0.003 mg/L) exceeded the 95% UCL but was within the historic range. The July nickel result (0.00207 mg/L) was within the 95% LCL and 95% UCL range and within the historic range. Both January results (environmental and duplicate samples) were non-detects; 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 2017, fourteen environmental and three 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 45% for chromium (CWL-MW11); all CY 2017 CWL-MW11 chromium results were non-detects. 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 or very flat 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 chart scale and decreases during the last nine sampling events (July

2013 through July 2017). 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 2016 and October 2017 ranged from 0.38 (CWL-MW10 and CWL-MW11) to 0.54 (CWL-BW5) feet; CWL-MW10 showed an increase in elevation of 0.26. The average rate of decline factoring in all four monitoring wells was 0.26 feet. This rate of decline was similar to the change from 2015 to 2016, and has significantly decreased from the 2014 to 2015 average decline rate, which was 0.72 feet.

In CY 2017, 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 2017 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 2017b). 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 across the site, the horizontal gradient did not change significantly from CY 2016 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 since CY 2014, 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.

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 2017 in accordance with PCCP Attachment 1, Sections 1.8 and 1.12, and Attachment 3 (NMED October 2009 and subsequent revisions). The CY 2017 annual soil-gas sampling event was the sixth 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 9, 2017. 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 2017 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 2017 monitoring event, duplicate environmental samples were collected from two CWL-D1 monitoring well sample ports, CWL-D1-240 and CWL-D1-470. The duplicate samples were 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 2017 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 2017 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 2017 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 2017. 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 2017

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-UI1-40	Carbon tetrachloride	16.3	7.10	88.8	J	--
	Chloroform	725	10.5	33.3	--	--
	Dichlorodifluoromethane	28.5	16.1	44.4	J	--
	1,1-Dichloroethane	13.4	7.99	33.3	J	--
	1,1-Dichloroethene	205	14.3	88.8	--	--
	1,2-Dichloropropane	47.0	26.6	44.4	--	--
	Methylene chloride	9.65	7.99	44.4	J	--
	Tetrachloroethene	3590	5.66	44.4	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	736	18.1	44.4	--	--
	1,1,1-Trichloroethane	49.0	7.22	33.3	--	--
	1,1,2-Trichloroethane	10.6	7.44	44.4	J	--
	Trichloroethene	5680	11.7	44.4	--	--
	Trichlorofluoromethane	192	21.8	44.4	--	--
	o-Xylene	7.29	5.99	44.4	J	--
	Total Organics ^c	11309.74	NA	NA	NA	NA
CWL-UI1-80	Chloroform	574	11.8	37.2	--	--
	Dichlorodifluoromethane	34.1	18.0	49.6	J	--
	1,1-Dichloroethane	14.6	8.93	37.2	J	--
	1,2-Dichloroethane	14.7	10.9	99.2	J	--
	1,1-Dichloroethene	336	16.0	99.2	--	--
	1,2-Dichloropropane	63.8	29.8	49.6	--	--
	Methylene chloride	60.1	8.93	49.6	--	--
	Tetrachloroethene	1230	6.32	49.6	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	859	20.2	49.6	--	--
	1,1,1-Trichloroethane	44.3	8.06	37.2	--	--
	Trichloroethene	7230	13.0	49.6	--	--
	Trichlorofluoromethane	225	24.3	49.6	--	--
	Total Organics ^c	10685.6	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
 Summary of Detected Volatile Organic Compounds
 Chemical Waste Landfill Soil-Gas Monitoring
 Analytical Method TO-15^a
 January 2017

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifie ^b	Validation Qualifier ^b
CWL-UI1-120	Carbon tetrachloride	20.0	10.5	131	J	--
	Chloroform	466	15.6	49.2	--	--
	Dichlorodifluoromethane	34.0	23.8	65.6	J	--
	1,1-Dichloroethane	16.9	11.8	49.2	J	--
	1,2-Dichloroethane	38.0	14.4	131	J	--
	1,1-Dichloroethene	368	21.2	131	--	--
	1,2-Dichloropropane	81.9	39.4	65.6	--	--
	Methylene chloride	171	11.8	65.6	--	--
	Tetrachloroethene	692	8.36	65.6	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	862	26.7	65.6	--	--
	1,1,1-Trichloroethane	40.7	10.7	49.2	J	--
	Trichloroethene	7820	17.2	65.6	--	--
	Trichlorofluoromethane	219	32.1	65.6	--	--
	Total Organics ^c	10829.5	NA	NA	NA	NA
CWL-UI2-36	Carbon tetrachloride	14.2	4.61	57.6	J	--
	Chloroform	649	6.84	21.6	--	--
	Dichlorodifluoromethane	23.5	10.4	28.8	J	--
	1,1-Dichloroethene	53.6	9.29	57.6	J	--
	1,2-Dichloropropane	51.9	17.3	28.8	--	--
	Methylene chloride	6.88	5.18	28.8	J	--
	Tetrachloroethene	213	3.67	28.8	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	550	11.7	28.8	--	--
	1,1,1-Trichloroethane	31.3	4.68	21.6	--	--
	Trichloroethene	3720	7.56	28.8	--	--
	Trichlorofluoromethane	152	14.1	28.8	--	--
	Total Organics ^c	5465.38	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 2017

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-UI2-76	Carbon tetrachloride	18.2	7.30	91.2	J	--
	Chloroform	719	10.8	34.2	--	--
	Dichlorodifluoromethane	31.8	16.5	45.6	J	--
	1,1-Dichloroethene	119	14.7	91.2	--	--
	1,2-Dichloropropane	107	27.4	45.6	--	--
	Methylene chloride	10.3	8.21	45.6	J	--
	Tetrachloroethene	244	5.81	45.6	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	728	18.6	45.6	--	--
	1,1,1-Trichloroethane	30.0	7.41	34.2	J	--
	Trichloroethene	5320	12.0	45.6	--	--
	Trichlorofluoromethane	197	22.3	45.6	--	--
	Total Organics ^c	7524.3	NA	NA	NA	NA
	CWL-UI2-136	Carbon tetrachloride	24.8	8.26	103	J
Chloroform		648	12.3	38.7	--	--
Dichlorodifluoromethane		34.9	18.7	51.6	J	--
1,1-Dichloroethane		11.2	9.29	38.7	J	--
1,2-Dichloroethane		17.3	11.4	103	J	--
1,1-Dichloroethene		186	16.6	103	--	--
1,2-Dichloropropane		164	31.0	51.6	--	--
Methylene chloride		13.3	9.29	51.6	J	--
Tetrachloroethene		266	6.58	51.6	--	--
1,1,2-Trichloro-1,2,2-trifluoroethane		861	21.0	51.6	--	--
1,1,1-Trichloroethane		26.7	8.39	38.7	J	--
Trichloroethene		6760	13.5	51.6	--	--
Trichlorofluoromethane		225	25.3	51.6	--	--
Total Organics ^c		9238.2	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 2017

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D1-100	Carbon tetrachloride	25.0	11.1	139	J	J-
	Chloroform	576	16.5	52.2	--	J-
	Dichlorodifluoromethane	43.5	25.2	69.6	J	J-
	1,1-Dichloroethane	17.9	12.5	52.2	J	J-
	1,2-Dichloroethane	27.6	15.3	139	J	J-
	1,1-Dichloroethene	403	22.4	139	--	J-
	1,2-Dichloropropane	92.0	41.8	69.6	--	J-
	Methylene chloride	30.3	12.5	69.6	J	J-
	Tetrachloroethene	474	8.87	69.6	--	J-
	1,1,2-Trichloro-1,2,2-trifluoroethane	1150	28.4	69.6	--	J-
	1,1,1-Trichloroethane	40.1	11.3	52.2	J	J-
	Trichloroethene	8040	18.3	69.6	--	J-
	Trichlorofluoromethane	290	34.1	69.6	--	J-
	Total Organics ^c	11209.4	NA	NA	NA	NA
CWL-D1-160	Carbon tetrachloride	54.6	11.4	142	J	--
	Chloroform	600	16.9	53.4	--	--
	Dichlorodifluoromethane	69.4	25.8	71.2	J	--
	1,1-Dichloroethane	29.9	12.8	53.4	J	--
	1,2-Dichloroethane	46.5	15.7	142	J	--
	1,1-Dichloroethene	750	23.0	142	--	--
	1,2-Dichloropropane	207	42.7	71.2	--	--
	Tetrachloroethene	789	9.08	71.2	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1950	29.0	71.2	--	--
	1,1,1-Trichloroethane	51.7	11.6	53.4	J	--
	Trichloroethene	15600	37.3	142	--	J-
	Trichlorofluoromethane	471	34.9	71.2	--	--
	Total Organics ^c	20619.1	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
 Summary of Detected Volatile Organic Compounds
 Chemical Waste Landfill Soil-Gas Monitoring
 Analytical Method TO-15^a
 January 2017

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D1-240	Carbon tetrachloride	72.6	18.2	227	J	--
	Chloroform	594	27.0	85.2	--	--
	Dichlorodifluoromethane	88.4	41.2	114	J	--
	1,1-Dichloroethane	39.9	20.4	85.2	J	--
	1,2-Dichloroethane	36.5	25.0	227	J	--
	1,1-Dichloroethene	1090	36.6	227	--	--
	1,2-Dichloropropane	265	68.2	114	--	--
	Methylene chloride	37.5	20.4	114	J	--
	Tetrachloroethene	731	14.5	114	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	2570	46.3	114	--	--
	1,1,1-Trichloroethane	51.8	18.5	85.2	J	--
	Trichloroethene	20400	59.6	227	--	J-
	Trichlorofluoromethane	628	55.7	114	--	--
	Total Organics ^c	26604.7	NA	NA	NA	NA
CWL-D1-240 (Duplicate)	Carbon tetrachloride	53.6	18.2	227	J	J-
	Chloroform	531	27.0	85.2	--	J-
	Dichlorodifluoromethane	79.8	41.2	114	J	J-
	1,1-Dichloroethane	39.0	20.4	85.2	J	J-
	1,2-Dichloroethane	29.3	25.0	227	J	J-
	1,1-Dichloroethene	985	36.6	227	--	J-
	1,2-Dichloropropane	241	68.2	114	--	J-
	Methylene chloride	35.2	20.4	114	J	J-
	Tetrachloroethene	680	14.5	114	--	J-
	1,1,2-Trichloro-1,2,2-trifluoroethane	2300	46.3	114	--	J-
	1,1,1-Trichloroethane	47.1	18.5	85.2	J	J-
	Trichloroethene	20300	54.2	206	--	J-
	Trichlorofluoromethane	553	55.7	114	--	J-
	Total Organics ^c	25874.0	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 2017

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D1-350	Carbon tetrachloride	29.7	12.5	157	J	J-
	Chloroform	178	18.6	58.8	--	J-
	Dichlorodifluoromethane	51.5	28.4	78.4	J	J-
	1,1-Dichloroethane	15.3	14.1	58.8	J	J-
	1,1-Dichloroethene	576	25.3	157	--	J-
	1,2-Dichloropropane	69.1	47.0	78.4	J	J-
	Methylene chloride	30.7	14.1	78.4	J	J-
	Tetrachloroethene	278	10.0	78.4	--	J-
	1,1,2-Trichloro-1,2,2-trifluoroethane	1350	31.9	78.4	--	J-
	1,1,1-Trichloroethane	16.5	12.7	58.8	J	J-
	Trichloroethene	10000	20.6	78.4	--	J-
	Trichlorofluoromethane	343	38.4	78.4	--	J-
	Total Organics ^c	12937.8	NA	NA	NA	NA
	CWL-D1-470	Acetone	9.90	1.03	28.8	J
2-Butanone		4.22	1.15	4.61	J	--
Carbon disulfide		37.6	0.449	4.61	--	--
Carbon tetrachloride		2.38	0.369	4.61	J	--
Chloroform		1.08	0.547	1.73	J	--
Dichlorodifluoromethane		12.2	0.835	2.30	--	--
1,1-Dichloroethene		30.2	0.743	4.61	--	--
Methylene chloride		3.93	0.415	2.30	--	--
Tetrachloroethene		8.07	0.294	2.30	--	--
Toluene		0.704	0.294	2.30	J	--
1,1,2-Trichloro-1,2,2-trifluoroethane		198	0.939	2.30	--	--
Trichloroethene		159	0.605	2.30	--	--
Trichlorofluoromethane		55.5	1.13	2.30	--	--
m,p-Xylene		0.664	0.576	4.61	J	--
Total Organics ^c		523.448	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 2017

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D1-470 (Duplicate)	Acetone	6.33	0.797	22.4	J	R
	Benzene	0.427	0.354	1.79	J	--
	Carbon disulfide	0.417	0.349	3.58	J	--
	Carbon tetrachloride	2.55	0.287	3.58	J	--
	Chloroform	1.41	0.426	1.34	--	--
	Dichlorodifluoromethane	12.3	0.650	1.79	--	--
	1,1-Dichloroethene	31.0	0.578	3.58	--	--
	Methylene chloride	3.98	0.323	1.79	--	--
	Tetrachloroethene	6.88	0.228	1.79	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	197	0.730	1.79	--	--
	Trichloroethene	167	0.470	1.79	--	--
	Trichlorofluoromethane	55.4	0.878	1.79	--	--
	Total Organics ^c	478.364	NA	NA	NA	NA
	CWL-D2-120	Carbon tetrachloride	46.1	15.8	198	J
Chloroform		798	23.5	74.1	--	J-
Dichlorodifluoromethane		62.6	35.8	98.8	J	J-
1,1-Dichloroethane		31.8	17.8	74.1	J	J-
1,2-Dichloroethane		73.9	21.7	198	J	J-
1,1-Dichloroethene		660	31.9	198	--	J-
1,2-Dichloropropane		288	59.3	98.8	--	J-
Methylene chloride		24.0	17.8	98.8	J	J-
Tetrachloroethene		885	12.6	98.8	--	J-
1,1,2-Trichloro-1,2,2-trifluoroethane		1740	40.3	98.8	--	J-
1,1,1-Trichloroethane		59.8	16.1	74.1	J	J-
Trichloroethene		14300	40.3	154	--	J-
Trichlorofluoromethane		437	48.4	98.8	--	J-
Total Organics ^c		19406.2	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 2017

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D2-240	Carbon tetrachloride	49.8	14.8	186	J	J-
	Chloroform	654	22.0	69.6	--	J-
	Dichlorodifluoromethane	62.3	33.6	92.8	J	J-
	1,1-Dichloroethane	31.1	16.7	69.6	J	J-
	1,2-Dichloroethane	52.3	20.4	186	J	J-
	1,1-Dichloroethene	688	29.9	186	--	J-
	1,2-Dichloropropane	283	55.7	92.8	--	J-
	Methylene chloride	50.4	16.7	92.8	J	J-
	Tetrachloroethene	691	11.8	92.8	--	J-
	1,1,2-Trichloro-1,2,2-trifluoroethane	1690	37.8	92.8	--	J-
	1,1,1-Trichloroethane	43.0	15.1	69.6	J	J-
	Trichloroethene	14800	43.1	164	--	J-
	Trichlorofluoromethane	426	45.5	92.8	--	J-
	Total Organics ^c	19520.9	NA	NA	NA	NA
CWL-D2-350	Carbon tetrachloride	29.9	8.90	111	J	--
	Chloroform	313	13.2	41.7	--	--
	Dichlorodifluoromethane	42.7	20.2	55.6	J	--
	1,1-Dichloroethane	16.1	10.0	41.7	J	--
	1,2-Dichloroethane	15.1	12.2	111	J	--
	1,1-Dichloroethene	469	17.9	111	--	--
	1,2-Dichloropropane	119	33.4	55.6	--	--
	Methylene chloride	52.9	10.0	55.6	J	--
	Tetrachloroethene	384	7.09	55.6	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1090	22.7	55.6	--	--
	1,1,1-Trichloroethane	22.5	9.04	41.7	J	--
	Trichloroethene	9850	23.7	90.4	--	J-
	Trichlorofluoromethane	294	27.2	55.6	--	--
	Total Organics ^c	12698.2	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 2017

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D2-440	Acetone	27.5	0.274	7.70	--	--
	Benzene	0.169	0.122	0.616	J	--
	2-Butanone	2.58	0.306	1.23	--	--
	Carbon disulfide	2.34	0.120	1.23	--	--
	Carbon tetrachloride	0.242	0.0986	1.23	J	--
	Chloroform	1.91	0.146	0.462	--	--
	Chloromethane	0.412	0.303	1.23	J	--
	Dichlorodifluoromethane	0.859	0.223	0.616	--	--
	1,1-Dichloroethane	0.114	0.111	0.462	J	--
	1,1-Dichloroethene	3.67	0.199	1.23	--	--
	1,2-Dichloropropane	0.880	0.370	0.616	--	--
	Methylene chloride	0.903	0.111	0.616	--	--
	Tetrachloroethene	4.91	0.0785	0.616	--	--
	Toluene	0.417	0.0785	0.616	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	6.45	0.251	0.616	--	--
	1,1,1-Trichloroethane	0.117	0.100	0.462	J	--
	Trichloroethene	66.0	0.162	0.616	--	--
	Trichlorofluoromethane	2.29	0.302	0.616	--	--
	Total Organics ^c	121.763	NA	NA	NA	NA
	CWL-D2-470	Carbon tetrachloride	11.0	6.12	76.5	J
Chloroform		318	9.08	28.7	--	--
Dichlorodifluoromethane		17.5	13.9	38.2	J	--
1,1-Dichloroethane		8.84	6.88	28.7	J	--
1,2-Dichloroethane		15.6	8.41	76.5	J	--
1,1-Dichloroethene		149	12.3	76.5	--	--
1,2-Dichloropropane		88.6	22.9	38.2	--	--
Methylene chloride		7.19	6.88	38.2	J	--
Tetrachloroethene		310	4.88	38.2	--	--
1,1,2-Trichloro-1,2,2-trifluoroethane		383	15.6	38.2	--	--
1,1,1-Trichloroethane		23.3	6.21	28.7	J	--
Trichloroethene		4330	10.0	38.2	--	--
Trichlorofluoromethane		112	18.7	38.2	--	--
Total Organics ^c		5774.03	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 2017

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D3-120	Carbon tetrachloride	17.5	7.30	91.2	J	--
	Chloroform	234	10.8	34.2	--	--
	Dichlorodifluoromethane	35.0	16.5	45.6	J	--
	1,1-Dichloroethane	11.0	8.21	34.2	J	--
	1,2-Dichloroethane	31.7	10.0	91.2	J	--
	1,1-Dichloroethene	257	14.7	91.2	--	--
	1,2-Dichloropropane	125	27.4	45.6	--	--
	Methylene chloride	17.9	8.21	45.6	J	--
	Tetrachloroethene	178	5.81	45.6	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	737	18.6	45.6	--	--
	1,1,1-Trichloroethane	15.5	7.41	34.2	J	--
	Trichloroethene	5770	12.0	45.6	--	--
	Trichlorofluoromethane	205	22.3	45.6	--	--
	Total Organics ^c	7634.6	NA	NA	NA	NA
CWL-D3-170	Carbon tetrachloride	23.2	8.45	106	J	--
	Chloroform	222	12.5	39.6	--	--
	Dichlorodifluoromethane	38.2	19.1	52.8	J	--
	1,1-Dichloroethane	11.6	9.50	39.6	J	--
	1,2-Dichloroethane	31.2	11.6	106	J	--
	1,1-Dichloroethene	300	17.0	106	--	--
	1,2-Dichloropropane	140	31.7	52.8	--	--
	Methylene chloride	39.3	9.50	52.8	J	--
	Tetrachloroethene	175	6.73	52.8	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	843	21.5	52.8	--	--
	1,1,1-Trichloroethane	13.6	8.58	39.6	J	--
	Trichloroethene	6360	13.9	52.8	--	--
	Trichlorofluoromethane	233	25.9	52.8	--	--
	Total Organics ^c	8430.1	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
 Summary of Detected Volatile Organic Compounds
 Chemical Waste Landfill Soil-Gas Monitoring
 Analytical Method TO-15^a
 January 2017

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D3-350	Carbon tetrachloride	21.5	6.72	84.0	J	--
	Chloroform	157	9.98	31.5	--	--
	Dichlorodifluoromethane	35.8	15.2	42.0	J	--
	1,2-Dichloroethane	17.7	9.24	84.0	J	--
	1,1-Dichloroethene	277	13.5	84.0	--	--
	1,2-Dichloropropane	135	25.2	42.0	--	--
	Methylene chloride	94.5	7.56	42.0	--	--
	Tetrachloroethene	150	5.36	42.0	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	763	17.1	42.0	--	--
	1,1,1-Trichloroethane	9.16	6.83	31.5	J	--
	Trichloroethene	5610	11.1	42.0	--	--
	Trichlorofluoromethane	211	20.6	42.0	--	--
	Total Organics ^c	7481.66	NA	NA	NA	NA
CWL-D3-440	Carbon tetrachloride	30.1	9.86	123	J	--
	Chloroform	235	14.6	46.2	--	--
	Dichlorodifluoromethane	46.8	22.3	61.6	J	--
	1,1-Dichloroethane	13.0	11.1	46.2	J	--
	1,2-Dichloroethane	31.2	13.6	123	J	--
	1,1-Dichloroethene	350	19.9	123	--	--
	1,2-Dichloropropane	209	37.0	61.6	--	--
	Methylene chloride	85.4	11.1	61.6	--	--
	Tetrachloroethene	210	7.85	61.6	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1080	25.1	61.6	--	--
	1,1,1-Trichloroethane	13.9	10.0	46.2	J	--
	Trichloroethene	8090	16.2	61.6	--	--
	Trichlorofluoromethane	295	30.2	61.6	--	--
Total Organics ^c	10689.4	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 2017

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D3-480	Acetone	2.92	0.402	11.3	J	11.3U
	Carbon disulfide	0.650	0.176	1.81	J	--
	Carbon tetrachloride	0.386	0.145	1.81	J	--
	Chloroform	6.59	0.215	0.678	--	--
	Dichlorodifluoromethane	1.26	0.328	0.904	--	--
	1,1-Dichloroethane	0.209	0.163	0.678	J	--
	1,2-Dichloroethane	0.298	0.199	1.81	J	--
	1,1-Dichloroethene	4.32	0.292	1.81	--	--
	1,2-Dichloropropane	1.87	0.542	0.904	--	--
	Tetrachloroethene	3.69	0.115	0.904	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	13.2	0.368	0.904	--	--
	1,1,1-Trichloroethane	0.452	0.147	0.678	J	--
	Trichloroethene	109	0.237	0.904	--	--
	Trichlorofluoromethane	4.37	0.443	0.904	--	--
Total Organics ^c	146.295	NA	NA	NA	NA	

Notes:

^aEPA January 1999b.

^bLaboratory/Validation Qualifier - Blank (--) cell = all quality control samples met acceptance criteria. "J," "J-," "R," and "U" see below.

^cTotal Organics -- sum of validated detected organic compounds.

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.

J- = The associated value is an estimated quantity with a suspected negative bias.

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.

January 9, 2017 Soil-Gas Results

Twenty-three samples were collected from the 21 sampling ports (21 environmental samples and 2 duplicate samples). In general, the January 2017 soil-gas results were consistent with the 2016 data set. A total of 22 VOCs were detected in the January 2017 samples, compared to 20 VOCs in 2016; these detected VOCs are listed below.

1,1-Dichloroethane	Carbon tetrachloride
1,1-Dichloroethene	Chloroform
1,2-Dichloroethane	Chloromethane
1,2-Dichloropropane	Dichlorodifluoromethane
1,1,2-Trichloro-1,2,2-trifluoroethane	Methylene chloride
1,1,1-Trichloroethane	Tetrachloroethene
1,1,2-Trichloroethane	Toluene
2-Butanone	Trichloroethene
Acetone	Trichlorofluoromethane
Benzene	o-Xylene
Carbon disulfide	M,p-Xylene

TCE is the primary VOC of concern at the CWL and was detected in all 23 samples. TCE concentrations ranged from 66 parts per billion by volume (ppbv) to 20,400 ppbv (CWL-D2-440 and CWL-D1-240, respectively). PCE was also detected in all samples at concentrations ranging from 3.69 ppbv to 3,590 ppbv (CWL-D3-480 and CWL-UI1-40, respectively). Other VOCs detected in all samples, generally at lower concentrations, included chloroform, 1,1-dichloroethene, dichlorodifluoromethane, 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 121.763 ppbv at CWL-D2-240 to 26,605 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 carbon tetrachloride (22 detections), methylene chloride, 1,2-dichloropropane, and 1,1,1-trichloroethane (each with 21 detections), 1,1-dichloroethane (18 detections), and 1,2-dichloroethane (16 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 4,330 ppbv or 4.3 parts per million by volume (ppmv) from CWL-D2-470. TCE was the only VOC that exceeded a concentration of 0.5 ppmv at the three deepest sampling ports.

5.2.2 Field Quality Control Sample Results

Table 5-2 presents field duplicate results for environmental-duplicate sample pairs collected in 2017 from sample ports located at 240 and 470 feet bgs at monitoring well CWL-D1. 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 2017 Duplicate Samples
 Chemical Waste Landfill Soil-Gas Monitoring

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a (%)
	(ppbv)		
CWL-D1-240			
1,1,2-Trichloro-1,2,2-trifluoroethane	2570	2300	11
Trichloroethene	20400	20300	< 1
CWL-D1-470			
Dichlorodifluoromethane	12.2	12.3	1
1,1-Dichloroethene	30.2	31.0	3
1,1,2-Trichloro-1,2,2-trifluoroethane	198	197	1
Trichloroethene	159	167	5
Trichlorofluoromethane	55.5	55.4	< 1

Notes:

^aRPD = 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: R₁ = environmental sample result.
 R₂ = 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-D1-240 and 470 sample sets (i.e., RPDs less than 50).

A total of five field blank samples were submitted with the 2017 samples. VOCs detected above laboratory MDLs in field blank samples included acetone (2 samples), 2-butanone (1 sample), ethylbenzene (1 sample), methylene chloride (2 samples), PCE (2 samples), styrene (1 sample), toluene (1 sample), TCE (4 samples), m,p-xylene (1 sample), and o-xylene (1 sample). No corrective action was required for VOCs detected in the field blank samples except for acetone, since all associated environmental sample results were not detected or results were greater than five times the field blank sample concentration. Acetone in the sample from well CWL-D3 (480 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-D1-470 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 2017 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 (PCCP Attachment 3, Section 3.9.3). Instead, this information was provided on copies of field forms that 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. Because the 11.7 eV lamp is suitable for detecting common VOCs during the purging process, there is no adverse impact to data quality.

On February 23, 2017, the NMED approved a modification to the PCCP that addresses both issues, as discussed in Section 7.1. In accordance with this approval, real time VOC screening with a PID to determine VOC stabilization during the purging process is no longer required and elevation and ambient pressure information can be provided to the laboratory on field forms referenced on the AR/COC.

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) is 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 collected prior to the start of soil-gas monitoring under the PCCP were not used for the statistical analysis presented in this report because six data sets under the PCCP were available as of the January 2017 sampling event (January 2012 through January 2017). Historic soil-gas data is still presented in Section 5.4 and 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 2016 results, TCE (4.330 ppmv) in the CWL-D2-470 sample exceeded the 0.5 ppmv threshold. However, 1,1,2-trichloro-1,2,2-trifluoroethane (0.383 ppmv) did not exceed the 0.5 ppmv threshold in CY 2017. 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 2017 soil-gas statistical assessment results are presented in Table 5-3. The calculated LCL for TCE was 3.936 ppmv, respectively, and is below the trigger level of 20 ppmv.

Table 5-3
 Chemical Waste Landfill Soil-Gas Monitoring
 Statistical Assessment Results Summary
 Calendar Year 2017

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
Trichloroethene (4.33 ppmv)	4.1	7.1	4.855	1.117	3.936	5.774	Normal	20	No

Notes:

^aMaximum concentration 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.

^bMinimum and maximum results determined from historic data, including the CY 2017 results.

^cMean, standard deviation, LCL, UCL, and Distribution Type determined using ProUCL statistical program.

^dExceedance 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 2017. 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 2017 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, 20.40 and 14.80 ppmv, respectively). The only other TCE result exceeding 20 ppmv in the CY 2017 data set was the duplicate sample from well CWL-D1 at a depth of 240 feet bgs (20.30 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 2017 TCE results are compared (i.e., comparing results since monitoring began under the PCCP), 14 sampling ports show a small decrease and 7 sampling ports show a small increase. When the January 2012 and January 2017 total VOC results are compared, 16 sampling ports show a small decrease and 5 sampling ports show a small increase. All CY 2017 TCE results below 240 feet bgs are low concentrations ranging from 10.00 ppmv (CWL-D1-350) to 0.07 ppmv (CWL-D2-440). All CY 2017 total VOC results below 240 feet bgs are also low concentrations ranging from 12.94 ppmv (CWL-D1-350) to 0.12 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 remained consistent with some slight increases 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	Sept 2004	Oct 2005	January ^c 2012	January ^c 2013	January 2014	January ^c 2015	January 2016	January 2017
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	5.68
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	7.23
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	7.82
CWL-UI2-36	0.037	0.70	ND	1.6	ND	1.2	3.10	3.50	2.80	3.00	5.20	3.72
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	5.32
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	6.76
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	8.04
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	15.60
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	20.40
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	10.00
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	0.17
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	14.3
CWL-D2-240	ND	40.0	38.0	26.0	13.0	17.0	18.00	23.00	16.00	13.00	14.00	14.8
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	9.85
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	0.07
CWL-D2-470	ND	0.94	5.8	3.1	4.6	4.3	4.10	7.00	4.70	4.50	4.40	4.33
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	5.77
CWL-D3-170	ND	2.5	9.9	4.5	6.6	4.4	7.90	7.20	5.40	6.40	8.50	6.36
CWL-D3-350	ND	1.6	2.4	2.2	1.5	1.4	8.80	7.80	5.30	6.60	7.80	5.61
CWL-D3-440	ND	1.8	0.26	0.75	3.4	3.3	6.80	13.00	8.20	6.80	6.30	8.09
CWL-D3-480	ND	1.9	1.2	0.2	2.1	4.1	0.21	0.03	0.04	0.30	0.02	0.11

Notes:

All results are in ppmv.

January 2012 – 2017 concentrations have been rounded for significant digit consistency; they may not exactly match the reported concentrations corresponding data tables.

^aJune 1998 through January 2012 are EPA Method TO-14 results (EPA January 1999a). January 2013 – 2017 are EPA Method TO-15 results (EPA January 1999b). If a duplicate sample was collected, the maximum concentration of the environmental-duplicate sample pair is shown.

^bPort depth is the last number in the Well Identification (ID), and is in feet below ground surface.

^cResults 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.

TCE = Trichloroethene.

ppmv = Parts per million by volume.

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	Sept 2004	Oct 2005	January ^c 2012	January ^c 2013	January 2014	January ^c 2015	January 2016	January 2017
CWL-UI1-40	112	246	141	11.78	11.47	13.15	11.76	14.68	9.54	9.27	9.14	11.31
CWL-UI1-80	0.22	9.63	13	10.61	10.67	11.61	10.18	13.74	9.43	8.74	8.63	10.69
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	10.83
CWL-UI2-36	17.6	2117	1800	813.7	850.0	391.78	4.64	5.02	4.81	5.37	7.63	5.47
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	7.52
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	9.24
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	11.21
CWL-D1-160	167	21.4	30.1	33.32	38.41	29.28	18.48	20.33	21.45	20.78	27.27	20.62
CWL-D1-240	261	78.4	61.5	45.27	44.74	32.60	22.46	28.71	25.32	26.04	34.14	26.60
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	12.94
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	0.52
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	19.41
CWL-D2-240	0.047	101	52.9	34.72	17.62	22.83	22.90	28.38	22.11	18.27	19.08	19.52
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	12.70
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	0.12
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	5.77
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	7.63
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	8.43
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	7.48
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	10.69
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	0.15

Notes:

All results are in ppmv.

January 2012 - 2017 concentrations have been rounded for significant digit consistency; they may not exactly match the reported concentrations corresponding data tables.

^aThe total VOC concentration is the sum of all detected constituents. June 1998 through January 2012 are EPA Method TO-14 results (EPA January 1999a). January 2013 – 2017 are EPA Method TO-15 results (EPA January 1999b). If a duplicate sample was collected, the maximum concentration of the environmental-duplicate sample pair is shown.

^bPort depth is the last number in the Well Identification (ID), and is in feet below ground surface.

^cResults 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.

TCE = Trichloroethene.

ppmv = Parts per million by volume.

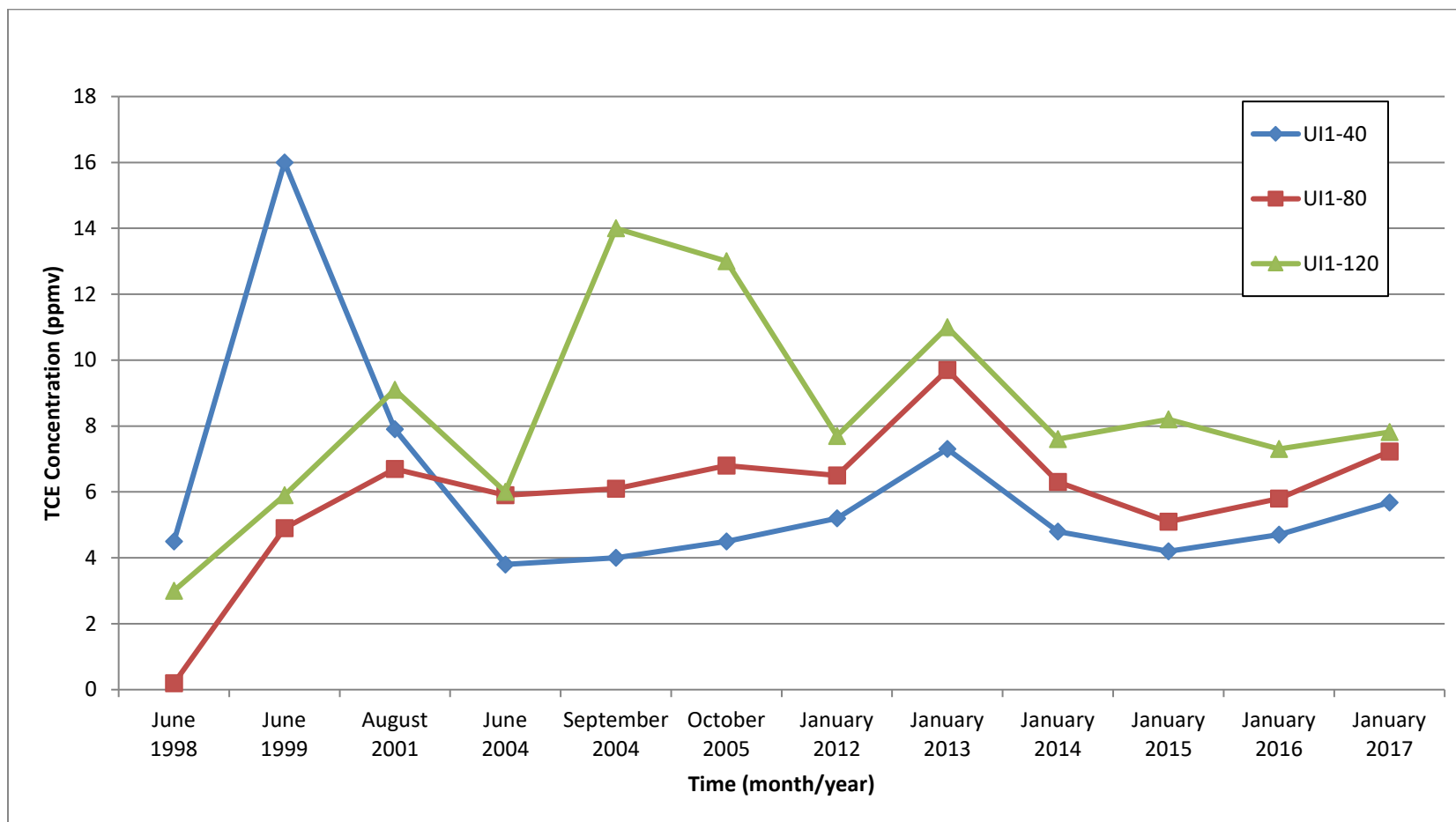


Figure 5-1
Historic TCE Concentrations vs. Time
Chemical Waste Landfill Well UI-1 Ports

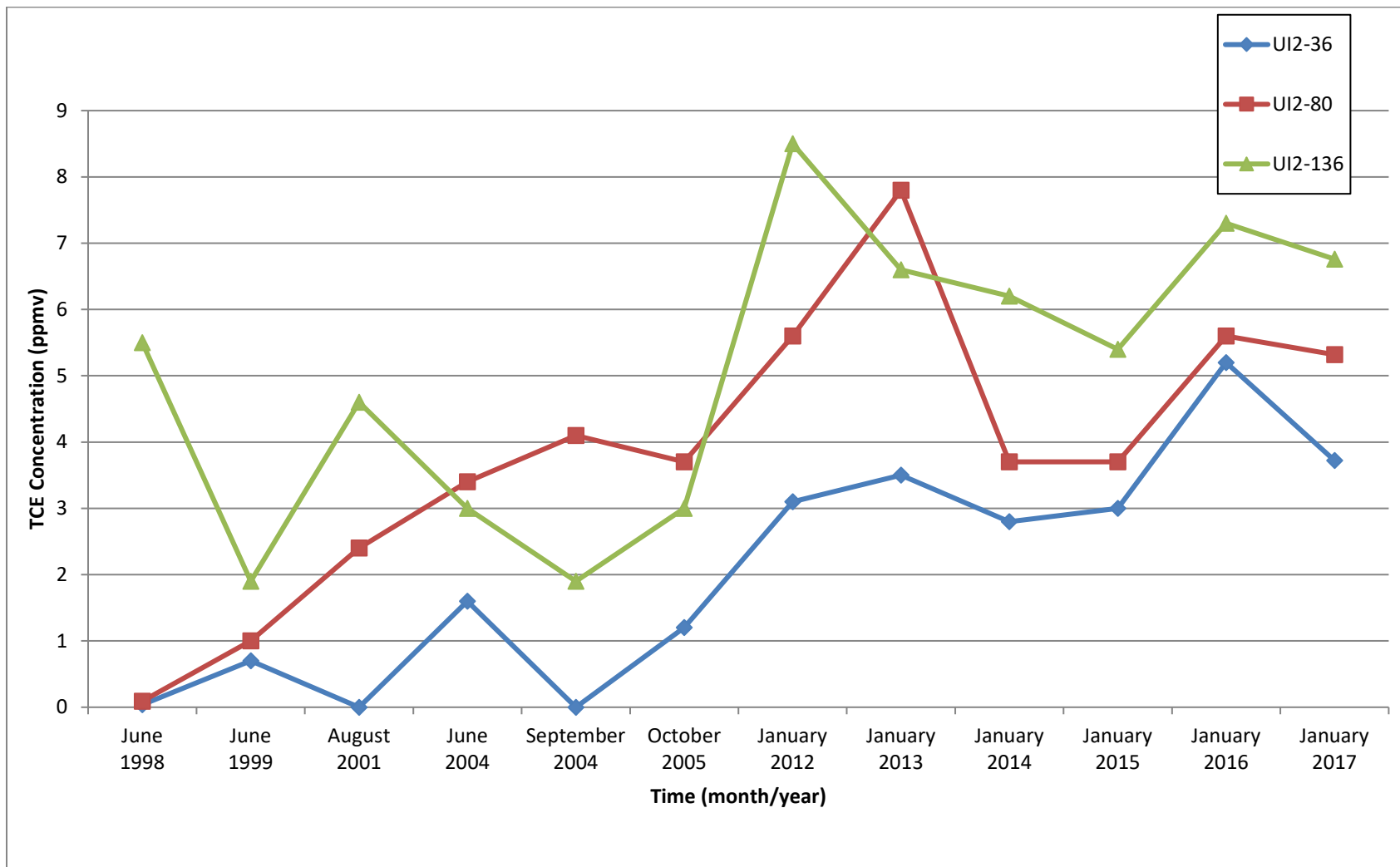


Figure 5-2
Historic TCE Concentrations vs. Time
Chemical Waste Landfill Well UI-2 Ports

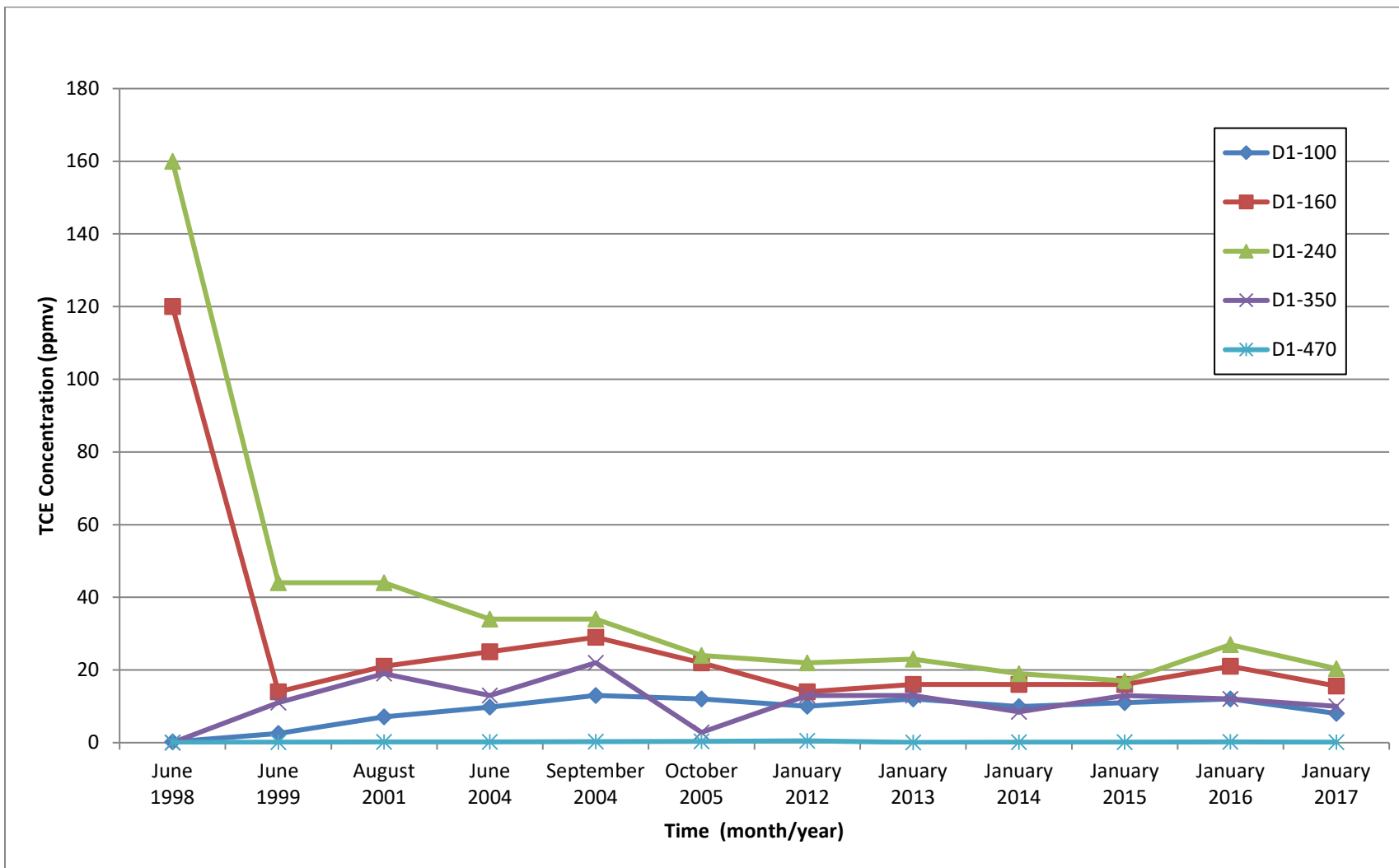


Figure 5-3
 Historic TCE Concentrations vs. Time
 Chemical Waste Landfill Well D1 Ports

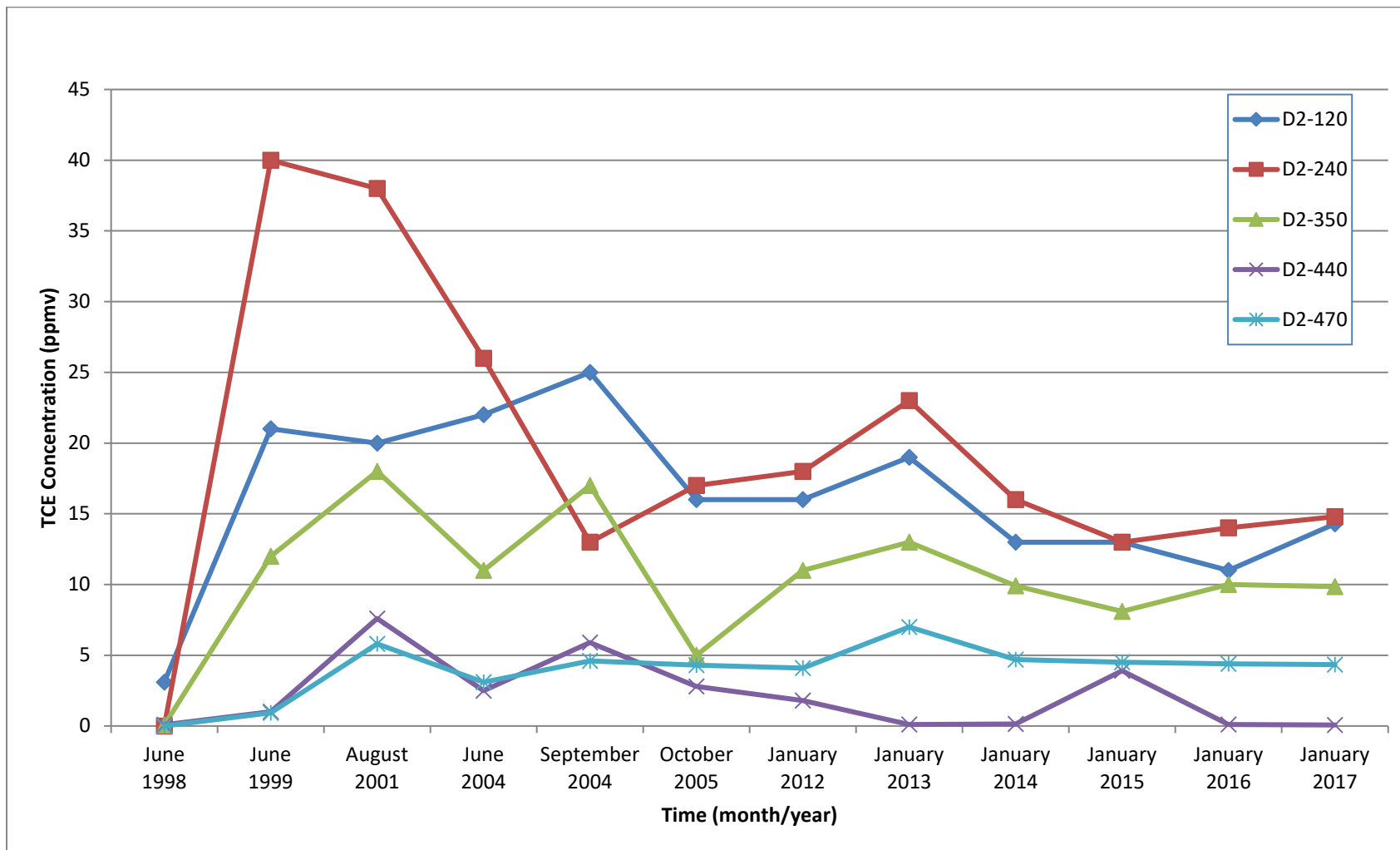


Figure 5-4
 Historic TCE Concentrations vs. Time
 Chemical Waste Landfill Well D2 Ports

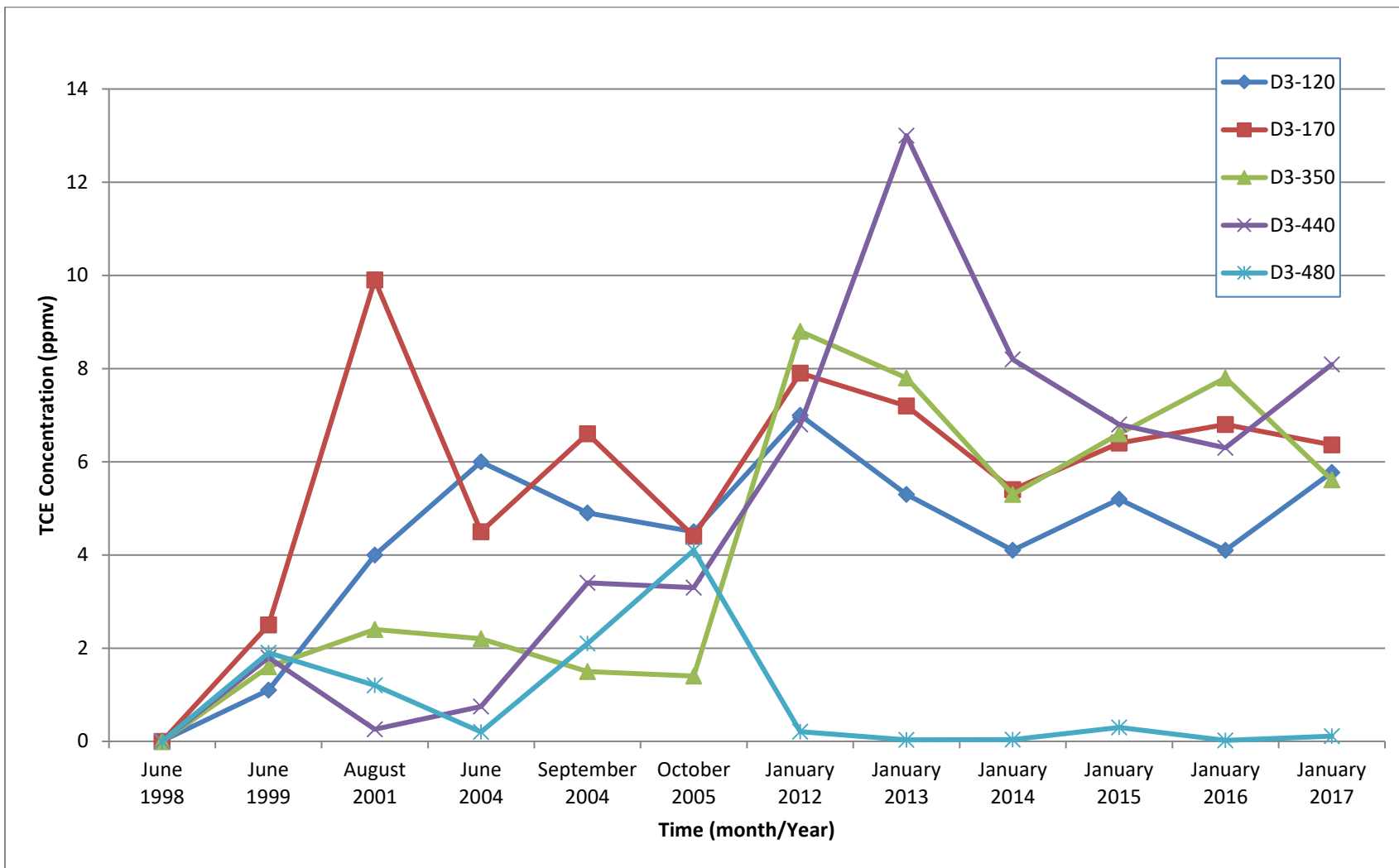


Figure 5-5
 Historic TCE Concentrations vs. Time
 Chemical Waste Landfill Well D3 Ports

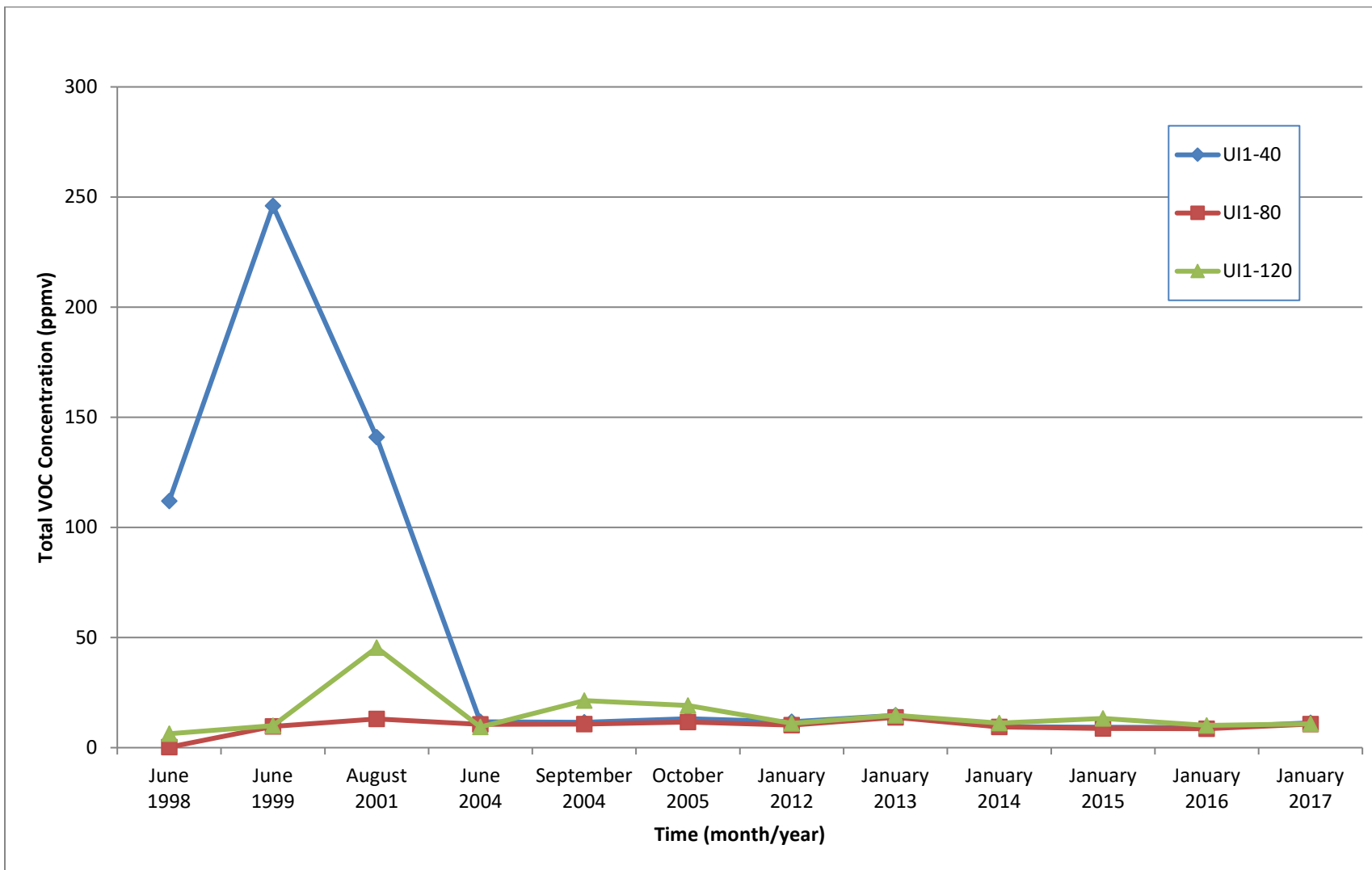


Figure 5-6
Historic Total Volatile Organic Compound Concentrations vs. Time
Chemical Waste Landfill Well UI-1 Ports

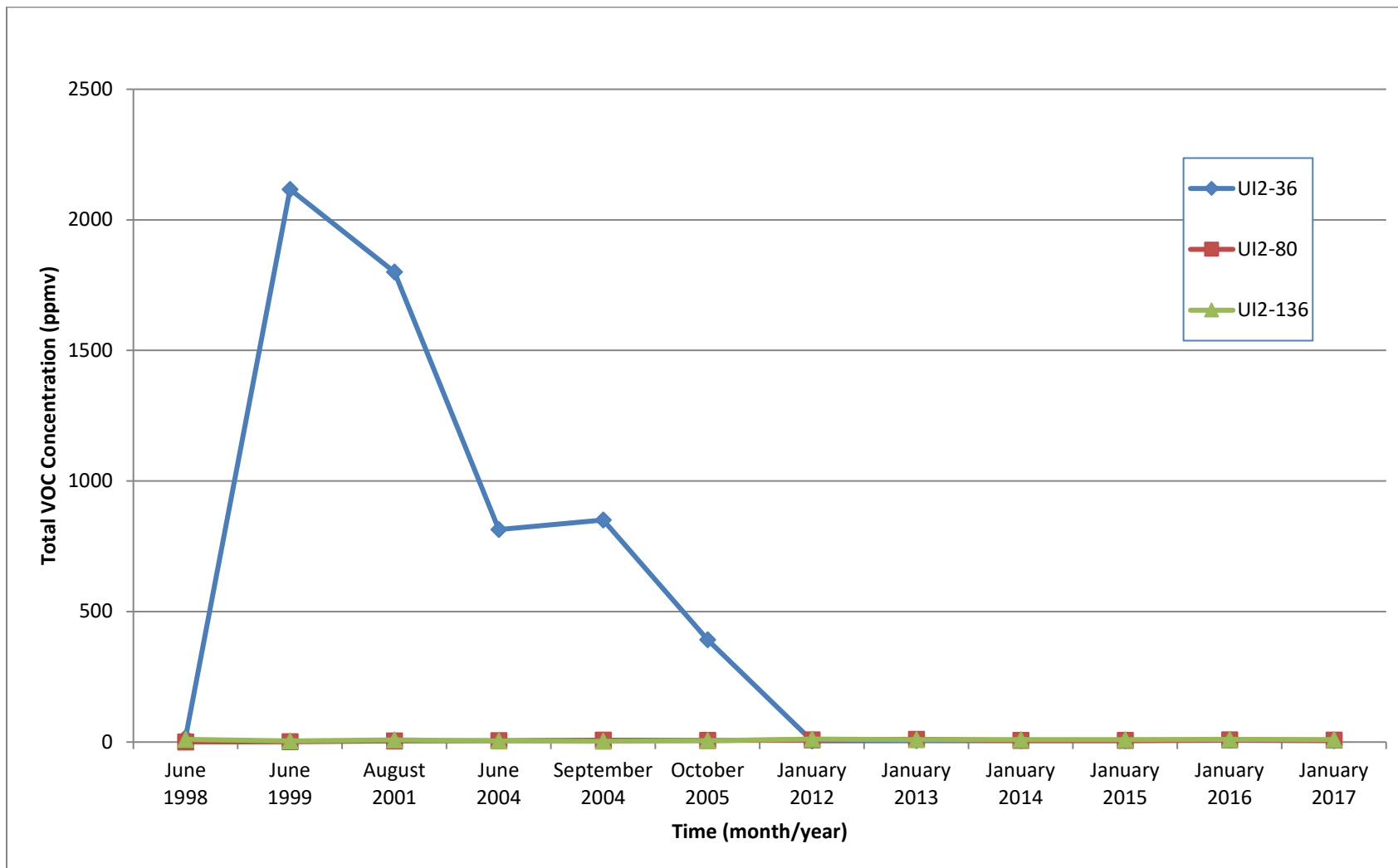


Figure 5-7
Historic Total Volatile Organic Compound Concentrations vs. Time
Chemical Waste Landfill Well UI-2 Ports

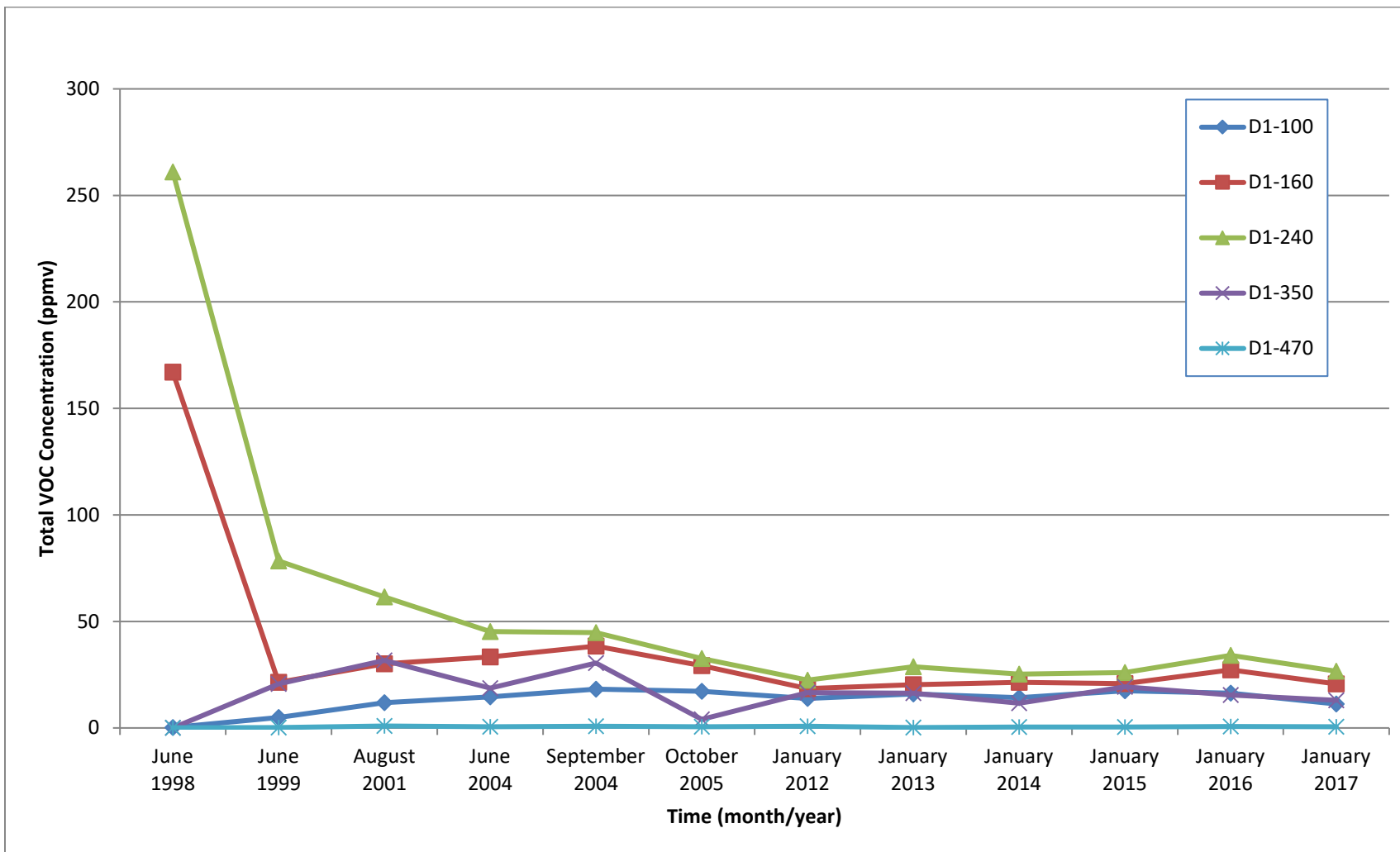


Figure 5-8
 Historic Total Volatile Organic Compound Concentrations vs. Time
 Chemical Waste Landfill Well D1 Ports

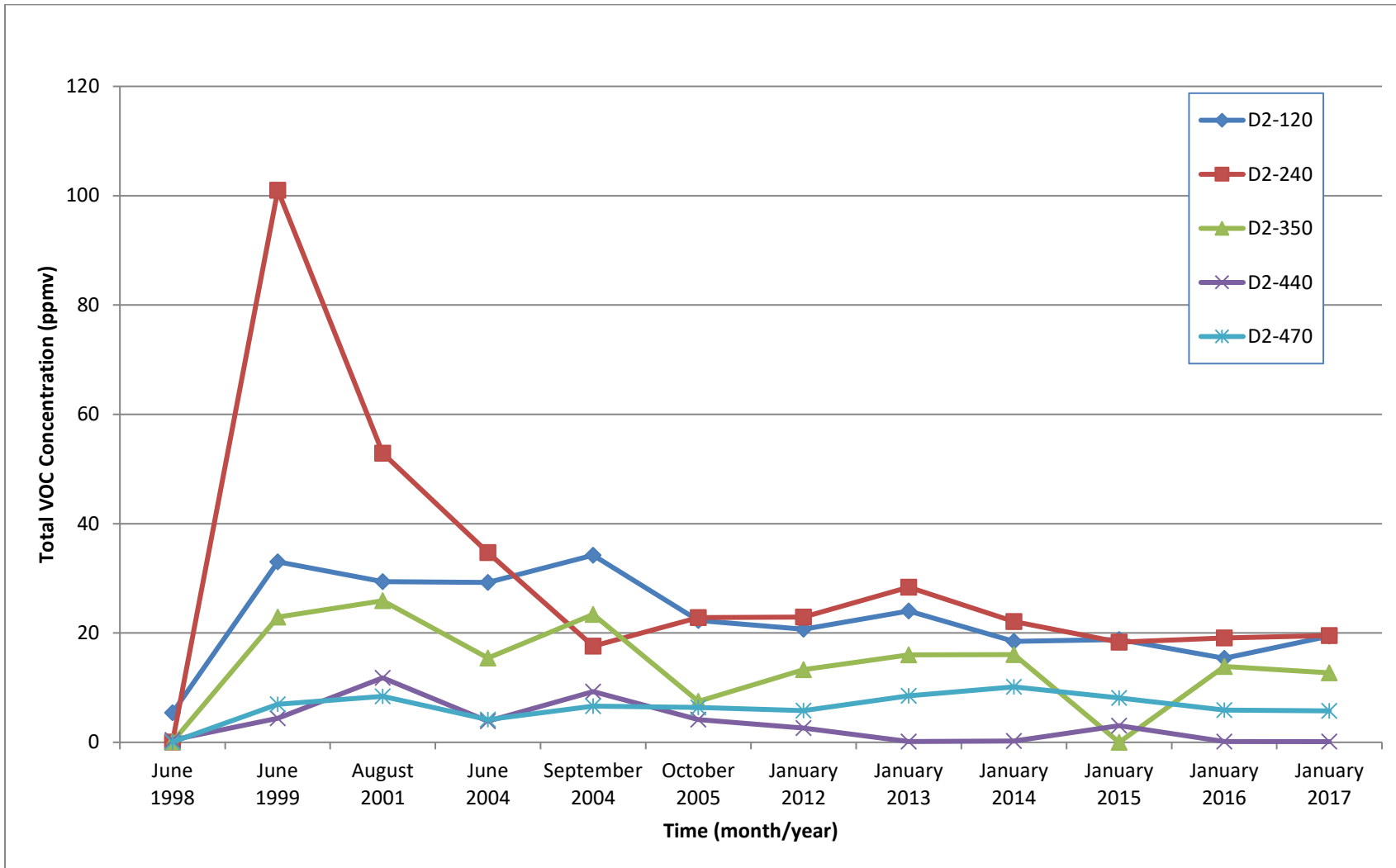


Figure 5-9
 Historic Total Volatile Organic Compound Concentrations vs. Time
 Chemical Waste Landfill Well D2 Ports

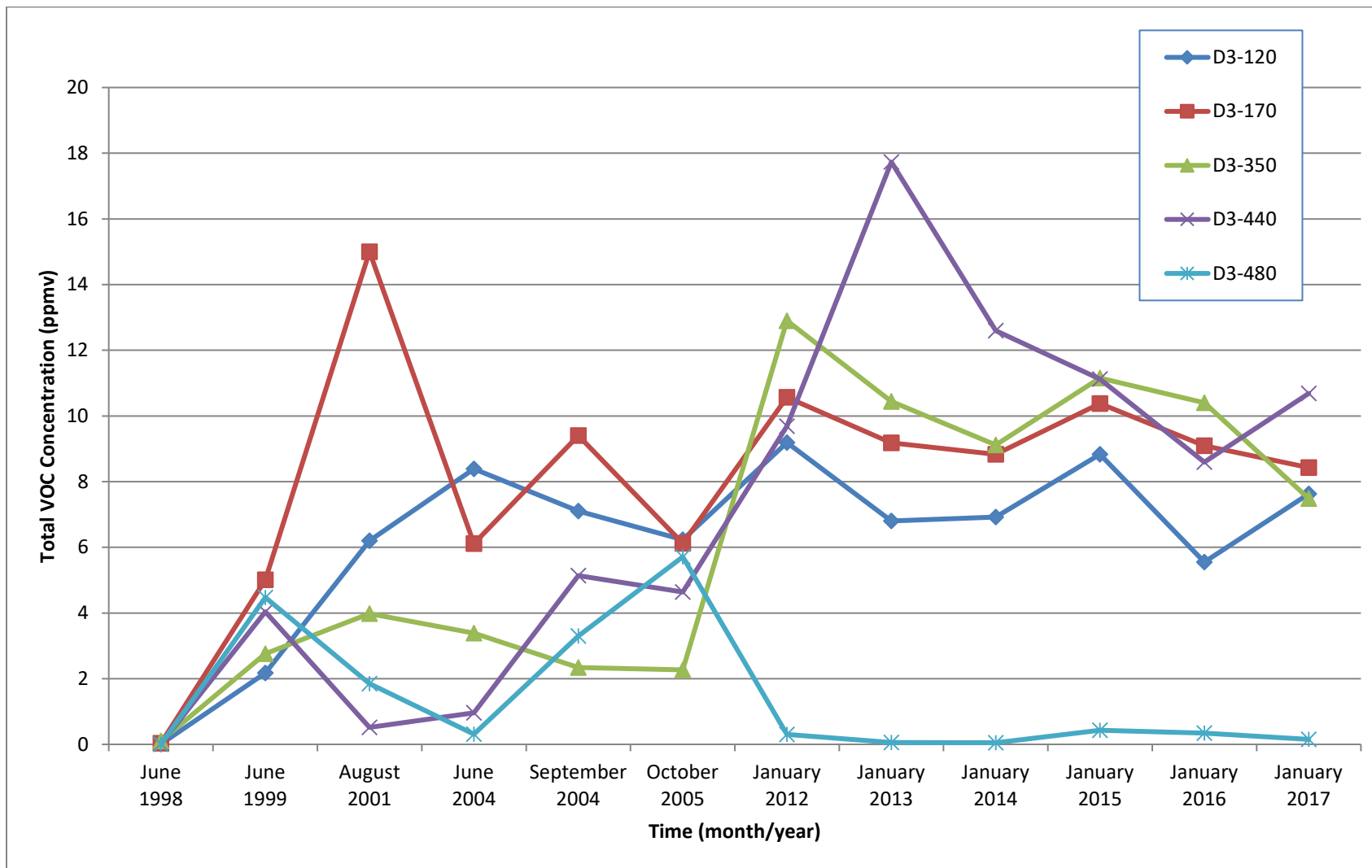


Figure 5-10
 Historic Total Volatile Organic Compound Concentrations vs. Time
 Chemical Waste Landfill Well D3 Ports

The majority of the CWL residual soil-gas plume is represented by the CWL-D1 through D3 wells that have significantly deeper sampling ports, ranging from 110 to 480 feet bgs. TCE is the primary VOC of concern, although trichlorofluoromethane, 1,1,2-trichloro-1,2,2-trifluoroethane, PCE, 1,1-dichloroethene, dichlorodifluoromethane, and chloroform were also detected in all 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 2017 results) are generally stable with most ports showing 2017 concentrations that are less than 2012 concentrations (4 out of 5 ports for both TCE and 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 2017 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, the capillary fringe barrier above the regional aquifer, 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 and current groundwater monitoring results and statistical evaluation of CWL-MW10 results (Section 4.3) since implementation of the PCCP in June 2011.

Six 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 2017 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).

This page intentionally left blank.

6.0 INSPECTION, MAINTENANCE, AND REPAIR RESULTS

This chapter presents a summary of CY 2017 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 2017 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 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 2017 by the staff biologist during the quarterly ET Cover surface inspections as a best practice.

The annual Biology Inspection of the ET Cover vegetation was conducted on August 14, 2017 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 31% 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. 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 2017 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 2017 observations, 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 2017. During all but the September inspection, a staff biologist also performed a supplemental quarterly biology inspection. 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 2017. 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 2017 by the ET Cover maintenance contractor is summarized in Section 6.6. No additional inspection items or issues required repairs.

Quarterly cover surface inspections were performed on March 22, June 14, September 13, and December 1, 2017. The cover surface and vegetation were in good condition throughout CY 2017 and 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 2017 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 three of the four quarterly inspections, windblown tumbleweeds were identified in the drainage culverts along the southern perimeter. Tumbleweed debris observed during the March, June, and September inspections was removed in May, June, and September 2017, respectively. Removal was performed by the ET Cover maintenance contractor (May and September) or by the field technician at the time of the inspection (June). All removals were

performed within 60 days of the inspection and are documented on the respective Inspection Forms.

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 2017 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 2017 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 inspection, windblown tumbleweeds were identified in the perimeter fence. Tumbleweeds were removed from the fence within 60 days of the inspection in May 2017 by the ET cover maintenance contractor. Tumbleweed debris partially covering the western-most survey monument was removed by the field technician during the inspection. Also during the June inspection, the field technician lubricated the main gate lock.

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 2017 by the ET Cover maintenance contractor is summarized below. ET Cover maintenance continued in 2017 with the long-range goal of establishing healthy, self-sustaining native grasses on the CWL ET Cover and perimeter areas by reducing competition with weedy species for limited moisture and nutrients. Removal of live and dead weed material and the application of pre-emergent herbicide helps reduce the availability of weed seeds, future weed growth, and future maintenance efforts.

Maintenance was performed in response to inspections and as recommended by the staff biologist as preventive, best practice. In most cases work on the ET Cover was performed manually; the only equipment operated on the ET Cover was a four-wheel drive Kubota All-Terrain Vehicle (ATV) equipped with a tank, mechanical sprayer, and low-impact turf tires. Most

2017 maintenance involved clearing the ET Cover, perimeter fence, and storm-water diversion features of live and dead tumbleweeds, and applying herbicides to the ET Cover and perimeter area to control invasive weed growth. All herbicides were reviewed and recommended for use by the staff biologist, approved for use at SNL/NM, and were applied following manufacturers' specifications. Three maintenance events were conducted in May, July, and September 2017 as described below.

May 10 - June 1, 2017

Windblown, dead, weedy vegetation (primarily tumbleweeds) identified during the March 22, 2017 quarterly inspection were removed from the southern storm-water diversion features and perimeter fence over a three-day period, May 10 through 12, 2017. In addition, live and dead weeds and small shrubs (e.g., Four-wing saltbush) were manually removed from the ET Cover by hand pulling and raking. This effort was conducted over a period of ten days from May 15 through May 26, 2017, which resulted in the removal of five trailer loads of highly compressed weeds (~35 cubic yards) that were disposed at the KAFB Landfill.

On May 23, 2017 after completion of weed removal activities, a pre-emergent/post-emergent herbicide mixture (Surflan® and Prosecutor Pro®) was applied to the perimeter area between the western fence and the western access road. A pre-emergent herbicide (Surflan®) was applied to the ET Cover on June 1, 2017 to help minimize additional growth of invasive weeds. Following the herbicide application on the ET Cover, 200 gallons of water was applied evenly across the cover to help move the herbicide down to the soil surface where it is most effective. All herbicides and water were applied using a four-wheel drive Kubota ATV equipped with a tank, mechanical sprayer, and low-impact turf tires.

July 13 - 24, 2017

The July weed removal effort was conducted over an eight-day period from July 13 through July 21, 2017. This best practice work was performed as recommended by the staff biologist based on the June quarterly inspection. Initially, dead weed material was removed by hand and using rakes from the perimeter fence and southern drainage areas. Live weeds were then removed by hand from the three-foot area just outside the fence. Upon completion of this work, both live and dead weeds were removed by hand and by raking from the ET Cover. This effort included removal of accumulated dead grass material to open more space for the living grass clumps. A total of three trailer loads of highly compressed weeds (~32 cubic yards) were removed and disposed at the KAFB Landfill.

On July 19, 2017 after completion of weed removal activities, a pre-emergent/post-emergent herbicide mixture (Surflan® and Prosecutor Pro®) was applied to the perimeter area between the western fence and the western access road, and the three-foot area outside the fence. Because the fence catches dead, windblown tumbleweeds, the area is prone to weed growth (i.e., weed seeds are concentrated in this area). On July 24, 2017, a pre-emergent herbicide (Surflan®) was applied to the ET Cover followed by the even application of 400 gallons of water across the cover to help move the herbicide down to the soil surface where it is most effective. All herbicides and water were applied using a four-wheel drive Kubota ATV equipped with a tank, mechanical sprayer, and low-impact turf tires.

September 14 - 21, 2017

Windblown, dead, weedy vegetation (primarily tumbleweeds) was removed from the perimeter fence and southern storm-water diversion features, and both live and dead weeds were removed from the ET Cover and the three-foot area outside the perimeter fence during two days between September 14 and September 21, 2017. A total of two trailer loads of highly compressed weeds (~10.6 cubic yards) were disposed at the KAFB Landfill.

On September 20, 2017 after weed removal completion, a pre-emergent/post-emergent herbicide mixture (Surflan[®] and Prosecutor Pro[®]) was applied to the three-foot area outside the fence. A final sweep to remove dead windblown weeds from the fence and storm-water diversion features was conducted on September 21, 2017. This effort completed the CY 2017 maintenance work focused on promoting the health of the existing native grasses and minimizing CY 2018 weed growth.

This page intentionally left blank.

7.0 REGULATORY ACTIVITIES

On June 2, 2011, the NMED approved closure of the CWL and the PCCP took effect (Kieling June 2011). Regulatory activities in CY 2017 consisted of two modification requests to the PCCP, one submittal of an updated reference document cited in the PCCP, and submittal of the Calendar Year 2016 Chemical Waste Landfill Annual Post-Closure Care Report (SNL/NM March 2017). These activities are summarized below in Sections 7.1 through 7.3, respectively. NMED-approved permit modifications and DOE/Sandia and DOE/NTESS submittals since the PCCP became effective are summarized in Section 7.4.

7.1 2017 Permit Modification Requests

Two modifications to the CWL PCCP were requested and approved/went into effect in the CY 2017 reporting period.

- On January 11, 2017, DOE and Sandia submitted a request proposing modifications to Permit Parts 1 and 2 and Permit Attachments 1, 2, 3, and 6 of the CWL PCCP (Harrell January 2017). The Class 1 permit modifications were approved by the NMED and went into effect on February 23, 2017 (Kieling February 2017).
- As required by PCCP Part 1, Section 1.6.2.2, on April 28, 2017, DOE and Sandia notified the NMED of Class 1 modifications to Permit Parts 1 and 2 and Permit Attachments 1 and 6 related to a change in the name of the Operator at SNL from Sandia Corporation to NTESS, which went into effect on May 1, 2017 (Harrell April 2017).

7.2 2017 Permit Submittals

On March 23, 2017, DOE and Sandia submitted the Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2016 to NMED (SNL/NM March 2017).

On July 11, 2017, DOE and NTESS submitted one updated reference document cited in the PCCP in accordance with requirements of PCCP Attachments 2 and 3 (Todd May 2016). Revisions included updates to keep the reference document current and to reflect ongoing modifications and improvements in industry practices. The revised reference document became effective on June 19, 2017.

7.3 2017 Technical Communication

There were no technical communications with NMED staff regarding CWL activities in CY 2017.

7.4 Permit Modification and Submittal History

Table 7-1 summarizes the modification history of the PCCP through CY 2017. Table 7-2 summarizes all submittals associated with the PCCP through CY 2017, 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.
February 23, 2017	Permit Parts 1 and 2; Permit Attachments 1, 2, 3, and 6	Revise, from two to one, the number of copies of submittals to be made to NMED; update the list of agencies with whom SNL/NM has coordination agreements; update reference test methods and revisions to certain laboratory quality control requirements in the groundwater sampling and analysis plan; revise the soil-gas sampling and analysis plan; and revise text in the Contingency Plan.
May 1, 2017	Permit Parts 1 and 2, Attachments 1 and 6	Revise name of the Operator at SNL/NM from Sandia Corporation to National Technology & Engineering Solutions of Sandia, LLC (NTESS).

Notes:

^aDate represents the effective date of modification.
 HASP = Health and Safety Plan.
 NMED = New Mexico Environment Department.
 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.
July 11, 2017	Permit Attachments 2 & 3	One operating procedure cited in the PCCP used by SNL/NM personnel to validate analytical data from contract laboratories.

Notes:

^aThis table does not include the submittal of routine CWL Annual Post-Closure Care Reports.

^bDate 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.

This page intentionally left blank.

8.0 SUMMARY AND CONCLUSIONS

A summary of CY 2017 activities and results is provided in this chapter, along with conclusions.

8.1 Groundwater and Soil-Gas Monitoring

Semi-annual groundwater monitoring events were conducted in January and July 2017. 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 previous year's results.

One annual soil-gas monitoring event was conducted in January 2017. Two minor variances from PCCP requirements were identified for the January 2017 soil-gas monitoring activities and were addressed through a PCCP modification request that was approved by NMED in February 2017. Analytical and statistical assessment results are consistent with previous years. There were no exceedances of trigger levels. Six 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 2017 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 August 2017 annual inspection, the ET Cover is in good condition with even coverage of mature, native perennial grasses. CY 2017 ET Cover maintenance was performed in May, July, and September in response to the inspections and as best practice for ET Cover vegetation. CY 2017 ET Cover maintenance included removal of small shrubs, dead and live weeds, and the application of a pre-emergent and pre-/post-emergent herbicides to the ET Cover, fence perimeter, and 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 live and dead weeds along with the selective application of pre- and post-emergent herbicides also helps reduce the availability of weed seeds, future weed growth, and future maintenance efforts.

8.3 Regulatory Activities

Regulatory activities in CY 2017 included submittal of the Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2016 (SNL/NM March 2017), two permit modifications to the PCCP (January and May 2017), and one submittal of an updated reference document cited in the PCCP (July 2017).

8.4 Conclusions

All PCCP monitoring, inspection, and maintenance/repair requirements have been met for CY 2017. 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

EPA, see U.S. Environmental Protection Agency.

Harrell, Jeffrey P., January 2017. "Request for Modification to Hazardous Waste Post-Closure Care Permit for Chemical Waste Landfill at Sandia National Laboratories/New Mexico, EPA ID No. NM 5890110518," January 11, 2017.

Harrell, Jeffrey P., April 2017. "Notification of Class 1 Modifications to Hazardous Waste Permits, Sandia National Laboratories/New Mexico," April 28, 2017.

Kieling, J.E., June 2011. "Notice of Approval, Closure of Chemical Waste Landfill and Post-Closure Care Permit in Effect, Sandia National Laboratories, EPA ID No. NM5890110518, HWB-SNL-10-013," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico, Jun 2, 2011.

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

Kieling, J.E., February 2017. "Approval of Class 1 Permit Modification, Chemical Waste Landfill at Sandia National Laboratories/New Mexico, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-17-001," New Mexico Environment Department Hazardous Waste Bureau, Santa Fe, New Mexico, February 23, 2017.

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.

NMED, see New Mexico Environment Department.

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

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

Sandia National Laboratories/New Mexico (SNL/NM), December 2004. "Chemical Waste Landfill Corrective Measures Study Report," Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), September 2010. "Chemical Waste Landfill Final Resource Conservation and Recovery Act Closure Report," Environmental Restoration Project, Sandia National Laboratories, Albuquerque, New Mexico.

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

Sandia National Laboratories/New Mexico (SNL/NM), March 2017. "Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2016," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), June 2017a. "Data Validation Procedure for Chemical and Radiochemical Data," (AOP 00-03), Sample Management Office, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), June 2017b. "Calendar Year 2016 Annual Groundwater Monitoring Report," SAND2017-5876 R, Sandia National Laboratories, Albuquerque, New Mexico.

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

Todd, J.W., July 2017. "Submittal of Updated Reference Document Cited in the Chemical Waste Landfill Post Closure Care Permit for the Department of Energy National Nuclear Security Administration/Sandia Site Office and Sandia National Laboratories/New Mexico, EPA ID No. NM5890110518," U.S. Department of Energy, July 6, 2017.

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

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
Calendar Year 2017 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 2017 GROUNDWATER MONITORING

HEALTH & SAFETY MEETING FORM

Dept: 4141 Facility: CWL-BW5 Date: 01/11/17 Time: 0810

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: 57 °F Wind Speed: 10-20 MPH Humidity: 17.9 % Wind Chill: _____ °F

Chemicals Used: None Preservatives in sample bottles Other: _____

Hospital/Clinic: Sandia Medial Clinic Bldg. 831 Phone: 911 on LAN; 844-0911 on mobile

Safety Topics Presented

<input checked="" type="checkbox"/> Wear safety glasses	<input checked="" type="checkbox"/> Wear leather gloves	<input type="checkbox"/> Wear sunscreen
<input checked="" type="checkbox"/> Wear safety boots	<input checked="" type="checkbox"/> Wear latex or nitrile gloves	<input type="checkbox"/> No eating or drinking onsite
<input type="checkbox"/> Wear hearing protection	<input checked="" type="checkbox"/> Use safe lifting practices	<input type="checkbox"/> Set up eye wash
<input checked="" type="checkbox"/> Be aware of biohazards (snakes, spiders, etc.)	<input checked="" type="checkbox"/> Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary	<input checked="" type="checkbox"/> Wear communication device (radio, cell phone, EOC alert enabled pager)
<input checked="" type="checkbox"/> Be aware of electrical hazards	<input checked="" type="checkbox"/> Be aware of pinch points	<input type="checkbox"/> Avoid spilling leachate (hose connections)
<input checked="" type="checkbox"/> Be aware of pressure hazards	<input type="checkbox"/> Notify RCT when using neutron probe	<input type="checkbox"/> Practice ALARA
<input checked="" type="checkbox"/> Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	<input type="checkbox"/> Other (list):	<input type="checkbox"/> Other (list):

Does anyone have any weight restrictions on lifting? Circle YES or **NO**. If answered YES explain.

Robert Lynch
Printed Name

William Gibson
Printed Name

ALFRED SANTILLANES
Printed Name

Printed Name

Printed Name

Printed Name

Attendees

[Signature]
Signature

[Signature]
Signature

[Signature]
Signature

Signature

Signature

Signature

Notes

HEALTH & SAFETY MEETING FORM

Dept: 4141 Facility: CWL-MW9 Date: 01/12/17 Time: 08:01

Activities: 1
 (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: 1 MPH Humidity: 75 % Wind Chill: 32 °F

Chemicals Used: None Preservatives in sample bottles Other: _____
 Hospital/Clinic: Sandia Medial Clinic Bldg. 831 Phone: 911 on LAN; 844-0911 on mobile

Safety Topics Presented

<input checked="" type="checkbox"/> Wear safety glasses	<input checked="" type="checkbox"/> Wear leather gloves	<input type="checkbox"/> Wear sunscreen
<input checked="" type="checkbox"/> Wear safety boots	<input checked="" type="checkbox"/> Wear latex or nitrile gloves	<input checked="" type="checkbox"/> No eating or drinking onsite
<input type="checkbox"/> Wear hearing protection	<input checked="" type="checkbox"/> Use safe lifting practices	<input checked="" type="checkbox"/> Set up eye wash
<input checked="" type="checkbox"/> Be aware of biohazards (snakes, spiders, etc.)	<input checked="" type="checkbox"/> Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary	<input checked="" type="checkbox"/> Wear communication device (radio, cell phone, EOC alert enabled pager)
<input checked="" type="checkbox"/> Be aware of electrical hazards	<input checked="" type="checkbox"/> Be aware of pinch points	<input type="checkbox"/> Avoid spilling leachate (hose connections)
<input checked="" type="checkbox"/> Be aware of pressure hazards	<input type="checkbox"/> Notify RCT when using neutron probe	<input type="checkbox"/> Practice ALARA
<input checked="" type="checkbox"/> Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	<input type="checkbox"/> Other (list):	<input type="checkbox"/> Other (list):

Does anyone have any weight restrictions on lifting? Circle YES or **(NO)**. If answered YES explain.

William Gibson
 Printed Name
Tim Jackson
 Printed Name
Alfred Santillana
 Printed Name

 Printed Name

 Printed Name

 Printed Name

Attendees

William Gibson
 Signature
T. Jackson
 Signature
ALFRED SANTILLANA
 Signature

 Signature

 Signature

Notes

HEALTH & SAFETY MEETING FORM

Dept: 4141 Facility: CWL-mw11 Date: 01/13/17 Time: 0735

Activities: Purge ground water and sample
 (Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:
 Temp: 37 °F Wind Speed: 0-5 MPH Humidity: 58 % Wind Chill: _____ °F

Chemicals Used: None Preservatives in sample bottles Other: _____
 Hospital/Clinic: Sandia Medial Clinic Bldg. 831 Phone: 911 on LAN; 844-0911 on mobile

Safety Topics Presented

<input checked="" type="checkbox"/> Wear safety glasses	<input checked="" type="checkbox"/> Wear leather gloves	<input type="checkbox"/> Wear sunscreen
<input checked="" type="checkbox"/> Wear safety boots	<input checked="" type="checkbox"/> Wear latex or nitrile gloves	<input checked="" type="checkbox"/> No eating or drinking onsite
<input type="checkbox"/> Wear hearing protection	<input checked="" type="checkbox"/> Use safe lifting practices	<input checked="" type="checkbox"/> Set up eye wash
<input checked="" type="checkbox"/> Be aware of biohazards (snakes, spiders, etc.)	<input checked="" type="checkbox"/> Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary	<input checked="" type="checkbox"/> Wear communication device (radio, cell phone, EOC alert enabled pager)
<input checked="" type="checkbox"/> Be aware of electrical hazards	<input checked="" type="checkbox"/> Be aware of pinch points	<input type="checkbox"/> Avoid spilling leachate (hose connections)
<input checked="" type="checkbox"/> Be aware of pressure hazards	<input type="checkbox"/> Notify RCT when using neutron probe	<input type="checkbox"/> Practice ALARA
<input checked="" type="checkbox"/> Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	<input type="checkbox"/> Other (list):	<input type="checkbox"/> Other (list):

Does anyone have any weight restrictions on lifting? Circle YES or **(NO)**. If answered YES explain.

ALFRED SANTILLANES
 Printed Name
William Gibson
 Printed Name

 Printed Name

 Printed Name

 Printed Name

 Printed Name

Attendees

Alfred Santillanes
 Signature
William Gibson
 Signature

 Signature

 Signature

 Signature

 Signature

Notes

IMPORTANT NOTICE: A printed copy of this form may not be the document currently in effect. The official version is located on the Sandia Restricted Network (SRN), 4100 Controlled Documents homepage.

HEALTH & SAFETY MEETING FORM

Dept: 4141 Facility: CWL-MW 10 Date: 01/16/17 Time: 0810

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

Weather Conditions:
 Temp: 41 °F Wind Speed: 0-5 MPH Humidity: 82 % Wind Chill: 24.69 °F ^{RL}

Chemicals Used: None Preservatives in sample bottles Other: _____
 Hospital/Clinic: Sandia Medial Clinic Bldg, 831 Phone: 911 on LAN; 844-0911 on mobile

Safety Topics Presented

<input checked="" type="checkbox"/> Wear safety glasses	<input type="checkbox"/> Wear leather gloves	<input type="checkbox"/> Wear sunscreen
<input checked="" type="checkbox"/> Wear safety boots	<input checked="" type="checkbox"/> Wear latex or nitrile gloves	<input type="checkbox"/> No eating or drinking onsite
<input type="checkbox"/> Wear hearing protection	<input checked="" type="checkbox"/> Use safe lifting practices	<input type="checkbox"/> Set up eye wash
<input checked="" type="checkbox"/> Be aware of biohazards (snakes, spiders, etc.)	<input checked="" type="checkbox"/> Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary	<input checked="" type="checkbox"/> Wear communication device (radio, cell phone, EOC alert enabled pager)
<input checked="" type="checkbox"/> Be aware of electrical hazards	<input checked="" type="checkbox"/> Be aware of pinch points	<input type="checkbox"/> Avoid spilling leachate (hose connections)
<input checked="" type="checkbox"/> Be aware of pressure hazards	<input type="checkbox"/> Notify RCT when using neutron probe	<input type="checkbox"/> Practice ALARA
<input checked="" type="checkbox"/> Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	<input type="checkbox"/> Other (list):	<input type="checkbox"/> Other (list):

Does anyone have any weight restrictions on lifting? Circle YES or NO. If answered YES explain.

Robert Thyngh
 Printed Name
ALFRED SANTILLANES
 Printed Name
William Gibson
 Printed Name
 1/17/17 Robert Lynch
 Printed Name
ALFRED SANTILLANES
 Printed Name
Elbert L. Quintana
 Printed Name

Attendees

[Signature]
 Signature
[Signature]
 Signature
[Signature]
 Signature
[Signature]
 Signature
[Signature]
 Signature

Notes

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: CWL						
Calibrations done by: R Lynch				Date: 01/11/17		
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: 0620	3.99	19.9	7.00	20.0	10.00	19.9
2. Time: 1121	3.97	19.8	7.00	19.8	10.01	19.9
3. Time:						
4. Time:						
Standard lot no.:	6GH909		6GG018		6GF797	
Expiration date:	AUG/18		JUL/18		JUN/18	
SC Calibration/Check						
Reference Value: 1413 uS			Standard Lot No.: 6GH952			
	Value	Temp	Expiration Date: AUG/17			
1. Time: 0618	1413.0	19.8				
2. Time: 1120	1413.3	19.9				
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV			Standard Lot No. 6GH792			
	Value	Temp	Expiration Date: MAY/17			
1. Time: 0622	220.0	19.8				
2. Time: 1123	219.9	19.9				
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time: 0617	82.0		24.51			
2. Time: 1119	81.7		24.47			
3. Time:						
4. Time:						

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.

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch			Date: 01/11/17	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 16040C049087	
Reference Value	10	20	100	800
Standard Lot No.	A6055	A6056	A6064	A6104
1. Time 0820	10.2	20.1	103	798
2. Time 1644	10.1	20.2	101	797
3. Time				
4. Time				
Comments:				

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.*

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: CWL						
Calibrations done by: <i>William Gibson</i>				Date: <i>01-12-2017</i>		
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:	<i>0744</i>	<i>3.99</i>	<i>20.0</i>	<i>20.0</i>	<i>9.98</i>	<i>20.0</i>
2. Time:	<i>1248</i>	<i>4.01</i>	<i>20.3</i>	<i>20.3</i>	<i>9.96</i>	<i>20.3</i>
3. Time:						
4. Time:						
Standard lot no.:	6GH909		6GG018		6GF797	
Expiration date:	AUG/18		JUL/18		JUN/18	
SC Calibration/Check						
Reference Value: 1413 uS			Standard Lot No.: 6GH952			
	Value	Temp	Expiration Date: AUG/17			
1. Time:	<i>0747</i>	<i>20.0</i>				
2. Time:	<i>1251</i>	<i>20.3</i>				
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV			Standard Lot No. 6GH792			
	Value	Temp	Expiration Date: MAY/17			
1. Time:	<i>0741</i>	<i>20.0</i>				
2. Time:	<i>1245</i>	<i>20.3</i>				
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	<i>0739</i>	<i>81.4</i>	<i>24.370</i>			
2. Time:	<i>1242</i>	<i>81.6</i>	<i>24.53</i>			
3. Time:						
4. Time:						

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.*

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

SNL/NM Project Name: CWL				
Calibration done by: <i>William Gibson</i>		Date: <i>01-12-17</i>		
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 16040C049087	
Reference Value	10	20	100	800
Standard Lot No.	A6055	A6056	A6064	A6104
1. Time <i>0737</i>	<i>11.3</i>	<i>22.7</i>	<i>104</i>	<i>801</i>
2. Time <i>1254</i>	<i>11.1</i>	<i>21.4</i>	<i>101</i>	<i>801</i>
3. Time				
4. Time				
Comments:				

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.*

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: CWL						
Calibrations done by: <i>William Gibson</i>			Date: <i>01-13-17</i>			
Make & Model: EXO 1						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <u>16D101840</u>						
Other (S/N): <u>NA</u>						
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:	<i>0705</i>	<i>4.01</i>	<i>20.1</i>	<i>7.01</i>	<i>20.1</i>	<i>9.96</i>
2. Time:	<i>1242</i>	<i>4.01</i>	<i>20.2</i>	<i>7.01</i>	<i>20.2</i>	<i>9.97</i>
3. Time:						
4. Time:						
Standard lot no.:	6GH909		6GG018		6GF797	
Expiration date:	AUG/18		JUL/18		JUN/18	
SC Calibration/Check						
Reference Value: 1413 uS			Standard Lot No.: 6GH952			
	Value	Temp	Expiration Date: AUG/17			
1. Time:	<i>0710</i>	<i>1413</i>	<i>20.1</i>			
2. Time:	<i>1245</i>	<i>1413</i>	<i>20.2</i>			
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV			Standard Lot No. 6GH792			
	Value	Temp	Expiration Date: MAY/17			
1. Time:	<i>0700</i>	<i>219.9</i>	<i>20.1</i>			
2. Time:	<i>0701</i>	<i>219.9</i>	<i>20.1</i>			
3. Time:	<i>1239</i>	<i>219.8</i>	<i>20.2</i>			
4. Time:						
DO Calibration/Check						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	<i>0748</i>	<i>81.7</i>	<i>24.72</i>			
2. Time:	<i>1233</i>	<i>81.8</i>	<i>24.75</i>			
3. Time:						
4. Time:						

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.*

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

SNL/NM Project Name: CWL				
Calibration done by: <i>William Gibson</i>		Date: <i>01-13-17</i>		
TURBIDIMETER				
Make & Model: HACH 2100Q		Serial No. S/N 16040C049087		
Reference Value	10	20	100	800
Standard Lot No.	A6055	A6056	A6064	A6104
1. Time <i>0802</i>	<i>10.7</i>	<i>20.5</i>	<i>101</i>	<i>801</i>
2. Time <i>1252</i>	<i>10.6</i>	<i>20.5</i>	<i>102</i>	<i>801</i>
3. Time				
4. Time				
Comments:				

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.*

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: CWL						
Calibrations done by: R Lynch				Date: 01/16/17 <i>01/17/17</i>		
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: <i>0622</i>	<i>3.98</i>	<i>19.7</i>	<i>7.01</i>	<i>19.7</i>	<i>10.00</i>	<i>19.7</i>
2. Time: <i>1143</i>	<i>3.99</i>	<i>19.9</i>	<i>7.00</i>	<i>19.9</i>	<i>10.01</i>	<i>19.9</i>
3. Time: <i>0635</i>	<i>3.97</i>	<i>19.6</i>	<i>6.99</i>	<i>19.6</i>	<i>10.00</i>	<i>19.7</i>
4. Time: <i>1051</i>	<i>3.99</i>	<i>19.7</i>	<i>7.01</i>	<i>19.7</i>	<i>10.01</i>	<i>19.7</i>
Standard lot no.:	6GH909		6GG018		6GF797	
Expiration date:	AUG/18		JUL/18		JUN/18	
SC Calibration/Check						
Reference Value: 1413 uS			Standard Lot No.: 6GH952			
	Value	Temp	Expiration Date: AUG/17			
1. Time: <i>0621</i>	<i>1412.8</i>	<i>19.7</i>				
2. Time: <i>1142</i>	<i>1413.3</i>	<i>19.9</i>				
3. Time: <i>0634</i>	<i>1413.1</i>	<i>19.7</i>				
4. Time: <i>1050</i>	<i>1413.3</i>	<i>19.7</i>				
ORP Calibration/Check						
Reference Value: 220 mV			Standard Lot No. 6GH792			
	Value	Temp	Expiration Date: MAY/17			
1. Time: <i>0624</i>	<i>220.2</i>	<i>19.7</i>				
2. Time: <i>1145</i>	<i>219.8</i>	<i>19.9</i>				
3. Time: <i>0637</i>	<i>220.4</i>	<i>19.6</i>				
4. Time: <i>1053</i>	<i>219.9</i>	<i>19.7</i>				
DO Calibration/Check						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time: <i>0620</i>	<i>81.8</i>		<i>24.53</i>			
2. Time: <i>1141</i>	<i>82.0</i>		<i>24.57</i>			
3. Time: <i>0633</i>	<i>81.7</i>		<i>24.69</i>			
4. Time: <i>1049</i>	<i>81.7</i>		<i>24.69</i>			

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.*

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch			Date: 01/16/17 01/17/17	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 16040C049087	
Reference Value	10	20	100	800
Standard Lot No.	A6055	A6056	A6064	A6104
1. Time 0818	10.2	20.4	102	797
2. Time 1034	9.97	20.1	104	803
3. Time 0844	10.4	20.0	106	798
4. Time 0947	10.1	19.7	103	797
Comments:				

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.

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL		
Well I.D.: CWL-MW 9	Date: 01/12/17	
Method: Portable pump <input checked="" type="checkbox"/> 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)
504.89	0826	Start							→
507.14	0910	5	18.36	905.9	186.9	7.14	1.50	39.2	3.68
507.80	0931	9	18.71	911.6	174.2	7.14	0.24	36.0	3.35
507.97	0941	11	18.86	910.1	171.8	7.14	0.96	35.9	3.32
508.10	0951	13	19.24	927.6	170.2	7.13	0.48	37.4	3.44
508.18	1002	15	19.25	933.7	171.7	7.13	0.31	38.9	3.58
508.22	1011	17	18.55 19.25	903.9 923.9	172.0	7.13	0.90	39.9	3.72
508.28	1022	19	18.45	930.0	168.9	7.13	0.59	41.0	3.84
508.33	1032	21	18.65	933.4	160.7	7.13	0.26	41.8	3.89
508.34	1037	22	18.71	937.5	166.4	7.12	0.46	42.6	3.94
508.37	1042	23	18.74	939.2	165.9	7.12	0.23	43.0	3.95
508.37	1047	24	18.83	940.8	164.8	7.12	0.21	43.3	3.97
508.35	1052	25	18.89	942.7	163.9	7.12	0.24	43.4	3.98
508.35	1057	26	18.94	943.2	163.8	7.12	0.22	43.5	3.99
	1058	Sample							→

Comments: ~1.5 gals purged from tubing 0839
 FB - DI 50014 → 1090 # 039

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.

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL	
Well I.D.: CWL-MW 10	Date: 01/16/17 <u>01/17/17</u>
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)
501.08	0827	Start							
505.49	0901	3	13.39	801.4	178.5	7.20	2.22	16.5	1.71
507.06	0914	5	14.14	816.5	138.3	7.22	1.70	17.5	1.79
508.64	0927	7	14.24	818.6	111.5	7.23	1.59	15.0	1.54
510.11	0940	9	14.21	817.9	95.3	7.23	2.26	14.5	1.48
511.59	0953	11	14.27	818.1	83.3	7.23	3.32	14.2	1.45
512.37	0959	12	14.14	815.5	80.0	7.23	4.23	15.8	1.61
513.21	1006	13	14.04	813.7	74.8	7.23	4.45	13.3	1.36
514.19	1012	14	14.00	813.4	73.5	7.23	4.67	15.8	1.63
514.80	1025	15	11.53	764.3	64.6	7.23	6.56	14.8	1.60
515.02	1028	15.1	10.76	7.68.4	63.5	7.24	6.73	14.0	1.52
515.02	1028	Well	DRY						
01/17/17- 506.42	0855	START							
507.78	0918	1 ^{1/17/17}	16.91	894.5	21.1	7.24	4.18	62.8	6.02
508.17	0924	2 ^{1/17/17}	17.52	909.2	-1.0	7.22	2.14	36.3	3.46
508.51	0930	2	17.98	917.6	-7.3	7.21	2.78	29.5	2.78
	0931		SAMPLING						

Comments: ~1.5 gals purged from tubing 0839
 01/17/17 0910

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL		
Well I.D.: CWL-MW 11	Date: 01/13/17	
Method: Portable pump <input checked="" type="checkbox"/>	Dedicated pump <input type="checkbox"/>	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)
500.23	0756	Start	_____	_____	_____	_____	_____	_____	_____
504.51	0844	5	15.22	909.5	197.6	7.12	0.34	59.2	5.93
506.53	0918	9	15.74	921.2	195.2	7.13	0.51	59.7	5.90
507.34	0935	11	16.29	933.6	195.6	7.13	0.59	59.8	5.84
508.34	0953	13	16.56	939.5	195.8	7.13	0.50	59.7	5.81
509.28	1010	15	16.44	936.2	196.1	7.13	0.52	58.4	5.69
510.21	1027	17	16.49	937.8	195.4	7.13	0.49	58.2	5.66
511.08	1046	19	16.11	927.2	193.5	7.13	0.64	56.7	5.56
511.99	1105	21	16.25	928.9	180.2	7.13	0.43	53.4	5.23
511.96	1128	23	15.85	911.2	198.9	7.13	0.31	55.3	5.53
511.85	1142	24	15.51	909.7	199.7	7.13	0.48	54.2	5.45
512.38	1154	25	15.69	923.9	201.6	7.12	0.53	56.3	5.53
512.65	1206	26	15.81	928.1	200.2	7.13	0.59	56.5	5.54
	1207	2	Sample	_____	_____	_____	_____	_____	_____

Comments: ~1.5 gals purged from tubing 0806
 FB-3 1090 DIW → 072

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.

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

Project Name: <u>CWL GWM</u>	Monitoring Well ID #: <u>CWL-BW5</u>	Date: <u>1/11/17</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-640</u>	Water Level Indicator ID #: <u>210269</u>	
<u>Personnel Performing Decontamination:</u>		
Robert Lynch Print Name: _____	<u>RL</u> Initial: _____	
Alfred Santillanes Print Name: _____	<u>AS</u> Initial: _____	
Condition of Equipment		
Pump: <u>Good</u>	Tubing Bundle: <u>Good</u>	Water Level Indicator: <u>Good</u>
List of Decontamination Materials		
Deionized Water	HNO₃	
Source: <u>SMO</u>	Grade: <u>Reagent</u>	
Lot Number: <u>070 009 008 041</u>	UN #: <u>2021</u>	
	Manufacturer: <u>ACROC</u>	
	Lot Number: <u>A0316863</u>	

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.


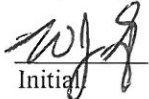
**Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form**

Project Name: <u>CWL-GWM</u>	Monitoring Well ID #: <u>CWL-MW9</u>	Date: <u>01-12-17</u>
------------------------------	--------------------------------------	-----------------------

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

Pump and Tubing Bundle ID #: <u>1806-640</u>	Water Level Indicator ID #: <u>210269</u>
--	---

Personnel Performing Decontamination:

Tim Jackson _____ Print Name:	 _____ Initial:
William Gibson _____ Print Name:	 _____ Initial:

Condition of Equipment		
Pump: <u>Good</u>	Tubing Bundle: <u>Good</u>	Water Level Indicator: <u>Good</u>

List of Decontamination Materials	
<p align="center">Deionized Water</p> Source: <u>1090 DIW</u> Lot Number: <u>046,038,002,057,013,068</u>	<p align="center">HNO₃</p> Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>ACROS</u> Lot Number: <u>A316863</u>

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.

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

Project Name: <u>CWL-GWM</u>	Monitoring Well ID #: <u>CWL-MWE mwl</u> <i>WJG</i>	Date: <u>01/13/17</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-640</u>	Water Level Indicator ID #: <u>210269</u>	
<u>Personnel Performing Decontamination:</u>		
William Gibson Print Name: _____	<i>WJG</i> Initial: _____	
Alfred Santillanes Print Name: _____	<i>AS</i> Initial: _____	
Condition of Equipment		
Pump: <u>Good</u>	Tubing Bundle: <u>Good</u>	Water Level Indicator: <u>Good</u>
List of Decontamination Materials		
<p align="center">Deonized Water</p> <p>Source: <u>1090 DIW</u></p> <p>Lot Number: <u>055,051,050,039,049,053</u></p>	<p align="center">HNO₃</p> <p>Grade: <u>Reagent</u></p> <p>UN #: <u>2031</u></p> <p>Manufacturer: <u>ACROS</u></p> <p>Lot Number: <u>A0316863</u></p>	

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.

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

Project Name: <u>CWL-GWM</u>	Monitoring Well ID #: <u>CWL-MW10</u>	Date: <u>01/17/17</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-640</u>	Water Level Indicator ID #: <u>210269</u>	
<u>Personnel Performing Decontamination:</u>		
Robert Lynch Print Name: _____	<u>RL</u> Initial: _____	
Alfred Santillanes <u>1/20/17</u> Print Name: _____	_____ Initial: _____	
Condition of Equipment		
Pump: <u>Good</u>	Tubing Bundle: <u>Good</u>	Water Level Indicator: <u>Good</u>
List of Decontamination Materials		
<p align="center">Deionized Water</p> <p>Source: <u>1090 DIW</u></p> <p>Lot Number: <u>003,036,054,072,056,062</u></p>	<p align="center">HNO₃</p> <p>Grade: <u>Reagent</u></p> <p>UN #: <u>2031</u></p> <p>Manufacturer: <u>ACROS</u></p> <p>Lot Number: <u>A0316863</u></p>	

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.

SUMMARY SHEET FOR JANUARY 2017 SAMPLES

Sample Summary for CWL GWM
January 2017

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	11-Jan-17	617565	101432	Environmental	n/a	617565 / 101433	n/a	
CWL-MW9	12-Jan-17	617567	101437	Environmental	n/a	617567 / 101438	617567 / 101436	
CWL-MW10	17-Jan-17	617572	101453	Environmental	n/a	617572 / 101454	n/a	
CWL-MW11	13-Jan-17	617570	101446	Environmental	617569 / 101442	617570 / 101448	617570 / 101445	
CWL-MW11	13-Jan-17	617570	101447	Duplicate	617569 / 101442	617570 / 101448	617570 / 101445	
CWL-EB1	12-Jan-17	617569	101442	Equipment Blank	n/a	617569 / 101443	n/a	Decon prior to CWL-MW11
CWL-FB1	12-Jan-17	617567	101436	Field Blank	n/a	617567 / 101438	n/a	at CWL-MW9
CWL-FB2	13-Jan-17	617570	101445	Field Blank	n/a	617570 / 101448	n/a	at CWL-MW11
CWL-DWI/QC	12-Jan-17	617569	101441	QC-DIW	n/a	617569 / 101443	n/a	DIW source for EB1
Waste Characterization Samples								
CWL-BW5	11-Jan-17	617566	101434	Waste	n/a	617566 / 101435	n/a	No data validation required
CWL-MW9	12-Jan-17	617568	101439	Waste	n/a	617568 / 101440	n/a	No data validation required
CWL-MW10	17-Jan-17	617573	101455	Waste	n/a	617573 / 101456	n/a	No data validation required
CWL-MW11	13-Jan-17	617571	101451	Waste	n/a	617571 / 101452	n/a	No data validation required

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES
GROUNDWATER MONITORING
JANUARY 2017

AR/COC NUMBERS 617565, 617567

Memorandum

Date: February 17, 2017
To: File
From: Jeanne Peterson
Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM
ARCOG: 617565, 617567
SDG: 414133
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

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Two TBs were submitted, one for each ARCO. A DIW FB was submitted with ARCO 617567 and was associated with the samples on the same ARCO.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 02/20/17

Memorandum

Date: February 17, 2017
To: File
From: Jeanne Peterson
Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
ARCOG: 617565, 617567
SDG: 414133
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 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. 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 instrument tune met QC acceptance criteria.

Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

Reporting Limit Verification

All 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 evaluated because the sample concentrations of Ca, Mg, Al and Fe were > that in the ICS solution. All acceptance criteria were met.

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 Donovan

Level: I

Date: 02/20/17

Sandia Data Validation Summary Worksheet

ARCOG#: 617565, 617567	Site/Project: CWL GWM	Validation Date: 02/17/2017
SDG #:414133	Laboratory: GEL	Validator: Jeanne Peterson
Matrix: Aqueous	# of Samples: 7	CVR present: Yes
ARCOG(s) present: Yes	Sample Container Integrity: OK	
Analysis Type: <input checked="" type="checkbox"/> Organic <input checked="" type="checkbox"/> Metals <input type="checkbox"/> Genchem <input type="checkbox"/> 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 01/12/2017

Validated by:


CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.	SMO Use	AR/COC	617565
Project Name: CWL GWM/SVM	Date Samples Shipped: 1. 11. 17	SMO Authorization: <i>Tommy Gordon</i>	
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. 259324	SMO Contact Phone: Wendy Palencia/505-844-3132	
Project/Task Number: 195122.10.11.03	Lab Contact: Edie Kent/843-769-7385	Send Report to SMO: Stephanie Montaño/505.284.2553	
Service Order: CF327-17	Lab Destination: GEL	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius	
	Contract No.: 1303873	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		Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
101432	001	CWL-BW5	522	1/11/17 - 10:37	GW	G	3x40 ml	HCl	G	SA	VOC, TCL (SW846-8260B)	001
101432	002	CWL-BW5	522	1/11/17 - 10:38	GW	P	500 ml	HNO3	G	SA	METALS (SW846-6020): Cr, Ni	002
101433	001	CWL-TB1	NA	1/11/17 - 10:37	DIW	G	3x40 ml	HCl	G	TB	VOC, TCL (SW846-8260B)	003

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:	EDD	<input checked="" type="checkbox"/> Yes	
Background: <input type="checkbox"/> Yes	Entered by:	Turnaround Time	<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day	
Confirmatory: <input type="checkbox"/> Yes	QC inits.:	Negotiated TAT	<input type="checkbox"/>	
Sample Team Members	Name	Signature	Init	
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/04141/505-844-4013/505-250-7090
	William Gibson	<i>William Gibson</i>	WG	SNL/04141/505-239-7367/505-239-7367
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/04141/505-284-6870/505-228-0710
Sample Disposal		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Lab Use
Return Samples By: Comments: Report CWL enhanced list of VOCs for environmental samples. These compounds include chloroform; 1,1-dichloroethene (1,1-DCE); tetrachloroethene (PCE); trichloroethene (TCE); trichlorofluoromethane (Freon 11); and 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113). Waste characterization samples (i.e. purge water) will be sampled on separate ARCO's.				

Relinquished by: <i>Alfred Santillanes</i>	Org. 4141	Date 1/11/17	Time 11:16	Relinquished by: <i>Stephanie Montaño</i>	Org. 4141	Date 1/11/17	Time 11:16
Received by: <i>Stephanie Montaño</i>	Org. 4141	Date 1/11/17	Time 11:16	Received by:	Org.	Date	Time
Relinquished by: <i>TOE</i>	Org. 4131	Date 1/11/17	Time 12:05	Relinquished by:	Org.	Date	Time
Received by: <i>Edie Kent</i>	Org.	Date 1/12/17	Time 8:00	Received by:	Org.	Date	Time

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No.		SMO Use										AR/COC		617567	
Project Name: CWL GWM/SVM		Date Samples Shipped: 1.12.17				SMO Authorization: Terry Goodwin						<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius			
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. 259384				SMO Contact Phone: Wendy Palencia/505-844-3132									
Project/Task Number: 195122.10.11.03		Lab Contact: Edie Kent/843-769-7385				Send Report to SMO: Stephanie Montaño/505.284.2553									
Service Order: CF327-17		Lab Destination: GEL				Contract No.: 1303873									
Tech Area:		Operational Site:										Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154			
Building:		Room:												414133	
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID		
							Type	Volume							
X 101436	001	CWL-FB1	NA	1/12/17	10:52	DIW	G	3x40 ml	HCl	G	FB	VOC, (SW846-8260B)	004		
X 101437	001	CWL-MW9	517	1/12/17	10:58	GW	G	3x40 ml	HCl	G	SA	VOC, (SW846-8260B)	005		
X 101437	002	CWL-MW9	517	1/12/17	11:00	GW	P	500 ml	HNO3	G	SA	METALS (SW846-6020): Cr, Ni	006		
101438	001	CWL-TB3	NA	1/12/17	10:52	DIW	G	3x40 ml	HCl	G	TB	VOC, (SW846-8260B)	007		
Last Chain: <input type="checkbox"/> Yes		Sample Tracking				SMO Use				Special Instructions/QC Requirements:				Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes				Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day					
Background: <input type="checkbox"/> Yes		Entered by:				Negotiated TAT <input type="checkbox"/>				Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab					
Confirmatory: <input type="checkbox"/> Yes		QC inits.:				Return Samples By:				Comments: Report CWL enhanced list of VOCs for environmental samples. These compounds include chloroform; 1,1-dichloroethene (1,1-DCE); tetrachloroethene (PCE); trichloroethene (TCE); trichlorofluoromethane (Freon 11); and 1,1,2-trichloro-1,2-trifluoroethane (Freon 113). Waste characterization samples (i.e. purge water) will be submitted on separate ARCO's.					
Sample Team Members	Name		Signature		Init.	Company/Organization/Phone/Cell				Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab					
	Robert Lynch					SNL/04141/505-844-4013/505-250-7090				Return Samples By:					
	William Gibson					SNL/04141/505-239-7367/505-239-7367				Comments: Report CWL enhanced list of VOCs for environmental samples.					
	Alfred Santillanes					SNL/04141/505-284-6870/505-228-0710				These compounds include chloroform; 1,1-dichloroethene (1,1-DCE); tetrachloroethene (PCE); trichloroethene (TCE); trichlorofluoromethane (Freon 11); and 1,1,2-trichloro-1,2-trifluoroethane (Freon 113). Waste characterization samples (i.e. purge water) will be submitted on separate ARCO's.					
Tim Jackson					SNL/0431/505-284-2547/505-263-6639										
Relinquished by		Org. 4131		Date 1/12/17	Time 11:37		Relinquished by				Org. Date Time				
Received by		Org. 4131		Date 1/12/17	Time 11:37		Received by				Org. Date 1-13-17 Time 7:50				
Relinquished by		Org. 4131		Date 1-12-17	Time 12:30		Relinquished by				Org. Date Time				
Received by		Org.		Date 1-13-17	Time 7:50		Received by				Org. Date Time				

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

AR/COC NUMBERS 617569, 617570, 617572

Memorandum

Date: February 24, 2017
To: File
From: Jeanne Peterson
Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 617569, 617570, 617572
SDG: 414418
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

Nine 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 except as follows.

The ICV %D was >20% and positive for trichlorofluoromethane. The associated sample results were non-detect and will not be qualified.

Blanks

No target analytes were detected in the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

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 ARCO. An EB was submitted with ARCO 617569 and was associated with the field samples on ARCO 617570. A QC/DIW sample was submitted with ARCO 617569 but was not associated with any field samples. An FB was submitted with ARCO 617570 and was associated with the samples on that ARCO. A field duplicate pair was submitted with ARCO 617570. 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 Donovan

Level: I

Date: 02/24/17

Memorandum

Date: February 24, 2017
To: File
From: Jeanne Peterson
Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
AR/COC: 617569, 617570, 617572
SDG: 414418
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 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. 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 instrument tune met QC acceptance criteria.

Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

Reporting Limit Verification

All 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.

Laboratory Replicate

The replicate met all QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

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

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were evaluated for samples 414418007, -009 and -012 because the sample concentrations of Ca were > that in the ICS solution. All acceptance criteria were met.

ICP Serial Dilution

The serial dilution met all QC acceptance criteria.

Other QC

An EB was submitted with ARCOG 617569 and was associated the field samples on ARCOG 617570. A field duplicate pair was submitted with ARCOG 617570. 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 Donovan

Level: I

Date: 02/24/17



Sample Findings Summary



AR/COC: 617569, 617570, 617572

Page 1 of 1

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

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

Sandia Data Validation Summary Worksheet

ARCOG#: 617569, 617570, 617572	Site/Project: CWL GWM	Validation Date: 02/22/2017
SDG #: 414418	Laboratory: GEL	Validator: Jeanne Peterson
Matrix: Aqueous	# of Samples: 13	CVR present: Yes
ARCOG(s) present: Yes	Sample Container Integrity: OK	
Analysis Type: <input checked="" type="checkbox"/> Organic <input checked="" type="checkbox"/> Metals <input type="checkbox"/> Genchem <input type="checkbox"/> 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 01/12, 13 and 17/2017

Validated by:


CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

ARCOC 617569

Batch No.		SMO Use		SMO Authorization: <i>TD Goodwin</i>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius	
Project Name: CWL GWM/SVM		Date Samples Shipped: <i>1-16-17</i>		SMO Contact Phone: Wendy Palencia/505-844-3132		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <i>414418</i>	
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>259465</i>		Send Report to SMO: Stephanie Montaño/505.284.2553			
Project/Task Number: 195122.10.11.03		Lab Contact: Edie Kent/843-769-7385					
Service Order: CF327-17		Lab Destination: GEL					
		Contract No.: 1303873					

Tech Area:		Room:		Operational Site:									
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
101441	001	CWL-DWI/QC	NA	1/12/17	13:44	DIW	G	3x40 ml	HCl	G	FB	VOC, TCL (SW846-8260B)	<i>001</i>
101442	001	CWL-EB1	NA	1/12/17	13:44	DIW	G	3x40 ml	HCl	G	EB	VOC, TCL (SW846-8260B)	<i>002</i>
101442	002	CWL-EB1	NA	1/12/17	13:46	DIW	P	500 ml	HNO3	G	EB	METALS (SW846-6020): Cr, Ni	<i>003</i>
101443	001	CWL-TB5	NA	1/12/17	13:44	DIW	G	3x40 ml	HCl	G	TB	VOC, TCL (SW846-8260B)	<i>004</i>

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD		<input checked="" type="checkbox"/> Yes					
Background: <input type="checkbox"/> Yes		Entered by:		Turnaround Time		<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day					
Confirmatory: <input type="checkbox"/> Yes		QC inits.:		Negotiated TAT		<input type="checkbox"/>					
Sample Team Members	Name		Signature		Init.		Company/Organization/Phone/Cell		Sample Disposal		Lab Use
	Robert Lynch		<i>[Signature]</i>		RL		SNL/04141/505-844-4013/505-250-7090		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		
	William Gibson		<i>[Signature]</i>		WG		SNL/04141/505-239-7367/505-239-7367		Return Samples By:		
	Alfred Santillanes		<i>[Signature]</i>		AS		SNL/04141/505-284-6870/505-228-0710		Comments: Report CWL enhanced list of VOCs for environmental samples. These compounds include chloroform; 1,1-dichloroethene (1,1-DCE); tetrachloroethene (PCE); trichloroethene (TCE); trichlorofluoromethane (Freon 11); and 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113). Waste characterization samples (i.e. purge water) will be submitted on separate ARCOs.		

Relinquished by <i>[Signature]</i>	Org. <i>4141</i>	Date <i>1/12/17</i>	Time <i>14:52</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>4131</i>	Date <i>1/12/17</i>	Time <i>14:52</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org. <i>4131</i>	Date <i>1/16/17</i>	Time <i>10:00</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org.	Date <i>1-17-17</i>	Time <i>2:50</i>	Received by	Org.	Date	Time

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. <i>N/A</i>		SMO Use		AR/COC		617570						
Project Name: CWL GWM/SVM		Date Samples Shipped: <i>1/16/17</i>		SMO Authorization: <i>[Signature]</i>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No.						
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>251465</i>		SMO Contact Phone: <i>900</i>		<input checked="" type="checkbox"/> 4° Celsius						
Project/Task Number: 195122.10.11.03		Lab Contact: Edie Kent/843-769-7385		Wendy Palencia/505-844-3132		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <i>414418</i>						
Service Order: CF327-17		Lab Destination: GEL		Send Report to SMO:								
		Contract No.: 1303873		Stephanie Montaño/505.284.2553								
Tech Area:		Operational Site:										
Building:		Room:										
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
101445	001	CWL-FB2	NA	1/13/17 12:07	DIW	G	3x40 ml	HCl	G	FB	VOC, TCL (SW846-8260B)	<i>005</i>
101446	001	CWL-MW11	513	1/13/17 12:07	GW	G	3x40 ml	HCl	G	SA	VOC, TCL (SW846-8260B)	<i>006</i>
101446	002	CWL-MW11	513	1/13/17 12:09	GW	P	500 ml	HNO3	G	SA	METALS (SW846-6020): Cr, Ni	<i>007</i>
101447	001	CWL-MW11	513	1/13/17 12:07	GW	G	3x40 ml	HCl	G	DU	VOC, TCL (SW846-8260B)	<i>008</i>
101447	002	CWL-MW11	513	1/13/17 12:09	GW	P	500 ml	HNO3	G	DU	METALS (SW846-6020): Cr, Ni	<i>009</i>
101448	001	CWL-TB6	NA	1/13/17 12:07	DIW	G	3x40 ml	HCl	G	TB	VOC, TCL (SW846-8260B)	<i>010</i>
Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD		<input checked="" type="checkbox"/> Yes						
Background: <input type="checkbox"/> Yes		Entered by:		Turnaround Time		<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day						
Confirmatory: <input type="checkbox"/> Yes		QC inits.:		Negotiated TAT		<input type="checkbox"/>						
Sample Team Members	Name		Signature		Init.		Company/Organization/Phone/Cell		Sample Disposal		Comments: Report CWL enhanced list of VOCs for environmental samples. These compounds include chloroform; 1,1-dichloroethene (1,1-DCE); tetrachloroethene (PCE); trichloroethene (TCE); trichlorofluoromethane (Freon 11); and 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113). Waste characterization samples (i.e. purge water) will be submitted on separate ARCOs.	
									<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			
									Return Samples By:			
Relinquished by <i>Alfred Santillanes</i>		Org. <i>4141</i>		Date <i>1/13/17</i>		Time <i>1405</i>		Relinquished by		Org. Date Time		
Received by <i>Wendy Palencia</i>		Org. <i>4131</i>		Date <i>1/13/17</i>		Time <i>1405</i>		Received by		Org. Date Time		
Relinquished by <i>[Signature]</i>		Org. <i>4131</i>		Date <i>1/16/17</i>		Time <i>0830</i>		Relinquished by		Org. Date Time		
Received by <i>[Signature]</i>		Org.		Date <i>1-17-17</i>		Time <i>1150</i>		Received by		Org. Date Time		

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. <i>N/A</i>	SMO Use	AR/COC	617572
Project Name: CWL GWM/SVM	Date Samples Shipped: <i>1-17-17</i>	SMO Authorization: <i>[Signature]</i>	
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. <i>258920</i>	SMO Contact Phone: <i>9MO</i>	
Project/Task Number: 195122.10.11.03	Lab Contact: Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	
Service Order: CF327-17	Lab Destination: GEL	Send Report to SMO:	
	Contract No.: 1303873	Stephanie Montaño/505.284.2553	
Tech Area:		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius	
Building: Room: Operational Site:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <i>414418</i>	

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
101453	001	CWL-MW10	515	1/17/17 09:31	GW	G	3x40 ml	HCl	G	SA	VOC, TCL (SW846-8260B)	<i>011</i>
101453	002	CWL-MW10	515	1/17/17 09:32	GW	P-	500 ml	HNO3	G	SA	METALS (SW846-6020): Cr, Ni	<i>012</i>
101454	001	CWL-TB8	NA	1/17/17 09:31	DIW	G	3x40 ml	HCl	G	TB	VOC, TCL (SW846-8260B)	<i>013</i>

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:	EDD	<input checked="" type="checkbox"/> Yes		
Background: <input type="checkbox"/> Yes	Entered by:	Turnaround Time	<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:	Negotiated TAT	<input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/04141/505-844-4013/505-250-7090	Return Samples By: Comments: Report CWL enhanced list of VOCs for environmental samples. These compounds include chloroform; 1,1-dichloroethene (1,1-DCE); tetrachloroethene (PCE); trichloroethene (TCE); trichlorofluoromethane (Freon 11); and 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113). Waste characterization samples (i.e. purge water) will be submitted on separate ARCOs.
	Gilbert Quintana	<i>[Signature]</i>	<i>GQ</i>	SNL/04141/505-239-7367/505-239-7367	
	Alfred Santillanes	<i>[Signature]</i>	<i>AS</i>	SNL/04141/505-284-6870/505-228-0710	
Relinquished by <i>[Signature]</i>	Org. <i>4141</i>	Date <i>1/17/17</i>	Time <i>10:12</i>	Relinquished by	Org. Date Time
Received by <i>[Signature]</i>	Org. <i>4141</i>	Date <i>1/17/17</i>	Time <i>10:12</i>	Received by	Org. Date Time
Relinquished by <i>[Signature]</i>	Org. <i>4131</i>	Date <i>1/17/17</i>	Time <i>11:30</i>	Relinquished by	Org. Date Time
Received by <i>[Signature]</i>	Org.	Date <i>1-18-17</i>	Time <i>7:40</i>	Received by	Org. Date Time

Relinquished by <i>[Signature]</i>	Org. <i>4141</i>	Date <i>1/17/17</i>	Time <i>10:12</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>4141</i>	Date <i>1/17/17</i>	Time <i>10:12</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org. <i>4131</i>	Date <i>1/17/17</i>	Time <i>11:30</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org.	Date <i>1-18-17</i>	Time <i>7:40</i>	Received by	Org.	Date	Time

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

CONTRACT VERIFICATION REVIEW FORMS
GROUNDWATER MONITORING
JANUARY 2017

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
617565	Environmental*
617566	Waste Characterization
617567	Environmental*
617568	Waste Characterization
617569	Environmental*
617570	Environmental*
617571	Waste Characterization
617572	Environmental*
617573	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. 617565, 617566, 617567 & 617568

Analytical Lab GEL

SDG No. 414129

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 ARCOG 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	Molybdenum not reported

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		
	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)	X		
	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)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) Instrument run logs provided	N/A		
4.3	HRGC/HRMS (1668)	N/A		
	a) 12-hour tune check provided			
	b) Initial calibration provided	N/A		
	c) Continuing calibration provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Labeled compound recovery data provided	N/A		
	f) RRTs for samples and standards provided	N/A		
	g) Ion abundance ratios for samples and standards provided	N/A		
	h) Instrument run logs provided	N/A		
4.4	LC/MS/MS (6850)	N/A		
	a) Initial calibration provided			
	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)	X		
	a) Initial calibration provided			
	b) Continuing calibration provided	X		
	c) ICP interference check sample data provided	X		
	d) ICP serial dilution provided	X		
	e) Instrument run logs provided	X		
4.6	Radiochemistry and General Chemistry	X		
	a) Instrument run logs provided			

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
101434-002 & 101439-002	TAL metals plus Mo	Molybdenum not reported
.		
.	.	.

Were deficiencies unresolved? Yes No

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

If no, provide nonconformance report or correction request number and date correction request was submitted: 02-14-2017

Reviewed by: Wendy Palencia Date: 02-15-2017 13:52:00

Were resolutions adequate and data package complete? Yes No

Closed by: Wendy Palencia Date: 02-23-2017 08:52:00

Contract Verification Form (CVR)

Project Leader Jackson

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

ARCOC No. 617569, 617570, 617571, 617572 & 617573

Analytical Lab GEL

SDG No. 414418

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 ARCOG 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	Molybdenum not reported

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	X		
	a) Laboratory control sample accuracy reported and met for all samples			
	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	X		
	a) Replicate sample precision reported and met for all inorganic and radiochemistry samples			
	b) Matrix spike duplicate RPD data reported and met for all organic samples	X		
3.5	Blank data		X	Acetone detected in method blank (QC1203714349 & QC1203714350)
	a) Method or reagent blank data reported and met for all samples			
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Acetone detected in CWL-TB7 and CWL-TB9

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)	X		
	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)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) Instrument run logs provided	N/A		
4.3	HRGC/HRMS (1668)	N/A		
	a) 12-hour tune check provided			
	b) Initial calibration provided	N/A		
	c) Continuing calibration provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Labeled compound recovery data provided	N/A		
	f) RRTs for samples and standards provided	N/A		
	g) Ion abundance ratios for samples and standards provided	N/A		
	h) Instrument run logs provided	N/A		
4.4	LC/MS/MS (6850)	N/A		
	a) Initial calibration provided			
	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)	X		
	a) Initial calibration provided			
	b) Continuing calibration provided	X		
	c) ICP interference check sample data provided	X		
	d) ICP serial dilution provided	X		
	e) Instrument run logs provided	X		
4.6	Radiochemistry and General Chemistry	X		
	a) Instrument run logs provided			

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
101451-002 & 101455-002	TAL Metals plus Mo	Molybdenum not reported

Were deficiencies unresolved? Yes No

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

If no, provide nonconformance report or correction request number and date correction request was submitted: 02-20-2017

Reviewed by: Wendy Palencia Date: 02-20-2017 10:48:00

Were resolutions adequate and data package complete? Yes No

Closed by: Date:

FIELD SAMPLING FORMS
JULY 2017 GROUNDWATER MONITORING

HEALTH & SAFETY MEETING FORM

Dept: 0641 Facility: CWL-BW5 Date: 07/18/17 Time: 0812

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

Weather Conditions:
 Temp: 82 °F Wind Speed: 5 MPH Humidity: 39 % Wind Chill: 83 °F

Chemicals Used: None Preservatives in sample bottles Other: _____
 Hospital/Clinic: Sandia Medial Clinic Bldg. 831 Phone: 911 on LAN; 844-0911 on mobile

Safety Topics Presented

<input checked="" type="checkbox"/> Wear safety glasses	<input checked="" type="checkbox"/> Wear leather gloves	<input type="checkbox"/> Wear sunscreen
<input checked="" type="checkbox"/> Wear safety boots	<input checked="" type="checkbox"/> Wear latex or nitrile gloves	<input type="checkbox"/> No eating or drinking onsite
<input type="checkbox"/> Wear hearing protection	<input type="checkbox"/> Use safe lifting practices	<input type="checkbox"/> Set up eye wash
<input checked="" type="checkbox"/> Be aware of biohazards (snakes, spiders, etc.)	<input checked="" type="checkbox"/> Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary	<input checked="" type="checkbox"/> Wear communication device (radio, cell phone, EOC alert enabled pager)
<input checked="" type="checkbox"/> Be aware of electrical hazards	<input checked="" type="checkbox"/> Be aware of pinch points	<input type="checkbox"/> Avoid spilling leachate (hose connections)
<input checked="" type="checkbox"/> Be aware of pressure hazards	<input type="checkbox"/> Notify RCT when using neutron probe	<input type="checkbox"/> Practice ALARA
<input checked="" type="checkbox"/> Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	<input type="checkbox"/> Other (list):	<input type="checkbox"/> Other (list):

Does anyone have any weight restrictions on lifting? Circle YES or NO. If answered YES explain.

Robert Lynch
 Printed Name
CHRIS HOLLIGER
 Printed Name
ALFRED SANTILLANES
 Printed Name
William Gibson
 Printed Name

 Printed Name

 Printed Name

Attendees
[Signature]
 Signature
[Signature]
 Signature
[Signature]
 Signature

 Signature

 Signature

Notes

HEALTH & SAFETY MEETING FORM

Dept: 6641 Facility: CWL-MW9 Date: 07/19/17 Time: 0800

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

Weather Conditions:

Temp: 86 °F Wind Speed: 5 MPH Humidity: 37 % Wind Chill: 86 °F

Chemicals Used: None Preservatives in sample bottles Other: _____

Hospital/Clinic: Sandia Medial Clinic Bldg. 831 Phone: 911 on LAN; 844-0911 on mobile

Safety Topics Presented

<input checked="" type="checkbox"/> Wear safety glasses	<input type="checkbox"/> Wear leather gloves	<input type="checkbox"/> Wear sunscreen
<input checked="" type="checkbox"/> Wear safety boots	<input checked="" type="checkbox"/> Wear latex or nitrile gloves	<input type="checkbox"/> No eating or drinking onsite
<input type="checkbox"/> Wear hearing protection	<input type="checkbox"/> Use safe lifting practices	<input type="checkbox"/> Set up eye wash
<input checked="" type="checkbox"/> Be aware of biohazards (snakes, spiders, etc.)	<input checked="" type="checkbox"/> Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary	<input checked="" type="checkbox"/> Wear communication device (radio, cell phone, EOC alert enabled pager)
<input checked="" type="checkbox"/> Be aware of electrical hazards	<input checked="" type="checkbox"/> Be aware of pinch points	<input type="checkbox"/> Avoid spilling leachate (hose connections)
<input checked="" type="checkbox"/> Be aware of pressure hazards	<input type="checkbox"/> Notify RCT when using neutron probe	<input type="checkbox"/> Practice ALARA
<input checked="" type="checkbox"/> Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	<input type="checkbox"/> Other (list):	<input type="checkbox"/> Other (list):

Does anyone have any weight restrictions on lifting? Circle YES or NO. If answered YES explain.

Printed Name: Robert Lynch
 Printed Name: CHRIS HULLIER
 Printed Name: ALFRED SANTILLANES
 Printed Name: William Gibson
 Printed Name: _____
 Printed Name: _____

Attendees

Signature: [Signature]
 Signature: [Signature]
 Signature: [Signature]
 Signature: _____
 Signature: _____

Notes

HEALTH & SAFETY MEETING FORM

Dept: 0641 Facility: CWL-MW 11 Date: 07/20/17 Time: 0815

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: 76 °F Wind Speed: 3 MPH Humidity: 41 % Wind Chill: _____ °F

Chemicals Used: None Preservatives in sample bottles Other: _____
 Hospital/Clinic: Sandia Medial Clinic Bldg. 831 Phone: 911 on LAN; 844-0911 on mobile

Safety Topics Presented

<input type="checkbox"/> Wear safety glasses	<input type="checkbox"/> Wear leather gloves	<input type="checkbox"/> Wear sunscreen
<input type="checkbox"/> Wear safety boots	<input checked="" type="checkbox"/> Wear latex or nitrile gloves	<input type="checkbox"/> No eating or drinking onsite
<input type="checkbox"/> Wear hearing protection	<input type="checkbox"/> Use safe lifting practices	<input type="checkbox"/> Set up eye wash
<input checked="" type="checkbox"/> Be aware of biohazards (snakes, spiders, etc.)	<input checked="" type="checkbox"/> Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary.	<input checked="" type="checkbox"/> Wear communication device (radio, cell phone, EOC alert enabled pager)
<input checked="" type="checkbox"/> Be aware of electrical hazards	<input checked="" type="checkbox"/> Be aware of pinch points	<input type="checkbox"/> Avoid spilling leachate (hose connections)
<input checked="" type="checkbox"/> Be aware of pressure hazards	<input type="checkbox"/> Notify RCT when using neutron probe	<input type="checkbox"/> Practice ALARA
<input checked="" type="checkbox"/> Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	<input type="checkbox"/> Other (list):	<input type="checkbox"/> Other (list):

Does anyone have any weight restrictions on lifting? Circle YES or NO. If answered YES explain.

Robert Lynch
 Printed Name
ALFRED SANTILLANES
 Printed Name
CHRIS HOLLANDER
 Printed Name
William Gibson
 Printed Name
 Printed Name
 Printed Name

Attendees
Robert Lynch
 Signature
Alfred Santillanes
 Signature
Chris Hollander
 Signature
William Gibson
 Signature
 Signature
 Signature

Notes

HEALTH & SAFETY MEETING FORM

Dept: 0641 Facility: CWL-MW10 Date: 07/21/17 Time: 0758

Activities: GW monitoring and sampling ^{07/24/17} 0820
 (Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:

Temp: 75 °F Wind Speed: 2 MPH Humidity: 56 % Wind Chill: 75 °F

Chemicals Used: None Preservatives in sample bottles Other: _____

Hospital/Clinic: Sandia Medial Clinic Bldg. 831 Phone: 911 on LAN; 844-0911 on mobile

Safety Topics Presented

<input type="checkbox"/> Wear safety glasses	<input type="checkbox"/> Wear leather gloves	<input type="checkbox"/> Wear sunscreen
<input type="checkbox"/> Wear safety boots	<input checked="" type="checkbox"/> Wear latex or nitrile gloves	<input type="checkbox"/> No eating or drinking onsite
<input type="checkbox"/> Wear hearing protection	<input type="checkbox"/> Use safe lifting practices	<input type="checkbox"/> Set up eye wash
<input checked="" type="checkbox"/> Be aware of biohazards (snakes, spiders, etc.)	<input checked="" type="checkbox"/> Be aware of slips, trips, and falls. Keep work area clean and use a step stool when necessary	<input checked="" type="checkbox"/> Wear communication device (radio, cell phone, EOC alert enabled pager)
<input checked="" type="checkbox"/> Be aware of electrical hazards	<input checked="" type="checkbox"/> Be aware of pinch points	<input type="checkbox"/> Avoid spilling leachate (hose connections)
<input checked="" type="checkbox"/> Be aware of pressure hazards	<input type="checkbox"/> Notify RCT when using neutron probe	<input type="checkbox"/> Practice ALARA
<input checked="" type="checkbox"/> Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.	<input type="checkbox"/> Other (list):	<input type="checkbox"/> Other (list):

Does anyone have any weight restrictions on lifting? Circle YES or NO. If answered YES explain.

Printed Name Robert Lynch
 Printed Name ALFRED SANTILLANES
 Printed Name William Gibson
 Printed Name CHRIS HULLIHER
 Printed Name 07/24/17 Robert Lynch
 Printed Name CHRIS HULLIHER

Attendees
 Signature [Signature]
 Signature [Signature]
 Signature [Signature]
 Signature [Signature]
 Signature [Signature]

William Gibson
ALFRED SANTILLANES

Notes William Gibson
Alfred Santillanes

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: CWL						
Calibrations done by: R Lynch				Date: 07/18/17		
Make & Model: EXO 1						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101187						
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:	0633	4.01	24.8	7.00	24.8	10.00
2. Time:	1234	4.00	25.2	7.01	25.2	10.01
3. Time:						
4. Time:						
Standard lot no.:	6GH909		6GC018		6GF797	
Expiration date:	AUG/18		JUL/18		JUN/18	
SC Calibration/Check						
Reference Value: 1413 uS			Standard Lot No.: 6GH952			
	Value	Temp	Expiration Date: AUG/17			
1. Time:	0631	1413.1	24.8			
2. Time:	1232	1413.2	25.2			
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV			Standard Lot No. 7GC1123			
	Value	Temp	Expiration Date: DEC/17			
1. Time:	0635	220.1	24.8			
2. Time:	1238	220.2	25.2			
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0630	81.8	24.50			
2. Time:	1230	81.9	24.54			
3. Time:						
4. Time:						

IMPORTANT NOTICE. A printed copy of this document may not be the document currently in effect. The official version is located on the Sondia Restricted Network (SRN), 4100 Controlled Documents home page.

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch			Date: 07/18/17	
TURBIDIMETER				
Make & Model: HACH 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	103	801
2. Time 1111	9.99	20.1	102	797
3. Time				
4. Time				
Comments:				

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.

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: CWL						
Calibrations done by: R Lynch				Date: 07/19/17		
Make & Model: EXO 1						
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:	0623	4.00	24.3	7.00	24.3	10.00
2. Time:	1252	3.99	24.7	7.00	24.7	9.99
3. Time:						
4. Time:						
Standard lot no.:	6GH909		6GC018		6GF797	
Expiration date:	AUG/18		JUL/18		JUN/18	
SC Calibration/Check						
Reference Value: 1413 uS			Standard Lot No.: 6GH952			
	Value	Temp	Expiration Date: AUG/17			
1. Time:	0622	1413.1	24.3			
2. Time:	1251	1413.3	24.7			
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV			Standard Lot No. 7GC1123			
	Value	Temp	Expiration Date: DEC/17			
1. Time:	0625	220.0	24.3			
2. Time:	1254	219.9	24.7			
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0620	81.9	24.59			
2. Time:	1250	82.0	24.60			
3. Time:						
4. Time:						

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.

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch			Date: 07/19/17	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 16040C049087	
Reference Value	10	20	100	800
Standard Lot No.	A6055	A6056	A6064	A6104
1. Time 0818	9.98	20.0	101	798
2. Time 1120	10.1	19.8	103	802
3. Time				
4. Time				
Comments:				

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.

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: CWL						
Calibrations done by: R Lynch				Date: 07/20/17		
Make & Model: EXO 1						
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	4.01	27.0	7.00	27.0	10.01
2. Time:	1513	4.03	28.0	7.01	27.9	10.01
3. Time:						
4. Time:						
Standard lot no.:	6GH909		6GC018		6GF797	
Expiration date:	AUG/18		JUL/18		JUN/18	
SC Calibration/Check						
Reference Value: 1413 uS				Standard Lot No.: 6GH952		
	Value	Temp	Expiration Date: AUG/17			
1. Time:	0641	1413.1	27.0			
2. Time:	1512	1413.3	28.2			
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV				Standard Lot No. 7GC1123		
	Value	Temp	Expiration Date: DEC/17			
1. Time:	0644	219.9	27.0			
2. Time:	1515	220.3	27.9			
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0640	87.1	24.83			
2. Time:	1510	87.4	24.85			
3. Time:						
4. Time:						

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.

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch			Date: 07/20/17	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 16040C049087	
Reference Value	10	20	100	800
Standard Lot No.	A6055	A6056	A6064	A6104
1. Time 0827	9.97	19.9	101	799
2. Time 1440	10.1	19.0	100	803
3. Time				
4. Time				
Comments:				

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.

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: CWL							
Calibrations done by: R Lynch				Date: 07/24/17 07/24/17			
Make & Model: EXO 1							
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:	0617	3.99	23.8	7.00	23.8	9.99	23.8
2. Time:	1304	4.01	23.6	6.99	23.6	10.00	23.6
3. Time:	0624	4.00	22.5	7.00	22.5	10.00	22.5
4. Time:	1054	4.00	22.8	7.00	22.8	10.01	22.8
Standard lot no.:	6GH909		6GC018		6GF797		
Expiration date:	AUG/18		JUL/18		JUN/18		
SC Calibration/Check							
Reference Value: 1413 uS				Standard Lot No.: 6GH952			
	Value	Temp	Expiration Date: AUG/17				
1. Time:	0615	1413.2	23.8				
2. Time:	1302	1413.1	23.7				
3. Time:	0623	1412.4	22.6				
4. Time:	1051	1413.3	22.8				
ORP Calibration/Check							
Reference Value: 220 mV				Standard Lot No. 7GC1123			
	Value	Temp	Expiration Date: DEC/17				
1. Time:	0619	219.9	23.8				
2. Time:	1306	220.1	23.6				
3. Time:	0626	220.2	22.6				
4. Time:	1052	219.9	22.8				
DO Calibration/Check							
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg				
1. Time:	0614	81.8	24.76				
2. Time:	1301	82.0	24.79				
3. Time:	0622	81.9	24.75				
4. Time:	1050	82.1	24.75				

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.

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch			Date: 07/21/17 07/24/17	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 16040C049087	
Reference Value	10	20	100	800
Standard Lot No.	A6055	A6056	A6064	A6104
1. Time 0800	9.99	20.1	100	803
2. Time 1120	10.2	20.0	99.8	799
3. Time 0825	10.1	20.2	103	796
4. Time 0918	9.99	20.1	101	799
Comments:				

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.

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL		
Well I.D.: CWL-MW 10	Date: 07/21/17	07/24/17
Method: Portable pump <input checked="" type="checkbox"/>	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)
502.27	0816	Start							
505.06	0852	2	24.19	956.2	251.5	7.23	0.91	33.9	2.84
506.72	0912	4	24.28	957.4	240.7	7.23	0.75	25.8	2.15
508.26	0932	6	24.47	961.4	233.1	7.24	1.47	22.1	1.84
509.78	0956	8	25.16	973.8	224.3	7.24	2.32	19.8	1.63
510.56	1009	9	25.23	976.6	217.6	7.25	2.21	19.2	1.58
511.13	1021	10	25.58	983.1	210.4	7.25	2.38	18.9	1.54
511.91	1034	11	25.98	991.8	195.6	7.25	2.49	18.5	1.49
512.88	1048	12	25.73	985.8	159.9	7.24	2.57	17.7	1.44
513.76	1059	13	25.45	980.8	128.4	7.24	2.37	16.2	1.33
514.89	1111	14	25.31	980.0	120.6	7.24	2.41	15.7	1.26
514.89	1111	well	DRY						
502.73	0837	start							
504.20	0854	0.5	23.23	933.7	75.1	7.26	2.75	74.2	6.26
504.68	0859	1	23.14	957.3	14.0	7.25	2.71	39.4	3.35
505.27	0905	1.5	23.10	954.8	1.1	7.26	2.89	29.9	2.55
	0906		SAMPLING						

Comments: ~1.5 gals purged from tubing 0832

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL	
Well I.D.: CWL-MW 11	Date: 07/20/17
Method: Portable pump <input checked="" type="checkbox"/> _____	Dedicated pump <input type="checkbox"/> _____ 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)
506.47	0842	Start							→
502.71	0918	2	24.40	1038.8	243.3	7.14	0.38	72.5	6.04
503.97	0942	4	25.49	1063.1	236.8	7.13	0.41	69.7	5.69
504.01	1003	6	25.44	1060.4	235.9	7.14	0.65	68.4	5.59
505.95	1024	8	25.79	1071.6	235.6	7.13	0.80	68.9	5.60
506.81	1047	10	25.72	1070.2	238.2	7.13	0.44	69.3	5.64
507.52	1111	12	25.86	1073.7	241.4	7.13	0.48	69.7	5.66
508.26	1134	14	26.30	1082.7	244.4	7.13	0.41	68.8	5.54
509.10	1158	16	25.78	1074.6	247.2	7.12	0.46	68.2	5.54
509.88	1224	18	26.44	1085.1	249.4	7.12	0.47	68.1	5.46
510.54	1249	20	26.66	1088.4	252.1	7.13	0.38	68.6	5.48
511.36	1310	22	27.07	1098.8	241.1	7.12	0.64	62.8	4.98
511.79	1336	24	27.27	1099.3	242.0	7.12	0.31	64.0	5.07
512.05	1349	25	27.17	1098.8	241.9	7.13	0.33	64.5	5.11
512.32	1402	26	27.07	1099.0	241.2	7.13	0.36	64.7	5.16
	1403	Sampling →							

Comments: ~1.5 gals purged from tubing 0859
 FB # 039

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.

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>CWL-GWM</u>	Monitoring Well ID #: <u>NA</u>	Date: <u>07/17/17</u>
------------------------------	---------------------------------	-----------------------

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

Pump and Tubing Bundle ID #: <u>1806-640</u>	Water Level Indicator ID #: <u>NA</u>
--	---------------------------------------

Personnel Performing Decontamination:

William Gibson

Print Name:

Alfred Santillanes

Print Name:

Initial: WJG

Initial: T. Santillanes 7/26/17
for Alfred Santillanes

Condition of Equipment

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

List of Decontamination Materials

<p>Deionized Water</p> <p>Source: <u>BLDG. 1090</u></p> <p>Lot Number: _____</p>	<p>HNO₃</p> <p>Grade: <u>Reagent</u></p> <p>UN #: <u>2031</u></p> <p>Manufacturer: <u>ACROS</u></p> <p>Lot Number: <u>A0358899</u></p>
--	---

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.

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>CWL-GWM</u>	Monitoring Well ID #: <u>CWL-BW5</u>	Date: <u>07/18/17</u>
------------------------------	--------------------------------------	-----------------------

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

Pump and Tubing Bundle ID #: <u>1806-640</u>	Water Level Indicator ID #: <u>62187</u>
--	--

Personnel Performing Decontamination:

William Gibson

Print Name:

WG
Initial:

~~Alfred Santillanes~~

Print Name:

~~AS~~
Initial: 7/25/17

Condition of Equipment

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

List of Decontamination Materials

<p>Deionized Water</p> <p>Source: <u>BLDG. 1090</u></p> <p>Lot Number: <u>042,012,041,040,027,048</u></p>	<p>HNO₃</p> <p>Grade: <u>Reagent</u></p> <p>UN #: <u>2031</u></p> <p>Manufacturer: <u>ACROS</u></p> <p>Lot Number: <u>A0358899</u></p>
--	--

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.

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>CWL-GWM</u>	Monitoring Well ID #: <u>CWL-MW9</u>	Date: <u>07/19/17</u>
------------------------------	--------------------------------------	-----------------------

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

Pump and Tubing Bundle ID #: <u>1806-640</u>	Water Level Indicator ID #: <u>62187</u>
--	--

Personnel Performing Decontamination:

Robert Lynch

Print Name:

RL
Initial:

William Gibson

Print Name:

WJG
Initial:

Condition of Equipment

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

List of Decontamination Materials

Deionized Water	HNO₃
Source: <u>BLDG. 1090</u>	Grade: <u>Reagent</u>
Lot Number: <u>020,053,011,065,067,024</u>	UN #: <u>2031</u>
	Manufacturer: <u>ACROS</u>
	Lot Number: <u>A0358899</u>

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.

Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>CWL-GWM</u>	Monitoring Well ID #: <u>CWL-MW11</u>	Date: <u>07/20/17</u>
------------------------------	---------------------------------------	-----------------------

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

Pump and Tubing Bundle ID #: <u>1806-640</u>	Water Level Indicator ID #: <u>62187</u>
--	--

Personnel Performing Decontamination:

Robert Lynch

Print Name:

RL
Initial:

Alfred Satillanes

Print Name:

AS
Initial:

Condition of Equipment

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

List of Decontamination Materials

Deionized Water	HNO₃
Source: <u>BLDG. 1090</u>	Grade: <u>Reagent</u>
Lot Number: <u>044,009,036,052,038,050</u>	UN #: <u>2031</u>
	Manufacturer: <u>ACROS</u>
	Lot Number: <u>A0358899</u>

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.

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

Project Name: <u>CWL-GWM</u>	Monitoring Well ID #: <u>CWL-MW10</u>	Date: <u>07/24/17</u>
------------------------------	---------------------------------------	-----------------------

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

Pump and Tubing Bundle ID #: <u>1806-640</u>	Water Level Indicator ID #: <u>62187</u>
--	--

Personnel Performing Decontamination:

William Gibson

Print Name:


Initial:

Alfred Satillanes

Print Name:


Initial:

Condition of Equipment

Pump: <u>Excellent</u>	Tubing Bundle: <u>Good</u>	Water Level Indicator: <u>Good</u>
------------------------	----------------------------	------------------------------------

List of Decontamination Materials

<p align="center">Deionized Water</p> <p>Source: <u>BLDG. 1090</u></p> <p>Lot Number: <u>016,057,004,039,068,043</u></p>	<p align="center">HNO₃</p> <p>Grade: <u>Reagent</u></p> <p>UN #: <u>2031</u></p> <p>Manufacturer: <u>ACROS</u></p> <p>Lot Number: <u>A0358899</u></p>
---	---

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.

SUMMARY SHEET FOR JULY 2017 SAMPLES

Sample Summary for CWL GWM
July 2017

Sample ID	Sample Date	ARCOG	Sample Number	Sample Type	Associated Equipment Blank (ARCOG #/Sample #)	Associated Trip Blank (ARCOG # / Sample #)	Associated Field Blank (ARCOG # / Sample #)	Comments
CWL GWM: Project Task # 195122.10.11.03. Service Order # CF 327-17								
Environmental Samples								
CWL-BW5	18-Jul-17	618011	103149	Environmental	n/a	618011 / 103150	n/a	
CWL-MW9	19-Jul-17	618013	103154	Environmental	n/a	618013 / 103155	618013 / 103153	
CWL-MW10	24-Jul-17	618019	103171	Environmental	618021 / 103176	618019 / 103173	n/a	
CWL-MW10	27-Jul-17	618019	103172	Duplicate	618021 / 103176	618019 / 103173	n/a	
CWL-MW11	20-Jul-17	618015	103159	Environmental	n/a	618015 / 103160	618015 / 103158	
CWL EB-1	20-Jul-17	618021	103176	Equipment Blank	n/a	618021 / 103177	n/a	Decon prior to CWL-MW10
CWL FB-1	19-Jul-17	618013	103153	Field Blank	n/a	618013 / 103155	n/a	at CWL-MW9
CWL FB-2	20-Jul-17	618015	103158	Field Blank	n/a	618015 / 103160	n/a	at CWL-MW11
CWL-DWI/QC	20-Jul-17	618017	103163	QC-DIW	n/a	618017 / 103164	n/a	DIW source for EB-1
Waste Characterization Samples								
CWL-BW5	18-Jul-17	618012	103151	Waste	n/a	618012 / 103152	n/a	No data validation required
CWL-MW9	19-Jul-17	618014	103156	Waste	n/a	618014 / 103157	n/a	No data validation required
CWL-MW10	24-Jul-17	618020	103174	Waste	n/a	618020 / 103175	n/a	No data validation required
CWL-MW11	20-Jul-17	618016	103161	Waste	n/a	618016 / 103162	n/a	No data validation required

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

GROUNDWATER MONITORING

JULY 2017

AR/COC NUMBERS 618011, 618013

Memorandum

Date: August 31, 2017
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM
ARCOG: 618011 and 618013
SDG: 428320
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. This validation was performed according to SNL/NM SMO Procedure AOP 00-03 Rev 5.

Summary

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

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

Holding Times

The samples were analyzed within the prescribed holding time and were 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 analyte was detected in any of the blanks.

Surrogates

Memorandum

Date: August 31, 2017
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
ARCOG: 618011 and 618013
SDG: 428320
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 SMO Procedure AOP 00-03 Rev 5.

Summary

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

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

Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times and were 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 LLCCV recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in any of the blanks.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria. It should be noted that the MS was performed on an SNL sample of similar matrix from another SDG included in this data package. No data will be qualified.

Laboratory Replicate

The replicate met all QC acceptance criteria. It should be noted that the replicate was performed on an SNL sample of similar matrix from another SDG included in this data package. No data will be qualified.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

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

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were evaluated because the concentration of Ca for both samples was > that in the ICS solutions. All QC acceptance criteria were met.

ICP Serial Dilution

The serial dilution met all QC acceptance criteria. It should be noted that the serial dilution was performed on an SNL sample of similar matrix from another SDG included in this data package. No data will be qualified.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 08/31/17

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met. It should be noted that the MS/MSD analyses were performed on an SNL sample of similar matrix from another SDG. No data will be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Two TBs were submitted, one for each ARCO. An FB was submitted with ARCO 618013 and was associated with the samples on the same ARCO.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 08/31/17



Sample Findings Summary



AR/COC: 618011, 618013

Page 1 of 1

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

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

Sandia Data Validation Summary Worksheet

ARCO#(s): 618011 and 618013	Site/Project: CWL GWM	Validation Date: 08/31/2017
SDG: 428320	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 7	CVR present: Yes
ARCO#(s) present: Yes	Sample Container Integrity: OK	
Analysis Type:		
<input checked="" type="checkbox"/> Organic <input checked="" type="checkbox"/> Metals <input type="checkbox"/> Genchem <input type="checkbox"/> 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: 07/18 and 07/19/2017

All 3 vials for 103150-001 (428320003 TB1) and 103153-001 (428320004 FB1)) were received with headspace.
 One of 3 vials for sample 103154-001(428320005) was received with headspace

Validated by:

L Thal

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *N/A*

SMO Use

AR/CO **618011**

Project Name: CWL GWM/SVM	Date Samples Shipped: <i>7/19/17</i>	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Timmie Jackson	Carrier/Waybill No: <i>367919</i>	SMO Contact Phone: <i>910</i>	
Project/Task Number: 195122.10.11.03	Lab Contact: Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	
Service Order: CF327-17	Lab Destination: GEL	Send Report to SMO: Stephanie Montaño/505.284.2553	
Contract No.: 1303873			

Bill to: Sandia National Laboratories (Accounts Payable),
P.O. Box 5800, MS-0154
Albuquerque, NM 87185-0154 *428320*

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
103149	001	CWL-BW5	522	7/18/17 10:55	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	<i>001</i>
103149	002	CWL-BW5	522	7/18/17 10:56	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	<i>002</i>
103150	001	CWL TB-1	NA	7/18/17 10:55	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	<i>003</i>

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt			
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes				
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day				
Confirmatory: <input type="checkbox"/> Yes	QC inits:		Negotiated TAT <input type="checkbox"/>				
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab Return Samples By: Comments: Received trip blanks at sandia National Labs, NM. with broken seals.		
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/00641/505-844-4013/505-250-7090			
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/00641/505-239-7367/505-239-7367			
	Alfred Santillanes	<i>[Signature]</i>	<i>AS</i>	SNL/00641/505-284-6870/505-228-0710			
Relinquished by <i>[Signature]</i>	Org. 0641	Date 7-18-17	Time 1150	Relinquished by <i>[Signature]</i>	Org. 0631	Date 7/19/17	Time 0730
Received by <i>[Signature]</i>	Org. 0631	Date 7-18-17	Time 1150	Received by <i>[Signature]</i>	Org. 0631	Date 7/20/17	Time 7:45am
Relinquished by <i>[Signature]</i>	Org. 0631	Date 7/18/17	Time 1208	Relinquished by <i>[Signature]</i>	Org. 0631	Date 7/18/17	Time 1208
Received by <i>[Signature]</i>	Org. 0631	Date 7/18/17	Time 1208	Received by <i>[Signature]</i>	Org. 0631	Date 7/18/17	Time 1208

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *n/a*

SMO Use

AR/COC **618013**

Project Name: CWL GWM/SVM	Date Samples Shipped: <i>7/20/17</i>	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. <i>268400</i>	SMO Contact Phone: <i>910</i>	
Project/Task Number: 195122.10.11.03	Lab Contact: Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	
Service Order: CF327-17	Lab Destination: GEL	Send Report to SMO: Stephanie Montaño/505.284.2553	
Contract No.: 1303873			

Bill to: Sandia National Laboratories (Accounts Payable),
P.O. Box 5800, MS-0154
Albuquerque, NM 87185-0154 *428 320*

Tech Area:		Room:		Operational Site:									
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
103153	001	CWL FB-1	NA	7/19/17 11:11	DIW	G	3x40 ml	HCl	G	FB	VOC-TCE (SW846-8260B)	<i>004</i>	
103154	001	CWL-MW9	517	7/19/17 11:11	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	<i>005</i>	
103154	002	CWL-MW9	517	7/19/17 11:13	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	<i>006</i>	
103155	001	CWL TB-3	NA	7/19/17 11:11	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	<i>007</i>	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/00641/505-844-4013/505-250-7090	Return Samples By: Comments: Received trip blanks at Sandia National Labs, NM. with broken seals.
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/00641/505-239-7367/505-239-7367	
	Alfred Santillanes	<i>[Signature]</i>	<i>AS</i>	SNL/00641/505-284-6870/505-228-0710	

Relinquished by <i>[Signature]</i> Org. <i>00641</i> Date <i>7/19/17</i> Time <i>1140</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i> Org. <i>00631</i> Date <i>7/19/17</i> Time <i>1140</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i> Org. <i>00631</i> Date <i>7/20/17</i> Time <i>0900</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i> Org. <i>00631</i> Date <i>7/21/17</i> Time <i>9:35</i>	Received by	Org.	Date	Time

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

AR/COC NUMBERS 618015, 618017, and 618021

Memorandum

Date: August 30, 2017
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM
ARCOG: 618015, 618017 and 618021
SDG: 428601
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. This validation was performed according to SNL/NM SMO Procedure AOP 00-03 Rev 5.

Summary

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

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

Holding Times

The samples were analyzed within the prescribed holding time and were 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 analyte was detected in any of the blanks.

Surrogates

Memorandum

Date: August 30, 2017
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
ARCOG: 618015, 618017 and 618021
SDG: 428601
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 SMO Procedure AOP 00-03 Rev 5.

Summary

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

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tune met QC acceptance criteria.

Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

Reporting Limit Verification

All LLCCV recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in any of the blanks.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria.

Laboratory Replicate

The replicate met all QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

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

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were evaluated because the concentration of Ca for sample 428601003 was > that in the ICS solutions. All QC acceptance criteria were met.

ICP Serial Dilution

The serial dilution met all QC acceptance criteria.

Other QC

An EB was submitted with ARCOG 618021 and was associated with the samples on ARCOG 618019 analyzed in another SDG. A distilled water sample, the source water for EB1, was submitted with ARCOG 618017 and was not associated with any field samples.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan **Level:** I **Date:** 08/31/17

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met. It should be noted that the MS/MSD analyses were performed on an SNL sample of similar matrix from another SDG. No data will be qualified.

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 ARCO. An EB was submitted with ARCO 618021 and was associated with the samples on ARCO 618019 analyzed in another SDG. An FB was submitted with ARCO 618015 and was associated with the samples on the same ARCO. A distilled water sample, the source water for EB1, was submitted with ARCO 618017 and was not associated with any field samples.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 08/31/17



Sample Findings Summary



AR/COC: 618015, 618017, 618021

Page 1 of 1

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

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

Sandia Data Validation Summary Worksheet

ARCO#(s): 618015, 618017 and 618021	Site/Project: CWL GWM	Validation Date: 08/30/2017
SDG: 428601	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 10	CVR present: Yes
ARCO#(s) present: Yes	Sample Container Integrity: OK	
Analysis Type: <input checked="" type="checkbox"/> Organic <input checked="" type="checkbox"/> Metals <input type="checkbox"/> Genchem <input type="checkbox"/> 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: 07/20/2017

All 3 vials for each trip blank (103177-001, 103164-001 and 103160-001) were received with headspace.

Validated by:

L Thal

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab												AR/COC	618015						
Batch No.												SMO Use							
Project Name:		CWL GWM/SVM		Date Samples Shipped:		7-21-17		SMO Authorization:		TC		<input type="checkbox"/> Waste Characterization							
Project/Task Manager:		Timmie Jackson		Carrier/Waybill No.:		268663		SMO Contact Phone:		Wendy Palencia/505-844-3132		<input type="checkbox"/> RMA							
Project/Task Number:		195122.10.11.03		Lab Contact:		Edie Kent/843-769-7385		Send Report to SMO:		Stephanie Montaño/505.284.2553		<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius							
Service Order:		CF327-17		Lab Destination:		GEL						Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154							
Contract No.:		1303873										428601 2/24/18 428599							
Tech Area:																			
Building:			Room:			Operational Site:													
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected		Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID						
				Type	Volume														
103158	001	CWL FB-2	NA	7/20/17	14:03	DIW	G	3x40 ml	HCl	G	FB	VOC-TCE (SW846-8260B)	001						
103159	001	CWL-MW11	513	7/20/17	14:03	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	002						
103159	002	CWL-MW11	513	7/20/17	14:04	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	003						
103160	001	CWL TB-5	NA	7/20/17	14:03	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	004						
Last Chain: <input type="checkbox"/> Yes												Conditions on Receipt							
Validation Req'd: <input checked="" type="checkbox"/> Yes																			
Background: <input type="checkbox"/> Yes																			
Confirmatory: <input type="checkbox"/> Yes																			
Sample Tracking			SMO Use			Special Instructions/QC Requirements:						Lab Use							
Date Entered:			Entered by:			EDD <input checked="" type="checkbox"/> Yes													
QC inits.:			Company/Organization/Phone/Cell			Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day													
Name			Signature			Negotiated TAT <input type="checkbox"/>													
Init.			Signature			Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab													
Return Samples By:																			
Comments: Received trip blanks at Sandia National labs, NM. with broken seals.																			
Sample Team Members																			
Robert Lynch																			
William Gibson																			
Alfred Santillanes																			
Relinquished by		Org. 0641		Date 7-21-17		Time 0850		Relinquished by		Org.		Date		Time					
Received by		Org. 0631		Date 7-21-17		Time 0850		Received by		Org.		Date		Time					
Relinquished by		Org. 0631		Date 7-21-17		Time 1215		Relinquished by		Org.		Date		Time					
Received by		Org.		Date 7/21/17		Time 9:00am		Received by		Org.		Date		Time					

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.	SMO Use	AR/COC	618017
Project Name: CWL GWM/SVM	Date Samples Shipped: 7.21.17	SMO Authorization: TCE	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. 2-68663	SMO Contact Phone: Wendy Palencia/505-844-3132	
Project/Task Number: 195122.10.11.03	Lab Contact: Edie Kent/843-769-7385	Send Report to SMO: Stephanie Montaño/505.284.2553	
Service Order: CF327-17	Lab Destination: GEL	Contract No.: 1303873	
Tech Area:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Building:	Room:	Operational Site:	

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
103163	001	CWL-DIW/QC	NA	7/20/19 15:30	DIW	G	3x40 ml	HCl	G	FB	VOC-TCE (SW846-8260B)	005
103163	002	CWL-DIW/QC	NA	7/20/19 15:30	DIW	P	500 ml	HNO3	G	FB	CHROMIUM, NICKEL (SW846-6020)	006
103164	001	CWL TB-7	NA	7/20/19 15:30	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	007

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD		<input checked="" type="checkbox"/> Yes				
Background: <input type="checkbox"/> Yes		Entered by:		Turnaround Time		<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day				
Confirmatory: <input type="checkbox"/> Yes		QC inits.:		Negotiated TAT		<input type="checkbox"/>				
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/00641/505-844-4013/505-250-7090		Return Samples By:		Comments: Received Trip Blanks at Sandia National Labs NM with broke seals		
	William Gibson	<i>William Gibson</i>	WG	SNL/00641/505-239-7367/505-239-7367						
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/00641/505-284-6870/505-228-0710						
Relinquished by	<i>William Gibson</i>	Org. 0641	Date 7.21.17	Time 0900	Relinquished by	Org.	Date	Time	Lab Use	
Received by	<i>Timmie Jackson</i>	Org. 0631	Date 7.21.17	Time 0900	Received by	Org.	Date	Time		
Relinquished by	<i>Timmie Jackson</i>	Org. 0631	Date 7.21.17	Time 1215	Relinquished by	Org.	Date	Time		
Received by	<i>Christi Par</i>	Org.	Date 7/24/17	Time 9:00am	Received by	Org.	Date	Time		

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.		SMO Use				AR/COC 618021						
Project Name: CWL GWM/SVM		Date Samples Shipped: <u>7.21.17</u>		SMO Authorization: <u>TSC</u>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius						
Project/Task Manager: Timmie Jackson		Carrier/Waybill No: <u>268663</u>		SMO Contact Phone: Wendy Palencia/505-844-3132		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 ^{cont} <u>428601</u> Albuquerque, NM 87185-0154 <u>7/24/17 428599</u>						
Project/Task Number: 195122.10.11.03		Lab Contact: Edie Kent/843-769-7385		Send Report to SMO: Stephanie Montaño/505.284.2553								
Service Order: CF327-17		Lab Destination: GEL										
		Contract No.: 1303873										
Tech Area:		Operational Site:										
Building:		Room:										
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
103176	001	CWL EB-1	NA	7/20/17 15:50	DIW GW	G	3x40 ml	HCl	G	EB	VOC-TCE (SW846-8260B)	008
103176	002	CWL EB-1	NA	7/20/17 15:51	DIW GW	P	500 ml	HNO3	G	EB	CHROMIUM, NICKEL (SW846-6020)	009
103177	001	CWL TB-8	NA	7/20/17 15:50	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	010
Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD		<input checked="" type="checkbox"/> Yes						
Background: <input type="checkbox"/> Yes		Entered by:		Turnaround Time		<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day						
Confirmatory: <input type="checkbox"/> Yes		QC inits:		Negotiated TAT		<input type="checkbox"/>						
Sample Team Members	Name		Signature		Init.		Company/Organization/Phone/Cell		Sample Disposal		Lab Use	
									<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			
									Return Samples By:			
									Comments: Received trip blanks at Sandia National Labs, NM. with broken seals.			
Relinquished by: <u>William Gibson</u>		Org. 0641		Date 7.21.17		Time 0900		Relinquished by:		Org. Date Time		
Received by: <u>[Signature]</u>		Org. 0631		Date 7.21.17		Time 0900		Received by:		Org. Date Time		
Relinquished by: <u>[Signature]</u>		Org. 0631		Date 7.21.17		Time 1215		Relinquished by:		Org. Date Time		
Received by: <u>Christie Pava</u>		Org. 1		Date 7/21/17		Time 9:25am		Received by:		Org. Date Time		

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

AR/COC NUMBER 618019

Memorandum

Date: September 6, 2017
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL GWM
ARCOG: 618019
SDG: 428708
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. This validation was performed according to SNL/NM SMO Procedure AOP 00-03 Rev 5.

Summary

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

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

Holding Times

The samples were analyzed within the prescribed holding time and were 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 analyte was detected in any of the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met. It should be noted that the MS/MSD analyses were performed on an SNL sample of similar matrix from another SDG. No data will be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

A TB was submitted with ARCOG 618019 and was associated with the samples on the same ARCOG. An EB was submitted with ARCOG 618021, analyzed in SDG 428601, and associated with the samples on ARCOG 618019 analyzed in this SDG. A field duplicate pair was submitted with ARCOG 618019. 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 Donovan

Level: I

Date: 09/06/17

Memorandum

Date: September 6, 2017
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: CWL GWM
ARCOG: 618019
SDG: 428708
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 SMO Procedure AOP 00-03 Rev 5.

Summary

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

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tune met QC acceptance criteria.

Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

Reporting Limit Verification

All LLCCV recoveries met QC acceptance criteria.

Blanks

No target analytes were detected in any of the blanks.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria. It should be noted that the MS analysis was performed on an SNL sample of similar matrix from another SDG. No data will be qualified.

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. No data will be qualified.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

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

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were evaluated because the concentrations of Ca for both samples were > those in the ICS solutions. All QC acceptance criteria were met.

ICP Serial Dilution

The serial dilution met all QC acceptance criteria. It should be noted that the serial dilution was performed on an SNL sample of similar matrix from another SDG. No data will be qualified.

Other QC

An EB was submitted with ARCOG 618021, analyzed in SDG 428601, and associated with the samples on ARCOG 618019 analyzed in this SDG. A field duplicate pair was submitted with ARCOG 618019. 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 Donovan

Level: I

Date: 09/06/17



Sample Findings Summary



AR/COC: 618019

Page 1 of 1

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

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

Sandia Data Validation Summary Worksheet

ARCO#(s): 618019	Site/Project: CWL GWM	Validation Date: 09/06/2017
SDG: 428708	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 5	CVR present: Yes
ARCO#(s) present: Yes	Sample Container Integrity: OK	
Analysis Type: <input checked="" type="checkbox"/> Organic <input checked="" type="checkbox"/> Metals <input type="checkbox"/> Genchem <input type="checkbox"/> 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: 07/24/2017

All 3 vials for the trip blank (103173-001) were received with headspace.

Validated by:

L. Thal

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab
 Batch No. *M/A* Page 1 of 1
AR/COC **618019**

Project Name: CWL GWM/SVM	Date Samples Shipped: <i>7/24/17</i>	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Timmie Jackson	Carrier/Waybill No: <i>268718</i>	SMO Contact Phone: <i>940</i>	<input type="checkbox"/> RMA
Project/Task Number: 195122.10.11.03	Lab Contact: Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF327-17	Lab Destination: GEL	Send Report to SMO: Stephanie Montaño/505.284.2553	
	Contract No.: 1303873		

Tech Area: _____
 Building: _____ Room: _____ Operational Site: _____
 Bill to: Sandia National Laboratories (Accounts Payable),
 P.O. Box 5800, MS-0154
 Albuquerque, NM 87185-0154 428708

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
103171	001	CWL-MW10	515	7/24/17 09:06	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	<i>001</i>
103171	002	CWL-MW10	515	7/24/17 09:08	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	<i>002</i>
103172	001	CWL-MW10	515	7/24/17 09:06	GW	G	3x40 ml	HCl	G	DU	VOC-TCE (SW846-8260B)	<i>003</i>
103172	002	CWL-MW10	515	7/24/17 09:08	GW	P	500 ml	HNO3	G	DU	CHROMIUM, NICKEL (SW846-6020)	<i>004</i>
103173	001	CWL TB-9	NA	7/24/17 09:06	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	<i>005</i>

Last Chain: <input checked="" type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt																			
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes																				
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day																				
Confirmatory: <input type="checkbox"/> Yes	QC inits:		Negotiated TAT <input type="checkbox"/>																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Sample Team Members</th> <th>Name</th> <th>Signature</th> <th>Init.</th> <th>Company/Organization/Phone/Cell</th> </tr> </thead> <tbody> <tr> <td></td> <td>Robert Lynch</td> <td><i>[Signature]</i></td> <td><i>RL</i></td> <td>SNL/00641/505-844-4013/505-250-7090</td> </tr> <tr> <td></td> <td>William Gibson</td> <td><i>[Signature]</i></td> <td><i>WG</i></td> <td>SNL/00641/505-239-7367/505-239-7367</td> </tr> <tr> <td></td> <td>Alfred Santillanes</td> <td><i>[Signature]</i></td> <td><i>AS</i></td> <td>SNL/00641/505-284-6870/505-228-0710</td> </tr> </tbody> </table>		Sample Team Members	Name		Signature	Init.	Company/Organization/Phone/Cell		Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/00641/505-844-4013/505-250-7090		William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/00641/505-239-7367/505-239-7367		Alfred Santillanes	<i>[Signature]</i>	<i>AS</i>	SNL/00641/505-284-6870/505-228-0710	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab Return Samples By: Comments: <i>Received trips blanks at Sandia National Labs, NM. with broken seals.</i>
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell																			
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/00641/505-844-4013/505-250-7090																			
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/00641/505-239-7367/505-239-7367																			
	Alfred Santillanes	<i>[Signature]</i>	<i>AS</i>	SNL/00641/505-284-6870/505-228-0710																			
Relinquished by <i>[Signature]</i> Org. <i>00641</i> Date <i>7/24/17</i> Time <i>0945</i>		Relinquished by _____ Org. _____ Date _____ Time _____		Lab Use																			
Received by <i>[Signature]</i> Org. <i>00631</i> Date <i>7/24/17</i> Time <i>0945</i>		Received by _____ Org. _____ Date _____ Time _____																					
Relinquished by <i>[Signature]</i> Org. <i>00631</i> Date <i>7/24/17</i> Time <i>1243</i>		Relinquished by _____ Org. _____ Date _____ Time _____																					
Received by <i>[Signature]</i> Org. _____ Date <i>7-25-17</i> Time <i>7:35</i>		Received by _____ Org. _____ Date _____ Time _____																					

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

CONTRACT VERIFICATION REVIEW FORMS
GROUNDWATER MONITORING
JULY 2017

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
618011	Environmental*
618012	Waste Characterization
618013	Environmental*
618014	Waste Characterization
618015	Environmental*
618016	Waste Characterization
618017	Environmental*
618019	Environmental*
618020	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. 618011, 618012, 618013 & 618014

Analytical Lab GEL

SDG No. 428314

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 ARCOG 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	X		
	a) Laboratory control sample accuracy reported and met for all samples			
	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	X		
	a) Replicate sample precision reported and met for all inorganic and radiochemistry samples			
	b) Matrix spike duplicate RPD data reported and met for all organic samples	X		
3.5	Blank data		X	Calcium detected in method blank (QC1203836531).
	a) Method or reagent blank data reported and met for all samples			
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Acetone detected in CWL TB-2 and CWL TB-4

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	Headspace issue not addressed in case narrative for samples 103150-001, 103151-001 & 103152-001
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)	X		
	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)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) Instrument run logs provided	N/A		
4.3	HRGC/HRMS (1668)	N/A		
	a) 12-hour tune check provided			
	b) Initial calibration provided	N/A		
	c) Continuing calibration provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Labeled compound recovery data provided	N/A		
	f) RRTs for samples and standards provided	N/A		
	g) Ion abundance ratios for samples and standards provided	N/A		
	h) Instrument run logs provided	N/A		
4.4	LC/MS/MS (6850)	N/A		
	a) Initial calibration provided			
	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)	X		
	a) Initial calibration provided			
	b) Continuing calibration provided	X		
	c) ICP interference check sample data provided	X		
	d) ICP serial dilution provided	X		
	e) Instrument run logs provided	X		
4.6	Radiochemistry and General Chemistry	X		
	a) Instrument run logs provided			

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
Case narrative	VOCs (8260B)	Headspace issue not addressed for samples 103150-001, 103151-001 & 103152-001

Were deficiencies unresolved? Yes No

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

If no, provide nonconformance report or correction request number and date correction request was submitted: 08-21-2017

Reviewed by: Wendy Palencia Date: 08-23-2017 10:42:00

Were resolutions adequate and data package complete? Yes No

Closed by: Wendy Palencia Date: 08-30-2017 13:51:00

Contract Verification Form (CVR)

Project Leader Jackson

Project Name CWL GWM

Project/Task No. 195122_10.11.03

ARCOC No. 618015, 618016, 618017 & 618021

Analytical Lab GEL

SDG No. 428599

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 ARCOG 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	X		
	a) Laboratory control sample accuracy reported and met for all samples			
	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	X		
	a) Replicate sample precision reported and met for all inorganic and radiochemistry samples			
	b) Matrix spike duplicate RPD data reported and met for all organic samples	X		
3.5	Blank data		X	Vanadium detected in method blank (QC1203838105)
	a) Method or reagent blank data reported and met for all samples			
	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)	X		
	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)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) Instrument run logs provided	N/A		
4.3	HRGC/HRMS (1668)	N/A		
	a) 12-hour tune check provided			
	b) Initial calibration provided	N/A		
	c) Continuing calibration provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Labeled compound recovery data provided	N/A		
	f) RRTs for samples and standards provided	N/A		
	g) Ion abundance ratios for samples and standards provided	N/A		
	h) Instrument run logs provided	N/A		
4.4	LC/MS/MS (6850)	N/A		
	a) Initial calibration provided			
	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)	X		
	a) Initial calibration provided			
	b) Continuing calibration provided	X		
	c) ICP interference check sample data provided	X		
	d) ICP serial dilution provided	X		
	e) Instrument run logs provided	X		
4.6	Radiochemistry and General Chemistry	X		
	a) Instrument run logs provided			

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: 08-28-2017 10:47:00

Closed by: Wendy Palencia Date: 08-28-2017 10:47:00

Contract Verification Form (CVR)

Project Leader Jackson

Project Name CWL GWM

Project/Task No. 195122_10.11.03

ARCOC No. 618019 & 618020

Analytical Lab GEL

SDG No. 428707

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 ARCOG 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		Sample 103175-001 contained head-space greater than pea size

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	X		
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	X		
	a) Laboratory control sample accuracy reported and met for all samples			
	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	X		
	a) Replicate sample precision reported and met for all inorganic and radiochemistry samples			
	b) Matrix spike duplicate RPD data reported and met for all organic samples	X		
3.5	Blank data	X		Methylene chloride detected in method blank (QC1203845743). Phenols detected in method blank (QC1203845262).
	a) Method or reagent blank data reported and met for all samples			
	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		'N' qualifier used incorrectly on metals results
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)	X		
	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)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) Instrument run logs provided	N/A		
4.3	HRGC/HRMS (1668)	N/A		
	a) 12-hour tune check provided			
	b) Initial calibration provided	N/A		
	c) Continuing calibration provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Labeled compound recovery data provided	N/A		
	f) RRTs for samples and standards provided	N/A		
	g) Ion abundance ratios for samples and standards provided	N/A		
	h) Instrument run logs provided	N/A		
4.4	LC/MS/MS (6850)	N/A		
	a) Initial calibration provided			
	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)	X		
	a) Initial calibration provided			
	b) Continuing calibration provided	X		
	c) ICP interference check sample data provided	X		
	d) ICP serial dilution provided	X		
	e) Instrument run logs provided	X		
4.6	Radiochemistry and General Chemistry	X		
	a) Instrument run logs provided			

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
103174-002	TAL metals	'N' qualifier used incorrectly on Ca, Mg, Mn & Na results
.	.	.

Were deficiencies unresolved? Yes No

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

If no, provide nonconformance report or correction request number and date correction request was submitted: 08-28-2017

Reviewed by: Wendy Palencia Date: 08-29-2017 06:41:00

Were resolutions adequate and data package complete? Yes No

Closed by: Wendy Palencia Date: 08-31-2017 10:29:00

ANNEX B
Chemical Waste Landfill
Calendar Year 2017 Soil-Gas Monitoring Forms and Reports

Field Forms

Data Validation Reports

Contract Verification Reports

Certificates of Analysis

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.

HEALTH & SAFETY MEETING FORM

11/9/17

Dept: 4141/4191 Facility: SMC/NM Date: 11/9/20167 Time: 745

Activities: Soil Vapor Monitoring - Chemical Waste Landfill
(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: 5 MPH Humidity: 85 % Wind Chill: 29 °F

Chemicals Used: [X] None [] Preservatives in sample bottles [] Other:
Hospital/Clinic: Sandia Medial Clinic Bldg. 831 Phone: 911 on LAN; 844-0911 on mobile

Safety Topics Presented

Table with 3 columns and 7 rows of safety topics. Topics include: Wear safety glasses, Wear safety boots, Wear hearing protection, Be aware of biohazards, Be aware of electrical hazards, Be aware of pressure hazards, Be aware of environmental conditions, Wear leather gloves, Wear latex or nitrile gloves, Use safe lifting practices, Be aware of slips, trips, and falls, Be aware of pinch points, Notify RCT when using neutron probe, Other (list), Wear sunscreen, No eating or drinking onsite, Set up eye wash, Wear communication device, Avoid spilling leachate, Practice ALARA, Other (list).

Does anyone have any weight restrictions on lifting? Circle YES or NO. If answered YES explain.

Attendees list with printed names: Tim Jackson, Robert Lynch, ALFRED SANTILLANES, William Gibson

Attendees list with signatures: T. Jackson, Robert Lynch, Alfred Santillanes, William Gibson

Notes

Soil Vapor Sampling Log Form

Location	Date 11/9/11	Time	Canister #	PID (ppm)	Flow Rate (L/min)	Initial Canister Vacuum (in-Hg)	Ending Canister Vacuum (in-Hg)	Comments
CWL-VI-	11/9/11	1006	34000151	NA	NA	-25	-8	Field Blank
CWL-VI-40		1008	NA	0.1	8.0	NA	NA	(OR Split)
		↓	↓	↓	↓	↓	↓	
		1009	↓	↓	↓	↓	↓	
		1009	34002026	NA	NA	-26	-8	
CWL-VI-80		1011	NA	0.1	8.0	NA	NA	
		↓	↓	↓	↓	↓	↓	
		1012	↓	↓	↓	↓	↓	
		1012	34000605	NA	NA	-26	-8	
CWL-VI-120		1014	NA	0.1	8.0	NA	NA	
		↓	↓	↓	↓	↓	↓	
		1014	↓	↓	↓	↓	↓	
		1015	34001555	NA	NA	-26	-8	

Field Notes:

Baroball Valve - air flowing out
 ~5400 feet above mean sea level
 PID : Mini RAE 3000, model PGM7320, serial# 592-914992
 Background - 0.0 ppm to 0.1 ppm

Soil Vapor Sampling Log Form

Location	Date	Time	Canister #	PID (ppm)	Flow Rate (L/h)	Initial Canister Vacuum (in-Hg)	Ending Canister Vacuum (in-Hg)	Comments
CWL-D1	1/9/17	829	34000584	NA	NA	-25	-28	Field Blank
CWL-D1-100		838	NA	0.0	8.0	NA	NA	
		↓	↓	↓	↓	↓	↓	
		839	↓	↓	↓	↓	↓	
		840	34000307	NA	NA	-26	-28	
CWL-D1-160		842	NA	0.0	8.0	NA	NA	
		↓	↓	↓	↓	↓	↓	
		843	34002087	↓	↓	↓	↓	
		845	34000049	NA	NA	-27	-28	
CWL-D1-350		846	NA	0.1	8.0	NA	NA	
		↓	↓	↓	↓	↓	↓	
		848	↓	↓	↓	↓	↓	
		849	8065	NA	NA	-26	-28	
CWL-D1-240		942		0.1	8.0	NA	NA	
		↓	↓	↓	↓	↓	↓	
		944		↓	↓	↓	↓	
		940	34000049	NA	NA	-24	-28	OB Split
		↓	34000340	↓	↓	-24	-28	Duplicate
CWL-D1-470		949	NA	0.1	8.0	NA	NA	
		↓	↓	↓	↓	↓	↓	
		952	↓	↓	↓	↓	↓	
		954	34000506	NA	NA	-24	-28	OB Split
		↓	34002073	↓	↓	-24	↓	Duplicate

Field Notes:

Baroball valve - air flowing out
 ~ 5400 feet above mean sea level

Soil Vapor Sampling Log Form

Location	Date 7/1/16/17	Time	Canister #	PID (ppm)	Flow Rate (L/min)	Initial Canister Vacuum (inHg)	Ending Canister Vacuum (inHg)	Comments
CWL-D2	11/9/16/17	1019	34002111	NA	NA	-25	-5	Field Black
CWL-D2-170		1034	NA	0.1	5.0	NA	NA	
↓		↓	↓	↓	↓	↓	↓	
		1035	8272	NA	NA	-26	-5	
CWL-D2-240		1037	NA	0.1	5.0	NA	NA	
↓		↓	↓	↓	↓	↓	↓	
		1039						
		1039	34000185	NA	NA	-26	-5	
CWL-D2-350		1041	NA	0.1	5.0	NA	NA	
↓		↓	↓	↓	↓	↓	↓	
		1044						
		1044	34000015	NA	NA	-26	-5	
CWL-D2-440		1046	NA	0.1	5.0	NA	NA	
↓		↓	↓	↓	↓	↓	↓	
		1048						
		1049	34000164	NA	NA	-26	-5	OB split
CWL-D2-470		1054	NA	0.1	5.0	NA	NA	
↓		↓	↓	↓	↓	↓	↓	
		1057						
		1058	34000080	NA	NA	-26	-5	OB split

Field Notes:

Barohall valve - air flowing out
 ~5400 feet above mean sea level
 sequoia spraying NW of CWL

Soil Vapor Sampling Log Form

Location	Date 1/19/17	Time	Canister #	PID (ppm)	Flow Rate (L/hr)	Initial Canister Vacuum (in-Hg)	Ending Canister Vacuum (in-Hg)	Comments
CWL-D3	1/19/17	1110	34000348	NA	NA	-24	-26	Field Blank
CWL-D3-120		1117	NA	0.1	8.0	NA	NA	
↓		↓	↓	↓	↓	↓	↓	
↓		1118	↓	↓	↓	↓	↓	
↓		1119	34000613	NA	NA	-27	-28	
CWL-D3-170		1120	NA	0.1	8.0	NA	NA	
↓		↓	↓	↓	↓	↓	↓	
↓		1121	↓	↓	↓	↓	↓	
↓		1122	34000168	NA	NA	-27	-28	
CWL-D3-350		1123	NA	0.1	8.0	NA	NA	
↓		↓	↓	↓	↓	↓	↓	
↓		1125	↓	↓	↓	↓	↓	
↓		1126	34001222	NA	NA	-26	-28	
CWL-D3-440		1129	NA	0.1	8.0	NA	NA	
↓		↓	↓	↓	↓	↓	↓	
↓		1131	↓	↓	↓	↓	↓	slow sample fill
↓		1135	34000158	NA	NA	-26	-28	OB split + DUP
CWL-D3-480		1143	NA	0.1	8.0	NA	NA	
↓		↓	↓	↓	↓	↓	↓	
↓		1146	↓	↓	↓	↓	↓	
↓		1147	7703	NA	NA	-26	-28	OB split

Field Notes:

Baroball valve - air flowing out
 ~5400 feet above mean sea level
 sequoia spraying NW of CWL

SUMMARY SHEET FOR JANUARY 2017 SAMPLES

**Sample Summary for CWL Soil Vapor Monitoring
January 2017**

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 195122.10.11.03 / Service Order Number CF 327-17										
CWL-UI1	9-Jan-17	CWL-UI1-40	34002026	617558	101386	Environmental	n/a	n/a	617558 / 101385	
		CWL-UI1-80	34000605		101387	Environmental				
		CWL-UI1-120	34001555		101388	Environmental				
		CWL-UI1-FB1	34000151		101385	Field QC				n/a
CWL-UI2	9-Jan-17	CWL-UI2-36	34001155	617559	101390	Environmental	n/a	n/a	617559 / 101389	
		CWL-UI2-76	7520		101391	Environmental				
		CWL-UI2-136	34001490		101392	Environmental				
		CWL-UI2-FB2	34000153		101389	Field QC				n/a
CWL-D1	9-Jan-17	CWL-D1-100	34000307	617560	101394	Environmental	n/a	n/a	617560 / 101393	
		CWL-D1-160	34000049		101395	Environmental				
		CWL-D1-240	34000049		101396	Environmental				
		CWL-D1-240	34000340		101397	Duplicate				
		CWL-D1-350	8065		101398	Environmental				
		CWL-D1-470	34000505		101399	Environmental				
		CWL-D1-470	34002073		101400	Duplicate				
		CWL-D1-FB1	34000584		101393	Field QC				n/a
CWL-D2	9-Jan-17	CWL-D2-120	8272	617561	101402	Environmental	n/a	n/a	617561 / 101401	
		CWL-D2-240	34000188		101403	Environmental				
		CWL-D2-350	34000015		101404	Environmental				
		CWL-D2-440	34000164		101405	Environmental				
		CWL-D2-470	34000080		101406	Environmental				
		CWL-D2-FB2	34002111		101401	Field QC				n/a
CWL-D3	9-Jan-17	CWL-D3-120	34000613	617562	101408	Environmental	n/a	n/a	617562 / 101407	
		CWL-D3-170	34000168		101409	Environmental				
		CWL-D3-350	34001222		101410	Environmental				
		CWL-D3-440	34000158		101411	Environmental				
		CWL-D3-480	7703		101412	Environmental				
		CWL-D3-FB1	34000348		101407	Field QC				n/a

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

Memorandum

Date: February 20, 2017

To: File

From: Jeanne Peterson

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL SVM
ARCOG: 617558, 617559, 617560, 617561, 617562
SDG: 320-25041
Laboratory: TestAmerica -West Sacramento
Project/Task: 195122.10.11.03
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. Acetone was detected at < the PQL in the field blank, sample 320-25041-23, associated with field samples -24, -25, -26, -27, and -28. The acetone result for sample -28 was a detect < the PQL and < 10X the FB result and will be **qualified 11.3U,B2** at the PQL.
2. The 4-bromofluorobenzene recoveries were < the lower acceptance limit but $\geq 10\%$ for samples -10, -11 DL, -12 DL, -13, -13 DL, -14, -18, -18 DL, -19, -19 DL and -20 DL. The associated sample results that were detect will be **qualified J-,S1**, and the associated sample results that were non-detect will be **qualified UJ,S1** based on professional judgment.
3. The acetone result for sample -16 will be **qualified R,Z1** due to failed mass spectra acceptability criteria.

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

The ICV %D was >30% and negative for hexachlorobutadiene. Because no other calibration infractions occurred, the associated sample results will not be qualified.

Blanks

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

Acetone; 2-butanone; ethylbenzene; methylene chloride; styrene; tetrachloroethene; m,p-xylene; and o-xylene were detected at < the PQL and toluene and trichloroethene at > the PQL in the FB, sample -5, associated with field samples -6, -7, and -8. All associated sample results were either detects >5(10)X the FB concentration or non-detect and will not be qualified.

Trichloroethene was detected at > the PQL in the FB, sample -9, associated with field samples -10, -11, -12, -13, -14, -15 and -16. The associated sample results were detects >5X the FB concentration and will not be qualified.

Methylene chloride, tetrachloroethene, and trichloroethene were detected at < the PQL in the FB, sample -17, associated with field samples -18, -19, -20, -21, and -22. All associated sample results were either detects >5(10)X the FB concentration or non-detect and will not be qualified.

Acetone and trichloroethene were detected at < the PQL in the FB, sample -23, associated with field samples -24, -25, -26, -27, and -28. The remaining associated sample results were either detects >5(10)X the FB concentration or non-detect and will not be qualified.

Surrogates

All surrogate acceptance criteria were met except as noted above in the Summary section. Although they are not required by the TO-15 method, surrogates were added during the analysis and reported by the lab. The laboratory criteria were used for validation and qualifications will be based on professional judgment.

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.

Detection Limits/Dilutions

All detection limits were properly reported and correctly adjusted for dilutions. The samples were diluted as follows. Sample -11 355X, -12 568X, -13 516X, -18 384X, -19 410X, and -20 226X for trichloroethene. Sample -2 111X, -3 124X, -4 164X, -6 72X, -7 114X, -8 129X, -10 174X, -11 178X, -12 284X, -13 284X, -14 196X, -15 5.76X, -16 4.48X, -18 247X, -19 232X, -20 139X, -21 1.54X, -22 95.6X, -24 114X, -25 132X, -26 105X, -27 154X, and -28 2.26X for all remaining target analytes.

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Mass spectra were verified during data validation and met QC acceptance criteria except as noted above in the Summary section.

One FB was submitted for each of the five ARCOCs and was associated with the samples on the same ARCOC. Two field duplicate pairs were submitted with ARCOC 617560. 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 Donovan

Level: I

Date: 02/20/17



Sample Findings Summary



AR/COC: 617558, 617559, 617560, 617561, 617562

Page 1 of 11

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
TO15			
	101394-001/CWL-D1-100	1,1,1-TRICHLOROETHANE (71-55-6)	J-, S1
	101394-001/CWL-D1-100	1,1,2,2-TETRACHLOROETHANE (79-34-5)	UJ, S1
	101394-001/CWL-D1-100	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (76-13-1)	J-, S1
	101394-001/CWL-D1-100	1,1,2-TRICHLOROETHANE (79-00-5)	UJ, S1
	101394-001/CWL-D1-100	1,1-DICHLOROETHANE (75-34-3)	J-, S1
	101394-001/CWL-D1-100	1,1-DICHLOROETHENE (75-35-4)	J-, S1
	101394-001/CWL-D1-100	1,2,4-TRICHLOROBENZENE (120-82-1)	UJ, S1
	101394-001/CWL-D1-100	1,2,4-TRIMETHYLBENZENE (95-63-6)	UJ, S1
	101394-001/CWL-D1-100	1,2-DIBROMOETHANE (EDB) (106-93-4)	UJ, S1
	101394-001/CWL-D1-100	1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (76-14-2)	UJ, S1
	101394-001/CWL-D1-100	1,2-DICHLOROBENZENE (95-50-1)	UJ, S1
	101394-001/CWL-D1-100	1,2-DICHLOROETHANE (107-06-2)	J-, S1
	101394-001/CWL-D1-100	1,2-DICHLOROPROPANE (78-87-5)	J-, S1
	101394-001/CWL-D1-100	1,3,5-TRIMETHYLBENZENE (108-67-8)	UJ, S1
	101394-001/CWL-D1-100	1,3-DICHLOROBENZENE (541-73-1)	UJ, S1
	101394-001/CWL-D1-100	1,4-DICHLOROBENZENE (106-46-7)	UJ, S1
	101394-001/CWL-D1-100	2-BUTANONE (MEK) (78-93-3)	UJ, S1
	101394-001/CWL-D1-100	2-HEXANONE (591-78-6)	UJ, S1
	101394-001/CWL-D1-100	4-ETHYLTOLUENE (622-96-8)	UJ, S1
	101394-001/CWL-D1-100	4-METHYL-2-PENTANONE (MIBK) (108-10-1)	UJ, S1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	101394-001/CWL-D1-100	ACETONE (67-64-1)	UJ, S1
	101394-001/CWL-D1-100	BENZENE (71-43-2)	UJ, S1
	101394-001/CWL-D1-100	BENZYL CHLORIDE (100-44-7)	UJ, S1
	101394-001/CWL-D1-100	BROMODICHLOROMETHANE (75-27-4)	UJ, S1
	101394-001/CWL-D1-100	BROMOFORM (75-25-2)	UJ, S1
	101394-001/CWL-D1-100	BROMOMETHANE (74-83-9)	UJ, S1
	101394-001/CWL-D1-100	CARBON DISULFIDE (75-15-0)	UJ, S1
	101394-001/CWL-D1-100	CARBON TETRACHLORIDE (56-23-5)	J-, S1
	101394-001/CWL-D1-100	CHLOROBENZENE (108-90-7)	UJ, S1
	101394-001/CWL-D1-100	CHLOROETHANE (75-00-3)	UJ, S1
	101394-001/CWL-D1-100	CHLOROFORM (67-66-3)	J-, S1
	101394-001/CWL-D1-100	CHLOROMETHANE (74-87-3)	UJ, S1
	101394-001/CWL-D1-100	CIS-1,2-DICHLOROETHENE (156-59-2)	UJ, S1
	101394-001/CWL-D1-100	CIS-1,3-DICHLOROPROPENE (10061-01-5)	UJ, S1
	101394-001/CWL-D1-100	DIBROMOCHLOROMETHANE (124-48-1)	UJ, S1
	101394-001/CWL-D1-100	DICHLORODIFLUOROMETHANE (75-71-8)	J-, S1
	101394-001/CWL-D1-100	ETHYLBENZENE (100-41-4)	UJ, S1
	101394-001/CWL-D1-100	HEXACHLOROBUTADIENE (87-68-3)	UJ, S1
	101394-001/CWL-D1-100	M,P-XYLENE (179601-23-1)	UJ, S1
	101394-001/CWL-D1-100	METHYLENE CHLORIDE (75-09-2)	J-, S1
	101394-001/CWL-D1-100	O-XYLENE (95-47-6)	UJ, S1
	101394-001/CWL-D1-100	STYRENE (100-42-5)	UJ, S1
	101394-001/CWL-D1-100	TETRACHLOROETHENE (127-18-4)	J-, S1
	101394-001/CWL-D1-100	TOLUENE (108-88-3)	UJ, S1
	101394-001/CWL-D1-100	TRANS-1,2-DICHLOROETHENE (156-60-5)	UJ, S1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	101394-001/CWL-D1-100	TRANS-1,3-DICHLOROPROPENE (10061-02-6)	UJ, S1
	101394-001/CWL-D1-100	TRICHLOROETHENE (79-01-6)	J-, S1
	101394-001/CWL-D1-100	TRICHLOROFLUOROMETHANE (75-69-4)	J-, S1
	101394-001/CWL-D1-100	VINYL ACETATE (108-05-4)	UJ, S1
	101394-001/CWL-D1-100	VINYL CHLORIDE (75-01-4)	UJ, S1
	101395-001/CWL-D1-160	TRICHLOROETHENE (79-01-6)	J-, S1
	101396-001/CWL-D1-240	TRICHLOROETHENE (79-01-6)	J-, S1
	101397-001/CWL-D1-240	1,1,1-TRICHLOROETHANE (71-55-6)	J-, S1
	101397-001/CWL-D1-240	1,1,2,2-TETRACHLOROETHANE (79-34-5)	UJ, S1
	101397-001/CWL-D1-240	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (76-13-1)	J-, S1
	101397-001/CWL-D1-240	1,1,2-TRICHLOROETHANE (79-00-5)	UJ, S1
	101397-001/CWL-D1-240	1,1-DICHLOROETHANE (75-34-3)	J-, S1
	101397-001/CWL-D1-240	1,1-DICHLOROETHENE (75-35-4)	J-, S1
	101397-001/CWL-D1-240	1,2,4-TRICHLOROBENZENE (120-82-1)	UJ, S1
	101397-001/CWL-D1-240	1,2,4-TRIMETHYLBENZENE (95-63-6)	UJ, S1
	101397-001/CWL-D1-240	1,2-DIBROMOETHANE (EDB) (106-93-4)	UJ, S1
	101397-001/CWL-D1-240	1,2-DICHLORO-1,1,2,2-TETRAFLUROETHANE (76-14-2)	UJ, S1
	101397-001/CWL-D1-240	1,2-DICHLOROBENZENE (95-50-1)	UJ, S1
	101397-001/CWL-D1-240	1,2-DICHLOROETHANE (107-06-2)	J-, S1
	101397-001/CWL-D1-240	1,2-DICHLOROPROPANE (78-87-5)	J-, S1
	101397-001/CWL-D1-240	1,3,5-TRIMETHYLBENZENE (108-67-8)	UJ, S1
	101397-001/CWL-D1-240	1,3-DICHLOROBENZENE (541-73-1)	UJ, S1
	101397-001/CWL-D1-240	1,4-DICHLOROBENZENE (106-46-7)	UJ, S1
	101397-001/CWL-D1-240	2-BUTANONE (MEK) (78-93-3)	UJ, S1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	101397-001/CWL-D1-240	2-HEXANONE (591-78-6)	UJ, S1
	101397-001/CWL-D1-240	4-ETHYLTOLUENE (622-96-8)	UJ, S1
	101397-001/CWL-D1-240	4-METHYL-2-PENTANONE (MIBK) (108-10-1)	UJ, S1
	101397-001/CWL-D1-240	ACETONE (67-64-1)	UJ, S1
	101397-001/CWL-D1-240	BENZENE (71-43-2)	UJ, S1
	101397-001/CWL-D1-240	BENZYL CHLORIDE (100-44-7)	UJ, S1
	101397-001/CWL-D1-240	BROMODICHLOROMETHANE (75- 27-4)	UJ, S1
	101397-001/CWL-D1-240	BROMOFORM (75-25-2)	UJ, S1
	101397-001/CWL-D1-240	BROMOMETHANE (74-83-9)	UJ, S1
	101397-001/CWL-D1-240	CARBON DISULFIDE (75-15-0)	UJ, S1
	101397-001/CWL-D1-240	CARBON TETRACHLORIDE (56-23-5)	J-, S1
	101397-001/CWL-D1-240	CHLOROBENZENE (108-90-7)	UJ, S1
	101397-001/CWL-D1-240	CHLOROETHANE (75-00-3)	UJ, S1
	101397-001/CWL-D1-240	CHLOROFORM (67-66-3)	J-, S1
	101397-001/CWL-D1-240	CHLOROMETHANE (74-87-3)	UJ, S1
	101397-001/CWL-D1-240	CIS-1,2-DICHLOROETHENE (156-59- 2)	UJ, S1
	101397-001/CWL-D1-240	CIS-1,3-DICHLOROPROPENE (10061- 01-5)	UJ, S1
	101397-001/CWL-D1-240	DIBROMOCHLOROMETHANE (124- 48-1)	UJ, S1
	101397-001/CWL-D1-240	DICHLORODIFLUOROMETHANE (75- 71-8)	J-, S1
	101397-001/CWL-D1-240	ETHYLBENZENE (100-41-4)	UJ, S1
	101397-001/CWL-D1-240	HEXACHLOROBUTADIENE (87-68-3)	UJ, S1
	101397-001/CWL-D1-240	M,P-XYLENE (179601-23-1)	UJ, S1
	101397-001/CWL-D1-240	METHYLENE CHLORIDE (75-09-2)	J-, S1
	101397-001/CWL-D1-240	O-XYLENE (95-47-6)	UJ, S1
	101397-001/CWL-D1-240	STYRENE (100-42-5)	UJ, S1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	101397-001/CWL-D1-240	TETRACHLOROETHENE (127-18-4)	J-, S1
	101397-001/CWL-D1-240	TOLUENE (108-88-3)	UJ, S1
	101397-001/CWL-D1-240	TRANS-1,2-DICHLOROETHENE (156-60-5)	UJ, S1
	101397-001/CWL-D1-240	TRANS-1,3-DICHLOROPROPENE (10061-02-6)	UJ, S1
	101397-001/CWL-D1-240	TRICHLOROETHENE (79-01-6)	J-, S1
	101397-001/CWL-D1-240	TRICHLOROFLUOROMETHANE (75-69-4)	J-, S1
	101397-001/CWL-D1-240	VINYL ACETATE (108-05-4)	UJ, S1
	101397-001/CWL-D1-240	VINYL CHLORIDE (75-01-4)	UJ, S1
	101398-001/CWL-D1-350	1,1,1-TRICHLOROETHANE (71-55-6)	J-, S1
	101398-001/CWL-D1-350	1,1,2,2-TETRACHLOROETHANE (79-34-5)	UJ, S1
	101398-001/CWL-D1-350	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (76-13-1)	J-, S1
	101398-001/CWL-D1-350	1,1,2-TRICHLOROETHANE (79-00-5)	UJ, S1
	101398-001/CWL-D1-350	1,1-DICHLOROETHANE (75-34-3)	J-, S1
	101398-001/CWL-D1-350	1,1-DICHLOROETHENE (75-35-4)	J-, S1
	101398-001/CWL-D1-350	1,2,4-TRICHLOROBENZENE (120-82-1)	UJ, S1
	101398-001/CWL-D1-350	1,2,4-TRIMETHYLBENZENE (95-63-6)	UJ, S1
	101398-001/CWL-D1-350	1,2-DIBROMOETHANE (EDB) (106-93-4)	UJ, S1
	101398-001/CWL-D1-350	1,2-DICHLORO-1,1,2,2-TETRAFLUROETHANE (76-14-2)	UJ, S1
	101398-001/CWL-D1-350	1,2-DICHLOROBENZENE (95-50-1)	UJ, S1
	101398-001/CWL-D1-350	1,2-DICHLOROETHANE (107-06-2)	UJ, S1
	101398-001/CWL-D1-350	1,2-DICHLOROPROPANE (78-87-5)	J-, S1
	101398-001/CWL-D1-350	1,3,5-TRIMETHYLBENZENE (108-67-8)	UJ, S1
	101398-001/CWL-D1-350	1,3-DICHLOROBENZENE (541-73-1)	UJ, S1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	101398-001/CWL-D1-350	1,4-DICHLOROBENZENE (106-46-7)	UJ, S1
	101398-001/CWL-D1-350	2-BUTANONE (MEK) (78-93-3)	UJ, S1
	101398-001/CWL-D1-350	2-HEXANONE (591-78-6)	UJ, S1
	101398-001/CWL-D1-350	4-ETHYLTOLUENE (622-96-8)	UJ, S1
	101398-001/CWL-D1-350	4-METHYL-2-PENTANONE (MIBK) (108-10-1)	UJ, S1
	101398-001/CWL-D1-350	ACETONE (67-64-1)	UJ, S1
	101398-001/CWL-D1-350	BENZENE (71-43-2)	UJ, S1
	101398-001/CWL-D1-350	BENZYL CHLORIDE (100-44-7)	UJ, S1
	101398-001/CWL-D1-350	BROMODICHLOROMETHANE (75- 27-4)	UJ, S1
	101398-001/CWL-D1-350	BROMOFORM (75-25-2)	UJ, S1
	101398-001/CWL-D1-350	BROMOMETHANE (74-83-9)	UJ, S1
	101398-001/CWL-D1-350	CARBON DISULFIDE (75-15-0)	UJ, S1
	101398-001/CWL-D1-350	CARBON TETRACHLORIDE (56-23-5)	J-, S1
	101398-001/CWL-D1-350	CHLOROBENZENE (108-90-7)	UJ, S1
	101398-001/CWL-D1-350	CHLOROETHANE (75-00-3)	UJ, S1
	101398-001/CWL-D1-350	CHLOROFORM (67-66-3)	J-, S1
	101398-001/CWL-D1-350	CHLOROMETHANE (74-87-3)	UJ, S1
	101398-001/CWL-D1-350	CIS-1,2-DICHLOROETHENE (156-59- 2)	UJ, S1
	101398-001/CWL-D1-350	CIS-1,3-DICHLOROPROPENE (10061- 01-5)	UJ, S1
	101398-001/CWL-D1-350	DIBROMOCHLOROMETHANE (124- 48-1)	UJ, S1
	101398-001/CWL-D1-350	DICHLORODIFLUOROMETHANE (75- 71-8)	J-, S1
	101398-001/CWL-D1-350	ETHYLBENZENE (100-41-4)	UJ, S1
	101398-001/CWL-D1-350	HEXACHLOROBUTADIENE (87-68-3)	UJ, S1
	101398-001/CWL-D1-350	M,P-XYLENE (179601-23-1)	UJ, S1
	101398-001/CWL-D1-350	METHYLENE CHLORIDE (75-09-2)	J-, S1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	101398-001/CWL-D1-350	O-XYLENE (95-47-6)	UJ, S1
	101398-001/CWL-D1-350	STYRENE (100-42-5)	UJ, S1
	101398-001/CWL-D1-350	TETRACHLOROETHENE (127-18-4)	J-, S1
	101398-001/CWL-D1-350	TOLUENE (108-88-3)	UJ, S1
	101398-001/CWL-D1-350	TRANS-1,2-DICHLOROETHENE (156-60-5)	UJ, S1
	101398-001/CWL-D1-350	TRANS-1,3-DICHLOROPROPENE (10061-02-6)	UJ, S1
	101398-001/CWL-D1-350	TRICHLOROETHENE (79-01-6)	J-, S1
	101398-001/CWL-D1-350	TRICHLOROFLUOROMETHANE (75-69-4)	J-, S1
	101398-001/CWL-D1-350	VINYL ACETATE (108-05-4)	UJ, S1
	101398-001/CWL-D1-350	VINYL CHLORIDE (75-01-4)	UJ, S1
	101400-001/CWL-D1-470	ACETONE (67-64-1)	R, Z1
	101402-001/CWL-D2-120	1,1,1-TRICHLOROETHANE (71-55-6)	J-, S1
	101402-001/CWL-D2-120	1,1,2,2-TETRACHLOROETHANE (79-34-5)	UJ, S1
	101402-001/CWL-D2-120	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (76-13-1)	J-, S1
	101402-001/CWL-D2-120	1,1,2-TRICHLOROETHANE (79-00-5)	UJ, S1
	101402-001/CWL-D2-120	1,1-DICHLOROETHANE (75-34-3)	J-, S1
	101402-001/CWL-D2-120	1,1-DICHLOROETHENE (75-35-4)	J-, S1
	101402-001/CWL-D2-120	1,2,4-TRICHLOROBENZENE (120-82-1)	UJ, S1
	101402-001/CWL-D2-120	1,2,4-TRIMETHYLBENZENE (95-63-6)	UJ, S1
	101402-001/CWL-D2-120	1,2-DIBROMOETHANE (EDB) (106-93-4)	UJ, S1
	101402-001/CWL-D2-120	1,2-DICHLORO-1,1,2,2-TETRAFLUROETHANE (76-14-2)	UJ, S1
	101402-001/CWL-D2-120	1,2-DICHLOROBENZENE (95-50-1)	UJ, S1
	101402-001/CWL-D2-120	1,2-DICHLOROETHANE (107-06-2)	J-, S1
	101402-001/CWL-D2-120	1,2-DICHLOROPROPANE (78-87-5)	J-, S1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	101402-001/CWL-D2-120	1,3,5-TRIMETHYLBENZENE (108-67-8)	UJ, S1
	101402-001/CWL-D2-120	1,3-DICHLOROBENZENE (541-73-1)	UJ, S1
	101402-001/CWL-D2-120	1,4-DICHLOROBENZENE (106-46-7)	UJ, S1
	101402-001/CWL-D2-120	2-BUTANONE (MEK) (78-93-3)	UJ, S1
	101402-001/CWL-D2-120	2-HEXANONE (591-78-6)	UJ, S1
	101402-001/CWL-D2-120	4-ETHYLTOLUENE (622-96-8)	UJ, S1
	101402-001/CWL-D2-120	4-METHYL-2-PENTANONE (MIBK) (108-10-1)	UJ, S1
	101402-001/CWL-D2-120	ACETONE (67-64-1)	UJ, S1
	101402-001/CWL-D2-120	BENZENE (71-43-2)	UJ, S1
	101402-001/CWL-D2-120	BENZYL CHLORIDE (100-44-7)	UJ, S1
	101402-001/CWL-D2-120	BROMODICHLOROMETHANE (75-27-4)	UJ, S1
	101402-001/CWL-D2-120	BROMOFORM (75-25-2)	UJ, S1
	101402-001/CWL-D2-120	BROMOMETHANE (74-83-9)	UJ, S1
	101402-001/CWL-D2-120	CARBON DISULFIDE (75-15-0)	UJ, S1
	101402-001/CWL-D2-120	CARBON TETRACHLORIDE (56-23-5)	J-, S1
	101402-001/CWL-D2-120	CHLOROBENZENE (108-90-7)	UJ, S1
	101402-001/CWL-D2-120	CHLOROETHANE (75-00-3)	UJ, S1
	101402-001/CWL-D2-120	CHLOROFORM (67-66-3)	J-, S1
	101402-001/CWL-D2-120	CHLOROMETHANE (74-87-3)	UJ, S1
	101402-001/CWL-D2-120	CIS-1,2-DICHLOROETHENE (156-59-2)	UJ, S1
	101402-001/CWL-D2-120	CIS-1,3-DICHLOROPROPENE (10061-01-5)	UJ, S1
	101402-001/CWL-D2-120	DIBROMOCHLOROMETHANE (124-48-1)	UJ, S1
	101402-001/CWL-D2-120	DICHLORODIFLUOROMETHANE (75-71-8)	J-, S1
	101402-001/CWL-D2-120	ETHYLBENZENE (100-41-4)	UJ, S1
	101402-001/CWL-D2-120	HEXACHLOROBUTADIENE (87-68-3)	UJ, S1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	101402-001/CWL-D2-120	M,P-XYLENE (179601-23-1)	UJ, S1
	101402-001/CWL-D2-120	METHYLENE CHLORIDE (75-09-2)	J-, S1
	101402-001/CWL-D2-120	O-XYLENE (95-47-6)	UJ, S1
	101402-001/CWL-D2-120	STYRENE (100-42-5)	UJ, S1
	101402-001/CWL-D2-120	TETRACHLOROETHENE (127-18-4)	J-, S1
	101402-001/CWL-D2-120	TOLUENE (108-88-3)	UJ, S1
	101402-001/CWL-D2-120	TRANS-1,2-DICHLOROETHENE (156-60-5)	UJ, S1
	101402-001/CWL-D2-120	TRANS-1,3-DICHLOROPROPENE (10061-02-6)	UJ, S1
	101402-001/CWL-D2-120	TRICHLOROETHENE (79-01-6)	J-, S1
	101402-001/CWL-D2-120	TRICHLOROFUOROMETHANE (75-69-4)	J-, S1
	101402-001/CWL-D2-120	VINYL ACETATE (108-05-4)	UJ, S1
	101402-001/CWL-D2-120	VINYL CHLORIDE (75-01-4)	UJ, S1
	101403-001/CWL-D2-240	1,1,1-TRICHLOROETHANE (71-55-6)	J-, S1
	101403-001/CWL-D2-240	1,1,2,2-TETRACHLOROETHANE (79-34-5)	UJ, S1
	101403-001/CWL-D2-240	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (76-13-1)	J-, S1
	101403-001/CWL-D2-240	1,1,2-TRICHLOROETHANE (79-00-5)	UJ, S1
	101403-001/CWL-D2-240	1,1-DICHLOROETHANE (75-34-3)	J-, S1
	101403-001/CWL-D2-240	1,1-DICHLOROETHENE (75-35-4)	J-, S1
	101403-001/CWL-D2-240	1,2,4-TRICHLOROBENZENE (120-82-1)	UJ, S1
	101403-001/CWL-D2-240	1,2,4-TRIMETHYLBENZENE (95-63-6)	UJ, S1
	101403-001/CWL-D2-240	1,2-DIBROMOETHANE (EDB) (106-93-4)	UJ, S1
	101403-001/CWL-D2-240	1,2-DICHLORO-1,1,2,2-TETRAFLUROETHANE (76-14-2)	UJ, S1
	101403-001/CWL-D2-240	1,2-DICHLOROBENZENE (95-50-1)	UJ, S1
	101403-001/CWL-D2-240	1,2-DICHLOROETHANE (107-06-2)	J-, S1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	101403-001/CWL-D2-240	1,2-DICHLOROPROPANE (78-87-5)	J-, S1
	101403-001/CWL-D2-240	1,3,5-TRIMETHYLBENZENE (108-67-8)	UJ, S1
	101403-001/CWL-D2-240	1,3-DICHLOROBENZENE (541-73-1)	UJ, S1
	101403-001/CWL-D2-240	1,4-DICHLOROBENZENE (106-46-7)	UJ, S1
	101403-001/CWL-D2-240	2-BUTANONE (MEK) (78-93-3)	UJ, S1
	101403-001/CWL-D2-240	2-HEXANONE (591-78-6)	UJ, S1
	101403-001/CWL-D2-240	4-ETHYLTOLUENE (622-96-8)	UJ, S1
	101403-001/CWL-D2-240	4-METHYL-2-PENTANONE (MIBK) (108-10-1)	UJ, S1
	101403-001/CWL-D2-240	ACETONE (67-64-1)	UJ, S1
	101403-001/CWL-D2-240	BENZENE (71-43-2)	UJ, S1
	101403-001/CWL-D2-240	BENZYL CHLORIDE (100-44-7)	UJ, S1
	101403-001/CWL-D2-240	BROMODICHLOROMETHANE (75-27-4)	UJ, S1
	101403-001/CWL-D2-240	BROMOFORM (75-25-2)	UJ, S1
	101403-001/CWL-D2-240	BROMOMETHANE (74-83-9)	UJ, S1
	101403-001/CWL-D2-240	CARBON DISULFIDE (75-15-0)	UJ, S1
	101403-001/CWL-D2-240	CARBON TETRACHLORIDE (56-23-5)	J-, S1
	101403-001/CWL-D2-240	CHLOROBENZENE (108-90-7)	UJ, S1
	101403-001/CWL-D2-240	CHLOROETHANE (75-00-3)	UJ, S1
	101403-001/CWL-D2-240	CHLOROFORM (67-66-3)	J-, S1
	101403-001/CWL-D2-240	CHLOROMETHANE (74-87-3)	UJ, S1
	101403-001/CWL-D2-240	CIS-1,2-DICHLOROETHENE (156-59-2)	UJ, S1
	101403-001/CWL-D2-240	CIS-1,3-DICHLOROPROPENE (10061-01-5)	UJ, S1
	101403-001/CWL-D2-240	DIBROMOCHLOROMETHANE (124-48-1)	UJ, S1
	101403-001/CWL-D2-240	DICHLORODIFLUOROMETHANE (75-71-8)	J-, S1
	101403-001/CWL-D2-240	ETHYLBENZENE (100-41-4)	UJ, S1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	101403-001/CWL-D2-240	HEXACHLOROBUTADIENE (87-68-3)	UJ, S1
	101403-001/CWL-D2-240	M,P-XYLENE (179601-23-1)	UJ, S1
	101403-001/CWL-D2-240	METHYLENE CHLORIDE (75-09-2)	J-, S1
	101403-001/CWL-D2-240	O-XYLENE (95-47-6)	UJ, S1
	101403-001/CWL-D2-240	STYRENE (100-42-5)	UJ, S1
	101403-001/CWL-D2-240	TETRACHLOROETHENE (127-18-4)	J-, S1
	101403-001/CWL-D2-240	TOLUENE (108-88-3)	UJ, S1
	101403-001/CWL-D2-240	TRANS-1,2-DICHLOROETHENE (156-60-5)	UJ, S1
	101403-001/CWL-D2-240	TRANS-1,3-DICHLOROPROPENE (10061-02-6)	UJ, S1
	101403-001/CWL-D2-240	TRICHLOROETHENE (79-01-6)	J-, S1
	101403-001/CWL-D2-240	TRICHLOROFLUOROMETHANE (75-69-4)	J-, S1
	101403-001/CWL-D2-240	VINYL ACETATE (108-05-4)	UJ, S1
	101403-001/CWL-D2-240	VINYL CHLORIDE (75-01-4)	UJ, S1
	101404-001/CWL-D2-350	TRICHLOROETHENE (79-01-6)	J-, S1
	101412-001/CWL-D3-480	ACETONE (67-64-1)	11.3U, B2


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

Sandia Data Validation Summary Worksheet

ARCOG#: 617558, 617559, 617560, 617561, 617562	Site/Project: CWL SVM	Validation Date: 02/15/2017
SDG #: 320-25041	Laboratory: TA-WS	Validator: Jeanne Peterson
Matrix: Air	# of Samples: 28	CVR present: Yes
ARCOG(s) present: Yes	Sample Container Integrity: OK	
Analysis Type: <input checked="" type="checkbox"/> Organic <input type="checkbox"/> Metals <input type="checkbox"/> Genchem <input type="checkbox"/> 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: 01/09/17 Received by information not completed on COCs 617559, 617560, 617561, 617562
Validated by: 

Organic Worksheet (GC/MS)

ARCO #s: 617558, 617559, 617560, 617561, 617562	SDG: 320-25041	Matrix: Air
Laboratory Sample IDs: 320-25041-1 thru -28		
Method/Batch #s: EPA TO-15/147570 (-1 thru -14), 147716 (-11DL, -12DL, -13DL, -15, and -18 thru -28), and 147886 (-16, -17, -18DL, -19DL, and -20DL)	Tuning (pass/fail): pass	TICs Required? (yes/no): no

Analyte (outliers)	Calibration				Method Blank	5X (10X) Method Blank	LCS %R	LCSD %R	LCS/ LCSD RPD	FB1 ¹	5X (10X) FB		
	Int.	RF	RSD/r ²	(ICV)/ CCV %D									
Hexachlorobutadiene	NA	✓	✓	(-30.6)/✓	✓	NA	✓	✓	✓	✓	NA		
										FB2 ²			
Hexachlorobutadiene	NA	✓	✓	(-30.6)/✓	✓	NA	✓	✓	✓	✓	NA		
Acetone	NA	✓	✓	✓	✓	NA	✓	✓	✓	2.19J	(21.9)		
2-Butanone	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.427J	(4.27)		
Ethylbenzene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.0959J	0.480		
Methylene chloride	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.349J	(3.49)		
Styrene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.0735J	0.368		
Tetrachloroethene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.0703J	0.352		
Toluene	NA	✓	✓	✓	✓	NA	✓	✓	✓	1.03	(10.3)		
Trichloroethene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.462	2.31		
m,p-Xylene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.248J	1.24		
o-Xylene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.0976J	0.488		
										FB3 ³			
Hexachlorobutadiene	NA	✓	✓	(-30.6)/✓	✓	NA	✓	✓	✓	✓	NA		
Trichloroethene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.805	4.025		
										FB4 ⁴			
Hexachlorobutadiene	NA	✓	✓	(-30.6)/✓	✓	NA	✓	✓	✓	✓	NA		
Methylene chloride	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.0835J	(0.835)		
Tetrachloroethene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.105J	0.525		
Trichloroethene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.242J	1.21		
										FB5 ⁵			
Hexachlorobutadiene	NA	✓	✓	(-30.6)/✓	✓	NA	✓	✓	✓	✓	NA		
Acetone	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.497J	(4.97)		
Trichloroethene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.215J	1.08		

Organic Worksheet (GC/MS) (cont)

ARCO #s: 617558, 617559, 617560, 617561, 617562	SDG: 320-25041	Matrix: Air
Laboratory Sample IDs: 320-25041-1 thru -28		
Method/Batch #s: EPA TO-15/147570 (-1 thru -14), 147716 (-11DL, -12DL, -13DL, -15, and -18 thru -28), and 147886 (-16, -17, -18DL, -19DL, and -20DL)	Tuning (pass/fail): pass	TICs Required? (yes/no): no

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	
-10	✓	✓	69		-18	✓	✓	58	
-11 DL	✓	✓	66		-18 DL	✓	✓	64	
-12 DL	✓	✓	60		-19	✓	✓	61	
-13	✓	✓	65		-19 DL	✓	✓	68	
-13 DL	✓	✓	64		-20 DL	✓	✓	66	
-14	✓	✓	67						

IS Outliers											
	CBM		DFB		CBZ						
Sample ID	Area	RT	Area	RT	Area	RT					
None											

Comments: HTs OK. ATMS9 01/05/2017; all average RF.

Mass spectra validated.

¹101385-001/CWL-UI1-FB1 (320-25041-1); associated with samples -2, -3, -4

²101389-001/CWL-UI2-FB2 (320-25041-5); associated with samples -6, -7, -8

³101393-001/CWL-D1-FB1 (320-25041-9); associated with samples -10 thru -16

⁴101401-001/CWL-D2-FB2 (320-25041-17); associated with samples -18 thru -22

⁵101407-001/CWL-D3-FB1 (320-25041-23); associated with samples -24 thru -28


Sample dilutions -11 355X, -12 568X, -13 516X, -18 384X, -19 410X, and -20 226X for trichloroethene. Sample -2 111X, -3 124X, -4 164X, -6 72X, -7 114X, -8 129X, -10 174X, -11 178X, -12 284X, -13 284X, -14 196X, -15 5.76X, -16 4.48X, -18 247X, -19 232X, -20 139X, -21 1.54X, -22 95.6X, -24 114X, -25 132X, -26 105X, -27 154X, and -28 2.26X for all remaining target analytes.

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No.		SMO Use		AR/COC 617558	
Project Name:	CWL GWM/SVM	Date Samples Shipped:	1/10/17	SMO Authorization:	Tommy Goodwin
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.:	259252	SMO Contact Phone:	Wendy Palencia/505-844-3132
Project/Task Number:	195122.10.11.03	Lab Contact:	Lee Ann Heathcote/	Send Report to SMO:	Stephanie Montaño/505.284.2553
Service Order:	CF327-17	Lab Destination:	TAL-WS	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius	
Tech Area:		Contract No.:	1636780		
Building:	Room:	Operational Site:		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		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
101385	001	CWL-UI1-FB1		1/9/17 10:06	UPN	S	6 L	None	G	FB	VOC (TO-15)	
101386	001	CWL-UI1-40		1/9/17 10:09	SG	S	6 L	None	G	SA	VOC (TO-15)	
101387	001	CWL-UI1-80		1/9/17 10:12	SG	S	6 L	None	G	SA	VOC (TO-15)	
101388	001	CWL-UI1-120		1/9/17 10:15	SG	S	6 L	None	G	SA	VOC (TO-15)	
 320-25041 Chain of Custody												

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:			Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD		<input checked="" type="checkbox"/> Yes				
Background: <input type="checkbox"/> Yes		Entered by:		Turnaround Time		<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day				
Confirmatory: <input type="checkbox"/> Yes		QC inits.:		Negotiated TAT		<input type="checkbox"/>				
Sample Team Members	Name		Signature		Init.		Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab	
	William Gibson		<i>[Signature]</i>		2088		SNL/04141/505-239-7367/505-239-7367		Return Samples By: Comments: Request each SUMMA canister certified clean. Elevation and pressure for ambient pressure information on attached forms.	
	Tim Jackson		<i>[Signature]</i>		TJG		SNL/04131/505-284-2547/505-263-6639			
	Robert Lynch		<i>[Signature]</i>		RL		SNL/04141/505-844-4013/505-250-7090			
	Alfred Santillanes		<i>[Signature]</i>		AS		SNL/04141/505-284-6870/505-228-0710			
Relinquished by <i>[Signature]</i>		Org. 4141	Date 1/10/17	Time 10:30	Relinquished by		Org.	Date	Time	Lab Use
Received by <i>[Signature]</i>		Org. 4131	Date 1/10/17	Time 10:30	Received by		Org.	Date	Time	
Relinquished by <i>[Signature]</i>		Org. 4131	Date 1/10/17	Time 11:55	Relinquished by		Org.	Date	Time	
Received by <i>[Signature]</i>		Org.	Date 1-17-17	Time 9:45	Received by		Org.	Date	Time	

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

Page 1200 of 1205

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.		SMO Use			AR/COG	617559
Project Name:	CWL GWM/SVM	Date Samples Shipped:	1/10/17		SMO Authorization:	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.:	259252		SMO Contact Phone:	
Project/Task Number:	195122.10.11.03	Lab Contact:	Lee Ann Heathcote/		Wendy Palencia/505-844-3132	
Service Order:	CF327-17	Lab Destination:	TAL-WS		Send Report to SMO:	
		Contract No.:	1636780		Stephanie Montaño/505.284.2553	
Tech Area:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154				
Building:	Room:	Operational Site:				

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
101389	001	CWL-UI2-FB2		1/9/17 11:58	UPN	S	6 L	None	G	FB	VOC (TO-15)	
101390	001	CWL-UI2-36		1/9/17 12:02	SG	S	6 L	None	G	SA	VOC (TO-15)	
101391	001	CWL-UI2-76		1/9/17 12:06	SG	S	6 L	None	G	SA	VOC (TO-15)	
101392	001	CWL-UI2-136		1/9/17 12:09	SG	S	6 L	None	G	SA	VOC (TO-15)	

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:			Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes				
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day				
Confirmatory: <input type="checkbox"/> Yes		QC inits.:				Negotiated TAT <input type="checkbox"/>				
Sample Team Members	Name		Signature		Init.		Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab	
	William Gibson		<i>[Signature]</i>		WJG		SNL/04141/505-239-7367/505-239-7367		Return Samples By:	
	Tim Jackson		<i>[Signature]</i>		TJ		SNL/04131/505-284-2547/505-263-6639		Comments: Request each SUMMA canister certified clean, elevation + ambient pressure information on attached forms.	
	Robert Lynch		<i>[Signature]</i>		RL		SNL/04141/505-844-4013/505-250-7090			
	Alfred Santillanes		<i>[Signature]</i>		AS		SNL/04141/505-284-6870/505-228-0710			
Relinquished by <i>[Signature]</i>		Org. 4141	Date 1/10/17	Time 10:30	Relinquished by		Org.	Date	Time	
Received by <i>[Signature]</i>		Org. 4131	Date 1/10/17	Time 10:30	Received by		Org.	Date	Time	
Relinquished by <i>[Signature]</i>		Org. 4131	Date 1/10/17	Time 11:59	Relinquished by		Org.	Date	Time	
Received by		Org.	Date	Time	Received by		Org.	Date	Time	

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

Page 1201 of 1205

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. _____		SMO Use		AR/COC 617560	
Project Name: CWL GWM/SVM	Date Samples Shipped: 1.10.17	SMO Authorization: <i>Tony Gardner</i>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius	
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. 259252	SMO Contact Phone: Wendy Palencia/505-844-3132			
Project/Task Number: 195122.10.11.03	Lab Contact: Lee Ann Heathcote/	Send Report to SMO: Stephanie Montaño/505.284.2553			
Service Order: CF327-17	Lab Destination: TAL-WS	Contract No.: 1636780			

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		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
101393	001	CWL-D1-FB1		1/9/17 08:29	UPN	S	6 L	None	G	FB	VOC (TO-15)	
101394	001	CWL-D1-100		1/9/17 08:40	SG	S	6 L	None	G	SA	VOC (TO-15)	
101395	001	CWL-D1-160		1/9/17 08:45	SG	S	6 L	None	G	SA	VOC (TO-15)	
101396	001	CWL-D1-240		1/9/17 09:46	SG	S	6 L	None	G	SA	VOC (TO-15)	
101397	001	CWL-D1-240		1/9/17 09:46	SG	S	6 L	None	G	DU	VOC (TO-15)	
101398	001	CWL-D1-350		1/9/17 08:49	SG	S	6 L	None	G	SA	VOC (TO-15)	
101399	001	CWL-D1-470		1/9/17 09:54	SG	S	6 L	None	G	SA	VOC (TO-15)	
101400	001	CWL-D1-470		1/9/17 09:54	SG	S	6 L	None	G	DU	VOC (TO-15)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:	EDD	<input checked="" type="checkbox"/> Yes	
9 <input type="checkbox"/> Yes	Entered by:	Turnaround Time	<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day	
<input type="checkbox"/> Yes	QC inits.:	Negotiated TAT	<input type="checkbox"/>	

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal	Return Samples By:
		William Gibson	<i>William Gibson</i>	WG	SNL/04141/505-239-7367/505-239-7367	<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Tim Jackson	<i>Tim Jackson</i>	TJ	SNL/04143/505-284-2547/505-263-6639		
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/04141/505-844-4013/505-250-7090		
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/04141/505-284-6870/505-228-0710		

Relinquished by <i>Alfred Santillanes</i>	Org. 4141	Date 1/10/17	Time 10:30	Relinquished by	Org.	Date	Time
Received by <i>TO</i>	Org. 4131	Date 1/10/17	Time 10:30	Received by	Org.	Date	Time
Relinquished by <i>TO</i>	Org. 4131	Date 1/10/17	Time 10:39	Relinquished by	Org.	Date	Time
Received by	Org.	Date	Time	Received by	Org.	Date	Time

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

Page 1202 of 1205

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No.		SMO Use		AR/COC		617561			
Project Name:	CWL GWM/SVM	Date Samples Shipped:	1-10-17	SMO Authorization:	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius				
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.:	254252	SMO Contact Phone:				Wendy Palencia/505-844-3132	
Project/Task Number:	195122.10.11.03	Lab Contact:	Lee Ann Heathcote/	Send Report to SMO:					
Service Order:	CF327-17	Lab Destination:	TAL-WS	Contract No.:				1636780	

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		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
101401	001	CWL-D2-FB2		1/9/17 10:19	UPN	S	6 L	None	G	FB	VOC (TO-15)	
101402	001	CWL-D2-120		1/9/17 10:35	SG	S	6 L	None	G	SA	VOC (TO-15)	
101403	001	CWL-D2-240		1/9/17 10:39	SG	S	6 L	None	G	SA	VOC (TO-15)	
101404	001	CWL-D2-350		1/9/17 10:44	SG	S	6 L	None	G	SA	VOC (TO-15)	
101405	001	CWL-D2-440		1/9/17 10:04	SG	S	6 L	None	G	SA	VOC (TO-15)	
101406	001	CWL-D2-470		1/9/17 10:58	SG	S	6 L	None	G	SA	VOC (TO-15)	

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD		<input checked="" type="checkbox"/> Yes						
Background: <input type="checkbox"/> Yes		Entered by:		Turnaround Time		<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day						
Confirmatory: <input type="checkbox"/> Yes		QC inits.:		Negotiated TAT		<input type="checkbox"/>						
Sample Team Members	9		Signature		Init.		Company/Organization/Phone/Cell		Sample Disposal		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab	
	William Gibson		<i>[Signature]</i>		WG		SNL/04141/505-239-7367/505-239-7367		Return Samples By: Comments: Request each SUMMA canister certified clean. <i>Elevation + ambient pressure information on attached forms</i>			
	Tim Jackson		<i>[Signature]</i>		TJ		SNL/04143/505-284-2547/505-263-6639					
	Robert Lynch		<i>[Signature]</i>		RL		SNL/04141/505-844-4013/505-250-7090					
Alfred Santillanes		<i>[Signature]</i>		AS		SNL/04141/505-284-6870/505-228-0710						

Relinquished by <i>[Signature]</i>	Org. 4141	Date 1/10/17	Time 10:30	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. 4131	Date 1/10/17	Time 10:30	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org. 4131	Date 1/10/17	Time 11:55	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org.	Date	Time	Received by	Org.	Date	Time

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

Page 1203 of 1205

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.		SMO Use		AR/COC 617562	
Project Name:	CWL GWM/SVM	Date Samples Shipped:	1/10/17	SMO Authorization:	Tommy Cooper
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.	259252	SMO Contact Phone:	Wendy Palencia/505-844-3132
Project/Task Number:	195122.10.11.03	Lab Contact:	Lee Ann Heathcote/	Send Report to SMO:	Stephanie Montaño/505.284.2553
Service Order:	CF327-17	Lab Destination:	TAL-WS		
		Contract No.:	1636780		
Tech Area:		Operational Site:		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius	
Building:				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		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
101407	001	CWL-D3-FB1		1/9/17 11:16	UPN	S	6 L	None	G	FB	VOC (TO-15)	
101408	001	CWL-D3-120		1/9/17 11:19	SG	S	6 L	None	G	SA	VOC (TO-15)	
101409	001	CWL-D3-170		1/9/17 11:22	SG	S	6 L	None	G	SA	VOC (TO-15)	
101410	001	CWL-D3-350		1/9/17 11:26	SG	S	6 L	None	G	SA	VOC (TO-15)	
101411	001	CWL-D3-440		1/9/17 11:35	SG	S	6 L	None	G	SA	VOC (TO-15)	
101412	001	CWL-D3-480		1/9/17 11:47	SG	S	6 L	None	G	SA	VOC (TO-15)	

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:			Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes					
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day					
Confirmatory: <input type="checkbox"/> Yes		QC inits.:				Negotiated TAT <input type="checkbox"/>					
Sample Team Members	Name		Signature		Init.		Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		
	William Gibson		<i>[Signature]</i>		WJG		SNL/04141/505-239-7367/505-239-7367		Return Samples By: Comments: Request each SUMMA canister certified clean. <i>Elevation and ambient pressure information on attached forms.</i>		
	Tim Jackson		<i>[Signature]</i>		TJ		SNL/04143/505-284-2547/505-263-6639				
	Robert Lynch		<i>[Signature]</i>		RL		SNL/04141/505-844-4013/505-250-7090				
Alfred Santillanes		<i>[Signature]</i>		AS		SNL/04141/505-284-6870/505-228-0710					

Relinquished by <i>[Signature]</i>	Org. 4141	Date 1/10/17	Time 10:30	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. 4131	Date 1/10/17	Time 10:30	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org. 4131	Date 1/10/17	Time 11:55	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org.	Date	Time	Received by	Org.	Date	Time

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

Page 1204 of 1205

CONTRACT VERIFICATION REVIEW FORMS

SOIL-GAS MONITORING

JANUARY 2017

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
617558	Environmental
617559	Environmental
617560	Environmental
617561	Environmental
617562	Environmental

Note: 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.** 195122_10.11.03

ARCOC No. 617558, 617559, 617560, 617561 & 617562

Analytical Lab TAL-WS

SDG No. 320-25041-1

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 ARCOG 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	Lab receipt signature missing on ARCOGs 617559, 617560, 617561 & 617562
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		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique		X	4-Bromofluorobenzene (surrogate) outside recovery limits for sample#101394-001, 101395-001, 101396-001, 101397-001, 101398-001, 101402-001, 101403-001 & 101404-001
	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		

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		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Acetone, 2-butanone, ethylbenzene, methylene chloride, styrene, tetrachloroethene, toluene, trichloroethene, m,p-xylene and o-xylene detected in CWL-UI2-FB2. Trichloroethene detected in CWL-D1-FB1. Methylene chloride, tetrachloroethene and trichloroethene detected in CWL-D2-FB2. Acetone and trichloroethene detected in CWL-D3-FB1.
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)	N/A		
	a) Initial calibration provided			
	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)	N/A		
	a) Initial calibration provided			
	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	N/A		
	a) Instrument run logs provided			

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: 02-13-2017 12:32:00

Closed by: Wendy Palencia Date: 02-13-2017 12:32:00

**SOIL-GAS SAMPLING RESULTS
CERTIFICATES OF ANALYSIS**

Chemical Waste Landfill

January 2017 – Soil-Gas Samples

Client Sample Results

Client: Sandia National Laboratories
 Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101385-001/CWL-UI1-FB1

Lab Sample ID: 320-25041-1

Date Collected: 01/09/17 10:06

Matrix: Air

Date Received: 01/17/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	0.178	U	5.00	0.178	ppb v/v			01/24/17 15:28	1
Benzene	0.0790	U	0.400	0.0790	ppb v/v			01/24/17 15:28	1
Benzyl chloride	0.163	U	0.800	0.163	ppb v/v			01/24/17 15:28	1
Bromodichloromethane	0.0660	U	0.300	0.0660	ppb v/v			01/24/17 15:28	1
Bromoform	0.0700	U	0.400	0.0700	ppb v/v			01/24/17 15:28	1
Bromomethane	0.335	U	0.800	0.335	ppb v/v			01/24/17 15:28	1
2-Butanone (MEK)	0.199	U	0.800	0.199	ppb v/v			01/24/17 15:28	1
Carbon disulfide	0.0780	U	0.800	0.0780	ppb v/v			01/24/17 15:28	1
Carbon tetrachloride	0.0640	U	0.800	0.0640	ppb v/v			01/24/17 15:28	1
Chlorobenzene	0.0640	U	0.300	0.0640	ppb v/v			01/24/17 15:28	1
Chloroethane	0.308	U	0.800	0.308	ppb v/v			01/24/17 15:28	1
Chloroform	0.0950	U	0.300	0.0950	ppb v/v			01/24/17 15:28	1
Chloromethane	0.197	U	0.800	0.197	ppb v/v			01/24/17 15:28	1
Dibromochloromethane	0.0790	U	0.400	0.0790	ppb v/v			01/24/17 15:28	1
1,2-Dibromoethane (EDB)	0.0750	U	0.800	0.0750	ppb v/v			01/24/17 15:28	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.155	U	0.400	0.155	ppb v/v			01/24/17 15:28	1
1,2-Dichlorobenzene	0.130	U	0.400	0.130	ppb v/v			01/24/17 15:28	1
1,3-Dichlorobenzene	0.110	U	0.400	0.110	ppb v/v			01/24/17 15:28	1
1,4-Dichlorobenzene	0.149	U	0.400	0.149	ppb v/v			01/24/17 15:28	1
Dichlorodifluoromethane	0.145	U	0.400	0.145	ppb v/v			01/24/17 15:28	1
1,1-Dichloroethane	0.0720	U	0.300	0.0720	ppb v/v			01/24/17 15:28	1
1,2-Dichloroethane	0.0880	U	0.800	0.0880	ppb v/v			01/24/17 15:28	1
1,1-Dichloroethene	0.129	U	0.800	0.129	ppb v/v			01/24/17 15:28	1
cis-1,2-Dichloroethene	0.0890	U	0.400	0.0890	ppb v/v			01/24/17 15:28	1
trans-1,2-Dichloroethene	0.100	U	0.400	0.100	ppb v/v			01/24/17 15:28	1
1,2-Dichloropropane	0.240	U	0.400	0.240	ppb v/v			01/24/17 15:28	1
cis-1,3-Dichloropropene	0.104	U	0.400	0.104	ppb v/v			01/24/17 15:28	1
trans-1,3-Dichloropropene	0.0880	U	0.400	0.0880	ppb v/v			01/24/17 15:28	1
Ethylbenzene	0.0630	U	0.400	0.0630	ppb v/v			01/24/17 15:28	1
4-Ethyltoluene	0.187	U	0.400	0.187	ppb v/v			01/24/17 15:28	1
Hexachlorobutadiene	0.432	U	2.00	0.432	ppb v/v			01/24/17 15:28	1
2-Hexanone	0.0870	U	0.400	0.0870	ppb v/v			01/24/17 15:28	1
4-Methyl-2-pentanone (MIBK)	0.135	U	0.400	0.135	ppb v/v			01/24/17 15:28	1
Methylene Chloride	0.0720	U	0.400	0.0720	ppb v/v			01/24/17 15:28	1
Styrene	0.0590	U	0.400	0.0590	ppb v/v			01/24/17 15:28	1
1,1,2,2-Tetrachloroethane	0.0690	U	0.400	0.0690	ppb v/v			01/24/17 15:28	1
Tetrachloroethene	0.0510	U	0.400	0.0510	ppb v/v			01/24/17 15:28	1
Toluene	0.0510	U	0.400	0.0510	ppb v/v			01/24/17 15:28	1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.163	U	0.400	0.163	ppb v/v			01/24/17 15:28	1
1,2,4-Trichlorobenzene	0.433	U	2.00	0.433	ppb v/v			01/24/17 15:28	1
1,1,1-Trichloroethane	0.0650	U	0.300	0.0650	ppb v/v			01/24/17 15:28	1
1,1,2-Trichloroethane	0.0670	U	0.400	0.0670	ppb v/v			01/24/17 15:28	1
Trichloroethene	0.105	U	0.400	0.105	ppb v/v			01/24/17 15:28	1
Trichlorofluoromethane	0.196	U	0.400	0.196	ppb v/v			01/24/17 15:28	1
1,2,4-Trimethylbenzene	0.162	U	0.800	0.162	ppb v/v			01/24/17 15:28	1
1,3,5-Trimethylbenzene	0.125	U	0.400	0.125	ppb v/v			01/24/17 15:28	1
Vinyl acetate	0.145	U	0.800	0.145	ppb v/v			01/24/17 15:28	1
Vinyl chloride	0.120	U	0.400	0.120	ppb v/v			01/24/17 15:28	1

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101385-001/CWL-UI1-FB1

Lab Sample ID: 320-25041-1

Date Collected: 01/09/17 10:06

Matrix: Air

Date Received: 01/17/17 09:45

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	0.100	U	0.800	0.100	ppb v/v			01/24/17 15:28	1
o-Xylene	0.0540	U	0.400	0.0540	ppb v/v			01/24/17 15:28	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		70 - 130					01/24/17 15:28	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					01/24/17 15:28	1
Toluene-d8 (Surr)	100		70 - 130					01/24/17 15:28	1

Client Sample ID: 101386-001/CWL-UI1-40

Lab Sample ID: 320-25041-2

Date Collected: 01/09/17 10:09

Matrix: Air

Date Received: 01/17/17 09:45

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	19.8	U	555	19.8	ppb v/v			01/24/17 16:18	111
Benzene	8.77	U	44.4	8.77	ppb v/v			01/24/17 16:18	111
Benzyl chloride	18.1	U	88.8	18.1	ppb v/v			01/24/17 16:18	111
Bromodichloromethane	7.33	U	33.3	7.33	ppb v/v			01/24/17 16:18	111
Bromoform	7.77	U	44.4	7.77	ppb v/v			01/24/17 16:18	111
Bromomethane	37.2	U	88.8	37.2	ppb v/v			01/24/17 16:18	111
2-Butanone (MEK)	22.1	U	88.8	22.1	ppb v/v			01/24/17 16:18	111
Carbon disulfide	8.66	U	88.8	8.66	ppb v/v			01/24/17 16:18	111
Carbon tetrachloride	16.3	J	88.8	7.10	ppb v/v			01/24/17 16:18	111
Chlorobenzene	7.10	U	33.3	7.10	ppb v/v			01/24/17 16:18	111
Chloroethane	34.2	U	88.8	34.2	ppb v/v			01/24/17 16:18	111
Chloroform	725		33.3	10.5	ppb v/v			01/24/17 16:18	111
Chloromethane	21.9	U	88.8	21.9	ppb v/v			01/24/17 16:18	111
Dibromochloromethane	8.77	U	44.4	8.77	ppb v/v			01/24/17 16:18	111
1,2-Dibromoethane (EDB)	8.33	U	88.8	8.33	ppb v/v			01/24/17 16:18	111
1,2-Dichloro-1,1,2,2-tetrafluoroethane	17.2	U	44.4	17.2	ppb v/v			01/24/17 16:18	111
1,2-Dichlorobenzene	14.4	U	44.4	14.4	ppb v/v			01/24/17 16:18	111
1,3-Dichlorobenzene	12.2	U	44.4	12.2	ppb v/v			01/24/17 16:18	111
1,4-Dichlorobenzene	16.5	U	44.4	16.5	ppb v/v			01/24/17 16:18	111
Dichlorodifluoromethane	28.5	J	44.4	16.1	ppb v/v			01/24/17 16:18	111
1,1-Dichloroethane	13.4	J	33.3	7.99	ppb v/v			01/24/17 16:18	111
1,2-Dichloroethane	9.77	U	88.8	9.77	ppb v/v			01/24/17 16:18	111
1,1-Dichloroethene	205		88.8	14.3	ppb v/v			01/24/17 16:18	111
cis-1,2-Dichloroethene	9.88	U	44.4	9.88	ppb v/v			01/24/17 16:18	111
trans-1,2-Dichloroethene	11.1	U	44.4	11.1	ppb v/v			01/24/17 16:18	111
1,2-Dichloropropane	47.0		44.4	26.6	ppb v/v			01/24/17 16:18	111
cis-1,3-Dichloropropene	11.5	U	44.4	11.5	ppb v/v			01/24/17 16:18	111
trans-1,3-Dichloropropene	9.77	U	44.4	9.77	ppb v/v			01/24/17 16:18	111
Ethylbenzene	6.99	U	44.4	6.99	ppb v/v			01/24/17 16:18	111
4-Ethyltoluene	20.8	U	44.4	20.8	ppb v/v			01/24/17 16:18	111
Hexachlorobutadiene	48.0	U	222	48.0	ppb v/v			01/24/17 16:18	111
2-Hexanone	9.66	U	44.4	9.66	ppb v/v			01/24/17 16:18	111
4-Methyl-2-pentanone (MIBK)	15.0	U	44.4	15.0	ppb v/v			01/24/17 16:18	111
Methylene Chloride	9.65	J	44.4	7.99	ppb v/v			01/24/17 16:18	111

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101386-001/CWL-UI1-40

Lab Sample ID: 320-25041-2

Date Collected: 01/09/17 10:09

Matrix: Air

Date Received: 01/17/17 09:45

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	6.55	U	44.4	6.55	ppb v/v			01/24/17 16:18	111
1,1,2,2-Tetrachloroethane	7.66	U	44.4	7.66	ppb v/v			01/24/17 16:18	111
Tetrachloroethene	3590		44.4	5.66	ppb v/v			01/24/17 16:18	111
Toluene	5.66	U	44.4	5.66	ppb v/v			01/24/17 16:18	111
1,1,2-Trichloro-1,2,2-trifluoroethane	736		44.4	18.1	ppb v/v			01/24/17 16:18	111
1,2,4-Trichlorobenzene	48.1	U	222	48.1	ppb v/v			01/24/17 16:18	111
1,1,1-Trichloroethane	49.0		33.3	7.22	ppb v/v			01/24/17 16:18	111
1,1,2-Trichloroethane	10.6	J	44.4	7.44	ppb v/v			01/24/17 16:18	111
Trichloroethene	5680		44.4	11.7	ppb v/v			01/24/17 16:18	111
Trichlorofluoromethane	192		44.4	21.8	ppb v/v			01/24/17 16:18	111
1,2,4-Trimethylbenzene	18.0	U	88.8	18.0	ppb v/v			01/24/17 16:18	111
1,3,5-Trimethylbenzene	13.9	U	44.4	13.9	ppb v/v			01/24/17 16:18	111
Vinyl acetate	16.1	U	88.8	16.1	ppb v/v			01/24/17 16:18	111
Vinyl chloride	13.3	U	44.4	13.3	ppb v/v			01/24/17 16:18	111
m,p-Xylene	11.1	U	88.8	11.1	ppb v/v			01/24/17 16:18	111
o-Xylene	7.29	J	44.4	5.99	ppb v/v			01/24/17 16:18	111

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	79		70 - 130		01/24/17 16:18	111
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		01/24/17 16:18	111
Toluene-d8 (Surr)	101		70 - 130		01/24/17 16:18	111

Client Sample ID: 101387-001/CWL-UI1-80

Lab Sample ID: 320-25041-3

Date Collected: 01/09/17 10:12

Matrix: Air

Date Received: 01/17/17 09:45

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	22.1	U	620	22.1	ppb v/v			01/24/17 17:07	124
Benzene	9.80	U	49.6	9.80	ppb v/v			01/24/17 17:07	124
Benzyl chloride	20.2	U	99.2	20.2	ppb v/v			01/24/17 17:07	124
Bromodichloromethane	8.18	U	37.2	8.18	ppb v/v			01/24/17 17:07	124
Bromoform	8.68	U	49.6	8.68	ppb v/v			01/24/17 17:07	124
Bromomethane	41.5	U	99.2	41.5	ppb v/v			01/24/17 17:07	124
2-Butanone (MEK)	24.7	U	99.2	24.7	ppb v/v			01/24/17 17:07	124
Carbon disulfide	9.67	U	99.2	9.67	ppb v/v			01/24/17 17:07	124
Carbon tetrachloride	7.94	U	99.2	7.94	ppb v/v			01/24/17 17:07	124
Chlorobenzene	7.94	U	37.2	7.94	ppb v/v			01/24/17 17:07	124
Chloroethane	38.2	U	99.2	38.2	ppb v/v			01/24/17 17:07	124
Chloroform	574		37.2	11.8	ppb v/v			01/24/17 17:07	124
Chloromethane	24.4	U	99.2	24.4	ppb v/v			01/24/17 17:07	124
Dibromochloromethane	9.80	U	49.6	9.80	ppb v/v			01/24/17 17:07	124
1,2-Dibromoethane (EDB)	9.30	U	99.2	9.30	ppb v/v			01/24/17 17:07	124
1,2-Dichloro-1,1,2,2-tetrafluoroethane	19.2	U	49.6	19.2	ppb v/v			01/24/17 17:07	124
1,2-Dichlorobenzene	16.1	U	49.6	16.1	ppb v/v			01/24/17 17:07	124
1,3-Dichlorobenzene	13.6	U	49.6	13.6	ppb v/v			01/24/17 17:07	124
1,4-Dichlorobenzene	18.5	U	49.6	18.5	ppb v/v			01/24/17 17:07	124

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101387-001/CWL-UI1-80

Lab Sample ID: 320-25041-3

Date Collected: 01/09/17 10:12

Matrix: Air

Date Received: 01/17/17 09:45

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	34.1	J	49.6	18.0	ppb v/v			01/24/17 17:07	124
1,1-Dichloroethane	14.6	J	37.2	8.93	ppb v/v			01/24/17 17:07	124
1,2-Dichloroethane	14.7	J	99.2	10.9	ppb v/v			01/24/17 17:07	124
1,1-Dichloroethene	336		99.2	16.0	ppb v/v			01/24/17 17:07	124
cis-1,2-Dichloroethene	11.0	U	49.6	11.0	ppb v/v			01/24/17 17:07	124
trans-1,2-Dichloroethene	12.4	U	49.6	12.4	ppb v/v			01/24/17 17:07	124
1,2-Dichloropropane	63.8		49.6	29.8	ppb v/v			01/24/17 17:07	124
cis-1,3-Dichloropropene	12.9	U	49.6	12.9	ppb v/v			01/24/17 17:07	124
trans-1,3-Dichloropropene	10.9	U	49.6	10.9	ppb v/v			01/24/17 17:07	124
Ethylbenzene	7.81	U	49.6	7.81	ppb v/v			01/24/17 17:07	124
4-Ethyltoluene	23.2	U	49.6	23.2	ppb v/v			01/24/17 17:07	124
Hexachlorobutadiene	53.6	U	248	53.6	ppb v/v			01/24/17 17:07	124
2-Hexanone	10.8	U	49.6	10.8	ppb v/v			01/24/17 17:07	124
4-Methyl-2-pentanone (MIBK)	16.7	U	49.6	16.7	ppb v/v			01/24/17 17:07	124
Methylene Chloride	60.1		49.6	8.93	ppb v/v			01/24/17 17:07	124
Styrene	7.32	U	49.6	7.32	ppb v/v			01/24/17 17:07	124
1,1,2,2-Tetrachloroethane	8.56	U	49.6	8.56	ppb v/v			01/24/17 17:07	124
Tetrachloroethene	1230		49.6	6.32	ppb v/v			01/24/17 17:07	124
Toluene	6.32	U	49.6	6.32	ppb v/v			01/24/17 17:07	124
1,1,2-Trichloro-1,2,2-trifluoroethane	859		49.6	20.2	ppb v/v			01/24/17 17:07	124
1,2,4-Trichlorobenzene	53.7	U	248	53.7	ppb v/v			01/24/17 17:07	124
1,1,1-Trichloroethane	44.3		37.2	8.06	ppb v/v			01/24/17 17:07	124
1,1,2-Trichloroethane	8.31	U	49.6	8.31	ppb v/v			01/24/17 17:07	124
Trichloroethene	7230		49.6	13.0	ppb v/v			01/24/17 17:07	124
Trichlorofluoromethane	225		49.6	24.3	ppb v/v			01/24/17 17:07	124
1,2,4-Trimethylbenzene	20.1	U	99.2	20.1	ppb v/v			01/24/17 17:07	124
1,3,5-Trimethylbenzene	15.5	U	49.6	15.5	ppb v/v			01/24/17 17:07	124
Vinyl acetate	18.0	U	99.2	18.0	ppb v/v			01/24/17 17:07	124
Vinyl chloride	14.9	U	49.6	14.9	ppb v/v			01/24/17 17:07	124
m,p-Xylene	12.4	U	99.2	12.4	ppb v/v			01/24/17 17:07	124
o-Xylene	6.70	U	49.6	6.70	ppb v/v			01/24/17 17:07	124

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	80		70 - 130		01/24/17 17:07	124
1,2-Dichloroethane-d4 (Surr)	102		70 - 130		01/24/17 17:07	124
Toluene-d8 (Surr)	101		70 - 130		01/24/17 17:07	124

Client Sample ID: 101388-001/CWL-UI1-120

Lab Sample ID: 320-25041-4

Date Collected: 01/09/17 10:15

Matrix: Air

Date Received: 01/17/17 09:45

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	29.2	U	820	29.2	ppb v/v			01/24/17 17:57	164
Benzene	13.0	U	65.6	13.0	ppb v/v			01/24/17 17:57	164
Benzyl chloride	26.7	U	131	26.7	ppb v/v			01/24/17 17:57	164
Bromodichloromethane	10.8	U	49.2	10.8	ppb v/v			01/24/17 17:57	164

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
 Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101388-001/CWL-UI1-120

Lab Sample ID: 320-25041-4

Date Collected: 01/09/17 10:15

Matrix: Air

Date Received: 01/17/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromoform	11.5	U	65.6	11.5	ppb v/v			01/24/17 17:57	164
Bromomethane	54.9	U	131	54.9	ppb v/v			01/24/17 17:57	164
2-Butanone (MEK)	32.6	U	131	32.6	ppb v/v			01/24/17 17:57	164
Carbon disulfide	12.8	U	131	12.8	ppb v/v			01/24/17 17:57	164
Carbon tetrachloride	20.0	J	131	10.5	ppb v/v			01/24/17 17:57	164
Chlorobenzene	10.5	U	49.2	10.5	ppb v/v			01/24/17 17:57	164
Chloroethane	50.5	U	131	50.5	ppb v/v			01/24/17 17:57	164
Chloroform	466		49.2	15.6	ppb v/v			01/24/17 17:57	164
Chloromethane	32.3	U	131	32.3	ppb v/v			01/24/17 17:57	164
Dibromochloromethane	13.0	U	65.6	13.0	ppb v/v			01/24/17 17:57	164
1,2-Dibromoethane (EDB)	12.3	U	131	12.3	ppb v/v			01/24/17 17:57	164
1,2-Dichloro-1,1,2,2-tetrafluoroethane	25.4	U	65.6	25.4	ppb v/v			01/24/17 17:57	164
1,2-Dichlorobenzene	21.3	U	65.6	21.3	ppb v/v			01/24/17 17:57	164
1,3-Dichlorobenzene	18.0	U	65.6	18.0	ppb v/v			01/24/17 17:57	164
1,4-Dichlorobenzene	24.4	U	65.6	24.4	ppb v/v			01/24/17 17:57	164
Dichlorodifluoromethane	34.0	J	65.6	23.8	ppb v/v			01/24/17 17:57	164
1,1-Dichloroethane	16.9	J	49.2	11.8	ppb v/v			01/24/17 17:57	164
1,2-Dichloroethane	38.0	J	131	14.4	ppb v/v			01/24/17 17:57	164
1,1-Dichloroethene	368		131	21.2	ppb v/v			01/24/17 17:57	164
cis-1,2-Dichloroethene	14.6	U	65.6	14.6	ppb v/v			01/24/17 17:57	164
trans-1,2-Dichloroethene	16.4	U	65.6	16.4	ppb v/v			01/24/17 17:57	164
1,2-Dichloropropane	81.9		65.6	39.4	ppb v/v			01/24/17 17:57	164
cis-1,3-Dichloropropene	17.1	U	65.6	17.1	ppb v/v			01/24/17 17:57	164
trans-1,3-Dichloropropene	14.4	U	65.6	14.4	ppb v/v			01/24/17 17:57	164
Ethylbenzene	10.3	U	65.6	10.3	ppb v/v			01/24/17 17:57	164
4-Ethyltoluene	30.7	U	65.6	30.7	ppb v/v			01/24/17 17:57	164
Hexachlorobutadiene	70.8	U	328	70.8	ppb v/v			01/24/17 17:57	164
2-Hexanone	14.3	U	65.6	14.3	ppb v/v			01/24/17 17:57	164
4-Methyl-2-pentanone (MIBK)	22.1	U	65.6	22.1	ppb v/v			01/24/17 17:57	164
Methylene Chloride	171		65.6	11.8	ppb v/v			01/24/17 17:57	164
Styrene	9.68	U	65.6	9.68	ppb v/v			01/24/17 17:57	164
1,1,2,2-Tetrachloroethane	11.3	U	65.6	11.3	ppb v/v			01/24/17 17:57	164
Tetrachloroethene	692		65.6	8.36	ppb v/v			01/24/17 17:57	164
Toluene	8.36	U	65.6	8.36	ppb v/v			01/24/17 17:57	164
1,1,2-Trichloro-1,2,2-trifluoroethane	862		65.6	26.7	ppb v/v			01/24/17 17:57	164
1,2,4-Trichlorobenzene	71.0	U	328	71.0	ppb v/v			01/24/17 17:57	164
1,1,1-Trichloroethane	40.7	J	49.2	10.7	ppb v/v			01/24/17 17:57	164
1,1,2-Trichloroethane	11.0	U	65.6	11.0	ppb v/v			01/24/17 17:57	164
Trichloroethene	7820		65.6	17.2	ppb v/v			01/24/17 17:57	164
Trichlorofluoromethane	219		65.6	32.1	ppb v/v			01/24/17 17:57	164
1,2,4-Trimethylbenzene	26.6	U	131	26.6	ppb v/v			01/24/17 17:57	164
1,3,5-Trimethylbenzene	20.5	U	65.6	20.5	ppb v/v			01/24/17 17:57	164
Vinyl acetate	23.8	U	131	23.8	ppb v/v			01/24/17 17:57	164
Vinyl chloride	19.7	U	65.6	19.7	ppb v/v			01/24/17 17:57	164
m,p-Xylene	16.4	U	131	16.4	ppb v/v			01/24/17 17:57	164
o-Xylene	8.86	U	65.6	8.86	ppb v/v			01/24/17 17:57	164

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101388-001/CWL-UI1-120

Lab Sample ID: 320-25041-4

Date Collected: 01/09/17 10:15

Matrix: Air

Date Received: 01/17/17 09:45

Sample Container: Summa Canister 6L

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	76		70 - 130		01/24/17 17:57	164
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		01/24/17 17:57	164
Toluene-d8 (Surr)	100		70 - 130		01/24/17 17:57	164

Client Sample ID: 101389-001/CWL-UI2-FB2

Lab Sample ID: 320-25041-5

Date Collected: 01/09/17 11:58

Matrix: Air

Date Received: 01/17/17 09:45

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	2.19	J	5.00	0.178	ppb v/v			01/24/17 18:53	1
Benzene	0.0790	U	0.400	0.0790	ppb v/v			01/24/17 18:53	1
Benzyl chloride	0.163	U	0.800	0.163	ppb v/v			01/24/17 18:53	1
Bromodichloromethane	0.0660	U	0.300	0.0660	ppb v/v			01/24/17 18:53	1
Bromoform	0.0700	U	0.400	0.0700	ppb v/v			01/24/17 18:53	1
Bromomethane	0.335	U	0.800	0.335	ppb v/v			01/24/17 18:53	1
2-Butanone (MEK)	0.427	J	0.800	0.199	ppb v/v			01/24/17 18:53	1
Carbon disulfide	0.0780	U	0.800	0.0780	ppb v/v			01/24/17 18:53	1
Carbon tetrachloride	0.0640	U	0.800	0.0640	ppb v/v			01/24/17 18:53	1
Chlorobenzene	0.0640	U	0.300	0.0640	ppb v/v			01/24/17 18:53	1
Chloroethane	0.308	U	0.800	0.308	ppb v/v			01/24/17 18:53	1
Chloroform	0.0950	U	0.300	0.0950	ppb v/v			01/24/17 18:53	1
Chloromethane	0.197	U	0.800	0.197	ppb v/v			01/24/17 18:53	1
Dibromochloromethane	0.0790	U	0.400	0.0790	ppb v/v			01/24/17 18:53	1
1,2-Dibromoethane (EDB)	0.0750	U	0.800	0.0750	ppb v/v			01/24/17 18:53	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.155	U	0.400	0.155	ppb v/v			01/24/17 18:53	1
1,2-Dichlorobenzene	0.130	U	0.400	0.130	ppb v/v			01/24/17 18:53	1
1,3-Dichlorobenzene	0.110	U	0.400	0.110	ppb v/v			01/24/17 18:53	1
1,4-Dichlorobenzene	0.149	U	0.400	0.149	ppb v/v			01/24/17 18:53	1
Dichlorodifluoromethane	0.145	U	0.400	0.145	ppb v/v			01/24/17 18:53	1
1,1-Dichloroethane	0.0720	U	0.300	0.0720	ppb v/v			01/24/17 18:53	1
1,2-Dichloroethane	0.0880	U	0.800	0.0880	ppb v/v			01/24/17 18:53	1
1,1-Dichloroethene	0.129	U	0.800	0.129	ppb v/v			01/24/17 18:53	1
cis-1,2-Dichloroethene	0.0890	U	0.400	0.0890	ppb v/v			01/24/17 18:53	1
trans-1,2-Dichloroethene	0.100	U	0.400	0.100	ppb v/v			01/24/17 18:53	1
1,2-Dichloropropane	0.240	U	0.400	0.240	ppb v/v			01/24/17 18:53	1
cis-1,3-Dichloropropene	0.104	U	0.400	0.104	ppb v/v			01/24/17 18:53	1
trans-1,3-Dichloropropene	0.0880	U	0.400	0.0880	ppb v/v			01/24/17 18:53	1
Ethylbenzene	0.0959	J	0.400	0.0630	ppb v/v			01/24/17 18:53	1
4-Ethyltoluene	0.187	U	0.400	0.187	ppb v/v			01/24/17 18:53	1
Hexachlorobutadiene	0.432	U	2.00	0.432	ppb v/v			01/24/17 18:53	1
2-Hexanone	0.0870	U	0.400	0.0870	ppb v/v			01/24/17 18:53	1
4-Methyl-2-pentanone (MIBK)	0.135	U	0.400	0.135	ppb v/v			01/24/17 18:53	1
Methylene Chloride	0.349	J	0.400	0.0720	ppb v/v			01/24/17 18:53	1
Styrene	0.0735	J	0.400	0.0590	ppb v/v			01/24/17 18:53	1
1,1,2,2-Tetrachloroethane	0.0690	U	0.400	0.0690	ppb v/v			01/24/17 18:53	1
Tetrachloroethene	0.0703	J	0.400	0.0510	ppb v/v			01/24/17 18:53	1
Toluene	1.03		0.400	0.0510	ppb v/v			01/24/17 18:53	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101389-001/CWL-UI2-FB2

Lab Sample ID: 320-25041-5

Date Collected: 01/09/17 11:58

Matrix: Air

Date Received: 01/17/17 09:45

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	0.163	U	0.400	0.163	ppb v/v			01/24/17 18:53	1
1,2,4-Trichlorobenzene	0.433	U	2.00	0.433	ppb v/v			01/24/17 18:53	1
1,1,1-Trichloroethane	0.0650	U	0.300	0.0650	ppb v/v			01/24/17 18:53	1
1,1,2-Trichloroethane	0.0670	U	0.400	0.0670	ppb v/v			01/24/17 18:53	1
Trichloroethene	0.462		0.400	0.105	ppb v/v			01/24/17 18:53	1
Trichlorofluoromethane	0.196	U	0.400	0.196	ppb v/v			01/24/17 18:53	1
1,2,4-Trimethylbenzene	0.162	U	0.800	0.162	ppb v/v			01/24/17 18:53	1
1,3,5-Trimethylbenzene	0.125	U	0.400	0.125	ppb v/v			01/24/17 18:53	1
Vinyl acetate	0.145	U	0.800	0.145	ppb v/v			01/24/17 18:53	1
Vinyl chloride	0.120	U	0.400	0.120	ppb v/v			01/24/17 18:53	1
m,p-Xylene	0.248	J	0.800	0.100	ppb v/v			01/24/17 18:53	1
o-Xylene	0.0976	J	0.400	0.0540	ppb v/v			01/24/17 18:53	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130					01/24/17 18:53	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 130					01/24/17 18:53	1
Toluene-d8 (Surr)	102		70 - 130					01/24/17 18:53	1

Client Sample ID: 101390-001/CWL-UI2-36

Lab Sample ID: 320-25041-6

Date Collected: 01/09/17 12:02

Matrix: Air

Date Received: 01/17/17 09:45

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	12.8	U	360	12.8	ppb v/v			01/24/17 19:42	72
Benzene	5.69	U	28.8	5.69	ppb v/v			01/24/17 19:42	72
Benzyl chloride	11.7	U	57.6	11.7	ppb v/v			01/24/17 19:42	72
Bromodichloromethane	4.75	U	21.6	4.75	ppb v/v			01/24/17 19:42	72
Bromoform	5.04	U	28.8	5.04	ppb v/v			01/24/17 19:42	72
Bromomethane	24.1	U	57.6	24.1	ppb v/v			01/24/17 19:42	72
2-Butanone (MEK)	14.3	U	57.6	14.3	ppb v/v			01/24/17 19:42	72
Carbon disulfide	5.62	U	57.6	5.62	ppb v/v			01/24/17 19:42	72
Carbon tetrachloride	14.2	J	57.6	4.61	ppb v/v			01/24/17 19:42	72
Chlorobenzene	4.61	U	21.6	4.61	ppb v/v			01/24/17 19:42	72
Chloroethane	22.2	U	57.6	22.2	ppb v/v			01/24/17 19:42	72
Chloroform	649		21.6	6.84	ppb v/v			01/24/17 19:42	72
Chloromethane	14.2	U	57.6	14.2	ppb v/v			01/24/17 19:42	72
Dibromochloromethane	5.69	U	28.8	5.69	ppb v/v			01/24/17 19:42	72
1,2-Dibromoethane (EDB)	5.40	U	57.6	5.40	ppb v/v			01/24/17 19:42	72
1,2-Dichloro-1,1,2,2-tetrafluoroethane	11.2	U	28.8	11.2	ppb v/v			01/24/17 19:42	72
1,2-Dichlorobenzene	9.36	U	28.8	9.36	ppb v/v			01/24/17 19:42	72
1,3-Dichlorobenzene	7.92	U	28.8	7.92	ppb v/v			01/24/17 19:42	72
1,4-Dichlorobenzene	10.7	U	28.8	10.7	ppb v/v			01/24/17 19:42	72
Dichlorodifluoromethane	23.5	J	28.8	10.4	ppb v/v			01/24/17 19:42	72
1,1-Dichloroethane	5.18	U	21.6	5.18	ppb v/v			01/24/17 19:42	72
1,2-Dichloroethane	6.34	U	57.6	6.34	ppb v/v			01/24/17 19:42	72
1,1-Dichloroethene	53.6	J	57.6	9.29	ppb v/v			01/24/17 19:42	72
cis-1,2-Dichloroethene	6.41	U	28.8	6.41	ppb v/v			01/24/17 19:42	72

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101390-001/CWL-UI2-36

Lab Sample ID: 320-25041-6

Date Collected: 01/09/17 12:02

Matrix: Air

Date Received: 01/17/17 09:45

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	7.20	U	28.8	7.20	ppb v/v			01/24/17 19:42	72
1,2-Dichloropropane	51.9		28.8	17.3	ppb v/v			01/24/17 19:42	72
cis-1,3-Dichloropropene	7.49	U	28.8	7.49	ppb v/v			01/24/17 19:42	72
trans-1,3-Dichloropropene	6.34	U	28.8	6.34	ppb v/v			01/24/17 19:42	72
Ethylbenzene	4.54	U	28.8	4.54	ppb v/v			01/24/17 19:42	72
4-Ethyltoluene	13.5	U	28.8	13.5	ppb v/v			01/24/17 19:42	72
Hexachlorobutadiene	31.1	U	144	31.1	ppb v/v			01/24/17 19:42	72
2-Hexanone	6.26	U	28.8	6.26	ppb v/v			01/24/17 19:42	72
4-Methyl-2-pentanone (MIBK)	9.72	U	28.8	9.72	ppb v/v			01/24/17 19:42	72
Methylene Chloride	6.88	J	28.8	5.18	ppb v/v			01/24/17 19:42	72
Styrene	4.25	U	28.8	4.25	ppb v/v			01/24/17 19:42	72
1,1,2,2-Tetrachloroethane	4.97	U	28.8	4.97	ppb v/v			01/24/17 19:42	72
Tetrachloroethene	213		28.8	3.67	ppb v/v			01/24/17 19:42	72
Toluene	3.67	U	28.8	3.67	ppb v/v			01/24/17 19:42	72
1,1,2-Trichloro-1,2,2-trifluoroethane	550		28.8	11.7	ppb v/v			01/24/17 19:42	72
1,2,4-Trichlorobenzene	31.2	U	144	31.2	ppb v/v			01/24/17 19:42	72
1,1,1-Trichloroethane	31.3		21.6	4.68	ppb v/v			01/24/17 19:42	72
1,1,2-Trichloroethane	4.82	U	28.8	4.82	ppb v/v			01/24/17 19:42	72
Trichloroethene	3720		28.8	7.56	ppb v/v			01/24/17 19:42	72
Trichlorofluoromethane	152		28.8	14.1	ppb v/v			01/24/17 19:42	72
1,2,4-Trimethylbenzene	11.7	U	57.6	11.7	ppb v/v			01/24/17 19:42	72
1,3,5-Trimethylbenzene	9.00	U	28.8	9.00	ppb v/v			01/24/17 19:42	72
Vinyl acetate	10.4	U	57.6	10.4	ppb v/v			01/24/17 19:42	72
Vinyl chloride	8.64	U	28.8	8.64	ppb v/v			01/24/17 19:42	72
m,p-Xylene	7.20	U	57.6	7.20	ppb v/v			01/24/17 19:42	72
o-Xylene	3.89	U	28.8	3.89	ppb v/v			01/24/17 19:42	72
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	73		70 - 130					01/24/17 19:42	72
1,2-Dichloroethane-d4 (Surr)	106		70 - 130					01/24/17 19:42	72
Toluene-d8 (Surr)	101		70 - 130					01/24/17 19:42	72

Client Sample ID: 101391-001/CWL-UI2-76

Lab Sample ID: 320-25041-7

Date Collected: 01/09/17 12:06

Matrix: Air

Date Received: 01/17/17 09:45

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	20.3	U	570	20.3	ppb v/v			01/24/17 20:32	114
Benzene	9.01	U	45.6	9.01	ppb v/v			01/24/17 20:32	114
Benzyl chloride	18.6	U	91.2	18.6	ppb v/v			01/24/17 20:32	114
Bromodichloromethane	7.52	U	34.2	7.52	ppb v/v			01/24/17 20:32	114
Bromoform	7.98	U	45.6	7.98	ppb v/v			01/24/17 20:32	114
Bromomethane	38.2	U	91.2	38.2	ppb v/v			01/24/17 20:32	114
2-Butanone (MEK)	22.7	U	91.2	22.7	ppb v/v			01/24/17 20:32	114
Carbon disulfide	8.89	U	91.2	8.89	ppb v/v			01/24/17 20:32	114
Carbon tetrachloride	18.2	J	91.2	7.30	ppb v/v			01/24/17 20:32	114

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101391-001/CWL-UI2-76

Lab Sample ID: 320-25041-7

Date Collected: 01/09/17 12:06

Matrix: Air

Date Received: 01/17/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	7.30	U	34.2	7.30	ppb v/v			01/24/17 20:32	114
Chloroethane	35.1	U	91.2	35.1	ppb v/v			01/24/17 20:32	114
Chloroform	719		34.2	10.8	ppb v/v			01/24/17 20:32	114
Chloromethane	22.5	U	91.2	22.5	ppb v/v			01/24/17 20:32	114
Dibromochloromethane	9.01	U	45.6	9.01	ppb v/v			01/24/17 20:32	114
1,2-Dibromoethane (EDB)	8.55	U	91.2	8.55	ppb v/v			01/24/17 20:32	114
1,2-Dichloro-1,1,2,2-tetrafluoroethane	17.7	U	45.6	17.7	ppb v/v			01/24/17 20:32	114
1,2-Dichlorobenzene	14.8	U	45.6	14.8	ppb v/v			01/24/17 20:32	114
1,3-Dichlorobenzene	12.5	U	45.6	12.5	ppb v/v			01/24/17 20:32	114
1,4-Dichlorobenzene	17.0	U	45.6	17.0	ppb v/v			01/24/17 20:32	114
Dichlorodifluoromethane	31.8	J	45.6	16.5	ppb v/v			01/24/17 20:32	114
1,1-Dichloroethane	8.21	U	34.2	8.21	ppb v/v			01/24/17 20:32	114
1,2-Dichloroethane	10.0	U	91.2	10.0	ppb v/v			01/24/17 20:32	114
1,1-Dichloroethene	119		91.2	14.7	ppb v/v			01/24/17 20:32	114
cis-1,2-Dichloroethene	10.1	U	45.6	10.1	ppb v/v			01/24/17 20:32	114
trans-1,2-Dichloroethene	11.4	U	45.6	11.4	ppb v/v			01/24/17 20:32	114
1,2-Dichloropropane	107		45.6	27.4	ppb v/v			01/24/17 20:32	114
cis-1,3-Dichloropropene	11.9	U	45.6	11.9	ppb v/v			01/24/17 20:32	114
trans-1,3-Dichloropropene	10.0	U	45.6	10.0	ppb v/v			01/24/17 20:32	114
Ethylbenzene	7.18	U	45.6	7.18	ppb v/v			01/24/17 20:32	114
4-Ethyltoluene	21.3	U	45.6	21.3	ppb v/v			01/24/17 20:32	114
Hexachlorobutadiene	49.2	U	228	49.2	ppb v/v			01/24/17 20:32	114
2-Hexanone	9.92	U	45.6	9.92	ppb v/v			01/24/17 20:32	114
4-Methyl-2-pentanone (MIBK)	15.4	U	45.6	15.4	ppb v/v			01/24/17 20:32	114
Methylene Chloride	10.3	J	45.6	8.21	ppb v/v			01/24/17 20:32	114
Styrene	6.73	U	45.6	6.73	ppb v/v			01/24/17 20:32	114
1,1,2,2-Tetrachloroethane	7.87	U	45.6	7.87	ppb v/v			01/24/17 20:32	114
Tetrachloroethene	244		45.6	5.81	ppb v/v			01/24/17 20:32	114
Toluene	5.81	U	45.6	5.81	ppb v/v			01/24/17 20:32	114
1,1,2-Trichloro-1,2,2-trifluoroethane	728		45.6	18.6	ppb v/v			01/24/17 20:32	114
1,2,4-Trichlorobenzene	49.4	U	228	49.4	ppb v/v			01/24/17 20:32	114
1,1,1-Trichloroethane	30.0	J	34.2	7.41	ppb v/v			01/24/17 20:32	114
1,1,2-Trichloroethane	7.64	U	45.6	7.64	ppb v/v			01/24/17 20:32	114
Trichloroethene	5320		45.6	12.0	ppb v/v			01/24/17 20:32	114
Trichlorofluoromethane	197		45.6	22.3	ppb v/v			01/24/17 20:32	114
1,2,4-Trimethylbenzene	18.5	U	91.2	18.5	ppb v/v			01/24/17 20:32	114
1,3,5-Trimethylbenzene	14.3	U	45.6	14.3	ppb v/v			01/24/17 20:32	114
Vinyl acetate	16.5	U	91.2	16.5	ppb v/v			01/24/17 20:32	114
Vinyl chloride	13.7	U	45.6	13.7	ppb v/v			01/24/17 20:32	114
m,p-Xylene	11.4	U	91.2	11.4	ppb v/v			01/24/17 20:32	114
o-Xylene	6.16	U	45.6	6.16	ppb v/v			01/24/17 20:32	114
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	75		70 - 130					01/24/17 20:32	114
1,2-Dichloroethane-d4 (Surr)	105		70 - 130					01/24/17 20:32	114
Toluene-d8 (Surr)	102		70 - 130					01/24/17 20:32	114

Client Sample Results

Client: Sandia National Laboratories
 Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101392-001/CWL-UI2-136

Lab Sample ID: 320-25041-8

Date Collected: 01/09/17 12:09

Matrix: Air

Date Received: 01/17/17 09:45

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	23.0	U	645	23.0	ppb v/v			01/24/17 21:20	129
Benzene	10.2	U	51.6	10.2	ppb v/v			01/24/17 21:20	129
Benzyl chloride	21.0	U	103	21.0	ppb v/v			01/24/17 21:20	129
Bromodichloromethane	8.51	U	38.7	8.51	ppb v/v			01/24/17 21:20	129
Bromoform	9.03	U	51.6	9.03	ppb v/v			01/24/17 21:20	129
Bromomethane	43.2	U	103	43.2	ppb v/v			01/24/17 21:20	129
2-Butanone (MEK)	25.7	U	103	25.7	ppb v/v			01/24/17 21:20	129
Carbon disulfide	10.1	U	103	10.1	ppb v/v			01/24/17 21:20	129
Carbon tetrachloride	24.8	J	103	8.26	ppb v/v			01/24/17 21:20	129
Chlorobenzene	8.26	U	38.7	8.26	ppb v/v			01/24/17 21:20	129
Chloroethane	39.7	U	103	39.7	ppb v/v			01/24/17 21:20	129
Chloroform	648		38.7	12.3	ppb v/v			01/24/17 21:20	129
Chloromethane	25.4	U	103	25.4	ppb v/v			01/24/17 21:20	129
Dibromochloromethane	10.2	U	51.6	10.2	ppb v/v			01/24/17 21:20	129
1,2-Dibromoethane (EDB)	9.68	U	103	9.68	ppb v/v			01/24/17 21:20	129
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	U	51.6	20.0	ppb v/v			01/24/17 21:20	129
1,2-Dichlorobenzene	16.8	U	51.6	16.8	ppb v/v			01/24/17 21:20	129
1,3-Dichlorobenzene	14.2	U	51.6	14.2	ppb v/v			01/24/17 21:20	129
1,4-Dichlorobenzene	19.2	U	51.6	19.2	ppb v/v			01/24/17 21:20	129
Dichlorodifluoromethane	34.9	J	51.6	18.7	ppb v/v			01/24/17 21:20	129
1,1-Dichloroethane	11.2	J	38.7	9.29	ppb v/v			01/24/17 21:20	129
1,2-Dichloroethane	17.3	J	103	11.4	ppb v/v			01/24/17 21:20	129
1,1-Dichloroethene	186		103	16.6	ppb v/v			01/24/17 21:20	129
cis-1,2-Dichloroethene	11.5	U	51.6	11.5	ppb v/v			01/24/17 21:20	129
trans-1,2-Dichloroethene	12.9	U	51.6	12.9	ppb v/v			01/24/17 21:20	129
1,2-Dichloropropane	164		51.6	31.0	ppb v/v			01/24/17 21:20	129
cis-1,3-Dichloropropene	13.4	U	51.6	13.4	ppb v/v			01/24/17 21:20	129
trans-1,3-Dichloropropene	11.4	U	51.6	11.4	ppb v/v			01/24/17 21:20	129
Ethylbenzene	8.13	U	51.6	8.13	ppb v/v			01/24/17 21:20	129
4-Ethyltoluene	24.1	U	51.6	24.1	ppb v/v			01/24/17 21:20	129
Hexachlorobutadiene	55.7	U	258	55.7	ppb v/v			01/24/17 21:20	129
2-Hexanone	11.2	U	51.6	11.2	ppb v/v			01/24/17 21:20	129
4-Methyl-2-pentanone (MIBK)	17.4	U	51.6	17.4	ppb v/v			01/24/17 21:20	129
Methylene Chloride	13.3	J	51.6	9.29	ppb v/v			01/24/17 21:20	129
Styrene	7.61	U	51.6	7.61	ppb v/v			01/24/17 21:20	129
1,1,2,2-Tetrachloroethane	8.90	U	51.6	8.90	ppb v/v			01/24/17 21:20	129
Tetrachloroethene	266		51.6	6.58	ppb v/v			01/24/17 21:20	129
Toluene	6.58	U	51.6	6.58	ppb v/v			01/24/17 21:20	129
1,1,2-Trichloro-1,2,2-trifluoroethane	861		51.6	21.0	ppb v/v			01/24/17 21:20	129
1,2,4-Trichlorobenzene	55.9	U	258	55.9	ppb v/v			01/24/17 21:20	129
1,1,1-Trichloroethane	26.7	J	38.7	8.39	ppb v/v			01/24/17 21:20	129
1,1,2-Trichloroethane	8.64	U	51.6	8.64	ppb v/v			01/24/17 21:20	129
Trichloroethene	6760		51.6	13.5	ppb v/v			01/24/17 21:20	129
Trichlorofluoromethane	225		51.6	25.3	ppb v/v			01/24/17 21:20	129
1,2,4-Trimethylbenzene	20.9	U	103	20.9	ppb v/v			01/24/17 21:20	129
1,3,5-Trimethylbenzene	16.1	U	51.6	16.1	ppb v/v			01/24/17 21:20	129
Vinyl acetate	18.7	U	103	18.7	ppb v/v			01/24/17 21:20	129
Vinyl chloride	15.5	U	51.6	15.5	ppb v/v			01/24/17 21:20	129

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101392-001/CWL-UI2-136

Lab Sample ID: 320-25041-8

Date Collected: 01/09/17 12:09

Matrix: Air

Date Received: 01/17/17 09:45

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	12.9	U	103	12.9	ppb v/v			01/24/17 21:20	129
o-Xylene	6.97	U	51.6	6.97	ppb v/v			01/24/17 21:20	129

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	72		70 - 130		01/24/17 21:20	129
1,2-Dichloroethane-d4 (Surr)	104		70 - 130		01/24/17 21:20	129
Toluene-d8 (Surr)	99		70 - 130		01/24/17 21:20	129

Client Sample ID: 101393-001/CWL-D1-FB1

Lab Sample ID: 320-25041-9

Date Collected: 01/09/17 08:29

Matrix: Air

Date Received: 01/17/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	0.178	U	5.00	0.178	ppb v/v			01/24/17 22:16	1
Benzene	0.0790	U	0.400	0.0790	ppb v/v			01/24/17 22:16	1
Benzyl chloride	0.163	U	0.800	0.163	ppb v/v			01/24/17 22:16	1
Bromodichloromethane	0.0660	U	0.300	0.0660	ppb v/v			01/24/17 22:16	1
Bromoform	0.0700	U	0.400	0.0700	ppb v/v			01/24/17 22:16	1
Bromomethane	0.335	U	0.800	0.335	ppb v/v			01/24/17 22:16	1
2-Butanone (MEK)	0.199	U	0.800	0.199	ppb v/v			01/24/17 22:16	1
Carbon disulfide	0.0780	U	0.800	0.0780	ppb v/v			01/24/17 22:16	1
Carbon tetrachloride	0.0640	U	0.800	0.0640	ppb v/v			01/24/17 22:16	1
Chlorobenzene	0.0640	U	0.300	0.0640	ppb v/v			01/24/17 22:16	1
Chloroethane	0.308	U	0.800	0.308	ppb v/v			01/24/17 22:16	1
Chloroform	0.0950	U	0.300	0.0950	ppb v/v			01/24/17 22:16	1
Chloromethane	0.197	U	0.800	0.197	ppb v/v			01/24/17 22:16	1
Dibromochloromethane	0.0790	U	0.400	0.0790	ppb v/v			01/24/17 22:16	1
1,2-Dibromoethane (EDB)	0.0750	U	0.800	0.0750	ppb v/v			01/24/17 22:16	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.155	U	0.400	0.155	ppb v/v			01/24/17 22:16	1
1,2-Dichlorobenzene	0.130	U	0.400	0.130	ppb v/v			01/24/17 22:16	1
1,3-Dichlorobenzene	0.110	U	0.400	0.110	ppb v/v			01/24/17 22:16	1
1,4-Dichlorobenzene	0.149	U	0.400	0.149	ppb v/v			01/24/17 22:16	1
Dichlorodifluoromethane	0.145	U	0.400	0.145	ppb v/v			01/24/17 22:16	1
1,1-Dichloroethane	0.0720	U	0.300	0.0720	ppb v/v			01/24/17 22:16	1
1,2-Dichloroethane	0.0880	U	0.800	0.0880	ppb v/v			01/24/17 22:16	1
1,1-Dichloroethene	0.129	U	0.800	0.129	ppb v/v			01/24/17 22:16	1
cis-1,2-Dichloroethene	0.0890	U	0.400	0.0890	ppb v/v			01/24/17 22:16	1
trans-1,2-Dichloroethene	0.100	U	0.400	0.100	ppb v/v			01/24/17 22:16	1
1,2-Dichloropropane	0.240	U	0.400	0.240	ppb v/v			01/24/17 22:16	1
cis-1,3-Dichloropropene	0.104	U	0.400	0.104	ppb v/v			01/24/17 22:16	1
trans-1,3-Dichloropropene	0.0880	U	0.400	0.0880	ppb v/v			01/24/17 22:16	1
Ethylbenzene	0.0630	U	0.400	0.0630	ppb v/v			01/24/17 22:16	1
4-Ethyltoluene	0.187	U	0.400	0.187	ppb v/v			01/24/17 22:16	1
Hexachlorobutadiene	0.432	U	2.00	0.432	ppb v/v			01/24/17 22:16	1
2-Hexanone	0.0870	U	0.400	0.0870	ppb v/v			01/24/17 22:16	1
4-Methyl-2-pentanone (MIBK)	0.135	U	0.400	0.135	ppb v/v			01/24/17 22:16	1
Methylene Chloride	0.0720	U	0.400	0.0720	ppb v/v			01/24/17 22:16	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101393-001/CWL-D1-FB1

Lab Sample ID: 320-25041-9

Date Collected: 01/09/17 08:29

Matrix: Air

Date Received: 01/17/17 09:45

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	0.0590	U	0.400	0.0590	ppb v/v			01/24/17 22:16	1
1,1,2,2-Tetrachloroethane	0.0690	U	0.400	0.0690	ppb v/v			01/24/17 22:16	1
Tetrachloroethene	0.0510	U	0.400	0.0510	ppb v/v			01/24/17 22:16	1
Toluene	0.0510	U	0.400	0.0510	ppb v/v			01/24/17 22:16	1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.163	U	0.400	0.163	ppb v/v			01/24/17 22:16	1
1,2,4-Trichlorobenzene	0.433	U	2.00	0.433	ppb v/v			01/24/17 22:16	1
1,1,1-Trichloroethane	0.0650	U	0.300	0.0650	ppb v/v			01/24/17 22:16	1
1,1,2-Trichloroethane	0.0670	U	0.400	0.0670	ppb v/v			01/24/17 22:16	1
Trichloroethene	0.805		0.400	0.105	ppb v/v			01/24/17 22:16	1
Trichlorofluoromethane	0.196	U	0.400	0.196	ppb v/v			01/24/17 22:16	1
1,2,4-Trimethylbenzene	0.162	U	0.800	0.162	ppb v/v			01/24/17 22:16	1
1,3,5-Trimethylbenzene	0.125	U	0.400	0.125	ppb v/v			01/24/17 22:16	1
Vinyl acetate	0.145	U	0.800	0.145	ppb v/v			01/24/17 22:16	1
Vinyl chloride	0.120	U	0.400	0.120	ppb v/v			01/24/17 22:16	1
m,p-Xylene	0.100	U	0.800	0.100	ppb v/v			01/24/17 22:16	1
o-Xylene	0.0540	U	0.400	0.0540	ppb v/v			01/24/17 22:16	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		70 - 130		01/24/17 22:16	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 130		01/24/17 22:16	1
Toluene-d8 (Surr)	101		70 - 130		01/24/17 22:16	1

Client Sample ID: 101394-001/CWL-D1-100

Lab Sample ID: 320-25041-10

Date Collected: 01/09/17 08:40

Matrix: Air

Date Received: 01/17/17 09:45

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	31.0	U	870	31.0	ppb v/v			01/24/17 23:06	174
Benzene	13.7	U	69.6	13.7	ppb v/v			01/24/17 23:06	174
Benzyl chloride	28.4	U	139	28.4	ppb v/v			01/24/17 23:06	174
Bromodichloromethane	11.5	U	52.2	11.5	ppb v/v			01/24/17 23:06	174
Bromoform	12.2	U	69.6	12.2	ppb v/v			01/24/17 23:06	174
Bromomethane	58.3	U	139	58.3	ppb v/v			01/24/17 23:06	174
2-Butanone (MEK)	34.6	U	139	34.6	ppb v/v			01/24/17 23:06	174
Carbon disulfide	13.6	U	139	13.6	ppb v/v			01/24/17 23:06	174
Carbon tetrachloride	25.0	J	139	11.1	ppb v/v			01/24/17 23:06	174
Chlorobenzene	11.1	U	52.2	11.1	ppb v/v			01/24/17 23:06	174
Chloroethane	53.6	U	139	53.6	ppb v/v			01/24/17 23:06	174
Chloroform	576		52.2	16.5	ppb v/v			01/24/17 23:06	174
Chloromethane	34.3	U	139	34.3	ppb v/v			01/24/17 23:06	174
Dibromochloromethane	13.7	U	69.6	13.7	ppb v/v			01/24/17 23:06	174
1,2-Dibromoethane (EDB)	13.1	U	139	13.1	ppb v/v			01/24/17 23:06	174
1,2-Dichloro-1,1,2,2-tetrafluoroethane	27.0	U	69.6	27.0	ppb v/v			01/24/17 23:06	174
1,2-Dichlorobenzene	22.6	U	69.6	22.6	ppb v/v			01/24/17 23:06	174
1,3-Dichlorobenzene	19.1	U	69.6	19.1	ppb v/v			01/24/17 23:06	174
1,4-Dichlorobenzene	25.9	U	69.6	25.9	ppb v/v			01/24/17 23:06	174
Dichlorodifluoromethane	43.5	J	69.6	25.2	ppb v/v			01/24/17 23:06	174

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101394-001/CWL-D1-100

Lab Sample ID: 320-25041-10

Date Collected: 01/09/17 08:40

Matrix: Air

Date Received: 01/17/17 09:45

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	17.9	J	52.2	12.5	ppb v/v			01/24/17 23:06	174
1,2-Dichloroethane	27.6	J	139	15.3	ppb v/v			01/24/17 23:06	174
1,1-Dichloroethene	403		139	22.4	ppb v/v			01/24/17 23:06	174
cis-1,2-Dichloroethene	15.5	U	69.6	15.5	ppb v/v			01/24/17 23:06	174
trans-1,2-Dichloroethene	17.4	U	69.6	17.4	ppb v/v			01/24/17 23:06	174
1,2-Dichloropropane	92.0		69.6	41.8	ppb v/v			01/24/17 23:06	174
cis-1,3-Dichloropropene	18.1	U	69.6	18.1	ppb v/v			01/24/17 23:06	174
trans-1,3-Dichloropropene	15.3	U	69.6	15.3	ppb v/v			01/24/17 23:06	174
Ethylbenzene	11.0	U	69.6	11.0	ppb v/v			01/24/17 23:06	174
4-Ethyltoluene	32.5	U	69.6	32.5	ppb v/v			01/24/17 23:06	174
Hexachlorobutadiene	75.2	U	348	75.2	ppb v/v			01/24/17 23:06	174
2-Hexanone	15.1	U	69.6	15.1	ppb v/v			01/24/17 23:06	174
4-Methyl-2-pentanone (MIBK)	23.5	U	69.6	23.5	ppb v/v			01/24/17 23:06	174
Methylene Chloride	30.3	J	69.6	12.5	ppb v/v			01/24/17 23:06	174
Styrene	10.3	U	69.6	10.3	ppb v/v			01/24/17 23:06	174
1,1,2,2-Tetrachloroethane	12.0	U	69.6	12.0	ppb v/v			01/24/17 23:06	174
Tetrachloroethene	474		69.6	8.87	ppb v/v			01/24/17 23:06	174
Toluene	8.87	U	69.6	8.87	ppb v/v			01/24/17 23:06	174
1,1,2-Trichloro-1,2,2-trifluoroethane	1150		69.6	28.4	ppb v/v			01/24/17 23:06	174
1,2,4-Trichlorobenzene	75.3	U	348	75.3	ppb v/v			01/24/17 23:06	174
1,1,1-Trichloroethane	40.1	J	52.2	11.3	ppb v/v			01/24/17 23:06	174
1,1,2-Trichloroethane	11.7	U	69.6	11.7	ppb v/v			01/24/17 23:06	174
Trichloroethene	8040		69.6	18.3	ppb v/v			01/24/17 23:06	174
Trichlorofluoromethane	290		69.6	34.1	ppb v/v			01/24/17 23:06	174
1,2,4-Trimethylbenzene	28.2	U	139	28.2	ppb v/v			01/24/17 23:06	174
1,3,5-Trimethylbenzene	21.8	U	69.6	21.8	ppb v/v			01/24/17 23:06	174
Vinyl acetate	25.2	U	139	25.2	ppb v/v			01/24/17 23:06	174
Vinyl chloride	20.9	U	69.6	20.9	ppb v/v			01/24/17 23:06	174
m,p-Xylene	17.4	U	139	17.4	ppb v/v			01/24/17 23:06	174
o-Xylene	9.40	U	69.6	9.40	ppb v/v			01/24/17 23:06	174

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	69	X	70 - 130		01/24/17 23:06	174
1,2-Dichloroethane-d4 (Surr)	105		70 - 130		01/24/17 23:06	174
Toluene-d8 (Surr)	100		70 - 130		01/24/17 23:06	174

Client Sample ID: 101395-001/CWL-D1-160

Lab Sample ID: 320-25041-11

Date Collected: 01/09/17 08:45

Matrix: Air

Date Received: 01/17/17 09:45

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	31.7	U	890	31.7	ppb v/v			01/24/17 23:55	178
Benzene	14.1	U	71.2	14.1	ppb v/v			01/24/17 23:55	178
Benzyl chloride	29.0	U	142	29.0	ppb v/v			01/24/17 23:55	178
Bromodichloromethane	11.7	U	53.4	11.7	ppb v/v			01/24/17 23:55	178
Bromoform	12.5	U	71.2	12.5	ppb v/v			01/24/17 23:55	178

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101395-001/CWL-D1-160

Lab Sample ID: 320-25041-11

Date Collected: 01/09/17 08:45

Matrix: Air

Date Received: 01/17/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromomethane	59.6	U	142	59.6	ppb v/v			01/24/17 23:55	178
2-Butanone (MEK)	35.4	U	142	35.4	ppb v/v			01/24/17 23:55	178
Carbon disulfide	13.9	U	142	13.9	ppb v/v			01/24/17 23:55	178
Carbon tetrachloride	54.6	J	142	11.4	ppb v/v			01/24/17 23:55	178
Chlorobenzene	11.4	U	53.4	11.4	ppb v/v			01/24/17 23:55	178
Chloroethane	54.8	U	142	54.8	ppb v/v			01/24/17 23:55	178
Chloroform	600		53.4	16.9	ppb v/v			01/24/17 23:55	178
Chloromethane	35.1	U	142	35.1	ppb v/v			01/24/17 23:55	178
Dibromochloromethane	14.1	U	71.2	14.1	ppb v/v			01/24/17 23:55	178
1,2-Dibromoethane (EDB)	13.4	U	142	13.4	ppb v/v			01/24/17 23:55	178
1,2-Dichloro-1,1,2,2-tetrafluoroethane	27.6	U	71.2	27.6	ppb v/v			01/24/17 23:55	178
1,2-Dichlorobenzene	23.1	U	71.2	23.1	ppb v/v			01/24/17 23:55	178
1,3-Dichlorobenzene	19.6	U	71.2	19.6	ppb v/v			01/24/17 23:55	178
1,4-Dichlorobenzene	26.5	U	71.2	26.5	ppb v/v			01/24/17 23:55	178
Dichlorodifluoromethane	69.4	J	71.2	25.8	ppb v/v			01/24/17 23:55	178
1,1-Dichloroethane	29.9	J	53.4	12.8	ppb v/v			01/24/17 23:55	178
1,2-Dichloroethane	46.5	J	142	15.7	ppb v/v			01/24/17 23:55	178
1,1-Dichloroethene	750		142	23.0	ppb v/v			01/24/17 23:55	178
cis-1,2-Dichloroethene	15.8	U	71.2	15.8	ppb v/v			01/24/17 23:55	178
trans-1,2-Dichloroethene	17.8	U	71.2	17.8	ppb v/v			01/24/17 23:55	178
1,2-Dichloropropane	207		71.2	42.7	ppb v/v			01/24/17 23:55	178
cis-1,3-Dichloropropene	18.5	U	71.2	18.5	ppb v/v			01/24/17 23:55	178
trans-1,3-Dichloropropene	15.7	U	71.2	15.7	ppb v/v			01/24/17 23:55	178
Ethylbenzene	11.2	U	71.2	11.2	ppb v/v			01/24/17 23:55	178
4-Ethyltoluene	33.3	U	71.2	33.3	ppb v/v			01/24/17 23:55	178
Hexachlorobutadiene	76.9	U	356	76.9	ppb v/v			01/24/17 23:55	178
2-Hexanone	15.5	U	71.2	15.5	ppb v/v			01/24/17 23:55	178
4-Methyl-2-pentanone (MIBK)	24.0	U	71.2	24.0	ppb v/v			01/24/17 23:55	178
Methylene Chloride	12.8	U	71.2	12.8	ppb v/v			01/24/17 23:55	178
Styrene	10.5	U	71.2	10.5	ppb v/v			01/24/17 23:55	178
1,1,2,2-Tetrachloroethane	12.3	U	71.2	12.3	ppb v/v			01/24/17 23:55	178
Tetrachloroethene	789		71.2	9.08	ppb v/v			01/24/17 23:55	178
Toluene	9.08	U	71.2	9.08	ppb v/v			01/24/17 23:55	178
1,1,2-Trichloro-1,2,2-trifluoroethane	1950		71.2	29.0	ppb v/v			01/24/17 23:55	178
1,2,4-Trichlorobenzene	77.1	U	356	77.1	ppb v/v			01/24/17 23:55	178
1,1,1-Trichloroethane	51.7	J	53.4	11.6	ppb v/v			01/24/17 23:55	178
1,1,2-Trichloroethane	11.9	U	71.2	11.9	ppb v/v			01/24/17 23:55	178
Trichlorofluoromethane	471		71.2	34.9	ppb v/v			01/24/17 23:55	178
1,2,4-Trimethylbenzene	28.8	U	142	28.8	ppb v/v			01/24/17 23:55	178
1,3,5-Trimethylbenzene	22.3	U	71.2	22.3	ppb v/v			01/24/17 23:55	178
Vinyl acetate	25.8	U	142	25.8	ppb v/v			01/24/17 23:55	178
Vinyl chloride	21.4	U	71.2	21.4	ppb v/v			01/24/17 23:55	178
m,p-Xylene	17.8	U	142	17.8	ppb v/v			01/24/17 23:55	178
o-Xylene	9.61	U	71.2	9.61	ppb v/v			01/24/17 23:55	178

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	70		70 - 130		01/24/17 23:55	178
1,2-Dichloroethane-d4 (Surr)	105		70 - 130		01/24/17 23:55	178

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101395-001/CWL-D1-160

Lab Sample ID: 320-25041-11

Date Collected: 01/09/17 08:45

Matrix: Air

Date Received: 01/17/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		70 - 130		01/24/17 23:55	178

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	15600		142	37.3	ppb v/v			01/25/17 18:04	355

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	66	X	70 - 130		01/25/17 18:04	355
1,2-Dichloroethane-d4 (Surr)	102		70 - 130		01/25/17 18:04	355
Toluene-d8 (Surr)	101		70 - 130		01/25/17 18:04	355

Client Sample ID: 101396-001/CWL-D1-240

Lab Sample ID: 320-25041-12

Date Collected: 01/09/17 09:46

Matrix: Air

Date Received: 01/17/17 09:45

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	50.6	U	1420	50.6	ppb v/v			01/25/17 00:44	284
Benzene	22.4	U	114	22.4	ppb v/v			01/25/17 00:44	284
Benzyl chloride	46.3	U	227	46.3	ppb v/v			01/25/17 00:44	284
Bromodichloromethane	18.7	U	85.2	18.7	ppb v/v			01/25/17 00:44	284
Bromoform	19.9	U	114	19.9	ppb v/v			01/25/17 00:44	284
Bromomethane	95.1	U	227	95.1	ppb v/v			01/25/17 00:44	284
2-Butanone (MEK)	56.5	U	227	56.5	ppb v/v			01/25/17 00:44	284
Carbon disulfide	22.2	U	227	22.2	ppb v/v			01/25/17 00:44	284
Carbon tetrachloride	72.6	J	227	18.2	ppb v/v			01/25/17 00:44	284
Chlorobenzene	18.2	U	85.2	18.2	ppb v/v			01/25/17 00:44	284
Chloroethane	87.5	U	227	87.5	ppb v/v			01/25/17 00:44	284
Chloroform	594		85.2	27.0	ppb v/v			01/25/17 00:44	284
Chloromethane	55.9	U	227	55.9	ppb v/v			01/25/17 00:44	284
Dibromochloromethane	22.4	U	114	22.4	ppb v/v			01/25/17 00:44	284
1,2-Dibromoethane (EDB)	21.3	U	227	21.3	ppb v/v			01/25/17 00:44	284
1,2-Dichloro-1,1,2,2-tetrafluoroethane	44.0	U	114	44.0	ppb v/v			01/25/17 00:44	284
1,2-Dichlorobenzene	36.9	U	114	36.9	ppb v/v			01/25/17 00:44	284
1,3-Dichlorobenzene	31.2	U	114	31.2	ppb v/v			01/25/17 00:44	284
1,4-Dichlorobenzene	42.3	U	114	42.3	ppb v/v			01/25/17 00:44	284
Dichlorodifluoromethane	88.4	J	114	41.2	ppb v/v			01/25/17 00:44	284
1,1-Dichloroethane	39.9	J	85.2	20.4	ppb v/v			01/25/17 00:44	284
1,2-Dichloroethane	36.5	J	227	25.0	ppb v/v			01/25/17 00:44	284
1,1-Dichloroethene	1090		227	36.6	ppb v/v			01/25/17 00:44	284
cis-1,2-Dichloroethene	25.3	U	114	25.3	ppb v/v			01/25/17 00:44	284
trans-1,2-Dichloroethene	28.4	U	114	28.4	ppb v/v			01/25/17 00:44	284
1,2-Dichloropropane	265		114	68.2	ppb v/v			01/25/17 00:44	284
cis-1,3-Dichloropropene	29.5	U	114	29.5	ppb v/v			01/25/17 00:44	284
trans-1,3-Dichloropropene	25.0	U	114	25.0	ppb v/v			01/25/17 00:44	284
Ethylbenzene	17.9	U	114	17.9	ppb v/v			01/25/17 00:44	284
4-Ethyltoluene	53.1	U	114	53.1	ppb v/v			01/25/17 00:44	284
Hexachlorobutadiene	123	U	568	123	ppb v/v			01/25/17 00:44	284

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101396-001/CWL-D1-240

Lab Sample ID: 320-25041-12

Date Collected: 01/09/17 09:46

Matrix: Air

Date Received: 01/17/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	24.7	U	114	24.7	ppb v/v			01/25/17 00:44	284
4-Methyl-2-pentanone (MIBK)	38.3	U	114	38.3	ppb v/v			01/25/17 00:44	284
Methylene Chloride	37.5	J	114	20.4	ppb v/v			01/25/17 00:44	284
Styrene	16.8	U	114	16.8	ppb v/v			01/25/17 00:44	284
1,1,2,2-Tetrachloroethane	19.6	U	114	19.6	ppb v/v			01/25/17 00:44	284
Tetrachloroethene	731		114	14.5	ppb v/v			01/25/17 00:44	284
Toluene	14.5	U	114	14.5	ppb v/v			01/25/17 00:44	284
1,1,2-Trichloro-1,2,2-trifluoroethane	2570		114	46.3	ppb v/v			01/25/17 00:44	284
1,2,4-Trichlorobenzene	123	U	568	123	ppb v/v			01/25/17 00:44	284
1,1,1-Trichloroethane	51.8	J	85.2	18.5	ppb v/v			01/25/17 00:44	284
1,1,2-Trichloroethane	19.0	U	114	19.0	ppb v/v			01/25/17 00:44	284
Trichlorofluoromethane	628		114	55.7	ppb v/v			01/25/17 00:44	284
1,2,4-Trimethylbenzene	46.0	U	227	46.0	ppb v/v			01/25/17 00:44	284
1,3,5-Trimethylbenzene	35.5	U	114	35.5	ppb v/v			01/25/17 00:44	284
Vinyl acetate	41.2	U	227	41.2	ppb v/v			01/25/17 00:44	284
Vinyl chloride	34.1	U	114	34.1	ppb v/v			01/25/17 00:44	284
m,p-Xylene	28.4	U	227	28.4	ppb v/v			01/25/17 00:44	284
o-Xylene	15.3	U	114	15.3	ppb v/v			01/25/17 00:44	284

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	70		70 - 130		01/25/17 00:44	284
1,2-Dichloroethane-d4 (Surr)	106		70 - 130		01/25/17 00:44	284
Toluene-d8 (Surr)	101		70 - 130		01/25/17 00:44	284

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	20400		227	59.6	ppb v/v			01/25/17 18:54	568

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	60	X	70 - 130		01/25/17 18:54	568
1,2-Dichloroethane-d4 (Surr)	104		70 - 130		01/25/17 18:54	568
Toluene-d8 (Surr)	100		70 - 130		01/25/17 18:54	568

Client Sample ID: 101397-001/CWL-D1-240

Lab Sample ID: 320-25041-13

Date Collected: 01/09/17 09:46

Matrix: Air

Date Received: 01/17/17 09:45

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	50.6	U	1420	50.6	ppb v/v			01/25/17 08:25	284
Benzene	22.4	U	114	22.4	ppb v/v			01/25/17 08:25	284
Benzyl chloride	46.3	U	227	46.3	ppb v/v			01/25/17 08:25	284
Bromodichloromethane	18.7	U	85.2	18.7	ppb v/v			01/25/17 08:25	284
Bromoform	19.9	U	114	19.9	ppb v/v			01/25/17 08:25	284
Bromomethane	95.1	U	227	95.1	ppb v/v			01/25/17 08:25	284
2-Butanone (MEK)	56.5	U	227	56.5	ppb v/v			01/25/17 08:25	284
Carbon disulfide	22.2	U	227	22.2	ppb v/v			01/25/17 08:25	284
Carbon tetrachloride	53.6	J	227	18.2	ppb v/v			01/25/17 08:25	284

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101397-001/CWL-D1-240

Lab Sample ID: 320-25041-13

Date Collected: 01/09/17 09:46

Matrix: Air

Date Received: 01/17/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	18.2	U	85.2	18.2	ppb v/v			01/25/17 08:25	284
Chloroethane	87.5	U	227	87.5	ppb v/v			01/25/17 08:25	284
Chloroform	531		85.2	27.0	ppb v/v			01/25/17 08:25	284
Chloromethane	55.9	U	227	55.9	ppb v/v			01/25/17 08:25	284
Dibromochloromethane	22.4	U	114	22.4	ppb v/v			01/25/17 08:25	284
1,2-Dibromoethane (EDB)	21.3	U	227	21.3	ppb v/v			01/25/17 08:25	284
1,2-Dichloro-1,1,2,2-tetrafluoroethane	44.0	U	114	44.0	ppb v/v			01/25/17 08:25	284
1,2-Dichlorobenzene	36.9	U	114	36.9	ppb v/v			01/25/17 08:25	284
1,3-Dichlorobenzene	31.2	U	114	31.2	ppb v/v			01/25/17 08:25	284
1,4-Dichlorobenzene	42.3	U	114	42.3	ppb v/v			01/25/17 08:25	284
Dichlorodifluoromethane	79.8	J	114	41.2	ppb v/v			01/25/17 08:25	284
1,1-Dichloroethane	39.0	J	85.2	20.4	ppb v/v			01/25/17 08:25	284
1,2-Dichloroethane	29.3	J	227	25.0	ppb v/v			01/25/17 08:25	284
1,1-Dichloroethene	985		227	36.6	ppb v/v			01/25/17 08:25	284
cis-1,2-Dichloroethene	25.3	U	114	25.3	ppb v/v			01/25/17 08:25	284
trans-1,2-Dichloroethene	28.4	U	114	28.4	ppb v/v			01/25/17 08:25	284
1,2-Dichloropropane	241		114	68.2	ppb v/v			01/25/17 08:25	284
cis-1,3-Dichloropropene	29.5	U	114	29.5	ppb v/v			01/25/17 08:25	284
trans-1,3-Dichloropropene	25.0	U	114	25.0	ppb v/v			01/25/17 08:25	284
Ethylbenzene	17.9	U	114	17.9	ppb v/v			01/25/17 08:25	284
4-Ethyltoluene	53.1	U	114	53.1	ppb v/v			01/25/17 08:25	284
Hexachlorobutadiene	123	U	568	123	ppb v/v			01/25/17 08:25	284
2-Hexanone	24.7	U	114	24.7	ppb v/v			01/25/17 08:25	284
4-Methyl-2-pentanone (MIBK)	38.3	U	114	38.3	ppb v/v			01/25/17 08:25	284
Methylene Chloride	35.2	J	114	20.4	ppb v/v			01/25/17 08:25	284
Styrene	16.8	U	114	16.8	ppb v/v			01/25/17 08:25	284
1,1,2,2-Tetrachloroethane	19.6	U	114	19.6	ppb v/v			01/25/17 08:25	284
Tetrachloroethene	680		114	14.5	ppb v/v			01/25/17 08:25	284
Toluene	14.5	U	114	14.5	ppb v/v			01/25/17 08:25	284
1,1,2-Trichloro-1,2,2-trifluoroethane	2300		114	46.3	ppb v/v			01/25/17 08:25	284
1,2,4-Trichlorobenzene	123	U	568	123	ppb v/v			01/25/17 08:25	284
1,1,1-Trichloroethane	47.1	J	85.2	18.5	ppb v/v			01/25/17 08:25	284
1,1,2-Trichloroethane	19.0	U	114	19.0	ppb v/v			01/25/17 08:25	284
Trichlorofluoromethane	553		114	55.7	ppb v/v			01/25/17 08:25	284
1,2,4-Trimethylbenzene	46.0	U	227	46.0	ppb v/v			01/25/17 08:25	284
1,3,5-Trimethylbenzene	35.5	U	114	35.5	ppb v/v			01/25/17 08:25	284
Vinyl acetate	41.2	U	227	41.2	ppb v/v			01/25/17 08:25	284
Vinyl chloride	34.1	U	114	34.1	ppb v/v			01/25/17 08:25	284
m,p-Xylene	28.4	U	227	28.4	ppb v/v			01/25/17 08:25	284
o-Xylene	15.3	U	114	15.3	ppb v/v			01/25/17 08:25	284

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	65	X	70 - 130		01/25/17 08:25	284
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		01/25/17 08:25	284
Toluene-d8 (Surr)	99		70 - 130		01/25/17 08:25	284

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101397-001/CWL-D1-240

Lab Sample ID: 320-25041-13

Date Collected: 01/09/17 09:46

Matrix: Air

Date Received: 01/17/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	20300		206	54.2	ppb v/v			01/25/17 19:44	516

Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	64	X	70 - 130				01/25/17 19:44	516
1,2-Dichloroethane-d4 (Surr)	105		70 - 130				01/25/17 19:44	516
Toluene-d8 (Surr)	99		70 - 130				01/25/17 19:44	516

Client Sample ID: 101398-001/CWL-D1-350

Lab Sample ID: 320-25041-14

Date Collected: 01/09/17 08:49

Matrix: Air

Date Received: 01/17/17 09:45

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	34.9	U	980	34.9	ppb v/v			01/25/17 09:15	196
Benzene	15.5	U	78.4	15.5	ppb v/v			01/25/17 09:15	196
Benzyl chloride	31.9	U	157	31.9	ppb v/v			01/25/17 09:15	196
Bromodichloromethane	12.9	U	58.8	12.9	ppb v/v			01/25/17 09:15	196
Bromoform	13.7	U	78.4	13.7	ppb v/v			01/25/17 09:15	196
Bromomethane	65.7	U	157	65.7	ppb v/v			01/25/17 09:15	196
2-Butanone (MEK)	39.0	U	157	39.0	ppb v/v			01/25/17 09:15	196
Carbon disulfide	15.3	U	157	15.3	ppb v/v			01/25/17 09:15	196
Carbon tetrachloride	29.7	J	157	12.5	ppb v/v			01/25/17 09:15	196
Chlorobenzene	12.5	U	58.8	12.5	ppb v/v			01/25/17 09:15	196
Chloroethane	60.4	U	157	60.4	ppb v/v			01/25/17 09:15	196
Chloroform	178		58.8	18.6	ppb v/v			01/25/17 09:15	196
Chloromethane	38.6	U	157	38.6	ppb v/v			01/25/17 09:15	196
Dibromochloromethane	15.5	U	78.4	15.5	ppb v/v			01/25/17 09:15	196
1,2-Dibromoethane (EDB)	14.7	U	157	14.7	ppb v/v			01/25/17 09:15	196
1,2-Dichloro-1,1,2,2-tetrafluoroethane	30.4	U	78.4	30.4	ppb v/v			01/25/17 09:15	196
1,2-Dichlorobenzene	25.5	U	78.4	25.5	ppb v/v			01/25/17 09:15	196
1,3-Dichlorobenzene	21.6	U	78.4	21.6	ppb v/v			01/25/17 09:15	196
1,4-Dichlorobenzene	29.2	U	78.4	29.2	ppb v/v			01/25/17 09:15	196
Dichlorodifluoromethane	51.5	J	78.4	28.4	ppb v/v			01/25/17 09:15	196
1,1-Dichloroethane	15.3	J	58.8	14.1	ppb v/v			01/25/17 09:15	196
1,2-Dichloroethane	17.2	U	157	17.2	ppb v/v			01/25/17 09:15	196
1,1-Dichloroethene	576		157	25.3	ppb v/v			01/25/17 09:15	196
cis-1,2-Dichloroethene	17.4	U	78.4	17.4	ppb v/v			01/25/17 09:15	196
trans-1,2-Dichloroethene	19.6	U	78.4	19.6	ppb v/v			01/25/17 09:15	196
1,2-Dichloropropane	69.1	J	78.4	47.0	ppb v/v			01/25/17 09:15	196
cis-1,3-Dichloropropene	20.4	U	78.4	20.4	ppb v/v			01/25/17 09:15	196
trans-1,3-Dichloropropene	17.2	U	78.4	17.2	ppb v/v			01/25/17 09:15	196
Ethylbenzene	12.3	U	78.4	12.3	ppb v/v			01/25/17 09:15	196
4-Ethyltoluene	36.7	U	78.4	36.7	ppb v/v			01/25/17 09:15	196
Hexachlorobutadiene	84.7	U	392	84.7	ppb v/v			01/25/17 09:15	196
2-Hexanone	17.1	U	78.4	17.1	ppb v/v			01/25/17 09:15	196
4-Methyl-2-pentanone (MIBK)	26.5	U	78.4	26.5	ppb v/v			01/25/17 09:15	196
Methylene Chloride	30.7	J	78.4	14.1	ppb v/v			01/25/17 09:15	196
Styrene	11.6	U	78.4	11.6	ppb v/v			01/25/17 09:15	196

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101398-001/CWL-D1-350

Lab Sample ID: 320-25041-14

Date Collected: 01/09/17 08:49

Matrix: Air

Date Received: 01/17/17 09:45

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	13.5	U	78.4	13.5	ppb v/v			01/25/17 09:15	196
Tetrachloroethene	278		78.4	10.0	ppb v/v			01/25/17 09:15	196
Toluene	10.0	U	78.4	10.0	ppb v/v			01/25/17 09:15	196
1,1,2-Trichloro-1,2,2-trifluoroethane	1350		78.4	31.9	ppb v/v			01/25/17 09:15	196
1,2,4-Trichlorobenzene	84.9	U	392	84.9	ppb v/v			01/25/17 09:15	196
1,1,1-Trichloroethane	16.5	J	58.8	12.7	ppb v/v			01/25/17 09:15	196
1,1,2-Trichloroethane	13.1	U	78.4	13.1	ppb v/v			01/25/17 09:15	196
Trichloroethene	10000		78.4	20.6	ppb v/v			01/25/17 09:15	196
Trichlorofluoromethane	343		78.4	38.4	ppb v/v			01/25/17 09:15	196
1,2,4-Trimethylbenzene	31.8	U	157	31.8	ppb v/v			01/25/17 09:15	196
1,3,5-Trimethylbenzene	24.5	U	78.4	24.5	ppb v/v			01/25/17 09:15	196
Vinyl acetate	28.4	U	157	28.4	ppb v/v			01/25/17 09:15	196
Vinyl chloride	23.5	U	78.4	23.5	ppb v/v			01/25/17 09:15	196
m,p-Xylene	19.6	U	157	19.6	ppb v/v			01/25/17 09:15	196
o-Xylene	10.6	U	78.4	10.6	ppb v/v			01/25/17 09:15	196

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	67	X	70 - 130		01/25/17 09:15	196
1,2-Dichloroethane-d4 (Surr)	105		70 - 130		01/25/17 09:15	196
Toluene-d8 (Surr)	100		70 - 130		01/25/17 09:15	196

Client Sample ID: 101399-001/CWL-D1-470

Lab Sample ID: 320-25041-15

Date Collected: 01/09/17 09:54

Matrix: Air

Date Received: 01/17/17 09:45

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	9.90	J	28.8	1.03	ppb v/v			01/25/17 20:33	5.76
Benzene	0.455	U	2.30	0.455	ppb v/v			01/25/17 20:33	5.76
Benzyl chloride	0.939	U	4.61	0.939	ppb v/v			01/25/17 20:33	5.76
Bromodichloromethane	0.380	U	1.73	0.380	ppb v/v			01/25/17 20:33	5.76
Bromoform	0.403	U	2.30	0.403	ppb v/v			01/25/17 20:33	5.76
Bromomethane	1.93	U	4.61	1.93	ppb v/v			01/25/17 20:33	5.76
2-Butanone (MEK)	4.22	J	4.61	1.15	ppb v/v			01/25/17 20:33	5.76
Carbon disulfide	37.6		4.61	0.449	ppb v/v			01/25/17 20:33	5.76
Carbon tetrachloride	2.38	J	4.61	0.369	ppb v/v			01/25/17 20:33	5.76
Chlorobenzene	0.369	U	1.73	0.369	ppb v/v			01/25/17 20:33	5.76
Chloroethane	1.77	U	4.61	1.77	ppb v/v			01/25/17 20:33	5.76
Chloroform	1.08	J	1.73	0.547	ppb v/v			01/25/17 20:33	5.76
Chloromethane	1.13	U	4.61	1.13	ppb v/v			01/25/17 20:33	5.76
Dibromochloromethane	0.455	U	2.30	0.455	ppb v/v			01/25/17 20:33	5.76
1,2-Dibromoethane (EDB)	0.432	U	4.61	0.432	ppb v/v			01/25/17 20:33	5.76
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.893	U	2.30	0.893	ppb v/v			01/25/17 20:33	5.76
1,2-Dichlorobenzene	0.749	U	2.30	0.749	ppb v/v			01/25/17 20:33	5.76
1,3-Dichlorobenzene	0.634	U	2.30	0.634	ppb v/v			01/25/17 20:33	5.76
1,4-Dichlorobenzene	0.858	U	2.30	0.858	ppb v/v			01/25/17 20:33	5.76
Dichlorodifluoromethane	12.2		2.30	0.835	ppb v/v			01/25/17 20:33	5.76

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101399-001/CWL-D1-470

Lab Sample ID: 320-25041-15

Date Collected: 01/09/17 09:54

Matrix: Air

Date Received: 01/17/17 09:45

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	0.415	U	1.73	0.415	ppb v/v			01/25/17 20:33	5.76
1,2-Dichloroethane	0.507	U	4.61	0.507	ppb v/v			01/25/17 20:33	5.76
1,1-Dichloroethene	30.2		4.61	0.743	ppb v/v			01/25/17 20:33	5.76
cis-1,2-Dichloroethene	0.513	U	2.30	0.513	ppb v/v			01/25/17 20:33	5.76
trans-1,2-Dichloroethene	0.576	U	2.30	0.576	ppb v/v			01/25/17 20:33	5.76
1,2-Dichloropropane	1.38	U	2.30	1.38	ppb v/v			01/25/17 20:33	5.76
cis-1,3-Dichloropropene	0.599	U	2.30	0.599	ppb v/v			01/25/17 20:33	5.76
trans-1,3-Dichloropropene	0.507	U	2.30	0.507	ppb v/v			01/25/17 20:33	5.76
Ethylbenzene	0.363	U	2.30	0.363	ppb v/v			01/25/17 20:33	5.76
4-Ethyltoluene	1.08	U	2.30	1.08	ppb v/v			01/25/17 20:33	5.76
Hexachlorobutadiene	2.49	U	11.5	2.49	ppb v/v			01/25/17 20:33	5.76
2-Hexanone	0.501	U	2.30	0.501	ppb v/v			01/25/17 20:33	5.76
4-Methyl-2-pentanone (MIBK)	0.778	U	2.30	0.778	ppb v/v			01/25/17 20:33	5.76
Methylene Chloride	3.93		2.30	0.415	ppb v/v			01/25/17 20:33	5.76
Styrene	0.340	U	2.30	0.340	ppb v/v			01/25/17 20:33	5.76
1,1,2,2-Tetrachloroethane	0.397	U	2.30	0.397	ppb v/v			01/25/17 20:33	5.76
Tetrachloroethene	8.07		2.30	0.294	ppb v/v			01/25/17 20:33	5.76
Toluene	0.704	J	2.30	0.294	ppb v/v			01/25/17 20:33	5.76
1,1,2-Trichloro-1,2,2-trifluoroethane	198		2.30	0.939	ppb v/v			01/25/17 20:33	5.76
1,2,4-Trichlorobenzene	2.49	U	11.5	2.49	ppb v/v			01/25/17 20:33	5.76
1,1,1-Trichloroethane	0.374	U	1.73	0.374	ppb v/v			01/25/17 20:33	5.76
1,1,2-Trichloroethane	0.386	U	2.30	0.386	ppb v/v			01/25/17 20:33	5.76
Trichloroethene	159		2.30	0.605	ppb v/v			01/25/17 20:33	5.76
Trichlorofluoromethane	55.5		2.30	1.13	ppb v/v			01/25/17 20:33	5.76
1,2,4-Trimethylbenzene	0.933	U	4.61	0.933	ppb v/v			01/25/17 20:33	5.76
1,3,5-Trimethylbenzene	0.720	U	2.30	0.720	ppb v/v			01/25/17 20:33	5.76
Vinyl acetate	0.835	U	4.61	0.835	ppb v/v			01/25/17 20:33	5.76
Vinyl chloride	0.691	U	2.30	0.691	ppb v/v			01/25/17 20:33	5.76
m,p-Xylene	0.664	J	4.61	0.576	ppb v/v			01/25/17 20:33	5.76
o-Xylene	0.311	U	2.30	0.311	ppb v/v			01/25/17 20:33	5.76

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130		01/25/17 20:33	5.76
1,2-Dichloroethane-d4 (Surr)	105		70 - 130		01/25/17 20:33	5.76
Toluene-d8 (Surr)	102		70 - 130		01/25/17 20:33	5.76

Client Sample ID: 101400-001/CWL-D1-470

Lab Sample ID: 320-25041-16

Date Collected: 01/09/17 09:54

Matrix: Air

Date Received: 01/17/17 09:45

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	6.33	J	22.4	0.797	ppb v/v			01/26/17 20:12	4.48
Benzene	0.427	J	1.79	0.354	ppb v/v			01/26/17 20:12	4.48
Benzyl chloride	0.730	U	3.58	0.730	ppb v/v			01/26/17 20:12	4.48
Bromodichloromethane	0.296	U	1.34	0.296	ppb v/v			01/26/17 20:12	4.48
Bromoform	0.314	U	1.79	0.314	ppb v/v			01/26/17 20:12	4.48

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101400-001/CWL-D1-470

Lab Sample ID: 320-25041-16

Date Collected: 01/09/17 09:54

Matrix: Air

Date Received: 01/17/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromomethane	1.50	U	3.58	1.50	ppb v/v			01/26/17 20:12	4.48
2-Butanone (MEK)	0.892	U	3.58	0.892	ppb v/v			01/26/17 20:12	4.48
Carbon disulfide	0.417	J	3.58	0.349	ppb v/v			01/26/17 20:12	4.48
Carbon tetrachloride	2.55	J	3.58	0.287	ppb v/v			01/26/17 20:12	4.48
Chlorobenzene	0.287	U	1.34	0.287	ppb v/v			01/26/17 20:12	4.48
Chloroethane	1.38	U	3.58	1.38	ppb v/v			01/26/17 20:12	4.48
Chloroform	1.41		1.34	0.426	ppb v/v			01/26/17 20:12	4.48
Chloromethane	0.883	U	3.58	0.883	ppb v/v			01/26/17 20:12	4.48
Dibromochloromethane	0.354	U	1.79	0.354	ppb v/v			01/26/17 20:12	4.48
1,2-Dibromoethane (EDB)	0.336	U	3.58	0.336	ppb v/v			01/26/17 20:12	4.48
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.694	U	1.79	0.694	ppb v/v			01/26/17 20:12	4.48
1,2-Dichlorobenzene	0.582	U	1.79	0.582	ppb v/v			01/26/17 20:12	4.48
1,3-Dichlorobenzene	0.493	U	1.79	0.493	ppb v/v			01/26/17 20:12	4.48
1,4-Dichlorobenzene	0.668	U	1.79	0.668	ppb v/v			01/26/17 20:12	4.48
Dichlorodifluoromethane	12.3		1.79	0.650	ppb v/v			01/26/17 20:12	4.48
1,1-Dichloroethane	0.323	U	1.34	0.323	ppb v/v			01/26/17 20:12	4.48
1,2-Dichloroethane	0.394	U	3.58	0.394	ppb v/v			01/26/17 20:12	4.48
1,1-Dichloroethene	31.0		3.58	0.578	ppb v/v			01/26/17 20:12	4.48
cis-1,2-Dichloroethene	0.399	U	1.79	0.399	ppb v/v			01/26/17 20:12	4.48
trans-1,2-Dichloroethene	0.448	U	1.79	0.448	ppb v/v			01/26/17 20:12	4.48
1,2-Dichloropropane	1.08	U	1.79	1.08	ppb v/v			01/26/17 20:12	4.48
cis-1,3-Dichloropropene	0.466	U	1.79	0.466	ppb v/v			01/26/17 20:12	4.48
trans-1,3-Dichloropropene	0.394	U	1.79	0.394	ppb v/v			01/26/17 20:12	4.48
Ethylbenzene	0.282	U	1.79	0.282	ppb v/v			01/26/17 20:12	4.48
4-Ethyltoluene	0.838	U	1.79	0.838	ppb v/v			01/26/17 20:12	4.48
Hexachlorobutadiene	1.94	U	8.96	1.94	ppb v/v			01/26/17 20:12	4.48
2-Hexanone	0.390	U	1.79	0.390	ppb v/v			01/26/17 20:12	4.48
4-Methyl-2-pentanone (MIBK)	0.605	U	1.79	0.605	ppb v/v			01/26/17 20:12	4.48
Methylene Chloride	3.98		1.79	0.323	ppb v/v			01/26/17 20:12	4.48
Styrene	0.264	U	1.79	0.264	ppb v/v			01/26/17 20:12	4.48
1,1,2,2-Tetrachloroethane	0.309	U	1.79	0.309	ppb v/v			01/26/17 20:12	4.48
Tetrachloroethene	6.88		1.79	0.228	ppb v/v			01/26/17 20:12	4.48
Toluene	0.228	U	1.79	0.228	ppb v/v			01/26/17 20:12	4.48
1,1,2-Trichloro-1,2,2-trifluoroethane	197		1.79	0.730	ppb v/v			01/26/17 20:12	4.48
1,2,4-Trichlorobenzene	1.94	U	8.96	1.94	ppb v/v			01/26/17 20:12	4.48
1,1,1-Trichloroethane	0.291	U	1.34	0.291	ppb v/v			01/26/17 20:12	4.48
1,1,2-Trichloroethane	0.300	U	1.79	0.300	ppb v/v			01/26/17 20:12	4.48
Trichloroethene	167		1.79	0.470	ppb v/v			01/26/17 20:12	4.48
Trichlorofluoromethane	55.4		1.79	0.878	ppb v/v			01/26/17 20:12	4.48
1,2,4-Trimethylbenzene	0.726	U	3.58	0.726	ppb v/v			01/26/17 20:12	4.48
1,3,5-Trimethylbenzene	0.560	U	1.79	0.560	ppb v/v			01/26/17 20:12	4.48
Vinyl acetate	0.650	U	3.58	0.650	ppb v/v			01/26/17 20:12	4.48
Vinyl chloride	0.538	U	1.79	0.538	ppb v/v			01/26/17 20:12	4.48
m,p-Xylene	0.448	U	3.58	0.448	ppb v/v			01/26/17 20:12	4.48
o-Xylene	0.242	U	1.79	0.242	ppb v/v			01/26/17 20:12	4.48

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130		01/26/17 20:12	4.48

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101400-001/CWL-D1-470

Lab Sample ID: 320-25041-16

Date Collected: 01/09/17 09:54

Matrix: Air

Date Received: 01/17/17 09:45

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)	105		70 - 130		01/26/17 20:12	4.48
Toluene-d8 (Surr)	100		70 - 130		01/26/17 20:12	4.48

Client Sample ID: 101401-001/CWL-D2-FB2

Lab Sample ID: 320-25041-17

Date Collected: 01/09/17 10:19

Matrix: Air

Date Received: 01/17/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	0.178	U	5.00	0.178	ppb v/v			01/26/17 21:09	1
Benzene	0.0790	U	0.400	0.0790	ppb v/v			01/26/17 21:09	1
Benzyl chloride	0.163	U	0.800	0.163	ppb v/v			01/26/17 21:09	1
Bromodichloromethane	0.0660	U	0.300	0.0660	ppb v/v			01/26/17 21:09	1
Bromoform	0.0700	U	0.400	0.0700	ppb v/v			01/26/17 21:09	1
Bromomethane	0.335	U	0.800	0.335	ppb v/v			01/26/17 21:09	1
2-Butanone (MEK)	0.199	U	0.800	0.199	ppb v/v			01/26/17 21:09	1
Carbon disulfide	0.0780	U	0.800	0.0780	ppb v/v			01/26/17 21:09	1
Carbon tetrachloride	0.0640	U	0.800	0.0640	ppb v/v			01/26/17 21:09	1
Chlorobenzene	0.0640	U	0.300	0.0640	ppb v/v			01/26/17 21:09	1
Chloroethane	0.308	U	0.800	0.308	ppb v/v			01/26/17 21:09	1
Chloroform	0.0950	U	0.300	0.0950	ppb v/v			01/26/17 21:09	1
Chloromethane	0.197	U	0.800	0.197	ppb v/v			01/26/17 21:09	1
Dibromochloromethane	0.0790	U	0.400	0.0790	ppb v/v			01/26/17 21:09	1
1,2-Dibromoethane (EDB)	0.0750	U	0.800	0.0750	ppb v/v			01/26/17 21:09	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.155	U	0.400	0.155	ppb v/v			01/26/17 21:09	1
1,2-Dichlorobenzene	0.130	U	0.400	0.130	ppb v/v			01/26/17 21:09	1
1,3-Dichlorobenzene	0.110	U	0.400	0.110	ppb v/v			01/26/17 21:09	1
1,4-Dichlorobenzene	0.149	U	0.400	0.149	ppb v/v			01/26/17 21:09	1
Dichlorodifluoromethane	0.145	U	0.400	0.145	ppb v/v			01/26/17 21:09	1
1,1-Dichloroethane	0.0720	U	0.300	0.0720	ppb v/v			01/26/17 21:09	1
1,2-Dichloroethane	0.0880	U	0.800	0.0880	ppb v/v			01/26/17 21:09	1
1,1-Dichloroethene	0.129	U	0.800	0.129	ppb v/v			01/26/17 21:09	1
cis-1,2-Dichloroethene	0.0890	U	0.400	0.0890	ppb v/v			01/26/17 21:09	1
trans-1,2-Dichloroethene	0.100	U	0.400	0.100	ppb v/v			01/26/17 21:09	1
1,2-Dichloropropane	0.240	U	0.400	0.240	ppb v/v			01/26/17 21:09	1
cis-1,3-Dichloropropene	0.104	U	0.400	0.104	ppb v/v			01/26/17 21:09	1
trans-1,3-Dichloropropene	0.0880	U	0.400	0.0880	ppb v/v			01/26/17 21:09	1
Ethylbenzene	0.0630	U	0.400	0.0630	ppb v/v			01/26/17 21:09	1
4-Ethyltoluene	0.187	U	0.400	0.187	ppb v/v			01/26/17 21:09	1
Hexachlorobutadiene	0.432	U	2.00	0.432	ppb v/v			01/26/17 21:09	1
2-Hexanone	0.0870	U	0.400	0.0870	ppb v/v			01/26/17 21:09	1
4-Methyl-2-pentanone (MIBK)	0.135	U	0.400	0.135	ppb v/v			01/26/17 21:09	1
Methylene Chloride	0.0835	J	0.400	0.0720	ppb v/v			01/26/17 21:09	1
Styrene	0.0590	U	0.400	0.0590	ppb v/v			01/26/17 21:09	1
1,1,2,2-Tetrachloroethane	0.0690	U	0.400	0.0690	ppb v/v			01/26/17 21:09	1
Tetrachloroethene	0.105	J	0.400	0.0510	ppb v/v			01/26/17 21:09	1
Toluene	0.0510	U	0.400	0.0510	ppb v/v			01/26/17 21:09	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101401-001/CWL-D2-FB2

Lab Sample ID: 320-25041-17

Date Collected: 01/09/17 10:19

Matrix: Air

Date Received: 01/17/17 09:45

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	0.163	U	0.400	0.163	ppb v/v			01/26/17 21:09	1
1,2,4-Trichlorobenzene	0.433	U	2.00	0.433	ppb v/v			01/26/17 21:09	1
1,1,1-Trichloroethane	0.0650	U	0.300	0.0650	ppb v/v			01/26/17 21:09	1
1,1,2-Trichloroethane	0.0670	U	0.400	0.0670	ppb v/v			01/26/17 21:09	1
Trichloroethene	0.242	J	0.400	0.105	ppb v/v			01/26/17 21:09	1
Trichlorofluoromethane	0.196	U	0.400	0.196	ppb v/v			01/26/17 21:09	1
1,2,4-Trimethylbenzene	0.162	U	0.800	0.162	ppb v/v			01/26/17 21:09	1
1,3,5-Trimethylbenzene	0.125	U	0.400	0.125	ppb v/v			01/26/17 21:09	1
Vinyl acetate	0.145	U	0.800	0.145	ppb v/v			01/26/17 21:09	1
Vinyl chloride	0.120	U	0.400	0.120	ppb v/v			01/26/17 21:09	1
m,p-Xylene	0.100	U	0.800	0.100	ppb v/v			01/26/17 21:09	1
o-Xylene	0.0540	U	0.400	0.0540	ppb v/v			01/26/17 21:09	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		70 - 130					01/26/17 21:09	1
1,2-Dichloroethane-d4 (Surr)	105		70 - 130					01/26/17 21:09	1
Toluene-d8 (Surr)	101		70 - 130					01/26/17 21:09	1

Client Sample ID: 101402-001/CWL-D2-120

Lab Sample ID: 320-25041-18

Date Collected: 01/09/17 10:35

Matrix: Air

Date Received: 01/17/17 09:45

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	44.0	U	1240	44.0	ppb v/v			01/25/17 23:10	247
Benzene	19.5	U	98.8	19.5	ppb v/v			01/25/17 23:10	247
Benzyl chloride	40.3	U	198	40.3	ppb v/v			01/25/17 23:10	247
Bromodichloromethane	16.3	U	74.1	16.3	ppb v/v			01/25/17 23:10	247
Bromoform	17.3	U	98.8	17.3	ppb v/v			01/25/17 23:10	247
Bromomethane	82.7	U	198	82.7	ppb v/v			01/25/17 23:10	247
2-Butanone (MEK)	49.2	U	198	49.2	ppb v/v			01/25/17 23:10	247
Carbon disulfide	19.3	U	198	19.3	ppb v/v			01/25/17 23:10	247
Carbon tetrachloride	46.1	J	198	15.8	ppb v/v			01/25/17 23:10	247
Chlorobenzene	15.8	U	74.1	15.8	ppb v/v			01/25/17 23:10	247
Chloroethane	76.1	U	198	76.1	ppb v/v			01/25/17 23:10	247
Chloroform	798		74.1	23.5	ppb v/v			01/25/17 23:10	247
Chloromethane	48.7	U	198	48.7	ppb v/v			01/25/17 23:10	247
Dibromochloromethane	19.5	U	98.8	19.5	ppb v/v			01/25/17 23:10	247
1,2-Dibromoethane (EDB)	18.5	U	198	18.5	ppb v/v			01/25/17 23:10	247
1,2-Dichloro-1,1,2,2-tetrafluoroethane	38.3	U	98.8	38.3	ppb v/v			01/25/17 23:10	247
1,2-Dichlorobenzene	32.1	U	98.8	32.1	ppb v/v			01/25/17 23:10	247
1,3-Dichlorobenzene	27.2	U	98.8	27.2	ppb v/v			01/25/17 23:10	247
1,4-Dichlorobenzene	36.8	U	98.8	36.8	ppb v/v			01/25/17 23:10	247
Dichlorodifluoromethane	62.6	J	98.8	35.8	ppb v/v			01/25/17 23:10	247
1,1-Dichloroethane	31.8	J	74.1	17.8	ppb v/v			01/25/17 23:10	247
1,2-Dichloroethane	73.9	J	198	21.7	ppb v/v			01/25/17 23:10	247
1,1-Dichloroethene	660		198	31.9	ppb v/v			01/25/17 23:10	247
cis-1,2-Dichloroethene	22.0	U	98.8	22.0	ppb v/v			01/25/17 23:10	247

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101402-001/CWL-D2-120

Lab Sample ID: 320-25041-18

Date Collected: 01/09/17 10:35

Matrix: Air

Date Received: 01/17/17 09:45

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	24.7	U	98.8	24.7	ppb v/v			01/25/17 23:10	247
1,2-Dichloropropane	288		98.8	59.3	ppb v/v			01/25/17 23:10	247
cis-1,3-Dichloropropene	25.7	U	98.8	25.7	ppb v/v			01/25/17 23:10	247
trans-1,3-Dichloropropene	21.7	U	98.8	21.7	ppb v/v			01/25/17 23:10	247
Ethylbenzene	15.6	U	98.8	15.6	ppb v/v			01/25/17 23:10	247
4-Ethyltoluene	46.2	U	98.8	46.2	ppb v/v			01/25/17 23:10	247
Hexachlorobutadiene	107	U	494	107	ppb v/v			01/25/17 23:10	247
2-Hexanone	21.5	U	98.8	21.5	ppb v/v			01/25/17 23:10	247
4-Methyl-2-pentanone (MIBK)	33.3	U	98.8	33.3	ppb v/v			01/25/17 23:10	247
Methylene Chloride	24.0	J	98.8	17.8	ppb v/v			01/25/17 23:10	247
Styrene	14.6	U	98.8	14.6	ppb v/v			01/25/17 23:10	247
1,1,2,2-Tetrachloroethane	17.0	U	98.8	17.0	ppb v/v			01/25/17 23:10	247
Tetrachloroethene	885		98.8	12.6	ppb v/v			01/25/17 23:10	247
Toluene	12.6	U	98.8	12.6	ppb v/v			01/25/17 23:10	247
1,1,2-Trichloro-1,2,2-trifluoroethane	1740		98.8	40.3	ppb v/v			01/25/17 23:10	247
1,2,4-Trichlorobenzene	107	U	494	107	ppb v/v			01/25/17 23:10	247
1,1,1-Trichloroethane	59.8	J	74.1	16.1	ppb v/v			01/25/17 23:10	247
1,1,2-Trichloroethane	16.5	U	98.8	16.5	ppb v/v			01/25/17 23:10	247
Trichlorofluoromethane	437		98.8	48.4	ppb v/v			01/25/17 23:10	247
1,2,4-Trimethylbenzene	40.0	U	198	40.0	ppb v/v			01/25/17 23:10	247
1,3,5-Trimethylbenzene	30.9	U	98.8	30.9	ppb v/v			01/25/17 23:10	247
Vinyl acetate	35.8	U	198	35.8	ppb v/v			01/25/17 23:10	247
Vinyl chloride	29.6	U	98.8	29.6	ppb v/v			01/25/17 23:10	247
m,p-Xylene	24.7	U	198	24.7	ppb v/v			01/25/17 23:10	247
o-Xylene	13.3	U	98.8	13.3	ppb v/v			01/25/17 23:10	247

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	58	X	70 - 130		01/25/17 23:10	247
1,2-Dichloroethane-d4 (Surr)	104		70 - 130		01/25/17 23:10	247
Toluene-d8 (Surr)	99		70 - 130		01/25/17 23:10	247

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	14300		154	40.3	ppb v/v			01/26/17 21:58	384

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	64	X	70 - 130		01/26/17 21:58	384
1,2-Dichloroethane-d4 (Surr)	105		70 - 130		01/26/17 21:58	384
Toluene-d8 (Surr)	100		70 - 130		01/26/17 21:58	384

Client Sample ID: 101403-001/CWL-D2-240

Lab Sample ID: 320-25041-19

Date Collected: 01/09/17 10:39

Matrix: Air

Date Received: 01/17/17 09:45

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	41.3	U	1160	41.3	ppb v/v			01/26/17 00:00	232
Benzene	18.3	U	92.8	18.3	ppb v/v			01/26/17 00:00	232

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101403-001/CWL-D2-240

Lab Sample ID: 320-25041-19

Date Collected: 01/09/17 10:39

Matrix: Air

Date Received: 01/17/17 09:45

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
Benzyl chloride	37.8	U	186	37.8	ppb v/v			01/26/17 00:00	232
Bromodichloromethane	15.3	U	69.6	15.3	ppb v/v			01/26/17 00:00	232
Bromoform	16.2	U	92.8	16.2	ppb v/v			01/26/17 00:00	232
Bromomethane	77.7	U	186	77.7	ppb v/v			01/26/17 00:00	232
2-Butanone (MEK)	46.2	U	186	46.2	ppb v/v			01/26/17 00:00	232
Carbon disulfide	18.1	U	186	18.1	ppb v/v			01/26/17 00:00	232
Carbon tetrachloride	49.8	J	186	14.8	ppb v/v			01/26/17 00:00	232
Chlorobenzene	14.8	U	69.6	14.8	ppb v/v			01/26/17 00:00	232
Chloroethane	71.5	U	186	71.5	ppb v/v			01/26/17 00:00	232
Chloroform	654		69.6	22.0	ppb v/v			01/26/17 00:00	232
Chloromethane	45.7	U	186	45.7	ppb v/v			01/26/17 00:00	232
Dibromochloromethane	18.3	U	92.8	18.3	ppb v/v			01/26/17 00:00	232
1,2-Dibromoethane (EDB)	17.4	U	186	17.4	ppb v/v			01/26/17 00:00	232
1,2-Dichloro-1,1,2,2-tetrafluoroethane	36.0	U	92.8	36.0	ppb v/v			01/26/17 00:00	232
1,2-Dichlorobenzene	30.2	U	92.8	30.2	ppb v/v			01/26/17 00:00	232
1,3-Dichlorobenzene	25.5	U	92.8	25.5	ppb v/v			01/26/17 00:00	232
1,4-Dichlorobenzene	34.6	U	92.8	34.6	ppb v/v			01/26/17 00:00	232
Dichlorodifluoromethane	62.3	J	92.8	33.6	ppb v/v			01/26/17 00:00	232
1,1-Dichloroethane	31.1	J	69.6	16.7	ppb v/v			01/26/17 00:00	232
1,2-Dichloroethane	52.3	J	186	20.4	ppb v/v			01/26/17 00:00	232
1,1-Dichloroethene	688		186	29.9	ppb v/v			01/26/17 00:00	232
cis-1,2-Dichloroethene	20.6	U	92.8	20.6	ppb v/v			01/26/17 00:00	232
trans-1,2-Dichloroethene	23.2	U	92.8	23.2	ppb v/v			01/26/17 00:00	232
1,2-Dichloropropane	283		92.8	55.7	ppb v/v			01/26/17 00:00	232
cis-1,3-Dichloropropene	24.1	U	92.8	24.1	ppb v/v			01/26/17 00:00	232
trans-1,3-Dichloropropene	20.4	U	92.8	20.4	ppb v/v			01/26/17 00:00	232
Ethylbenzene	14.6	U	92.8	14.6	ppb v/v			01/26/17 00:00	232
4-Ethyltoluene	43.4	U	92.8	43.4	ppb v/v			01/26/17 00:00	232
Hexachlorobutadiene	100	U	464	100	ppb v/v			01/26/17 00:00	232
2-Hexanone	20.2	U	92.8	20.2	ppb v/v			01/26/17 00:00	232
4-Methyl-2-pentanone (MIBK)	31.3	U	92.8	31.3	ppb v/v			01/26/17 00:00	232
Methylene Chloride	50.4	J	92.8	16.7	ppb v/v			01/26/17 00:00	232
Styrene	13.7	U	92.8	13.7	ppb v/v			01/26/17 00:00	232
1,1,2,2-Tetrachloroethane	16.0	U	92.8	16.0	ppb v/v			01/26/17 00:00	232
Tetrachloroethene	691		92.8	11.8	ppb v/v			01/26/17 00:00	232
Toluene	11.8	U	92.8	11.8	ppb v/v			01/26/17 00:00	232
1,1,2-Trichloro-1,2,2-trifluoroethane	1690		92.8	37.8	ppb v/v			01/26/17 00:00	232
1,2,4-Trichlorobenzene	100	U	464	100	ppb v/v			01/26/17 00:00	232
1,1,1-Trichloroethane	43.0	J	69.6	15.1	ppb v/v			01/26/17 00:00	232
1,1,2-Trichloroethane	15.5	U	92.8	15.5	ppb v/v			01/26/17 00:00	232
Trichlorofluoromethane	426		92.8	45.5	ppb v/v			01/26/17 00:00	232
1,2,4-Trimethylbenzene	37.6	U	186	37.6	ppb v/v			01/26/17 00:00	232
1,3,5-Trimethylbenzene	29.0	U	92.8	29.0	ppb v/v			01/26/17 00:00	232
Vinyl acetate	33.6	U	186	33.6	ppb v/v			01/26/17 00:00	232
Vinyl chloride	27.8	U	92.8	27.8	ppb v/v			01/26/17 00:00	232
m,p-Xylene	23.2	U	186	23.2	ppb v/v			01/26/17 00:00	232
o-Xylene	12.5	U	92.8	12.5	ppb v/v			01/26/17 00:00	232

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101403-001/CWL-D2-240

Lab Sample ID: 320-25041-19

Date Collected: 01/09/17 10:39

Matrix: Air

Date Received: 01/17/17 09:45

Sample Container: Summa Canister 6L

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	61	X	70 - 130		01/26/17 00:00	232
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		01/26/17 00:00	232
Toluene-d8 (Surr)	99		70 - 130		01/26/17 00:00	232

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	14800		164	43.1	ppb v/v			01/26/17 22:49	410

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	68	X	70 - 130		01/26/17 22:49	410
1,2-Dichloroethane-d4 (Surr)	106		70 - 130		01/26/17 22:49	410
Toluene-d8 (Surr)	100		70 - 130		01/26/17 22:49	410

Client Sample ID: 101404-001/CWL-D2-350

Lab Sample ID: 320-25041-20

Date Collected: 01/09/17 10:44

Matrix: Air

Date Received: 01/17/17 09:45

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	24.7	U	695	24.7	ppb v/v			01/26/17 00:50	139
Benzene	11.0	U	55.6	11.0	ppb v/v			01/26/17 00:50	139
Benzyl chloride	22.7	U	111	22.7	ppb v/v			01/26/17 00:50	139
Bromodichloromethane	9.17	U	41.7	9.17	ppb v/v			01/26/17 00:50	139
Bromoform	9.73	U	55.6	9.73	ppb v/v			01/26/17 00:50	139
Bromomethane	46.6	U	111	46.6	ppb v/v			01/26/17 00:50	139
2-Butanone (MEK)	27.7	U	111	27.7	ppb v/v			01/26/17 00:50	139
Carbon disulfide	10.8	U	111	10.8	ppb v/v			01/26/17 00:50	139
Carbon tetrachloride	29.9	J	111	8.90	ppb v/v			01/26/17 00:50	139
Chlorobenzene	8.90	U	41.7	8.90	ppb v/v			01/26/17 00:50	139
Chloroethane	42.8	U	111	42.8	ppb v/v			01/26/17 00:50	139
Chloroform	313		41.7	13.2	ppb v/v			01/26/17 00:50	139
Chloromethane	27.4	U	111	27.4	ppb v/v			01/26/17 00:50	139
Dibromochloromethane	11.0	U	55.6	11.0	ppb v/v			01/26/17 00:50	139
1,2-Dibromoethane (EDB)	10.4	U	111	10.4	ppb v/v			01/26/17 00:50	139
1,2-Dichloro-1,1,2,2-tetrafluoroethane	21.5	U	55.6	21.5	ppb v/v			01/26/17 00:50	139
1,2-Dichlorobenzene	18.1	U	55.6	18.1	ppb v/v			01/26/17 00:50	139
1,3-Dichlorobenzene	15.3	U	55.6	15.3	ppb v/v			01/26/17 00:50	139
1,4-Dichlorobenzene	20.7	U	55.6	20.7	ppb v/v			01/26/17 00:50	139
Dichlorodifluoromethane	42.7	J	55.6	20.2	ppb v/v			01/26/17 00:50	139
1,1-Dichloroethane	16.1	J	41.7	10.0	ppb v/v			01/26/17 00:50	139
1,2-Dichloroethane	15.1	J	111	12.2	ppb v/v			01/26/17 00:50	139
1,1-Dichloroethene	469		111	17.9	ppb v/v			01/26/17 00:50	139
cis-1,2-Dichloroethene	12.4	U	55.6	12.4	ppb v/v			01/26/17 00:50	139
trans-1,2-Dichloroethene	13.9	U	55.6	13.9	ppb v/v			01/26/17 00:50	139
1,2-Dichloropropane	119		55.6	33.4	ppb v/v			01/26/17 00:50	139
cis-1,3-Dichloropropene	14.5	U	55.6	14.5	ppb v/v			01/26/17 00:50	139
trans-1,3-Dichloropropene	12.2	U	55.6	12.2	ppb v/v			01/26/17 00:50	139
Ethylbenzene	8.76	U	55.6	8.76	ppb v/v			01/26/17 00:50	139
4-Ethyltoluene	26.0	U	55.6	26.0	ppb v/v			01/26/17 00:50	139

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101404-001/CWL-D2-350

Lab Sample ID: 320-25041-20

Date Collected: 01/09/17 10:44

Matrix: Air

Date Received: 01/17/17 09:45

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	60.0	U	278	60.0	ppb v/v			01/26/17 00:50	139
2-Hexanone	12.1	U	55.6	12.1	ppb v/v			01/26/17 00:50	139
4-Methyl-2-pentanone (MIBK)	18.8	U	55.6	18.8	ppb v/v			01/26/17 00:50	139
Methylene Chloride	52.9	J	55.6	10.0	ppb v/v			01/26/17 00:50	139
Styrene	8.20	U	55.6	8.20	ppb v/v			01/26/17 00:50	139
1,1,2,2-Tetrachloroethane	9.59	U	55.6	9.59	ppb v/v			01/26/17 00:50	139
Tetrachloroethene	384		55.6	7.09	ppb v/v			01/26/17 00:50	139
Toluene	7.09	U	55.6	7.09	ppb v/v			01/26/17 00:50	139
1,1,2-Trichloro-1,2,2-trifluoroethane	1090		55.6	22.7	ppb v/v			01/26/17 00:50	139
1,2,4-Trichlorobenzene	60.2	U	278	60.2	ppb v/v			01/26/17 00:50	139
1,1,1-Trichloroethane	22.5	J	41.7	9.04	ppb v/v			01/26/17 00:50	139
1,1,2-Trichloroethane	9.31	U	55.6	9.31	ppb v/v			01/26/17 00:50	139
Trichlorofluoromethane	294		55.6	27.2	ppb v/v			01/26/17 00:50	139
1,2,4-Trimethylbenzene	22.5	U	111	22.5	ppb v/v			01/26/17 00:50	139
1,3,5-Trimethylbenzene	17.4	U	55.6	17.4	ppb v/v			01/26/17 00:50	139
Vinyl acetate	20.2	U	111	20.2	ppb v/v			01/26/17 00:50	139
Vinyl chloride	16.7	U	55.6	16.7	ppb v/v			01/26/17 00:50	139
m,p-Xylene	13.9	U	111	13.9	ppb v/v			01/26/17 00:50	139
o-Xylene	7.51	U	55.6	7.51	ppb v/v			01/26/17 00:50	139

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	72		70 - 130		01/26/17 00:50	139
1,2-Dichloroethane-d4 (Surr)	106		70 - 130		01/26/17 00:50	139
Toluene-d8 (Surr)	101		70 - 130		01/26/17 00:50	139

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	9850		90.4	23.7	ppb v/v			01/26/17 23:38	226

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	66	X	70 - 130		01/26/17 23:38	226
1,2-Dichloroethane-d4 (Surr)	106		70 - 130		01/26/17 23:38	226
Toluene-d8 (Surr)	99		70 - 130		01/26/17 23:38	226

Client Sample ID: 101405-001/CWL-D2-440

Lab Sample ID: 320-25041-21

Date Collected: 01/09/17 10:04

Matrix: Air

Date Received: 01/17/17 09:45

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	27.5		7.70	0.274	ppb v/v			01/26/17 01:44	1.54
Benzene	0.169	J	0.616	0.122	ppb v/v			01/26/17 01:44	1.54
Benzyl chloride	0.251	U	1.23	0.251	ppb v/v			01/26/17 01:44	1.54
Bromodichloromethane	0.102	U	0.462	0.102	ppb v/v			01/26/17 01:44	1.54
Bromoform	0.108	U	0.616	0.108	ppb v/v			01/26/17 01:44	1.54
Bromomethane	0.516	U	1.23	0.516	ppb v/v			01/26/17 01:44	1.54
2-Butanone (MEK)	2.58		1.23	0.306	ppb v/v			01/26/17 01:44	1.54
Carbon disulfide	2.34		1.23	0.120	ppb v/v			01/26/17 01:44	1.54

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101405-001/CWL-D2-440

Lab Sample ID: 320-25041-21

Date Collected: 01/09/17 10:04

Matrix: Air

Date Received: 01/17/17 09:45

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	0.242	J	1.23	0.0986	ppb v/v			01/26/17 01:44	1.54
Chlorobenzene	0.0986	U	0.462	0.0986	ppb v/v			01/26/17 01:44	1.54
Chloroethane	0.474	U	1.23	0.474	ppb v/v			01/26/17 01:44	1.54
Chloroform	1.91		0.462	0.146	ppb v/v			01/26/17 01:44	1.54
Chloromethane	0.412	J	1.23	0.303	ppb v/v			01/26/17 01:44	1.54
Dibromochloromethane	0.122	U	0.616	0.122	ppb v/v			01/26/17 01:44	1.54
1,2-Dibromoethane (EDB)	0.116	U	1.23	0.116	ppb v/v			01/26/17 01:44	1.54
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.239	U	0.616	0.239	ppb v/v			01/26/17 01:44	1.54
1,2-Dichlorobenzene	0.200	U	0.616	0.200	ppb v/v			01/26/17 01:44	1.54
1,3-Dichlorobenzene	0.169	U	0.616	0.169	ppb v/v			01/26/17 01:44	1.54
1,4-Dichlorobenzene	0.229	U	0.616	0.229	ppb v/v			01/26/17 01:44	1.54
Dichlorodifluoromethane	0.859		0.616	0.223	ppb v/v			01/26/17 01:44	1.54
1,1-Dichloroethane	0.114	J	0.462	0.111	ppb v/v			01/26/17 01:44	1.54
1,2-Dichloroethane	0.136	U	1.23	0.136	ppb v/v			01/26/17 01:44	1.54
1,1-Dichloroethene	3.67		1.23	0.199	ppb v/v			01/26/17 01:44	1.54
cis-1,2-Dichloroethene	0.137	U	0.616	0.137	ppb v/v			01/26/17 01:44	1.54
trans-1,2-Dichloroethene	0.154	U	0.616	0.154	ppb v/v			01/26/17 01:44	1.54
1,2-Dichloropropane	0.880		0.616	0.370	ppb v/v			01/26/17 01:44	1.54
cis-1,3-Dichloropropene	0.160	U	0.616	0.160	ppb v/v			01/26/17 01:44	1.54
trans-1,3-Dichloropropene	0.136	U	0.616	0.136	ppb v/v			01/26/17 01:44	1.54
Ethylbenzene	0.0970	U	0.616	0.0970	ppb v/v			01/26/17 01:44	1.54
4-Ethyltoluene	0.288	U	0.616	0.288	ppb v/v			01/26/17 01:44	1.54
Hexachlorobutadiene	0.665	U	3.08	0.665	ppb v/v			01/26/17 01:44	1.54
2-Hexanone	0.134	U	0.616	0.134	ppb v/v			01/26/17 01:44	1.54
4-Methyl-2-pentanone (MIBK)	0.208	U	0.616	0.208	ppb v/v			01/26/17 01:44	1.54
Methylene Chloride	0.903		0.616	0.111	ppb v/v			01/26/17 01:44	1.54
Styrene	0.0909	U	0.616	0.0909	ppb v/v			01/26/17 01:44	1.54
1,1,2,2-Tetrachloroethane	0.106	U	0.616	0.106	ppb v/v			01/26/17 01:44	1.54
Tetrachloroethene	4.91		0.616	0.0785	ppb v/v			01/26/17 01:44	1.54
Toluene	0.417	J	0.616	0.0785	ppb v/v			01/26/17 01:44	1.54
1,1,2-Trichloro-1,2,2-trifluoroethane	6.45		0.616	0.251	ppb v/v			01/26/17 01:44	1.54
1,2,4-Trichlorobenzene	0.667	U	3.08	0.667	ppb v/v			01/26/17 01:44	1.54
1,1,1-Trichloroethane	0.117	J	0.462	0.100	ppb v/v			01/26/17 01:44	1.54
1,1,2-Trichloroethane	0.103	U	0.616	0.103	ppb v/v			01/26/17 01:44	1.54
Trichloroethene	66.0		0.616	0.162	ppb v/v			01/26/17 01:44	1.54
Trichlorofluoromethane	2.29		0.616	0.302	ppb v/v			01/26/17 01:44	1.54
1,2,4-Trimethylbenzene	0.249	U	1.23	0.249	ppb v/v			01/26/17 01:44	1.54
1,3,5-Trimethylbenzene	0.193	U	0.616	0.193	ppb v/v			01/26/17 01:44	1.54
Vinyl acetate	0.223	U	1.23	0.223	ppb v/v			01/26/17 01:44	1.54
Vinyl chloride	0.185	U	0.616	0.185	ppb v/v			01/26/17 01:44	1.54
m,p-Xylene	0.154	U	1.23	0.154	ppb v/v			01/26/17 01:44	1.54
o-Xylene	0.0832	U	0.616	0.0832	ppb v/v			01/26/17 01:44	1.54

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130		01/26/17 01:44	1.54
1,2-Dichloroethane-d4 (Surr)	106		70 - 130		01/26/17 01:44	1.54
Toluene-d8 (Surr)	97		70 - 130		01/26/17 01:44	1.54

Client Sample Results

Client: Sandia National Laboratories
 Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101406-001/CWL-D2-470

Lab Sample ID: 320-25041-22

Date Collected: 01/09/17 10:58

Matrix: Air

Date Received: 01/17/17 09:45

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	17.0	U	478	17.0	ppb v/v			01/26/17 02:33	95.6
Benzene	7.55	U	38.2	7.55	ppb v/v			01/26/17 02:33	95.6
Benzyl chloride	15.6	U	76.5	15.6	ppb v/v			01/26/17 02:33	95.6
Bromodichloromethane	6.31	U	28.7	6.31	ppb v/v			01/26/17 02:33	95.6
Bromoform	6.69	U	38.2	6.69	ppb v/v			01/26/17 02:33	95.6
Bromomethane	32.0	U	76.5	32.0	ppb v/v			01/26/17 02:33	95.6
2-Butanone (MEK)	19.0	U	76.5	19.0	ppb v/v			01/26/17 02:33	95.6
Carbon disulfide	7.46	U	76.5	7.46	ppb v/v			01/26/17 02:33	95.6
Carbon tetrachloride	11.0	J	76.5	6.12	ppb v/v			01/26/17 02:33	95.6
Chlorobenzene	6.12	U	28.7	6.12	ppb v/v			01/26/17 02:33	95.6
Chloroethane	29.4	U	76.5	29.4	ppb v/v			01/26/17 02:33	95.6
Chloroform	318		28.7	9.08	ppb v/v			01/26/17 02:33	95.6
Chloromethane	18.8	U	76.5	18.8	ppb v/v			01/26/17 02:33	95.6
Dibromochloromethane	7.55	U	38.2	7.55	ppb v/v			01/26/17 02:33	95.6
1,2-Dibromoethane (EDB)	7.17	U	76.5	7.17	ppb v/v			01/26/17 02:33	95.6
1,2-Dichloro-1,1,2,2-tetrafluoroethane	14.8	U	38.2	14.8	ppb v/v			01/26/17 02:33	95.6
1,2-Dichlorobenzene	12.4	U	38.2	12.4	ppb v/v			01/26/17 02:33	95.6
1,3-Dichlorobenzene	10.5	U	38.2	10.5	ppb v/v			01/26/17 02:33	95.6
1,4-Dichlorobenzene	14.2	U	38.2	14.2	ppb v/v			01/26/17 02:33	95.6
Dichlorodifluoromethane	17.5	J	38.2	13.9	ppb v/v			01/26/17 02:33	95.6
1,1-Dichloroethane	8.84	J	28.7	6.88	ppb v/v			01/26/17 02:33	95.6
1,2-Dichloroethane	15.6	J	76.5	8.41	ppb v/v			01/26/17 02:33	95.6
1,1-Dichloroethene	149		76.5	12.3	ppb v/v			01/26/17 02:33	95.6
cis-1,2-Dichloroethene	8.51	U	38.2	8.51	ppb v/v			01/26/17 02:33	95.6
trans-1,2-Dichloroethene	9.56	U	38.2	9.56	ppb v/v			01/26/17 02:33	95.6
1,2-Dichloropropane	88.6		38.2	22.9	ppb v/v			01/26/17 02:33	95.6
cis-1,3-Dichloropropene	9.94	U	38.2	9.94	ppb v/v			01/26/17 02:33	95.6
trans-1,3-Dichloropropene	8.41	U	38.2	8.41	ppb v/v			01/26/17 02:33	95.6
Ethylbenzene	6.02	U	38.2	6.02	ppb v/v			01/26/17 02:33	95.6
4-Ethyltoluene	17.9	U	38.2	17.9	ppb v/v			01/26/17 02:33	95.6
Hexachlorobutadiene	41.3	U	191	41.3	ppb v/v			01/26/17 02:33	95.6
2-Hexanone	8.32	U	38.2	8.32	ppb v/v			01/26/17 02:33	95.6
4-Methyl-2-pentanone (MIBK)	12.9	U	38.2	12.9	ppb v/v			01/26/17 02:33	95.6
Methylene Chloride	7.19	J	38.2	6.88	ppb v/v			01/26/17 02:33	95.6
Styrene	5.64	U	38.2	5.64	ppb v/v			01/26/17 02:33	95.6
1,1,2,2-Tetrachloroethane	6.60	U	38.2	6.60	ppb v/v			01/26/17 02:33	95.6
Tetrachloroethene	310		38.2	4.88	ppb v/v			01/26/17 02:33	95.6
Toluene	4.88	U	38.2	4.88	ppb v/v			01/26/17 02:33	95.6
1,1,2-Trichloro-1,2,2-trifluoroethane	383		38.2	15.6	ppb v/v			01/26/17 02:33	95.6
1,2,4-Trichlorobenzene	41.4	U	191	41.4	ppb v/v			01/26/17 02:33	95.6
1,1,1-Trichloroethane	23.3	J	28.7	6.21	ppb v/v			01/26/17 02:33	95.6
1,1,2-Trichloroethane	6.41	U	38.2	6.41	ppb v/v			01/26/17 02:33	95.6
Trichloroethene	4330		38.2	10.0	ppb v/v			01/26/17 02:33	95.6
Trichlorofluoromethane	112		38.2	18.7	ppb v/v			01/26/17 02:33	95.6
1,2,4-Trimethylbenzene	15.5	U	76.5	15.5	ppb v/v			01/26/17 02:33	95.6
1,3,5-Trimethylbenzene	12.0	U	38.2	12.0	ppb v/v			01/26/17 02:33	95.6
Vinyl acetate	13.9	U	76.5	13.9	ppb v/v			01/26/17 02:33	95.6
Vinyl chloride	11.5	U	38.2	11.5	ppb v/v			01/26/17 02:33	95.6

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101406-001/CWL-D2-470

Lab Sample ID: 320-25041-22

Date Collected: 01/09/17 10:58

Matrix: Air

Date Received: 01/17/17 09:45

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	9.56	U	76.5	9.56	ppb v/v			01/26/17 02:33	95.6
o-Xylene	5.16	U	38.2	5.16	ppb v/v			01/26/17 02:33	95.6
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	72		70 - 130					01/26/17 02:33	95.6
1,2-Dichloroethane-d4 (Surr)	105		70 - 130					01/26/17 02:33	95.6
Toluene-d8 (Surr)	100		70 - 130					01/26/17 02:33	95.6

Client Sample ID: 101407-001/CWL-D3-FB1

Lab Sample ID: 320-25041-23

Date Collected: 01/09/17 11:16

Matrix: Air

Date Received: 01/17/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	0.497	J	5.00	0.178	ppb v/v			01/26/17 03:29	1
Benzene	0.0790	U	0.400	0.0790	ppb v/v			01/26/17 03:29	1
Benzyl chloride	0.163	U	0.800	0.163	ppb v/v			01/26/17 03:29	1
Bromodichloromethane	0.0660	U	0.300	0.0660	ppb v/v			01/26/17 03:29	1
Bromoform	0.0700	U	0.400	0.0700	ppb v/v			01/26/17 03:29	1
Bromomethane	0.335	U	0.800	0.335	ppb v/v			01/26/17 03:29	1
2-Butanone (MEK)	0.199	U	0.800	0.199	ppb v/v			01/26/17 03:29	1
Carbon disulfide	0.0780	U	0.800	0.0780	ppb v/v			01/26/17 03:29	1
Carbon tetrachloride	0.0640	U	0.800	0.0640	ppb v/v			01/26/17 03:29	1
Chlorobenzene	0.0640	U	0.300	0.0640	ppb v/v			01/26/17 03:29	1
Chloroethane	0.308	U	0.800	0.308	ppb v/v			01/26/17 03:29	1
Chloroform	0.0950	U	0.300	0.0950	ppb v/v			01/26/17 03:29	1
Chloromethane	0.197	U	0.800	0.197	ppb v/v			01/26/17 03:29	1
Dibromochloromethane	0.0790	U	0.400	0.0790	ppb v/v			01/26/17 03:29	1
1,2-Dibromoethane (EDB)	0.0750	U	0.800	0.0750	ppb v/v			01/26/17 03:29	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.155	U	0.400	0.155	ppb v/v			01/26/17 03:29	1
1,2-Dichlorobenzene	0.130	U	0.400	0.130	ppb v/v			01/26/17 03:29	1
1,3-Dichlorobenzene	0.110	U	0.400	0.110	ppb v/v			01/26/17 03:29	1
1,4-Dichlorobenzene	0.149	U	0.400	0.149	ppb v/v			01/26/17 03:29	1
Dichlorodifluoromethane	0.145	U	0.400	0.145	ppb v/v			01/26/17 03:29	1
1,1-Dichloroethane	0.0720	U	0.300	0.0720	ppb v/v			01/26/17 03:29	1
1,2-Dichloroethane	0.0880	U	0.800	0.0880	ppb v/v			01/26/17 03:29	1
1,1-Dichloroethene	0.129	U	0.800	0.129	ppb v/v			01/26/17 03:29	1
cis-1,2-Dichloroethene	0.0890	U	0.400	0.0890	ppb v/v			01/26/17 03:29	1
trans-1,2-Dichloroethene	0.100	U	0.400	0.100	ppb v/v			01/26/17 03:29	1
1,2-Dichloropropane	0.240	U	0.400	0.240	ppb v/v			01/26/17 03:29	1
cis-1,3-Dichloropropene	0.104	U	0.400	0.104	ppb v/v			01/26/17 03:29	1
trans-1,3-Dichloropropene	0.0880	U	0.400	0.0880	ppb v/v			01/26/17 03:29	1
Ethylbenzene	0.0630	U	0.400	0.0630	ppb v/v			01/26/17 03:29	1
4-Ethyltoluene	0.187	U	0.400	0.187	ppb v/v			01/26/17 03:29	1
Hexachlorobutadiene	0.432	U	2.00	0.432	ppb v/v			01/26/17 03:29	1
2-Hexanone	0.0870	U	0.400	0.0870	ppb v/v			01/26/17 03:29	1
4-Methyl-2-pentanone (MIBK)	0.135	U	0.400	0.135	ppb v/v			01/26/17 03:29	1
Methylene Chloride	0.0720	U	0.400	0.0720	ppb v/v			01/26/17 03:29	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101407-001/CWL-D3-FB1

Lab Sample ID: 320-25041-23

Date Collected: 01/09/17 11:16

Matrix: Air

Date Received: 01/17/17 09:45

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	0.0590	U	0.400	0.0590	ppb v/v			01/26/17 03:29	1
1,1,2,2-Tetrachloroethane	0.0690	U	0.400	0.0690	ppb v/v			01/26/17 03:29	1
Tetrachloroethene	0.0510	U	0.400	0.0510	ppb v/v			01/26/17 03:29	1
Toluene	0.0510	U	0.400	0.0510	ppb v/v			01/26/17 03:29	1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.163	U	0.400	0.163	ppb v/v			01/26/17 03:29	1
1,2,4-Trichlorobenzene	0.433	U	2.00	0.433	ppb v/v			01/26/17 03:29	1
1,1,1-Trichloroethane	0.0650	U	0.300	0.0650	ppb v/v			01/26/17 03:29	1
1,1,2-Trichloroethane	0.0670	U	0.400	0.0670	ppb v/v			01/26/17 03:29	1
Trichloroethene	0.215	J	0.400	0.105	ppb v/v			01/26/17 03:29	1
Trichlorofluoromethane	0.196	U	0.400	0.196	ppb v/v			01/26/17 03:29	1
1,2,4-Trimethylbenzene	0.162	U	0.800	0.162	ppb v/v			01/26/17 03:29	1
1,3,5-Trimethylbenzene	0.125	U	0.400	0.125	ppb v/v			01/26/17 03:29	1
Vinyl acetate	0.145	U	0.800	0.145	ppb v/v			01/26/17 03:29	1
Vinyl chloride	0.120	U	0.400	0.120	ppb v/v			01/26/17 03:29	1
m,p-Xylene	0.100	U	0.800	0.100	ppb v/v			01/26/17 03:29	1
o-Xylene	0.0540	U	0.400	0.0540	ppb v/v			01/26/17 03:29	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		70 - 130		01/26/17 03:29	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 130		01/26/17 03:29	1
Toluene-d8 (Surr)	99		70 - 130		01/26/17 03:29	1

Client Sample ID: 101408-001/CWL-D3-120

Lab Sample ID: 320-25041-24

Date Collected: 01/09/17 11:19

Matrix: Air

Date Received: 01/17/17 09:45

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	20.3	U	570	20.3	ppb v/v			01/26/17 04:18	114
Benzene	9.01	U	45.6	9.01	ppb v/v			01/26/17 04:18	114
Benzyl chloride	18.6	U	91.2	18.6	ppb v/v			01/26/17 04:18	114
Bromodichloromethane	7.52	U	34.2	7.52	ppb v/v			01/26/17 04:18	114
Bromoform	7.98	U	45.6	7.98	ppb v/v			01/26/17 04:18	114
Bromomethane	38.2	U	91.2	38.2	ppb v/v			01/26/17 04:18	114
2-Butanone (MEK)	22.7	U	91.2	22.7	ppb v/v			01/26/17 04:18	114
Carbon disulfide	8.89	U	91.2	8.89	ppb v/v			01/26/17 04:18	114
Carbon tetrachloride	17.5	J	91.2	7.30	ppb v/v			01/26/17 04:18	114
Chlorobenzene	7.30	U	34.2	7.30	ppb v/v			01/26/17 04:18	114
Chloroethane	35.1	U	91.2	35.1	ppb v/v			01/26/17 04:18	114
Chloroform	234		34.2	10.8	ppb v/v			01/26/17 04:18	114
Chloromethane	22.5	U	91.2	22.5	ppb v/v			01/26/17 04:18	114
Dibromochloromethane	9.01	U	45.6	9.01	ppb v/v			01/26/17 04:18	114
1,2-Dibromoethane (EDB)	8.55	U	91.2	8.55	ppb v/v			01/26/17 04:18	114
1,2-Dichloro-1,1,2,2-tetrafluoroethane	17.7	U	45.6	17.7	ppb v/v			01/26/17 04:18	114
1,2-Dichlorobenzene	14.8	U	45.6	14.8	ppb v/v			01/26/17 04:18	114
1,3-Dichlorobenzene	12.5	U	45.6	12.5	ppb v/v			01/26/17 04:18	114
1,4-Dichlorobenzene	17.0	U	45.6	17.0	ppb v/v			01/26/17 04:18	114
Dichlorodifluoromethane	35.0	J	45.6	16.5	ppb v/v			01/26/17 04:18	114

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101408-001/CWL-D3-120

Lab Sample ID: 320-25041-24

Date Collected: 01/09/17 11:19

Matrix: Air

Date Received: 01/17/17 09:45

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	11.0	J	34.2	8.21	ppb v/v			01/26/17 04:18	114
1,2-Dichloroethane	31.7	J	91.2	10.0	ppb v/v			01/26/17 04:18	114
1,1-Dichloroethene	257		91.2	14.7	ppb v/v			01/26/17 04:18	114
cis-1,2-Dichloroethene	10.1	U	45.6	10.1	ppb v/v			01/26/17 04:18	114
trans-1,2-Dichloroethene	11.4	U	45.6	11.4	ppb v/v			01/26/17 04:18	114
1,2-Dichloropropane	125		45.6	27.4	ppb v/v			01/26/17 04:18	114
cis-1,3-Dichloropropene	11.9	U	45.6	11.9	ppb v/v			01/26/17 04:18	114
trans-1,3-Dichloropropene	10.0	U	45.6	10.0	ppb v/v			01/26/17 04:18	114
Ethylbenzene	7.18	U	45.6	7.18	ppb v/v			01/26/17 04:18	114
4-Ethyltoluene	21.3	U	45.6	21.3	ppb v/v			01/26/17 04:18	114
Hexachlorobutadiene	49.2	U	228	49.2	ppb v/v			01/26/17 04:18	114
2-Hexanone	9.92	U	45.6	9.92	ppb v/v			01/26/17 04:18	114
4-Methyl-2-pentanone (MIBK)	15.4	U	45.6	15.4	ppb v/v			01/26/17 04:18	114
Methylene Chloride	17.9	J	45.6	8.21	ppb v/v			01/26/17 04:18	114
Styrene	6.73	U	45.6	6.73	ppb v/v			01/26/17 04:18	114
1,1,2,2-Tetrachloroethane	7.87	U	45.6	7.87	ppb v/v			01/26/17 04:18	114
Tetrachloroethene	178		45.6	5.81	ppb v/v			01/26/17 04:18	114
Toluene	5.81	U	45.6	5.81	ppb v/v			01/26/17 04:18	114
1,1,2-Trichloro-1,2,2-trifluoroethane	737		45.6	18.6	ppb v/v			01/26/17 04:18	114
1,2,4-Trichlorobenzene	49.4	U	228	49.4	ppb v/v			01/26/17 04:18	114
1,1,1-Trichloroethane	15.5	J	34.2	7.41	ppb v/v			01/26/17 04:18	114
1,1,2-Trichloroethane	7.64	U	45.6	7.64	ppb v/v			01/26/17 04:18	114
Trichloroethene	5770		45.6	12.0	ppb v/v			01/26/17 04:18	114
Trichlorofluoromethane	205		45.6	22.3	ppb v/v			01/26/17 04:18	114
1,2,4-Trimethylbenzene	18.5	U	91.2	18.5	ppb v/v			01/26/17 04:18	114
1,3,5-Trimethylbenzene	14.3	U	45.6	14.3	ppb v/v			01/26/17 04:18	114
Vinyl acetate	16.5	U	91.2	16.5	ppb v/v			01/26/17 04:18	114
Vinyl chloride	13.7	U	45.6	13.7	ppb v/v			01/26/17 04:18	114
m,p-Xylene	11.4	U	91.2	11.4	ppb v/v			01/26/17 04:18	114
o-Xylene	6.16	U	45.6	6.16	ppb v/v			01/26/17 04:18	114

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	76		70 - 130		01/26/17 04:18	114
1,2-Dichloroethane-d4 (Surr)	105		70 - 130		01/26/17 04:18	114
Toluene-d8 (Surr)	100		70 - 130		01/26/17 04:18	114

Client Sample ID: 101409-001/CWL-D3-170

Lab Sample ID: 320-25041-25

Date Collected: 01/09/17 11:22

Matrix: Air

Date Received: 01/17/17 09:45

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	23.5	U	660	23.5	ppb v/v			01/26/17 05:09	132
Benzene	10.4	U	52.8	10.4	ppb v/v			01/26/17 05:09	132
Benzyl chloride	21.5	U	106	21.5	ppb v/v			01/26/17 05:09	132
Bromodichloromethane	8.71	U	39.6	8.71	ppb v/v			01/26/17 05:09	132
Bromoform	9.24	U	52.8	9.24	ppb v/v			01/26/17 05:09	132

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101409-001/CWL-D3-170

Lab Sample ID: 320-25041-25

Date Collected: 01/09/17 11:22

Matrix: Air

Date Received: 01/17/17 09:45

Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromomethane	44.2	U	106	44.2	ppb v/v			01/26/17 05:09	132
2-Butanone (MEK)	26.3	U	106	26.3	ppb v/v			01/26/17 05:09	132
Carbon disulfide	10.3	U	106	10.3	ppb v/v			01/26/17 05:09	132
Carbon tetrachloride	23.2	J	106	8.45	ppb v/v			01/26/17 05:09	132
Chlorobenzene	8.45	U	39.6	8.45	ppb v/v			01/26/17 05:09	132
Chloroethane	40.7	U	106	40.7	ppb v/v			01/26/17 05:09	132
Chloroform	222		39.6	12.5	ppb v/v			01/26/17 05:09	132
Chloromethane	26.0	U	106	26.0	ppb v/v			01/26/17 05:09	132
Dibromochloromethane	10.4	U	52.8	10.4	ppb v/v			01/26/17 05:09	132
1,2-Dibromoethane (EDB)	9.90	U	106	9.90	ppb v/v			01/26/17 05:09	132
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.5	U	52.8	20.5	ppb v/v			01/26/17 05:09	132
1,2-Dichlorobenzene	17.2	U	52.8	17.2	ppb v/v			01/26/17 05:09	132
1,3-Dichlorobenzene	14.5	U	52.8	14.5	ppb v/v			01/26/17 05:09	132
1,4-Dichlorobenzene	19.7	U	52.8	19.7	ppb v/v			01/26/17 05:09	132
Dichlorodifluoromethane	38.2	J	52.8	19.1	ppb v/v			01/26/17 05:09	132
1,1-Dichloroethane	11.6	J	39.6	9.50	ppb v/v			01/26/17 05:09	132
1,2-Dichloroethane	31.2	J	106	11.6	ppb v/v			01/26/17 05:09	132
1,1-Dichloroethene	300		106	17.0	ppb v/v			01/26/17 05:09	132
cis-1,2-Dichloroethene	11.7	U	52.8	11.7	ppb v/v			01/26/17 05:09	132
trans-1,2-Dichloroethene	13.2	U	52.8	13.2	ppb v/v			01/26/17 05:09	132
1,2-Dichloropropane	140		52.8	31.7	ppb v/v			01/26/17 05:09	132
cis-1,3-Dichloropropene	13.7	U	52.8	13.7	ppb v/v			01/26/17 05:09	132
trans-1,3-Dichloropropene	11.6	U	52.8	11.6	ppb v/v			01/26/17 05:09	132
Ethylbenzene	8.32	U	52.8	8.32	ppb v/v			01/26/17 05:09	132
4-Ethyltoluene	24.7	U	52.8	24.7	ppb v/v			01/26/17 05:09	132
Hexachlorobutadiene	57.0	U	264	57.0	ppb v/v			01/26/17 05:09	132
2-Hexanone	11.5	U	52.8	11.5	ppb v/v			01/26/17 05:09	132
4-Methyl-2-pentanone (MIBK)	17.8	U	52.8	17.8	ppb v/v			01/26/17 05:09	132
Methylene Chloride	39.3	J	52.8	9.50	ppb v/v			01/26/17 05:09	132
Styrene	7.79	U	52.8	7.79	ppb v/v			01/26/17 05:09	132
1,1,2,2-Tetrachloroethane	9.11	U	52.8	9.11	ppb v/v			01/26/17 05:09	132
Tetrachloroethene	175		52.8	6.73	ppb v/v			01/26/17 05:09	132
Toluene	6.73	U	52.8	6.73	ppb v/v			01/26/17 05:09	132
1,1,2-Trichloro-1,2,2-trifluoroethane	843		52.8	21.5	ppb v/v			01/26/17 05:09	132
1,2,4-Trichlorobenzene	57.2	U	264	57.2	ppb v/v			01/26/17 05:09	132
1,1,1-Trichloroethane	13.6	J	39.6	8.58	ppb v/v			01/26/17 05:09	132
1,1,2-Trichloroethane	8.84	U	52.8	8.84	ppb v/v			01/26/17 05:09	132
Trichloroethene	6360		52.8	13.9	ppb v/v			01/26/17 05:09	132
Trichlorofluoromethane	233		52.8	25.9	ppb v/v			01/26/17 05:09	132
1,2,4-Trimethylbenzene	21.4	U	106	21.4	ppb v/v			01/26/17 05:09	132
1,3,5-Trimethylbenzene	16.5	U	52.8	16.5	ppb v/v			01/26/17 05:09	132
Vinyl acetate	19.1	U	106	19.1	ppb v/v			01/26/17 05:09	132
Vinyl chloride	15.8	U	52.8	15.8	ppb v/v			01/26/17 05:09	132
m,p-Xylene	13.2	U	106	13.2	ppb v/v			01/26/17 05:09	132
o-Xylene	7.13	U	52.8	7.13	ppb v/v			01/26/17 05:09	132

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	72		70 - 130		01/26/17 05:09	132

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101409-001/CWL-D3-170

Lab Sample ID: 320-25041-25

Date Collected: 01/09/17 11:22

Matrix: Air

Date Received: 01/17/17 09:45

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)	104		70 - 130		01/26/17 05:09	132
Toluene-d8 (Surr)	101		70 - 130		01/26/17 05:09	132

Client Sample ID: 101410-001/CWL-D3-350

Lab Sample ID: 320-25041-26

Date Collected: 01/09/17 11:26

Matrix: Air

Date Received: 01/17/17 09:45

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	18.7	U	525	18.7	ppb v/v			01/26/17 05:58	105
Benzene	8.30	U	42.0	8.30	ppb v/v			01/26/17 05:58	105
Benzyl chloride	17.1	U	84.0	17.1	ppb v/v			01/26/17 05:58	105
Bromodichloromethane	6.93	U	31.5	6.93	ppb v/v			01/26/17 05:58	105
Bromoform	7.35	U	42.0	7.35	ppb v/v			01/26/17 05:58	105
Bromomethane	35.2	U	84.0	35.2	ppb v/v			01/26/17 05:58	105
2-Butanone (MEK)	20.9	U	84.0	20.9	ppb v/v			01/26/17 05:58	105
Carbon disulfide	8.19	U	84.0	8.19	ppb v/v			01/26/17 05:58	105
Carbon tetrachloride	21.5	J	84.0	6.72	ppb v/v			01/26/17 05:58	105
Chlorobenzene	6.72	U	31.5	6.72	ppb v/v			01/26/17 05:58	105
Chloroethane	32.3	U	84.0	32.3	ppb v/v			01/26/17 05:58	105
Chloroform	157		31.5	9.98	ppb v/v			01/26/17 05:58	105
Chloromethane	20.7	U	84.0	20.7	ppb v/v			01/26/17 05:58	105
Dibromochloromethane	8.30	U	42.0	8.30	ppb v/v			01/26/17 05:58	105
1,2-Dibromoethane (EDB)	7.88	U	84.0	7.88	ppb v/v			01/26/17 05:58	105
1,2-Dichloro-1,1,2,2-tetrafluoroethane	16.3	U	42.0	16.3	ppb v/v			01/26/17 05:58	105
1,2-Dichlorobenzene	13.7	U	42.0	13.7	ppb v/v			01/26/17 05:58	105
1,3-Dichlorobenzene	11.6	U	42.0	11.6	ppb v/v			01/26/17 05:58	105
1,4-Dichlorobenzene	15.6	U	42.0	15.6	ppb v/v			01/26/17 05:58	105
Dichlorodifluoromethane	35.8	J	42.0	15.2	ppb v/v			01/26/17 05:58	105
1,1-Dichloroethane	7.56	U	31.5	7.56	ppb v/v			01/26/17 05:58	105
1,2-Dichloroethane	17.7	J	84.0	9.24	ppb v/v			01/26/17 05:58	105
1,1-Dichloroethene	277		84.0	13.5	ppb v/v			01/26/17 05:58	105
cis-1,2-Dichloroethene	9.35	U	42.0	9.35	ppb v/v			01/26/17 05:58	105
trans-1,2-Dichloroethene	10.5	U	42.0	10.5	ppb v/v			01/26/17 05:58	105
1,2-Dichloropropane	135		42.0	25.2	ppb v/v			01/26/17 05:58	105
cis-1,3-Dichloropropene	10.9	U	42.0	10.9	ppb v/v			01/26/17 05:58	105
trans-1,3-Dichloropropene	9.24	U	42.0	9.24	ppb v/v			01/26/17 05:58	105
Ethylbenzene	6.62	U	42.0	6.62	ppb v/v			01/26/17 05:58	105
4-Ethyltoluene	19.6	U	42.0	19.6	ppb v/v			01/26/17 05:58	105
Hexachlorobutadiene	45.4	U	210	45.4	ppb v/v			01/26/17 05:58	105
2-Hexanone	9.14	U	42.0	9.14	ppb v/v			01/26/17 05:58	105
4-Methyl-2-pentanone (MIBK)	14.2	U	42.0	14.2	ppb v/v			01/26/17 05:58	105
Methylene Chloride	94.5		42.0	7.56	ppb v/v			01/26/17 05:58	105
Styrene	6.20	U	42.0	6.20	ppb v/v			01/26/17 05:58	105
1,1,2,2-Tetrachloroethane	7.25	U	42.0	7.25	ppb v/v			01/26/17 05:58	105
Tetrachloroethene	150		42.0	5.36	ppb v/v			01/26/17 05:58	105
Toluene	5.36	U	42.0	5.36	ppb v/v			01/26/17 05:58	105

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101410-001/CWL-D3-350

Lab Sample ID: 320-25041-26

Date Collected: 01/09/17 11:26

Matrix: Air

Date Received: 01/17/17 09:45

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	763		42.0	17.1	ppb v/v			01/26/17 05:58	105
1,2,4-Trichlorobenzene	45.5	U	210	45.5	ppb v/v			01/26/17 05:58	105
1,1,1-Trichloroethane	9.16	J	31.5	6.83	ppb v/v			01/26/17 05:58	105
1,1,2-Trichloroethane	7.04	U	42.0	7.04	ppb v/v			01/26/17 05:58	105
Trichloroethene	5610		42.0	11.0	ppb v/v			01/26/17 05:58	105
Trichlorofluoromethane	211		42.0	20.6	ppb v/v			01/26/17 05:58	105
1,2,4-Trimethylbenzene	17.0	U	84.0	17.0	ppb v/v			01/26/17 05:58	105
1,3,5-Trimethylbenzene	13.1	U	42.0	13.1	ppb v/v			01/26/17 05:58	105
Vinyl acetate	15.2	U	84.0	15.2	ppb v/v			01/26/17 05:58	105
Vinyl chloride	12.6	U	42.0	12.6	ppb v/v			01/26/17 05:58	105
m,p-Xylene	10.5	U	84.0	10.5	ppb v/v			01/26/17 05:58	105
o-Xylene	5.67	U	42.0	5.67	ppb v/v			01/26/17 05:58	105

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	74		70 - 130		01/26/17 05:58	105
1,2-Dichloroethane-d4 (Surr)	106		70 - 130		01/26/17 05:58	105
Toluene-d8 (Surr)	100		70 - 130		01/26/17 05:58	105

Client Sample ID: 101411-001/CWL-D3-440

Lab Sample ID: 320-25041-27

Date Collected: 01/09/17 11:35

Matrix: Air

Date Received: 01/17/17 09:45

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	27.4	U	770	27.4	ppb v/v			01/26/17 08:15	154
Benzene	12.2	U	61.6	12.2	ppb v/v			01/26/17 08:15	154
Benzyl chloride	25.1	U	123	25.1	ppb v/v			01/26/17 08:15	154
Bromodichloromethane	10.2	U	46.2	10.2	ppb v/v			01/26/17 08:15	154
Bromoform	10.8	U	61.6	10.8	ppb v/v			01/26/17 08:15	154
Bromomethane	51.6	U	123	51.6	ppb v/v			01/26/17 08:15	154
2-Butanone (MEK)	30.6	U	123	30.6	ppb v/v			01/26/17 08:15	154
Carbon disulfide	12.0	U	123	12.0	ppb v/v			01/26/17 08:15	154
Carbon tetrachloride	30.1	J	123	9.86	ppb v/v			01/26/17 08:15	154
Chlorobenzene	9.86	U	46.2	9.86	ppb v/v			01/26/17 08:15	154
Chloroethane	47.4	U	123	47.4	ppb v/v			01/26/17 08:15	154
Chloroform	235		46.2	14.6	ppb v/v			01/26/17 08:15	154
Chloromethane	30.3	U	123	30.3	ppb v/v			01/26/17 08:15	154
Dibromochloromethane	12.2	U	61.6	12.2	ppb v/v			01/26/17 08:15	154
1,2-Dibromoethane (EDB)	11.6	U	123	11.6	ppb v/v			01/26/17 08:15	154
1,2-Dichloro-1,1,2,2-tetrafluoroethane	23.9	U	61.6	23.9	ppb v/v			01/26/17 08:15	154
1,2-Dichlorobenzene	20.0	U	61.6	20.0	ppb v/v			01/26/17 08:15	154
1,3-Dichlorobenzene	16.9	U	61.6	16.9	ppb v/v			01/26/17 08:15	154
1,4-Dichlorobenzene	22.9	U	61.6	22.9	ppb v/v			01/26/17 08:15	154
Dichlorodifluoromethane	46.8	J	61.6	22.3	ppb v/v			01/26/17 08:15	154
1,1-Dichloroethane	13.0	J	46.2	11.1	ppb v/v			01/26/17 08:15	154
1,2-Dichloroethane	31.2	J	123	13.6	ppb v/v			01/26/17 08:15	154
1,1-Dichloroethene	350		123	19.9	ppb v/v			01/26/17 08:15	154

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101411-001/CWL-D3-440

Lab Sample ID: 320-25041-27

Date Collected: 01/09/17 11:35

Matrix: Air

Date Received: 01/17/17 09:45

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	13.7	U	61.6	13.7	ppb v/v			01/26/17 08:15	154
trans-1,2-Dichloroethene	15.4	U	61.6	15.4	ppb v/v			01/26/17 08:15	154
1,2-Dichloropropane	209		61.6	37.0	ppb v/v			01/26/17 08:15	154
cis-1,3-Dichloropropene	16.0	U	61.6	16.0	ppb v/v			01/26/17 08:15	154
trans-1,3-Dichloropropene	13.6	U	61.6	13.6	ppb v/v			01/26/17 08:15	154
Ethylbenzene	9.70	U	61.6	9.70	ppb v/v			01/26/17 08:15	154
4-Ethyltoluene	28.8	U	61.6	28.8	ppb v/v			01/26/17 08:15	154
Hexachlorobutadiene	66.5	U	308	66.5	ppb v/v			01/26/17 08:15	154
2-Hexanone	13.4	U	61.6	13.4	ppb v/v			01/26/17 08:15	154
4-Methyl-2-pentanone (MIBK)	20.8	U	61.6	20.8	ppb v/v			01/26/17 08:15	154
Methylene Chloride	85.4		61.6	11.1	ppb v/v			01/26/17 08:15	154
Styrene	9.09	U	61.6	9.09	ppb v/v			01/26/17 08:15	154
1,1,2,2-Tetrachloroethane	10.6	U	61.6	10.6	ppb v/v			01/26/17 08:15	154
Tetrachloroethene	210		61.6	7.85	ppb v/v			01/26/17 08:15	154
Toluene	7.85	U	61.6	7.85	ppb v/v			01/26/17 08:15	154
1,1,2-Trichloro-1,2,2-trifluoroethane	1080		61.6	25.1	ppb v/v			01/26/17 08:15	154
1,2,4-Trichlorobenzene	66.7	U	308	66.7	ppb v/v			01/26/17 08:15	154
1,1,1-Trichloroethane	13.9	J	46.2	10.0	ppb v/v			01/26/17 08:15	154
1,1,2-Trichloroethane	10.3	U	61.6	10.3	ppb v/v			01/26/17 08:15	154
Trichloroethene	8090		61.6	16.2	ppb v/v			01/26/17 08:15	154
Trichlorofluoromethane	295		61.6	30.2	ppb v/v			01/26/17 08:15	154
1,2,4-Trimethylbenzene	24.9	U	123	24.9	ppb v/v			01/26/17 08:15	154
1,3,5-Trimethylbenzene	19.3	U	61.6	19.3	ppb v/v			01/26/17 08:15	154
Vinyl acetate	22.3	U	123	22.3	ppb v/v			01/26/17 08:15	154
Vinyl chloride	18.5	U	61.6	18.5	ppb v/v			01/26/17 08:15	154
m,p-Xylene	15.4	U	123	15.4	ppb v/v			01/26/17 08:15	154
o-Xylene	8.32	U	61.6	8.32	ppb v/v			01/26/17 08:15	154
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	75		70 - 130					01/26/17 08:15	154
1,2-Dichloroethane-d4 (Surr)	104		70 - 130					01/26/17 08:15	154
Toluene-d8 (Surr)	101		70 - 130					01/26/17 08:15	154

Client Sample ID: 101412-001/CWL-D3-480

Lab Sample ID: 320-25041-28

Date Collected: 01/09/17 11:47

Matrix: Air

Date Received: 01/17/17 09:45

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	2.92	J	11.3	0.402	ppb v/v			01/26/17 09:08	2.26
Benzene	0.179	U	0.904	0.179	ppb v/v			01/26/17 09:08	2.26
Benzyl chloride	0.368	U	1.81	0.368	ppb v/v			01/26/17 09:08	2.26
Bromodichloromethane	0.149	U	0.678	0.149	ppb v/v			01/26/17 09:08	2.26
Bromoform	0.158	U	0.904	0.158	ppb v/v			01/26/17 09:08	2.26
Bromomethane	0.757	U	1.81	0.757	ppb v/v			01/26/17 09:08	2.26
2-Butanone (MEK)	0.450	U	1.81	0.450	ppb v/v			01/26/17 09:08	2.26
Carbon disulfide	0.650	J	1.81	0.176	ppb v/v			01/26/17 09:08	2.26

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
 Project/Site: CWL-GWM/SVM

TestAmerica Job ID: 320-25041-1

Client Sample ID: 101412-001/CWL-D3-480

Lab Sample ID: 320-25041-28

Date Collected: 01/09/17 11:47

Matrix: Air

Date Received: 01/17/17 09:45

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	0.386	J	1.81	0.145	ppb v/v			01/26/17 09:08	2.26
Chlorobenzene	0.145	U	0.678	0.145	ppb v/v			01/26/17 09:08	2.26
Chloroethane	0.696	U	1.81	0.696	ppb v/v			01/26/17 09:08	2.26
Chloroform	6.59		0.678	0.215	ppb v/v			01/26/17 09:08	2.26
Chloromethane	0.445	U	1.81	0.445	ppb v/v			01/26/17 09:08	2.26
Dibromochloromethane	0.179	U	0.904	0.179	ppb v/v			01/26/17 09:08	2.26
1,2-Dibromoethane (EDB)	0.170	U	1.81	0.170	ppb v/v			01/26/17 09:08	2.26
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.350	U	0.904	0.350	ppb v/v			01/26/17 09:08	2.26
1,2-Dichlorobenzene	0.294	U	0.904	0.294	ppb v/v			01/26/17 09:08	2.26
1,3-Dichlorobenzene	0.249	U	0.904	0.249	ppb v/v			01/26/17 09:08	2.26
1,4-Dichlorobenzene	0.337	U	0.904	0.337	ppb v/v			01/26/17 09:08	2.26
Dichlorodifluoromethane	1.26		0.904	0.328	ppb v/v			01/26/17 09:08	2.26
1,1-Dichloroethane	0.209	J	0.678	0.163	ppb v/v			01/26/17 09:08	2.26
1,2-Dichloroethane	0.298	J	1.81	0.199	ppb v/v			01/26/17 09:08	2.26
1,1-Dichloroethene	4.32		1.81	0.292	ppb v/v			01/26/17 09:08	2.26
cis-1,2-Dichloroethene	0.201	U	0.904	0.201	ppb v/v			01/26/17 09:08	2.26
trans-1,2-Dichloroethene	0.226	U	0.904	0.226	ppb v/v			01/26/17 09:08	2.26
1,2-Dichloropropane	1.87		0.904	0.542	ppb v/v			01/26/17 09:08	2.26
cis-1,3-Dichloropropene	0.235	U	0.904	0.235	ppb v/v			01/26/17 09:08	2.26
trans-1,3-Dichloropropene	0.199	U	0.904	0.199	ppb v/v			01/26/17 09:08	2.26
Ethylbenzene	0.142	U	0.904	0.142	ppb v/v			01/26/17 09:08	2.26
4-Ethyltoluene	0.423	U	0.904	0.423	ppb v/v			01/26/17 09:08	2.26
Hexachlorobutadiene	0.976	U	4.52	0.976	ppb v/v			01/26/17 09:08	2.26
2-Hexanone	0.197	U	0.904	0.197	ppb v/v			01/26/17 09:08	2.26
4-Methyl-2-pentanone (MIBK)	0.305	U	0.904	0.305	ppb v/v			01/26/17 09:08	2.26
Methylene Chloride	0.163	U	0.904	0.163	ppb v/v			01/26/17 09:08	2.26
Styrene	0.133	U	0.904	0.133	ppb v/v			01/26/17 09:08	2.26
1,1,2,2-Tetrachloroethane	0.156	U	0.904	0.156	ppb v/v			01/26/17 09:08	2.26
Tetrachloroethene	3.69		0.904	0.115	ppb v/v			01/26/17 09:08	2.26
Toluene	0.115	U	0.904	0.115	ppb v/v			01/26/17 09:08	2.26
1,1,2-Trichloro-1,2,2-trifluoroethane	13.2		0.904	0.368	ppb v/v			01/26/17 09:08	2.26
1,2,4-Trichlorobenzene	0.979	U	4.52	0.979	ppb v/v			01/26/17 09:08	2.26
1,1,1-Trichloroethane	0.452	J	0.678	0.147	ppb v/v			01/26/17 09:08	2.26
1,1,2-Trichloroethane	0.151	U	0.904	0.151	ppb v/v			01/26/17 09:08	2.26
Trichloroethene	109		0.904	0.237	ppb v/v			01/26/17 09:08	2.26
Trichlorofluoromethane	4.37		0.904	0.443	ppb v/v			01/26/17 09:08	2.26
1,2,4-Trimethylbenzene	0.366	U	1.81	0.366	ppb v/v			01/26/17 09:08	2.26
1,3,5-Trimethylbenzene	0.283	U	0.904	0.283	ppb v/v			01/26/17 09:08	2.26
Vinyl acetate	0.328	U	1.81	0.328	ppb v/v			01/26/17 09:08	2.26
Vinyl chloride	0.271	U	0.904	0.271	ppb v/v			01/26/17 09:08	2.26
m,p-Xylene	0.226	U	1.81	0.226	ppb v/v			01/26/17 09:08	2.26
o-Xylene	0.122	U	0.904	0.122	ppb v/v			01/26/17 09:08	2.26

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130		01/26/17 09:08	2.26
1,2-Dichloroethane-d4 (Surr)	105		70 - 130		01/26/17 09:08	2.26
Toluene-d8 (Surr)	99		70 - 130		01/26/17 09:08	2.26

ANNEX C
Chemical Waste Landfill
Calendar Year 2017 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 3/22/17
2. Time of Inspection 0925-0945
3. Name of Inspector Robert Zick, 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.)

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]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
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]			
<i>Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
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]			
<i>Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Accumulation of wind-blown plants and debris.	yes	yes	2
B. Fence wires and posts in need of repair/maintenance.	yes	No	
C. Gates in need of oiling/repair/maintenance.	yes	No	
D. Locks in need of cleaning or replacement.	yes	No	
E. Warning signs in need of repair or replacement.	yes	No	
F. Survey monuments in vicinity of CWL visible.	yes	No	

IV. PREVIOUS DEFICIENCIES			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	N/A	N/A	

**Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (continued)**

NOTES

Note Number	Description
1.	Accumulation of wind blown plant debris in drainage culverts south side of site.
2.	Accumulation of wind blown plant debris on perimeter fence.

**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 5/11/17

Action (Note Number) 2 assigned to Don Schofield Date action completed 5/11/17

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:

There is new weed growth throughout the cover.

1. Wind blown plant debris was removed from the
the drainage culverts by the landscaping/maintenance
contractor on May 11, 2017. RJZ

2. Wind blown plant debris was removed from the
perimeter fence by the landscaping/maintenance
contractor over May 10 & 11, 2017. RJZ

Inspector's Signature Russ Reavis

Original to: Chemical Waste Landfill Operating Record

Copy to: Environmental Safety and Health (ES&H) and Security Records Center



date: **March 30, 2017**

to: **Michael M. Mitchell, MS: 0718 (06234)**

from: **Jennifer Payne MS:0729 (04143)**

subject: **CWL: March 2017 Vegetation Monitoring Observations and Recommendations**

The CWL was assessed on March 27th for native vegetation health. The native vegetation at the CWL appears to be healthy, but annual weeds were observed to be thickly present across the CWL. Although these annual weeds do not pose a detrimental threat to the native vegetation, they do compete against the native vegetation for early season soil moisture and nutrients. Weedy annual vegetation is present on the CWL cover at a rate much higher than is present in the surrounding background native vegetation.

The weeds at the CWL were observed to be almost entirely in flower, and many have already set seeds. Due to nearly complete life cycles, the current weeds at the CWL are past any means of treatment to control them or their seed production.

Although the CWL native vegetation is healthy, it would greatly benefit from reduced competition from weeds throughout the spring and summer. The native vegetation would be more robust without competition for soil moisture and nutrient availability; allowing it to be more resilient when adverse events such as drought occur.

Recommendations:

1. To reduce or prevent the current seeds from competing with the native vegetation on the CWL in Spring 2018, a pre-emergent must applied sometime during the last three weeks of February 2018.
2. To reduce or prevent the warmer season weedy annual plants from competing with the native vegetation on the CWL in during the upcoming summer, a spray pre-emergent herbicide should be applied across the site at the end of April 2017 after the spring weeds remnants have been cleared by a landscaping crew. A pre-emergent should be applied to bare soil after the dead weeds have been removed from the site. This type of herbicide works via soil contact by forming a crust at the soil surface, interrupting seed germination through the soil surface.

If the site already has juvenile weedy annual plants growing widely across it at the time of the pre-emergent spraying in the end of April 2017, a post-emergent may be beneficial to

also include in the spray application. The post-emergent herbicide must specifically target broadleaf/dicots plants only and applied while the weeds are small, before they have flowered or set seed. The post-emergent herbicide cannot affect any grasses/monocot plants. If the new crop of weedy annual plants has already grown to moderate or full-size, the post-emergent should not be included because it is most effective against young weeds. The decision whether or not to include a post-emergent herbicide will need to be determined at the time of applying the pre-emergent, based on the conditions described above.

If the summer annual weeds are abundant across the CWL ET Cover and a post-emergent herbicide is not used, these annual weeds need to otherwise be removed as soon as possible. Annual weedy plants set seed rapidly and they have to be removed while they are young for increased future control. If they are not eliminated from the site prior to flowering and setting seed, these weedy annual plants will provide increased competition for resources in future years against the desired native vegetation.

If you should have any questions, don't hesitate to contact me at my office 845-9849, cell 218-1815, or email at jjpayne@sandia.gov.

cc: MS 0651 Customer Funded Records Center
MS 0729 Ecology Library

Chemical Waste Landfill Post-Closure Inspection Form Checklist for Cover System / Surface-Water / Security Fence

1. Date of Inspection 6/14/17
2. Time of Inspection 0845-0912
3. Name of Inspector Robert Zöck, 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.)

Training records maintained at CAMU Administrative Trailer.

RZ

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

I. COVER SYSTEM [Quarterly]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Visible settlement of the soil cover in excess of 6 inches.	<i>yes</i>	<i>No</i>	
B. Erosion of the soil cover in excess of 6 inches deep.	<i>yes</i>	<i>No</i>	
C. Evidence of water ponding on the CWL cover surface in excess of 100 square feet.	<i>yes</i>	<i>No</i>	
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.	<i>yes</i>	<i>No</i>	
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.	<i>yes</i>	<i>No</i>	

II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]			
<i>Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Channel or sidewall erosion in excess of 6 inches deep.	<i>yes</i>	<i>No</i>	
B. Channel sediment accumulation in excess of 6 inches deep.	<i>yes</i>	<i>No</i>	
C. Debris that blocks more than 1/3 of the channel width.	<i>yes</i>	<i>yes</i>	<i>1</i>

**Chemical Waste Landfill
 Post-Closure Inspection Form
 Checklist for Cover System / Surface-Water / Security Fence (continued)**

III. SECURITY FENCE [Quarterly]			
<i>Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
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	yes	2
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			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
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	wind blown plant debris accumulated in one of the south west drainage culverts. Debris was removed at time of the inspection.
2	Man gate lock needed to be lubricated, which was performed at time of the inspection.
3	Survey monument at western most location was cleared of wind blown plant debris at time of the inspection.

**Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (continued)**

Action (Note Number) 1 assigned to Robert Zöck Date action completed 6/14/17

Action (Note Number) 2 assigned to Robert Zöck Date action completed 6/14/17

Action (Note Number) 3 assigned to Robert Zöck Date action completed 6/14/17

Action (Note Number) _____ assigned to _____ Date action completed _____

Action (Note Number) _____ assigned to _____ Date action completed _____

Additional Comments:

1. Wind blown plant debris was removed from southwest drainage culvert at time of the inspection. RZ 6/14/17

2. Lock was lubricated at time of the inspection. RZ 6/14/17

3. Survey monument was cleared of wind blown plant debris at time of the inspection. RZ 6/14/17

Inspector's Signature Robert Zöck, Bruce Reavies

Original to: Chemical Waste Landfill Operating Record

Copy to: Environmental Safety and Health (ES&H) and Security Records Center



date: June 27, 2017

to: Mike Mitchell (08854)

from: Jennifer Payne (00643) jjpayne@sandia.gov

subject: **June 2017 Quarterly Inspections - Biology Follow-Up**

Biological Requirement:

Biological Surveys are required prior to driving across any area of native vegetation, spraying herbicides or initiating other work activities that disturb wildlife.

Please submit request three weeks to prior work at: <https://info.sandia.gov/esh/ecoticket/request.php>

Should personnel find a bird's nest during any of the work associated with these sites, they will need to halt work, and contact the Ecology Program at <https://info.sandia.gov/esh/ecoticket/request.php> If other wildlife is encountered that may cause a health and safety issue, contact the Ecology Program.

All proposed project activities will be conducted in keeping with Corporate Procedure ESH100.2.ENV.2, "Comply with Environmental Requirements for Migratory Birds, Protected Species, and Other Biota".

Nesting Birds Biological Survey: I did not observe any nesting birds on any of the three ET Covers. ET Cover work activities, including driving, needs to begin by July 3rd. If the work begins after July 3rd, you will need contact me prior to beginning work.

Post-emergent herbicides: emphasize to Sequoia that any post-emergent must NOT harm grasses. Last month Sequoia originally suggested using Glyphosate for post-emergent weed control at the CWL, but Glyphosate is a non-selective herbicide and it will kill the grasses.

Prodiamine 4L is a broad-leaf selective post-emergent that should not harm the grasses and does not have a bee precaution, according to the University of California Integrated Pest Management bee precaution pesticide ratings. Sequoia should have this herbicide available.

Only a selective broadleaf post-emergent should be used anywhere near the covers due to possible wind drift carrying the herbicide to the covers.

Pre-emergent herbicides: the pre-emergent herbicide Surflan seems to have worked well so far and does not have a bee precaution, according to the University of California Integrated Pest Management bee precaution pesticide ratings.

ET Covers Observations and Recommendations

CAMU

- The two 4 inch holes on the north slope are as you describe. I will need to check the possibly active burrow with our downhole camera. Although the entrance is in good shape, today it didn't show any sign of recent activity.
- I also saw two approximately 4-inch burrow entrances on the west slope. They both appear to be abandoned. I will check them again when I return with the camera. I will fill in all inactive burrows.
- For your maintenance scope: the entire south slope up to the southernmost part of the top of the ET Cover has a moderately dense amount of small Russian thistle plants. They should either be pulled or sprayed with a broad-leaf post-emergent. Spraying might be a better choice to avoid excessive foot traffic on the steep graveled slope. The post-emergent would need to be very safe for grasses. A pre-emergent in this area would help to prevent more Russian thistle.

CWL

- The grasses are generally not robust. Supplemental water will give them a boost as soon it's available.
- Very few weeds on the ET Cover.
- I like the strategy of two rounds of vehicle-mounted water sprayed across the cover after the pre-emergent herbicide. Although we wouldn't want the cover driven over regularly, the two rounds of water spray will be helpful until either we can use the Big Sprinkler or the monsoons arrive.
- Two rounds of sprayed water after the pre-emergent should be enough water to settle the herbicide down through the litter (dead vegetation) that is across the cover and down through the gravel. Something to consider based on time availability: if Sequoia is limited on time for this maintenance event, we could postpone the litter raking until a later maintenance event.
- Surflan is a good pre-emergent herbicide for the CWL. There are many weedy grasses that need to be controlled, so a non-selective pre-emergent is currently preferable.
- My herbicide recommendation is the same as last month that we should only use the pre-emergent in this herbicide application on the CWL ET Cover.

This due to:

- o 1. The grasses are generally not robust.
- o 2. there is a relatively low weed presence at the moment.

If we had supplemental water or guaranteed rain in the near future to bolster the health of the grasses, then I would like to use the pre/post combination. Without a guaranteed boost, I am more concerned with anything that might unintentionally weaken the native grasses on the CWL. I think the trade-off of allowing the current weeds to grow without a post-emergent is okay. I think the native grasses will most benefit from decreased future weed competition.

When the native grasses are more robust I will feel more comfortable using the pre-/post-emergent herbicide combination.

- Off the cover (outside the fence line) a pre-/post-emergent combination is fine. I think the small amount of post-emergent broadleaf-selective herbicide drift that reaches the cover should be okay. I would just like to be extra-cautious inside the fence line.

MWL

- Very few weeds on the ET Cover. Overall things look very good.
- South of the previous dirt pile area there is quite a bit of silverleaf nightshade (*Solanum*



elaeagnifolium) scattered throughout the grass.

Although it's not a terrible weed, it should be removed due to its tendency to spread more widely. This is the primary weed that I think should currently be removed.

- All of the Russian thistle (large and small) should be removed from the 10 perimeter monitoring well locations.
- Other observations: two large ant colonies at the toe of the north slope, one toward the eastern corner and the other toward the western corner. Evidence of small mammal seed eating activity on the top of the ET Cover.

If you should have any questions, don't hesitate to contact me at my office 845-9849, cell 218-1815, or email at jjpayne@sandia.gov.

cc: Customer Funded Records Center
Ecology Library
Steve Cox
Robert Ziock
Don Schofield
Rick Dotson

Chemical Waste Landfill Post-Closure Inspection Form Checklist for Cover System / Surface-Water / Security Fence

1. Date of Inspection 9/13/2017
2. Time of Inspection 0849 - 0918
3. Name of Inspector Robert Zöck, 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.)*

RZ
BR

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]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
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]			
<i>Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
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]			
<i>Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Accumulation of wind-blown plants and debris.	yes	No	
B. Fence wires and posts in need of repair/maintenance.	yes	No	
C. Gates in need of oiling/repair/maintenance.	yes	No	
D. Locks in need of cleaning or replacement.	yes	No	
E. Warning signs in need of repair or replacement.	yes	No	
F. Survey monuments in vicinity of CWL visible.	yes	No	

IV. PREVIOUS DEFICIENCIES			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
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 wind blow plant debris
	in drainage culverts south side of site.

**Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (continued)**

Action (Note Number) 1 assigned to Robert Zibck Date action completed 9/14/17

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. Wind blown plant debris was removed at time of inspection from 2 drainage culverts south of the cover and north of the road. Wind blown plant debris was removed from the drainage culvert located south of the cover and south of the road by the landscaping/maintenance contractor on 9/14/17.

Inspector's Signature Robert Zibck Bruce Bavis

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 12/1/17
2. Time of Inspection 09:10 - 09:35
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.)*

*RZ
BR*

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]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Visible settlement of the soil cover in excess of 6 inches.	<i>yes</i>	<i>No</i>	
B. Erosion of the soil cover in excess of 6 inches deep.	<i>yes</i>	<i>No</i>	
C. Evidence of water ponding on the CWL cover surface in excess of 100 square feet.	<i>yes</i>	<i>No</i>	
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.	<i>yes</i>	<i>No</i>	
E. Contiguous areas of no vegetation greater than 200 ft. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	<i>yes</i>	<i>No</i>	

II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]			
<i>Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Channel or sidewall erosion in excess of 6 inches deep.	<i>yes</i>	<i>No</i>	
B. Channel sediment accumulation in excess of 6 inches deep.	<i>yes</i>	<i>No</i>	
C. Debris that blocks more than 1/3 of the channel width.	<i>yes</i>	<i>No</i>	

**Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Cover System / Surface-Water / Security Fence (continued)**

III. SECURITY FENCE [Quarterly]			
<i>Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Accumulation of wind-blown plants and debris.	yes	No	
B. Fence wires and posts in need of repair/maintenance.	yes	No	
C. Gates in need of oiling/repair/maintenance.	yes	No	
D. Locks in need of cleaning or replacement.	yes	No	
E. Warning signs in need of repair or replacement.	yes	No	
F. Survey monuments in vicinity of CWL visible.	yes	No	

IV. PREVIOUS DEFICIENCIES			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	



date: December 21, 2017

to: Mike Mitchell (08854)

from: Jennifer Payne (00643) jjpayne@sandia.gov

subject: **December 2017 Quarterly Inspections - Biology Follow-Up**

Biological Requirement:

Biological Surveys are required prior to driving across any area of native vegetation, spraying herbicides or initiating other work activities that disturb wildlife.

Please submit request three weeks to prior work at: <https://info.sandia.gov/esh/ecoticket/request.php>

Should personnel find a bird's nest during any of the work associated with these sites, they will need to halt work, and contact the Ecology Program at <https://info.sandia.gov/esh/ecoticket/request.php> If other wildlife is encountered that may cause a health and safety issue, contact the Ecology Program.

All proposed project activities will be conducted in keeping with Corporate Procedure ESH100.2.ENV.2, "Comply with Environmental Requirements for Migratory Birds, Protected Species, and Other Biota".

ET Covers Observations and Recommendations

CAMU

Observations:

- The December 18th inspection found the CAMU Cover to be in excellent condition. The native clump grasses have good spacing with a diverse age and species community structure. In the upcoming year the CAMU does not need additional native grass recruitment from on-site seed.
- No animal holes of concern.
- A low amount of snakeweed shrubs are present on the side slopes.
- A low amount of dried annual weedy plant species are present as litter on the cover; these are mostly tumbleweed.
- Very few tumbleweeds observed in the fenceline.
- The area in between the toe of the cover and the fenceline is clear of weeds with few native clump grasses.
- Two four-wing saltbush shrubs were observed on the cover, both at the top of the slope at the north end. The one located at the NE corner of the cover is flagged. The other shrub is located just to the SW of the uppermost sampling/monitoring tube and is not flagged.

Maintenance Planning Recommendations:

- A minimum of two pre-emergent herbicide applications should be made across the cover in 2018. This will control all weedy annual species without harming the existing native clump grasses. The pre-emergent herbicide Surflan, applied in liquid form, has worked well so far on the covers and does not have a bee precaution, according to the University of California Integrated Pest Management bee precaution pesticide ratings.
 - o The first application should be as early as possible in the Jan-March timeframe.
 - o The second application should be approximately 3 months after the first application.
 - o A third application should be made approximately 3 months after the second application.
- A weed-removal sweep should be made across the cover during each maintenance event to remove any weedy annuals and shrubs. Of note is that the four-wing saltbush shrub is much easier to see during the winter months because its foliage stands out against the dried grass blades, it is much harder to observe during the summer months.

CWL**Observations:**

- The CWL Cover looked great on the December 18th inspection. The native clump grasses made good progress maturing in 2017. In the upcoming year the CWL does not need additional native grass recruitment from on-site seed.
- Blue grama grass appears extremely dominant during this inspection. This native grass species has retained many more seedheads than any of the other native grasses on the CWL and during the growing season its total foliar area covered per plant is much less than other species.
- Very few tumbleweeds observed on the ET Cover and a few along the east fenceline.
- Very few dried weedy plants observed on the ET Cover.

Maintenance Planning Recommendations:

- A minimum of two pre-emergent herbicide applications should be made across the cover in 2018. This will control all weedy annual species without harming the existing native clump grasses. The pre-emergent herbicide Surflan, applied in liquid form, has worked well so far on the covers and does not have a bee precaution, according to the University of California Integrated Pest Management bee precaution pesticide ratings.
 - o The first application should be as early as possible in the Jan-March timeframe.
 - o The second application should be approximately 3 months after the first application.
 - o A third application should be made approximately 3 months after the second application.
- A weed-removal sweep should be made across the cover during each maintenance event to remove any weedy annuals and shrubs. Of note is that the four-wing saltbush shrub is much easier to see during the winter months because its foliage stands out against the dried grass blades, it is much harder to observe during the summer months.
- Off the cover (outside the fence line) a pre-/post-emergent combination is fine as deemed necessary. I think the small amount of post-emergent broadleaf-selective herbicide drift that reaches the cover should be okay. I would just like to be extra-cautious inside the fence line.

MWL**Observations:**

- The Cover is really in excellent condition. The native clump grasses have good spacing with a diverse age and species community structure. In the upcoming year the MWL does not need additional native grass recruitment from on-site seed.
- The fencelines were all clear of tumbleweeds during my December 19th inspection.
- Very few tumbleweeds or other weeds present on the ET Cover.

Maintenance Planning Recommendations:

- A minimum of two pre-emergent herbicide applications should be made across the cover in 2018. This will control all weedy annual species without harming the existing native clump grasses. The pre-emergent herbicide Surflan, applied in liquid form, has worked well so far on the covers and does not have a bee precaution, according to the University of California Integrated Pest Management bee precaution pesticide ratings.
 - o The first application should be as early as possible in the Jan-March timeframe.
 - o The second application should be approximately 3 months after the first application.
 - o A third application should be made approximately 3 months after the second application.
- A weed-removal sweep should be made across the cover during each maintenance event to remove any weedy annuals and shrubs. The MWL should require very low weed removal efforts.

If you should have any questions, don't hesitate to contact me at my office 845-9849, cell 218-1815, or email at jjpayne@sandia.gov.

cc: Customer Funded Records Center
Ecology Library
Steve Cox
Robert Ziock
Don Schofield
Rick Dotson
Stephanie Salinas

GROUNDWATER/SOIL-VAPOR EQUIPMENT INSPECTIONS

Chemical Waste Landfill Post-Closure Inspection Form Checklist for Groundwater Monitoring Locations / Sampling Equipment

1. Date of Inspection 04/11/17
2. Time of Inspection 0750
3. Name of Inspector Robert Lynch

Mandatory requirement:

The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: *(Inspector must initial box before proceeding with the inspection.)*

Training records maintained at CAMU Administrative Trailer.

RL

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

I. GROUNDWATER MONITORING LOCATIONS [Semi-annually]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
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]			
<i>Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
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)**

Action (Note Number) _____ assigned to _____ Date action completed _____

Action (Note Number) _____ assigned to _____ Date action completed _____

Action (Note Number) _____ assigned to _____ Date action completed _____

Action (Note Number) _____ assigned to _____ Date action completed _____

Action (Note Number) _____ assigned to _____ Date action completed _____

Additional Comments:

Inspector's Signature 

Original to: Chemical Waste Landfill Operating Record

Copy to: Environmental Safety and Health (ES&H) and Security Records Center

Soil Vapor Monitoring Inspection Form

1. Soil vapor monitoring site CWL
2. Date of Inspection 1/9/17
3. Time of Inspection 0823
4. Name of Inspector Robert Lynch

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

SOIL VAPOR MONITORING LOCATIONS				
<i>Inspection Parameter</i>	<i>Indicate if Applicable (Yes or No)</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	YES	YES	NO	
B. Above-ground enclosure in need of repair/maintenance.	NA			
C. Well cover caps and Swagelok® dust caps in need of repair/maintenance.	YES	YES	NO	
D. Sampling ports in need of repair/maintenance.	YES	YES	NO	
E. Passive venting Baroballs™ in need of repair/maintenance.	YES	YES	NO	
F. Monitoring wells and soil-gas sample port locations properly labeled.	YES	YES	NO	
G. Locks in need of cleaning or replacement.	YES	YES	NO	

SAMPLING EQUIPMENT				
<i>Inspection Parameter</i>	<i>Indicate if Applicable (Yes or No)</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Sampling pump in need of repair/maintenance	YES	YES	NO	
B. Sampling manifold (tubing, gauges, and valves) in need of repair/maintenance.	YES	YES	NO	

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, 4100 Controlled Documents home page.

Soil Vapor Monitoring Inspection Form

PREVIOUS DEFICIENCIES			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	N/A		

NOTES

Note Number	Description

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 _____

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, 4100 Controlled Documents home page.

Chemical Waste Landfill Post-Closure Inspection Form Checklist for Groundwater Monitoring Locations / Sampling Equipment

1. Date of Inspection 07/18/17
2. Time of Inspection 0755
3. Name of Inspector Robert Lynch

Mandatory requirement:

The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: (Inspector must initial box before proceeding with the inspection.)

Training records maintained at CAMU Administrative Trailer.

RL

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

I. GROUNDWATER MONITORING LOCATIONS [Semi-annually]

<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
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.	YES	NO	

II. GROUNDWATER SAMPLING EQUIPMENT [Semi-annually]

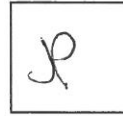
<i>Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Sampling pump in need of repair/maintenance.	YES	NO	
B. Sampling assembly (e.g., tubing, gauges, and valves) in need of repair/maintenance.	YES	NO	

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): 31 %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.

<u>Scientific Name</u>	<u>Common Name (optional)</u>	<u>%Total cover</u>
<u>Sporobolus cryptandrus</u>	<u>Sand dropseed</u>	<u>14 %</u>
<u>Bouteloua gracilis</u>	<u>Blue grama</u>	<u>11 %</u>
<u>Pleuraphis jamesii</u>	<u>Galleta grass</u>	<u>6 %</u>
<u>Sporobolus contractus</u>	<u>Spike dropseed</u>	<u><0.5 %</u>
<u>Salsola tragus</u>	<u>Russian thistle</u>	<u><0.5 %</u>
<u>Solanum elaeagnifolium</u>	<u>Silverleaf nightshade</u>	<u><0.5 %</u>
<u>Opuntia phaeacantha</u>	<u>Brown spined prickly pear</u>	<u><0.5 %</u>
<u>Sphaeralcea incana</u>	<u>Yellow globemallow</u>	<u><0.5 %</u>
<u>Sphaeralcea hastulata</u>	<u>Wrinkled globemallow</u>	<u><0.5 %</u>
<u>Chenopodium species</u>	<u>Goosefoot species</u>	<u><0.5 %</u>
<u>Amaranthus species</u>	<u>Pigweed species</u>	<u><0.5 %</u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>

Note: ¹All 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? No

Does any burrow(s) appear to be active? Yes

Animal Burrow Notes: Ant burrows are distributed across the CWL cover with varied activity levels. Two small mammal burrow entrances (less than 1.5-inch diameter) were observed; no sign of recent activity at either burrow. No map is attached because there are no burrow entrances in excess of 4 inches in diameter. No repair is needed.

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? No If "Yes," describe below.

Plant Notes: _____

Chemical Waste Landfill Biology Inspection Checklist for the CWL Cover (Concluded)

General Observations:

Overall the CWL Cover is in excellent condition. The native perennial grasses appear more robust than during the 2016 annual biology inspection. The grasses overall appear more mature with healthy green color and healthy leaf blades. Many young, healthy juvenile native grass clumps are also present across the CWL Cover, providing a healthy, varied-age plant community. A moderate amount of seedheads observed, lower than expected considering the robust appearance of the grasses. This makes the exact species percent present identifications difficult. Also of note is that Sand dropseed has very large, showy seedheads which when casually observed can make it appear to be more abundant than it actually is. The inspection timing may be slightly ahead of prime seed production time. The “Approximate percent native vegetation coverage (i.e., “living plants”)” is lower than last year. This is likely due to senesced vegetation (dried out from previous seasons growth) that was removed as part of 2017 maintenance activities which reduced the total amount of area covered by each living plant.

The NW corner appears to again this year have more bunch grasses, similar to last year. They are growing well, appearing more mature and dense than previous years.

Pre-emergent herbicide application in 2018 may again be a useful best practice to proactively control weed growth on the cover. Controlling weed growth is important for the overall health of the native grasses, as the weeds compete for limited nutrients and soil moisture. The native clump grasses have formed good spacing; currently no additional native plant recruitment is needed onsite from seed. Further development of the currently established bunch grasses will help reduce future maintenance and improve the overall health of the established native grasses. The timely application of pre-emergent herbicide would also aid in maintaining the current spacing and allow ecological resources to further bolster the established native plants.

Biological Aspects Map – [note: sketch map to locate specific features described above is attached if needed – see notes above]

Survey Biologist Name: _____
Original to: Chemical Waste Landfill Operating Record

Date: 8/14/17

ANNEX D
Calendar Year 2017 Chemical Waste Landfill Biology Report

2017 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) 2017 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 2017 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 2017 was conducted on August 14, 2017. 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 2017 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 2017 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 2017 CWL Biology Inspections document cover conditions that continue 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

2017 Chemical Waste Landfill Biology Report

blue grama as the dominant grass species (through 2013) to sand dropseed becoming the dominant grass species (since 2014). As documented in the September 2016 and August 2017 CWL Biology Inspections, the ET Cover continues to display healthy, even coverage of mixed-age native perennial clump grasses.

Local Climate Trends for 2017 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 2017 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.

Warmer than average temperatures with below average precipitation have been the meteorological norm in the CWL area since 2008. As of December 12, 2017 the CWL area was still classified as “Abnormally Dry” according to the U.S. Drought Monitor (December 2017). The months of October through December 2016 and January 2017 had above average precipitation, providing good soil moisture and aiding vegetative root health during the dormant season. The total annual precipitation for the 2017 growing season and preceding winter-to-spring timeframe (October 2016-September 2017) was 9.58 inches, above the 20-year mean of 8.72 inches. The active growing season of June through August 2017 received 2.39 inches of precipitation, well below the historical timeframe mean of 3.70 inches. The end of 2017 was extremely dry, receiving only 0.07 inches of precipitation during the final quarter.

October 2016-September 2017 relative humidity was 40.7%, closely tracking 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.

Temperature

The final quarter of 2016 was warmer than normal, with a mean temperature of 2.7°F above average for the quarter.

2017 Chemical Waste Landfill Biology Report

Table 1
October-December 2016 Meteorological Data Summary for the Chemical Waste Landfill^a

Month	October	November	December	
Temperature (°F)				3-Month Avg
Monthly Mean	63.0	47.7	38.7	49.8
20-year Temp Means	57.9	46.4	37.0	47.1
Precipitation (Inches)				3-Month Total
Monthly Total	1.23	0.98	0.65	2.86
20-year Precip Means	0.93	0.41	0.57	1.91
Relative Humidity (%)				3-Month Avg
Monthly Mean	35.6	51.4	55.9	47.6
20-year RH Means	46.6	47.6	48.6	47.6
Wind (Miles/hour)				3-Month Avg
Monthly Mean	7.4	8	7	7.5
20-year Wind Means	7.8	7.1	6.8	7.2

^aInformation Source: SNL/NM Meteorological Monitoring Program.

2017 Chemical Waste Landfill Biology Report

Table 2
2017 Meteorological Data Summary for the Chemical Waste Landfill^a

Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	
Year	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017	
Temperature (°F)													Annual ^b
Monthly Mean	38.4	46.1	54.3	55.9	63.7	76.3	76.1	72.1	68.9	57.9	54.1	42.8	58.9
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	1.18	0.14	0.10	1.07	0.27	0.06	0.94	1.39	1.57	0.07	0.00	0.00	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	57.4	45.7	28.7	33.5	28.5	24.2	41.1	47.3	38.6	40.5	35.5	35.6	38.1
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	7.5	8.3	8.6	9.6	9.8	9.6	8.8	8.1	8.9	8.2	6.6	6.3	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

^aInformation Source: SNL/NM Meteorological Monitoring Program.

^bValues provided are averages of the monthly data.

^cValues provided are totals of the monthly data.

2017 Chemical Waste Landfill Biology Report

In CY 2017 the CWL experienced 91.2 degrees of temperature variability, with a low of 11.5°F in January 2017 and a high of 102.7°F in June 2017. The annual mean temperature was 58.9°F, which is 1.6°F above the historical mean of 57.3°F. The monthly temperature means were near normal, except for February, March, November, and December 2017 which were 4.4°F, 5.5°F, 7.7°F, and 5.8°F above their respective historical mean temperatures. November 2017 was the warmest November on record since meteorological data collection began more than 100 years ago at the ABQ Sunport, followed by an abnormally warm December.

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 more resilient grass clumps to expand their root systems and grow. Since 2013 additional native grass clumps have become established and developed in these open areas.

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. 2017 activities are presented in Section 6.6 of this 2017 CWL Annual Post-Closure Care Report and are briefly summarized below. Relatively little ET Cover maintenance was required in 2017, which reflects significant progress in establishing healthy, self-sustaining native grasses on the CWL ET Cover and perimeter areas.

Three maintenance events were conducted in May, July, and September 2017. Each event involved the removal of windblown weeds (primarily tumbleweeds) from the cover, perimeter fences and within drainage areas along the south portion of the CWL. A live and dead weed removal sweep was also conducted by hand on the CWL cover during each maintenance event. The July event also included raking out the dead grass material and removing it from the CWL cover.

In addition to weed removal activities, a pre-emergent/post-emergent herbicide mix was applied between the west perimeter fence and the perimeter road in May and July, and to the 3-foot perimeter area beyond the fence in both July and September. In the May and July event, a pre-emergent herbicide mixture was also applied to the entire CWL cover after completion of weed removal and raking. The purpose of this best practice effort that included both weed removal and selective herbicide application 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 herbicides helps reduce the availability of weed seeds, future weed growth, and future maintenance efforts. The fence line is an accumulation area for weed seeds and growth because dead, windblown weeds commonly are caught in the fence.

2017 Chemical Waste Landfill Biology Report

August 2017 Inspection Results

The August 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 31%, of which approximately 99% was native perennial grasses (Figure 1). Sand dropseed was the dominant grass species (14% total foliar coverage) along with Blue grama (11% total foliar coverage) and Galleta grass (6% total foliar coverage). Foliar coverage of the three native grass species was lower than in 2016; this is likely due to senesced vegetation (dried out from previous seasons growth) that was removed as part of the 2017 maintenance activities which reduced the total amount of area covered by each living plant. As the CWL cover develops into a more 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. Many juvenile native grass clumps were also present across the CWL Cover, providing a healthy varied-age plant community. The grasses overall appeared more mature in 2017, with healthy green color and broad leaf blades.

Two small mammal burrow entrances were observed, each less than 1.5 inches in diameter. Ant burrows observed were distributed evenly across the cover and showed varied activity levels. 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 2017, the existing native grasses could benefit from additional 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 spring and summer of 2018 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 2018 if the monsoon rains and previous 12-month precipitation total are below normal.

2017 Chemical Waste Landfill Biology Report



Southwest portion of the cover



Northwest portion of the cover



Southeast portion of the cover



Northeast portion of the cover

Figure 1 August 14, 2017 CWL ET Cover Photos

2017 Chemical Waste Landfill Biology Report

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.

U. S. Drought Monitor (December 2017)
<http://droughtmonitor.unl.edu/>