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**CHEMICAL WASTE LANDFILL  
ANNUAL POST-CLOSURE CARE REPORT  
CALENDAR YEAR 2019**

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

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**MARCH 2020**



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

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**ANNUAL CHEMICAL WASTE LANDFILL  
POST-CLOSURE CARE REPORT  
CALENDAR YEAR 2019**

**Facility:** Chemical Waste Landfill

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

**EPA ID No.:** NM5890110518

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

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- Annex B      Chemical Waste Landfill Calendar Year 2019 Soil-Gas Monitoring Forms and Reports
- Annex C      Chemical Waste Landfill Calendar Year 2019 Post-Closure Inspection Forms
- Annex D      Chemical Waste Landfill Calendar Year 2019 Biology Report

## ACRONYMS AND ABBREVIATIONS

AOP	administrative operating procedure
bgs	below ground surface
CAMU	Corrective Action Management Unit
CFR	Code of Federal Regulations
CWL	Chemical Waste Landfill
CY	calendar year
DOE	U.S. Department of Energy
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
ET	evapotranspirative
gpm	gallons per minute
KAFB	Kirtland Air Force Base
LCL	lower confidence limit
LE	Landfill Excavation
MDL	method detection limit
NMAC	New Mexico Administrative Code
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
PCCP	Post-Closure Care Permit
PCE	tetrachloroethene
%	percent
pH	potential of hydrogen (negative logarithm of the hydrogen ion concentration)
ppbv	parts per billion by volume
ppmv	parts per million by volume
QC	quality control
RPD	relative percent difference
SAP	sampling and analysis plan
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 Sandia National Laboratories/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 ninth CWL Annual Post-Closure Care Report documents all activities and results as required by the PCCP Attachment 1, Section 1.12.

Two semiannual groundwater sampling events were conducted in calendar year (CY) 2019. 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 with limited resampling of two sampling ports in March due to quality issues with the corresponding January samples. Analytical and statistical assessment results are consistent with previous years and there were no exceedances of established trigger levels. Soil-gas monitoring results continue to confirm stability and three-dimensional diffusion of the residual volatile organic compound soil-gas plume beneath the CWL in the vadose zone.

Inspections of the CWL final cover system, compliance monitoring networks and sampling equipment, storm-water diversion structures, and security fence were performed in accordance with PCCP requirements. Required repairs were minor and were generally performed during the inspections. All controls are performing as designed.

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 2019 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 2019 included two submittals of updated reference documents cited in the PCCP (Harrell May and November 2019) and submittal of the Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2018 (SNL/NM March 2019).

All PCCP requirements have been met for CY 2019. Industrial land use is being maintained for the CWL consistent with PCCP requirements. Based upon monitoring, inspection, and maintenance results, the ET Cover is functioning as designed and site conditions remain protective of human health and the environment.

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## 1.0 INTRODUCTION

Sandia National Laboratories (SNL) is a multi-purpose engineering and science laboratory owned by the U.S. Department of Energy (DOE)/National Nuclear Security Administration. SNL is managed and operated by 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 (SNL/NM December 1992 and subsequent revisions). The CWL Post-Closure Care Permit (PCCP) (NMED October 2009), which became effective June 2, 2011 (Kieling June 2011) and as modified, defines all post-closure requirements. There were no PCCP modifications in calendar year (CY) 2019. The modification history of the PCCP through CY 2019 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 2019.

All PCCP monitoring, inspection, and maintenance/repair requirements have been met for CY 2019 and are documented in this CWL Annual Post-Closure Care Report in accordance with PCCP Attachment 1. Based upon monitoring, inspection, and maintenance results, the Evapotranspirative (ET) Cover and associated controls are functioning as designed, and site conditions remain protective of human health and the environment. No groundwater or soil-gas 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 2019 as required by PCCP Attachment 1, Section 1.12 (NMED October 2009 and subsequent revisions). This annual report documents post-closure care activities conducted from January through December 2019 and fulfills the PCCP requirement for annual reporting to the NMED.

The PCCP monitoring, inspection, and maintenance/repair activities that must be documented and reported for each CY are presented in Chapter 3 of this report and are summarized as follows.

- 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 semiannual monitoring events.

- One annual inspection of the soil-gas monitoring network and sampling equipment performed in conjunction with the annual monitoring event.
- One annual inspection of final cover vegetation and biological parameters (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 2019 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, 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 CY 2019 reporting period.
- Chapter 9 lists the references cited in this report.

Annexes are provided that include CY 2019 supporting information as follows:

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

## **2.0 CHEMICAL WASTE LANDFILL POST-CLOSURE CARE CONDITIONS**

The CWL is a 1.9-acre remediated 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 CWL Final 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 volatile organic compound (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 (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% 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

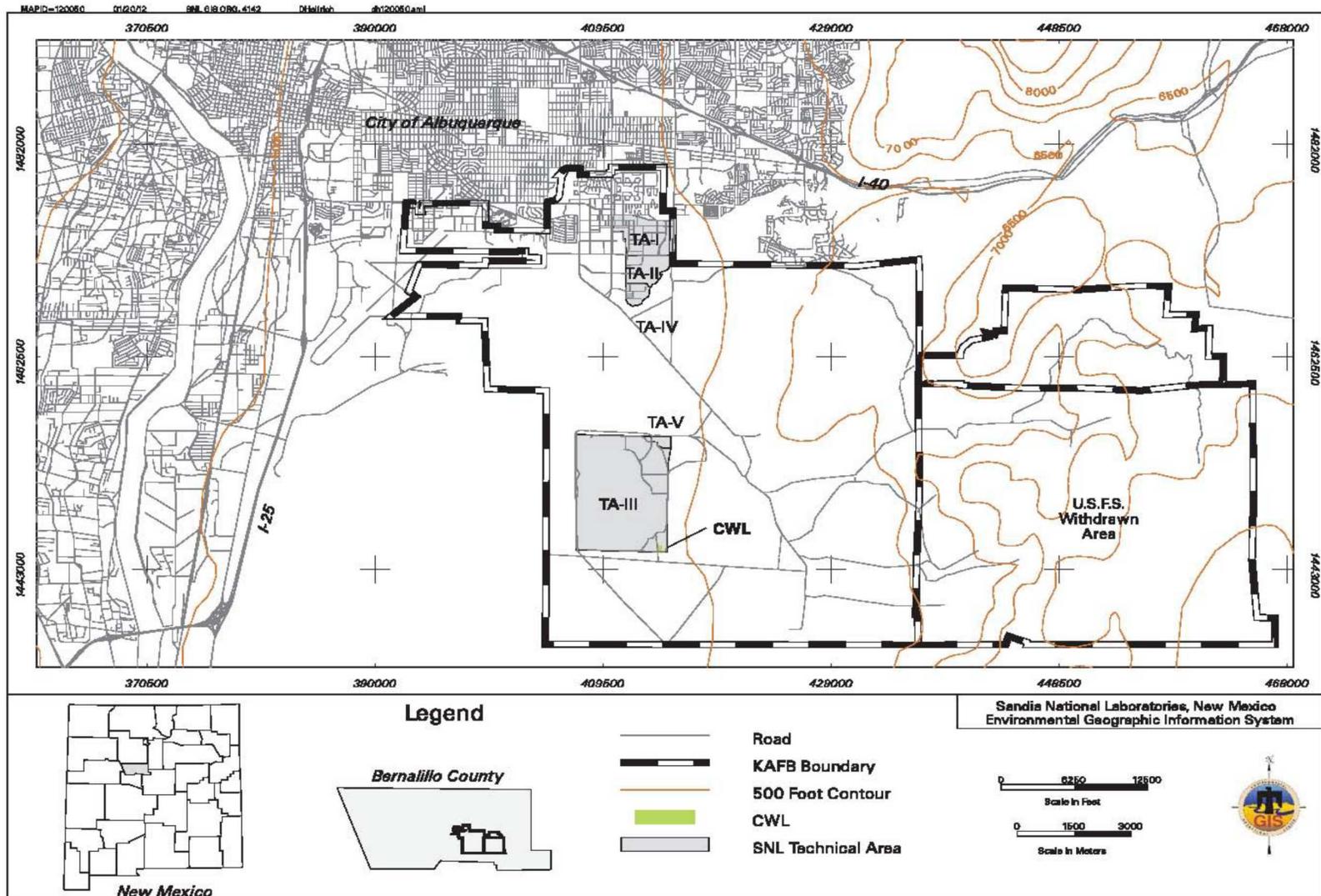


Figure 2-1  
 Location of the Chemical Waste Landfill with Respect to Kirtland Air Force Base and the City of Albuquerque

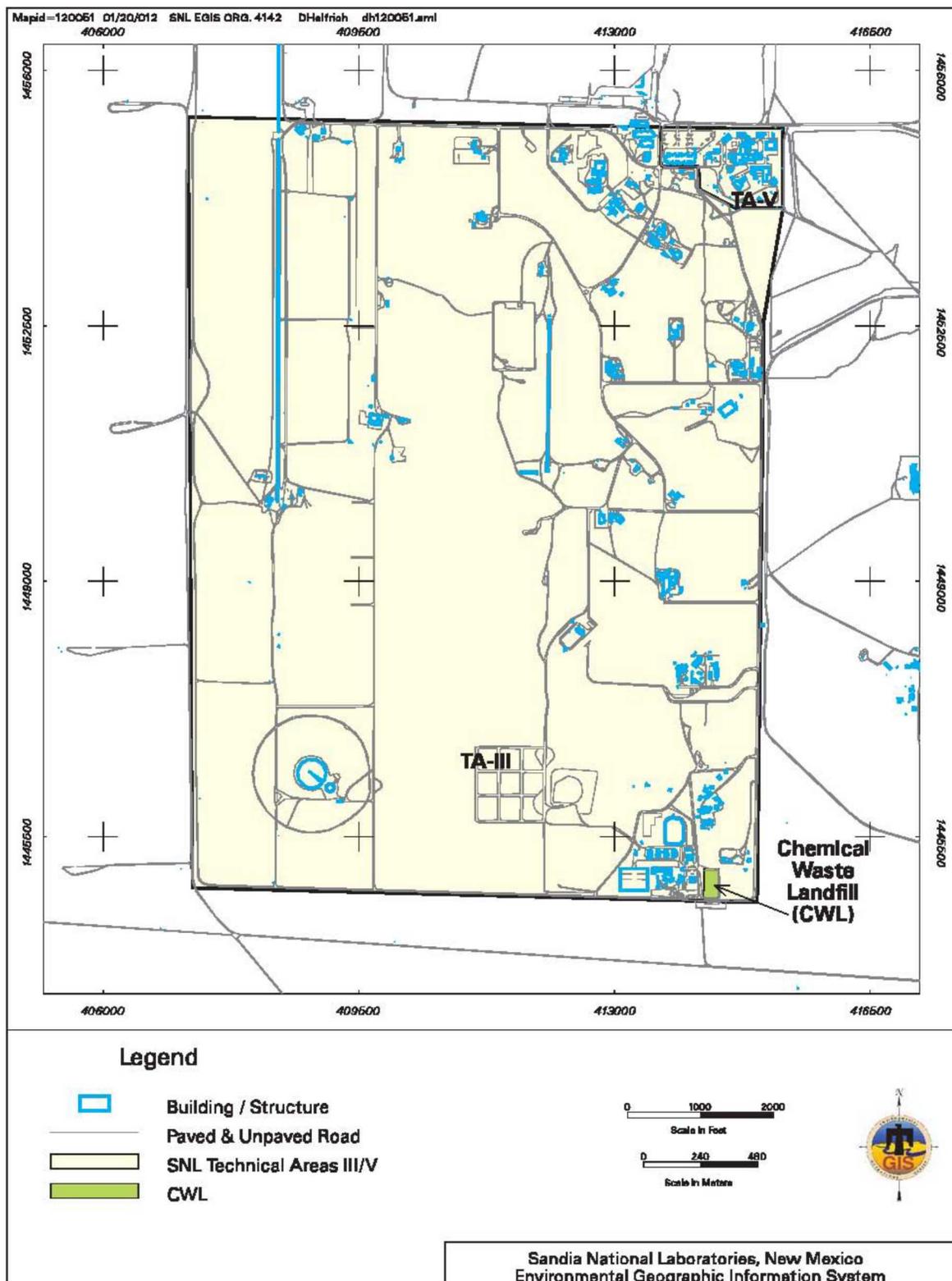


Figure 2-2  
Location of the Chemical Waste Landfill within Technical Area III

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.

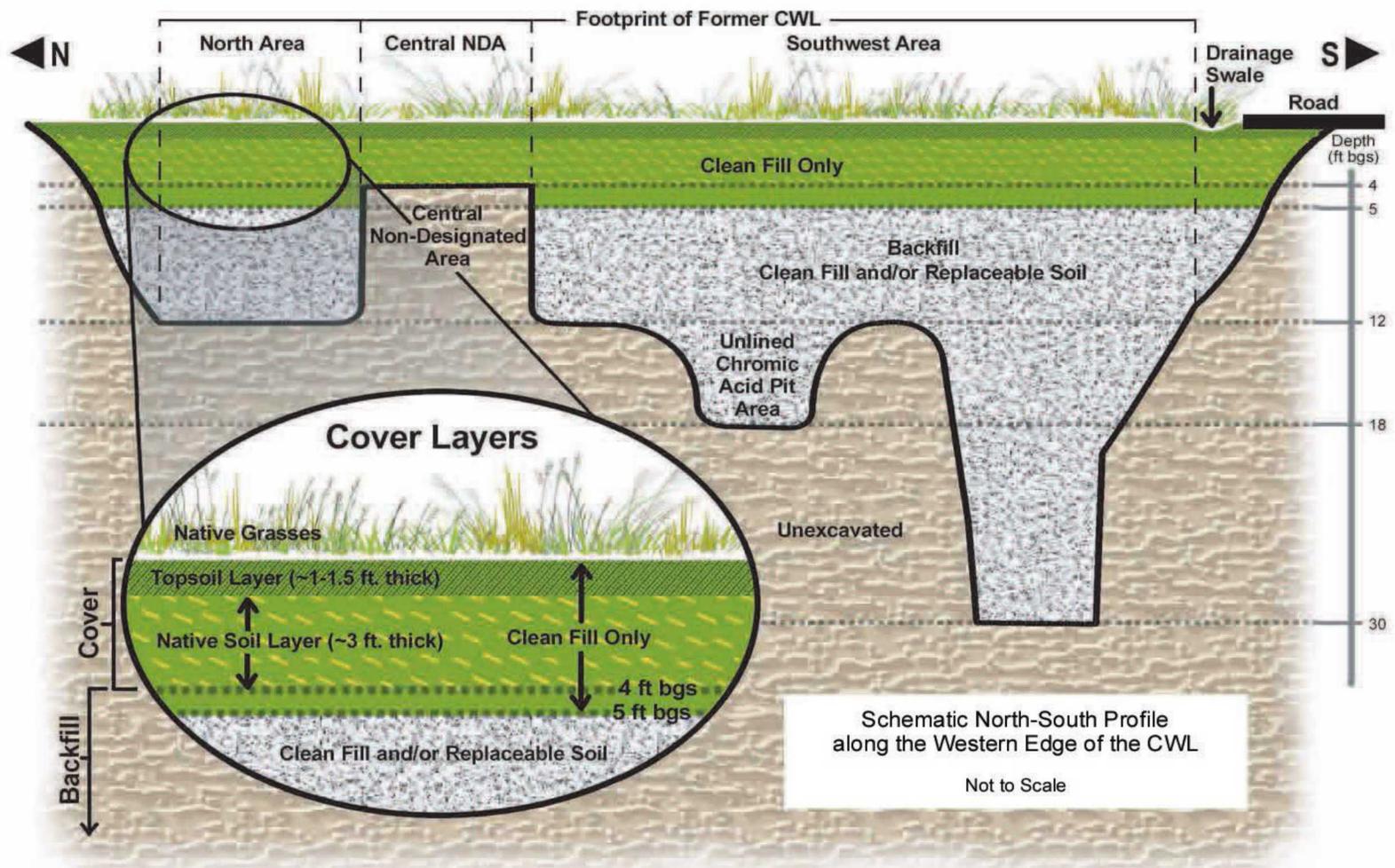
Well-completion diagrams for the groundwater monitoring wells are provided in PCCP Attachment 2.

### **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:

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

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



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

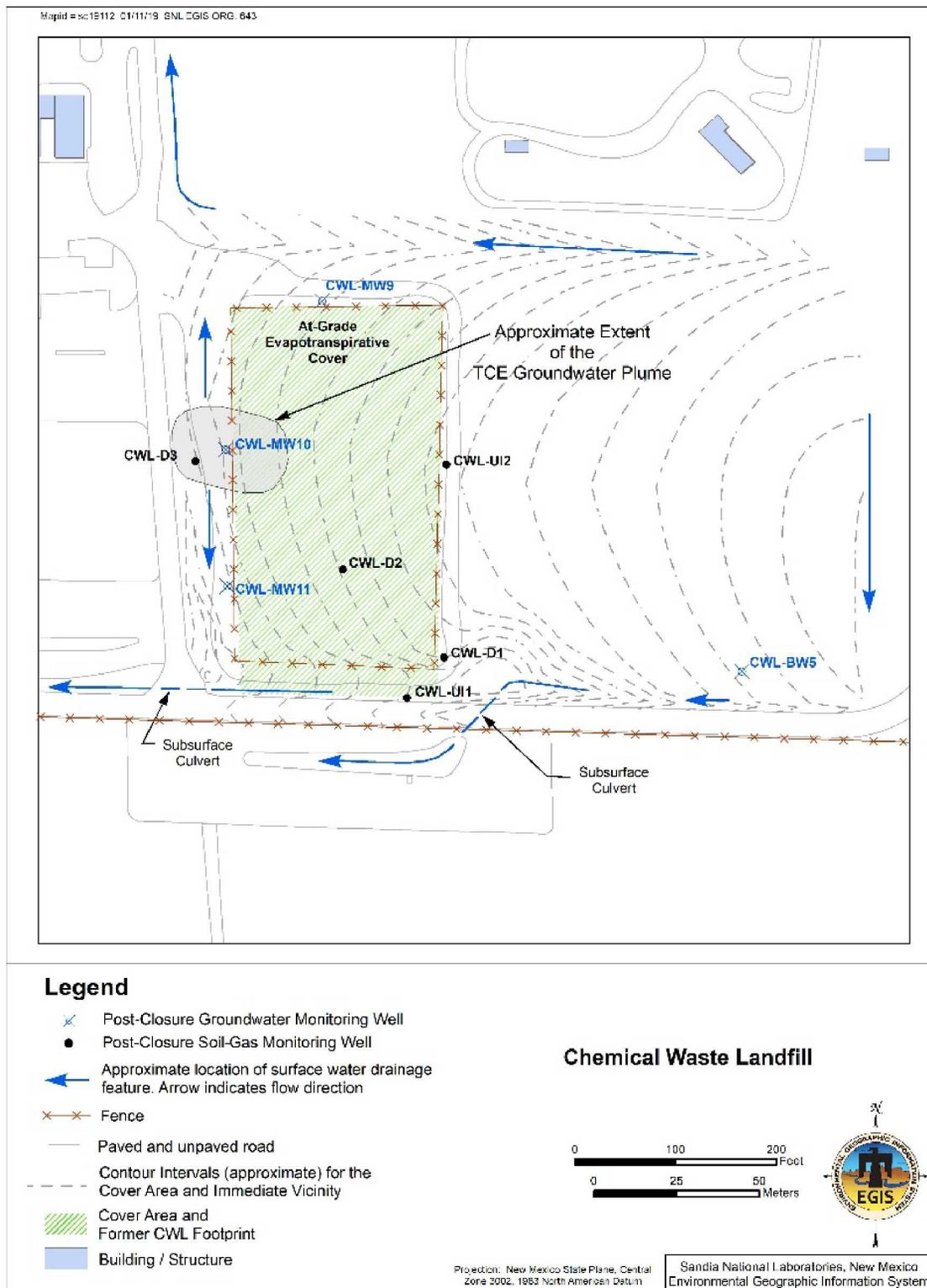


Figure 2-4  
 Chemical Waste Landfill Surface Drainage Patterns and Monitoring Networks

## **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% grade from east to west) of the ET Cover surface.

## **2.5 Security Fence**

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

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### **3.0 MONITORING AND INSPECTION REQUIREMENTS**

Monitoring, inspection, maintenance, and repair requirements are defined in PCCP Attachment 1 (NMED October 2009 and subsequent revisions) and are 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 post-closure care period. Inspection requirements apply to the final cover, storm-water diversion structures, compliance monitoring networks and associated sampling equipment, 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 2019 in accordance with PCCP Attachment 1, Sections 1.8 through 1.10. Results of CY 2019 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 semiannual 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 historical 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. EPA Method TO-15 has been used since CY 2013. This method provides lower detection limits and enhanced quality assurance/quality control (QC) 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	Semiannual <sup>a</sup>	TCE by EPA Method 8260 <sup>b</sup> and Cr and Ni by EPA Method 6020 <sup>b</sup>	Sampling and Analysis per PCCP Attachment 2
Soil-Gas	Annual	VOCs <sup>c</sup> by EPA Compendium Method TO-15 or equivalent	Sampling and Analysis per PCCP Attachment 3

Notes:

<sup>a</sup>Semiannual: An enhanced list of constituents must be analyzed on an annual basis (see Section 1.8.1.1 of PCCP Attachment 1).

<sup>b</sup>EPA November 1986.

<sup>c</sup>See Table 1-5 in PCCP Attachment 1 for the required list of 50 VOCs.

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 when inspected items exceed or do not meet requirements and in accordance with best practice. Best practice measures are actions and/or improvements not explicitly required by the PCCP that improve performance and/or minimize maintenance.

#### 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.

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

The ET Cover vegetation has met successful revegetation criteria since CY 2011. Since this time, the staff biologist inspects the cover annually near the end of the growing season (August-September) to most accurately determine the coverage of living plants. The inspection is to be documented on the Biology Inspection Form/Checklist (PCCP Attachment 4 or equivalent) and includes inspecting the cover for contiguous areas lacking vegetation in excess of 200 square feet, signs of animal intrusion, and deep-rooted plants. Repairs required to address vegetation parameters not meeting PCCP specifications documented during the inspections 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 in a report with a summary of local climate trends and recommendations to be included in the CWL Annual Post-Closure Care Report submitted to NMED.

### *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).

### *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.

## 4.0 GROUNDWATER MONITORING RESULTS

This chapter presents groundwater monitoring activities (i.e., sampling and analysis), analytical results, and data evaluation for CY 2019 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 (i.e., the Region Aquifer). 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 semiannually, were conducted in CY 2019.

- The first sampling event was conducted January 14-21, 2019. 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, 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 11-19, 2019. 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, and nickel.

#### 4.1.1 Well Purging and Sampling

Purging removes stagnant water from the well so that a representative groundwater sample can be collected. For the CWL, the minimum purge requirement is one saturated casing volume (the volume of all static water in the well screen plus the borehole annulus around the saturated

screen interval). The purging process continued after meeting the minimum purge volume requirement until four stable field measurements for temperature, specific conductivity, potential of hydrogen (pH), and turbidity were obtained in all monitoring wells that did not purge dry. After completion of the purging process, the groundwater samples are collected in appropriate containers. 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% for turbidity values greater than 5 NTU, pH is within 0.1 units, temperature is within 1.0 degree Celsius, and specific conductivity is within 5% as micromhos per centimeter. The January and July 2019 water quality field measurement parameters were collected using an In-Situ Incorporated Aqua TROLL<sup>®</sup> 600 Multiparameter Water Quality Sonde and a HACH<sup>™</sup> Model 2100Q portable turbidity meter. Additional water quality measurements included oxidation-reduction potential and dissolved oxygen.

A portable Bennett Company groundwater sampling system was used to purge and collect groundwater samples from all wells. Prior to purging and sampling each monitoring well, the sampling pump and tubing bundle were decontaminated in accordance with the SNL/NM field operating procedure. The following solutions were pumped through the entire sampling system: 5 gallons of deionized water mixed with 20 milliliters of non-phosphate laboratory detergent; 5 gallons of deionized water; 5 gallons of deionized water mixed with 20 milliliters reagent grade nitric acid; and 15 gallons of deionized water. In addition, the outside of the pump tubing was rinsed with deionized water. Consistent with historical 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 14.0 gallons were purged from monitoring well CWL-MW10 prior to the well going dry (purge volume requirement was approximately 23 gallons). The average estimated flow rate was 0.112 gallons per minute (gpm), and the estimated flow rate was 0.086 gpm during the final three gallons (equivalent to 0.424 and 0.326 liters per minute, respectively). During July, approximately 14.0 gallons were purged from CWL-MW10 prior to the well going dry (purge volume requirement was approximately 23 gallons). The average estimated flow rate was 0.099 gpm, and the estimated flow rate was 0.079 gpm during the final three gallons (equivalent to 0.375 and 0.299 liters per minute, respectively).

#### 4.1.2 Field Quality Control

Field QC samples were collected as part of each sampling event and included environmental duplicate, equipment blank, trip blank, and field blank samples. An environmental duplicate sample was collected and analyzed to estimate the overall reproducibility of the sampling and analysis process. The duplicate sample was 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 to verify equipment decontamination prior to installing the equipment in a monitoring well for the purging and environmental sample collection process. Trip blank samples were used to evaluate potential contamination by VOCs during sampling, shipment, and the laboratory process. Field blank samples were 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 Semiannual Sampling Event – January 14-21, 2019***

A duplicate environmental sample was collected from CWL-MW10. One equipment blank sample was collected prior to sampling monitoring well CWL-MW10. The samples (equipment blank, environmental sample, and environmental duplicate sample) were submitted for all analyses. A total of six trip blank samples were submitted with the January 2019 groundwater samples and analyzed for the enhanced list of VOCs. Two field blank samples were collected for VOC analysis (enhanced list) by pouring deionized water into sample containers at the CWL-BW5 and CWL-MW9 sampling locations to simulate the transfer of environmental samples from the sampling system to the sample container. A third field blank sample was collected from the deionized water source used for the equipment decontamination process by pouring the water into the sampling container at the field office where equipment decontamination is performed.

### ***Second Semiannual Sampling Event – July 11-19, 2019***

A duplicate environmental sample was collected from CWL-MW11 and one equipment blank sample was also collected prior to sampling CWL-MW11. The samples (equipment blank, environmental sample, and environmental duplicate sample) were submitted for all analyses. A total of six trip blank samples were submitted with the July 2019 groundwater samples and analyzed for TCE. Two field blank samples were collected for TCE analysis by pouring deionized water into sample containers at the CWL-BW5 and CWL-MW10 sampling locations to simulate the transfer of environmental samples. A third field blank sample was collected from the deionized water source used for the equipment decontamination process by pouring the water into the sampling container at the field office where equipment decontamination is performed.

#### **4.1.3 Waste Management**

Purge and decontamination water generated from sampling activities were placed into 55-gallon containers and managed at a less-than-90-day hazardous waste accumulation area. Approximately 247 gallons of wastewater were generated during the January sampling event and approximately 230 gallons of wastewater were generated during the July sampling event (total of 477 gallons). Separate waste characterization samples were collected from purge and

decontamination water and analyzed for Albuquerque Bernalillo County Water Utility Authority discharge parameters. All wastewater was discharged to the sanitary sewer 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 2019 monitoring activities were packaged into 5-gallon plastic buckets and managed as hazardous waste in accordance with all applicable requirements. All hazardous waste was disposed at a permitted off-site facility.

## **4.2 Laboratory Results**

Groundwater and field QC samples were submitted to GEL Laboratories LLC 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 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, practical quantitation limits, 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 2019 groundwater sampling events. Table 4-3 summarizes results for the additional VOCs (enhanced list) included in the January 2019 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 Semiannual Sampling Event – January 14-21, 2019***

TCE was detected above the laboratory MDL in the CWL-MW10 environmental and duplicate samples at a concentration of 0.630 µg/L. There were no other detections of TCE or enhanced list VOCs. Chromium and nickel were not detected above the laboratory MDL in any of the groundwater samples.

#### ***Second Semiannual Sampling Event – July 11-19, 2019***

TCE was not detected above the laboratory MDL in any of the groundwater samples. This was the first time TCE was not detected in the sample from CWL-MW10. Chromium and nickel were not detected above the laboratory MDL in any of the groundwater samples.

Table 4-1  
 Summary of TCE Results  
 Chemical Waste Landfill Groundwater Monitoring  
 Analytical Method SW846-8260B<sup>a</sup>  
 Calendar Year 2019

Well ID	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
<b>January 2019 Sampling Event</b>					
CWL-BW5	ND	0.300	1.00	U	--
CWL-MW9	ND	0.300	1.00	U	--
CWL-MW10	0.630	0.300	1.00	J	--
CWL-MW10 (Duplicate)	0.630	0.300	1.00	J	--
CWL-MW11	ND	0.300	1.00	U	--
<b>July 2019 Sampling Event</b>					
CWL-BW5	ND	0.300	1.00	U	--
CWL-MW9	ND	0.300	1.00	U	--
CWL-MW10	ND	0.300	1.00	U	--
CWL-MW11	ND	0.300	1.00	U	--
CWL-MW11 (Duplicate)	ND	0.300	1.00	U	--

Notes:

<sup>a</sup>EPA November 1986.

<sup>b</sup>Laboratory/Validation Qualifier - If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted samples. See explanation for "J" and "U" laboratory qualifiers below.

EPA = U.S. Environmental Protection Agency.

ID = Identification.

J = Amount detected is above the MDL but below the PQL.

MDL = Method detection limit. The minimum concentration or activity that can be measured and reported with 99 percent 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<sup>a</sup>  
 Calendar Year 2019

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
<b>January 2019 Sampling Event</b>						
CWL-BW5	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0006	0.002	U	--
CWL-MW9	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0006	0.002	U	--
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	ND	0.0006	0.002	U	--
<b>July 2019 Sampling Event</b>						
CWL-BW5	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0006	0.002	U	--
CWL-MW9	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0006	0.002	U	UJ
CWL-MW10	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0006	0.002	U	--
CWL-MW11	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0006	0.002	U	UJ
CWL-MW11 (Duplicate)	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0006	0.002	U	UJ

Notes:

<sup>a</sup>EPA November 1986.

<sup>b</sup>Laboratory/Validation Qualifier - If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted sample. See explanation for "U," and "UJ" qualifiers below.

EPA = U.S. Environmental Protection Agency.

ID = Identification.

MDL = Method detection limit. The minimum concentration or activity that can be measured and reported with 99 percent confidence that the analyte is greater than zero, analyte is matrix-specific.

mg/L = Milligram(s) per liter.

ND = Not detected at MDL.

PQL = Practical quantitation limit. The lowest concentration of analytes in a sample that can be reliably determined within specified limits of precision and accuracy by the applicable method under routine laboratory operating conditions.

U = Analyte is not present or concentration is below the MDL.

UJ = The analyte was analyzed for but was not detected.

Table 4-3  
 Summary of Additional Volatile Organic Compound Results  
 Chemical Waste Landfill Groundwater Monitoring  
 Analytical Method SW846-8260B<sup>a</sup>  
 January 2019

Well ID	Analyte	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
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-MW10 (Duplicate)	1,1-Dichloroethene	ND	0.300	1.00	U	--
	Chloroform	ND	0.300	1.00	U	--
	Tetrachloroethene	ND	0.300	1.00	U	--
	Trichlorofluoromethane	ND	0.300	1.00	U	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	U	--
CWL-MW11	1,1-Dichloroethene	ND	0.300	1.00	U	--
	Chloroform	ND	0.300	1.00	U	--
	Tetrachloroethene	ND	0.300	1.00	U	--
	Trichlorofluoromethane	ND	0.300	1.00	U	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	U	--

Refer to footnotes at end of table.

Table 4-3 (*Concluded*)  
Summary of Additional Volatile Organic Compound Results  
Chemical Waste Landfill Groundwater Monitoring  
Analytical Method SW846-8260B<sup>a</sup>  
January 2019

Notes:

<sup>a</sup>EPA November 1986.

<sup>b</sup>Laboratory/Validation Qualifier - If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted samples.

EPA = U.S. Environmental Protection Agency.

ID = Identification.

MDL = Method detection limit. The minimum concentration or activity that can be measured and reported with 99 percent confidence that the analyte is greater than zero, analyte is matrix-specific.

µg/L = Microgram(s) 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<sup>a</sup>  
 Chemical Waste Landfill Groundwater Monitoring  
 Calendar Year 2019

Well ID	Temperature (°C)	SC (µmho/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (% Sat)	DO (mg/L)
<b>January 2019 Sampling Event</b>							
CWL-BW5	15.27	1073.0	135.4	6.92	0.61	84.4	7.02
CWL-MW9	16.06	926.3	53.9	7.02	0.28	52.4	4.20
CWL-MW10	14.02	896.3	15.0	7.12	2.25	26.8	2.33
CWL-MW11	16.74	994.9	23.9	7.01	0.60	66.1	5.54
<b>July 2019 Sampling Event</b>							
CWL-BW5	22.87	1141.1	103.6	6.89	0.43	96.6	7.38
CWL-MW9	22.87	982.8	122.9	7.03	0.21	55.9	4.57
CWL-MW10	25.20	1174.6	-11.1	6.96	2.65	27.7	1.97
CWL-MW11	26.99	1134.0	29.6	7.00	1.65	86.2	6.00

Notes:

<sup>a</sup>Field measurements collected prior to sampling. Some values rounded for significant digit consistency.

°C = Degrees Celsius.

% Sat = Percent saturation.

DO = Dissolved oxygen.

ID = Identification.

mg/L = Milligram(s) per liter.

µmho/cm = Micromhos per centimeter.

mV = Millivolt(s).

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) between the environmental and duplicate sample results for the January (CWL-MW10) and July (CWL-MW11) sample pairs. For the environmental-duplicate sample pair collected at CWL-MW10 in January, TCE was the only analyte detected in both samples. The RPD value for TCE was less than 1 and shows good agreement (i.e., RPD value less than 20 for VOCs). For the environmental-duplicate sample pair collected at CWL-MW11 in July, no VOCs or metals were detected. Therefore, RPD values were not calculated.

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

Table 4-5  
 Summary of Duplicate Sample Results  
 Chemical Waste Landfill Groundwater Monitoring  
 Calendar Year 2019

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD <sup>a</sup>
<b>January 2019 Sampling Event (CWL-MW9)</b>			
TCE (mg/L)	0.630	0.630	< 1

Notes:

<sup>a</sup>RPD = Relative percent difference is calculated with the following equation and rounded to the nearest whole number.

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

where: R<sub>1</sub> = environmental sample result.  
 R<sub>2</sub> = duplicate sample result.

ID = Identification.  
 mg/L = Milligram(s) per liter.  
 TCE = Trichloroethene (trichloroethylene).

VOCs were not detected above the associated laboratory MDLs in the three field blank samples associated with the January sampling event. TCE was not detected above the MDL in the two field blank samples collected in July.

No VOCs were detected in the six trip blank samples associated with the January VOC environmental samples. For the six trip blank samples associated with the July TCE 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 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 2017). All laboratory control sample results met PCCP data quality requirements (PCCP Attachment 2).

Based upon the data validation and review criteria, all analytical data were determined acceptable. Reported QC sample 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 2019 semiannual 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, historical groundwater sampling results are used to augment the data sets and increase the amount of data available for statistical analysis. Historical groundwater data is limited to data obtained no earlier than May 1998 (i.e., near the completion of the VE VCM).

Statistical evaluation of the groundwater data includes results from CWL-BW5, 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 eighteen times as of July 2019 (November-December 2010, July-August 2011, January and July 2012 through 2019). Statistical evaluation of the results from these wells was first presented in the CWL Annual Post-Closure Care Report, Calendar Year 2013 (SNL/NM March 2014). CWL-BW5 is a replacement well for CWL-BW4A; therefore, historical 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 2019 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 = Microgram(s) per liter.
- mg/L = Milligram(s) per liter.
- SNL/NM = Sandia National Laboratories/New Mexico.

**Prediction and Confidence Intervals**

The probability that each semiannual 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 2019 sample results are also compared to the historical range (minimum and maximum result derived from historical results not including CY 2019 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 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 for each hazardous constituent using all historical data for that specific monitoring well. For each sampling event the result is compared to the median value calculated using historical data prior to the sampling event being evaluated, and determined to be above or below that median value. For example, the median value against which the January 2019 CWL-BW5/4A sample result for a specific constituent is compared is calculated using historical results obtained since May 1998 (i.e., completion of the VE VCM), not including the January 2019 sample result. Then, the January 2019 sample result is compared to the median value and determined to be above or below. For the next groundwater monitoring event (i.e., July 2019), the median value is recalculated by including the January 2019 sample result; and the July 2019 sample result is compared to the recalculated median value.

The cumulative percentage of results exceeding median values reflects how many times the sample result exceeded the median value. For a given hazardous constituent, if the cumulative percentage of results greater than median values 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 2019 groundwater sampling data and statistical analysis for CWL-BW5/4A, CWL-MW9, CWL-MW10, and CWL-MW11 are discussed in this section. Statistical assessment results are presented in Table 4-7 and shown graphically in Figures 4-1 through 4-9.

The statistical analysis of specific constituents was not performed if all results for the data set 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 eighteen data points for each constituent), the very low concentrations, and in most 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. Except for chromium, the laboratory MDLs have generally decreased over time, which impacts the CWL-BW5/4A statistical evaluation results as the historical data set for this well includes results from 1998 through the present. The chromium MDL has slightly increased over time for the CY 2010 through 2019 data sets. Statistical results are presented below for all cases where evaluation was possible.

#### ***Prediction Intervals Results***

##### *Monitoring Well CWL-BW5/4A*

CY 2019 CWL-BW5 chromium, nickel, and TCE sample results were all non-detections. The MDL for chromium (0.003 milligrams per liter [mg/L]) was within the prediction interval (i.e., range of 95% LCL to 95% UCL) and the historical range (i.e., historical minimum and maximum results not including the CY 2019 results). The MDL for nickel (0.0006 mg/L) and TCE (0.300 µg/L) were below the prediction interval but within the historical range. The nickel and TCE results are typical of a data set dominated by non-detections and MDLs that have decreased over time.

Table 4-7  
 Statistical Assessment Results Summary  
 Chemical Waste Landfill Groundwater Monitoring  
 Calendar Year 2019

Hazardous Constituent <sup>a</sup>	Minimum <sup>b</sup>	Maximum <sup>b</sup>	Mean <sup>c</sup>	Standard Deviation <sup>c</sup>	Prediction Interval		Distribution Type <sup>c</sup>	Median Test <sup>d</sup>	Concentration Limit Exceeded <sup>e</sup> ?
					LCL <sup>c</sup>	UCL <sup>c</sup>			
<b>CWL-BW5/4A</b>									
Chromium (mg/L)	0.00038	0.0125	0.00313	0.00275	0.00242	0.00384	Normal	48%	No
Nickel (mg/L)	0.0005	0.049	0.00464	0.00749	0.00272	0.00656	Normal	38%	No
TCE (µg/L)	0.10	0.78	0.338	0.119	0.307	0.369	Normal	3%	No
<b>CWL-MW9</b>									
Chromium (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	No
Nickel (mg/L)	0.0005	0.00435	0.00206	0.00134	0.00151	0.00261	Normal	20%	No
TCE (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	No
<b>CWL-MW10</b>									
Chromium (mg/L)	0.002	0.00325	0.00247	0.000545	0.00225	0.00269	Normal	47%	No
Nickel (mg/L)	0.000501	0.00707	0.00209	0.00177	0.00136	0.00282	Normal	7%	No
TCE (µg/L)	0.35	4.68	1.554	1.505	0.937	2.171	Normal	13%	No
<b>CWL-MW11</b>									
Chromium (mg/L)	0.002	0.00304	0.0025	0.000484	0.0023	0.0027	Normal	60%	No
Nickel (mg/L)	0.0005	0.00449	0.00176	0.00123	0.00126	0.00226	Normal	13%	No
TCE (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	No

Notes:

<sup>a</sup>Hazardous Constituents from CWL Permit Attachment 1, Section 1.4.1, Table 1-2 (Table 4-6 of this report).

<sup>b</sup>Minimum and maximum result determined from historical data not including 2019 sample results.

<sup>c</sup>Mean, Standard Deviation, LCL, UCL, and Distribution Type determined using ProUCL statistical program.

<sup>d</sup>Median Test is the cumulative percentage of sample results that are greater than the median.

<sup>e</sup>Exceedance determined by comparing the constituent LCL against the concentration limit in Table 4-6 of this report.

% = Percent.

CWL = Chemical Waste Landfill.

LCL = Lower confidence limit.

µg/L = Microgram(s) per liter.

mg/L = Milligram(s) per liter.

NA = Not Applicable; constituent has not been detected in any samples from this monitoring well.

TCE = Trichloroethene.

UCL = Upper confidence limit.

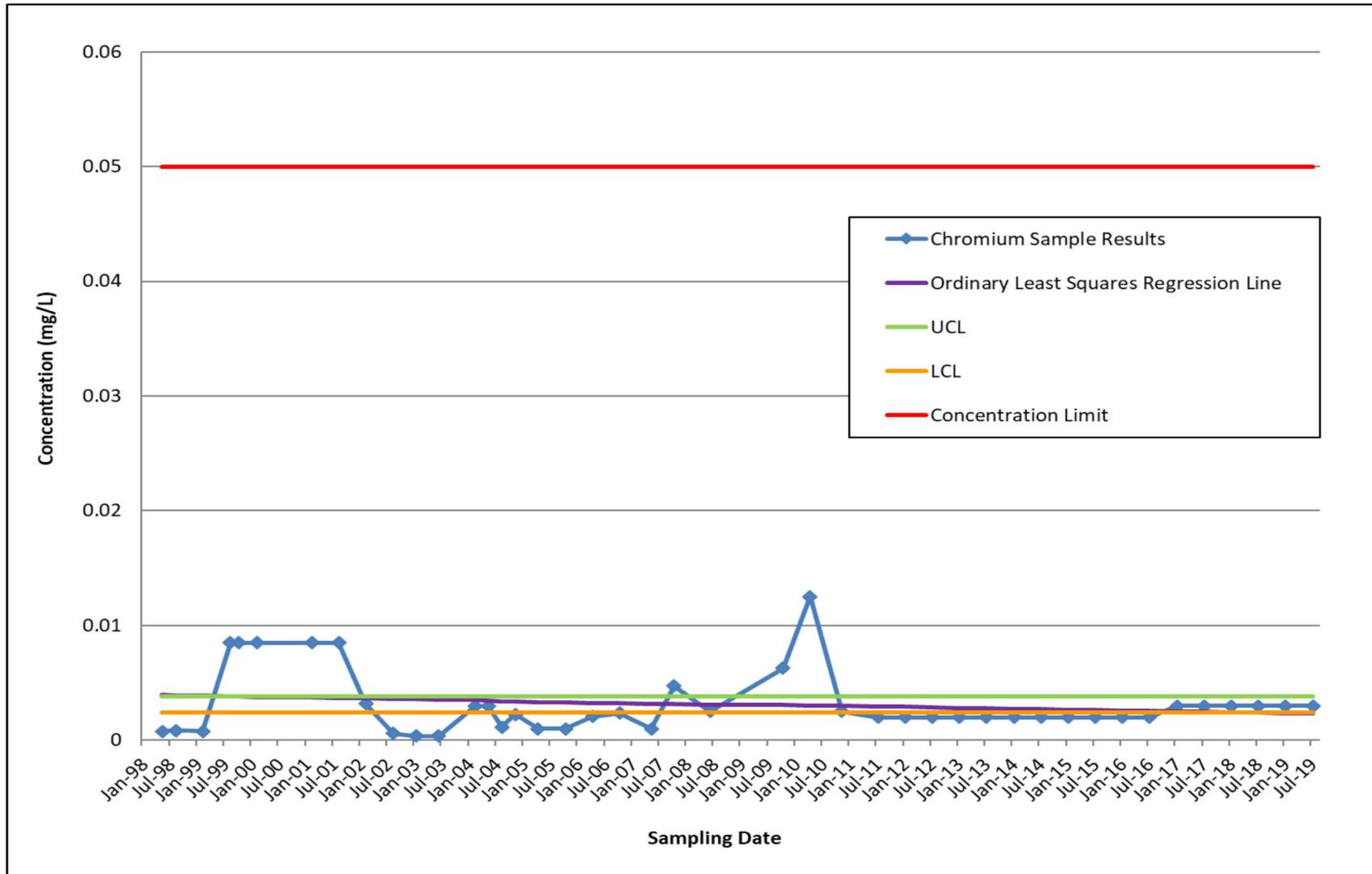


Figure 4-1  
Chromium Control Chart for CWL-BW5/4A

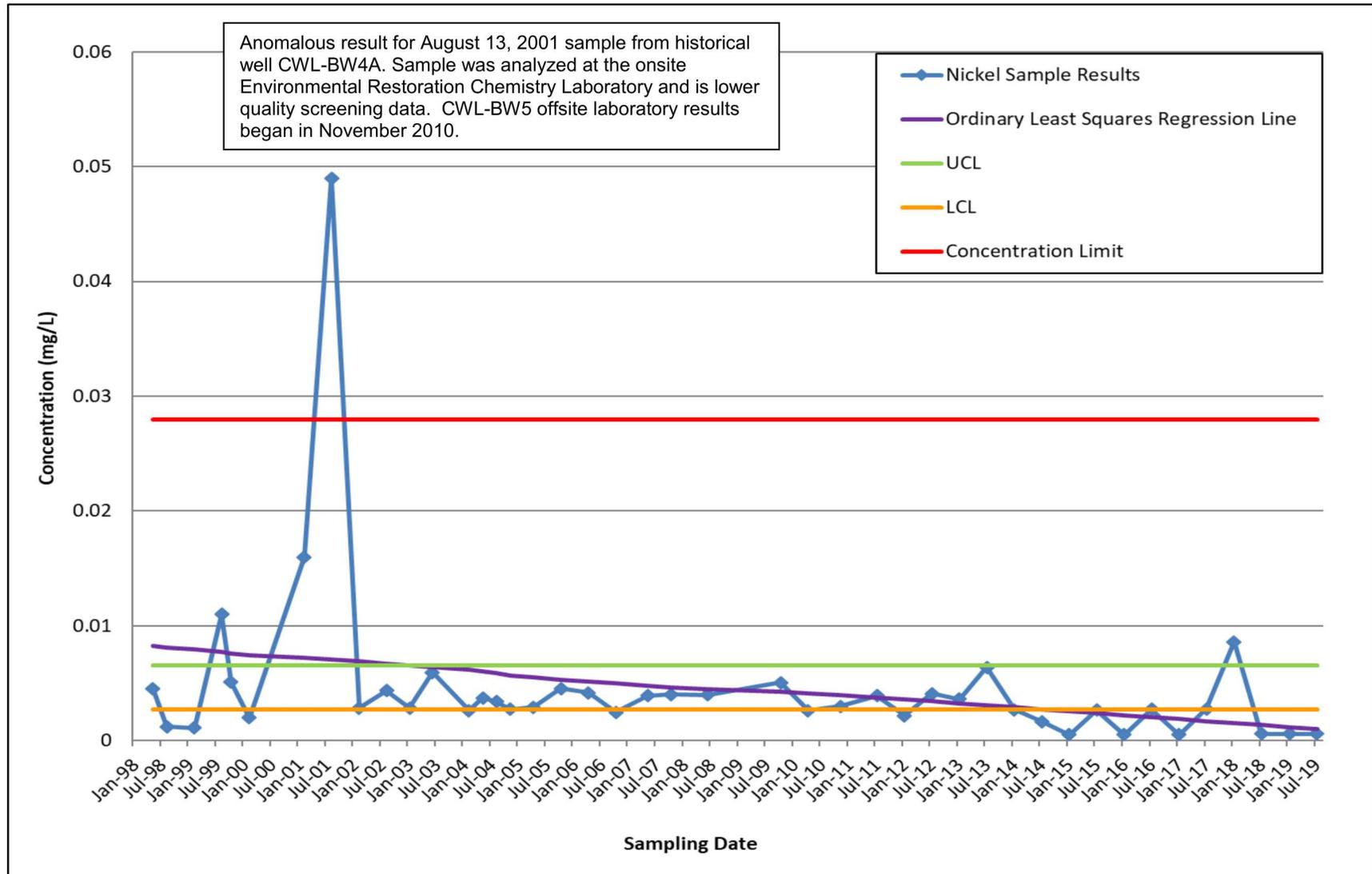


Figure 4-2  
 Nickel Control Chart for CWL-BW5/4A

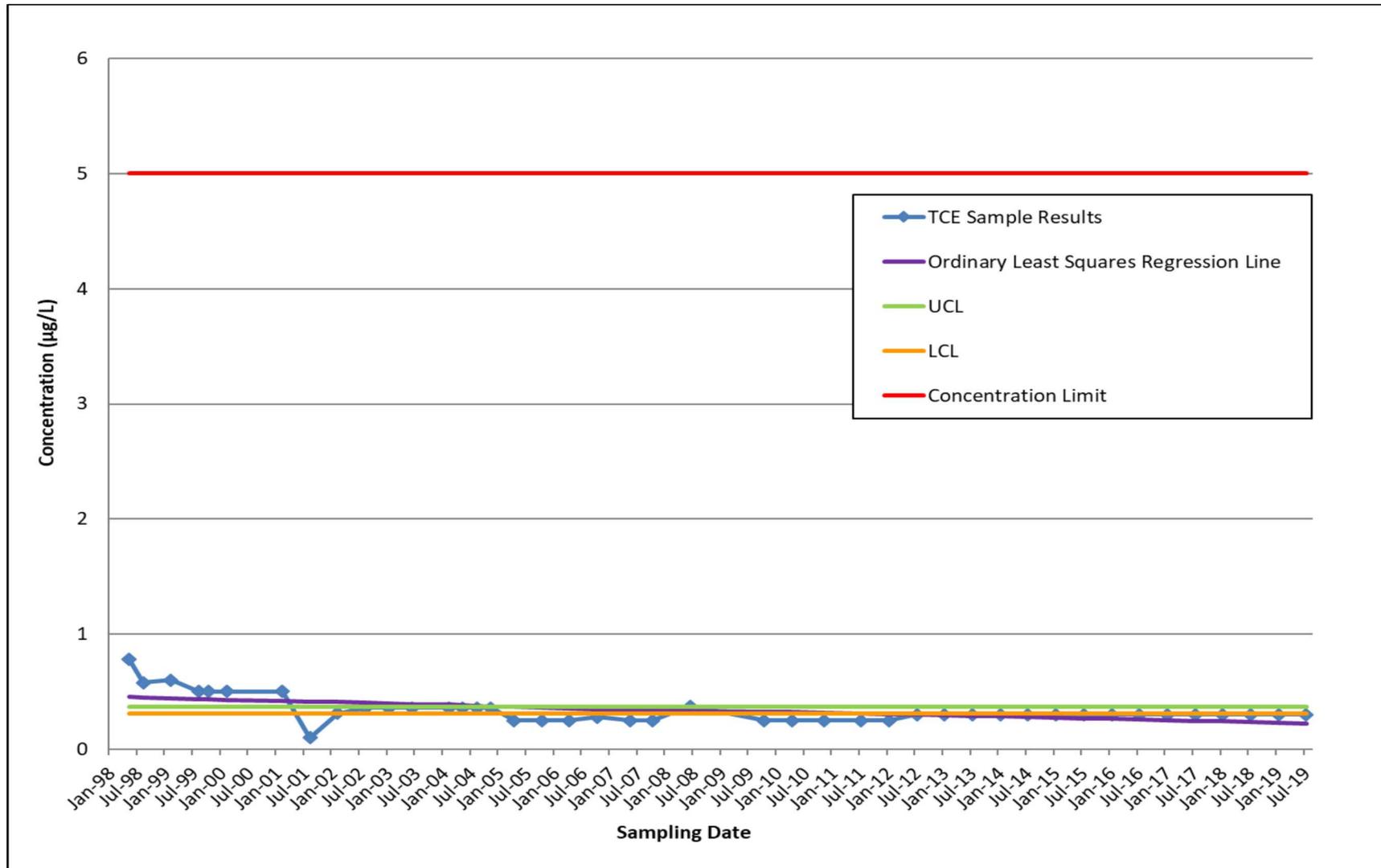


Figure 4-3  
TCE Control Chart for CWL-BW5/4A

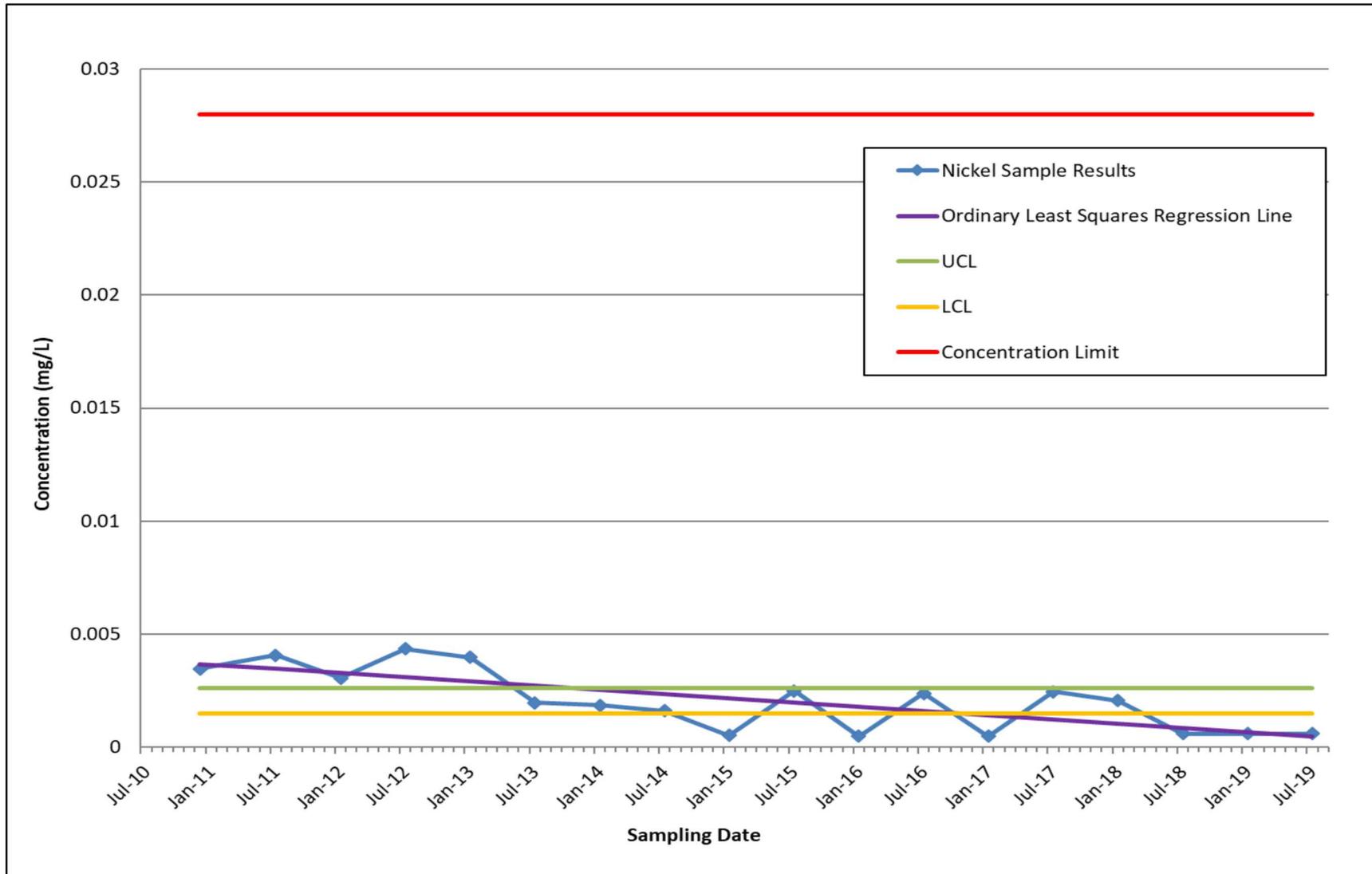


Figure 4-4  
Nickel Control Chart for CWL-MW9

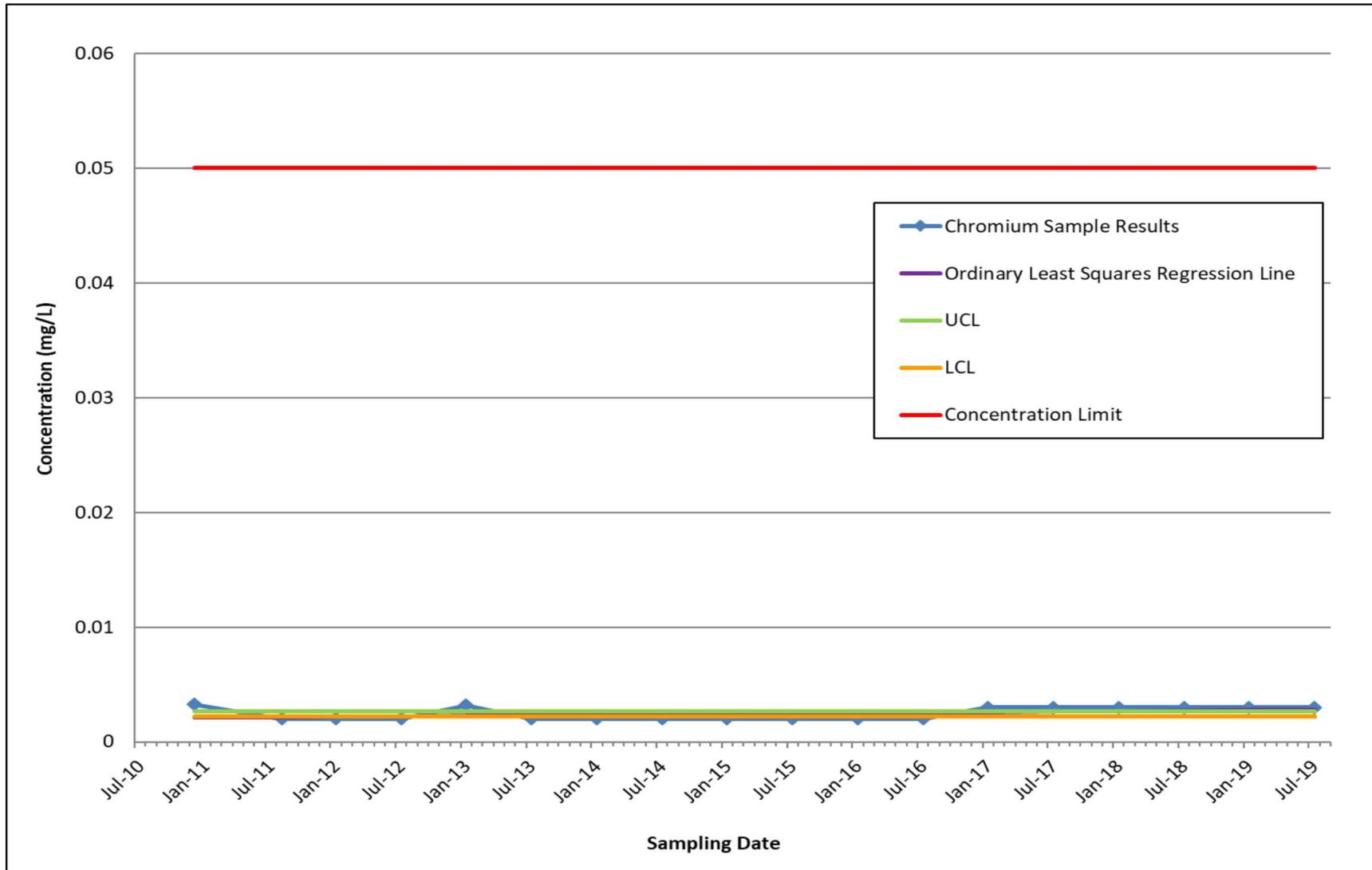


Figure 4-5  
Chromium Control Chart for CWL-MW10

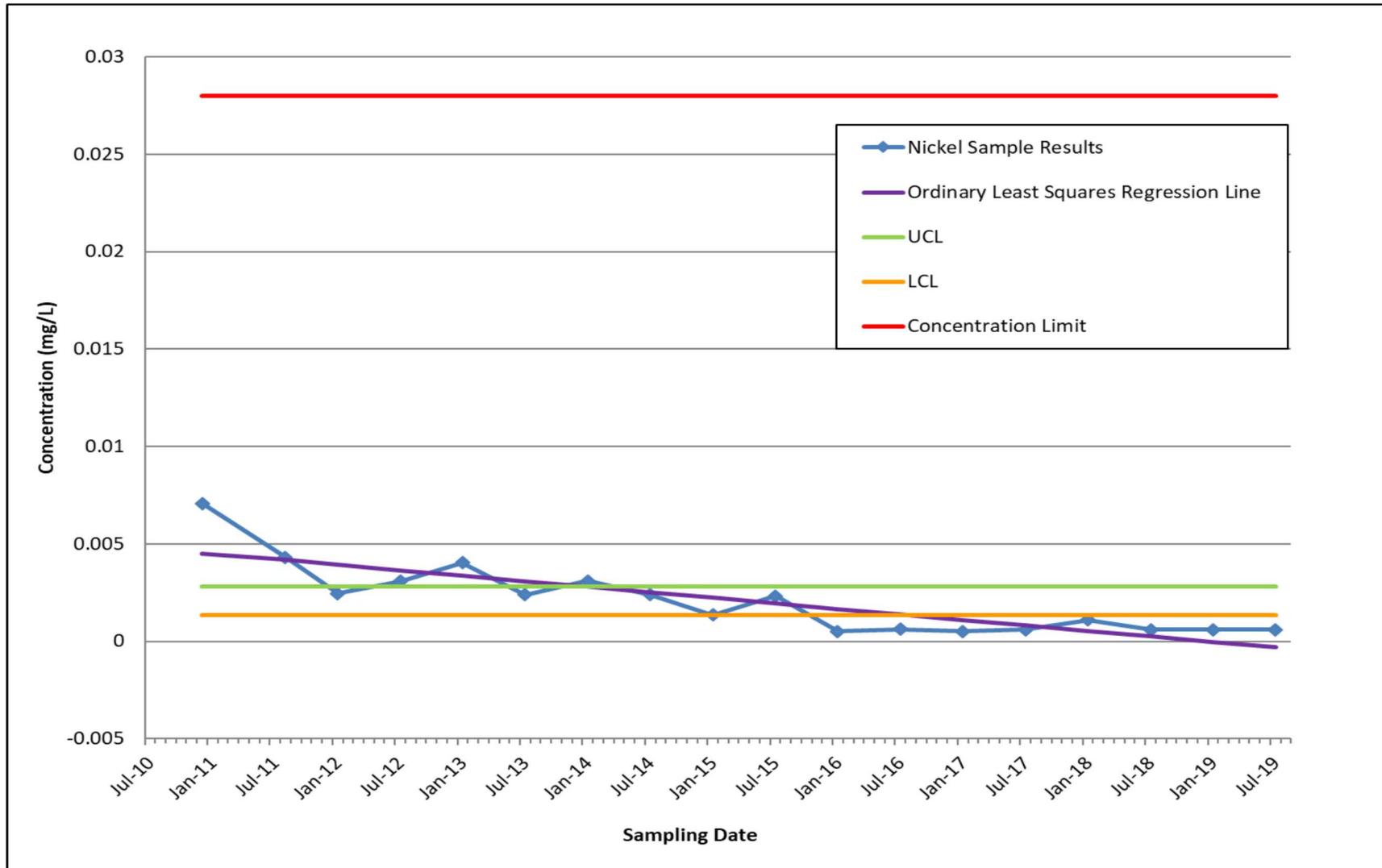


Figure 4-6  
Nickel Control Chart for CWL-MW10

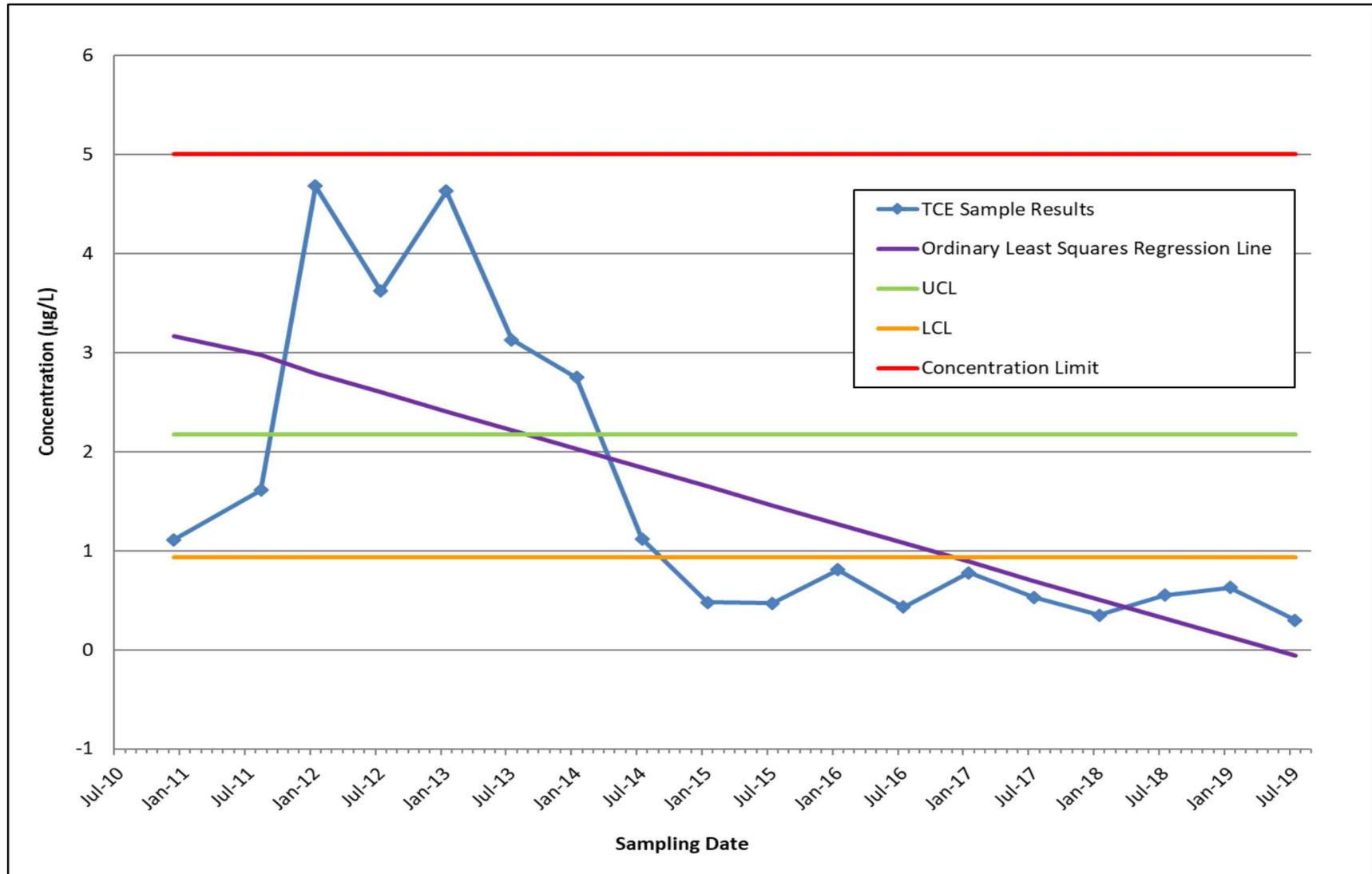


Figure 4-7  
TCE Control Chart for CWL-MW10

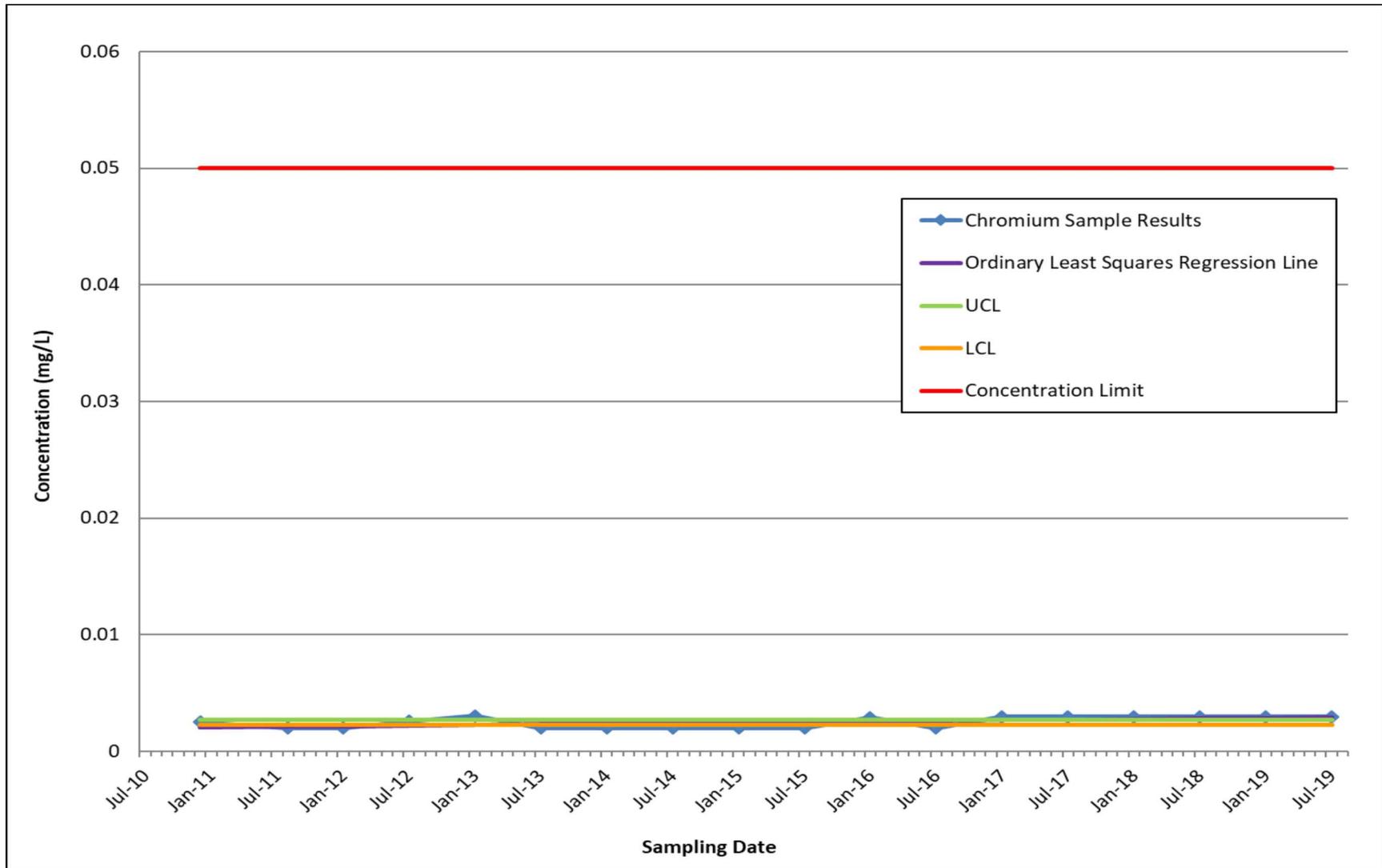


Figure 4-8  
Chromium Control Chart for CWL-MW11

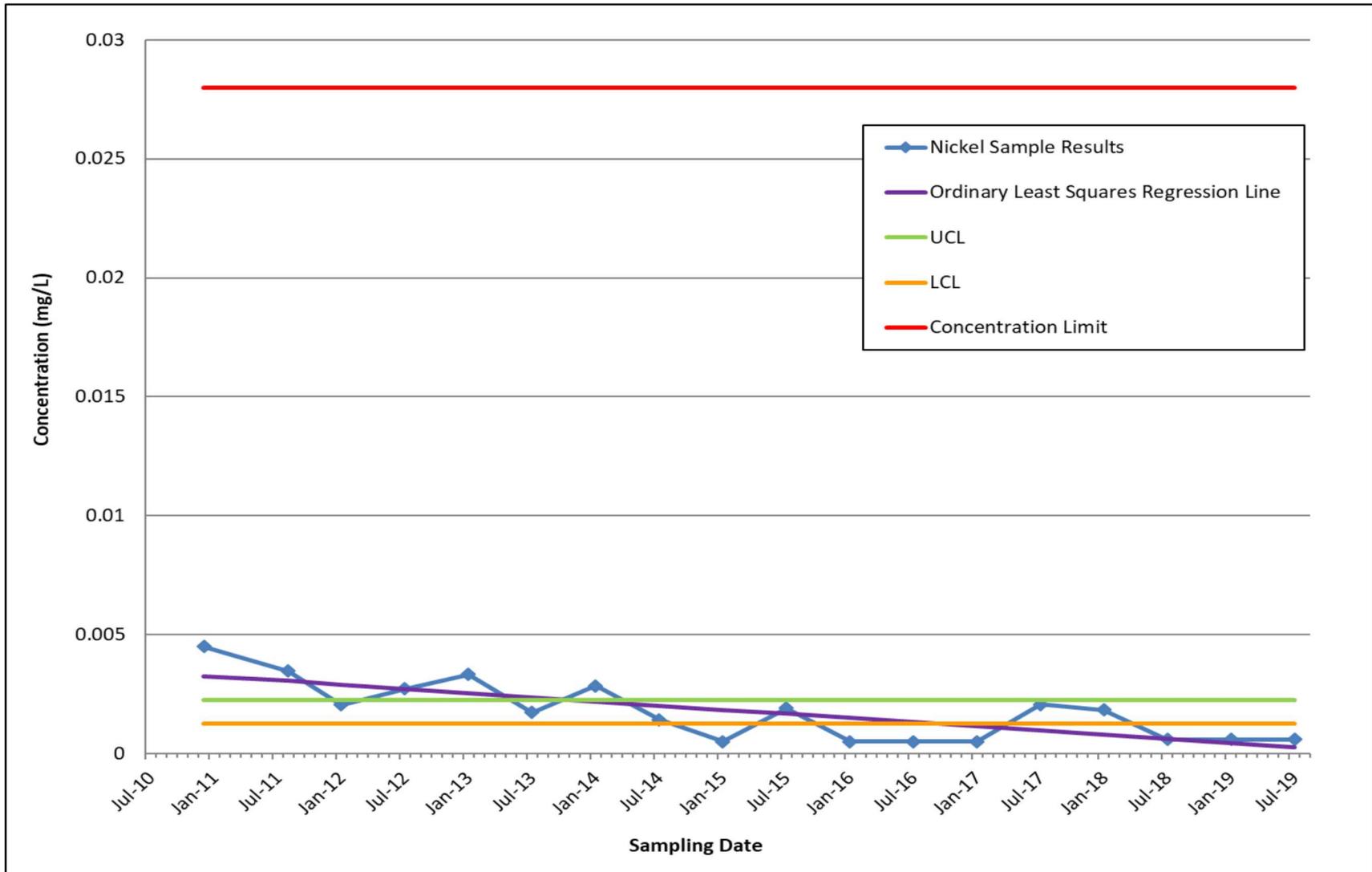


Figure 4-9  
Nickel Control Chart for CWL-MW11

### *Monitoring Well CWL-MW9*

Chromium and TCE have not been detected in any CWL-MW9 samples (CY 2010 through 2019). Therefore, statistical evaluation of these constituents is not presented. The CY 2019 nickel sample results were both non-detections, and the MDL (0.0006 mg/L) was below the prediction interval but within the historical range. The nickel results reflect a slight decrease in the MDL over time.

### *Monitoring Well CWL-MW10*

CY 2019 CWL-MW10 chromium and nickel sample results were all non-detections. The MDL for chromium (0.003 mg/L) was above the prediction interval but within the historical range. The MDL for nickel (0.0006 mg/L) was below the prediction interval but within the historical range, and reflects a slight decrease in the MDL over time. TCE results for the January environmental and duplicate samples (both 0.630 µg/L) were below the prediction interval but within the historical range. The July TCE result was a non-detection; the MDL (0.300 µg/L) was below the prediction interval and historical range. The TCE results are representative of decreasing concentrations over time.

### *Monitoring Well CWL-MW11*

CY 2019 CWL-MW11 sample results were all non-detections. The MDL for chromium (0.003 mg/L) was above prediction interval but within the historical range, and reflects a slight increase in the MDL over time. The MDL for nickel (0.0006 mg/L) was below the prediction interval but within the historical range, and reflects a slight decrease in the MDL over time. TCE has not been detected in any CWL-MW11 samples (CY 2010 through 2019); 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 60% for chromium (CWL-MW11); all CY 2019 CWL-MW11 chromium results were non-detects. The higher Median Test results for chromium are influenced by the slight increase in the MDL over time (i.e., 0.002

to 0.003 mg/L) and do not reflect an increase in chromium groundwater sample concentrations. The low Median Test results for TCE in CWL-BW5/4A (3%) reflects a data set influenced by non-detection results and an MDL that has generally decreased over time (i.e., 0.600 to 0.300 µg/L).

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 13 sampling events (July 2013 through July 2019), including the latest July 2019 result that was a non-detection. The trend shown in Figure 4-7 indicates the two CWL VCMs were effective in remediating TCE.

#### 4.4 Hydrogeologic Assessment

The regional aquifer beneath 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 2018 and October 2019 was consistent at the four monitoring wells and ranged from 0.59 (CWL-MW11) to 0.69 (CWL-BW5) feet. This rate of decline was slightly lower than the rate of decline for CY 2017 to 2018.

In CY 2019, water levels were measured in the groundwater monitoring wells on a quarterly basis and 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 2019 water-level measurements and has changed very little over the past seven years. 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 2019). 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 previous years 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% 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  $1.8 \times 10^{-4}$  to  $2.8 \times 10^{-3}$  feet per day (equivalent to  $6.3 \times 10^{-8}$  to  $1.0 \times 10^{-6}$  centimeters per second). The average groundwater velocity is  $1 \times 10^{-3}$  feet per day (equivalent to  $4.1 \times 10^{-7}$  centimeters per second). These very low values are consistent with previous estimates for horizontal groundwater flow at the water table in the CWL vicinity.

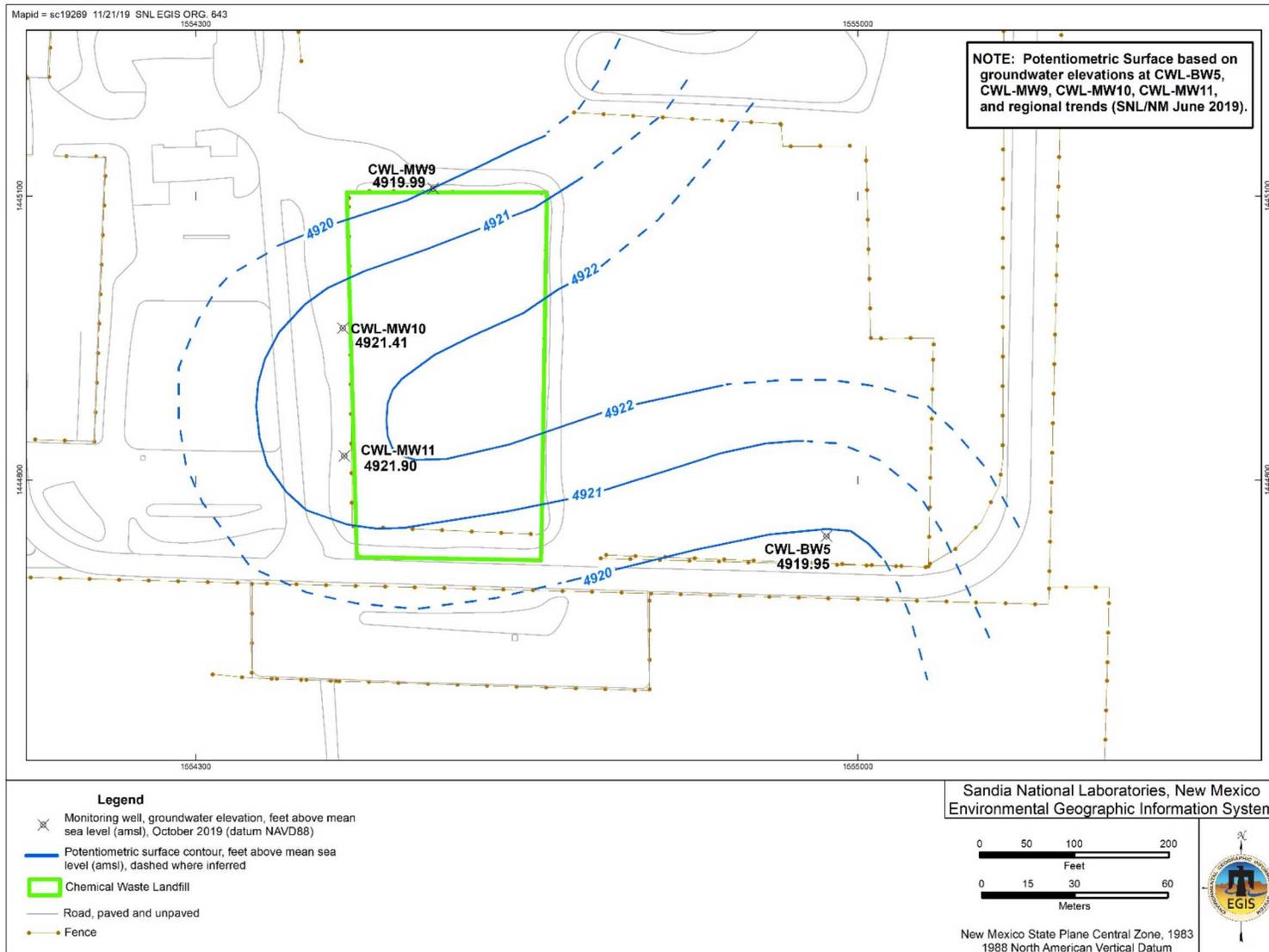


Figure 4-10  
 Potentiometric Surface of the Regional Aquifer at the Chemical Waste Landfill, October 2019

## 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 2019 in accordance with PCCP Attachment 1, Sections 1.8 and 1.12, and Attachment 3 (NMED October 2009 and subsequent revisions). The CY 2019 annual soil-gas sampling event was the eighth 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 sampling forms and documentation that address calibration of equipment, well evacuation, purging flow rates and times, and vacuum pressure readings for each sample container are provided in Annex B of this report and filed in the SNL/NM Records Center.

Soil-gas samples were collected from monitoring wells CWL-UI1, CWL-UI2, CWL-D1, CWL-D2, and CWL-D3 on January 17, 2019. Resampling of CWL-D1 (350 foot bgs sample port) and CWL-D3 (350 foot bgs sample port) was performed on March 28, 2019 due to the following issues with the January 2019 sampling event and results:

- The laboratory received sample CWL-D1 (350 foot bgs sample port) without sufficient sample volume.
- Sample results from CWL-D3 (350 foot bgs sample port) were reported at concentrations lower than historical values.

As a result, only the March resample results are presented for these two sampling locations. 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 2019 soil-gas sampling activities and results are described in the following sections.

#### 5.1.1 Well Evacuation and Sampling

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, 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<sup>®</sup> 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 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 of this report.

During the January 2019 monitoring event, duplicate environmental samples were collected from two CWL-UI2 monitoring well sample ports, CWL-UI2-76 (76 feet bgs) and CWL-UI2-136 (136 feet bgs). 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 2019 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<sup>®</sup> canisters. Results are used to assess whether contamination of the samples may have resulted from ambient field conditions. A total of nine field blank samples were submitted for analysis with CY 2019 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 and March 2019 soil-gas monitoring events. 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 of this report and filed in the SNL/NM Records Center.

### 5.2.1 Environmental Sample Results

This section summarizes detected VOCs from soil-gas samples collected in January and March 2019. 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<sup>a</sup>  
 January 2019

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
CWL-UI1-40 17-Jan-19	Carbon tetrachloride	11	4.4	56	J	--
	Chloroform	510	6.6	21	--	--
	Dichlorodifluoromethane	24	10	28	J	--
	1,1-Dichloroethane	9.3	5.0	21	J	--
	1,1-Dichloroethene	130	9.0	56	--	--
	1,2-Dichloropropane	36	17	28	--	--
	Methylene chloride	7.7	5.0	28	J	--
	Tetrachloroethene	3000	3.5	28	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	500	11	28	--	--
	1,1,1-Trichloroethane	31	4.5	21	--	--
	1,1,2-Trichloroethane	7.4	4.7	28	J	--
	Trichloroethene	4400	7.3	28	--	--
	Trichlorofluoromethane	150	14	28	--	--
	o-Xylene	5.9	3.8	28	B, J	28U
	Total Organics <sup>c</sup>	8816.4	NA	NA	NA	NA
CWL-UI1-80 17-Jan-19	Carbon tetrachloride	12	5.8	73	J	--
	Chloroform	400	8.7	27	--	--
	Dichlorodifluoromethane	27	13	37	J	--
	1,1-Dichloroethane	12	6.6	27	J	--
	1,2-Dichloroethane	15	8.0	73	J	--
	1,1-Dichloroethene	230	12	73	--	--
	1,2-Dichloropropane	52	22	37	--	--
	Methylene chloride	42	6.6	37	--	--
	Tetrachloroethene	890	4.7	37	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	580	15	37	--	--
	1,1,1-Trichloroethane	28	5.9	27	--	--
	Trichloroethene	5300	9.6	37	--	--
	Trichlorofluoromethane	160	18	37	--	--
	Total Organics <sup>c</sup>	7748	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<sup>a</sup>  
 January 2019

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
CWL-UI1-120 17-Jan-19	Carbon tetrachloride	16	6.8	85	J	--
	Chloroform	370	10	32	--	--
	Dichlorodifluoromethane	31	15	42	J	--
	1,1-Dichloroethane	15	7.6	32	J	--
	1,2-Dichloroethane	32	9.3	85	J	--
	1,1-Dichloroethene	290	14	85	--	--
	1,2-Dichloropropane	68	25	42	--	--
	Methylene chloride	120	7.6	42	--	--
	Tetrachloroethene	680	5.4	42	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	670	17	42	--	--
	1,1,1-Trichloroethane	28	6.9	32	J	--
	Trichloroethene	6600	11	42	--	--
	Trichlorofluoromethane	190	21	42	--	--
	Total Organics <sup>c</sup>	9110	NA	NA	NA	NA
CWL-UI2-36 17-Jan-19	Carbon tetrachloride	7.6	2.9	36	J	--
	Chloroform	400	4.3	14	--	--
	Dichlorodifluoromethane	15	6.6	18	J	--
	1,1-Dichloroethane	3.4	3.3	14	J	--
	1,1-Dichloroethene	33	5.9	36	J	--
	1,2-Dichloropropane	38	11	18	--	--
	Methylene chloride	4.6	3.3	18	J	--
	Tetrachloroethene	140	2.3	18	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	310	7.4	18	--	--
	1,1,1-Trichloroethane	18	3.0	14	--	--
	Trichloroethene	2500	4.8	18	--	--
	Trichlorofluoromethane	95	8.9	18	--	--
	Total Organics <sup>c</sup>	3564.6	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<sup>a</sup>  
 January 2019

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
CWL-UI2-76 17-Jan-19	Carbon tetrachloride	13	4.5	56	J	--
	Chloroform	490	6.7	21	--	--
	Dichlorodifluoromethane	23	10	28	J	--
	1,1-Dichloroethane	6.1	5.1	21	J	--
	1,1-Dichloroethene	80	9.1	56	--	--
	1,2-Dichloropropane	76	17	28	--	--
	Methylene chloride	6.3	5.1	28	J	--
	Tetrachloroethene	180	3.6	28	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	490	12	28	--	--
	1,1,1-Trichloroethane	19	4.6	21	J	--
	Trichloroethene	4000	7.4	28	--	--
	Trichlorofluoromethane	130	14	28	--	--
	Total Organics <sup>c</sup>	5513.4	NA	NA	NA	NA
CWL-UI2-76 (Duplicate) 17-Jan-19	Chloroform	510	6.6	21	--	--
	Dichlorodifluoromethane	23	10	28	J	--
	1,1-Dichloroethane	5.7	5.0	21	J	--
	1,2-Dichloroethane	6.2	6.1	56	J	--
	1,1-Dichloroethene	81	9.0	56	--	--
	1,2-Dichloropropane	78	17	28	--	--
	Tetrachloroethene	180	3.5	28	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	490	11	28	--	--
	1,1,1-Trichloroethane	19	4.5	21	J	--
	Trichloroethene	4100	7.3	28	--	--
	Trichlorofluoromethane	140	14	28	--	--
	Total Organics <sup>c</sup>	5632.9	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
 Summary of Detected Volatile Organic Compounds  
 Chemical Waste Landfill Soil-Gas Monitoring  
 Analytical Method TO-15<sup>a</sup>  
 January 2019

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
CWL-UI2-136 17-Jan-19	Carbon tetrachloride	14	4.7	58	J	--
	Chloroform	410	6.9	22	--	--
	Dichlorodifluoromethane	23	11	29	J	--
	1,1-Dichloroethane	6.8	5.3	22	J	--
	1,2-Dichloroethane	12	6.4	58	J	--
	1,1-Dichloroethene	110	9.4	58	--	--
	1,2-Dichloropropane	110	18	29	--	--
	Tetrachloroethene	160	3.7	29	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	490	12	29	--	--
	1,1,1-Trichloroethane	15	4.7	22	J	--
	Trichloroethene	4400	7.7	29	--	--
	Trichlorofluoromethane	140	14	29	--	--
	Total Organics <sup>c</sup>	5890.8	NA	NA	NA	NA
CWL-UI2-136 (Duplicate) 17-Jan-19	Carbon tetrachloride	14	5.0	63	J	--
	Chloroform	400	7.5	24	--	--
	Dichlorodifluoromethane	23	11	31	J	--
	1,1-Dichloroethane	6.7	5.7	24	J	--
	1,2-Dichloroethane	13	6.9	63	J	--
	1,1-Dichloroethene	110	10	63	--	--
	1,2-Dichloropropane	110	19	31	--	--
	Tetrachloroethene	170	4.0	31	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	490	13	31	--	--
	1,1,1-Trichloroethane	15	5.1	24	J	--
	Trichloroethene	4600	8.3	31	--	--
	Trichlorofluoromethane	140	15	31	--	--
	Total Organics <sup>c</sup>	6091.7	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<sup>a</sup>  
 January 2019

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
CWL-D1-100 17-Jan-19	Carbon tetrachloride	16	6.5	81	J	J
	Chloroform	340	9.6	30	--	J
	Dichlorodifluoromethane	30	15	40	J	J
	1,1-Dichloroethane	11	7.3	30	J	J
	1,2-Dichloroethane	16	8.9	81	J	J
	1,1-Dichloroethene	230	13	81	--	J
	1,2-Dichloropropane	79	24	40	--	J
	Methylene chloride	16	7.3	40	J	J
	Tetrachloroethene	650	5.2	40	--	J
	1,1,2-Trichloro-1,2,2-trifluoroethane	630	16	40	--	J
	1,1,1-Trichloroethane	21	6.6	30	J	J
	Trichloroethene	5900	11	40	--	J
	Trichlorofluoromethane	170	20	40	--	J
	Total Organics <sup>c</sup>	8109	NA	NA	NA	NA
	CWL-D1-160 17-Jan-19	Carbon tetrachloride	26	10	130	J
Chloroform		400	15	47	--	J
Dichlorodifluoromethane		50	23	63	J	J
1,1-Dichloroethane		20	11	47	J	J
1,2-Dichloroethane		30	14	130	J	J
1,1-Dichloroethene		420	20	130	--	J
1,2-Dichloropropane		120	38	63	--	J
Methylene chloride		21	11	63	J	J
Tetrachloroethene		490	8.1	63	--	J
1,1,2-Trichloro-1,2,2-trifluoroethane		1100	26	63	--	J
1,1,1-Trichloroethane		28	10	47	J	J
Trichloroethene		10000	17	63	--	J
Trichlorofluoromethane		270	31	63	--	J
Total Organics <sup>c</sup>		12975	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<sup>a</sup>  
 January 2019

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
CWL-D1-240 17-Jan-19	Carbon tetrachloride	35	12	150	J	--
	Chloroform	330	18	56	--	--
	Dichlorodifluoromethane	61	27	74	J	--
	1,1-Dichloroethane	24	13	56	J	--
	1,2-Dichloroethane	20	16	150	J	--
	1,1-Dichloroethene	560	24	150	--	--
	1,2-Dichloropropane	140	45	74	--	--
	Methylene chloride	21	13	74	J	--
	Tetrachloroethene	390	9.5	74	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1300	30	74	--	--
	1,1,1-Trichloroethane	23	12	56	J	--
	Trichloroethene	12000	20	74	--	--
	Trichlorofluoromethane	320	36	74	--	--
	Total Organics <sup>c</sup>	15224	NA	NA	NA	NA
CWL-D1-350 (Resample) 28-Mar-19	Carbon tetrachloride	33	17	210	J	--
	Chloroform	210	25	79	--	--
	Dichlorodifluoromethane	84	38	110	B, J	110U
	1,1-Dichloroethane	31	19	79	J	--
	1,1-Dichloroethene	670	34	210	--	--
	1,2-Dichloropropane	66	63	110	J	--
	Methylene chloride	53	19	110	B, J	110U
	Tetrachloroethene	320	13	110	--	--
	Toluene	21	13	110	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1500	43	110	--	--
	Trichloroethene	13000	28	110	--	--
	Trichlorofluoromethane	390	52	110	--	--
	Total Organics <sup>c</sup>	16241	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<sup>a</sup>  
 January 2019

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
CWL-D1-470 17-Jan-19	Carbon disulfide	1.2	0.28	2.9	J	J
	Carbon tetrachloride	2.0	0.23	2.9	J	J
	Chloroform	0.71	0.35	1.1	J	1.1UJ
	Dichlorodifluoromethane	8.6	0.53	1.5	--	J
	1,1-Dichloroethene	26	0.47	2.9	--	J
	Methylene chloride	2.6	0.26	1.5	--	J
	Tetrachloroethene	5.7	0.19	1.5	--	J
	1,1,2-Trichloro-1,2,2-trifluoroethane	170	0.59	1.5	--	J
	Trichloroethene	130	0.38	1.5	--	J
	Trichlorofluoromethane	48	0.72	1.5	--	J
	Total Organics <sup>c</sup>	394.1	NA	NA	NA	NA
CWL-D2-120 17-Jan-19	Carbon tetrachloride	25	9.4	120	J	--
	Chloroform	490	14	44	--	--
	Dichlorodifluoromethane	44	21	59	J	--
	1,1-Dichloroethane	18	11	44	J	--
	1,2-Dichloroethane	38	13	120	J	--
	1,1-Dichloroethene	360	19	120	--	--
	1,2-Dichloropropane	160	35	59	--	--
	Tetrachloroethene	480	7.5	59	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	930	24	59	--	--
	1,1,1-Trichloroethane	34	9.6	44	J	--
	Trichloroethene	9100	15	59	--	--
	Trichlorofluoromethane	250	29	59	--	--
	Total Organics <sup>c</sup>	11929	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<sup>a</sup>  
 January 2019

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
CWL-D2-240 17-Jan-19	Carbon tetrachloride	28	10	130	J	--
	Chloroform	490	15	47	--	--
	Dichlorodifluoromethane	47	23	63	J	--
	1,1-Dichloroethane	22	11	47	J	--
	1,2-Dichloroethane	38	14	130	J	--
	1,1-Dichloroethene	440	20	130	--	--
	1,2-Dichloropropane	190	38	63	--	--
	Methylene chloride	14	11	63	J	--
	Tetrachloroethene	480	8.1	63	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1100	26	63	--	--
	1,1,1-Trichloroethane	29	10	47	J	--
	Trichloroethene	11000	17	63	--	--
	Trichlorofluoromethane	290	31	63	--	--
	Total Organics <sup>c</sup>	14168	NA	NA	NA	NA
CWL-D2-350 17-Jan-19	Carbon tetrachloride	23	8.1	100	J	--
	Chloroform	290	12	38	--	--
	Dichlorodifluoromethane	40	18	51	J	--
	1,1-Dichloroethane	15	9.1	38	J	--
	1,2-Dichloroethane	13	11	100	J	--
	1,1-Dichloroethene	360	16	100	--	--
	1,2-Dichloropropane	98	30	51	--	--
	Methylene chloride	42	9.1	51	J	--
	Tetrachloroethene	330	6.5	51	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	830	21	51	--	--
	1,1,1-Trichloroethane	21	8.3	38	J	--
	Trichloroethene	7400	13	51	--	--
	Trichlorofluoromethane	240	25	51	--	--
	Total Organics <sup>c</sup>	9702	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<sup>a</sup>  
 January 2019

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
CWL-D2-440 17-Jan-19	Acetone	5.0	0.30	8.5	J	--
	Benzene	0.18	0.13	0.68	J	--
	2-Butanone	1.6	0.34	1.4	--	--
	Carbon tetrachloride	0.31	0.11	1.4	J	--
	Chloroform	2.6	0.16	0.51	--	--
	Chloromethane	0.46	0.33	1.4	J	--
	Dichlorodifluoromethane	0.75	0.25	0.68	--	--
	1,1-Dichloroethane	0.16	0.12	0.51	J	--
	1,1-Dichloroethene	5.2	0.22	1.4	--	--
	1,2-Dichloropropane	1.1	0.41	0.68	--	--
	Methylene chloride	1.2	0.12	0.68	--	--
	Tetrachloroethene	3.6	0.087	0.68	--	--
	Toluene	0.19	0.087	0.68	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	8.0	0.28	0.68	--	--
	Trichloroethene	84	0.18	0.68	--	--
	Trichlorofluoromethane	3.2	0.33	0.68	--	--
Total Organics <sup>c</sup>	117.55	NA	NA	NA	NA	
CWL-D2-470 17-Jan-19	Carbon tetrachloride	10	4.8	60	J	--
	Chloroform	250	7.1	22	--	--
	Dichlorodifluoromethane	19	11	30	J	--
	1,1-Dichloroethane	7.3	5.4	22	J	--
	1,2-Dichloroethane	11	6.5	60	J	--
	1,1-Dichloroethene	140	9.6	60	--	--
	1,2-Dichloropropane	71	18	30	--	--
	Tetrachloroethene	270	3.8	30	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	370	12	30	--	--
	1,1,1-Trichloroethane	24	4.8	22	--	--
	Trichloroethene	4000	7.8	30	--	--
	Trichlorofluoromethane	120	15	30	--	--
	Total Organics <sup>c</sup>	5292.3	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
 Summary of Detected Volatile Organic Compounds  
 Chemical Waste Landfill Soil-Gas Monitoring  
 Analytical Method TO-15<sup>a</sup>  
 January 2019

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
CWL-D3-120 17-Jan-19	Carbon tetrachloride	8.6	3.4	43	J	--
	Chloroform	140	5.1	16	--	--
	Dichlorodifluoromethane	19	7.8	21	J	--
	1,1-Dichloroethane	5.8	3.9	16	J	--
	1,2-Dichloroethane	16	4.7	43	J	--
	1,1-Dichloroethene	130	6.9	43	--	--
	1,2-Dichloropropane	64	13	21	--	--
	Methylene chloride	12	3.9	21	J	--
	Tetrachloroethene	68	2.7	21	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	360	8.7	21	--	--
	1,1,1-Trichloroethane	8.0	3.5	16	J	--
	Trichloroethene	3000	5.6	21	--	--
	Trichlorofluoromethane	110	11	21	--	--
	Total Organics <sup>c</sup>	3941.4	NA	NA	NA	NA
CWL-D3-170 17-Jan-19	Carbon tetrachloride	9.8	3.9	49	J	--
	Chloroform	120	5.8	18	--	--
	Dichlorodifluoromethane	23	8.9	25	J	--
	1,1-Dichloroethane	6.5	4.4	18	J	--
	1,2-Dichloroethane	16	5.4	49	J	--
	1,1-Dichloroethene	150	7.9	49	--	--
	1,2-Dichloropropane	74	15	25	--	--
	Methylene chloride	14	4.4	25	J	--
	Tetrachloroethene	100	3.1	25	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	390	10	25	--	--
	1,1,1-Trichloroethane	5.7	4.0	18	J	--
	Trichloroethene	3400	6.4	25	--	--
	Trichlorofluoromethane	120	12	25	--	--
	Total Organics <sup>c</sup>	4429	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<sup>a</sup>  
 January 2019

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
CWL-D3-350 (Resample) 28-Mar-19	Carbon tetrachloride	3.3	1.8	23	J	--
	Chloroform	32	2.7	8.6	--	--
	Dichlorodifluoromethane	8.9	4.1	11	B, J	11U
	1,1-Dichloroethane	2.9	2.1	8.6	J	--
	1,2-Dichloroethane	3.3	2.5	23	J	--
	1,1-Dichloroethene	47	3.7	23	--	--
	1,2-Dichloropropane	21	6.8	11	--	--
	Methylene chloride	9.4	2.1	11	B, J	11U
	Tetrachloroethene	26	1.5	11	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	130	4.6	11	--	--
	Trichloroethene	1100	3.0	11	--	--
	Trichlorofluoromethane	37	5.6	11	--	--
	Total Organics <sup>c</sup>	1402.5	NA	NA	NA	NA
	CWL-D3-440 17-Jan-19	Carbon tetrachloride	14	4.8	60	J
Chloroform		130	7.1	22	--	--
Dichlorodifluoromethane		27	11	30	J	--
1,1-Dichloroethane		7.7	5.4	22	J	--
1,2-Dichloroethane		15	6.6	60	J	--
1,1-Dichloroethene		190	9.6	60	--	--
1,2-Dichloropropane		110	18	30	--	--
Methylene chloride		7.8	5.4	30	J	--
Tetrachloroethene		110	3.8	30	--	--
1,1,2-Trichloro-1,2,2-trifluoroethane		500	12	30	--	--
Trichloroethene		4300	7.9	30	--	--
Trichlorofluoromethane		140	15	30	--	--
Total Organics <sup>c</sup>		5551.5	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<sup>a</sup>  
 January 2019

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
CWL-D3-480 17-Jan-19	Acetone	1.7	0.18	5.0	J	--
	Carbon tetrachloride	0.20	0.064	0.80	J	--
	Chloroform	1.2	0.095	0.30	--	--
	Chloromethane	0.41	0.20	0.80	J	--
	Dichlorodifluoromethane	0.43	0.15	0.40	--	--
	1,2-Dichloroethane	0.17	0.088	0.80	J	--
	1,1-Dichloroethene	1.4	0.13	0.80	--	--
	1,2-Dichloropropane	0.95	0.24	0.40	--	--
	Methylene chloride	0.18	0.072	0.40	J	--
	Tetrachloroethene	1.6	0.051	0.40	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	3.9	0.16	0.40	--	--
	Trichloroethene	38	0.11	0.40	--	--
	Trichlorofluoromethane	1.4	0.20	0.40	--	--
Total Organics <sup>c</sup>	51.54	NA	NA	NA	NA	

Notes:

<sup>a</sup>EPA January 1999b.

<sup>b</sup>Laboratory/Validation Qualifier – If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted samples.

Laboratory Qualifier

B = Compound was found in blank and sample.

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Validation Qualifier

J = The associated value is an estimated quantity.

U = The analyte was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.

UJ = The analyte was analyzed for but was not detected. The associated numerical value is an estimate and may be inaccurate or imprecise.

<sup>c</sup>Total Organics - sum of validated detected organic compounds (i.e., results for analytes reported as detections by the laboratory but qualified during data validation as not detected are not included in the Total Organics value).

EPA = U.S. Environmental Protection Agency.

ID = Identification.

MDL = Method detection limit. The minimum concentration that can be measured and reported with 99 percent confidence that the analyte is greater than zero, analyte is matrix specific.

NA = Not applicable.

ppbv = Parts per billion by volume.

RL = Reporting limit. The minimum concentration that can be reported with a specified degree of confidence.

## January 17 and March 28, 2019 Soil-Gas Results

Twenty-three samples were collected from the 21 sampling ports (21 environmental samples and 2 duplicate samples; 2 of the environmental samples from March resample event). In general, the January and March 2019 soil-gas results were consistent with the 2018 data set. A total of 20 VOCs were detected in the 2019 data set compared to 22 VOCs detected in the 2018 data set. The detected VOCs are listed below.

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

TCE is the primary VOC of concern at the CWL and was detected in all 23 samples. TCE concentrations ranged from 38 parts per billion by volume (ppbv) to 13,000 ppbv (CWL-D3-480 and CWL-D1-350, respectively). PCE was also detected in all samples at concentrations ranging from 1.6 ppbv to 3,000 ppbv (CWL-D3-480 and CWL-UI1-40, respectively). Other VOCs detected in all samples, generally at lower concentrations, included 1,1-dichloroethene; 1,1,2-trichloro-1,2,2-trifluoroethane (commonly known as Freon 113), and trichlorofluoromethane (commonly known as Freon 11). Total VOCs, as the sum of validated detected VOCs, were reported in all environmental samples at concentrations ranging from 51.54 ppbv at well CWL-D3 (480 foot bgs sample port) to 16,241 ppbv at CWL-D1 (350 foot bgs sample port). The maximum TCE and Total VOC concentrations were reported in samples from the 350 foot bgs sampling port at monitoring well CWL-D1.

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 4,000 ppbv or 4.0 parts per million by volume (ppmv) from CWL-D2-470. TCE was the only VOC that exceeded a concentration of 0.50 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 2019 from sample ports located at 76 and 136 feet bgs at monitoring well CWL-UI2. 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 was not detected in the corresponding duplicate or environmental sample, no RPD was calculated. The duplicate sample results show good agreement for all detected VOCs (i.e., RPDs less than 50), with RPDs ranging from < 1 to 7.

Table 5-2  
 Summary of January 2019 Duplicate Samples  
 Chemical Waste Landfill Soil-Gas Monitoring

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD <sup>a</sup> (%)
	(ppbv)		
<b>CWL-UI2-76</b>			
Chloroform	490	510	4
Tetrachloroethene	180	180	< 1
1,1,2-Trichloro-1,2,2-trifluoroethane	490	490	< 1
Trichloroethene	4000	4100	2
Trichlorofluoromethane	130	140	7
<b>CWL-UI2-136</b>			
Chloroform	410	400	2
Tetrachloroethene	160	170	6
1,1,2-Trichloro-1,2,2-trifluoroethane	490	490	< 1
Trichloroethene	4400	4600	4
Trichlorofluoromethane	140	140	< 1

Notes:

<sup>a</sup>RPD = Relative percent difference is calculated with the following equation and rounded to nearest whole number.

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

where: R<sub>1</sub> = environmental sample result.  
 R<sub>2</sub> = duplicate sample result.

ID = Identification.

ppbv = Parts per billion by volume.

A total of nine field blank samples were submitted with the 2019 samples. VOCs detected above laboratory MDLs in field blank samples included acetone (1 sample), chloroform (1 sample), methylene chloride (2 samples), PCE (3 samples), 1,1,2-trichloro-1,2,2-trifluoroethane (1 sample), and TCE (4 samples). No corrective action was required for acetone, methylene chloride, PCE, 1,1,2-trichloro-1,2,2-trifluoroethane, or TCE, since all associated environmental sample results were not detected, results were less than 5 times the field blank concentration, or compound(s) were qualified separately due to associated laboratory method blank sample contamination. Chloroform in the sample from well CWL-D1 (470 fbgs 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 were analyzed concurrently with all environmental samples in accordance with laboratory procedures and the EPA method. These samples included laboratory control samples, replicates, matrix spikes, matrix spike

supplicates, and surrogate spike samples. Laboratory blank samples were used to determine potential contamination introduced by the laboratory processes and methodologies and laboratory spike samples were used to determine the accuracy and precision of the analytical method. The original sample from CWL-D1 (350 foot bgs sample port) collected in January 2019 was received at the laboratory with insufficient sample volume and the results were qualified as not usable. The original sample results from CWL-D3 (350 foot bgs sample port) were reported at concentrations lower than historical values. Resampling of both these sampling ports was conducted in March 2019 and only the March results are reported in Table 5-1. The o-xylene result in the sample from well CWL-UI1 (40 foot bgs sample port) was qualified as not detected during data validation since o-xylene was detected in the associated laboratory blank sample at a similar concentration (i.e., blank sample result indicates laboratory contamination).

Laboratory QC samples identified potential contamination introduced at the laboratory and verified the accuracy and precision of the analytical method. The data were reviewed and qualified in accordance with AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data" (SNL/NM June 2017). All data were determined to be acceptable and reported QC 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

There were no variances from PCCP requirements for the January and March 2019 soil-gas monitoring activities.

### 5.3 Data Evaluation

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

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

The trigger level of 20 ppmv only applies to the 95% LCL of the mean and not to individual sample results. For the first 5 years after the effective date of the PCCP (June 2, 2011), historical soil-gas monitoring results were used to augment the statistical analysis. In accordance with PCCP Attachment 1, Section 1.8.2.2, historical data collected prior to implementation of the PCCP are no longer used for statistical analysis because six or more data sets collected under the PCCP are available. Historical soil-gas data is 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 generally representative of the conditions when the VE system was shut down a month later.

### 5.3.1 Statistical Assessment Requirements

Similar to CY 2018 results, only TCE (4.0 ppmv) in the CWL-D2-470 sample exceeded the 0.50 ppmv threshold. In accordance with the PCCP Attachment 1, Section 1.8.2.2, confidence intervals (UCLs and LCLs) are calculated and used to compare to the trigger level of 20 ppmv. If a result is below the analytical laboratory detection limit, the MDL for the constituent is used for statistical analysis. For duplicate analyses, only the highest detection for the environmental-duplicate sample pair is used for statistical analysis.

### 5.3.2 Statistical Assessment Results

CY 2019 soil-gas statistical assessment results are presented in Table 5-3. The calculated LCL for CWL-D2-470 TCE results is 4.077 ppmv and is below the trigger level of 20 ppmv.

## 5.4 Historical 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 historical 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 historical 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 2019 (most current data set). For January 2019 data set, two March 2019 resample results were used for two sampling ports (CWL-D1-350 and CWL-D3-350) due to issues identified with the January samples (Section 5.1).

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 2019 concentrations of TCE in soil gas remain in the central part of the vadose zone, from approximately 120 to 350 feet bgs. CWL-D1 results for the depths of 160, 240, and 350 feet bgs ranged from 10.00 to 13.00 ppmv. CWL-D2 results for the depth of 120 to 350 feet bgs ranged from 11.00 to 7.40 ppmv.

In general, TCE and Total VOC concentrations are relatively stable and slowly decreasing throughout the vadose zone (Tables 5-4 and 5-5). When the January 2012 and January 2019 TCE and Total VOC results are compared (i.e., comparing current results to the first data set under the PCCP), all sampling ports show a decrease or an equivalent result (i.e., only the TCE results for the samples from CWL-D1-350 were the same, all others showed a decrease). All CY 2019 TCE results below 350 feet bgs are low concentrations ranging from 4.30 ppmv (CWL-D3-440) to 0.04 ppmv (CWL-D3-480). All CY 2019 Total VOC results below 350 feet bgs are also low concentrations ranging from 5.55 ppmv (CWL-D3-440) to 0.05 ppmv (CWL-D3-480).

Table 5-3  
 Statistical Assessment Results Summary  
 Chemical Waste Landfill Soil-Gas Monitoring  
 Calendar Year 2019

Soil-Gas Constituent Exceeding Threshold Concentration <sup>a</sup>	Minimum <sup>b</sup> (ppmv)	Maximum <sup>b</sup> (ppmv)	Mean <sup>c</sup> (ppmv)	Standard Deviation <sup>c</sup>	LCL <sup>c</sup> (ppmv)	UCL <sup>c</sup> (ppmv)	Distribution Type <sup>c</sup>	Trigger Level <sup>a</sup> (ppmv)	Trigger Level Exceeded <sup>d</sup>
Trichloroethene (4.0 ppmv)	4.0	7.1 <sup>e</sup>	4.741	0.9909	4.077	5.405	Normal	20	No

Notes:

<sup>a</sup>The CWL-D2-470 January environmental sample trichloroethene (TCE) result of 4.0 ppmv was the only constituent detected in samples from the three deepest sampling ports of wells CWL-D1 through CWL-D3 that exceeded the 0.50 ppmv threshold for statistical assessment. Therefore, this table only summarizes statistical assessment of TCE results from CWL-D2-470. 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.

<sup>b</sup>Minimum and maximum results determined from historical data (2012 through 2019) and include the CY 2019 results.

<sup>c</sup>Mean, standard deviation, LCL, UCL, and Distribution Type determined using ProUCL statistical program.

<sup>d</sup>Exceedance determined by comparing the constituent LCL against the trigger level of 20 ppmv.

<sup>e</sup>Maximum historical concentration from the March 2013 environmental sample result.

CWL = Chemical Waste Landfill.

CY = Calendar year.

LCL = Lower confidence limit.

ppmv = Parts per million by volume.

UCL = Upper confidence limit.

Table 5-4  
 Historical Soil-Gas Monitoring Summary – TCE Concentrations<sup>a</sup>  
 Chemical Waste Landfill

Well ID & Sample Port Depth <sup>b</sup>	June 1998	June 1999	Aug 2001	June 2004	Sept 2004	Oct 2005	Jan <sup>c</sup> 2012	Jan <sup>c</sup> 2013	Jan 2014	Jan <sup>c</sup> 2015	Jan 2016	Jan 2017	Jan 2018	Jan 2019
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	8.30	4.40
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	6.20	5.30
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	5.30	6.60
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	2.30	2.50
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	4.70	4.10
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	6.70	4.60
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	6.10	5.90
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	10.00	10.00
CWL-D1-240	160.0	44.0	44.0	34.0	34.0	24.0	22.00	23.00	19.00	17.00	27.00	20.40	11.00	12.00
CWL-D1-350	0.013	11.0	19.0	13.0	22.0	2.8	13.00	13.00	8.50	13.00	12.00	10.00	4.20	13.00 <sup>d</sup>
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	0.19	0.13
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	7.70	9.10
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	9.70	11.00
CWL-D2-350	0.064	12.0	18.0	11.0	17.0	5.0	11.00	13.00	9.90	8.10	10.00	9.85	6.40	7.40
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	0.12	0.08
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	4.80	4.00
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	3.50	3.00
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	4.70	3.40
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	4.50	1.10 <sup>d</sup>
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	4.80	4.30
CWL-D3-480	ND	1.9	1.2	0.2	2.1	4.1	0.21	0.03	0.04	0.30	0.02	0.11	0.03	0.04

Notes:

All results are in ppmv.

January 2012 – 2019 concentrations have been rounded for significant digit consistency; they may not exactly match the reported concentrations in corresponding data tables.

<sup>a</sup>June 1998 through January 2012 are EPA Method TO-14 results (EPA January 1999a). January 2013 – 2019 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.

<sup>b</sup>Port depth is the last number in the Well Identification (ID), and is in feet below ground surface.

<sup>c</sup>Results associated with duplicate resampling conducted in May (2012 data set), March (2013 data set), and March (2015 data set) are not included. CWL-D3-440 results for January 2012 were collected in March 2012 due to issues with sampling this port; could not be sampled in January 2012.

<sup>d</sup>March 2019 resample result used due to data quality issues with the corresponding January 2019 sample (Section 5.1).

EPA = U.S. Environmental Protection Agency. ppmv = Parts per million by volume.

ND = Not detected.

TCE = Trichloroethene.

Table 5-5  
 Historical Soil-Gas Monitoring Summary – Total Volatile Organic Compound Concentrations<sup>a</sup>  
 Chemical Waste Landfill

Well ID & Sample Port Depth <sup>b</sup>	June 1998	June 1999	Aug 2001	June 2004	Sept 2004	Oct 2005	Jan <sup>c</sup> 2012	Jan <sup>c</sup> 2013	Jan 2014	Jan <sup>c</sup> 2015	Jan 2016	Jan 2017	Jan 2018	Jan 2019
CWL-UI1-40	112	246	141	11.78	11.47	13.15	11.76	14.68	9.54	9.27	9.14	11.31	11.46	8.82
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	8.91	7.75
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	10.50	9.11
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	3.24	3.57
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	6.39	5.63
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	8.69	6.09
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	8.42	8.11
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	13.00	12.98
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	13.76	15.22
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	5.65	16.24 <sup>d</sup>
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	0.43	0.40
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	10.17	11.93
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	12.47	14.17
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	8.33	9.70
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	0.16	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	6.18	5.29
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	4.59	3.94
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	6.11	4.43
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	5.86	1.40 <sup>d</sup>
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	6.22	5.55
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	0.03	0.05

Notes:

All results are in ppmv.

January 2012 - 2019 concentrations have been rounded for significant digit consistency; they may not exactly match the reported concentrations in corresponding data tables.

<sup>a</sup>The 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 – 2019 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.

<sup>b</sup>Port depth is the last number in the Well Identification (ID), and is in feet below ground surface.

<sup>c</sup>Results associated with duplicate resampling conducted in May (2012 data set), March (2013 data set), and March (2015) are not included. CWL-D3-440 results for January 2012 were collected in March 2012 due to issues with sampling this port; could not be sampled in January 2012.

<sup>d</sup>March 2019 resample result used due to data quality issues with the corresponding January 2019 sample (Section 5.1).

EPA = U.S. Environmental Protection Agency. VOC = Volatile organic compound.

ppmv = Parts per million by volume.

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).

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 100 to 480 feet bgs. TCE is the primary VOC of concern, although 1,1-dichloroethene, 1,1,2-trichloro-1,2,2-trifluoroethane, and trichlorofluoromethane were also detected in all the January/March 2019 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 2019 results) are generally stable with all ports showing 2019 concentrations that are less than 2012 concentrations for both TCE and Total VOCs. Over the historical monitoring period, the highest TCE and Total VOC concentrations in the deepest ports (CWL-D1-470, CWL-D2-470, and DWL-D3-480) have been consistently observed at the CWL-D2-470 port (one to two orders of magnitude higher).

TCE in groundwater has only been 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 2019 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 and the most recent result (July 2019) was a non-detect (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 of this report and Annex E of the CWL Corrective Measures Study Report [SNL/NM December 2004]). This conclusion is supported by historical and current groundwater monitoring results and statistical evaluation of CWL-MW10 results (Section 4.3) since implementation of the PCCP in June 2011.

Eight years of soil-gas monitoring under the PCCP (2012 through 2019) and previous monitoring conducted since completion of the VE VCM in July 1998 confirm 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).

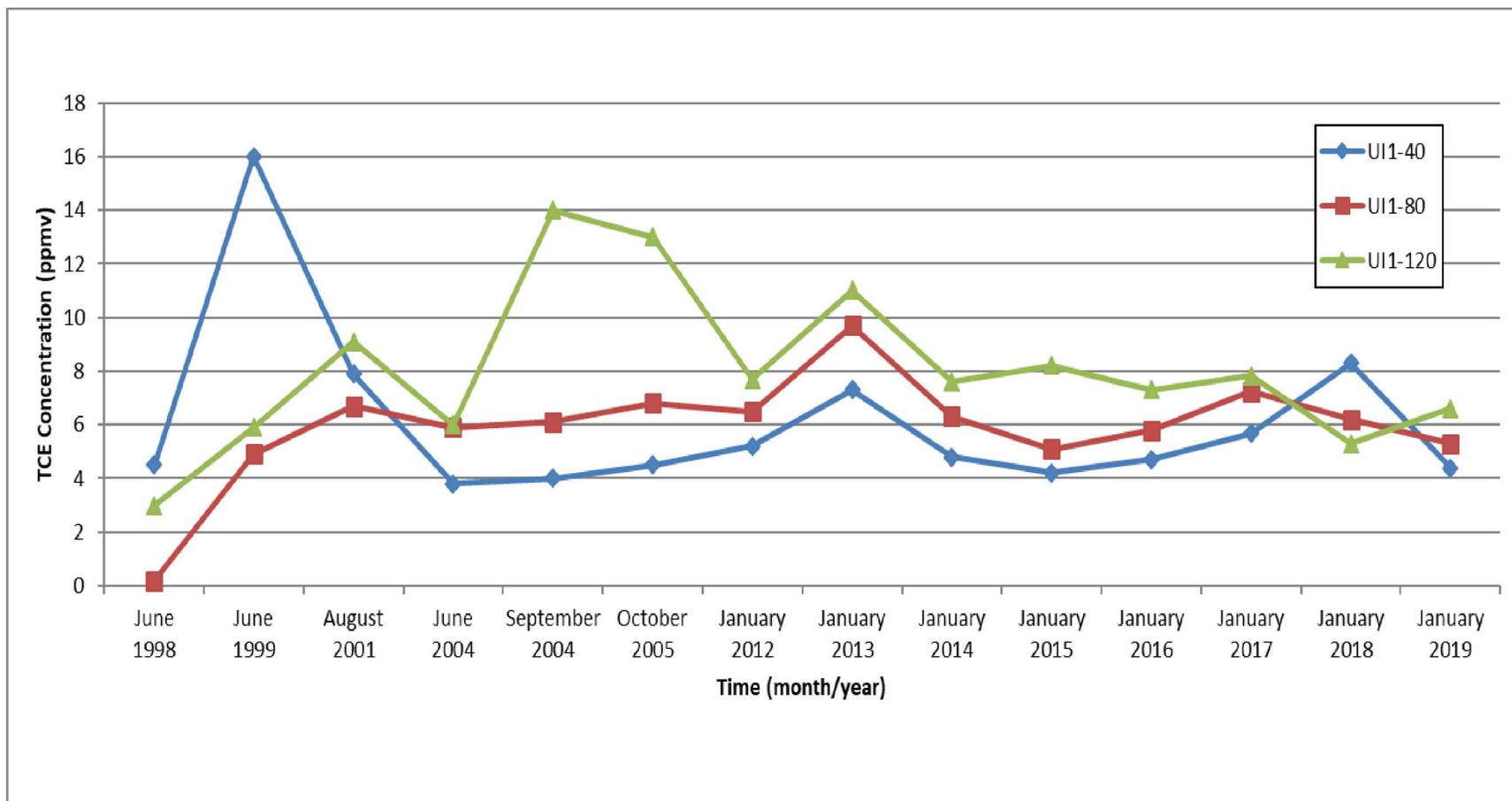


Figure 5-1  
 Historical TCE Concentrations vs. Time  
 Chemical Waste Landfill Well UI-1 Ports

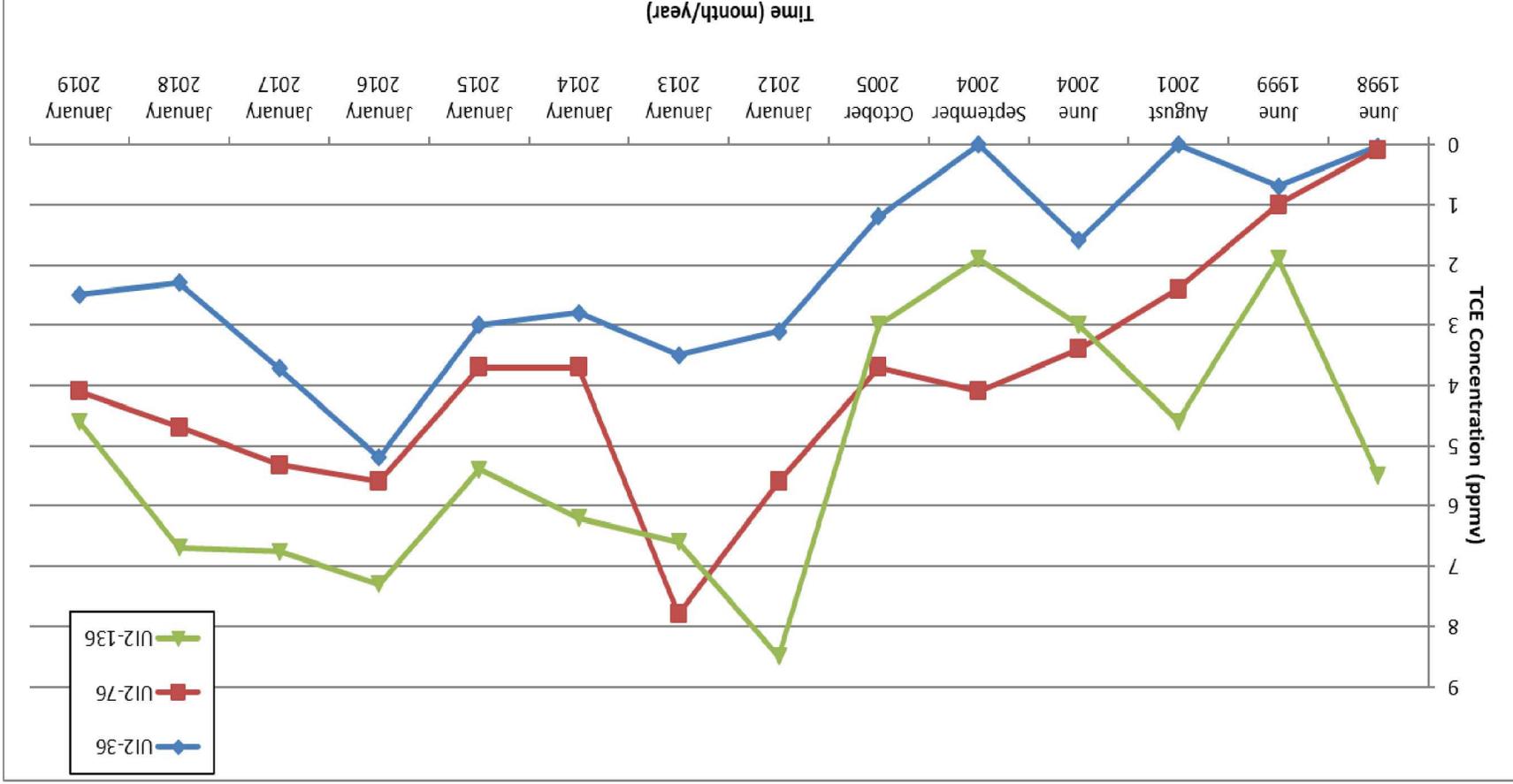


Figure 5-2  
Historical TCE Concentrations vs. Time  
Chemical Waste Landfill Well U1-2 Ports

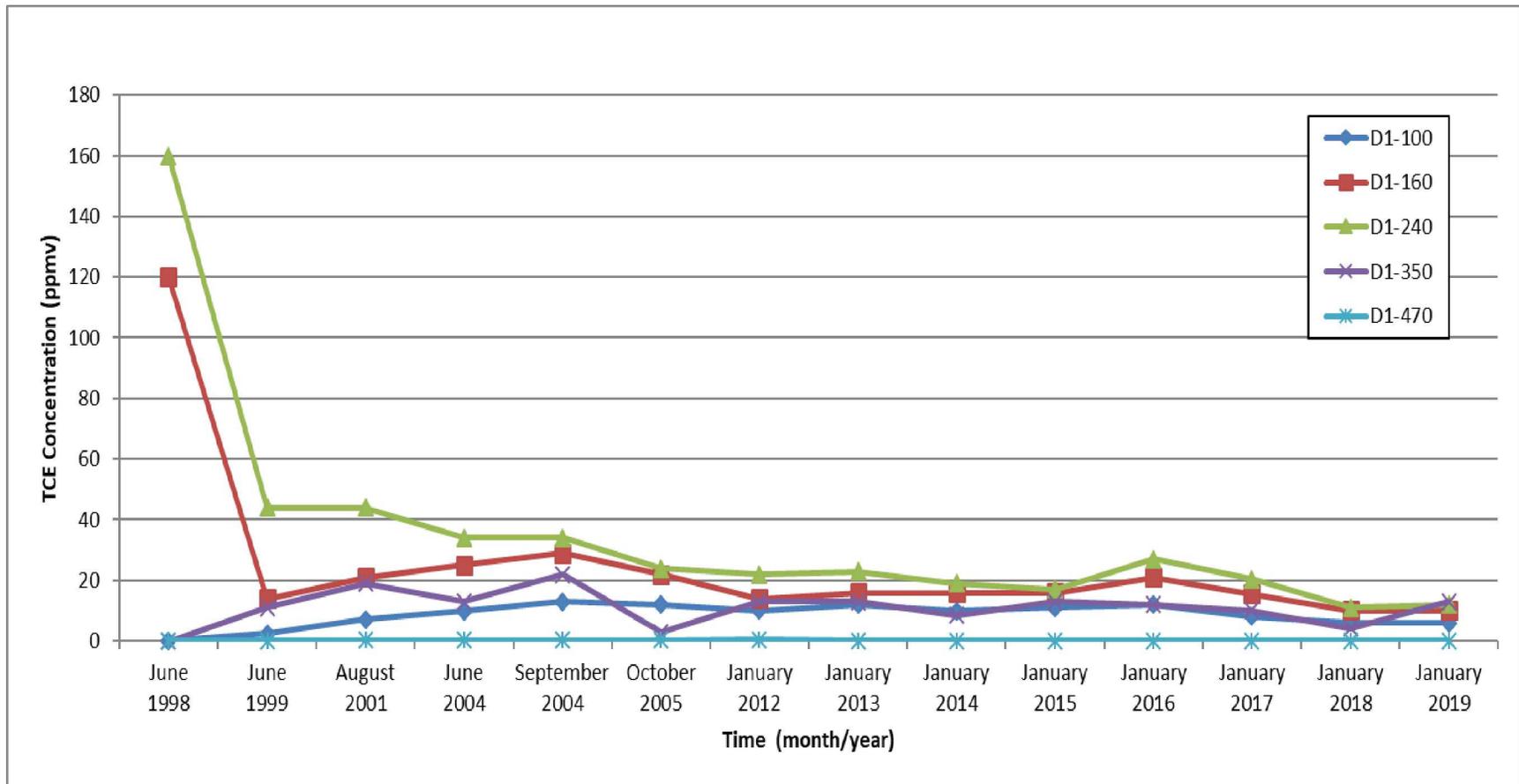


Figure 5-3  
Historical TCE Concentrations vs. Time  
Chemical Waste Landfill Well D1 Ports

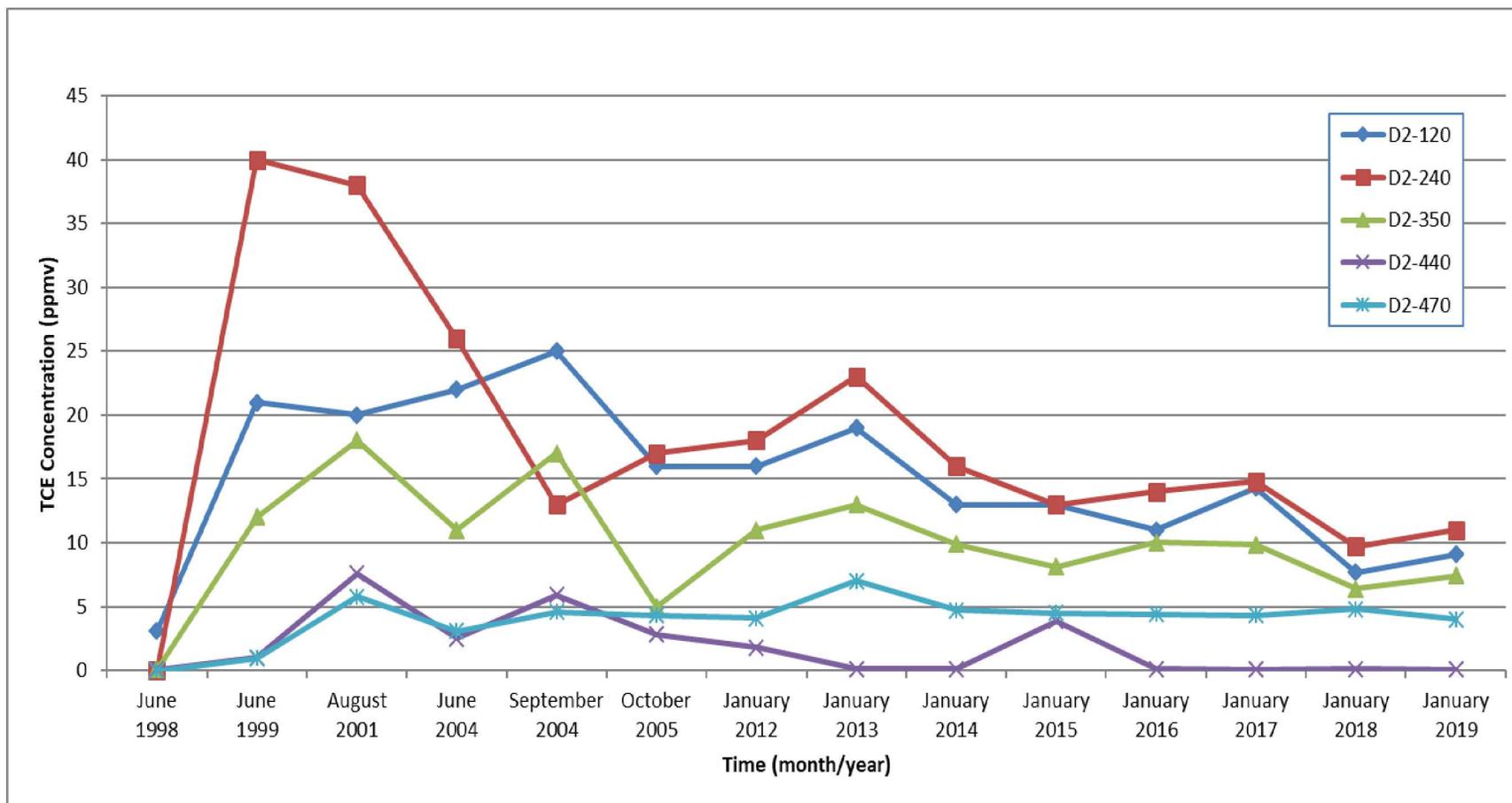


Figure 5-4  
 Historical TCE Concentrations vs. Time  
 Chemical Waste Landfill Well D2 Ports

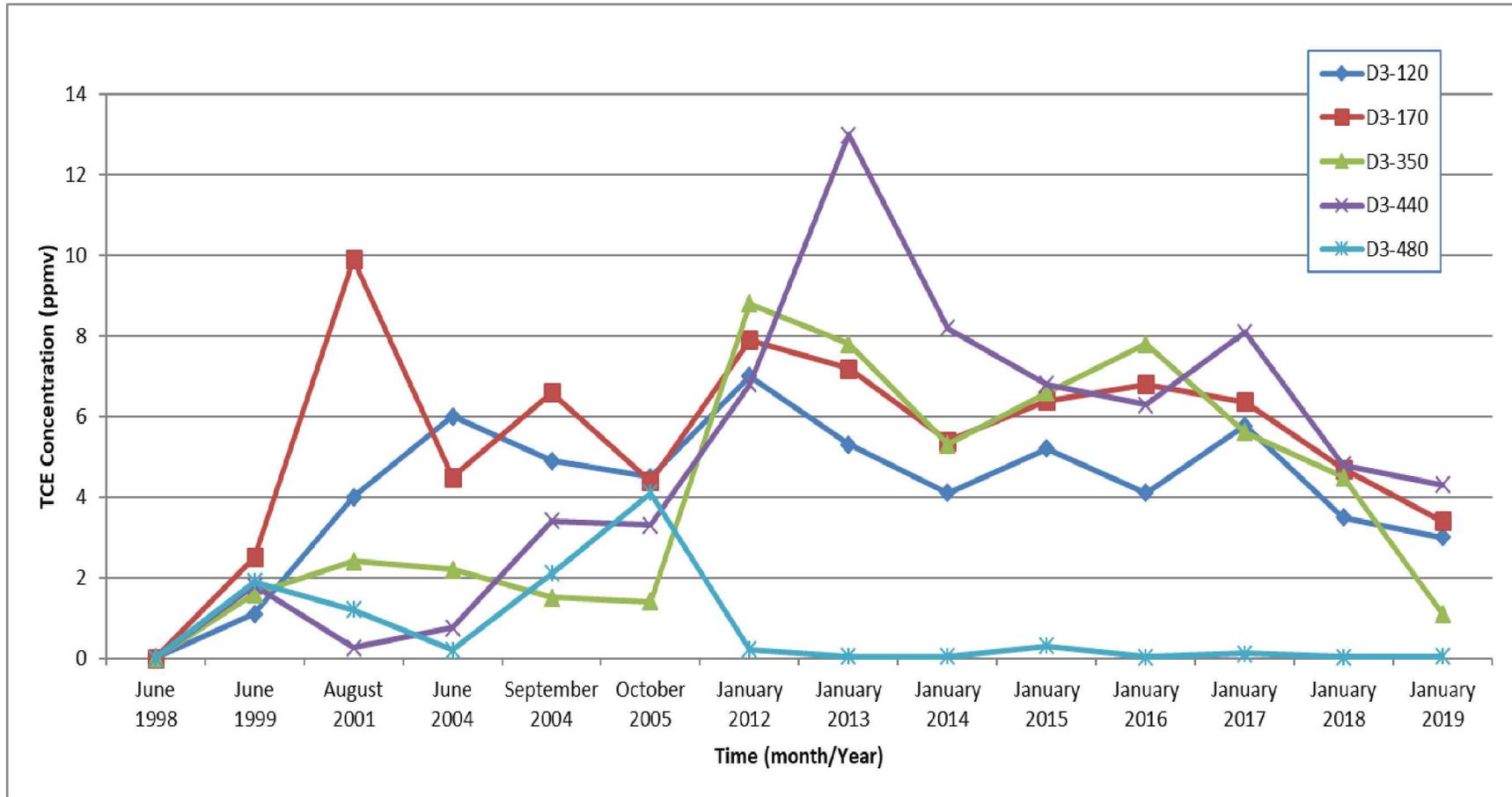


Figure 5-5  
Historical TCE Concentrations vs. Time  
Chemical Waste Landfill Well D3 Ports

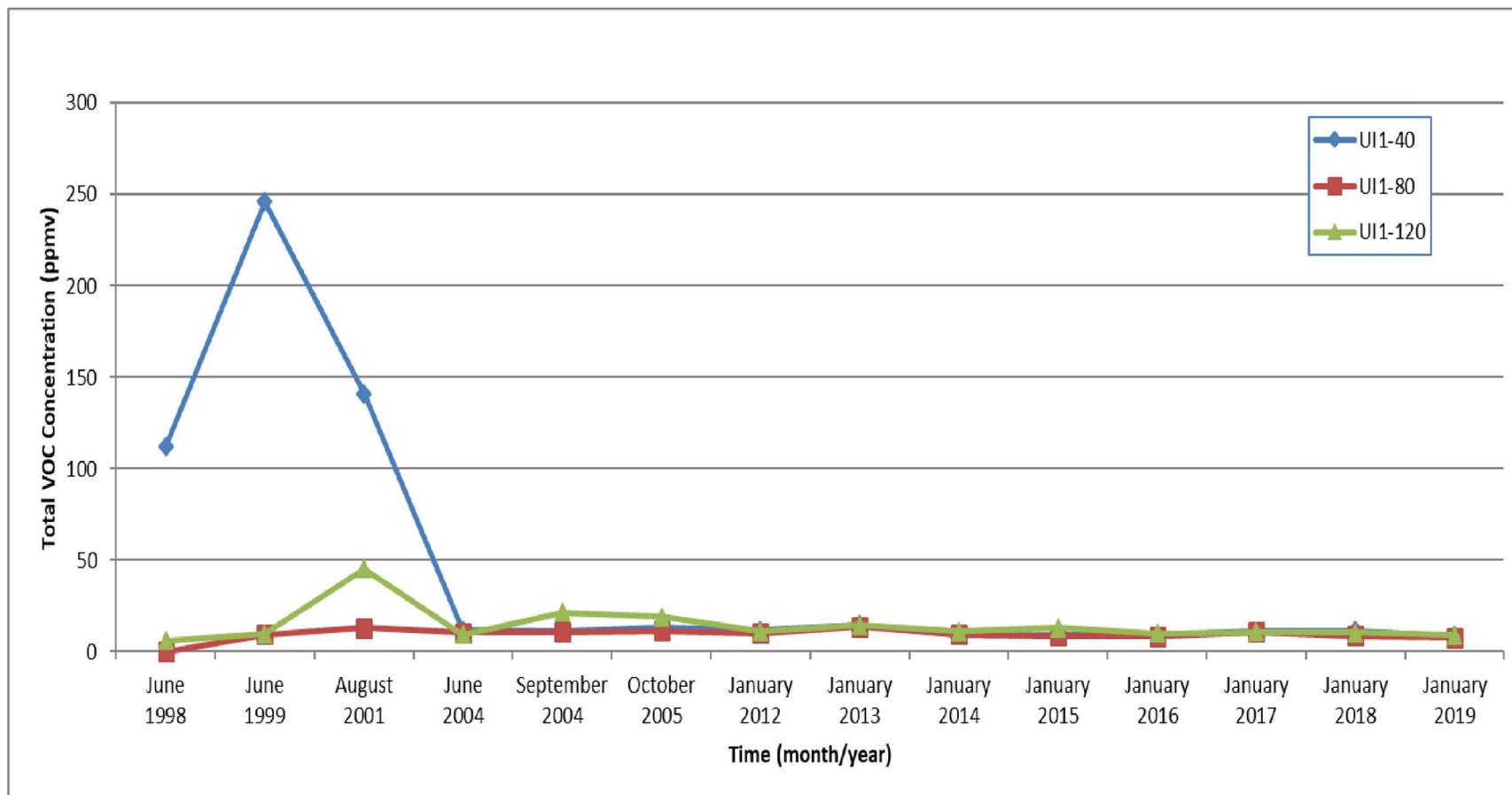


Figure 5-6  
Historical Total Volatile Organic Compound Concentrations vs. Time  
Chemical Waste Landfill Well UI-1 Ports

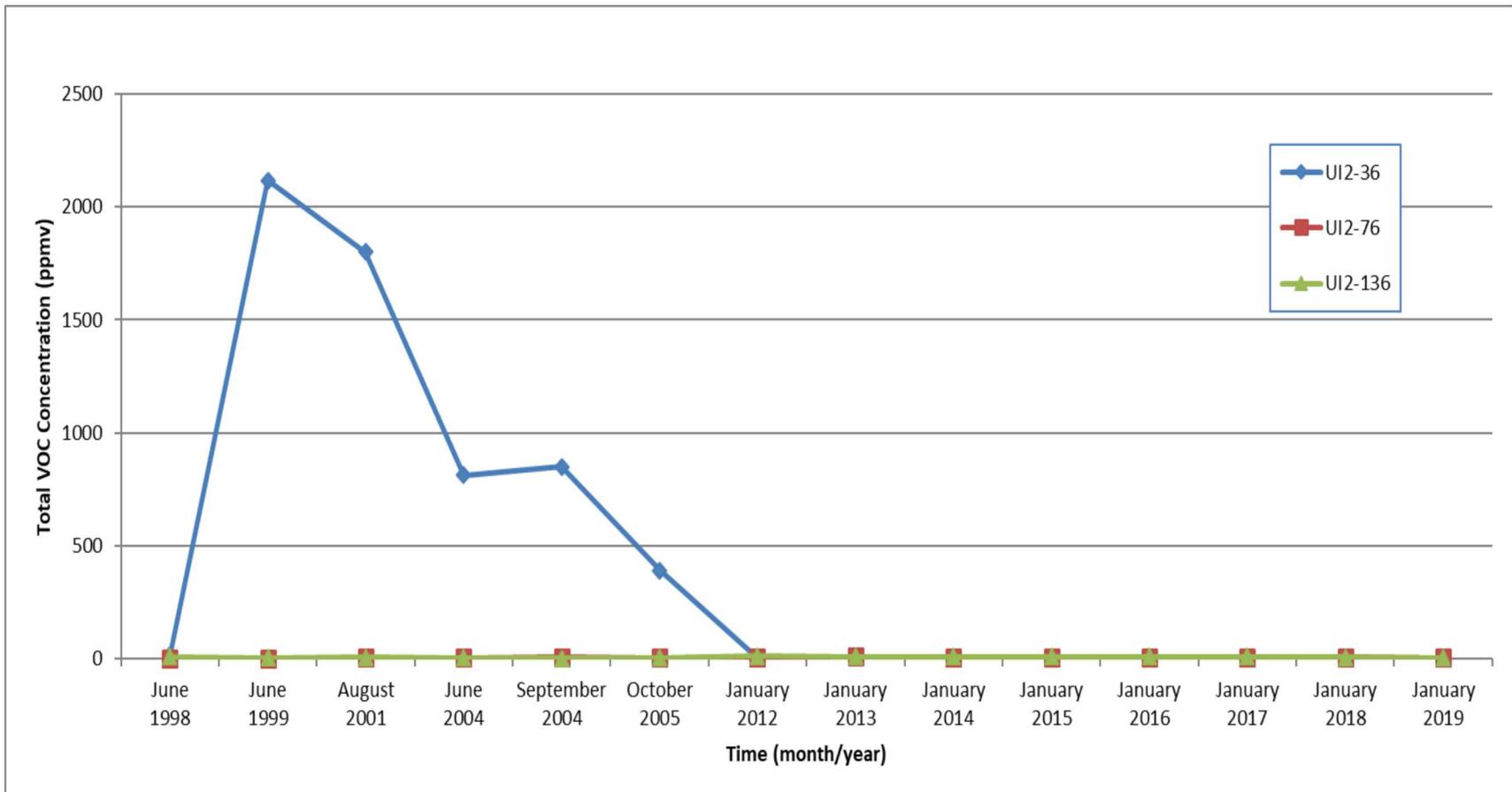


Figure 5-7  
Historical Total Volatile Organic Compound Concentrations vs. Time  
Chemical Waste Landfill Well UI-2 Ports

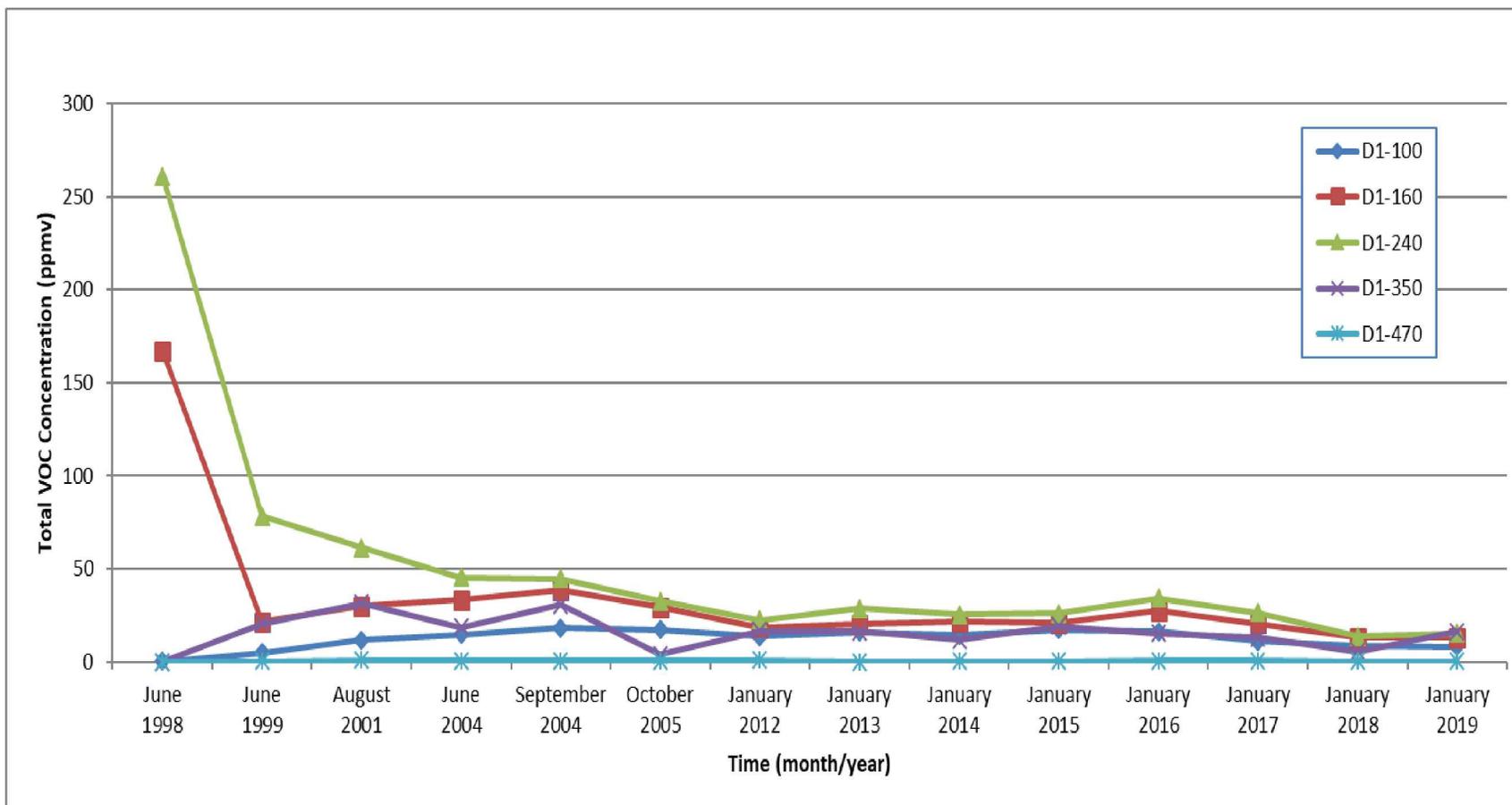


Figure 5-8  
 Historical Total Volatile Organic Compound Concentrations vs. Time  
 Chemical Waste Landfill Well D1 Ports

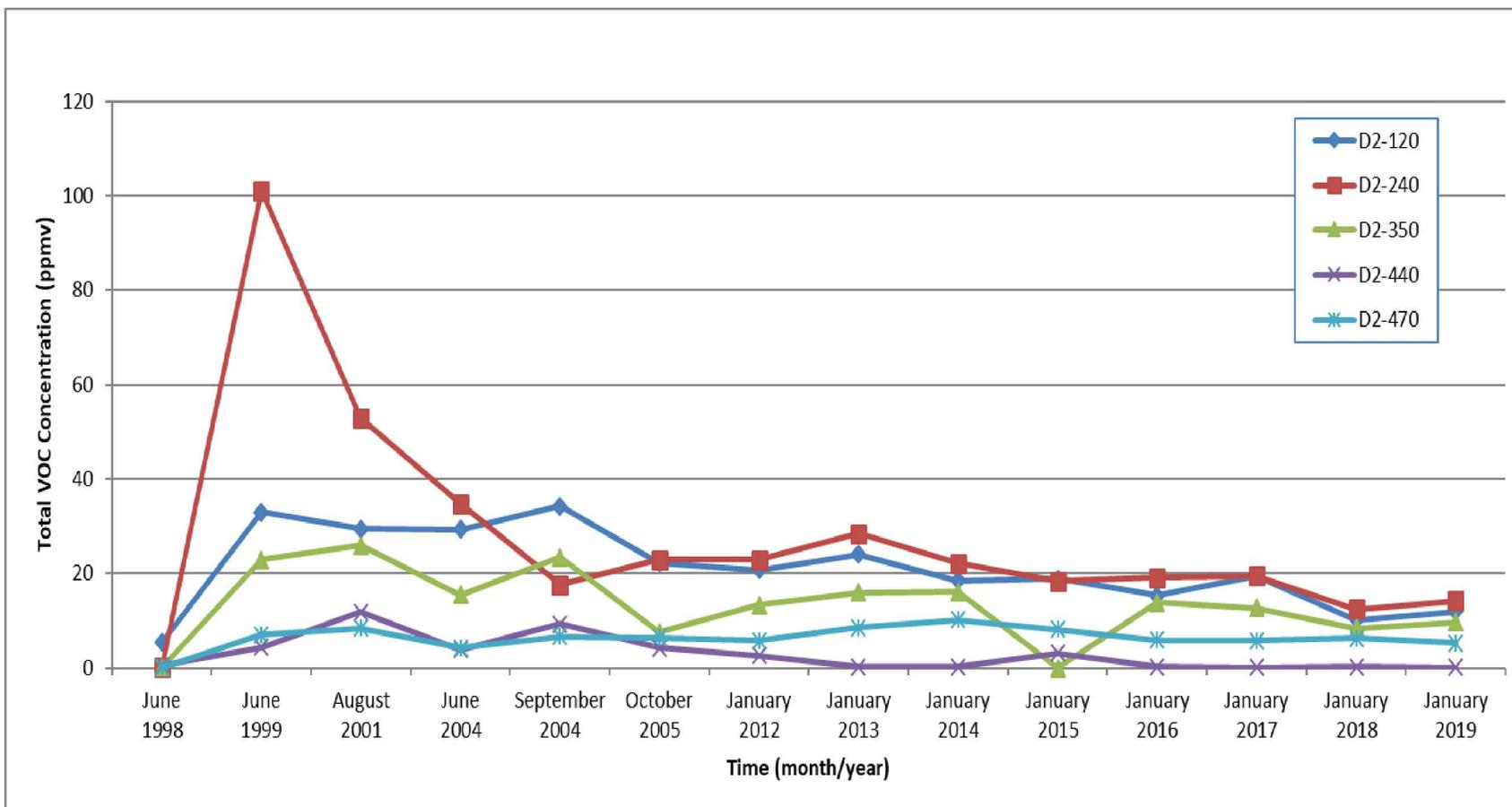


Figure 5-9  
 Historical Total Volatile Organic Compound Concentrations vs. Time  
 Chemical Waste Landfill Well D2 Ports

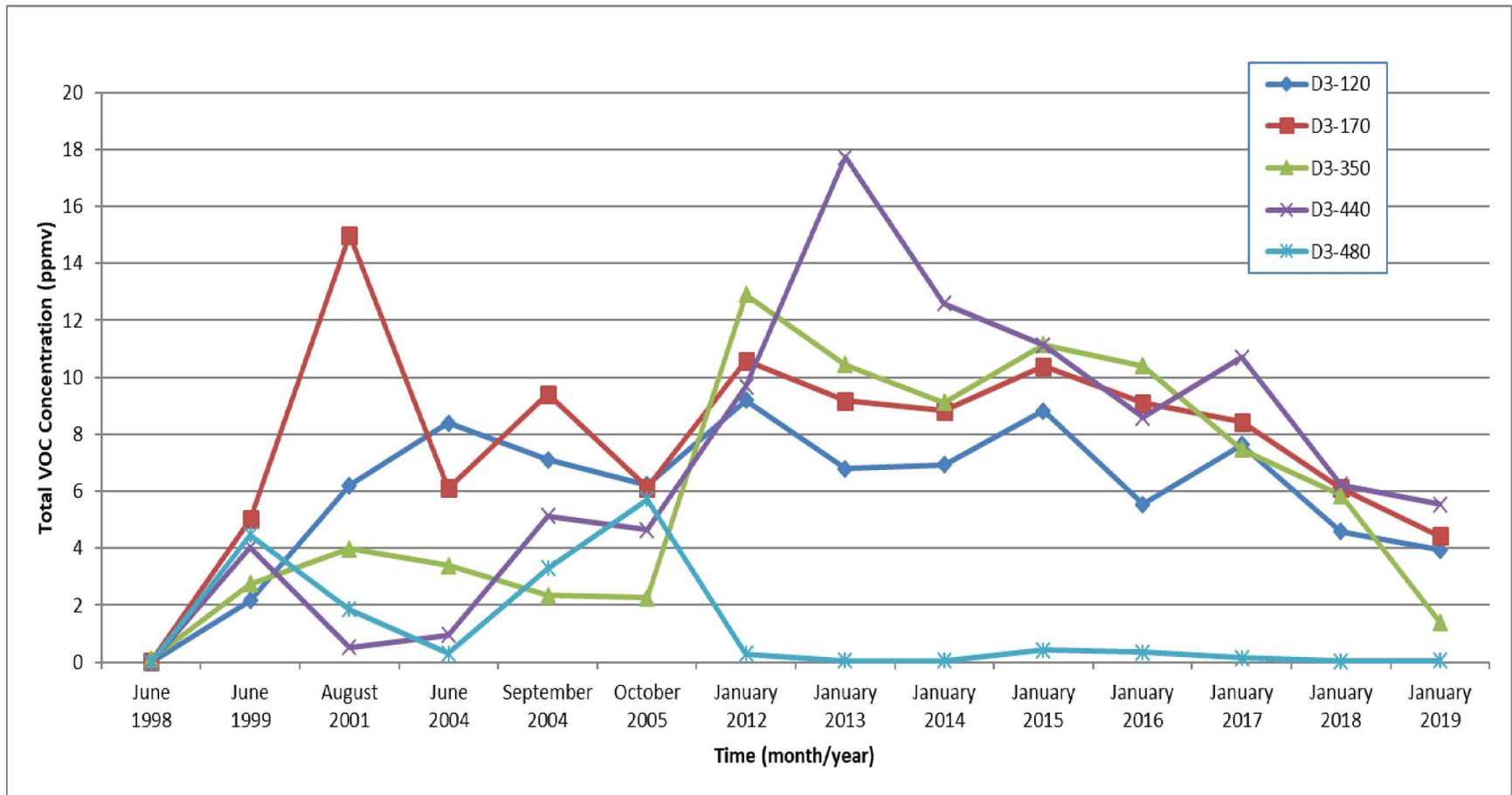


Figure 5-10  
 Historical Total Volatile Organic Compound Concentrations vs. Time  
 Chemical Waste Landfill Well D3 Port

## **6.0 INSPECTION, MAINTENANCE, AND REPAIR RESULTS**

This chapter presents a summary of CY 2019 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);
- Storm-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 2019 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**

The annual Biology Inspection of the ET Cover vegetation was conducted on September 5, 2019 by the SNL/NM staff biologist (Inspection Form in Annex C of this report). The inspection was conducted at the end of the New Mexico growing season for an accurate determination of living plants. The ET Cover continues to meet PCCP requirements for successful revegetation, with 30% total foliar coverage, of which 99 percent 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 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 2019 Chemical Waste Landfill Biology Report is presented in Annex D of this report and includes a summary of local climate trends, the successional development of the native grasses, ET Cover photographs, a summary of 2019 observations, and staff biologist recommendations.

### 6.1.2 Cover Inspection

Quarterly cover surface inspections were performed by a field technician on March 4, June 3, September 9, and December 3, 2019. During all but the September inspection, a staff biologist also performed a supplemental quarterly biology inspection as best practice. During September, the more detailed annual ET Cover biology inspection (see Section 6.1.1) and a quarterly cover inspection were performed independently. Based on the quarterly inspections the ET Cover surface and vegetation was in good condition throughout CY 2019 and no maintenance and/or repairs were required. Cover and site maintenance performed during CY 2019 by the ET Cover maintenance contractor is summarized in Section 6.6.

## 6.2 Storm-Water Diversion Structure Inspection

Quarterly inspections of storm-water diversion structures were performed by a field technician on March 4, June 3, September 9, and December 3, 2019 at the same time as the cover surface inspections. Minor maintenance performed during or after the inspections based on PCCP requirements is summarized below. No additional storm-water diversion structure inspection items or issues required repairs.

During the March, June, and December inspections, wind-blown tumbleweeds were identified in the drainage culverts along the southern perimeter. The debris was removed in March, June, and December 2019, respectively, within 60 days of the inspection as documented on the respective inspection forms. Removal was performed by the ET Cover maintenance contractor in March and by the field technician at the time of the inspection in June and December.

## 6.3 Monitoring Well Network Inspection

Semiannual inspection of the groundwater monitoring network and sampling equipment was performed by a field technician during the January and July 2019 monitoring events. In January, the annual inspection for the soil-gas monitoring wells and sampling equipment was also performed. In addition, the two wells and equipment involved in the March resampling event were inspected again. No inspection items or issues required repairs based on these inspections. BaroBall™ passive venting devices remain on all soil-gas and groundwater monitoring wells, and are in good condition.

Additional groundwater monitoring equipment inspections were performed prior to and after sampling each monitoring well during both semiannual events. Any observations and follow-up actions associated with these inspections are documented in Section 4.1.2. The January and March soil-gas monitoring events were each completed in one day.

## **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 on March 4, June 3, September 9, and December 3, 2019 at the same time as the cover surface inspections. Minor maintenance and/or repairs performed during or after the inspections based on PCCP requirements are summarized below. No additional inspection items or issues required repairs.

During the March, June, and December inspections, wind-blown tumbleweeds were identified on the perimeter fence. Removal was performed by the ET Cover maintenance contractor in April and by the field technician at the time of the inspection in June and December. All removals were performed within 60 days of the inspection and are documented on the respective Inspection Forms. Tumbleweed debris and sediment partially covering the western-most survey monument was removed by the field technician during the March, June, September, and December inspections. Sediment covering all four survey monuments was removed by the field technician during the December inspection.

## **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 2019 by the ET Cover maintenance contractor is summarized below. ET Cover maintenance continued in 2019 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 helps reduce the availability of weed seeds, future weed growth, and future maintenance efforts.

Maintenance was performed in response to inspections, general site conditions, and recommendations by the staff biologist. Inspection-required maintenance was minor and is described above; it involved manually clearing the perimeter fence and storm-water diversion features of wind-blown tumbleweed debris. The five maintenance events conducted in March/April, May, August, October/November, and December 2019 are described below and were mostly focused on best practice measures for the long-term goal of establishing healthy, self-sustaining native grasses on the ET Cover. This work included removal of live and dead weeds from the ET Cover and perimeter areas, applying preventive herbicides for invasive weed control, and providing supplemental water to the ET Cover after a weak monsoon season (i.e., low precipitation totals for July – September).

### ***March 25-April 4, 2019***

Wind-blown, dead weeds (primarily tumbleweeds) identified during the March 4, 2019 quarterly inspection were removed from the perimeter fence, the area between the fence and road on the south and west sides of the ET Cover, and all storm-water diversion features. A total of approximately 98 cubic yards (seven trailer loads) of highly compressed weeds were removed and disposed at the KAFB Landfill.

A pre-emergent herbicide (Surflan-water mixture) was applied following manufacturer's instructions to the 3-foot area outside the perimeter fence line; from the west perimeter fence to the west road; and to the entire ET Cover. The application was performed using a hand-sprayer attachment to apply the herbicide between the native grass clumps on the ET Cover and perimeter areas.

### ***May 6-20, 2019***

Wind-blown, dead weeds (primarily tumbleweeds) were removed from the perimeter fence, area between the fence and road on the south and west sides of the ET Cover, all storm-water diversion features, and the ET Cover by hand and/or using pitch forks and rakes. Prevalent live weeds were also removed from the ET Cover and 3-foot area outside the perimeter fence using the same methods. This best practice maintenance effort removed live and dead weeds and cleared the open spaces between the native grass clumps on ET Cover, providing more space for the living grass clumps. A total of approximately 44 cubic yards (three-full trailer loads) of highly compressed weeds were removed and disposed at the KAFB Landfill.

Due to the widespread live weed removal effort, a pre-emergent herbicide (Surflan-water mixture) was again applied following manufacturer's instructions to the 3-foot area outside the perimeter fence line and to the entire ET Cover to help minimize additional weed growth during the 2019 growing season.

### ***August 5-6, 2019***

Wind-blown, dead weeds (primarily tumbleweeds) were removed from the perimeter fence, area between the fence and road on the south and west sides of the ET Cover, all storm-water diversion features, and the ET Cover by hand and/or using pitch forks and rakes. Live weeds, primarily Russian thistle, were also removed from the ET Cover and 3-foot area outside the perimeter fence using the same method. The Russian thistle weeds were most prevalent on the western perimeter area. This best practice maintenance effort removed live and dead weeds and helped maintain the open spaces between the native grass clumps on ET Cover, providing more space for the living grass clumps and reducing competition for limited moisture and soil nutrients. A total of approximately 18 cubic yards (one-full trailer load) of highly compressed weeds were removed and disposed at the KAFB Landfill.

### ***October 14 – November 4, 2019***

Supplemental watering was performed on the ET Cover as a best practice based on site conditions and limited monsoonal moisture during July through September. A total of six

separate “0.5-inch watering events” were performed between October 14 and November 4, 2019. A calculated volume of water was applied at six locations using a mobile sprinkler system to ensure an even distribution of water across the ET Cover following the same process used in CY 2014 (SNL/NM March 2015) in accordance with the CWL PCCP, Attachment 1, Section 1.9.1.3. Each event was typically completed in one day, but two events required two days due to strong winds causing watering operations to shut down. This Fall watering promotes native grass root growth that will help the grasses through the Winter season and facilitate above-ground growth during the 2020 growing season.

***December 2-3, 2019***

Based on CY 2019 experience with early Winter invasive weed growth on the ET Cover, a pre-emergent herbicide (Prodiamine-water mixture) was applied to the entire ET Cover, the 3-foot area outside the perimeter fence, and the western perimeter area between the fence and the road. This work was recommended by the staff biologist as a preventive measure to reduce late Winter/early Spring invasive weed growth and CY 2020 ET Cover maintenance, and is part of CY 2019 best practice measures to promote the growth and health of the desired native grass species on the ET Cover.

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## **7.0 REGULATORY ACTIVITIES**

On June 2, 2011, the NMED approved closure of the CWL and the PCCP took effect (Kieling June 2011). Regulatory activities in CY 2019 consisted of two submittals of updated reference documents cited in the PCCP and submittal of the Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2018 (SNL/NM March 2019). These activities are summarized below in Section 7.2. NMED-approved permit modifications and other regulatory submittals since the PCCP became effective are summarized in Section 7.4.

### **7.1 2019 Permit Modification Requests**

There were no modifications to the CWL PCCP in the CY 2019 reporting period.

### **7.2 2019 Permit Submittals**

On May 8, 2019 and on November 8, 2019, DOE and NTESS submitted updated reference documents cited in the PCCP in accordance with the requirements of Attachment 2 (Section 2.0) and Attachment 3 (Section 3.9) of the PCCP (Harrell May and November 2019). Each submittal included two updated reference documents that were revised to keep the reference documents current and to reflect ongoing modifications and improvements in industry practices. The revised reference documents became effective on April 22 and October 17, 2019, respectively, and were submitted to the NMED within 30 days of the effective date.

DOE and NTESS submitted the Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2018 to NMED (SNL/NM March 2019). NMED approved the report on April 16, 2010 (Kieling April 2019).

### **7.3 2019 Technical Communication**

There were no technical communications with NMED staff regarding CWL activities in CY 2019.

### **7.4 Permit Modification and Submittal History**

Table 7-1 summarizes the modification history of the PCCP through CY 2019. Table 7-2 summarizes all submittals associated with the PCCP through CY 2019, not including routine annual reports.

Table 7-1  
 Chemical Waste Landfill Post-Closure Care Permit Modification History

Date of Modification <sup>a</sup>	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, Permit 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:

<sup>a</sup>Date 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<sup>a</sup>

Date of Submittal <sup>b</sup>	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.
February 8, 2018	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 8, 2019	Permit Attachments 2 & 3	Two operating procedures related to groundwater and soil-vapor monitoring activities were updated to include minor changes that do not affect sampling procedures or protocols.
November 8, 2019	Permit Attachments 2 & 3	Two operating procedures related to groundwater and soil-vapor monitoring activities were updated to include minor changes that do not affect sampling procedures or protocols.

Table 7-2 (*Concluded*)  
Chemical Waste Landfill Post-Closure Care Permit Document Submittal History<sup>a</sup>

Notes:

<sup>a</sup>This table does not include the submittal of routine CWL Annual Post-Closure Care Reports.

<sup>b</sup>Date represents the date stamp on the DOE transmittal letter for the submittal.

CWL = Chemical Waste Landfill.

DOE = U.S. Department of Energy.

PCCP = Post-Closure Care Permit.

SNL/NM = Sandia National Laboratories/New Mexico.

## **8.0 SUMMARY AND CONCLUSIONS**

A summary of CY 2019 activities and results is provided in this chapter, along with conclusions.

### **8.1 Groundwater and Soil-Gas Monitoring**

Semiannual groundwater monitoring events were conducted in January and July 2019. 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 were determined and are consistent with previous year's results.

One annual soil-gas monitoring event was conducted in January 2019 with resampling of two sampling ports at wells CWL-D1 (350 foot bgs sample port) and CWL-D3 (350 foot bgs sample port) in March 2019 due to quality issues with the corresponding January samples. There were no variances. Analytical and statistical assessment results are consistent with previous years. There were no exceedances of trigger levels. Eight years of soil-gas monitoring under the PCCP and previous monitoring conducted since completion of the VE VCM in July 1998 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 features and the perimeter fence, securing a loose warning sign, and clearing tumbleweeds and soil from survey monuments.

The ET Cover continues to meet successful revegetation criteria. As documented in the September 2019 annual inspection, the ET Cover is in good condition with even coverage of mature, native perennial grasses. CY 2019 ET Cover maintenance was performed in March/April, May, August, October/November, and December in response to the inspections and as best practice for ET Cover vegetation. CY 2019 ET Cover maintenance included selective herbicide application and removal of dead and live weeds from the ET Cover, perimeter areas, and all storm-water diversion features. The October/November ET Cover maintenance included only supplemental watering to support native grass root development during the Winter months after limited monsoonal moisture during July through September. The December maintenance included the application of a pre-emergent herbicide to the ET Cover and perimeter areas to reduce late Winter/early Spring invasive weed growth. The purpose of ongoing maintenance is to promote the growth and health of the desired native grass species on the ET Cover. Removal of live and dead weeds also helps reduce competition for limited moisture and nutrients, the availability of weed seeds, future weed growth, and future maintenance efforts.

### **8.3 Regulatory Activities**

Regulatory activities in CY 2019 included two submittals of updated reference documents cited in the PCCP (Harrell May and November 2019) and submittal of the Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2018 (SNL/NM March 2019).

### **8.4 Conclusions**

All PCCP monitoring, inspection, and maintenance/repair requirements have been met for CY 2019. 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 performing as designed and site conditions remain protective of human health and the environment. Industrial land use is being maintained for the CWL consistent with PCCP requirements.

## 9.0 REFERENCES

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**ANNEX A**

**Chemical Waste Landfill  
Calendar Year 2019  
Groundwater Monitoring Forms and Reports**

**Field Forms**

**Data Validation Reports**

**Contract Verification Reports**

**FIELD SAMPLING FORMS**  
**CHEMICAL WASTE LANDFILL**  
**POST-CLOSURE CARE GROUNDWATER MONITORING**

<b>Form Title</b>	<b>Corresponding Procedure</b>
Health & Safety Meeting Form	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 2019**  
**GROUNDWATER MONITORING**

### HEALTH & SAFETY MEETING FORM

Dept: 8888 Facility: ERFO bld. 9925 Date: 01/10/19 Time: 1000

Activities: Deconing Pump

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

Weather Conditions:

Temp: 48 °F Wind Speed: 3 MPH Humidity: 48 % Wind Chill: NA °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 type="checkbox"/> Wear safety boots	<input 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 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 Libson  
Printed Name

Robert Lynch  
Printed Name

Denisha Sanchez  
Printed Name

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Printed Name

Attendees

William Libson  
Signature

Robert Lynch  
Signature

Denisha Sanchez  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

#### Notes

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### HEALTH & SAFETY MEETING FORM

Dept: 8888 Facility: CWL-BW-5 Date: 01/14/19 Time: 0825

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

Weather Conditions:  
 Temp: 36 °F Wind Speed: 4 MPH Humidity: 87 % Wind Chill: 33 °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.

Robert Lynch  
 Printed Name  
William Gibson  
 Printed Name  
Denisha Sanchez  
 Printed Name  
 \_\_\_\_\_  
 Printed Name  
 \_\_\_\_\_  
 Printed Name  
 \_\_\_\_\_  
 Printed Name

Attendees

Robert Lynch  
 Signature  
William Gibson  
 Signature  
Denisha Sanchez  
 Signature  
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 Signature  
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 Signature  
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 Signature

#### Notes

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### HEALTH & SAFETY MEETING FORM

Dept: 8888 Facility: CWL-MW-9 Date: 01/15/19 Time: 0840

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

Weather Conditions:  
 Temp: 29 °F Wind Speed: 4 MPH Humidity: 90 % Wind Chill: 25 °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.

Robert Lynch  
 Printed Name

William Gibson  
 Printed Name

\_\_\_\_\_  
 Printed Name

\_\_\_\_\_  
 Printed Name

\_\_\_\_\_  
 Printed Name

\_\_\_\_\_  
 Printed Name

Attendees

Robert Lynch  
 Signature

William Gibson  
 Signature

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 Signature

#### Notes

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**HEALTH & SAFETY MEETING FORM**

Dept: 8888 Facility: CWL-MW-11 Date: 01/16/19 Time: 0814

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: 33 °F Wind Speed: 6 MPH Humidity: 94 % Wind Chill: 28 °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.

Robert Lynch  
Printed Name

Zad Teru  
Printed Name

Denisha Sanchez  
Printed Name

William Gibson  
Printed Name

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Printed Name

Attendees

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### HEALTH & SAFETY MEETING FORM

Dept: 8888 Facility: CWL-MW-10 Date: 01/18/19 Time: 0826

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: 44 °F Wind Speed: 12 MPH Humidity: 74 % Wind Chill: 37 °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.

Robert Lynch  
Printed Name

William Gibson  
Printed Name

Zach Terrio  
Printed Name

Duska Soy  
Printed Name

Printed Name

Printed Name

Attendees

[Signature]  
Signature

[Signature]  
Signature

[Signature]  
Signature

Signature

Signature

#### Notes

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**FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION**

Project Name: CWL		
Well I.D.: CWL-MW-9	Date: 01/15/19	
Method: Portable pump <input checked="" type="checkbox"/>	Dedicated pump <input type="checkbox"/>	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)
505.81	0857	Start							
507.87	0928	4	14.38	857.2	58.3	7.00	0.30	48.8	4.05
508.36	0952	8	15.10	877.9	51.0	7.02	0.32	45.4	3.72
508.47	1002	10	15.38	890.9	49.7	7.03	0.30	46.4	3.78
508.09	1014	12	15.57	899.4	49.4	7.03	0.51	47.8	3.87
508.68	1025	14	15.83	911.5	49.7	7.02	0.43	49.5	3.99
508.75	1037	16	15.97	917.3	50.3	7.02	0.37	50.3	4.05
508.78	1042	17	16.06	921.3	51.1	7.02	0.34	50.6	4.05
508.81	1047	18	16.12	924.1	51.6	7.02	0.28	51.3	4.11
508.84	1053	19	16.13	925.5	52.2	7.02	0.23	51.6	4.13
508.86	1058	20	16.08	924.9	52.8	7.02	0.24	51.6	4.14
508.88	1104	21	16.03	924.7	53.4	7.02	0.31	52.0	4.17
508.91	1109	22	16.06	926.3	53.9	7.02	0.28	52.4	4.20
	1110	SAMPLING							

Comments: ~1.5 gals purged from tubing 0905  
 FB-2 1090 DIW #003

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**FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION**

Project Name: CWL		
Well I.D.: CWL-MW-10	Date: 01/18/19 / 1/21/19	
Method: Portable pump <input checked="" type="checkbox"/>	Dedicated pump <input type="checkbox"/>	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)
502.71	0847	Start							
505.48	0915	2	11.67	822.3	86.6	7.09	1.72	36.5	2.84
507.13	0931	4	11.82	824.4	79.5	7.09	1.35	26.6	2.47
508.66	0946	6	11.53	821.2	75.1	7.12	1.65	25.5	2.32
510.13	1001	8	12.12	834.4	70.9	7.14	2.09	22.1	2.00
510.89	1009	9	12.56	844.9	69.8	7.15	1.94	25.5	2.27
511.74	1017	10	12.90	852.4	68.4	7.15	2.61	24.3	2.15
512.51	1024	11	13.14	857.2	66.6	7.15	2.97	23.5	2.06
513.49	1031	12	13.28	859.8	66.1	7.15	4.51	22.5	1.97
514.27	1043	13	12.42	838.2	65.5	7.15	5.31	21.7	1.94
515.04	1059	14	10.36	830.0	64.4	7.16	8.34	21.8	2.04
515.05	1100		well	DRY					
503.37	0848	START							
506.00	0940	2	14.63	906.65	13.5	7.12	87.73	36.26	2.59
507.48	1004	4	14.02	896.30	15.0	7.12	2.25	26.78	2.33
	1005	SAMPLE							

Comments: ~1.5 gals purged from tubing 0901 / 0911

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**FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION**

Project Name: CWL		
Well I.D.: CWL-MW-11	Date: 01/16/19	
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)
500.98	0829	Start							
504.26	0924	4	12.53	890.1	34.7	7.03	0.43	68.2	6.11
506.39	1000	8	14.02	926.5	41.4	7.05	0.49	68.3	5.93
507.31	1017	10	15.49	958.6	45.3	7.03	0.54	69.6	5.85
508.24	1036	12	16.80	993.5	49.3	7.01	0.54	71.7	5.86
509.18	1053	14	17.32	1000.6	53.2	7.01	0.66	71.3	5.77
510.13	1113	16	17.71	1010.7	56.8	7.00	0.57	71.2	5.72
510.92	1130	18	18.14	1019.7	59.3	7.00	0.77	71.02	5.65
511.40	1139	19	17.76	1005.2	53.0	7.00	0.72	70.37	5.59
511.87	1149	20	17.48	998.9	49.6	7.00	0.77	69.43	5.53
512.26	1158	21	16.89	997.6	29.1	7.00	0.68	64.0	5.23
512.45	1212	22	16.74	994.9	23.9	7.01	0.60	66.1	5.54
	1213	Sampling							
512.24	1220								

Comments: ~1.5 gals purged from tubing 0845  
 CWL- Q6/D1W 1090 # 75

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**GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG**

Page 1 of 2

SNL/NM Project Name: <b>CWL</b>						
Calibrations done by: <b>R Lynch</b>				Date: <b>01/14/19</b>		
Make & Model: <b>INSITU AT600</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>571017</b>						
Other (S/N): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>7.00</b>			pH sloped to (std): <b>10.00</b>			
Reference value:		4.00		7.00		10.00
	Value	Temp	Value	Temp	Value	Temp
1. Time:	<b>0640</b>	<b>4.01</b>	<b>19.2</b>	<b>7.02</b>	<b>20.0</b>	<b>10.04</b>
2. Time:	<b>1316</b>	<b>3.98</b>	<b>20.0</b>	<b>6.99</b>	<b>18.9</b>	<b>10.01</b>
3. Time:						
4. Time:						
Standard lot no.:	<b>8GG386</b>		<b>8GI848</b>		<b>8GF147</b>	
Expiration date:	<b>JUL/20</b>		<b>SEP/20</b>		<b>JUN/20</b>	
<b>SC Calibration/Check</b>						
Reference Value: <b>1413 uS/cm @ 25c</b>			Standard Lot No.: <b>8GH451</b>			
	Value	Temp	Expiration Date: <b>AUG/19</b>			
1. Time:	<b>0647</b>	<b>1252.1</b>	<b>19.0</b>			
2. Time:	<b>1324</b>	<b>1253.4</b>	<b>19.9</b>			
3. Time:						
4. Time:						
<b>ORP Calibration/Check</b>						
Reference Value: <b>220 mV</b>			Standard Lot No. <b>8GJ283</b>			
	Value	Temp	Expiration Date: <b>JUL/19</b>			
1. Time:	<b>0651</b>	<b>220.0</b>	<b>19.0</b>			
2. Time:	<b>1328</b>	<b>221.5</b>	<b>20.1</b>			
3. Time:						
4. Time:						
<b>DO Calibration/Check</b>						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	<b>0639</b>	<b>97.2</b>	<b>24.99</b>			
2. Time:	<b>1330</b>	<b>96.8</b>	<b>25.15</b>			
3. Time:						
4. Time:						

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

SNL/NM Project Name: <b>CWL</b>				
Calibration done by: <b>R Lynch</b>			Date: <b>01/14/19</b>	
TURBIDIMETER				
Make & Model: <b>HACH 2100Q</b>			Serial No. S/N <b>14060C033238</b>	
Reference Value	<b>10</b>	20	100	800
Standard Lot No.	<b>A6055</b>	<b>A6056</b>	<b>A6064</b>	<b>A6104</b>
1. Time <b>0640</b>	<b>10.1</b>	<b>20.1</b>	<b>99.6</b>	<b>796</b>
2. Time <b>1319</b>	<b>10.1</b>	<b>20.4</b>	<b>100</b>	<b>798</b>
3. Time				
4. Time				
Comments:				

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

SNL/NM Project Name: <b>CWL</b>						
Calibrations done by: <b>R Lynch</b>				Date: <b>01/15/19</b>		
Make & Model: <b>INSITU AT600</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>571017</b>						
Other (S/N): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>7.00</b>			pH sloped to (std): <b>10.00</b>			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: <b>0648</b>	<b>4.01</b>	<b>20.3</b>	<b>7.00</b>	<b>20.6</b>	<b>10.03</b>	<b>20.8</b>
2. Time: <b>1313</b>	<b>4.00</b>	<b>19.6</b>	<b>6.99</b>	<b>19.3</b>	<b>10.04</b>	<b>19.5</b>
3. Time:						
4. Time:						
Standard lot no.:	<b>8GG386</b>		<b>8GI848</b>		<b>8GF147</b>	
Expiration date:	<b>JUL/20</b>		<b>SEP/20</b>		<b>JUN/20</b>	
<b>SC Calibration/Check</b>						
Reference Value: <b>1413 uS/cm @ 25c</b>			Standard Lot No.: <b>8GH451</b>			
	Value	Temp	Expiration Date: <b>AUG/19</b>			
1. Time: <b>0642</b>	<b>1300.8</b>	<b>20.8</b>				
2. Time: <b>1318</b>	<b>1189.3</b>	<b>19.3</b>				
3. Time:						
4. Time:						
<b>ORP Calibration/Check</b>						
Reference Value: <b>220 mV</b>			Standard Lot No. <b>8GJ283</b>			
	Value	Temp	Expiration Date: <b>JUL/19</b>			
1. Time: <b>0644</b>	<b>221.1</b>	<b>20.6</b>				
2. Time: <b>1315</b>	<b>220.7</b>	<b>19.7</b>				
3. Time:						
4. Time:						
<b>DO Calibration/Check</b>						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time: <b>0640</b>	<b>98.2</b>		<b>24.53</b>			
2. Time: <b>1322</b>	<b>98.2</b>		<b>24.97</b>			
3. Time:						
4. Time:						

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

SNL/NM Project Name: <b>CWL</b>				
Calibration done by: <b>R Lynch</b>			Date: <b>01/15/19</b>	
TURBIDIMETER				
Make & Model: <b>HACH 2100Q</b>			Serial No. S/N <b>14060C033238</b>	
Reference Value	<b>10</b>	<b>20</b>	<b>100</b>	<b>800</b>
Standard Lot No.	<b>A6055</b>	<b>A6056</b>	<b>A6064</b>	<b>A6104</b>
1. Time <b>0640</b>	<b>9.98</b>	<b>19.8</b>	<b>100</b>	<b>790</b>
2. Time <b>1311</b>	<b>10.1</b>	<b>20.6</b>	<b>99.5</b>	<b>791</b>
3. Time				
4. Time				
Comments:				

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

SNL/NM Project Name: <b>CWL</b>						
Calibrations done by: <b>R Lynch</b>				Date: <b>01/16/19</b>		
Make & Model: <b>INSITU AT600</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>571017</b>						
Other (S/N): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>7.00</b>				pH sloped to (std): <b>10.00</b>		
Reference value:		4.00		7.00		10.00
	Value	Temp	Value	Temp	Value	Temp <sup>R</sup>
1. Time:	<b>0645</b>	<b>3.99</b>	<b>20.7</b>	<b>6.99</b>	<b>21.1</b>	<b>10.02</b>
2. Time:	<b>1448</b>	<b>4.01</b>	<b>20.9</b>	<b>7.01</b>	<b>20.8</b>	<b>10.03</b>
3. Time:						
4. Time:						
Standard lot no.:	<b>8GG386</b>		<b>8GI848</b>		<b>8GF147</b>	
Expiration date:	<b>JUL/20</b>		<b>SEP/20</b>		<b>JUN/20</b>	
<b>SC Calibration/Check</b>						
Reference Value: <b>1413 uS/cm @ 25c</b>				Standard Lot No.: <b>8GH451</b>		
	Value	Temp	Expiration Date: <b>AUG/19</b>			
1. Time:	<b>0635</b>	<b>1266.5</b>	<b>20.7</b>			
2. Time:	<b>1444</b>	<b>1269.0</b>	<b>21.0</b>			
3. Time:						
4. Time:						
<b>ORP Calibration/Check</b>						
Reference Value: <b>220 mV</b>				Standard Lot No. <b>8GJ283</b>		
	Value	Temp	Expiration Date: <b>JUL/19</b>			
1. Time:	<b>0637</b>	<b>220.2</b>	<b>20.9</b>			
2. Time:	<b>1452</b>	<b>221.1</b>	<b>20.6</b>			
3. Time:						
4. Time:						
<b>DO Calibration/Check</b>						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	<b>0632</b>	<b>94.5</b>	<b>25.38</b>			
2. Time:	<b>1441</b>	<b>95.8</b>	<b>25.41</b>			
3. Time:						
4. Time:						

1/16/19  
21.3

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

SNL/NM Project Name: <b>CWL</b>				
Calibration done by: <b>R Lynch</b>			Date: <b>01/16/19</b>	
TURBIDIMETER				
Make & Model: <b>HACH 2100Q</b>			Serial No. S/N <b>14060C033238</b>	
Reference Value	<b>10</b>	<b>20</b>	<b>100</b>	<b>800</b>
Standard Lot No.	<b>A6055</b>	<b>A6056</b>	<b>A6064</b>	<b>A6104</b>
1. Time <b>0632</b>	<b>10.1</b>	<b>20.0</b>	<b>101</b>	<b>792</b>
2. Time <b>1442</b>	<b>10.0</b>	<b>20.1</b>	<b>100</b>	<b>794</b>
3. Time				
4. Time				
Comments:				

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

SNL/NM Project Name: <b>CWL</b>						
Calibrations done by: <b>R Lynch / Z TENORIO</b>			Date: <b>01/18/19 / 01/21/19</b>			
Make & Model: <b>INSITU AT600</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>571017</b>						
Other (S/N): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>7.00</b>			pH sloped to (std): <b>10.00</b>			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: <b>0641</b>	<b>4.02</b>	<b>21.1</b>	<b>7.01</b>	<b>20.7</b>	<b>10.02</b>	<b>20.9</b>
2. Time: <b>1440</b>	<b>4.00</b>	<b>20.3</b>	<b>7.00</b>	<b>20.4</b>	<b>10.03</b>	<b>20.3</b>
3. Time: <b>0704</b>	<b>3.93</b>	<b>20.5</b>	<b>7.03</b>	<b>19.9</b>	<b>10.04</b>	<b>19.8</b>
4. Time: <b>1348</b>	<b>3.97</b>	<b>20.1</b>	<b>7.03</b>	<b>20.14</b>	<b>10.06</b>	<b>20.11</b>
Standard lot no.:	<b>8GG386</b>		<b>8GI848</b>		<b>8GF147</b>	
Expiration date:	<b>JUL/20</b>		<b>SEP/20</b>		<b>JUN/20</b>	
<b>SC Calibration/Check</b>						
Reference Value: <b>1413 uS/cm @ 25c</b>			Standard Lot No.: <b>8GH451</b>			
	Value	Temp	Expiration Date: <b>AUG/19</b>			
1. Time: <b>0638</b>	<b>1314.2</b>	<b>21.2</b>				
2. Time: <b>1451</b>	<b>1264.5</b>	<b>20.6</b>				
3. Time: <b>0659</b>	<b>1299.3</b>	<b>21.0</b>				
4. Time: <b>1153</b>	<b>1338.4</b>	<b>20.2</b>				
<b>ORP Calibration/Check</b>						
Reference Value: <b>220 mV</b>			Standard Lot No. <del><b>8GJ283</b></del> <sup>21</sup> <b>8GJ263</b>			
	Value	Temp	Expiration Date: <b>JUL/19</b>			
1. Time: <b>0636</b>	<b>219.8</b>	<b>20.8</b>				
2. Time: <b>1446</b>	<b>220.1</b>	<b>20.5</b>				
3. Time: <b>0700</b>	<b>219.0</b>	<b>20.5</b>				
4. Time: <b>1355</b>	<b>219.3</b>	<b>19.98</b>				
<b>DO Calibration/Check</b>						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time: <b>0635</b>	<b>98.8</b>		<b>25.82</b>			
2. Time: <b>1432</b>	<b>98.3</b>		<b>25.21</b>			
3. Time: <b>0658</b>	<b>92.3</b>		<b>25.37</b>			
4. Time: <b>1346</b>	<b>93.33</b>		<b>20.20</b>			

1/20/19

01/21/19

1/21/19

01/21/19

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

SNL/NM Project Name: <b>CWL</b>				
Calibration done by: <b>R Lynch / D. Sanchez</b>			Date: <b>01/18/19 / 01/21/19</b>	
TURBIDIMETER				
Make & Model: <b>HACH 2100Q</b>			Serial No. S/N <b>14060C033238</b>	
Reference Value	<b>10</b>	<b>20</b>	<b>100</b>	<b>800</b>
Standard Lot No.	<b>A6055</b>	<b>A6056</b>	<b>A6064</b>	<b>A6104</b>
1. Time	<b>0634</b>	<b>10.1</b>	<b>19.9</b>	<b>100</b>
2. Time	<b>0653</b>	<b>10.6</b>	<b>20.2</b>	<b>100</b>
3. Time	<b>0658</b>	<b>9.73</b>	<b>20.5</b>	<b>101</b>
4. Time	<b>1343</b>	<b>9.75</b>	<b>20.2</b>	<b>101</b>
Comments:				

1/21/19

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

Project Name: <u>CWL-PCCP</u>	Monitoring Well ID #: <u>NA</u>	Date: <u>01/10/19</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:  
 Robert Lynch  
 Print Name:

*WJG*  
 Initial:  
*RL*  
 Initial:

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

List of Decontamination Materials

Deionized Water	HNO <sub>3</sub>
Source: <u>Culligan</u>	Grade: <u>Reagent</u>
Lot Number: <u>10-17-18</u>	UN #: <u>2031</u>
	Manufacturer: <u>ACROS</u>
	Lot Number: <u>A0385545</u>

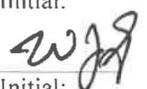
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**Portable Pump and Tubing / Water Level Indicator  
Decontamination Log Form**

Project Name: <u>CWL PCCP</u>	Monitoring Well ID #: <u>CWL-BW5</u>	Date: <u>01/14/19</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>210272</u>
--	---

<b><u>Personnel Performing Decontamination:</u></b>	
Robert Lynch Print Name: _____	 Initial: _____
William Gibson Print Name: _____	 Initial: _____

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

List of Decontamination Materials

<p align="center"><b>Deionized Water</b></p> <p>Source: <u>Culligan</u></p> <p>Lot Number: <u>10/17/18</u></p>	<p align="center"><b>HNO<sub>3</sub></b></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>
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**Portable Pump and Tubing / Water Level Indicator  
Decontamination Log Form**

<b>Project Name:</b> <u>CWL PCCP</u>	<b>Monitoring Well ID #:</b> <u>CWL-MW9</u>	<b>Date:</b> <u>01/15/19</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
<b>Pump and Tubing Bundle ID #:</b> <u>1806-640</u>	<b>Water Level Indicator ID #:</b> <u>210272</u>	
<b><u>Personnel Performing Decontamination:</u></b>		
<b>Robert Lynch</b> Print Name:	 Initial:	
<b>William Gibson</b> Print Name:		
<b>Condition of Equipment</b>		
<b>Pump:</b> <u>Excellent</u>	<b>Tubing Bundle:</b> <u>Excellent</u>	<b>Water Level Indicator:</b> <u>Good</u>
List of Decontamination Materials		
<b>Deionized Water</b>		<b>HNO<sub>3</sub></b>
<b>Source:</b> <u>Culligan</u>	<b>Grade:</b> <u>Reagent</u>	
<b>Lot Number:</b> <u>10/17/18</u>	<b>UN #:</b> <u>2031</u>	
	<b>Manufacturer:</b> <u>ACROS</u>	
	<b>Lot Number:</b> <u>A0358899</u>	

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

<b>Project Name:</b> <u>CWL-PCCP</u>	<b>Monitoring Well ID #:</b> <u>CWL-MW11</u>	<b>Date:</b> <u>01/16/19</u>
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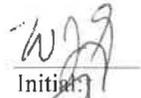
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03

<b>Pump and Tubing Bundle ID #:</b> <u>1806 -640</u>	<b>Water Level Indicator ID #:</b> <u>210272</u>
--	--

**Personnel Performing Decontamination:**

**William Gibson**

Print Name:

  
Initial: WG

**Robert Lynch**

Print Name:

  
Initial: RL

**Condition of Equipment**

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

**List of Decontamination Materials**

<p align="center"><b>Deionized Water</b></p> <p><b>Source:</b> <u>1090</u></p> <p><b>Lot Number:</b> <u>014,009,068,001,003,028,093,095,096,084,072,075</u></p>	<p align="center"><b>HNO<sub>3</sub></b></p> <p><b>Grade:</b> <u>Reagent</u></p> <p><b>UN #:</b> <u>2031</u></p> <p><b>Manufacturer:</b> <u>ACROS</u></p> <p><b>Lot Number:</b> <u>A0385545</u></p>
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Portable Pump and Tubing / Water Level Indicator  
Decontamination Log Form

Project Name: <u>CWL-PCCP</u>	Monitoring Well ID #: <u>CWL-MW10</u>	Date: <u>01/21/19</u>
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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>210272</u>
---	---

**Personnel Performing Decontamination:**

William Gibson Print Name:	 Initial:
Zach Tenorio Print Name:	 Initial:

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

List of Decontamination Materials	
<p><b>Deionized Water</b></p> <p>Source: <u>Culligan</u></p> <p>Lot Number: <u>01/14/19</u></p>	<p><b>HNO<sub>3</sub></b></p> <p>Grade: <u>Reagent</u></p> <p>UN #: <u>2031</u></p> <p>Manufacturer: <u>ACROS</u></p> <p>Lot Number: <u>A0385545</u></p>

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**SUMMARY SHEET FOR JANUARY 2019 SAMPLES**

**Sample Summary for Chemical Waste Landfill Groundwater Monitoring  
January 2019**

<b>Sample ID</b>	<b>Sample Date</b>	<b>ARCOC</b>	<b>Sample Number</b>	<b>Sample Type</b>	<b>Associated Equipment Blank (ARCOC #/Sample #)</b>	<b>Associated Trip Blank (ARCOC # / Sample #)</b>	<b>Associated Field Blank (ARCOC # / Sample #)</b>	<b>Comments</b>
<b>CWL GWM: Project Task # 195122.10.11.03. Service Order # CF 327-19</b>								
<b>Environmental Samples</b>								
CWL-BW5	14-Jan-19	619368	106910	Environmental	n/a	619368 / 106911	619368 / 106909	
CWL-MW9	15-Jan-19	619370	106915	Environmental	n/a	619370 / 106916	619370 / 106914	
CWL-MW10	21-Jan-19	619375	106926	Environmental	619377 / 106931	619375 / 106928	n/a	
CWL-MW10	21-Jan-19	619375	106927	Duplicate	619377 / 106931	619375 / 106928	n/a	
CWL-MW11	16-Jan-19	619372	106919	Environmental	n/a	619372 / 106920	n/a	
CWL-EB 1	16-Jan-19	619377	106931	Equipment Blank	n/a	619377 / 106932	n/a	Decon prior to CWL-MW10
CWL-FB 1	14-Jan-19	619368	106909	Field Blank	n/a	619368 / 106911	n/a	at CWL-BW5
CWL-FB 2	15-Jan-19	619370	106914	Field Blank	n/a	619370 / 106916	n/a	at CWL-MW9
CWL-DIW/QC	16-Jan-19	619374	106924	QC-DIW	n/a	619374 / 106925	n/a	DIW source for CWL-EB 1
<b>Waste Characterization Samples</b>								
CWL-BW5	14-Jan-19	619369	106912	Waste	n/a	619369 / 106913	n/a	No data validation required
CWL-MW9	15-Jan-19	619371	106917	Waste	n/a	619371 / 106918	n/a	No data validation required
CWL-MW10	21-Jan-19	619376	106929	Waste	n/a	619376 / 106930	n/a	No data validation required
CWL-MW11	16-Jan-19	619373	106922	Waste	n/a	619373 / 106923	n/a	No data validation required

**DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES**

**CHEMICAL WASTE LANDFILL**

**GROUNDWATER MONITORING**

**JANUARY 2019**

**AR/COC NUMBERS 619368, 619370, 619372, 619374, 619377**

## Memorandum

Date: February 15, 2019  
To: File  
From: Linda Thal  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: CWL PCCP  
ARCO: 619368, 619370, 619372, 619374 and 619377  
SDG: 468919  
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**

Twelve 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 and Preservation**

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 analytes were 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**

Five TBs were submitted, one for each ARCO. FB 1 and FB 2 were submitted with ARCOs 619368 and 619370 and were associated with the samples on their respective ARCOs. EB 1 was submitted with ARCO 619377 and was associated with the samples on ARCO 619375 submitted in another SDG. A deionized water sample, the source water for EB 1, was submitted with ARCO 619374 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:** 02/18/19

## Memorandum

Date: February 15, 2019  
To: File  
From: Linda Thal  
Subject: Inorganic Data Review and Validation – SNL  
Site: CWL PCCP  
ARCOG: 619368, 619370, 619372, 619374 and 619377  
SDG: 468919  
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**

Five 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.

### **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 Ca concentrations for samples 468919003, -007 and -010 were > those in the ICS A and AB solutions. All QC acceptance criteria were met.

### **ICP Serial Dilution**

The serial dilution met all QC acceptance criteria.

### **Other QC**

EB 1 was submitted with ARCOG 619377 and was associated with the samples on ARCOG 619375 submitted in another SDG. A deionized water sample, the source water for EB 1, was submitted with ARCOG 619374 and was not associated with any field samples.

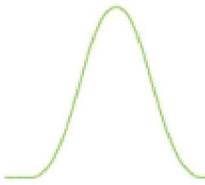
No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donovan

**Level:** I

**Date:** 02/18/19

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## Sample Findings Summary



AR/COC: 619368, 619370, 619372, 619374, 619377

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#: 619368, 619370, 619372, 619374 and 619377	Site/Project: CWL PCCP	Validation Date: 02/15/2019
SDG #: 468919	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 17	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: Collected: 01/14 through 01/16/2019  
 ARCOG 619377 has an EB associated with samples on ARCOG 619375 in another SDG

Validated by:

*L Thal*





# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. <i>N/A</i>	SMO Use	<b>AR/COC</b>	<b>619368</b>
Project Name: CWL PCCP	Date Samples Shipped: <i>1/14/19</i>	SMO Authorization: <i>[Signature]</i>	
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. <i>292538</i>	SMO Contact Phone: <i>[Signature]</i>	
Project/Task Number: 195122.10.11.03	Lab Contact: Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	
Service Order: CF327-19	Lab Destination: GEL	Send Report to SMO: <input type="checkbox"/> 4° Celsius	
	Contract No.: 1303873	Stephanie Montaño/505-284-2553	

Bill to: Sandia National Laboratories (Accounts Payable),  
P.O. Box 5800, MS-0154  
Albuquerque, NM 87185-0154 *468919*

Tech Area:	Building:	Room:	Operational Site:
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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					
106909	001	CWL-FB 1	NA	1/14/19 10:53	DIW	G	3x40 ml	HCl	G	FB	VOC-TCE (SW846-8260B)	001
106910	001	CWL-BW5	522	1/14/19 10:53	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	002
106910	002	CWL-BW5	522	1/14/19 10:55	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	003
106911	001	CWL-TB 1	NA	1/14/19 10:53	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	004

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>[Init.]</i>	SNL/08888/505-844-4013/505-250-7090	Return Samples By: Comments: Report CWL enhanced list of compounds (chloroform, 1,1-DCE, PCE, TCE, Freon 11, and Freon 113) for environmental samples. Waste characterizations samples submitted on separate ARCO. Received trip blanks from lab for VOC, TCE with bubbles.
	William Gibson	<i>[Signature]</i>	<i>[Init.]</i>	SNL/08888/505-284-3307/505-239-7367	
	Denisha Sanchez	<i>[Signature]</i>	<i>[Init.]</i>	SNL/08888/505-845-7829/505-208-1375	

Relinquished by <i>[Signature]</i> Org. <i>8888</i> Date <i>1/14/19</i> Time <i>1125</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i> Org. <i>00642</i> Date <i>1/14/19</i> Time <i>1125</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i> Org. <i>00642</i> Date <i>1/14/19</i> Time <i>1205</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i> Org. <i>00642</i> Date <i>1-15-19</i> Time <i>0920</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

Page 1 of 1

Batch No. <i>N/A</i>	SMO Use		AR/COC <b>619370</b>
Project Name: CWL PCCP	Date Samples Shipped: <i>1/15/19</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"/> <b>4° Celsius</b>
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. <i>292603</i>	SMO Contact Phone: <i>[Signature]</i> <i>SMO</i>	
Project/Task Number: 195122.10.11.03	Lab Contact: Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	
Service Order: CF327-19	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 <i>402919</i>

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								
106914	001	CWL-FB 2	NA	1/15/19	11:10	DIW	G	3x40 ml	HCl	D	FB	VOC-TCE (SW846-8260B)	<i>005</i>
106915	001	CWL-MW9	517	1/15/19	11:10	GW	G	3x40 ml	HCl	D	SA	VOC-TCE (SW846-8260B)	<i>006</i>
106915	002	CWL-MW9	517	1/15/19	11:12	GW	P	500 ml	HNO3	D	SA	CHROMIUM, NICKEL (SW846-6020)	<i>007</i>
106916	001	CWL-TB 4	NA	1/15/19	11:10	DIW	G	3x40 ml	HCl	D	TB	VOC-TCE (SW846-8260B)	<i>008</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 initials:		Negotiated TAT <input type="checkbox"/>		
<b>Sample Team Members</b>	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/08888/505-844-4013/505-250-7090	Return Samples By: Comments: Report CWL enhanced list of compounds (chloroform, 1,1-DCE, PCE, TCE, Freon 11, and Freon 113) for environmental samples. Waste characterizations samples submitted on separate ARCO. Received trip blanks from lab for VOC, TCE with bubbles.
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/08888/505-284-3307/505-239-7367	
					Lab Use

Relinquished by <i>[Signature]</i>	Org. <i>8888</i> Date <i>1/15/19</i> Time <i>1150</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>00642</i> Date <i>1/15/19</i> Time <i>1150</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org. <i>00642</i> Date <i>1/15/19</i> Time <i>1230</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. Date <i>1-16-19</i> Time <i>735</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 <b>619372</b>	
Project Name: CWL PCCP		Date Samples Shipped: <i>1/17/19</i>		SMO Authorization: <i>[Signature]</i>	
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>292775</i>		SMO Contact Phone: <i>Wendy Palencia/505-844-3132</i>	
Project/Task Number: 195122.10.11.03		Lab Contact: Edie Kent/843-769-7385		Send Report to SMO: <input checked="" type="checkbox"/> 4° Celsius	
Service Order: CF327-19		Lab Destination: GEL		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	
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					
106919	001	CWL-MW11	513	1/16/19	12:13	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	<i>009</i>
106919	002	CWL-MW11	513	1/16/19	12:15	GW	P	500 ml	HNO3	G	SA	CHROMIUM NICKEL (SW846-6020)	<i>010</i>
106920	001	CWL-TB 6	NA	1/16/19	12:13	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	<i>011</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/08888/505-844-4013/505-250-7090		Return Samples By: Comments: Report CWL enhanced list of compounds (chloroform, 1,1-DCE, PCE, TCE, Freon 11, and Freon 113) for environmental samples. Waste characterizations samples submitted on separate ARCO. Received trip blanks from lab for VOC, TCE with bubbles.	
	William Gibson		<i>[Signature]</i>		<i>WG</i>		SNL/08888/505-284-3307/505-239-7367			
	Zachary Tenorio		<i>[Signature]</i>		<i>ZT</i>		SNL/08888/505-845-8636/505-259-5765			
Denisha Sanchez		<i>[Signature]</i>		<i>DS</i>		SNL/08888/505-845-7829/505-208-1375				
Relinquished by <i>[Signature]</i>		Org. <i>8888</i>		Date <i>1/16/19</i>		Time <i>1400</i>		Relinquished by		
Received by <i>[Signature]</i>		Org. <i>00612</i>		Date <i>1/16/19</i>		Time <i>1400</i>		Received by		
Relinquished by <i>[Signature]</i>		Org. <i>00642</i>		Date <i>1/17/19</i>		Time <i>0905</i>		Relinquished by		
Received by <i>[Signature]</i>		Org.		Date <i>1-18-19</i>		Time <i>0730</i>		Received by		

\*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. <u>114</u>		SMO Use		AR/COC <b>619377</b>	
Project Name: CWL PCCP		Date Samples Shipped: <u>1/17/19</u>		SMO Authorization: <u>[Signature]</u>	
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <u>292775</u>		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: CF327-19		Lab Destination: GEL		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> <b>4° Celsius</b>	
Tech Area:		Contract No.: 1303873		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					
106931	001	CWL-EB 1	NA	1/16/19	13:42	DIW	G	3x40 ml	HCl	G	EB	VOC-TCE (SW846-8260B)	015
106931	002	CWL-EB 1	NA	1/16/19	13:43	DIW	P	500 ml	HNO3	G	EB	CHROMIUM, NICKEL (SW846-6020)	016
106932	001	CWL-TB 8	NA	1/16/19	13:42	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	017

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:		Entered by:		EDD <input checked="" type="checkbox"/> Yes					
Background: <input type="checkbox"/> Yes		QC inits.:		Turnaround Time		<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day					
Confirmatory: <input type="checkbox"/> Yes		Negotiated TAT		Return Samples By:		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab					
Sample Team Members	Name		Signature		Init.		Company/Organization/Phone/Cell		Sample Disposal		Lab Use
	Robert Lynch		<u>[Signature]</u>		RL		SNL/08888/505-844-4013/505-250-7090		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		
	William Gibson		<u>[Signature]</u>		WG		SNL/08888/505-284-3307/505-239-7367		Comments: Report CWL enhanced list of compounds (chloroform, 1,1-DCE, PCE, TCE, Freon 11, and Freon 113) for environmental samples. Received trip blanks from lab for VOC,TCE with bubbles.		
	Zachary Tenorio		<u>[Signature]</u>		ZT		SNL/08888/505-845-8636/505-259-5765				
Denisha Sanchez		<u>[Signature]</u>		DS		SNL/08888/505-845-7829/505-208-1375					
Relinquished by <u>[Signature]</u>		Org. <u>8058</u>		Date <u>1/16/19</u>		Time <u>1400</u>		Relinquished by		Org. Date Time	
Received by <u>[Signature]</u>		Org. <u>00642</u>		Date <u>1/16/19</u>		Time <u>1400</u>		Received by		Org. Date Time	
Relinquished by <u>[Signature]</u>		Org. <u>00642</u>		Date <u>1/17/19</u>		Time <u>0905</u>		Relinquished by		Org. Date Time	
Received by <u>[Signature]</u>		Org. <u> </u>		Date <u>1/18/19</u>		Time <u>730</u>		Received by		Org. Date Time	

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

**AR/COC NUMBER 619375**

## Memorandum

Date: February 20, 2019  
To: File  
From: Mary Donovan  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: CWL PCCP  
ARCO: 619375  
SDG: 469479  
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 and Preservation**

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 analytes were 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 the ARCOG. EB 1 was submitted with ARCOG 619377 in another SDG and was associated with the samples on ARCOG 619375. A field duplicate pair was submitted with ARCOG 619375. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 02/20/2019

## Memorandum

Date: February 20, 2019  
To: File  
From: Mary Donovan  
Subject: Inorganic Data Review and Validation – SNL  
Site: CWL PCCP  
ARCOG: 619375  
SDG: 469479  
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 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 laboratory 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 Ca concentrations for samples 469479002 and -004 were > those in the ICS A and AB 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 analysis was performed on an SNL sample of similar matrix from another SDG. No data will be qualified.

### **Other QC**

EB 1 was submitted with ARCOG 619377 in another SDG and was associated with the samples on ARCOG 619375. A field duplicate pair was submitted with ARCOG 619375. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

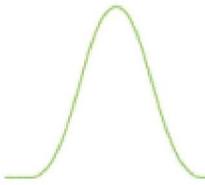
No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 02/20/2019

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## Sample Findings Summary



AR/COC: 619375

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#: 619375	Site/Project: CWL PCCP	Validation Date: 02/20/2019
SDG #: 469479	Laboratory: GEL Laboratories, LLC	Validator: Mary Donovan
Matrix: Aqueous	# of Samples: 5	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: Collected: 01/21/2019

The EB associated with the samples on this ARCOG was submitted on ARCOG 619377 in another SDG.

1 vial for sample 469479005 (106928-001) was received with headspace.

Validated by:

*Mary A. Donovan*







**CONTRACT VERIFICATION REVIEW FORMS**  
**CHEMICAL WASTE LANDFILL**  
**GROUNDWATER MONITORING**  
**JANUARY 2019**

Note: The review forms in this section include AR/COC numbers for environmental and quality control samples; the AR/COC forms are provided in the Data Validation Section of this annex.

<b>AR/COC Number</b>	<b>Sample Type</b>
619368	Environmental
619370	Environmental
619372	Environmental
619375	Environmental
619374	Quality Control
619377	Quality Control

## Contract Verification Form (CVR)

**Project Leader** Jackson

**Project Name** CWL PCCP **Project/Task No.** 195122\_10.11.03

**ARCOC No.** 619368, 619370, 619372, 619374 & 619377

**Analytical Lab** GEL

**SDG No.** 468919

*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 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)	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	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
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Were deficiencies unresolved?  Yes  No

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

Reviewed by: Wendy Palencia Date: 02-14-2019 14:34:00

Closed by: Wendy Palencia Date: 02-14-2019 14:34:00

## Contract Verification Form (CVR)

**Project Leader** Jackson

**Project Name** CWL PCCP

**Project/Task No.** 195122\_10.11.03

**ARCOC No.** 619375

**Analytical Lab** GEL

**SDG No.** 469479

*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		1 of the 3 vials received with headspace for sample 106928-001

### 2.0 Analytical Laboratory Report

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

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	X		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	X		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	X		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	X		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	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	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
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Were deficiencies unresolved?  Yes  No

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

Reviewed by: Wendy Palencia Date: 02-20-2019 09:27:00

Closed by: Wendy Palencia Date: 02-20-2019 09:27:00

**FIELD SAMPLING FORMS**

**JULY 2019**

**GROUNDWATER MONITORING**

### HEALTH & SAFETY MEETING FORM

Dept: 8888 Facility: 9925 Date: 07/10/19 Time: 0835

Activities: Pre Decon

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

Weather Conditions:

Temp: 72 °F Wind Speed: 12 MPH Humidity: 19 % 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 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.

#### Attendees

Zachary Terorio  
Printed Name

Robert Lynch  
Printed Name

William Gibson  
Printed Name

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Printed Name

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[Signature]  
Signature

[Signature]  
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#### Notes

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### HEALTH & SAFETY MEETING FORM

Dept: 08555 Facility: SWL - Basecircle Date: 7/11/19 Time: 0906

Activities: CWL - BWS Sample + Purge  
 (Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:  
 Temp: 79 °F Wind Speed: 15 MPH Humidity: 47 % Wind Chill: 80 °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 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.

Denisha Sanchez  
 Printed Name  
Robert Lynch  
 Printed Name  
Zach Tewari  
 Printed Name  
William Gibson  
 Printed Name  
 \_\_\_\_\_  
 Printed Name  
 \_\_\_\_\_  
 Printed Name

Attendees

Denisha Sanchez  
 Signature  
Robert Lynch  
 Signature  
Zach Tewari  
 Signature  
William Gibson  
 Signature  
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 Signature  
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 Signature

Notes

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### HEALTH & SAFETY MEETING FORM

Dept: 8888

Facility: CWL-MW-9

Date: 07/15/19

Time: 0820

Activities: Groundwater Monitoring and Sampling

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

Weather Conditions:

Temp: 74 °F

Wind Speed: 7 MPH

Humidity: 55 %

Wind Chill: 74 °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.

Robert Lynch  
Printed Name

Denisha Sanchez  
Printed Name

Zach Tewora  
Printed Name

William Gibson  
Printed Name

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Printed Name

Attendees

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[Signature]  
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[Signature]  
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Signature

#### Notes

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\_\_\_\_\_

**HEALTH & SAFETY MEETING FORM**

Dept: 8888 Location: CWL-MW-11 Date: 07/16/19 Time: 0820

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

Weather Conditions:  
 Temp: 79 °F Wind Speed: 2 MPH Humidity: 41 % Wind Chill: 79 °F

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

**Hazards and Controls**

<input checked="" type="checkbox"/> Wear appropriate eye protection.	<input type="checkbox"/> Wear leather gloves.	<input type="checkbox"/> Wear hearing protection.
<input checked="" type="checkbox"/> Wear safety boots.	<input checked="" type="checkbox"/> Wear latex or nitrile gloves.	<input checked="" type="checkbox"/> Wear communication device (radio, cell phone, EOC alert enabled device).
<input checked="" type="checkbox"/> Use safe lifting practices.	<input checked="" type="checkbox"/> No eating or drinking onsite/when sampling.	<input checked="" type="checkbox"/> Eye wash is present.
<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"/> Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.
<input checked="" type="checkbox"/> Be aware of electrical hazards.	<input checked="" type="checkbox"/> Be aware of pinch points (cable reel, hydraulic lift gate).	<input type="checkbox"/> Avoid spilling leachate/purge or decon water.
<input checked="" type="checkbox"/> Be aware of pressure hazards.	<input checked="" type="checkbox"/> Be aware of chemical hazards.	<input type="checkbox"/> Practice ALARA and wear TLD when using neutron probe.
<input type="checkbox"/> Other (list):	<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.

Rober Lynch  
 Printed Name  
Denisha Sanchez  
 Printed Name  
William Gibson  
 Printed Name  
Zach Terrio  
 Printed Name  
 \_\_\_\_\_  
 Printed Name  
 \_\_\_\_\_  
 Printed Name

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

**Notes**

**HEALTH & SAFETY MEETING FORM**

Dept: 8888 Location: CWL-MW-10 Date: 07/17/19 Time: 0830

Activities: Groundwater Monitoring and Sampling 07/19/19 0836  
 (Anyone has the right to cease field activities for safety concerns. The buddy system will be used when needed.)

Weather Conditions:  
 Temp: 72 °F Wind Speed: 5 MPH Humidity: 66 % Wind Chill: 72 °F

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

**Hazards and Controls**

<input checked="" type="checkbox"/> Wear appropriate eye protection.	<input type="checkbox"/> Wear leather gloves.	<input type="checkbox"/> Wear hearing protection.
<input checked="" type="checkbox"/> Wear safety boots.	<input checked="" type="checkbox"/> Wear latex or nitrile gloves.	<input checked="" type="checkbox"/> Wear communication device (radio, cell phone, EOC alert enabled device).
<input checked="" type="checkbox"/> Use safe lifting practices.	<input checked="" type="checkbox"/> No eating or drinking onsite/when sampling.	<input checked="" type="checkbox"/> Eye wash is present.
<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"/> Be aware of environmental conditions (heat/cold stress). Dress accordingly. Wear sunscreen if necessary. Stay hydrated.
<input checked="" type="checkbox"/> Be aware of electrical hazards.	<input checked="" type="checkbox"/> Be aware of pinch points (cable reel, hydraulic lift gate).	<input type="checkbox"/> Avoid spilling leachate/purge or decon water.
<input checked="" type="checkbox"/> Be aware of pressure hazards.	<input checked="" type="checkbox"/> Be aware of chemical hazards.	<input type="checkbox"/> Practice ALARA and wear TLD when using neutron probe.
<input type="checkbox"/> Other (list):	<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  
Zach Tenorio  
 Printed Name  
William Gibson  
 Printed Name  
Robert Lynch  
 Printed Name  
Zach Tenorio  
 Printed Name  
William Gibson  
 Printed Name  
Deasha Sanchez  
 Printed Name

Attendees  
Robert Lynch  
 Signature  
Zach Tenorio  
 Signature  
William Gibson  
 Signature  
Robert Lynch  
 Signature  
Zach Tenorio  
 Signature  
William Gibson  
 Signature  
Deasha Sanchez  
 Signature

Notes

07/19/19

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**FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION**

Project Name: CWL	
Well I.D.: CWL-MW-9	Date: 07/15/19
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)
505.91	0832	Start							
508.31	0909	5	22.54	957.50	139.1	7.06	0.45	59.15	4.52
508.85	0924	8	22.40	925.09	133.1	7.12	0.30	57.96	4.40
509.10	0934	10	22.44	939.03	132.2	7.05	0.24	54.27	4.15
509.28	0944	12	22.54	931.18	129.5	7.04	0.30	56.74	4.32
509.46	0953	14	22.44	959.10	127.6	7.07	0.28	58.88	4.59
509.55	0958	15	22.46	954.05	127.0	7.04	0.38	57.47	4.33
509.61	1003	16	22.44	977.29	126.3	7.04	0.31	57.86	4.37
509.66	1008	17	22.46	976.48	126.0	7.04	0.27	58.21	4.46
509.70	1014	18	22.68	983.73	124.1	7.04	0.25	58.28	4.52
509.78	1019	19	22.81	987.40	124.1	7.03	0.22	59.41	4.44
509.78	1024	20	22.82	981.28	124.0	7.02	0.26	59.91	4.53
982.88 509.78	1028	21	22.87	982.88	122.9	7.03	0.21	58.93	4.57
	1029	Sampling							

Comments: ~1.5 gals purged from tubing 0842

QC Lot # 061319

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**FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION**

Project Name: CWL		
Well I.D.: CWL-MW-10	Date: 07/17/19	
Method: Portable pump <input checked="" type="checkbox"/>	Dedicated pump <input type="checkbox"/>	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)
502.90	0847	Start	---	---	---	---	---	---	---
505.67	0922	2	24.04	1099.8	143.2	7.01	1.49	45.87	3.37
507.28	0943	4	24.84	1110.6	133.5	7.01	1.19	39.61	2.86
508.79	1001	6	24.40	1083.1	124.1	7.01	0.97	34.07	2.49
510.36	1019	8	24.11	1061.6	112.8	7.02	1.35	30.59	2.24
511.80	1034	10	24.25	1052.9	100.5	7.02	1.87	29.64	2.16
512.72	1043	11	24.23	1027.5	91.2	7.02	2.15	28.73	2.10
513.67	1052	12	24.34	1024.9	83.9	7.02	3.36	27.41	2.00
514.41	1108	13	26.37	1068.1	76.4	7.01	3.25	28.18	1.98
515.07	1122	13.78	27.23	1067.3	76.3	7.01	3.44	29.10	2.01
515.07	1122	well	DRY	→					
504.52	0851	START	→						
506.50	0912	1	27.60	1241.5	16.9	6.94	2.50	56.21	3.77
507.43	0919	2	25.99	1195.2	-6.7	6.96	2.48	32.19	2.26
508.26	0926	3	25.20	1174.6	-11.1	6.96	2.65	27.69	1.97
	0927	Sampling →							

Comments: ~ 1.5 gals purged from tubing 0904  
 0907 07/19/19  
 FB Lot # 062119

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**FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION**

Project Name: CWL		
Well I.D.: CWL-MW-11	Date: 07/16/19	
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. (Lgal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO (mg/L)
50.03	0836	Start	— —	— —	— —	— —	— —	— —	— —
505.12	0940	5	25.13	1121.8	138.5	7.00	0.69	83.39	6.05
506.75	1007	8	24.76	1139.9	137.5	7.01	0.85	82.34	6.02
507.63	1023	10	24.30	1139.3	136.7	7.01	0.85	81.16	6.00
508.65	1038	12	24.25	1131.3	135.5	7.02	0.90	81.48	5.99
509.68	1054	14	24.22	1189.2	135.1	7.01	0.79	79.55	5.87
510.71	1111	16	24.42	1135.1	133.8	7.01	0.78	79.62	5.86
511.19	1120	17	24.74	1135.4	-60.3	7.01	0.81	76.72	5.60
511.44	1134	18	25.71	1134.4	-75.5	7.00	1.29	76.00	5.44
511.67	1150	19	26.48	1138.0	-80.5	6.99	1.10	73.24	5.18
511.90	1205	20	26.83	1136.4	-3.2	7.03	0.88	79.56	5.59
511.98	1213	21	26.93	1134.2	13.7	7.01	1.03	86.14	6.12
512.04	1224	22	26.99	1134.0	29.6	7.00	1.65	86.20	6.00
	1225	Sampling →							

Comments: ~ 1.5 gals purged from tubing 0854

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

SNL/NM Project Name: <b>CWL</b>						
Calibrations done by: <b>Z. Tenorio</b>				Date: <b>07/11/19 - 07/12/19</b>		
Make & Model: <b>AquaTroll 600</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>571025</b>						
Other (S/N): _____						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>7.00</b>			pH sloped to (std): <b>10.00</b>			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: <b>0630</b>	4.00	25.39	7.00	25.47	10.02	25.41
2. Time: <b>0732</b>	4.00	23.85	7.00	23.86	10.00	23.92
3. Time:						
4. Time:						
Standard lot no.:	8GB303		9GB038		8GB459	
Expiration date:	FEB/21		FEB/21		FEB/21	
<b>SC Calibration/Check</b>						
Reference Value: <b>1413uS/cm @ 25 c</b>			Standard Lot No.: <b>8GB450</b>			
	Value	Temp	Expiration Date: <b>FEB/20</b>			
1. Time: <b>0635</b>	1429.0	25.56				
2. Time: <b>0725</b>	1384.0	24.40				
3. Time:						
4. Time:						
<b>ORP Calibration/Check</b>						
Reference Value: <b>220 mV</b>			Standard Lot No. <b>9GC752</b>			
	Value	Temp	Expiration Date: <b>Aug/19</b>			
1. Time: <b>0638</b>	220.0	25.56				
2. Time: <b>0720</b>	218.7	24.42				
3. Time:						
4. Time:						
<b>DO Calibration/Check</b>						
Calibration Value: <b>100%</b>	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time: <b>0642</b>	<b>100%</b>		<b>26.75</b>			
2. Time: <b>0715</b>	<b>104%</b>		<b>25.63</b>			
3. Time:						
4. Time:						

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

SNL/NM Project Name: <b>CWL</b>				
Calibration done by: <b>Z.Tenorio</b>			Date: <b>07/12/19 - 07/11/19</b>	
<b>TURBIDIMETER</b>				
Make & Model: <b>HACH 2100Q</b>			Serial No. S/N <b>14060C033238</b>	
Reference Value	<b>10</b>	20	100	800
Standard Lot No.	<b>A8012</b>	<b>A8015</b>	<b>A8010</b>	<b>A8015</b>
1. Time <i>0650</i>	<b>9.89</b>	<b>19.9</b>	<b>97.6</b>	<b>792</b>
2. Time <i>0740</i>	<b>10.5</b>	<b>19.6</b>	<b>97.0</b>	<b>790</b>
3. Time				
4. Time				
Comments:				

7/12/19

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

SNL/NM Project Name: <b>CWL</b>						
Calibrations done by: <b>R Lynch</b>				Date: <b>07/15/19</b>		
Make & Model: <b>INSITU AT600</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>571025</b>						
Other (S/N): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>7.00</b>			pH sloped to (std): <b>10.00</b>			
Reference value:		4.00		7.00		10.00
	Value	Temp	Value	Temp	Value	Temp
1. Time:	<b>0641</b>	<b>4.02</b>	<b>23.04</b>	<b>7.02</b>	<b>23.95</b>	<b>23.61</b>
2. Time:	<b>1313</b>	<b>4.00</b>	<b>23.21</b>	<b>7.02</b>	<b>23.84</b>	<b>10.03</b>
3. Time:						
4. Time:						
Standard lot no.:	<b>9GB303</b>		<b>9GB038</b>		<b>9GB459</b>	
Expiration date:	<b>FEB/21</b>		<b>FEB/21</b>		<b>FEB/21</b>	
<b>SC Calibration/Check</b>						
Reference Value: <b>1413 uS/cm @ 25c</b>			Standard Lot No.: <b>9GB450</b>			
	Value	Temp	Expiration Date: <b>FEB/20</b>			
1. Time:	<b>0646</b>	<b>1369.0</b>	<b>23.24</b>			
2. Time:	<b>1305</b>	<b>1372.2</b>	<b>23.41</b>			
3. Time:						
4. Time:						
<b>ORP Calibration/Check</b>						
Reference Value: <b>220 mV</b>			Standard Lot No. <b>9GC752</b>			
	Value	Temp	Expiration Date: <b>DEC/19</b>			
1. Time:	<b>0647</b>	<b>218.6</b>	<b>24.03</b>			
2. Time:	<b>1308</b>	<b>218.8</b>	<b>24.12</b>			
3. Time:						
4. Time:						
<b>DO Calibration/Check</b>						
Calibration Value: <b>100%</b>	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	<b>0638</b>	<b>99.7</b>	<b>26.18</b>			
2. Time:	<b>1303</b>	<b>98.8</b>	<b>26.21</b>			
3. Time:						
4. Time:						

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

SNL/NM Project Name: <b>CWL</b>				
Calibration done by: <b>R Lynch</b>			Date: <b>07/15/19</b>	
TURBIDIMETER				
Make & Model: <b>HACH 2100Q</b>			Serial No. S/N <b>14060C033238</b>	
Reference Value	<b>10</b>	<b>20</b>	<b>100</b>	<b>800</b>
Standard Lot No.	<b>A8297</b>	<b>A8313</b>	<b>A8348</b>	<b>A8313</b>
1. Time <b>0640</b>	<b>10.1</b>	<b>20.2</b>	<b>103</b>	<b>796</b>
2. Time <b>1301</b>	<b>9.94</b>	<b>20.4</b>	<b>101</b>	<b>797</b>
3. Time				
4. Time				
Comments:				

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

SNL/NM Project Name: <b>CWL</b>						
Calibrations done by: <b>R Lynch</b>				Date: <b>07/16/19</b>		
Make & Model: <b>INSITU AT 600</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>571025</b>						
Other (S/N): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>7.00</b>			pH sloped to (std): <b>10.00</b>			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: <b>0644</b>	<b>4.03</b>	<b>23.01</b>	<b>7.02</b>	<b>23.24</b>	<b>10.02</b>	<b>23.11</b>
2. Time: <b>1328</b>	<b>4.03</b>	<b>25.55</b>	<b>7.01</b>	<b>25.53</b>	<b>10.02</b>	<b>25.26</b>
3. Time:						
4. Time:						
Standard lot no.:	<b>9GB303</b>		<b>9GB038</b>		<b>9GB459</b>	
Expiration date:	<b>FEB/21</b>		<b>FEB/21</b>		<b>FEB/21</b>	
<b>SC Calibration/Check</b>						
Reference Value: <b>1413 uS/cm @ 25C</b>			Standard Lot No.: <b>9GB450</b>			
	Value	Temp	Expiration Date: <b>FEB/20</b>			
1. Time: <b>0642</b>	<b>1349.7</b>	<b>22.80</b>				
2. Time: <b>1332</b>	<b>1414.4</b>	<b>25.25</b>				
3. Time:						
4. Time:						
<b>ORP Calibration/Check</b>						
Reference Value: <b>220 mV</b>			Standard Lot No. <b>9GC752</b>			
	Value	Temp	Expiration Date: <b>DEC/19</b>			
1. Time: <b>0652</b>	<b>218.9</b>	<b>22.20</b>				
2. Time: <b>1322</b>	<b>218.2</b>	<b>26.04</b>				
3. Time:						
4. Time:						
<b>DO Calibration/Check</b>						
Calibration Value: <b>100%</b>	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time: <b>0640</b>	<b>97.8</b>		<b>25.89</b>			
2. Time: <b>1320</b>	<b>98.1</b>		<b>26.52</b>			
3. Time:						
4. Time:						

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch			Date: 07/16/19	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 14060C033238	
Reference Value	10	20	100	800
Standard Lot No.	A8297	A8313	A8348	A8313
1. Time 0641	9.91	20.1	99.8	794
2. Time 1315	9.94	20.4	101	796
3. Time				
4. Time				
Comments:				

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

SNL/NM Project Name: CWL						
Calibrations done by: R Lynch				Date: 07/17/19 <u>7/19/19</u>		
Make & Model: INSITU AT 600						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <u>571025</u>						
Other (S/N): <u>NA</u>						
<b>pH Calibration/Check</b>						
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:	<u>0649</u>	<u>4.03</u>	<u>23.78</u>	<u>7.00</u>	<u>23.58</u>	<u>10.00</u>
2. Time:	<u>1335</u>	<u>4.04</u>	<u>25.97</u>	<u>7.01</u>	<u>25.52</u>	<u>9.97</u>
3. Time:	<u>0647</u>	<u>4.02</u>	<u>23.42</u>	<u>7.00</u>	<u>23.38</u>	<u>9.99</u>
4. Time:	<u>1105</u>	<u>4.02</u>	<u>24.57</u>	<u>7.00</u>	<u>23.70</u>	<u>9.98</u>
Standard lot no.:	9GB303		9GB038		9GB459	
Expiration date:	FEB/21		FEB/21		FEB/21	
<b>SC Calibration/Check</b>						
Reference Value: 1413 uS/cm @ 25C			Standard Lot No.: 9GB450			
	Value	Temp	Expiration Date: FEB/20			
1. Time:	<u>0647</u>	<u>1343.4</u>	<u>22.93</u>			
2. Time:	<u>1341</u>	<u>1497.5</u>	<u>25.15</u>			
3. Time:	<u>0635</u>	<u>1371.1</u>	<u>23.36</u>			
4. Time:	<u>1059</u>	<u>1379.3</u>	<u>23.93</u>			
<b>ORP Calibration/Check</b>						
Reference Value: 220 mV			Standard Lot No. 9GC752			
	Value	Temp	Expiration Date: DEC/19			
1. Time:	<u>0645</u>	<u>220.0</u>	<u>23.85</u>			
2. Time:	<u>1346</u>	<u>220.0</u>	<u>24.86</u>			
3. Time:	<u>0641</u>	<u>219.9</u>	<u>23.51</u>			
4. Time:	<u>1101</u>	<u>220.2</u>	<u>23.70</u>			
<b>DO Calibration/Check</b>						
Calibration Value: 100%	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	<u>0640</u>	<u>96.47</u>	<u>26.23</u>			
2. Time:	<u>1332</u>	<u>103.29</u>	<u>25.42</u>			
3. Time:	<u>0633</u>	<u>97.12</u>	<u>26.13</u>			
4. Time:	<u>1057</u>	<u>98.21</u>	<u>26.27</u>			

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch			Date: 07/17/19 07/19/19	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 14060C033238	
Reference Value	10	20	100	800
Standard Lot No.	A8297	A8313	A8348	A8313
1. Time 0642	9.91	20.1	99.7	793
2. Time 1325	10	20.2	99.4	801
3. Time 0632	9.98	20.3	101	797
4. Time 1056	10.1	20.1	99.6	794
Comments:				

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

<b>Project Name:</b> <u>CWL</u>	<b>Monitoring Well ID #:</b> <u>Pre-Decon</u>	<b>Date:</b> <u>07/10/19</u>
---------------------------------	---	------------------------------

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

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

**Personnel Performing Decontamination:**

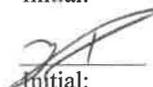
Robert Lynch

Print Name:

  
Initial: \_\_\_\_\_

Zachary Tenorio

Print Name:

  
Initial: \_\_\_\_\_

**Condition of Equipment**

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

List of Decontamination Materials

<p><b>Deionized Water</b></p> <p><b>Source:</b> <u>Culligan</u></p> <p><b>Lot Number:</b> <u>06/13/19</u></p>	<p><b>HNO<sub>3</sub></b></p> <p><b>Grade:</b> <u>Reagent</u></p> <p><b>UN #:</b> <u>2031</u></p> <p><b>Manufacturer:</b> <u>ACROS</u></p> <p><b>Lot Number:</b> <u>A0400317</u></p>
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**Portable Pump and Tubing / Water Level Indicator  
Decontamination Log Form**

Project Name: <u>CWL</u>	Monitoring Well ID #: <u>CWL-BW5</u>	Date: <u>7/11/2019</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>280206</u>
--	---

**Personnel Performing Decontamination:**

William Gibson Print Name: _____	 Initial: _____
Denisha Sanchez Print Name: _____	 Initial: _____

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

List of Decontamination Materials	
<p align="center"><b>Deionized Water</b></p> Source: <u>Culligan</u> Lot Number: <u>6/13/19</u>	<p align="center"><b>HNO<sub>3</sub></b></p> Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>ACROS</u> Lot Number: <u>A03400317</u>

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Portable Pump and Tubing / Water Level Indicator  
Decontamination Log Form

Project Name: <u>CWL</u>	Monitoring Well ID #: <u>CWL-MW-9</u>	Date: <u>7/15/2019</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>280206</u>
--	---

Personnel Performing Decontamination:

Zachary Tenorio

Print Name:

Initial: 

Denisha Sanchez

Print Name:

Initial: 

Condition of Equipment

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

List of Decontamination Materials

<b>Deionized Water</b>	<b>HNO<sub>3</sub></b>
Source: <u>Culligan</u>	Grade: <u>Reagent</u>
Lot Number: <u>6/13/19</u>	UN #: <u>2031</u>
	Manufacturer: <u>ACROS</u>
	Lot Number: <u>A03400317</u>

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

Project Name: <u>CWL</u>	Monitoring Well ID #: <u>CWL-MW11</u>	Date: <u>7/16/19</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>280206</u>
--	---

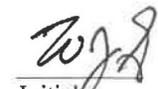
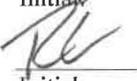
<b><u>Personnel Performing Decontamination:</u></b>	
Robert Lynch Print Name: _____	 Initial: _____
Denisha Sanchez Print Name: _____	 Initial: _____

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

<b>List of Decontamination Materials</b>	
<p align="center"><b>Deionized Water</b></p> <p>Source: <u>Culligan</u></p> <p>Lot Number: <u>6/13/19-6/21/19</u></p>	<p align="center"><b>HNO<sub>3</sub></b></p> <p>Grade: <u>Reagent</u></p> <p>UN #: <u>2031</u></p> <p>Manufacturer: <u>ACROS</u></p> <p>Lot Number: <u>A0400317</u></p>

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

<b>Project Name:</b> <u>CWL</u>	<b>Monitoring Well ID #:</b> <u>CWL-MW10</u>	<b>Date:</b> <u>7/19/19</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
<b>Pump and Tubing Bundle ID #:</b> <u>1806-640</u>	<b>Water Level Indicator ID #:</b> <u>280206</u>	
<p><b><u>Personnel Performing Decontamination:</u></b></p> <p>William Gibson Print Name: _____</p> <p>Robert Lynch Print Name: _____</p> <div style="display: flex; justify-content: center; align-items: center; gap: 20px;"> <div style="text-align: center;">               Initial: _____         </div> <div style="text-align: center;">               Initial: _____         </div> </div>		
<b>Condition of Equipment</b>		
<b>Pump:</b> <u>Good</u>	<b>Tubing Bundle:</b> <u>Excellent</u>	<b>Water Level Indicator:</b> <u>Good</u>
<b>List of Decontamination Materials</b>		
<p align="center"><b>Deionized Water</b></p> <p><b>Source:</b> <u>Culligan</u></p> <p><b>Lot Number:</b> <u>06/21/19</u></p>	<p align="center"><b>HNO<sub>3</sub></b></p> <p><b>Grade:</b> <u>Reagent</u></p> <p><b>UN #:</b> <u>2031</u></p> <p><b>Manufacturer:</b> <u>ACROS</u></p> <p><b>Lot Number:</b> <u>A0400317</u></p>	

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**SUMMARY SHEET FOR JULY 2019 SAMPLES**

Sample Summary for Chemical Waste Landfill Groundwater Monitoring  
July 2019

Well	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
<b>CWL GWM: Project Task # 195122.10.11.03. Service Order # CF 327-19</b>									
<b>Environmental Samples</b>									
CWL-BW5	CWL-SA 1	11-Jul-19	620019	108729	Environmental	n/a	620019 / 108730	620019 / 108728	
CWL-MW9	CWL-SA 2	15-Jul-19	620010	108699	Environmental	n/a	620010 / 108700	n/a	
CWL-MW10	CWL-SA 3	19-Jul-19	620017	108724	Environmental	n/a	620017 / 108725	620017 / 108723	
CWL-MW11	CWL-SA 4	16-Jul-19	620015	108718	Environmental	620014 / 108716	620015 / 108720	n/a	
CWL-MW11	CWL-SA 5	16-Jul-19	620015	108719	Duplicate	620014 / 108716	620015 / 108720	n/a	
CWL-EB 1	CWL-SA 6	15-Jul-19	620014	108716	Equipment Blank	n/a	620014 / 108717	n/a	Decon prior to CWL-MW11
CWL-FB 1	CWL-SA 8	11-Jul-19	620019	108728	Field Blank	n/a	620019 / 108730	n/a	at CWL-BW5
CWL-FB 2	CWL-SA 7	19-Jul-19	620017	108723	Field Blank	n/a	620017 / 108725	n/a	at CWL-MW10
CWL-DIW/QC	CWL-SA 9	15-Jul-19	620012	108709	QC-DIW	n/a	620012 / 108710	n/a	DIW source for CWL-EB 1
<b>Waste Characterization Samples</b>									
CWL-BW5	BW5 Purge	11-Jul-19	620009	108697	Waste	n/a	620009 / 108698	n/a	No data validation required
CWL-MW9	MW9 Purge	15-Jul-19	620011	108703	Waste	n/a	620011 / 108704	n/a	No data validation required
CWL-MW10	MW10 Purge	17-Jul-19	620018	108726	Waste	n/a	620018 / 108727	n/a	No data validation required
CWL-MW11	MW11 Purge	16-Jul-19	620016	108721	Waste	n/a	620016 / 108722	n/a	No data validation required

**DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES**

**CHEMICAL WASTE LANDFILL**

**GROUNDWATER MONITORING**

**JULY 2019**

**AR/COC NUMBERS 620010, 620012, 620014, 620015**

## Memorandum

Date: August 22, 2019  
To: File  
From: Linda Thal  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: CWL PCCP  
ARCO: 620010, 620012, 620014 and 620015  
SDG: 484737  
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**

Nine 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 and Preservation**

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 analytes were 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**

Four TBs were submitted, one for each ARCO. EB1 was submitted with ARCO 620014 and was associated with the samples on ARCO 620015. A DIW/QC sample was submitted with ARCO 620012 and was the source water for EB 1. A field duplicate pair was submitted with ARCO 620015. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donivan

**Level:** I

**Date:** 08/23/19

## Memorandum

Date: August 22, 2019  
To: File  
From: Linda Thal  
Subject: Inorganic Data Review and Validation – SNL  
Site: CWL PCCP  
ARCO: 620010, 620012, 620014 and 620015  
SDG: 484737  
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

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

1. The original sample result for Ni was > the PQL but <5X the PQL; the replicate sample result was non-detect and the difference between the original and replicate result was > the PQL. The associated sample results were non-detect and will be **qualified UJ,RP2** due to poor replicate precision.

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 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 except as noted above in the Summary section. 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 Ca concentration for samples 484737002, -011 and -013 were > those in the ICS A and AB 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 analysis was performed on an SNL sample of similar matrix from another SDG. No data will be qualified.

### **Other QC**

EB1 was submitted with ARCOG 620014 and was associated with the samples on ARCOG 620015. A DIW/QC sample was submitted with ARCOG 620012 and was the source water for EB 1. A field duplicate pair was submitted with ARCOG 620015. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

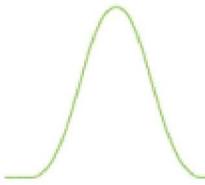
No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donovan

**Level:** I

**Date:** 08/23/19

---



## Sample Findings Summary



AR/COC: 620010, 620012, 620014, 620015

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3005A/6020B			
	108699-002/CWL-MW9	Nickel (7440-02-0)	UJ, RP2
	108709-002/CWL-DIW/QC	Nickel (7440-02-0)	UJ, RP2
	108716-002/CWL-EB 1	Nickel (7440-02-0)	UJ, RP2
	108718-002/CWL-MW11	Nickel (7440-02-0)	UJ, RP2
	108719-002/CWL-MW11	Nickel (7440-02-0)	UJ, RP2

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

## Sandia Data Validation Summary Worksheet

ARCOG#: 620010, 620012, 620014 and 620015	Site/Project: CWL PCCP	Validation Date: 08/22/2019
SDG #: 484737	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 14	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:** Collected: 07/15 and 07/16/2019

The ARCOG noted that the trip blank vials were received from the lab with headspace.

For samples 484737003(108700-001), 484737006(108710-001) and 484737014(108720-001) one of three vials were received containing headspace

Validated by:

*L. Thal*



## Sandia Inorganic Metals Worksheet

ARCO #s): 620010, 620012, 620014 and 620015	SDG #(s): 484737	Matrix: Aqueous
Laboratory Sample IDs: 484737002, -005, -008, -011, -013		
Method/Batch #s: <b>3005A/6020</b> :1898114(prepare)/1898115		

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

Analyte (outliers)	Calibration						MB mg/L	5X Blank mg/L	LCS %R	MS %R	Lab Rep RPD	Serial Dil. %D	ICS AB %R	ICS A ±MDL ug/L (x50)	LLCCV %R	DIW/QC -005	EB 1 -008		
	Int. mg/L	R <sup>2</sup>	ICV	CCV	ICB ug/L	CCB ug/L													
Ni	NA	✓	✓	✓	✓	✓	NA	✓	✓	abs > RL	✓	✓	✓	✓	✓	✓			

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

Comments: HTs OK. MS/DUP/SD on SNL sample 484735002. Sample result for Ni > PQL (.0025) and the duplicate result was non-detect  
 Cr and Ni only  
 -002, -011 and -013 result for Ca > ICSA

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

SDG: 484737 Rev 1

Internal Lab		AR/COC <b>620010</b>	
Batch No. <u>MA</u>		SMO Use	
Project Name: CWL PCCP	Date Samples Shipped: <u>7/15/19</u>	SMO Authorization: <u>[Signature]</u>	
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. <u>300701</u>	SMO Contact Phone: <u>Wendy Palencia/505-844-3132</u>	
Project/Task Number: 195122.10.11.03	Lab Contact: <u>Edie Kent/843-769-7385</u>	Send Report to SMO: <u>Stephanie Montaño/505-284-2553</u>	
Service Order: CF327-19	Lab Destination: <u>GEL</u>		
	Contract No.: <u>1983530</u>		
Tech Area:		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> <b>4° Celsius</b>	
Building: Room: Operational Site:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <u>484737</u>	

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								
108699	001	CWL-SA 2	517	7/15/19	10:29	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	001
108699	002	CWL-SA 2	517	7/15/19	10:30	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	002
108700	001	CWL-TB 4	N/A	7/15/19	10:29	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (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:		Entered by:		EDD <input checked="" type="checkbox"/> Yes				
Background: <input type="checkbox"/> Yes		QC inits.:		Turnaround Time		<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day				
Confirmatory: <input type="checkbox"/> Yes		Sample Disposal		Negotiated TAT		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab				
Sample Team Members	Name		Signature		Init.		Company/Organization/Phone/Cell		Return Samples By:	
	Robert Lynch		<u>[Signature]</u>		RL		SNL/08888/505-844-4013/505-250-7090		Comments: TCE must be analyzed within analytical method hold-time requirements. Received trip blanks from lab with head space.	
	William Gibson		<u>[Signature]</u>		WG		SNL/08888/505-284-3307/505-239-7367			
	Zachary Tenorio		<u>[Signature]</u>		ZT		SNL/08888/505-845-8636/505-259-5765			
Denisha Sanchez		<u>[Signature]</u>		DS		SNL/08888/505-845-7829/505-208-1375				

Relinquished by <u>[Signature]</u> Org. <u>88888</u> Date <u>7/15/19</u> Time <u>1100</u>	Relinquished by _____ Org. _____ Date _____ Time _____
Received by <u>[Signature]</u> Org. <u>00642</u> Date <u>7/15/19</u> Time <u>1100</u>	Received by _____ Org. _____ Date _____ Time _____
Relinquished by <u>[Signature]</u> Org. <u>00642</u> Date <u>7/15/19</u> Time <u>1145</u>	Relinquished by _____ Org. _____ Date _____ Time _____
Received by <u>[Signature]</u> Org. _____ Date <u>7-16-19</u> Time <u>1015</u>	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		AR/COC <b>620012</b>	
Batch No. <i>N/A</i>	SMO Use		
Project Name: CWL PCCP	Date Samples Shipped: <i>7/15/19</i>	SMO Authorization: <i>[Signature]</i>	
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. <i>300701</i>	SMO Contact Phone: <i>SMO</i>	
Project/Task Number: 195122.10.11.03	Lab Contact: Edie Kent/843-769-7385	Wendy Palencia/505-844-3132	
Service Order: CF327-19	Lab Destination: GEL	Send Report to SMO: Stephanie Montaño/505-284-2553	
	Contract No.: 1983530		

Waste Characterization  
 RMA  
 Released by COC No.  **4° Celsius**

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
108709	001	CWL-SA 9	N/A	7/15/19 10:15	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	<i>004</i>
108709	002	CWL-SA 9	N/A	7/15/19 10:16	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	<i>005</i>
108710	001	CWL-TB 5	N/A	7/15/19 10:15	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	<i>006</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		Signature		Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab Return Samples By:			
		<i>Robert Lynch</i>		SNL/08888/505-844-4013/505-250-7090		Comments: TCE must be analyzed within analytical method hold-time requirements. Received trip blanks from lab with head space.			
		<i>William Gibson</i>		SNL/08888/505-284-3307/505-239-7367					
		<i>Zachary Tenorio</i>		SNL/08888/505-845-8636/505-259-5765					
		<i>Denisha Sanchez</i>		SNL/08888/505-845-7829/505-208-1375					

Relinquished by <i>[Signature]</i> Org. <i>8888</i> Date <i>7/15/19</i> Time <i>1100</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i> Org. <i>00612</i> Date <i>7/15/19</i> Time <i>1100</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i> Org. <i>00042</i> Date <i>7/15/19</i> Time <i>1145</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i> Org. Date <i>7/16/19</i> Time <i>1015</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		AR/COC <b>620014</b>	
Batch No. <i>NA</i>	SMO Use	SMO Authorization: <i>[Signature]</i>	
Project Name: CWL PCCP	Date Samples Shipped: <i>7/16/19</i>	SMO Contact Phone: <i>[Signature]</i>	
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. <i>300912</i>	Wendy Palencia/505-844-3132	
Project/Task Number: 195122.10.11.03	Lab Contact: Edie Kent/843-769-7385	Send Report to SMO: <input checked="" type="checkbox"/> 4° Celsius	
Service Order: CF327-19	Lab Destination: GEL	Stephanie Montaño/505-284-2553	
	Contract No.: 1983530	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <i>404737</i>	

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					
108716	001	CWL-SA 6	N/A	7/15/19	13:46	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	<i>007</i>
108716	002	CWL-SA 6	N/A	7/15/19	13:47	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	<i>008</i>
108717	001	CWL-TB 6	N/A	7/15/19	13:46	DIW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	<i>009</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:		Entered by:		EDD <input checked="" type="checkbox"/> Yes			
Background: <input type="checkbox"/> Yes		QC inits.:		Turnaround Time		<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day			
Confirmatory: <input type="checkbox"/> Yes		Negotiated TAT		Sample Disposal		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Return Samples By:			
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/08888/505-844-4013/505-250-7090		Comments: TCE must be analyzed within analytical method hold-time requirements. Received trip blanks from lab with head space.			
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/08888/505-284-3307/505-239-7367					
	Zachary Tenorio	<i>[Signature]</i>	<i>ZT</i>	SNL/08888/505-845-8636/505-259-5765					
Denisha Sanchez	<i>[Signature]</i>	<i>DS</i>	SNL/08888/505-845-7829/505-208-1375						
Lab Use									

Relinquished by <i>[Signature]</i> Org. <i>8888</i> Date <i>7/15/19</i> Time <i>1415</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i> Org. <i>00042</i> Date <i>7/15/19</i> Time <i>1415</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i> Org. <i>00042</i> Date <i>7/16/19</i> Time <i>1315</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i> Org. Date <i>7-16-19</i> Time <i>1000</i>	Received by	Org.	Date	Time

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

*7.16.19*  
*TR*

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab		AR/COG		<b>620015</b>								
Batch No. <i>NA</i>		SMO Use		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> <b>4° Celsius</b>								
Project Name: CWL PCCP		Date Samples Shipped: <i>7/16/19</i>				SMO Authorization: <i>[Signature]</i>						
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>300912</i>				SMO Contact Phone: <i>[Signature]</i>						
Project/Task Number: 195122.10.11.03		Lab Contact: Edie Kent/843-769-7385				Wendy Palencia/505-844-3132						
Service Order: CF327-19		Lab Destination: GEL				Send Report to SMO:						
Tech Area:		Contract No.: 1983530		Stephanie Montaño/505-284-2553								
Building:		Room:		Operational Site:								
Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <i>484737</i>												
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
108718	001	CWL-SA 4	513	7/16/19 12:25	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	<i>010</i>
108718	002	CWL-SA 4	513	7/16/19 12:26	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	<i>011</i>
108719	001	CWL-SA 5	513	7/16/19 12:25	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	<i>012</i>
108719	002	CWL-SA 5	513	7/16/19 12:26	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	<i>013</i>
108720	001	CWL-TB 7	N/A	7/16/19 12:25	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	<i>014</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			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"/>						
Confirmatory: <input type="checkbox"/> Yes			QC inits.:			Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Return Samples By:						
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/08888/505-844-4013/505-250-7090		Comments: TCE must be analyzed within analytical method hold-time requirements. Received trip blanks from lab with head space.						
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/08888/505-284-3307/505-239-7367								
	Zachary Tenorio	<i>[Signature]</i>	<i>ZT</i>	SNL/08888/505-845-8636/505-259-5765								
Denisha Sanchez	<i>[Signature]</i>	<i>DS</i>	SNL/08888/505-845-7829/505-208-1375									
Relinquished by	<i>[Signature]</i>	Org. <i>8888</i>	Date <i>7/16/19</i>	Time <i>1300</i>	Relinquished by	Org.	Date	Time	Received by	Org.	Date	Time
Received by	<i>[Signature]</i>	Org. <i>00612</i>	Date <i>7/16/19</i>	Time <i>1300</i>	Received by	Org.	Date	Time	Relinquished by	Org.	Date	Time
Relinquished by	<i>[Signature]</i>	Org. <i>00642</i>	Date <i>7/16/19</i>	Time <i>1330</i>	Relinquished by	Org.	Date	Time	Received by	Org.	Date	Time
Received by	<i>[Signature]</i>	Org.	Date <i>7/17/19</i>	Time <i>1000</i>	Received by	Org.	Date	Time	Received by	Org.	Date	Time

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

**AR/COC NUMBER 620017**

## Memorandum

Date: August 28, 2019  
To: File  
From: Linda Thal  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: CWL PCCP  
ARCO: 620017  
SDG: 485365  
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 and Preservation**

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 analytes were 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 and an FB were submitted with ARCOG 620017 and were associated with the field sample on the ARCOG.

No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donovan

**Level:** I

**Date:** 08/29/19

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## Memorandum

Date: August 28, 2019  
To: File  
From: Linda Thal  
Subject: Inorganic Data Review and Validation – SNL  
Site: CWL PCCP  
ARCO: 620017  
SDG: 485365  
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**

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

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

### **Holding Times and Preservation**

The sample was prepared and analyzed within the prescribed holding times and was 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 sample was not diluted.

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

Results of the ICS A and AB analyses were evaluated because the Ca concentration for sample 485365003 was > those in the ICS A and AB solutions. All QC acceptance criteria were met.

### **ICP Serial Dilution**

The serial dilution met all QC acceptance criteria.

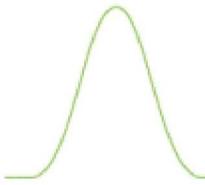
### **Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donovan

**Level:** I

**Date:** 08/29/19



## Sample Findings Summary



AR/COC: 620017

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#: 620017	Site/Project: CWL PCCP	Validation Date: 08/28/2019
SDG #: 485365	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 4	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: Collected: 07/19/2019

The ARCOG noted that the trip blank vials were received from the lab with headspace.

Validated by: *L Thal*





# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

SDG: 485305

Internal Lab		Batch No. <u>N/A</u>		SMO Use		<b>AR/COC</b>		<b>620017</b>							
Project Name: CWL PCCP		Date Samples Shipped: <u>7/22/19</u>		SMO Authorization: <u>[Signature]</u>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> <b>4° Celsius</b>		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <u>485305</u>							
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <u>301157</u>		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: CF327-19		Lab Destination: GEL		Contract No.: 1983530											
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								
108723	001	CWL-SA 7	N/A	7/19/19 09:27	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	001			
108724	001	CWL-SA 3	515	7/19/19 09:27	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	002			
108724	002	CWL-SA 3	515	7/19/19 09:28	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	003			
108725	001	CWL-TB 9	N/A	7/19/19 09:27	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	004			
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:		Entered by:		EDD <input checked="" type="checkbox"/> Yes									
Background: <input type="checkbox"/> Yes		QC inits.:		Turnaround Time		<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day <input type="checkbox"/> Negotiated TAT									
Confirmatory: <input type="checkbox"/> Yes		Sample Disposal		Return Samples By:		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab Comments: TCE must be analyzed within analytical method hold-time requirements. Received trip blanks from lab with head space.									
Sample Team Members	Name		Signature		Init.		Company/Organization/Phone/Cell		Lab Use						
	Robert Lynch		<u>[Signature]</u>		<u>[Init]</u>		SNL/08888/505-844-4013/505-250-7090								
	William Gibson		<u>[Signature]</u>		<u>[Init]</u>		SNL/08888/505-284-3307/505-239-7367								
	Zachary Tenorio		<u>[Signature]</u>		<u>[Init]</u>		SNL/08888/505-845-8636/505-259-5765								
Denisha Sanchez		<u>[Signature]</u>		<u>[Init]</u>		SNL/08888/505-845-7829/505-208-1375									
Relinquished by <u>[Signature]</u>		Org. <u>08888</u>		Date <u>7/19/19</u>		Time <u>0952</u>		Relinquished by		Org.		Date		Time	
Received by <u>[Signature]</u>		Org. <u>00628</u>		Date <u>7/19/19</u>		Time <u>0952</u>		Received by		Org.		Date		Time	
Relinquished by <u>[Signature]</u>		Org. <u>00628</u>		Date <u>7/22/19</u>		Time <u>1145</u>		Relinquished by		Org.		Date		Time	
Received by <u>[Signature]</u>		Org.		Date <u>7-23-19</u>		Time <u>7:40</u>		Received by		Org.		Date		Time	

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

**AR/COC NUMBER 620019**

## Memorandum

Date: August 21, 2019  
To: File  
From: Linda Thal  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: CWL PCCP  
ARCO: 620019  
SDG: 484515  
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 and Preservation**

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 analytes were 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 and an FB were submitted with ARCOG 620019 and were associated with the field sample on the ARCOG.

No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donovan

**Level:** I

**Date:** 08/21/19

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## Memorandum

Date: August 21, 2019  
To: File  
From: Linda Thal  
Subject: Inorganic Data Review and Validation – SNL  
Site: CWL PCCP  
ARCOG: 620019  
SDG: 484515  
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**

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

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

### **Holding Times and Preservation**

The sample was prepared and analyzed within the prescribed holding times and was 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 sample was not diluted.

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

Results of the ICS A and AB analyses were evaluated because the Ca concentration for sample 484515003 was > those in the ICS A and AB 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 analysis was performed on an SNL sample of similar matrix from another SDG. No data will be qualified.

### **Other QC**

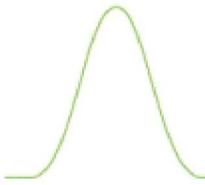
No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donovan

**Level:** I

**Date:** 08/21/19

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## Sample Findings Summary



AR/COC: 620019

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#: 620019	Site/Project: CWL PCCP	Validation Date: 08/21/2019
SDG #: 484515	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 4	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: Collected: 07/11/2019

The ARCOG noted that the trip blank vials were received from the lab with headspace.

Validated by:

*L Thal*





# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Page 5 of 224  
SDG: 484515 Rev 2

Internal Lab

Page 1 of 1

Batch No. <i>MA</i>	SMO Use	AR/COC	<b>620019</b>
Project Name: CWL PCCP	Date Samples Shipped: <i>7/11/19</i>	SMO Authorization: <i>[Signature]</i>	
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. <i>300685</i>	SMO Contact Phone: <i>Wendy Palencia/505-844-3132</i>	
Project/Task Number: 195122.10.11.03	Lab Contact: Edie Kent/843-769-7385	Send Report to SMO: <input checked="" type="checkbox"/> 4° Celsius	
Service Order: CF327-19	Lab Destination: GEL		
	Contract No.: 1983530	Stephanie Montaño/505-284-2553	

Tech Area:	Operational Site:	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <i>484515</i>
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					
108728	001	CWL-SA 8	N/A	7/11/19	10:12	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	<i>001</i>
108729	001	CWL-SA 1	522	7/11/19	10:13	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	<i>002</i>
108729	002	CWL-SA 1	522	7/11/19	10:14	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	<i>003</i>
108730	001	CWL-TB 1	N/A	7/11/19	10:12	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (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"/>		
<b>Sample Team Members</b>	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>[Init]</i>	SNL/08888/505-844-4013/505-250-7090	Return Samples By: Comments: TCE must be analyzed within analytical method hold-time requirements. Received trip blanks from lab with head space.
	William Gibson	<i>[Signature]</i>	<i>[Init]</i>	SNL/08888/505-284-3307/505-239-7367	
	Zachary Tenorio	<i>[Signature]</i>	<i>[Init]</i>	SNL/08888/505-845-8636/505-259-5765	
Denisha Sanchez	<i>[Signature]</i>	<i>[Init]</i>	SNL/08888/505-845-7829/505-208-1375		

Relinquished by <i>[Signature]</i> Org. <i>8888</i> Date <i>7/11/19</i> Time <i>10:57</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i> Org. <i>00642</i> Date <i>7/11/19</i> Time <i>10:52</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i> Org. <i>00642</i> Date <i>7/11/19</i> Time <i>11:15</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i> Org. Date <i>7-12-19</i> Time <i>1:30</i>	Received by	Org.	Date	Time

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

**CONTRACT VERIFICATION REVIEW FORMS**  
**CHEMICAL WASTE LANDFILL**  
**GROUNDWATER MONITORING**  
**JULY 2019**

Note: The review forms in this section include AR/COC numbers for environmental and quality control samples; the AR/COC forms are provided in the Data Validation Section of this annex.

<b>AR/COC Number</b>	<b>Sample Type</b>
620010	Environmental
620015	Environmental
620017	Environmental
620019	Environmental
620012	Quality Control
620014	Quality Control

## Contract Verification Form (CVR)

Project Leader JACKSON

Project Name CWL PCCP

Project/Task No. 195122 / 10.11.03

ARCOC No. 620010, 620012, 620014, 620015

Analytical Lab GEL

SDG No. 484737

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

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

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

### 2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	No	
2.1	Data reviewed, signature	X		
2.2	Method reference number(s) complete and correct	X		
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X		
2.4	Matrix spike/matrix spike duplicate data provided	X		
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and Lc	X		

Line No.	Item	Complete?		If no, explain
		Yes	No	
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 or 1-sigma for bioassay) and tracer recovery (if applicable) reported	N/A		
2.10	Narrative provided	X		
2.11	TAT met		X	Original report received within 30-day TAT. Report revisions received post 30-day TAT request.
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	X		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	X		Matrix (post) spike recovery for VOC target compound TCE met criteria.
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples		X	QC1204335550 DUP, SW846 6020B, Nickel

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
	b) Matrix spike duplicate RPD data reported and met for all organic samples	X		
	c) Laboratory control sample duplicate RPD data reported and met for other analyses	N/A		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	X		
3.6	Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "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 and TO-15) 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		

Line No.	Item	Yes	No	Comments
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 and 8290) a) 12-hour tune check provided	N/A		
	b) Initial calibration provided	N/A		
	c) Continuing calibration provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Labeled compound recovery data provided	N/A		
	f) RRTs for samples and standards provided	N/A		
	g) Ion abundance ratios for samples and standards provided	N/A		
	h) Instrument run logs provided	N/A		
4.4	LC/MS/MS (6850 and 8330) a) Initial calibration provided	N/A		
	b) Continuing calibration provided	N/A		
	c) CRI provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals) a) Initial calibration provided	X		
	b) Continuing calibration provided	X		
	c) ICP interference check sample data provided	X		
	d) ICP serial dilution provided	X		
	e) Instrument run logs provided	X		

Line No.	Item	Yes	No	Comments
4.6	Radiochemistry and General Chemistry a) Instrument run logs provided	N/A		

## 5.0 Data Anomaly Report

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

## 6.0 Problem Resolution

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

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions
QC1204335550 DUP	SW846 6020B, Nickel	Replicate sample analysis was performed on a Sandia groundwater sample not in this SDG. The precision measurement for Nickel exceeded acceptance criteria with the parent sample result a detect and the replicate sample result non-detect. All samples in this SDG were non-detect for Nickel and reported without qualification.

Were deficiencies unresolved?  Yes  No

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

Reviewed by: Mark L Lyon Date: 08-22-2019 09:19:00

Closed by: Mark L Lyon Date: 08-22-2019 09:19:00

## Contract Verification Form (CVR)

Project Leader JACKSON

Project Name CWL PCCP

Project/Task No. 195122 / 10.11.03

ARCOG No. 620017

Analytical Lab GEL

SDG No. 485365

*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		

Line No.	Item	Complete?		If no, explain
		Yes	No	
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 or 1-sigma for bioassay) and tracer recovery (if applicable) reported	N/A		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	X		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	X		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	X		

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
	b) Matrix spike duplicate RPD data reported and met for all organic samples	X		
	c) Laboratory control sample duplicate RPD data reported and met for other analyses	N/A		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	X		
3.6	Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "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 and TO-15) 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		

Line No.	Item	Yes	No	Comments
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 and 8290) a) 12-hour tune check provided	N/A		
	b) Initial calibration provided	N/A		
	c) Continuing calibration provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Labeled compound recovery data provided	N/A		
	f) RRTs for samples and standards provided	N/A		
	g) Ion abundance ratios for samples and standards provided	N/A		
	h) Instrument run logs provided	N/A		
4.4	LC/MS/MS (6850 and 8330) a) Initial calibration provided	N/A		
	b) Continuing calibration provided	N/A		
	c) CRI provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals) a) Initial calibration provided	X		
	b) Continuing calibration provided	X		
	c) ICP interference check sample data provided	X		
	d) ICP serial dilution provided	X		
	e) Instrument run logs provided	X		

Line No.	Item	Yes	No	Comments
4.6	Radiochemistry and General Chemistry a) Instrument run logs provided	N/A		

## 5.0 Data Anomaly Report

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

## 6.0 Problem Resolution

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

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

Were deficiencies unresolved?  Yes  No

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

Reviewed by: Mark L Lyon Date: 08-27-2019 11:05:00

Closed by: Mark L Lyon Date: 08-27-2019 11:05:00

## Contract Verification Form (CVR)

Project Leader JACKSON

Project Name CWL PCCP

Project/Task No. 195122 / 10.11.03

ARCOG No. 620019

Analytical Lab GEL

SDG No. 484515

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		

Line No.	Item	Complete?		If no, explain
		Yes	No	
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 or 1-sigma for bioassay) and tracer recovery (if applicable) reported	N/A		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	X		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	X		

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
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		
	c) Laboratory control sample duplicate RPD data reported and met for other analyses	N/A		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	X		
3.6	Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "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 and TO-15) a) 12-hour tune check provided	X		
	b) Initial calibration provided	X		See VOC case narrative, page 41, concerning initial calibration criteria.

Line No.	Item	Yes	No	Comments
	c) Continuing calibration provided	X		
	d) Internal standard performance data provided	X		
	e) Instrument run logs provided	X		
4.2	GC/HPLC (8330, 8082, 9070A, and 8010) a) Initial calibration provided	N/A		
	b) Continuing calibration provided	N/A		
	c) Instrument run logs provided	N/A		
4.3	HRGC/HRMS (1668 and 8290) a) 12-hour tune check provided	N/A		
	b) Initial calibration provided	N/A		
	c) Continuing calibration provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Labeled compound recovery data provided	N/A		
	f) RRTs for samples and standards provided	N/A		
	g) Ion abundance ratios for samples and standards provided	N/A		
	h) Instrument run logs provided	N/A		
4.4	LC/MS/MS (6850 and 8330) a) Initial calibration provided	N/A		
	b) Continuing calibration provided	N/A		
	c) CRI provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals) a) Initial calibration provided	X		

Line No.	Item	Yes	No	Comments
	b) Continuing calibration provided	X		
	c) ICP interference check sample data provided	X		
	d) ICP serial dilution provided	X		
	e) Instrument run logs provided	X		
4.6	Radiochemistry and General Chemistry a) Instrument run logs provided	N/A		

## 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

If no, provide nonconformance report or correction request number  and date correction request was submitted: 08-16-2019

Reviewed by: Mark L Lyon Date: 08-16-2019 08:15:00

Were resolutions adequate and data package complete?  Yes  No

Closed by: Mark L Lyon Date: 08-21-2019 09:39:00

**ANNEX B**

**Chemical Waste Landfill  
Calendar Year 2019  
Soil-Gas Monitoring Forms and Reports**

**Field Forms**

**Data Validation Reports**

**Contract Verification Reports**

**Certificates of Analysis**

**FIELD SAMPLING FORMS**  
**CHEMICAL WASTE LANDFILL**  
**POST-CLOSURE CARE SOIL-GAS MONITORING**

<b>Form Title</b>	<b>Corresponding Procedure</b>
Health & Safety Meeting Form	PLA 05-09
SUMMA <sup>®</sup> Canister Log	FOP 08-22
Soil Vapor Sampling Form	FOP 08-22
Analysis Request and Chain of Custody*	LOP 94-03

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

**FIELD SAMPLING FORMS**

**JANUARY 2019**

**SOIL-GAS MONITORING**

### HEALTH & SAFETY MEETING FORM

Dept: 8888 Facility: CWL Date: 01/17/19 Time: 0820

Activities: Soil Vapor 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: 51 °F Wind Speed: 2 MPH Humidity: 49 % Wind Chill: 51 °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.

William Gibson  
 Printed Name  
Denisha Sanchez  
 Printed Name  
Zeck Turner  
 Printed Name  
Robert Lynch  
 Printed Name  
 \_\_\_\_\_  
 Printed Name  
 \_\_\_\_\_  
 Printed Name

Attendees

William Gibson  
 Signature  
Denisha Sanchez  
 Signature  
Zeck Turner  
 Signature  
Robert Lynch  
 Signature  
 \_\_\_\_\_  
 Signature  
 \_\_\_\_\_  
 Signature

#### Notes

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

*C-ft*  
Soil Vapor Sampling Log Form

Location	Date	Time	Canister #	PID (ppm)	Flow Rate (PSI)	Initial Canister Vacuum (PSI)	Ending Canister Vacuum (PSI)	Comments
CWL-DL 3	1/10/19	0907	34000570	NA	NA	-22	-8	FB
CWL-D1- <sup>470</sup> <del>100</del>	1-17-19	0924	NA		8	-NA	NA	
↓	↓	↓	↓		↓	↓	↓	
		0925	34000892		8	-24	-8	T9 2/27/19
CWL-D1-160		0926	NA		↓	NA	NA	Bad Sample Canister
↓		↓	↓		8	↓	↓	requires resampling
		0927	34001409		8	-25	-6	
CWL-D1-240		0933	NA		8	NA	NA	
↓		0934	↓		8	↓	↓	
		0935	8078		NA	-25	-8	
CWL-D1- <sup>160</sup> <del>350</del>		0938			8	NA	NA	
↓		0939			↓	↓	↓	
		0940	34001662		NA	-25	-8	OB split
CWL-D1- <sup>100</sup> <del>470</del>		0947	NA		8	NA	NA	
↓		0948	↓		↓	↓	↓	
	1/17/19	0950	34001510		NA	-25	-8	OB split

Field Notes:

OB split samples @  
350 fbg  
470 fbg

Elevation ~ 5400 fmsl



Soil Vapor Sampling Log Form

Location	Date	Time	Canister #	PID (ppm)	Flow Rate (L/min)	Initial Canister Vacuum (PSI)	Ending Canister Vacuum (PSI)	Comments
CWL-D3-QC5	11/17/19	1045	34001413	NA	NA	-23	-8	FB <sup>OB</sup> spilt
CWL-D3-120		1053	NA		8	NA	NA	
↓		1054	34001577		NA	-26	-8	
CWL-D3-170		1057	NA		8	NA	NA	
↓		1058	↓		↓	↓	↓	
↓		1059	34000393		NA	-26	-8	
CWL-D3-350		1100	NA		8	NA	NA	
↓		1101	↓		↓	↓	↓	
↓		1102	8360		NA	-24	-8	
CWL-D3-440		1104	NA		8	NA	NA	
↓		1105	↓		↓	↓	↓	
↓		1106	↓		↓	↓	↓	
↓		1107	34001335		NA	-25	-8	OB spilt
CWL-D3-480		1116	NA		8	NA	NA	
↓		1117	↓		↓	↓	↓	
↓		1119	↓		↓	↓	↓	
↓		1120	34000002		NA	-26	-8	OB spilt

Field Notes:

Elevation ~ 5400 famsl  
 OB spilt @ 440'  
 480'

## Soil Vapor Sampling Log Form

Location	Date	Time	Canister #	PID (ppm)	Flow Rate (cc-ft)	Initial Canister Vacuum (PSI)	Ending Canister Vacuum (PSI)	Comments
CWL-D2-QC4	11/17/19	1135	34000779	NA	NA	-23	-8	FB OB split
CWL-D2-120		1143	NA		8	NA	NA	
		1144	↓		↓	↓	↓	
		1145	34000404		NA	-25	-8	
CWL-D2-240		1147	NA		8	NA	NA	
		1148			↓	↓	↓	
		1149	34001422		NA	-26	-8	
CWL-D2-350		1149	NA		8	NA	NA	
		1150	↓		↓	↓	↓	
		1151	↓		↓	↓	↓	
		1152	34001158		NA	-26	-8	
CWL-D2-440		1152	NA		8	NA	NA	
		1153	↓		↓	↓	↓	
		1154	↓		↓	↓	↓	
		1155	34001257		NA	-26	-8	OB split
CWL-D2-470		1158	NA		8	NA	NA	
		1159	↓		↓	↓	↓	
		1200	↓		↓	↓	↓	
		1201	↓		↓	↓	↓	
		1202	34002038		NA	-26	-8	OB split

## Field Notes:

Elevation ~ 5400

OB splits 440'  
470'



**SUMMARY SHEET FOR JANUARY 2019 SAMPLES**

**Sample Summary for Chemical Waste Landfill Soil-Gas Monitoring  
January 2019**

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
<b>Chemical Waste Landfill Soil Vapor Monitoring: Project Task Number 195122.10.11.03 / Service Order Number CF 327-19</b>										
CWL-UI1	17-Jan-19	CWL-UI1-40	34000110	619395	106946	Environmental	n/a	n/a	619395 / 106945	
		CWL-UI1-80	34001192		106947	Environmental				
		CWL-UI1-120	34000353		106948	Environmental				
		CWL QC 1	34000226		106945	Field QC				n/a
CWL-UI2	17-Jan-19	CWL-UI2-36	34001564	619396	106950	Environmental	n/a	n/a	619396 / 106949	
		CWL-UI2-76	34001215		106951	Environmental				
		CWL-UI2-76	8180		106952	Duplicate				
		CWL-UI2-136	34000424		106953	Environmental				
		CWL-UI2-136	34000450		109954	Duplicate				
		CWL-QC-2	34000432		106949	Field QC				n/a
CWL-D1	17-Jan-19	CWL-D1-470	34000892	619397	106978	Environmental	n/a	n/a	619397 / 106977	sampled out of order
		CWL-D1-350	34001409		106979	Environmental				sampled out of order
		CWL-D1-240	8078		106980	Environmental				
		CWL-D1-160	34001662		106981	Environmental				
		CWL-D1-100	34001510		106982	Environmental				sampled out of order
		CWL-QC 3	34000570		106977	Field QC				n/a
CWL-D2	17-Jan-19	CWL-D2-120	34000404	619398	106984	Environmental	n/a	n/a	619398 / 106983	
		CWL-D2-240	34001422		106985	Environmental				
		CWL-D2-350	34001158		106986	Environmental				
		CWL-D2-440	34001257		106987	Environmental				
		CWL-D2-470	34002038		106988	Environmental				
		CWL QC 4	34000779		106983	Field QC				n/a
CWL-D3	17-Jan-19	CWL-D3-120	34001577	619399	106990	Environmental	n/a	n/a	619399 / 106989	
		CWL-D3-170	34000393		106991	Environmental				
		CWL-D3-350	8360		106992	Environmental				
		CWL-D3-440	34001335		106993	Environmental				
		CWL-D3-480	34000002		106994	Environmental				
		CWL QC 5	34001413		106989	Field QC				n/a

**DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES**

**CHEMICAL WASTE LANDFILL**

**SOIL-GAS MONITORING**

**JANUARY 2019**

## Memorandum

Date: February 22, 2019

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL  
Site: CWL PCCP  
ARCOG: 619395, 619396, 619397, 619398 and 619399  
SDG: 320-47154  
Laboratory: TestAmerica Laboratories, Inc. -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. This validation was performed according to SNL/NM SMO Procedure AOP 00-03 Rev 5.

### 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. Sample 320-47154-13 was received at the laboratory with insufficient sample volume. At the client's request, the lab proceeded with sample analysis. However, the sample results did not agree with historical values and the results were not usable. As per the clients request, all sample results will be **qualified R,X1**.
2. Samples -12, -15 and -16 were collected out of order in the field and misidentified in the original documentation. As per the client request, based on their professional judgment and comparison to historical values, all associated sample results that were detects will be **qualified J,X1** and all associated sample results that were non-detect will be **qualified UJ,X1**.
3. o-Xylene and m,p-xylene were detected at  $\leq$  the PQL in the method blank associated with samples -1 through -12. The o-xylene result for sample -2 was a detect  $\leq$  the PQL and will be **qualified 28U,B**, non-detect at the PQL.
4. Chloroform was detected at  $\leq$  the PQL in sample QC3, a field blank associated with samples -12 through -16. The chloroform result for sample -12 was a detect  $<$  the PQL and will be **qualified 1.1U,B2**, non-detect at the PQL.

Data are acceptable except and noted above 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.

### **Instrument Tune**

All instrument tune requirements were met.

### **Calibration**

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

### **Blanks**

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

o-Xylene and m,p-xylene were detected at  $\leq$  the PQL in the method blank associated with samples -1 through -12. All associated sample results, *except* the o-xylene result for sample -2, were non-detect and will not be qualified.

Styrene, ethylbenzene, o-xylene and m,p-xylene were detected at  $\leq$  the PQL in the method blank associated with samples -13, -14 and -16 through -24. All associated sample results were non-detect and will not be qualified.

Tetrachloroethene was detected at  $\leq$  the PQL and trichloroethene was detected at  $>$  the PQL in sample QC2, a field blank associated with samples -6 through -10. The associated sample results were detects  $>5X$  the FB values and will not be qualified.

Tetrachloroethene and chloroform were detected at  $\leq$  the PQL and trichloroethene was detected at  $>$  the PQL in sample QC3, a field blank associated with samples -12 through -16. All associated sample results, *except* the chloroform result for sample -12, were either non-detect or detects  $>5X$  the FB values and will not be qualified. The results for sample -013 were deemed unusable by the client, therefore blank infractions were not evaluated for this sample.

Tetrachloroethene was detected at  $\leq$  the PQL and trichloroethene was detected at  $>$  the PQL in samples QC4 and QC5, field blanks associated with samples -18 through -22 and -24 through -28 respectively. The associated sample results were detects  $>5X$  the FB values and will not be qualified.

It should be noted that, according to the canister sample reports, several target analytes including acetone were present in the certified canisters at  $<$  the PQL.

### **Surrogates**

All surrogate acceptance criteria were met.

### **Internal Standards**

All internal standards met QC acceptance criteria.

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

An MS/MSD was not performed.

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

The LCS/LCSD met all QC acceptance criteria for accuracy and precision.

### **Detection Limits/Dilutions**

All detection limits were properly reported and correctly adjusted for dilutions. The samples were diluted for all target analytes as follows.

Sample -2 (69.5X); -3 (91.3X); -4 (106X); -6 (45.4X); -7 (70.6X); -8 (69.6X); -9 (73X); -10 (78.7X); -12 (3.65X); -13 (46.1X); -14 (186X); -15 (158X); -16 (101X); -18 (147X); -19 (158X); -20 (127X); -21 (1.7X); -22 (74.4X); -24 (53.6X); -25 (61.4X); -26 (16.9X) and -27 (74.8X).

### **Tentatively Identified Compounds (TICs)**

TIC reports were not required.

### **Other QC**

Mass spectra acceptability were verified during data validation and met QC acceptance criteria. Sample results < the PQL with missing ions or poor ratios were qualified J by the laboratory and were not further qualified during data validation.

FBs were submitted with each ARCO. Two field duplicate pairs were submitted with ARCO 619396. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

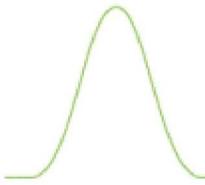
No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donovan

**Level:** I

**Date:** 02/25/19

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## Sample Findings Summary



AR/COC: 619395, 619396, 619397, 619398, 619399

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
<b>TO15</b>			
	106946-001/CWL-UI1-40	O-XYLENE (95-47-6)	28U, B
	106978-001/CWL-D1-470	1,1,1-TRICHLOROETHANE (71-55-6)	UJ, X1
	106978-001/CWL-D1-470	1,1,2,2-TETRACHLOROETHANE (79-34-5)	UJ, X1
	106978-001/CWL-D1-470	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (76-13-1)	J, X1
	106978-001/CWL-D1-470	1,1,2-TRICHLOROETHANE (79-00-5)	UJ, X1
	106978-001/CWL-D1-470	1,1-DICHLOROETHANE (75-34-3)	UJ, X1
	106978-001/CWL-D1-470	1,1-DICHLOROETHENE (75-35-4)	J, X1
	106978-001/CWL-D1-470	1,2,4-TRICHLOROBENZENE (120-82-1)	UJ, X1
	106978-001/CWL-D1-470	1,2,4-TRIMETHYLBENZENE (95-63-6)	UJ, X1
	106978-001/CWL-D1-470	1,2-DIBROMOETHANE (EDB) (106-93-4)	UJ, X1
	106978-001/CWL-D1-470	1,2-DICHLORO-1,1,2,2-TETRAFLUROETHANE (76-14-2)	UJ, X1
	106978-001/CWL-D1-470	1,2-DICHLOROBENZENE (95-50-1)	UJ, X1
	106978-001/CWL-D1-470	1,2-DICHLOROETHANE (107-06-2)	UJ, X1
	106978-001/CWL-D1-470	1,2-DICHLOROPROPANE (78-87-5)	UJ, X1
	106978-001/CWL-D1-470	1,3,5-TRIMETHYLBENZENE (108-67-8)	UJ, X1
	106978-001/CWL-D1-470	1,3-DICHLOROBENZENE (541-73-1)	UJ, X1
	106978-001/CWL-D1-470	1,4-DICHLOROBENZENE (106-46-7)	UJ, X1
	106978-001/CWL-D1-470	2-BUTANONE (MEK) (78-93-3)	UJ, X1
	106978-001/CWL-D1-470	2-HEXANONE (591-78-6)	UJ, X1
	106978-001/CWL-D1-470	4-ETHYLTOLUENE (622-96-8)	UJ, X1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	106978-001/CWL-D1-470	4-METHYL-2-PENTANONE (MIBK) (108-10-1)	UJ, X1
	106978-001/CWL-D1-470	ACETONE (67-64-1)	UJ, X1
	106978-001/CWL-D1-470	BENZENE (71-43-2)	UJ, X1
	106978-001/CWL-D1-470	BENZYL CHLORIDE (100-44-7)	UJ, X1
	106978-001/CWL-D1-470	BROMODICHLOROMETHANE (75- 27-4)	UJ, X1
	106978-001/CWL-D1-470	BROMOFORM (75-25-2)	UJ, X1
	106978-001/CWL-D1-470	BROMOMETHANE (74-83-9)	UJ, X1
	106978-001/CWL-D1-470	CARBON DISULFIDE (75-15-0)	J, X1
	106978-001/CWL-D1-470	CARBON TETRACHLORIDE (56-23-5)	J, X1
	106978-001/CWL-D1-470	CHLOROBENZENE (108-90-7)	UJ, X1
	106978-001/CWL-D1-470	CHLOROETHANE (75-00-3)	UJ, X1
	106978-001/CWL-D1-470	CHLOROFORM (67-66-3)	1.1UJ, B2,X1
	106978-001/CWL-D1-470	CHLOROMETHANE (74-87-3)	UJ, X1
	106978-001/CWL-D1-470	CIS-1,2-DICHLOROETHENE (156-59- 2)	UJ, X1
	106978-001/CWL-D1-470	CIS-1,3-DICHLOROPROPENE (10061- 01-5)	UJ, X1
	106978-001/CWL-D1-470	DIBROMOCHLOROMETHANE (124- 48-1)	UJ, X1
	106978-001/CWL-D1-470	DICHLORODIFLUOROMETHANE (75- 71-8)	J, X1
	106978-001/CWL-D1-470	ETHYLBENZENE (100-41-4)	UJ, X1
	106978-001/CWL-D1-470	HEXACHLOROBUTADIENE (87-68-3)	UJ, X1
	106978-001/CWL-D1-470	M,P-XYLENE (179601-23-1)	UJ, X1
	106978-001/CWL-D1-470	METHYLENE CHLORIDE (75-09-2)	J, X1
	106978-001/CWL-D1-470	O-XYLENE (95-47-6)	UJ, X1
	106978-001/CWL-D1-470	STYRENE (100-42-5)	UJ, X1
	106978-001/CWL-D1-470	TETRACHLOROETHENE (127-18-4)	J, X1
	106978-001/CWL-D1-470	TOLUENE (108-88-3)	UJ, X1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	106978-001/CWL-D1-470	TRANS-1,2-DICHLOROETHENE (156-60-5)	UJ, X1
	106978-001/CWL-D1-470	TRANS-1,3-DICHLOROPROPENE (10061-02-6)	UJ, X1
	106978-001/CWL-D1-470	TRICHLOROETHENE (79-01-6)	J, X1
	106978-001/CWL-D1-470	TRICHLOROFUOROMETHANE (75-69-4)	J, X1
	106978-001/CWL-D1-470	VINYL ACETATE (108-05-4)	UJ, X1
	106978-001/CWL-D1-470	VINYL CHLORIDE (75-01-4)	UJ, X1
	106979-001/CWL-D1-350	1,1,1-TRICHLOROETHANE (71-55-6)	R, X1
	106979-001/CWL-D1-350	1,1,2,2-TETRACHLOROETHANE (79-34-5)	R, X1
	106979-001/CWL-D1-350	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (76-13-1)	R, X1
	106979-001/CWL-D1-350	1,1,2-TRICHLOROETHANE (79-00-5)	R, X1
	106979-001/CWL-D1-350	1,1-DICHLOROETHANE (75-34-3)	R, X1
	106979-001/CWL-D1-350	1,1-DICHLOROETHENE (75-35-4)	R, X1
	106979-001/CWL-D1-350	1,2,4-TRICHLOROBENZENE (120-82-1)	R, X1
	106979-001/CWL-D1-350	1,2,4-TRIMETHYLBENZENE (95-63-6)	R, X1
	106979-001/CWL-D1-350	1,2-DIBROMOETHANE (EDB) (106-93-4)	R, X1
	106979-001/CWL-D1-350	1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (76-14-2)	R, X1
	106979-001/CWL-D1-350	1,2-DICHLOROBENZENE (95-50-1)	R, X1
	106979-001/CWL-D1-350	1,2-DICHLOROETHANE (107-06-2)	R, X1
	106979-001/CWL-D1-350	1,2-DICHLOROPROPANE (78-87-5)	R, X1
	106979-001/CWL-D1-350	1,3,5-TRIMETHYLBENZENE (108-67-8)	R, X1
	106979-001/CWL-D1-350	1,3-DICHLOROBENZENE (541-73-1)	R, X1
	106979-001/CWL-D1-350	1,4-DICHLOROBENZENE (106-46-7)	R, X1
	106979-001/CWL-D1-350	2-BUTANONE (MEK) (78-93-3)	R, X1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	106979-001/CWL-D1-350	2-HEXANONE (591-78-6)	R, X1
	106979-001/CWL-D1-350	4-ETHYLTOLUENE (622-96-8)	R, X1
	106979-001/CWL-D1-350	4-METHYL-2-PENTANONE (MIBK) (108-10-1)	R, X1
	106979-001/CWL-D1-350	ACETONE (67-64-1)	R, X1
	106979-001/CWL-D1-350	BENZENE (71-43-2)	R, X1
	106979-001/CWL-D1-350	BENZYL CHLORIDE (100-44-7)	R, X1
	106979-001/CWL-D1-350	BROMODICHLOROMETHANE (75- 27-4)	R, X1
	106979-001/CWL-D1-350	BROMOFORM (75-25-2)	R, X1
	106979-001/CWL-D1-350	BROMOMETHANE (74-83-9)	R, X1
	106979-001/CWL-D1-350	CARBON DISULFIDE (75-15-0)	R, X1
	106979-001/CWL-D1-350	CARBON TETRACHLORIDE (56-23-5)	R, X1
	106979-001/CWL-D1-350	CHLOROBENZENE (108-90-7)	R, X1
	106979-001/CWL-D1-350	CHLOROETHANE (75-00-3)	R, X1
	106979-001/CWL-D1-350	CHLOROFORM (67-66-3)	R, X1
	106979-001/CWL-D1-350	CHLOROMETHANE (74-87-3)	R, X1
	106979-001/CWL-D1-350	CIS-1,2-DICHLOROETHENE (156-59- 2)	R, X1
	106979-001/CWL-D1-350	CIS-1,3-DICHLOROPROPENE (10061- 01-5)	R, X1
	106979-001/CWL-D1-350	DIBROMOCHLOROMETHANE (124- 48-1)	R, X1
	106979-001/CWL-D1-350	DICHLORODIFLUOROMETHANE (75- 71-8)	R, X1
	106979-001/CWL-D1-350	ETHYLBENZENE (100-41-4)	R, X1
	106979-001/CWL-D1-350	HEXACHLOROBUTADIENE (87-68-3)	R, X1
	106979-001/CWL-D1-350	M,P-XYLENE (179601-23-1)	R, X1
	106979-001/CWL-D1-350	METHYLENE CHLORIDE (75-09-2)	R, X1
	106979-001/CWL-D1-350	O-XYLENE (95-47-6)	R, X1
	106979-001/CWL-D1-350	STYRENE (100-42-5)	R, X1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	106979-001/CWL-D1-350	TETRACHLOROETHENE (127-18-4)	R, X1
	106979-001/CWL-D1-350	TOLUENE (108-88-3)	R, X1
	106979-001/CWL-D1-350	TRANS-1,2-DICHLOROETHENE (156-60-5)	R, X1
	106979-001/CWL-D1-350	TRANS-1,3-DICHLOROPROPENE (10061-02-6)	R, X1
	106979-001/CWL-D1-350	TRICHLOROETHENE (79-01-6)	R, X1
	106979-001/CWL-D1-350	TRICHLOROFLUOROMETHANE (75-69-4)	R, X1
	106979-001/CWL-D1-350	VINYL ACETATE (108-05-4)	R, X1
	106979-001/CWL-D1-350	VINYL CHLORIDE (75-01-4)	R, X1
	106981-001/CWL-D1-160	1,1,1-TRICHLOROETHANE (71-55-6)	J, X1
	106981-001/CWL-D1-160	1,1,2,2-TETRACHLOROETHANE (79-34-5)	UJ, X1
	106981-001/CWL-D1-160	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (76-13-1)	J, X1
	106981-001/CWL-D1-160	1,1,2-TRICHLOROETHANE (79-00-5)	UJ, X1
	106981-001/CWL-D1-160	1,1-DICHLOROETHANE (75-34-3)	J, X1
	106981-001/CWL-D1-160	1,1-DICHLOROETHENE (75-35-4)	J, X1
	106981-001/CWL-D1-160	1,2,4-TRICHLOROBENZENE (120-82-1)	UJ, X1
	106981-001/CWL-D1-160	1,2,4-TRIMETHYLBENZENE (95-63-6)	UJ, X1
	106981-001/CWL-D1-160	1,2-DIBROMOETHANE (EDB) (106-93-4)	UJ, X1
	106981-001/CWL-D1-160	1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (76-14-2)	UJ, X1
	106981-001/CWL-D1-160	1,2-DICHLOROBENZENE (95-50-1)	UJ, X1
	106981-001/CWL-D1-160	1,2-DICHLOROETHANE (107-06-2)	J, X1
	106981-001/CWL-D1-160	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	106981-001/CWL-D1-160	1,3,5-TRIMETHYLBENZENE (108-67-8)	UJ, X1
	106981-001/CWL-D1-160	1,3-DICHLOROBENZENE (541-73-1)	UJ, X1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	106981-001/CWL-D1-160	1,4-DICHLOROBENZENE (106-46-7)	UJ, X1
	106981-001/CWL-D1-160	2-BUTANONE (MEK) (78-93-3)	UJ, X1
	106981-001/CWL-D1-160	2-HEXANONE (591-78-6)	UJ, X1
	106981-001/CWL-D1-160	4-ETHYLTOLUENE (622-96-8)	UJ, X1
	106981-001/CWL-D1-160	4-METHYL-2-PENTANONE (MIBK) (108-10-1)	UJ, X1
	106981-001/CWL-D1-160	ACETONE (67-64-1)	UJ, X1
	106981-001/CWL-D1-160	BENZENE (71-43-2)	UJ, X1
	106981-001/CWL-D1-160	BENZYL CHLORIDE (100-44-7)	UJ, X1
	106981-001/CWL-D1-160	BROMODICHLOROMETHANE (75- 27-4)	UJ, X1
	106981-001/CWL-D1-160	BROMOFORM (75-25-2)	UJ, X1
	106981-001/CWL-D1-160	BROMOMETHANE (74-83-9)	UJ, X1
	106981-001/CWL-D1-160	CARBON DISULFIDE (75-15-0)	UJ, X1
	106981-001/CWL-D1-160	CARBON TETRACHLORIDE (56-23-5)	J, X1
	106981-001/CWL-D1-160	CHLOROBENZENE (108-90-7)	UJ, X1
	106981-001/CWL-D1-160	CHLOROETHANE (75-00-3)	UJ, X1
	106981-001/CWL-D1-160	CHLOROFORM (67-66-3)	J, X1
	106981-001/CWL-D1-160	CHLOROMETHANE (74-87-3)	UJ, X1
	106981-001/CWL-D1-160	CIS-1,2-DICHLOROETHENE (156-59- 2)	UJ, X1
	106981-001/CWL-D1-160	CIS-1,3-DICHLOROPROPENE (10061- 01-5)	UJ, X1
	106981-001/CWL-D1-160	DIBROMOCHLOROMETHANE (124- 48-1)	UJ, X1
	106981-001/CWL-D1-160	DICHLORODIFLUOROMETHANE (75- 71-8)	J, X1
	106981-001/CWL-D1-160	ETHYLBENZENE (100-41-4)	UJ, X1
	106981-001/CWL-D1-160	HEXACHLOROBUTADIENE (87-68-3)	UJ, X1
	106981-001/CWL-D1-160	M,P-XYLENE (179601-23-1)	UJ, X1
	106981-001/CWL-D1-160	METHYLENE CHLORIDE (75-09-2)	J, X1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	106981-001/CWL-D1-160	O-XYLENE (95-47-6)	UJ, X1
	106981-001/CWL-D1-160	STYRENE (100-42-5)	UJ, X1
	106981-001/CWL-D1-160	TETRACHLOROETHENE (127-18-4)	J, X1
	106981-001/CWL-D1-160	TOLUENE (108-88-3)	UJ, X1
	106981-001/CWL-D1-160	TRANS-1,2-DICHLOROETHENE (156-60-5)	UJ, X1
	106981-001/CWL-D1-160	TRANS-1,3-DICHLOROPROPENE (10061-02-6)	UJ, X1
	106981-001/CWL-D1-160	TRICHLOROETHENE (79-01-6)	J, X1
	106981-001/CWL-D1-160	TRICHLOROFLUOROMETHANE (75-69-4)	J, X1
	106981-001/CWL-D1-160	VINYL ACETATE (108-05-4)	UJ, X1
	106981-001/CWL-D1-160	VINYL CHLORIDE (75-01-4)	UJ, X1
	106982-001/CWL-D1-100	1,1,1-TRICHLOROETHANE (71-55-6)	J, X1
	106982-001/CWL-D1-100	1,1,2,2-TETRACHLOROETHANE (79-34-5)	UJ, X1
	106982-001/CWL-D1-100	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (76-13-1)	J, X1
	106982-001/CWL-D1-100	1,1,2-TRICHLOROETHANE (79-00-5)	UJ, X1
	106982-001/CWL-D1-100	1,1-DICHLOROETHANE (75-34-3)	J, X1
	106982-001/CWL-D1-100	1,1-DICHLOROETHENE (75-35-4)	J, X1
	106982-001/CWL-D1-100	1,2,4-TRICHLOROBENZENE (120-82-1)	UJ, X1
	106982-001/CWL-D1-100	1,2,4-TRIMETHYLBENZENE (95-63-6)	UJ, X1
	106982-001/CWL-D1-100	1,2-DIBROMOETHANE (EDB) (106-93-4)	UJ, X1
	106982-001/CWL-D1-100	1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (76-14-2)	UJ, X1
	106982-001/CWL-D1-100	1,2-DICHLOROBENZENE (95-50-1)	UJ, X1
	106982-001/CWL-D1-100	1,2-DICHLOROETHANE (107-06-2)	J, X1
	106982-001/CWL-D1-100	1,2-DICHLOROPROPANE (78-87-5)	J, X1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	106982-001/CWL-D1-100	1,3,5-TRIMETHYLBENZENE (108-67-8)	UJ, X1
	106982-001/CWL-D1-100	1,3-DICHLOROBENZENE (541-73-1)	UJ, X1
	106982-001/CWL-D1-100	1,4-DICHLOROBENZENE (106-46-7)	UJ, X1
	106982-001/CWL-D1-100	2-BUTANONE (MEK) (78-93-3)	UJ, X1
	106982-001/CWL-D1-100	2-HEXANONE (591-78-6)	UJ, X1
	106982-001/CWL-D1-100	4-ETHYLTOLUENE (622-96-8)	UJ, X1
	106982-001/CWL-D1-100	4-METHYL-2-PENTANONE (MIBK) (108-10-1)	UJ, X1
	106982-001/CWL-D1-100	ACETONE (67-64-1)	UJ, X1
	106982-001/CWL-D1-100	BENZENE (71-43-2)	UJ, X1
	106982-001/CWL-D1-100	BENZYL CHLORIDE (100-44-7)	UJ, X1
	106982-001/CWL-D1-100	BROMODICHLOROMETHANE (75-27-4)	UJ, X1
	106982-001/CWL-D1-100	BROMOFORM (75-25-2)	UJ, X1
	106982-001/CWL-D1-100	BROMOMETHANE (74-83-9)	UJ, X1
	106982-001/CWL-D1-100	CARBON DISULFIDE (75-15-0)	UJ, X1
	106982-001/CWL-D1-100	CARBON TETRACHLORIDE (56-23-5)	J, X1
	106982-001/CWL-D1-100	CHLOROBENZENE (108-90-7)	UJ, X1
	106982-001/CWL-D1-100	CHLOROETHANE (75-00-3)	UJ, X1
	106982-001/CWL-D1-100	CHLOROFORM (67-66-3)	J, X1
	106982-001/CWL-D1-100	CHLOROMETHANE (74-87-3)	UJ, X1
	106982-001/CWL-D1-100	CIS-1,2-DICHLOROETHENE (156-59-2)	UJ, X1
	106982-001/CWL-D1-100	CIS-1,3-DICHLOROPROPENE (10061-01-5)	UJ, X1
	106982-001/CWL-D1-100	DIBROMOCHLOROMETHANE (124-48-1)	UJ, X1
	106982-001/CWL-D1-100	DICHLORODIFLUOROMETHANE (75-71-8)	J, X1
	106982-001/CWL-D1-100	ETHYLBENZENE (100-41-4)	UJ, X1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	106982-001/CWL-D1-100	HEXACHLOROBUTADIENE (87-68-3)	UJ, X1
	106982-001/CWL-D1-100	M,P-XYLENE (179601-23-1)	UJ, X1
	106982-001/CWL-D1-100	METHYLENE CHLORIDE (75-09-2)	J, X1
	106982-001/CWL-D1-100	O-XYLENE (95-47-6)	UJ, X1
	106982-001/CWL-D1-100	STYRENE (100-42-5)	UJ, X1
	106982-001/CWL-D1-100	TETRACHLOROETHENE (127-18-4)	J, X1
	106982-001/CWL-D1-100	TOLUENE (108-88-3)	UJ, X1
	106982-001/CWL-D1-100	TRANS-1,2-DICHLOROETHENE (156-60-5)	UJ, X1
	106982-001/CWL-D1-100	TRANS-1,3-DICHLOROPROPENE (10061-02-6)	UJ, X1
	106982-001/CWL-D1-100	TRICHLOROETHENE (79-01-6)	J, X1
	106982-001/CWL-D1-100	TRICHLOROFLUOROMETHANE (75-69-4)	J, X1
	106982-001/CWL-D1-100	VINYL ACETATE (108-05-4)	UJ, X1
	106982-001/CWL-D1-100	VINYL CHLORIDE (75-01-4)	UJ, X1

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

### Sandia Data Validation Summary Worksheet

ARCOG#: 619395, 619396, 619397, 619398 and 619399	Site/Project: CWL PCCP	Validation Date: 02/21/2019
SDG #:320-47154	Laboratory: TA Laboratories Inc. - West Sacramento, CA	Validator: Linda Thal
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 01/17/2019

The corrected ARCOG 619397 is missing a final signature. The final signature is present on the original uncorrected ARCOG,

Validated by: 







# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No *NA*

SMO Use

AR/COC **619397**

Project Name: CWL PCCP	Date Samples Shipped: <i>1/21/19</i>	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Timmie Jackson	Carrier/Waybill No: <i>292908</i>	SMO Contact Phone: <i>[Signature]</i>	<input type="checkbox"/> RMA
Project/Task Number: 195122.10 11 03	Lab Contact: Lee Ann Heathcote/916-373-5600	Wendy Palencia/505-844-3132	<input type="checkbox"/> Released by COC No.
Service Order: CF327-19	Lab Destination: TAL-WS	Send Report to SMO: Stephanie Montaño/505-284-2553	<input checked="" type="checkbox"/> 4° Celsius
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					
106977	001	CWL-QC 3 34000570	NA	1/17/19 09:07	UPN	S	6 L	None	G	FB	VOC (TO-15)	
106978	001	CWL-D1-100 34000892	<i>470</i> 100	1/17/19 09:25	SG	S	6 L	None	G	SA	VOC (TO-15)	
106979	001	CWL-D1-100 34001409	<i>350</i> 160	1/17/19 09:27	SG	S	6 L	None	G	SA	VOC (TO-15)	
106980	001	CWL-D1-240 8078	240	1/17/19 09:35	SG	S	6 L	None	G	SA	VOC (TO-15)	
106981	001	CWL-D1-350 34001662	<i>160</i> 350	1/17/19 09:40	SG	S	6 L	None	G	SA	VOC (TO-15)	
106982	001	CWL-D1-470 34001510	<i>100</i> 470	1/17/19 09:50	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"/>		
<b>Sample Team Members</b>	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/08888/505-844-4013/505-250-7090	Return Samples By: Comments:
	William Gibson	<i>[Signature]</i>	<i>WGA</i>	SNL/08888/505-284-3307/505-239-7367	
	Zachary Tenorio	<i>[Signature]</i>	<i>ZT</i>	SNL/08888/505-845-8636/505-259-5765	
	Denisha Sanchez	<i>[Signature]</i>	<i>DS</i>	SNL/08888/505-845-7829/505-208-1375	

Relinquished by <i>[Signature]</i> Org. <i>8888</i> Date <i>1/21/19</i> Time <i>1055</i>	Relinquished by _____ Org. _____ Date _____ Time _____
Received by <i>[Signature]</i> Org. <i>00642</i> Date <i>1/21/19</i> Time <i>1055</i>	Received by _____ Org. _____ Date _____ Time _____
Relinquished by <i>[Signature]</i> Org. <i>00642</i> Date <i>1/21/19</i> Time <i>1145</i>	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

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY



320-47154 Chain of Custody

Internal Lab

Batch No. *MA* AR/COC **619395**

Project Name: CWL PCCP Date Samples Shipped: *1/21/19* SMO Authorization: *[Signature]*

Project/Task Manager: Timmie Jackson Carrier/Waybill No. *292908* SMO Contact Phone: *[Signature]*

Project/Task Number: 195122.10.11.03 Lab Contact: Lee Ann Heathcote/916-373-5600 Wendy Palencia/505-844-3132

Service Order: CF327-19 Lab Destination: TAL-WS Send Report to SMO: Stephanie Montaño/505-284-2553

Contract No.: 1636780

Waste Characterization  
 RMA  
 Released by COC No.  **4° Celsius**

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

Tech Area: \_\_\_\_\_  
Building: \_\_\_\_\_ Room: \_\_\_\_\_ Operational Site: \_\_\_\_\_

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
106945	001	CWL-QC 1 34000226	NA	1/17/19 12:17	UPN	S	6 L	None	G	FB	VOC (TO-15)	
106946	001	CWL-UI1-40 34000110	40	1/17/19 12:22	SG	S	6 L	None	G	SA	VOC (TO-15)	
106947	001	CWL-UI1-80 34001192	80	1/17/19 12:24	SG	S	6 L	None	G	SA	VOC (TO-15)	
106948	001	CWL-UI1-120 34000353	120	1/17/19 12:27	SG	S	6 L	None	G	SA	VOC (TO-15)	

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>[Init]</i>	SNL/08888/505-844-4013/505-250-7090		Return Samples By:			
	William Gibson	<i>[Signature]</i>	<i>[Init]</i>	SNL/08888/505-284-3307/505-239-7367		Comments:			
	Zachary Tenorio	<i>[Signature]</i>	<i>[Init]</i>	SNL/08888/505-845-8636/505-259-5765					
Denisha Sanchez	<i>[Signature]</i>	<i>[Init]</i>	SNL/08888/505-845-7829/505-208-1375					Lab Use	

Relinquished by <i>[Signature]</i> Org. <i>8888</i> Date <i>01/21/19</i> Time <i>10:55</i>	Relinquished by _____ Org. _____ Date _____ Time _____
Received by <i>[Signature]</i> Org. <i>0042</i> Date <i>1/21/19</i> Time <i>10:55</i>	Received by _____ Org. _____ Date _____ Time _____
Relinquished by <i>[Signature]</i> Org. <i>0042</i> Date <i>1/21/19</i> Time <i>11:45</i>	Relinquished by _____ Org. _____ Date _____ Time _____
Received by <i>Gabriela Ilic</i> Org. _____ Date <i>1/28/19</i> Time <i>10:45</i>	Received by _____ Org. _____ Date _____ Time _____

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

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# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. <i>N/A</i>		SMO Use		AR/COC <b>619397</b>	
Project Name: CWL PCCP	Date Samples Shipped: <i>1/21/19</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"/> <b>4° Celsius</b>	
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. <i>292908</i>	SMO Contact Phone: <i>SMO</i>			
Project/Task Number: 195122.10.11.03	Lab Contact: Lee Ann Heathcote/916-373-5600	Wendy Palencia/505-844-3132			
Service Order: CF327-19	Lab Destination: TAL-WS	Send Report to SMO: Stephanie Montaño/505-284-2553			
		Contract No.: 1636780			

Tech Area:			Bill to: Sandia National Laboratories (Accounts Payable),		
Building:			P.O. Box 5800, MS-0154		
Room:			Albuquerque, NM 87185-0154		
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					
106977	001	CWL-QC 3 34000570	NA	1/17/19 09:07	UPN	S	6 L	None	G	FB	VOC (TO-15)	
106978	001	CWL-D1-100 34000892	100	1/17/19 09:25	SG	S	6 L	None	G	SA	VOC (TO-15)	
106979	001	CWL-D1-160 34001409	160	1/17/19 09:27	SG	S	6 L	None	G	SA	VOC (TO-15)	
106980	001	CWL-D1-240 8078	240	1/17/19 09:35	SG	S	6 L	None	G	SA	VOC (TO-15)	
106981	001	CWL-D1-350 34001662	350	1/17/19 09:40	SG	S	6 L	None	G	SA	VOC (TO-15)	
106982	001	CWL-D1-470 34001510	470	1/17/19 09:50	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		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:			
<b>Sample Team Members</b>	Name	Signature	Init.	Company/Organization/Phone/Cell					
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/08888/505-844-4013/505-250-7090					
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/08888/505-284-3307/505-239-7367					
	Zachary Tenorio	<i>[Signature]</i>	<i>ZT</i>	SNL/08888/505-845-8636/505-259-5765					
Denisha Sanchez	<i>[Signature]</i>	<i>DS</i>	SNL/08888/505-845-7829/505-208-1375						

Relinquished by <i>[Signature]</i> Org. <i>8888</i> Date <i>1/21/19</i> Time <i>10:55</i>	Relinquished by _____ Org. _____ Date _____ Time _____
Received by <i>[Signature]</i> Org. <i>0042</i> Date <i>1/21/19</i> Time <i>10:55</i>	Received by _____ Org. _____ Date _____ Time _____
Relinquished by <i>[Signature]</i> Org. <i>0042</i> Date <i>1/21/19</i> Time <i>11:45</i>	Relinquished by _____ Org. _____ Date _____ Time _____
Received by <i>[Signature]</i> Org. _____ Date <i>1/28/19</i> Time <i>10:45</i>	Received by _____ Org. _____ Date _____ Time _____

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

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# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. <i>VKA</i>	SMO Use		<b>AR/COC</b>	<b>619398</b>
Project Name: CWL PCCP	Date Samples Shipped: <i>1/21/19</i>	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization	
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. <i>292908</i>	SMO Contact Phone: <i>[Signature]</i>	<input type="checkbox"/> RMA	
Project/Task Number: 195122.10.11.03	Lab Contact: Lee Ann Heathcote/916-373-5600	Wendy Palencia/505-844-3132	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> <b>4° Celsius</b>	
Service Order: CF327-19	Lab Destination: TAL-WS	Send Report to SMO:		
	Contract No.: 1636780	Stephanie Montaño/505-284-2553	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	

Tech Area:	Building:	Room:	Operational Site:
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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					
106983	001	CWL-QC 4 34000779	NA	1/17/19	11:35	UPN	S	6 L	None	G	FB	VOC (TO-15)	
106984	001	CWL-D2-120 34000404	120	1/17/19	11:45	SG	S	6 L	None	G	SA	VOC (TO-15)	
106985	001	CWL-D2-240 34001422	240	1/17/19	11:49	SG	S	6 L	None	G	SA	VOC (TO-15)	
106986	001	CWL-D2-350 34001158	350	1/17/19	11:52	SG	S	6 L	None	G	SA	VOC (TO-15)	
106987	001	CWL-D2-440 34001257	440	1/17/19	11:55	SG	S	6 L	None	G	SA	VOC (TO-15)	
106988	001	CWL-D2-470 34002038	470	1/17/19	12:02	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"/>		
<b>Sample Team Members</b>	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/08888/505-844-4013/505-250-7090	Return Samples By: Comments:
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/08888/505-284-3307/505-239-7367	
	Zachary Tenorio	<i>[Signature]</i>	<i>ZT</i>	SNL/08888/505-845-8636/505-259-5765	
Denisha Sanchez	<i>[Signature]</i>	<i>DS</i>	SNL/08888/505-845-7829/505-208-1375		

Relinquished by <i>[Signature]</i> Org. <i>8888</i> Date <i>1/21/19</i> Time <i>10:55</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i> Org. <i>006472</i> Date <i>1/21/19</i> Time <i>10:55</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i> Org. <i>006472</i> Date <i>1/28/19</i> Time <i>11:45</i>	Relinquished by	Org.	Date	Time
Received by <i>Gabriella Isern</i> Org. Date <i>1/28/19</i> Time <i>10:45</i>	Received by	Org.	Date	Time

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

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**CONTRACT VERIFICATION REVIEW FORMS**  
**CHEMICAL WASTE LANDFILL**  
**SOIL-GAS MONITORING**  
**JANUARY 2019**

<b>AR/COC Number</b>	<b>Sample Type</b>
619395	Environmental
619396	Environmental
619397	Environmental
619398	Environmental
619399	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 PCCP **Project/Task No.** 195122\_10.11.03

**ARCOC No.** 619395, 619396, 619397, 619398 & 619399

**Analytical Lab** TAL-WS

**SDG No.** 320-47154-1

*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		
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		Insufficient sample volume provided for sample 106979-001/CWL-D1-160

## 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		
	c) Matrix spike recovery data reported and met	N/A		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	N/A		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	N/A		
3.5	Blank data a) Method or reagent blank data reported and met for all samples		X	m,p-xylene and o-xylene detected in method blank (batch 273950). Ethylbenzene, styrene, m,p-xylene and o-xylene detected in method blank (batch 274149).

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Tetrachloroethene and trichloroethene detected in CWL-QC2, CWL-QC4 and CWL-QC5. Chloroform, tetrachloroethene and trichloroethene detected in CWL-QC3.
3.6	Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits	X		
3.7	Narrative addresses planchet flaming for gross alpha/beta	N/A		
3.8	Narrative included, correct, and complete	X		
3.9	Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151.	N/A		

#### 4.0 Calibration and Validation Documentation

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

Line No.	Item	Yes	No	Comments
	c) Continuing calibration provided	X		
	d) Internal standard performance data provided	X		
	e) Instrument run logs provided	X		
4.2	GC/HPLC (8330, 8082, 9070A, and 8010)	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			

Line No.	Item	Yes	No	Comments
	b) Continuing calibration provided	N/A		
	c) CRI provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	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		

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

## 6.0 Problem Resolution

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

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

Were deficiencies unresolved?  Yes  No

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

Reviewed by: Wendy Palencia Date: 02-12-2019 10:36:00

Closed by: Wendy Palencia Date: 02-12-2019 10:36:00

**FIELD SAMPLING FORMS**

**MARCH 2019**

**SOIL-GAS MONITORING**

### HEALTH & SAFETY MEETING FORM

Dept: 8888 Facility: CWL Date: 03/28/19 Time: 0850

Activities: Soil Vapor 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: 62 °F Wind Speed: 62<sup>45</sup> MPH Humidity: 19 % Wind Chill: \_\_\_\_\_ °F  
173/28/19

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.

Robert Lynch  
 Printed Name

Denisha Sanchez  
 Printed Name

Tim Jackson  
 Printed Name

Zach Tenorio  
 Printed Name

William Gibson  
 Printed Name

\_\_\_\_\_  
 Printed Name

Attendees

Robert Lynch  
 Signature

Denisha Sanchez  
 Signature

T. Jackson  
 Signature

Zach Tenorio  
 Signature

William Gibson  
 Signature

\_\_\_\_\_  
 Signature

Notes

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_





## **SUMMARY SHEET FOR MARCH 2019 SAMPLES**

**Sample Summary for Chemical Waste Landfill Soil-Gas Monitoring  
March 2019 Resample Event**

Well ID	Sample Date	Sample ID / Port	SUMMA Number	ARCOG	Sample Number	Sample Type	Associated Field QC Sample (ARCOG #/Sample #)	Associated Field Blank (ARCOG #/Sample #)	Comments
<b>Chemical Waste Landfill Soil Vapor Monitoring: Project Task Number 195122.10.11.03   Service Order Number CF 327-19</b>									
CWL-D1	28-Mar-19	CWL-D1-350	34000513	619618	107997	Environmental	n/a	619618 / 107998	
		CWL-QC 1	34000124		107998	Field QC	n/a		Ultra Pure N2
CWL-D3	28-Mar-19	CWL-D3-350	34000240	619619	107999	Environmental	619619 / 108039	619619 / 108000	
		CWL-QC 2	34000408		108000	Field QC	n/a		Ultra Pure N2
		CWL-TRUCK-QC	8273		108038	Field QC	n/a		Ambient sample inside truck
		CWL-AMB-QC	34001441		108039	Field QC	n/a		Ambient sample at well

**DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES**

**CHEMICAL WASTE LANDFILL**

**SOIL-GAS MONITORING**

**MARCH 2019**

**AR/COC NUMBERS 619618, 619619**

## Memorandum

Date: May 8, 2019  
To: File  
From: Linda Thal  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: CWL PCCP  
ARCO: 619618 and 619619  
SDG: 320-48958 and 320-48959  
Laboratory: Eurofins TestAmerica, 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. This validation was performed according to SNL/NM SMO Procedure AOP 00-03 Rev 5.

### Summary

Six 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. Methylene chloride was detected at  $\leq$  the PQL in the method blank. The associated sample results were detects  $\leq$  the PQL and will be qualified non-detect at the PQL. Sample 48958-1 will be **qualified 110U,B**; sample 48959-1 will be **qualified 11U,B** and samples 48958-2, 48959-2, -3 and -4 will be **qualified 0.40U,B**.
2. Dichlorodifluoromethane was detected at  $\leq$  the PQL in the method blank. The associated results for samples 48958-1 and 48959-1 were detects  $\leq$  the PQL and will be **qualified 110U,B and 11U,B** respectively, non-detect at the PQL. The associated results for samples 48959-3 and -4 were detects  $>$  the PQL but  $\leq 5X$  the method blank value and will be **qualified J+,B**.

Data are acceptable except and noted above 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.

### Instrument Tune

All instrument tune requirements were met.

### **Calibration**

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

### **Blanks**

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

Dichlorodifluoromethane was detected at  $\leq$  the PQL in the method blank. The associated results for samples 48958-2 and 48959-2 were non-detect and will not be qualified.

1,2-Dichloro-1,1,2,2-tetrafluoroethane was detected at  $\leq$  the PQL in the method blank. The associated sample results were non-detect and will not be qualified.

Trichloroethene was detected at  $>$  the PQL and methylene chloride; 1,1-dichloroethene and 1,1,2-trichloro-1,2,2-trifluoroethane were detected at  $\leq$  the PQL in sample 48958-2, QC1, a FB associated with sample -1. Methylene chloride was qualified non-detect due to method blank contamination and will not be applied to the associated sample result. The remaining associated sample results were detects  $>5X$  the FB values and will not be qualified.

Trichloroethene was detected at  $>$  the PQL and methylene chloride and acetone were detected at  $\leq$  the PQL in sample 48959-2, QC2, a FB associated with sample -1. Methylene chloride was qualified non-detect due to method blank contamination and will not be applied to the sample result. The associated sample result for trichloroethene was a detect  $>5X$  the FB value and will not be qualified. The associated sample result for acetone was non-detect and will not be qualified.

It should be noted that, according to the canister sample reports, several target analytes including acetone were present in the certified canisters at  $<$  the PQL.

### **Surrogates**

All surrogate acceptance criteria were met.

### **Internal Standards**

All internal standards met QC acceptance criteria.

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

An MS/MSD was not performed.

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

The LCS/LCSD met all QC acceptance criteria for accuracy and precision.

### **Detection Limits/Dilutions**

All detection limits were properly reported and correctly adjusted for dilutions. The following samples were diluted for all target analytes.

Sample 48958-1 was diluted 263X and sample 48959-1 was diluted 28.5X.

**Tentatively Identified Compounds (TICs)**

TIC reports were not required.

**Other QC**

Mass spectra acceptability were verified during data validation and met QC acceptance criteria. Sample results < the PQL with missing ions or poor ratios were qualified J by the laboratory and were not further qualified during data validation.

FBs were submitted with each ARCO. Additionally samples 48959-3 (TRUCK QC) and -4 (AMB QC) were submitted with ARCO 619619 and were not associated with the field samples.

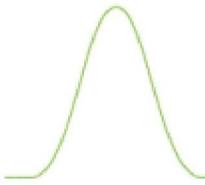
No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donovan

**Level:** I

**Date:** 05/09/19

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## Sample Findings Summary



AR/COC: 619618, 619619

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
TO15			
	107997-001/CWL-D1-350	DICHLORODIFLUOROMETHANE (75-71-8)	110U, B
	107997-001/CWL-D1-350	METHYLENE CHLORIDE (75-09-2)	110U, B
	107998-001/CWL-QC1	METHYLENE CHLORIDE (75-09-2)	0.4U, B
	107999-001/CWL-D3-350	DICHLORODIFLUOROMETHANE (75-71-8)	11U, B
	107999-001/CWL-D3-350	METHYLENE CHLORIDE (75-09-2)	11U, B
	108000-001/CWL-QC2	METHYLENE CHLORIDE (75-09-2)	0.4U, B
	108038-001/CWL-TRUCK-QC	DICHLORODIFLUOROMETHANE (75-71-8)	J+, B
	108038-001/CWL-TRUCK-QC	METHYLENE CHLORIDE (75-09-2)	0.4U, B
	108039-001/CWL-AMB-QC	DICHLORODIFLUOROMETHANE (75-71-8)	J+, B
	108039-001/CWL-AMB-QC	METHYLENE CHLORIDE (75-09-2)	0.4U, B

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

### Sandia Data Validation Summary Worksheet

ARCOG#: 619618 and 619619	Site/Project: CWL PCCP	Validation Date: 05/08/2019
SDG #:320-48958 and 320-48959	Laboratory: Eurofins TestAmerica, Sacramento	Validator: Linda Thal
Matrix: Air	# of Samples: 6	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 03/28/2019
Validated by: <i>L. Thal</i>

## Sandia Organic Worksheet (GC/MS VOC)

ARCOG #:619618 and 619619	SDG: 320-48958 and 320-48959	Matrix: Air
Laboratory Sample IDs: 320-48958-1, -2 and 320-48959-1 through -4		
Method/Batch #s: TO-15/289077	Tuning (pass/fail):pass	TICs Required? (yes/no):no

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	LCSD %R	LCS/ LCSD RPD	FB1 QC1 48958-2 5X (10X)	FB2 QC2 48959-2 /X5 (X10)		
	Int.	RF/ Slope	RSD/r <sup>2</sup>	(ICV)/ CCV %D									
1,1-Dichloroethene	NA	✓	✓	✓	✓	NA	✓	✓	✓	.27J/1.35	✓		
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	.36J/1.8	✓		
Acetone	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	.26J/(2.6)		
Methylene Chloride	NA	✓	✓	✓	.0886J	(.886)	✓	✓	✓	.089J/ (.89)	.11J/(1.1)		
Trichloroethene	NA	✓	✓	✓	✓	NA	✓	✓	✓	1.9/9.5	.64/3.2		
Dichlorodifluoromethane	NA	✓	✓	✓	.164J	.82	✓	✓	✓	✓	✓		
1,2-Dichloro-1,1,2,2-tetrafluoroethane	NA	✓	✓	✓	.16J	.80	✓	✓	✓	✓	✓		
2-Butanone	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓		
Chloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓		
Toluene	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓		
Trichlorofluoromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓		
Surrogate Recovery Outliers													
Sample ID	1,2-DCA-d4 %R	Toluene-d8 %R	BFB %R		Sample ID	1,2-DCA-d4 %R	Toluene-d8 %R	BFB %R					
none													
IS Outliers													
Sample ID	FBZ		Chl-d5		1,4-DCB-d4								
	Area	RT	Area	RT	Area	RT							
none													

Comments: HTs OK. LCS/LCSD (CWL - lab limits). RSDs and CCVs ≤30%. ATMS 6 ICAL 01/31/2019. All Avg RF

Samples missing ions that were "J" Qualified by the lab were not further qualified during DV eg - 1,1-Dichloroethane in 48958-1 and 48959-1 and toluene 48959-3

Canister certification batches indicated trace amounts of acetone and other target analytes including carbon disulfide

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. <i>MA</i>	SMO Use	AR/COC	<b>619618</b>
Project Name: CWL PCCP	Date Samples Shipped: <i>4-01-19</i>	SMO Authorization: <i>[Signature]</i>	
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. <i>296028</i>	SMO Contact Phone: <i>[Signature]</i> <b>SMO</b>	
Project/Task Number: 195122.10.11.03	Lab Contact: Lee Ann Heathcote/916-373-5600	Wendy Palencia/505-844-3132	
Service Order: CF327-19	Lab Destination: TAL-WS	Send Report to SMO: <input checked="" type="checkbox"/> 4° Celsius	
	Contract No.: 1636780	Stephanie Montaño/505-284-2553	

Waste Characterization  
 RMA  
 Released by COC No.  
 4° Celsius

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

Tech Area: \_\_\_\_\_  
 Building: \_\_\_\_\_ Room: \_\_\_\_\_ Operational Site: \_\_\_\_\_

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
107997	001	CWL-D1-350	350	3/28/19 09:14	SG	S	6 L	None	G	SA	VOC (TO-15)	
107998	001	CWL QC 1	NA	3/28/19 09:04	UPN	S	6 L	None	G	FB	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 Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab																								
<b>Sample Team Members</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Name</th> <th>Signature</th> <th>Init</th> <th>Company/Organization/Phone/Cell</th> </tr> </thead> <tbody> <tr> <td>Robert Lynch</td> <td><i>[Signature]</i></td> <td><i>RL</i></td> <td>SNL/08888/505-844-4013/505-250-7090</td> </tr> <tr> <td>William Gibson</td> <td><i>[Signature]</i></td> <td><i>WG</i></td> <td>SNL/08888/505-284-3307/505-239-7367</td> </tr> <tr> <td>Zachary Tenorio</td> <td><i>[Signature]</i></td> <td><i>ZT</i></td> <td>SNL/08888/505-845-8636/505-259-5765</td> </tr> <tr> <td>Denisha Sanchez</td> <td><i>[Signature]</i></td> <td><i>DS</i></td> <td>SNL/08888/505-845-7829/505-208-1375</td> </tr> <tr> <td>Timmie Jackson</td> <td><i>[Signature]</i></td> <td><i>TJ</i></td> <td>SNL/08888/505-284-2547/505-263-6639</td> </tr> </tbody> </table>		Name	Signature	Init	Company/Organization/Phone/Cell	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/08888/505-844-4013/505-250-7090	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/08888/505-284-3307/505-239-7367	Zachary Tenorio	<i>[Signature]</i>	<i>ZT</i>	SNL/08888/505-845-8636/505-259-5765	Denisha Sanchez	<i>[Signature]</i>	<i>DS</i>	SNL/08888/505-845-7829/505-208-1375	Timmie Jackson	<i>[Signature]</i>	<i>TJ</i>	SNL/08888/505-284-2547/505-263-6639	Return Samples By:
Name	Signature	Init	Company/Organization/Phone/Cell																								
Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/08888/505-844-4013/505-250-7090																								
William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/08888/505-284-3307/505-239-7367																								
Zachary Tenorio	<i>[Signature]</i>	<i>ZT</i>	SNL/08888/505-845-8636/505-259-5765																								
Denisha Sanchez	<i>[Signature]</i>	<i>DS</i>	SNL/08888/505-845-7829/505-208-1375																								
Timmie Jackson	<i>[Signature]</i>	<i>TJ</i>	SNL/08888/505-284-2547/505-263-6639																								
			Comments: <i>see attached form</i>	Lab Use																							
Relinquished by <i>[Signature]</i>	Org. <i>8888</i> Date <i>3/28/19</i> Time <i>1015</i>	Relinquished by	Org. _____ Date _____ Time _____																								
Received by <i>[Signature]</i>	Org. <i>00642</i> Date <i>3/28/19</i> Time <i>1015</i>	Received by	Org. _____ Date _____ Time _____																								
Relinquished by <i>[Signature]</i>	Org. <i>00642</i> Date <i>4/01/19</i> Time <i>1130</i>	Relinquished by	Org. _____ Date _____ Time _____																								
Received by <i>[Signature]</i>	Org. _____ Date <i>4-4-19</i> Time <i>600</i>	Received by	Org. _____ Date _____ Time _____																								

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

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# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. <i>MA</i>	SMO Use	AR/COC	<b>619619</b>
Project Name: CWL PCCP	Date Samples Shipped: <i>4-01-19</i>	SMO Authorization: <i>[Signature]</i>	
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. <i>296028</i>	SMO Contact Phone: <i>[Signature]</i>	
Project/Task Number: 195122.10.11.03	Lab Contact: Lee Ann Heathcote/916-373-5600	Wendy Palencia/505-844-3132	
Service Order: CF327-19	Lab Destination: TAL-WS	Send Report to SMO: <input checked="" type="checkbox"/> 4° Celsius	
	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					
<i>LD</i> 107999	001	CWL-D3-350	350	3/28/19 09:50	SG	S	6 L	None	G	SA	VOC (TO-15)	
<i>DB</i> 108000	001	CWL-QC 2	NA	3/28/19 09:41	UPN	S	6 L	None	G	FB	VOC (TO-15)	
<i>BS</i> 108038	001	CWL-TRUCK-QC	NA	3/28/19 09:45	AIR	S	6 L	None	G	FB	VOC (TO-15)	
<i>LI</i> 108039	001	CWL-AMB-QC	NA	3/28/19 09:42	AIR	S	6 L	None	G	FB	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	
	Robert Lynch	<i>[Signature]</i>	<i>[Init]</i>	SNL/08888/505-844-4013/505-250-7090	Return Samples By: Comments: See attached log		
	William Gibson	<i>[Signature]</i>	<i>[Init]</i>	SNL/08888/505-284-3307/505-239-7367			
	Zachary Tenorio	<i>[Signature]</i>	<i>[Init]</i>	SNL/08888/505-845-8636/505-259-5765			
	Denisha Sanchez	<i>[Signature]</i>	<i>[Init]</i>	SNL/08888/505-845-7829/505-208-1375			
Timmie Jackson	<i>[Signature]</i>	<i>[Init]</i>	SNL/08888/505-284-2547/505-263-6639				
Relinquished by <i>[Signature]</i>	Org. <i>8881</i>	Date <i>3/28/19</i>	Time <i>1015</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>00642</i>	Date <i>3/28/19</i>	Time <i>1015</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org. <i>00642</i>	Date <i>04-01-19</i>	Time <i>1130</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org.	Date <i>4-4-19</i>	Time <i>0800</i>	Received by	Org.	Date	Time

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

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**CONTRACT VERIFICATION REVIEW FORMS**  
**CWL SOIL-GAS MONITORING**  
**MARCH 2019**

<b>AR/COC Number</b>	<b>Sample Type</b>
619618	Environmental
619619	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 PCCP

Project/Task No. 195122\_10.11.03

ARCOG No. 619618 &amp; 619619

Analytical Lab TAL-WS

SDG No. 320-48958-1

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		
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		

Line No.	Item	Complete?		If no, explain
		Yes	No	
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 or 1-sigma for bioassay) and tracer recovery (if applicable) reported	N/A		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	X		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	N/A		

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
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		
	c) Laboratory control sample duplicate RPD data reported and met for other analyses	X		
3.5	Blank data a) Method or reagent blank data reported and met for all samples		X	1,2-Dichloro-1,1,2,2-tetrafluoroethane, methylene chloride and dichlorodifluoromethane detected in method blank (batch 289077)
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	1,1-Dichloroethene, methylene chloride, 1,1,2-trichloro-1,2,2-trifluoroethane and trichloroethene detected in CWL QC 1. Acetone, methylene chloride and trichloroethene detected in CWL-QC 2. Several compounds detected in CWL-TRUCK-QC and CWL-AMB-QC.
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 and TO-15) a) 12-hour tune check provided	X		
	b) Initial calibration provided	X		

Line No.	Item	Yes	No	Comments
	c) Continuing calibration provided	X		
	d) Internal standard performance data provided	X		
	e) Instrument run logs provided	X		
4.2	GC/HPLC (8330, 8082, 9070A, and 8010) a) Initial calibration provided	N/A		
	b) Continuing calibration provided	N/A		
	c) Instrument run logs provided	N/A		
4.3	HRGC/HRMS (1668 and 8290) a) 12-hour tune check provided	N/A		
	b) Initial calibration provided	N/A		
	c) Continuing calibration provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Labeled compound recovery data provided	N/A		
	f) RRTs for samples and standards provided	N/A		
	g) Ion abundance ratios for samples and standards provided	N/A		
	h) Instrument run logs provided	N/A		
4.4	LC/MS/MS (6850 and 8330) a) Initial calibration provided	N/A		
	b) Continuing calibration provided	N/A		
	c) CRI provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals) a) Initial calibration provided	N/A		

Line No.	Item	Yes	No	Comments
	b) Continuing calibration provided	N/A		
	c) ICP interference check sample data provided	N/A		
	d) ICP serial dilution provided	N/A		
	e) Instrument run logs provided	N/A		
4.6	Radiochemistry and General Chemistry a) Instrument run logs provided	N/A		

## 5.0 Data Anomaly Report

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

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

Reviewed by: Wendy Palencia Date: 05-07-2019 01:34:00

Closed by: Wendy Palencia Date: 05-07-2019 01:34:00

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

**Chemical Waste Landfill**

**January 2019 Samples**

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106945-001/CWL-QC1**

**Lab Sample ID: 320-47154-1**

**Date Collected: 01/17/19 12:17**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		5.0	0.18	ppb v/v			02/04/19 16:53	1
Benzene	ND		0.40	0.079	ppb v/v			02/04/19 16:53	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			02/04/19 16:53	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			02/04/19 16:53	1
Bromoform	ND		0.40	0.070	ppb v/v			02/04/19 16:53	1
Bromomethane	ND		0.80	0.34	ppb v/v			02/04/19 16:53	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			02/04/19 16:53	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			02/04/19 16:53	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			02/04/19 16:53	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			02/04/19 16:53	1
Chloroethane	ND		0.80	0.31	ppb v/v			02/04/19 16:53	1
Chloroform	ND		0.30	0.095	ppb v/v			02/04/19 16:53	1
Chloromethane	ND		0.80	0.20	ppb v/v			02/04/19 16:53	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			02/04/19 16:53	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			02/04/19 16:53	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			02/04/19 16:53	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			02/04/19 16:53	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			02/04/19 16:53	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			02/04/19 16:53	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			02/04/19 16:53	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			02/04/19 16:53	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			02/04/19 16:53	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			02/04/19 16:53	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			02/04/19 16:53	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			02/04/19 16:53	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			02/04/19 16:53	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			02/04/19 16:53	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			02/04/19 16:53	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			02/04/19 16:53	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			02/04/19 16:53	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			02/04/19 16:53	1
2-Hexanone	ND		0.40	0.087	ppb v/v			02/04/19 16:53	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			02/04/19 16:53	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			02/04/19 16:53	1
Styrene	ND		0.40	0.059	ppb v/v			02/04/19 16:53	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			02/04/19 16:53	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			02/04/19 16:53	1
Toluene	ND		0.40	0.051	ppb v/v			02/04/19 16:53	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			02/04/19 16:53	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			02/04/19 16:53	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			02/04/19 16:53	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			02/04/19 16:53	1
Trichloroethene	ND		0.40	0.11	ppb v/v			02/04/19 16:53	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			02/04/19 16:53	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			02/04/19 16:53	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			02/04/19 16:53	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			02/04/19 16:53	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			02/04/19 16:53	1

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106945-001/CWL-QC1**

**Lab Sample ID: 320-47154-1**

**Date Collected: 01/17/19 12:17**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		0.80	0.10	ppb v/v			02/04/19 16:53	1
o-Xylene	ND		0.40	0.054	ppb v/v			02/04/19 16:53	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		70 - 130					02/04/19 16:53	1
1,2-Dichloroethane-d4 (Surr)	97		70 - 130					02/04/19 16:53	1
Toluene-d8 (Surr)	98		70 - 130					02/04/19 16:53	1

**Client Sample ID: 106946-001/CWL-UI1-40**

**Lab Sample ID: 320-47154-2**

**Date Collected: 01/17/19 12:22**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		350	12	ppb v/v			02/04/19 17:46	69.5
Benzene	ND		28	5.5	ppb v/v			02/04/19 17:46	69.5
Benzyl chloride	ND		56	11	ppb v/v			02/04/19 17:46	69.5
Bromodichloromethane	ND		21	4.6	ppb v/v			02/04/19 17:46	69.5
Bromoform	ND		28	4.9	ppb v/v			02/04/19 17:46	69.5
Bromomethane	ND		56	23	ppb v/v			02/04/19 17:46	69.5
2-Butanone (MEK)	ND		56	14	ppb v/v			02/04/19 17:46	69.5
Carbon disulfide	ND		56	5.4	ppb v/v			02/04/19 17:46	69.5
<b>Carbon tetrachloride</b>	<b>11</b>	<b>J</b>	56	4.4	ppb v/v			02/04/19 17:46	69.5
Chlorobenzene	ND		21	4.4	ppb v/v			02/04/19 17:46	69.5
Chloroethane	ND		56	21	ppb v/v			02/04/19 17:46	69.5
<b>Chloroform</b>	<b>510</b>		21	6.6	ppb v/v			02/04/19 17:46	69.5
Chloromethane	ND		56	14	ppb v/v			02/04/19 17:46	69.5
Dibromochloromethane	ND		28	5.5	ppb v/v			02/04/19 17:46	69.5
1,2-Dibromoethane (EDB)	ND		56	5.2	ppb v/v			02/04/19 17:46	69.5
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		28	11	ppb v/v			02/04/19 17:46	69.5
1,2-Dichlorobenzene	ND		28	9.0	ppb v/v			02/04/19 17:46	69.5
1,3-Dichlorobenzene	ND		28	7.6	ppb v/v			02/04/19 17:46	69.5
1,4-Dichlorobenzene	ND		28	10	ppb v/v			02/04/19 17:46	69.5
<b>Dichlorodifluoromethane</b>	<b>24</b>	<b>J</b>	28	10	ppb v/v			02/04/19 17:46	69.5
<b>1,1-Dichloroethane</b>	<b>9.3</b>	<b>J</b>	21	5.0	ppb v/v			02/04/19 17:46	69.5
1,2-Dichloroethane	ND		56	6.1	ppb v/v			02/04/19 17:46	69.5
<b>1,1-Dichloroethene</b>	<b>130</b>		56	9.0	ppb v/v			02/04/19 17:46	69.5
cis-1,2-Dichloroethene	ND		28	6.2	ppb v/v			02/04/19 17:46	69.5
trans-1,2-Dichloroethene	ND		28	7.0	ppb v/v			02/04/19 17:46	69.5
<b>1,2-Dichloropropane</b>	<b>36</b>		28	17	ppb v/v			02/04/19 17:46	69.5
cis-1,3-Dichloropropene	ND		28	7.2	ppb v/v			02/04/19 17:46	69.5
trans-1,3-Dichloropropene	ND		28	6.1	ppb v/v			02/04/19 17:46	69.5
Ethylbenzene	ND		28	4.4	ppb v/v			02/04/19 17:46	69.5
4-Ethyltoluene	ND		28	13	ppb v/v			02/04/19 17:46	69.5
Hexachlorobutadiene	ND		140	30	ppb v/v			02/04/19 17:46	69.5
2-Hexanone	ND		28	6.0	ppb v/v			02/04/19 17:46	69.5
4-Methyl-2-pentanone (MIBK)	ND		28	9.4	ppb v/v			02/04/19 17:46	69.5
<b>Methylene Chloride</b>	<b>7.7</b>	<b>J</b>	28	5.0	ppb v/v			02/04/19 17:46	69.5

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106946-001/CWL-UI1-40**

**Lab Sample ID: 320-47154-2**

**Date Collected: 01/17/19 12:22**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		28	4.1	ppb v/v			02/04/19 17:46	69.5
1,1,2,2-Tetrachloroethane	ND		28	4.8	ppb v/v			02/04/19 17:46	69.5
<b>Tetrachloroethene</b>	<b>3000</b>		28	3.5	ppb v/v			02/04/19 17:46	69.5
Toluene	ND		28	3.5	ppb v/v			02/04/19 17:46	69.5
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>500</b>		28	11	ppb v/v			02/04/19 17:46	69.5
1,2,4-Trichlorobenzene	ND		140	30	ppb v/v			02/04/19 17:46	69.5
<b>1,1,1-Trichloroethane</b>	<b>31</b>		21	4.5	ppb v/v			02/04/19 17:46	69.5
<b>1,1,2-Trichloroethane</b>	<b>7.4 J</b>		28	4.7	ppb v/v			02/04/19 17:46	69.5
<b>Trichloroethene</b>	<b>4400</b>		28	7.3	ppb v/v			02/04/19 17:46	69.5
<b>Trichlorofluoromethane</b>	<b>150</b>		28	14	ppb v/v			02/04/19 17:46	69.5
1,2,4-Trimethylbenzene	ND		56	11	ppb v/v			02/04/19 17:46	69.5
1,3,5-Trimethylbenzene	ND		28	8.7	ppb v/v			02/04/19 17:46	69.5
Vinyl acetate	ND		56	10	ppb v/v			02/04/19 17:46	69.5
Vinyl chloride	ND		28	8.3	ppb v/v			02/04/19 17:46	69.5
m,p-Xylene	ND		56	7.0	ppb v/v			02/04/19 17:46	69.5
<b>o-Xylene</b>	<b>5.9 J B</b>		28	3.8	ppb v/v			02/04/19 17:46	69.5
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	77		70 - 130					02/04/19 17:46	69.5
1,2-Dichloroethane-d4 (Surr)	101		70 - 130					02/04/19 17:46	69.5
Toluene-d8 (Surr)	98		70 - 130					02/04/19 17:46	69.5

**Client Sample ID: 106947-001/CWL-UI1-80**

**Lab Sample ID: 320-47154-3**

**Date Collected: 01/17/19 12:24**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		460	16	ppb v/v			02/04/19 18:37	91.3
Benzene	ND		37	7.2	ppb v/v			02/04/19 18:37	91.3
Benzyl chloride	ND		73	15	ppb v/v			02/04/19 18:37	91.3
Bromodichloromethane	ND		27	6.0	ppb v/v			02/04/19 18:37	91.3
Bromoform	ND		37	6.4	ppb v/v			02/04/19 18:37	91.3
Bromomethane	ND		73	31	ppb v/v			02/04/19 18:37	91.3
2-Butanone (MEK)	ND		73	18	ppb v/v			02/04/19 18:37	91.3
Carbon disulfide	ND		73	7.1	ppb v/v			02/04/19 18:37	91.3
<b>Carbon tetrachloride</b>	<b>12 J</b>		73	5.8	ppb v/v			02/04/19 18:37	91.3
Chlorobenzene	ND		27	5.8	ppb v/v			02/04/19 18:37	91.3
Chloroethane	ND		73	28	ppb v/v			02/04/19 18:37	91.3
<b>Chloroform</b>	<b>400</b>		27	8.7	ppb v/v			02/04/19 18:37	91.3
Chloromethane	ND		73	18	ppb v/v			02/04/19 18:37	91.3
Dibromochloromethane	ND		37	7.2	ppb v/v			02/04/19 18:37	91.3
1,2-Dibromoethane (EDB)	ND		73	6.8	ppb v/v			02/04/19 18:37	91.3
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		37	14	ppb v/v			02/04/19 18:37	91.3
1,2-Dichlorobenzene	ND		37	12	ppb v/v			02/04/19 18:37	91.3
1,3-Dichlorobenzene	ND		37	10	ppb v/v			02/04/19 18:37	91.3
1,4-Dichlorobenzene	ND		37	14	ppb v/v			02/04/19 18:37	91.3

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106947-001/CWL-UI1-80**

**Lab Sample ID: 320-47154-3**

**Date Collected: 01/17/19 12:24**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	27	J	37	13	ppb v/v			02/04/19 18:37	91.3
1,1-Dichloroethane	12	J	27	6.6	ppb v/v			02/04/19 18:37	91.3
1,2-Dichloroethane	15	J	73	8.0	ppb v/v			02/04/19 18:37	91.3
1,1-Dichloroethene	230		73	12	ppb v/v			02/04/19 18:37	91.3
cis-1,2-Dichloroethene	ND		37	8.1	ppb v/v			02/04/19 18:37	91.3
trans-1,2-Dichloroethene	ND		37	9.1	ppb v/v			02/04/19 18:37	91.3
1,2-Dichloropropane	52		37	22	ppb v/v			02/04/19 18:37	91.3
cis-1,3-Dichloropropene	ND		37	9.5	ppb v/v			02/04/19 18:37	91.3
trans-1,3-Dichloropropene	ND		37	8.0	ppb v/v			02/04/19 18:37	91.3
Ethylbenzene	ND		37	5.8	ppb v/v			02/04/19 18:37	91.3
4-Ethyltoluene	ND		37	17	ppb v/v			02/04/19 18:37	91.3
Hexachlorobutadiene	ND		180	39	ppb v/v			02/04/19 18:37	91.3
2-Hexanone	ND		37	7.9	ppb v/v			02/04/19 18:37	91.3
4-Methyl-2-pentanone (MIBK)	ND		37	12	ppb v/v			02/04/19 18:37	91.3
Methylene Chloride	42		37	6.6	ppb v/v			02/04/19 18:37	91.3
Styrene	ND		37	5.4	ppb v/v			02/04/19 18:37	91.3
1,1,2,2-Tetrachloroethane	ND		37	6.3	ppb v/v			02/04/19 18:37	91.3
Tetrachloroethene	890		37	4.7	ppb v/v			02/04/19 18:37	91.3
Toluene	ND		37	4.7	ppb v/v			02/04/19 18:37	91.3
1,1,2-Trichloro-1,2,2-trifluoroethane	580		37	15	ppb v/v			02/04/19 18:37	91.3
1,2,4-Trichlorobenzene	ND		180	40	ppb v/v			02/04/19 18:37	91.3
1,1,1-Trichloroethane	28		27	5.9	ppb v/v			02/04/19 18:37	91.3
1,1,2-Trichloroethane	ND		37	6.1	ppb v/v			02/04/19 18:37	91.3
Trichloroethene	5300		37	9.6	ppb v/v			02/04/19 18:37	91.3
Trichlorofluoromethane	160		37	18	ppb v/v			02/04/19 18:37	91.3
1,2,4-Trimethylbenzene	ND		73	15	ppb v/v			02/04/19 18:37	91.3
1,3,5-Trimethylbenzene	ND		37	11	ppb v/v			02/04/19 18:37	91.3
Vinyl acetate	ND		73	13	ppb v/v			02/04/19 18:37	91.3
Vinyl chloride	ND		37	11	ppb v/v			02/04/19 18:37	91.3
m,p-Xylene	ND		73	9.1	ppb v/v			02/04/19 18:37	91.3
o-Xylene	ND		37	4.9	ppb v/v			02/04/19 18:37	91.3

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	82		70 - 130		02/04/19 18:37	91.3
1,2-Dichloroethane-d4 (Surr)	102		70 - 130		02/04/19 18:37	91.3
Toluene-d8 (Surr)	98		70 - 130		02/04/19 18:37	91.3

**Client Sample ID: 106948-001/CWL-UI1-120**

**Lab Sample ID: 320-47154-4**

**Date Collected: 01/17/19 12:27**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		530	19	ppb v/v			02/04/19 19:29	106
Benzene	ND		42	8.4	ppb v/v			02/04/19 19:29	106
Benzyl chloride	ND		85	17	ppb v/v			02/04/19 19:29	106
Bromodichloromethane	ND		32	7.0	ppb v/v			02/04/19 19:29	106

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106948-001/CWL-UI1-120**

**Lab Sample ID: 320-47154-4**

**Date Collected: 01/17/19 12:27**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		42	7.4	ppb v/v			02/04/19 19:29	106
Bromomethane	ND		85	36	ppb v/v			02/04/19 19:29	106
2-Butanone (MEK)	ND		85	21	ppb v/v			02/04/19 19:29	106
Carbon disulfide	ND		85	8.3	ppb v/v			02/04/19 19:29	106
<b>Carbon tetrachloride</b>	<b>16</b>	<b>J</b>	85	6.8	ppb v/v			02/04/19 19:29	106
Chlorobenzene	ND		32	6.8	ppb v/v			02/04/19 19:29	106
Chloroethane	ND		85	33	ppb v/v			02/04/19 19:29	106
<b>Chloroform</b>	<b>370</b>		32	10	ppb v/v			02/04/19 19:29	106
Chloromethane	ND		85	21	ppb v/v			02/04/19 19:29	106
Dibromochloromethane	ND		42	8.4	ppb v/v			02/04/19 19:29	106
1,2-Dibromoethane (EDB)	ND		85	8.0	ppb v/v			02/04/19 19:29	106
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		42	16	ppb v/v			02/04/19 19:29	106
1,2-Dichlorobenzene	ND		42	14	ppb v/v			02/04/19 19:29	106
1,3-Dichlorobenzene	ND		42	12	ppb v/v			02/04/19 19:29	106
1,4-Dichlorobenzene	ND		42	16	ppb v/v			02/04/19 19:29	106
<b>Dichlorodifluoromethane</b>	<b>31</b>	<b>J</b>	42	15	ppb v/v			02/04/19 19:29	106
<b>1,1-Dichloroethane</b>	<b>15</b>	<b>J</b>	32	7.6	ppb v/v			02/04/19 19:29	106
<b>1,2-Dichloroethane</b>	<b>32</b>	<b>J</b>	85	9.3	ppb v/v			02/04/19 19:29	106
<b>1,1-Dichloroethene</b>	<b>290</b>		85	14	ppb v/v			02/04/19 19:29	106
cis-1,2-Dichloroethene	ND		42	9.4	ppb v/v			02/04/19 19:29	106
trans-1,2-Dichloroethene	ND		42	11	ppb v/v			02/04/19 19:29	106
<b>1,2-Dichloropropane</b>	<b>68</b>		42	25	ppb v/v			02/04/19 19:29	106
cis-1,3-Dichloropropene	ND		42	11	ppb v/v			02/04/19 19:29	106
trans-1,3-Dichloropropene	ND		42	9.3	ppb v/v			02/04/19 19:29	106
Ethylbenzene	ND		42	6.7	ppb v/v			02/04/19 19:29	106
4-Ethyltoluene	ND		42	20	ppb v/v			02/04/19 19:29	106
Hexachlorobutadiene	ND		210	46	ppb v/v			02/04/19 19:29	106
2-Hexanone	ND		42	9.2	ppb v/v			02/04/19 19:29	106
4-Methyl-2-pentanone (MIBK)	ND		42	14	ppb v/v			02/04/19 19:29	106
<b>Methylene Chloride</b>	<b>120</b>		42	7.6	ppb v/v			02/04/19 19:29	106
Styrene	ND		42	6.3	ppb v/v			02/04/19 19:29	106
1,1,2,2-Tetrachloroethane	ND		42	7.3	ppb v/v			02/04/19 19:29	106
<b>Tetrachloroethene</b>	<b>680</b>		42	5.4	ppb v/v			02/04/19 19:29	106
Toluene	ND		42	5.4	ppb v/v			02/04/19 19:29	106
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>670</b>		42	17	ppb v/v			02/04/19 19:29	106
1,2,4-Trichlorobenzene	ND		210	46	ppb v/v			02/04/19 19:29	106
<b>1,1,1-Trichloroethane</b>	<b>28</b>	<b>J</b>	32	6.9	ppb v/v			02/04/19 19:29	106
1,1,2-Trichloroethane	ND		42	7.1	ppb v/v			02/04/19 19:29	106
<b>Trichloroethene</b>	<b>6600</b>		42	11	ppb v/v			02/04/19 19:29	106
<b>Trichlorofluoromethane</b>	<b>190</b>		42	21	ppb v/v			02/04/19 19:29	106
1,2,4-Trimethylbenzene	ND		85	17	ppb v/v			02/04/19 19:29	106
1,3,5-Trimethylbenzene	ND		42	13	ppb v/v			02/04/19 19:29	106
Vinyl acetate	ND		85	15	ppb v/v			02/04/19 19:29	106
Vinyl chloride	ND		42	13	ppb v/v			02/04/19 19:29	106
m,p-Xylene	ND		85	11	ppb v/v			02/04/19 19:29	106
o-Xylene	ND		42	5.7	ppb v/v			02/04/19 19:29	106

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106948-001/CWL-UI1-120**

**Lab Sample ID: 320-47154-4**

**Date Collected: 01/17/19 12:27**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**Sample Container: Summa Canister 6L**

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	83		70 - 130		02/04/19 19:29	106
1,2-Dichloroethane-d4 (Surr)	102		70 - 130		02/04/19 19:29	106
Toluene-d8 (Surr)	98		70 - 130		02/04/19 19:29	106

**Client Sample ID: 106949-001/CWL-QC2**

**Lab Sample ID: 320-47154-5**

**Date Collected: 01/17/19 10:05**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		5.0	0.18	ppb v/v			02/04/19 20:32	1
Benzene	ND		0.40	0.079	ppb v/v			02/04/19 20:32	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			02/04/19 20:32	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			02/04/19 20:32	1
Bromoform	ND		0.40	0.070	ppb v/v			02/04/19 20:32	1
Bromomethane	ND		0.80	0.34	ppb v/v			02/04/19 20:32	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			02/04/19 20:32	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			02/04/19 20:32	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			02/04/19 20:32	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			02/04/19 20:32	1
Chloroethane	ND		0.80	0.31	ppb v/v			02/04/19 20:32	1
Chloroform	ND		0.30	0.095	ppb v/v			02/04/19 20:32	1
Chloromethane	ND		0.80	0.20	ppb v/v			02/04/19 20:32	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			02/04/19 20:32	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			02/04/19 20:32	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			02/04/19 20:32	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			02/04/19 20:32	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			02/04/19 20:32	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			02/04/19 20:32	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			02/04/19 20:32	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			02/04/19 20:32	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			02/04/19 20:32	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			02/04/19 20:32	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			02/04/19 20:32	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			02/04/19 20:32	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			02/04/19 20:32	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			02/04/19 20:32	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			02/04/19 20:32	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			02/04/19 20:32	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			02/04/19 20:32	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			02/04/19 20:32	1
2-Hexanone	ND		0.40	0.087	ppb v/v			02/04/19 20:32	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			02/04/19 20:32	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			02/04/19 20:32	1
Styrene	ND		0.40	0.059	ppb v/v			02/04/19 20:32	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			02/04/19 20:32	1
<b>Tetrachloroethene</b>	<b>0.11</b>	<b>J</b>	0.40	0.051	ppb v/v			02/04/19 20:32	1
Toluene	ND		0.40	0.051	ppb v/v			02/04/19 20:32	1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106949-001/CWL-QC2**

**Lab Sample ID: 320-47154-5**

**Date Collected: 01/17/19 10:05**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		0.40	0.16	ppb v/v			02/04/19 20:32	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			02/04/19 20:32	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			02/04/19 20:32	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			02/04/19 20:32	1
<b>Trichloroethene</b>	<b>0.64</b>		0.40	0.11	ppb v/v			02/04/19 20:32	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			02/04/19 20:32	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			02/04/19 20:32	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			02/04/19 20:32	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			02/04/19 20:32	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			02/04/19 20:32	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			02/04/19 20:32	1
o-Xylene	ND		0.40	0.054	ppb v/v			02/04/19 20:32	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	90		70 - 130					02/04/19 20:32	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 130					02/04/19 20:32	1
Toluene-d8 (Surr)	98		70 - 130					02/04/19 20:32	1

**Client Sample ID: 106950-001/CWL-UI2-36**

**Lab Sample ID: 320-47154-6**

**Date Collected: 01/17/19 10:12**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		230	8.1	ppb v/v			02/04/19 21:24	45.4
Benzene	ND		18	3.6	ppb v/v			02/04/19 21:24	45.4
Benzyl chloride	ND		36	7.4	ppb v/v			02/04/19 21:24	45.4
Bromodichloromethane	ND		14	3.0	ppb v/v			02/04/19 21:24	45.4
Bromoform	ND		18	3.2	ppb v/v			02/04/19 21:24	45.4
Bromomethane	ND		36	15	ppb v/v			02/04/19 21:24	45.4
2-Butanone (MEK)	ND		36	9.0	ppb v/v			02/04/19 21:24	45.4
Carbon disulfide	ND		36	3.5	ppb v/v			02/04/19 21:24	45.4
<b>Carbon tetrachloride</b>	<b>7.6</b>	<b>J</b>	36	2.9	ppb v/v			02/04/19 21:24	45.4
Chlorobenzene	ND		14	2.9	ppb v/v			02/04/19 21:24	45.4
Chloroethane	ND		36	14	ppb v/v			02/04/19 21:24	45.4
<b>Chloroform</b>	<b>400</b>		14	4.3	ppb v/v			02/04/19 21:24	45.4
Chloromethane	ND		36	8.9	ppb v/v			02/04/19 21:24	45.4
Dibromochloromethane	ND		18	3.6	ppb v/v			02/04/19 21:24	45.4
1,2-Dibromoethane (EDB)	ND		36	3.4	ppb v/v			02/04/19 21:24	45.4
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		18	7.0	ppb v/v			02/04/19 21:24	45.4
1,2-Dichlorobenzene	ND		18	5.9	ppb v/v			02/04/19 21:24	45.4
1,3-Dichlorobenzene	ND		18	5.0	ppb v/v			02/04/19 21:24	45.4
1,4-Dichlorobenzene	ND		18	6.8	ppb v/v			02/04/19 21:24	45.4
<b>Dichlorodifluoromethane</b>	<b>15</b>	<b>J</b>	18	6.6	ppb v/v			02/04/19 21:24	45.4
<b>1,1-Dichloroethane</b>	<b>3.4</b>	<b>J</b>	14	3.3	ppb v/v			02/04/19 21:24	45.4
1,2-Dichloroethane	ND		36	4.0	ppb v/v			02/04/19 21:24	45.4
<b>1,1-Dichloroethene</b>	<b>33</b>	<b>J</b>	36	5.9	ppb v/v			02/04/19 21:24	45.4
cis-1,2-Dichloroethene	ND		18	4.0	ppb v/v			02/04/19 21:24	45.4

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106950-001/CWL-UI2-36**

**Lab Sample ID: 320-47154-6**

**Date Collected: 01/17/19 10:12**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		18	4.5	ppb v/v			02/04/19 21:24	45.4
<b>1,2-Dichloropropane</b>	<b>38</b>		18	11	ppb v/v			02/04/19 21:24	45.4
cis-1,3-Dichloropropene	ND		18	4.7	ppb v/v			02/04/19 21:24	45.4
trans-1,3-Dichloropropene	ND		18	4.0	ppb v/v			02/04/19 21:24	45.4
Ethylbenzene	ND		18	2.9	ppb v/v			02/04/19 21:24	45.4
4-Ethyltoluene	ND		18	8.5	ppb v/v			02/04/19 21:24	45.4
Hexachlorobutadiene	ND		91	20	ppb v/v			02/04/19 21:24	45.4
2-Hexanone	ND		18	3.9	ppb v/v			02/04/19 21:24	45.4
4-Methyl-2-pentanone (MIBK)	ND		18	6.1	ppb v/v			02/04/19 21:24	45.4
<b>Methylene Chloride</b>	<b>4.6</b>	<b>J</b>	18	3.3	ppb v/v			02/04/19 21:24	45.4
Styrene	ND		18	2.7	ppb v/v			02/04/19 21:24	45.4
1,1,2,2-Tetrachloroethane	ND		18	3.1	ppb v/v			02/04/19 21:24	45.4
<b>Tetrachloroethene</b>	<b>140</b>		18	2.3	ppb v/v			02/04/19 21:24	45.4
Toluene	ND		18	2.3	ppb v/v			02/04/19 21:24	45.4
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>310</b>		18	7.4	ppb v/v			02/04/19 21:24	45.4
1,2,4-Trichlorobenzene	ND		91	20	ppb v/v			02/04/19 21:24	45.4
<b>1,1,1-Trichloroethane</b>	<b>18</b>		14	3.0	ppb v/v			02/04/19 21:24	45.4
1,1,2-Trichloroethane	ND		18	3.0	ppb v/v			02/04/19 21:24	45.4
<b>Trichloroethene</b>	<b>2500</b>		18	4.8	ppb v/v			02/04/19 21:24	45.4
<b>Trichlorofluoromethane</b>	<b>95</b>		18	8.9	ppb v/v			02/04/19 21:24	45.4
1,2,4-Trimethylbenzene	ND		36	7.4	ppb v/v			02/04/19 21:24	45.4
1,3,5-Trimethylbenzene	ND		18	5.7	ppb v/v			02/04/19 21:24	45.4
Vinyl acetate	ND		36	6.6	ppb v/v			02/04/19 21:24	45.4
Vinyl chloride	ND		18	5.4	ppb v/v			02/04/19 21:24	45.4
m,p-Xylene	ND		36	4.5	ppb v/v			02/04/19 21:24	45.4
o-Xylene	ND		18	2.5	ppb v/v			02/04/19 21:24	45.4
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	83		70 - 130					02/04/19 21:24	45.4
1,2-Dichloroethane-d4 (Surr)	104		70 - 130					02/04/19 21:24	45.4
Toluene-d8 (Surr)	99		70 - 130					02/04/19 21:24	45.4

**Client Sample ID: 106951-001/CWL-UI2-76**

**Lab Sample ID: 320-47154-7**

**Date Collected: 01/17/19 10:20**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		350	13	ppb v/v			02/04/19 22:16	70.6
Benzene	ND		28	5.6	ppb v/v			02/04/19 22:16	70.6
Benzyl chloride	ND		56	12	ppb v/v			02/04/19 22:16	70.6
Bromodichloromethane	ND		21	4.7	ppb v/v			02/04/19 22:16	70.6
Bromoform	ND		28	4.9	ppb v/v			02/04/19 22:16	70.6
Bromomethane	ND		56	24	ppb v/v			02/04/19 22:16	70.6
2-Butanone (MEK)	ND		56	14	ppb v/v			02/04/19 22:16	70.6
Carbon disulfide	ND		56	5.5	ppb v/v			02/04/19 22:16	70.6
<b>Carbon tetrachloride</b>	<b>13</b>	<b>J</b>	56	4.5	ppb v/v			02/04/19 22:16	70.6

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106951-001/CWL-UI2-76**

**Lab Sample ID: 320-47154-7**

**Date Collected: 01/17/19 10:20**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		21	4.5	ppb v/v			02/04/19 22:16	70.6
Chloroethane	ND		56	22	ppb v/v			02/04/19 22:16	70.6
<b>Chloroform</b>	<b>490</b>		21	6.7	ppb v/v			02/04/19 22:16	70.6
Chloromethane	ND		56	14	ppb v/v			02/04/19 22:16	70.6
Dibromochloromethane	ND		28	5.6	ppb v/v			02/04/19 22:16	70.6
1,2-Dibromoethane (EDB)	ND		56	5.3	ppb v/v			02/04/19 22:16	70.6
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		28	11	ppb v/v			02/04/19 22:16	70.6
1,2-Dichlorobenzene	ND		28	9.2	ppb v/v			02/04/19 22:16	70.6
1,3-Dichlorobenzene	ND		28	7.8	ppb v/v			02/04/19 22:16	70.6
1,4-Dichlorobenzene	ND		28	11	ppb v/v			02/04/19 22:16	70.6
<b>Dichlorodifluoromethane</b>	<b>23 J</b>		28	10	ppb v/v			02/04/19 22:16	70.6
<b>1,1-Dichloroethane</b>	<b>6.1 J</b>		21	5.1	ppb v/v			02/04/19 22:16	70.6
1,2-Dichloroethane	ND		56	6.2	ppb v/v			02/04/19 22:16	70.6
<b>1,1-Dichloroethene</b>	<b>80</b>		56	9.1	ppb v/v			02/04/19 22:16	70.6
cis-1,2-Dichloroethene	ND		28	6.3	ppb v/v			02/04/19 22:16	70.6
trans-1,2-Dichloroethene	ND		28	7.1	ppb v/v			02/04/19 22:16	70.6
<b>1,2-Dichloropropane</b>	<b>76</b>		28	17	ppb v/v			02/04/19 22:16	70.6
cis-1,3-Dichloropropene	ND		28	7.3	ppb v/v			02/04/19 22:16	70.6
trans-1,3-Dichloropropene	ND		28	6.2	ppb v/v			02/04/19 22:16	70.6
Ethylbenzene	ND		28	4.4	ppb v/v			02/04/19 22:16	70.6
4-Ethyltoluene	ND		28	13	ppb v/v			02/04/19 22:16	70.6
Hexachlorobutadiene	ND		140	30	ppb v/v			02/04/19 22:16	70.6
2-Hexanone	ND		28	6.1	ppb v/v			02/04/19 22:16	70.6
4-Methyl-2-pentanone (MIBK)	ND		28	9.5	ppb v/v			02/04/19 22:16	70.6
<b>Methylene Chloride</b>	<b>6.3 J</b>		28	5.1	ppb v/v			02/04/19 22:16	70.6
Styrene	ND		28	4.2	ppb v/v			02/04/19 22:16	70.6
1,1,2,2-Tetrachloroethane	ND		28	4.9	ppb v/v			02/04/19 22:16	70.6
<b>Tetrachloroethene</b>	<b>180</b>		28	3.6	ppb v/v			02/04/19 22:16	70.6
Toluene	ND		28	3.6	ppb v/v			02/04/19 22:16	70.6
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>490</b>		28	12	ppb v/v			02/04/19 22:16	70.6
1,2,4-Trichlorobenzene	ND		140	31	ppb v/v			02/04/19 22:16	70.6
<b>1,1,1-Trichloroethane</b>	<b>19 J</b>		21	4.6	ppb v/v			02/04/19 22:16	70.6
1,1,2-Trichloroethane	ND		28	4.7	ppb v/v			02/04/19 22:16	70.6
<b>Trichloroethene</b>	<b>4000</b>		28	7.4	ppb v/v			02/04/19 22:16	70.6
<b>Trichlorofluoromethane</b>	<b>130</b>		28	14	ppb v/v			02/04/19 22:16	70.6
1,2,4-Trimethylbenzene	ND		56	11	ppb v/v			02/04/19 22:16	70.6
1,3,5-Trimethylbenzene	ND		28	8.8	ppb v/v			02/04/19 22:16	70.6
Vinyl acetate	ND		56	10	ppb v/v			02/04/19 22:16	70.6
Vinyl chloride	ND		28	8.5	ppb v/v			02/04/19 22:16	70.6
m,p-Xylene	ND		56	7.1	ppb v/v			02/04/19 22:16	70.6
o-Xylene	ND		28	3.8	ppb v/v			02/04/19 22:16	70.6
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	76		70 - 130					02/04/19 22:16	70.6
1,2-Dichloroethane-d4 (Surr)	105		70 - 130					02/04/19 22:16	70.6
Toluene-d8 (Surr)	100		70 - 130					02/04/19 22:16	70.6

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106952-001/CWL-UI2-76**

**Lab Sample ID: 320-47154-8**

**Date Collected: 01/17/19 10:20**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		350	12	ppb v/v			02/04/19 23:09	69.6
Benzene	ND		28	5.5	ppb v/v			02/04/19 23:09	69.6
Benzyl chloride	ND		56	11	ppb v/v			02/04/19 23:09	69.6
Bromodichloromethane	ND		21	4.6	ppb v/v			02/04/19 23:09	69.6
Bromoform	ND		28	4.9	ppb v/v			02/04/19 23:09	69.6
Bromomethane	ND		56	23	ppb v/v			02/04/19 23:09	69.6
2-Butanone (MEK)	ND		56	14	ppb v/v			02/04/19 23:09	69.6
Carbon disulfide	ND		56	5.4	ppb v/v			02/04/19 23:09	69.6
Carbon tetrachloride	ND		56	4.5	ppb v/v			02/04/19 23:09	69.6
Chlorobenzene	ND		21	4.5	ppb v/v			02/04/19 23:09	69.6
Chloroethane	ND		56	21	ppb v/v			02/04/19 23:09	69.6
<b>Chloroform</b>	<b>510</b>		21	6.6	ppb v/v			02/04/19 23:09	69.6
Chloromethane	ND		56	14	ppb v/v			02/04/19 23:09	69.6
Dibromochloromethane	ND		28	5.5	ppb v/v			02/04/19 23:09	69.6
1,2-Dibromoethane (EDB)	ND		56	5.2	ppb v/v			02/04/19 23:09	69.6
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		28	11	ppb v/v			02/04/19 23:09	69.6
1,2-Dichlorobenzene	ND		28	9.0	ppb v/v			02/04/19 23:09	69.6
1,3-Dichlorobenzene	ND		28	7.7	ppb v/v			02/04/19 23:09	69.6
1,4-Dichlorobenzene	ND		28	10	ppb v/v			02/04/19 23:09	69.6
<b>Dichlorodifluoromethane</b>	<b>23 J</b>		28	10	ppb v/v			02/04/19 23:09	69.6
<b>1,1-Dichloroethane</b>	<b>5.7 J</b>		21	5.0	ppb v/v			02/04/19 23:09	69.6
<b>1,2-Dichloroethane</b>	<b>6.2 J</b>		56	6.1	ppb v/v			02/04/19 23:09	69.6
<b>1,1-Dichloroethene</b>	<b>81</b>		56	9.0	ppb v/v			02/04/19 23:09	69.6
cis-1,2-Dichloroethene	ND		28	6.2	ppb v/v			02/04/19 23:09	69.6
trans-1,2-Dichloroethene	ND		28	7.0	ppb v/v			02/04/19 23:09	69.6
<b>1,2-Dichloropropane</b>	<b>78</b>		28	17	ppb v/v			02/04/19 23:09	69.6
cis-1,3-Dichloropropene	ND		28	7.2	ppb v/v			02/04/19 23:09	69.6
trans-1,3-Dichloropropene	ND		28	6.1	ppb v/v			02/04/19 23:09	69.6
Ethylbenzene	ND		28	4.4	ppb v/v			02/04/19 23:09	69.6
4-Ethyltoluene	ND		28	13	ppb v/v			02/04/19 23:09	69.6
Hexachlorobutadiene	ND		140	30	ppb v/v			02/04/19 23:09	69.6
2-Hexanone	ND		28	6.1	ppb v/v			02/04/19 23:09	69.6
4-Methyl-2-pentanone (MIBK)	ND		28	9.4	ppb v/v			02/04/19 23:09	69.6
Methylene Chloride	ND		28	5.0	ppb v/v			02/04/19 23:09	69.6
Styrene	ND		28	4.1	ppb v/v			02/04/19 23:09	69.6
1,1,2,2-Tetrachloroethane	ND		28	4.8	ppb v/v			02/04/19 23:09	69.6
<b>Tetrachloroethene</b>	<b>180</b>		28	3.5	ppb v/v			02/04/19 23:09	69.6
Toluene	ND		28	3.5	ppb v/v			02/04/19 23:09	69.6
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>490</b>		28	11	ppb v/v			02/04/19 23:09	69.6
1,2,4-Trichlorobenzene	ND		140	30	ppb v/v			02/04/19 23:09	69.6
<b>1,1,1-Trichloroethane</b>	<b>19 J</b>		21	4.5	ppb v/v			02/04/19 23:09	69.6
1,1,2-Trichloroethane	ND		28	4.7	ppb v/v			02/04/19 23:09	69.6
<b>Trichloroethene</b>	<b>4100</b>		28	7.3	ppb v/v			02/04/19 23:09	69.6
<b>Trichlorofluoromethane</b>	<b>140</b>		28	14	ppb v/v			02/04/19 23:09	69.6
1,2,4-Trimethylbenzene	ND		56	11	ppb v/v			02/04/19 23:09	69.6
1,3,5-Trimethylbenzene	ND		28	8.7	ppb v/v			02/04/19 23:09	69.6
Vinyl acetate	ND		56	10	ppb v/v			02/04/19 23:09	69.6
Vinyl chloride	ND		28	8.4	ppb v/v			02/04/19 23:09	69.6

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106952-001/CWL-UI2-76**

**Lab Sample ID: 320-47154-8**

**Date Collected: 01/17/19 10:20**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		56	7.0	ppb v/v			02/04/19 23:09	69.6
o-Xylene	ND		28	3.8	ppb v/v			02/04/19 23:09	69.6
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	79		70 - 130					02/04/19 23:09	69.6
1,2-Dichloroethane-d4 (Surr)	107		70 - 130					02/04/19 23:09	69.6
Toluene-d8 (Surr)	99		70 - 130					02/04/19 23:09	69.6

**Client Sample ID: 106953-001/CWL-UI2-136**

**Lab Sample ID: 320-47154-9**

**Date Collected: 01/17/19 10:30**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		370	13	ppb v/v			02/05/19 00:01	73
Benzene	ND		29	5.8	ppb v/v			02/05/19 00:01	73
Benzyl chloride	ND		58	12	ppb v/v			02/05/19 00:01	73
Bromodichloromethane	ND		22	4.8	ppb v/v			02/05/19 00:01	73
Bromoform	ND		29	5.1	ppb v/v			02/05/19 00:01	73
Bromomethane	ND		58	24	ppb v/v			02/05/19 00:01	73
2-Butanone (MEK)	ND		58	15	ppb v/v			02/05/19 00:01	73
Carbon disulfide	ND		58	5.7	ppb v/v			02/05/19 00:01	73
<b>Carbon tetrachloride</b>	<b>14</b>	<b>J</b>	58	4.7	ppb v/v			02/05/19 00:01	73
Chlorobenzene	ND		22	4.7	ppb v/v			02/05/19 00:01	73
Chloroethane	ND		58	22	ppb v/v			02/05/19 00:01	73
<b>Chloroform</b>	<b>410</b>		22	6.9	ppb v/v			02/05/19 00:01	73
Chloromethane	ND		58	14	ppb v/v			02/05/19 00:01	73
Dibromochloromethane	ND		29	5.8	ppb v/v			02/05/19 00:01	73
1,2-Dibromoethane (EDB)	ND		58	5.5	ppb v/v			02/05/19 00:01	73
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		29	11	ppb v/v			02/05/19 00:01	73
1,2-Dichlorobenzene	ND		29	9.5	ppb v/v			02/05/19 00:01	73
1,3-Dichlorobenzene	ND		29	8.0	ppb v/v			02/05/19 00:01	73
1,4-Dichlorobenzene	ND		29	11	ppb v/v			02/05/19 00:01	73
<b>Dichlorodifluoromethane</b>	<b>23</b>	<b>J</b>	29	11	ppb v/v			02/05/19 00:01	73
<b>1,1-Dichloroethane</b>	<b>6.8</b>	<b>J</b>	22	5.3	ppb v/v			02/05/19 00:01	73
<b>1,2-Dichloroethane</b>	<b>12</b>	<b>J</b>	58	6.4	ppb v/v			02/05/19 00:01	73
<b>1,1-Dichloroethene</b>	<b>110</b>		58	9.4	ppb v/v			02/05/19 00:01	73
cis-1,2-Dichloroethene	ND		29	6.5	ppb v/v			02/05/19 00:01	73
trans-1,2-Dichloroethene	ND		29	7.3	ppb v/v			02/05/19 00:01	73
<b>1,2-Dichloropropane</b>	<b>110</b>		29	18	ppb v/v			02/05/19 00:01	73
cis-1,3-Dichloropropene	ND		29	7.6	ppb v/v			02/05/19 00:01	73
trans-1,3-Dichloropropene	ND		29	6.4	ppb v/v			02/05/19 00:01	73
Ethylbenzene	ND		29	4.6	ppb v/v			02/05/19 00:01	73
4-Ethyltoluene	ND		29	14	ppb v/v			02/05/19 00:01	73
Hexachlorobutadiene	ND		150	32	ppb v/v			02/05/19 00:01	73
2-Hexanone	ND		29	6.4	ppb v/v			02/05/19 00:01	73
4-Methyl-2-pentanone (MIBK)	ND		29	9.9	ppb v/v			02/05/19 00:01	73
Methylene Chloride	ND		29	5.3	ppb v/v			02/05/19 00:01	73

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106953-001/CWL-UI2-136**

**Lab Sample ID: 320-47154-9**

**Date Collected: 01/17/19 10:30**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		29	4.3	ppb v/v			02/05/19 00:01	73
1,1,2,2-Tetrachloroethane	ND		29	5.0	ppb v/v			02/05/19 00:01	73
<b>Tetrachloroethene</b>	<b>160</b>		29	3.7	ppb v/v			02/05/19 00:01	73
Toluene	ND		29	3.7	ppb v/v			02/05/19 00:01	73
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>490</b>		29	12	ppb v/v			02/05/19 00:01	73
1,2,4-Trichlorobenzene	ND		150	32	ppb v/v			02/05/19 00:01	73
<b>1,1,1-Trichloroethane</b>	<b>15 J</b>		22	4.7	ppb v/v			02/05/19 00:01	73
1,1,2-Trichloroethane	ND		29	4.9	ppb v/v			02/05/19 00:01	73
<b>Trichloroethene</b>	<b>4400</b>		29	7.7	ppb v/v			02/05/19 00:01	73
<b>Trichlorofluoromethane</b>	<b>140</b>		29	14	ppb v/v			02/05/19 00:01	73
1,2,4-Trimethylbenzene	ND		58	12	ppb v/v			02/05/19 00:01	73
1,3,5-Trimethylbenzene	ND		29	9.1	ppb v/v			02/05/19 00:01	73
Vinyl acetate	ND		58	11	ppb v/v			02/05/19 00:01	73
Vinyl chloride	ND		29	8.8	ppb v/v			02/05/19 00:01	73
m,p-Xylene	ND		58	7.3	ppb v/v			02/05/19 00:01	73
o-Xylene	ND		29	3.9	ppb v/v			02/05/19 00:01	73

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	73		70 - 130		02/05/19 00:01	73
1,2-Dichloroethane-d4 (Surr)	105		70 - 130		02/05/19 00:01	73
Toluene-d8 (Surr)	98		70 - 130		02/05/19 00:01	73

**Client Sample ID: 106954-001/CWL-UI2-136**

**Lab Sample ID: 320-47154-10**

**Date Collected: 01/17/19 10:30**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		390	14	ppb v/v			02/05/19 00:54	78.7
Benzene	ND		31	6.2	ppb v/v			02/05/19 00:54	78.7
Benzyl chloride	ND		63	13	ppb v/v			02/05/19 00:54	78.7
Bromodichloromethane	ND		24	5.2	ppb v/v			02/05/19 00:54	78.7
Bromoform	ND		31	5.5	ppb v/v			02/05/19 00:54	78.7
Bromomethane	ND		63	26	ppb v/v			02/05/19 00:54	78.7
2-Butanone (MEK)	ND		63	16	ppb v/v			02/05/19 00:54	78.7
Carbon disulfide	ND		63	6.1	ppb v/v			02/05/19 00:54	78.7
<b>Carbon tetrachloride</b>	<b>14 J</b>		63	5.0	ppb v/v			02/05/19 00:54	78.7
Chlorobenzene	ND		24	5.0	ppb v/v			02/05/19 00:54	78.7
Chloroethane	ND		63	24	ppb v/v			02/05/19 00:54	78.7
<b>Chloroform</b>	<b>400</b>		24	7.5	ppb v/v			02/05/19 00:54	78.7
Chloromethane	ND		63	16	ppb v/v			02/05/19 00:54	78.7
Dibromochloromethane	ND		31	6.2	ppb v/v			02/05/19 00:54	78.7
1,2-Dibromoethane (EDB)	ND		63	5.9	ppb v/v			02/05/19 00:54	78.7
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		31	12	ppb v/v			02/05/19 00:54	78.7
1,2-Dichlorobenzene	ND		31	10	ppb v/v			02/05/19 00:54	78.7
1,3-Dichlorobenzene	ND		31	8.7	ppb v/v			02/05/19 00:54	78.7
1,4-Dichlorobenzene	ND		31	12	ppb v/v			02/05/19 00:54	78.7

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106954-001/CWL-UI2-136**

**Lab Sample ID: 320-47154-10**

**Date Collected: 01/17/19 10:30**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	23	J	31	11	ppb v/v			02/05/19 00:54	78.7
1,1-Dichloroethane	6.7	J	24	5.7	ppb v/v			02/05/19 00:54	78.7
1,2-Dichloroethane	13	J	63	6.9	ppb v/v			02/05/19 00:54	78.7
1,1-Dichloroethene	110		63	10	ppb v/v			02/05/19 00:54	78.7
cis-1,2-Dichloroethene	ND		31	7.0	ppb v/v			02/05/19 00:54	78.7
trans-1,2-Dichloroethene	ND		31	7.9	ppb v/v			02/05/19 00:54	78.7
1,2-Dichloropropane	110		31	19	ppb v/v			02/05/19 00:54	78.7
cis-1,3-Dichloropropene	ND		31	8.2	ppb v/v			02/05/19 00:54	78.7
trans-1,3-Dichloropropene	ND		31	6.9	ppb v/v			02/05/19 00:54	78.7
Ethylbenzene	ND		31	5.0	ppb v/v			02/05/19 00:54	78.7
4-Ethyltoluene	ND		31	15	ppb v/v			02/05/19 00:54	78.7
Hexachlorobutadiene	ND		160	34	ppb v/v			02/05/19 00:54	78.7
2-Hexanone	ND		31	6.8	ppb v/v			02/05/19 00:54	78.7
4-Methyl-2-pentanone (MIBK)	ND		31	11	ppb v/v			02/05/19 00:54	78.7
Methylene Chloride	ND		31	5.7	ppb v/v			02/05/19 00:54	78.7
Styrene	ND		31	4.6	ppb v/v			02/05/19 00:54	78.7
1,1,2,2-Tetrachloroethane	ND		31	5.4	ppb v/v			02/05/19 00:54	78.7
Tetrachloroethene	170		31	4.0	ppb v/v			02/05/19 00:54	78.7
Toluene	ND		31	4.0	ppb v/v			02/05/19 00:54	78.7
1,1,2-Trichloro-1,2,2-trifluoroethane	490		31	13	ppb v/v			02/05/19 00:54	78.7
1,2,4-Trichlorobenzene	ND		160	34	ppb v/v			02/05/19 00:54	78.7
1,1,1-Trichloroethane	15	J	24	5.1	ppb v/v			02/05/19 00:54	78.7
1,1,2-Trichloroethane	ND		31	5.3	ppb v/v			02/05/19 00:54	78.7
Trichloroethene	4600		31	8.3	ppb v/v			02/05/19 00:54	78.7
Trichlorofluoromethane	140		31	15	ppb v/v			02/05/19 00:54	78.7
1,2,4-Trimethylbenzene	ND		63	13	ppb v/v			02/05/19 00:54	78.7
1,3,5-Trimethylbenzene	ND		31	9.8	ppb v/v			02/05/19 00:54	78.7
Vinyl acetate	ND		63	11	ppb v/v			02/05/19 00:54	78.7
Vinyl chloride	ND		31	9.4	ppb v/v			02/05/19 00:54	78.7
m,p-Xylene	ND		63	7.9	ppb v/v			02/05/19 00:54	78.7
o-Xylene	ND		31	4.2	ppb v/v			02/05/19 00:54	78.7

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	77		70 - 130		02/05/19 00:54	78.7
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		02/05/19 00:54	78.7
Toluene-d8 (Surr)	98		70 - 130		02/05/19 00:54	78.7

**Client Sample ID: 106977-001/CWL-QC3**

**Lab Sample ID: 320-47154-11**

**Date Collected: 01/17/19 09:07**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		5.0	0.18	ppb v/v			02/05/19 01:59	1
Benzene	ND		0.40	0.079	ppb v/v			02/05/19 01:59	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			02/05/19 01:59	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			02/05/19 01:59	1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
 Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
 SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106977-001/CWL-QC3**

**Lab Sample ID: 320-47154-11**

**Date Collected: 01/17/19 09:07**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		0.40	0.070	ppb v/v			02/05/19 01:59	1
Bromomethane	ND		0.80	0.34	ppb v/v			02/05/19 01:59	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			02/05/19 01:59	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			02/05/19 01:59	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			02/05/19 01:59	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			02/05/19 01:59	1
Chloroethane	ND		0.80	0.31	ppb v/v			02/05/19 01:59	1
<b>Chloroform</b>	<b>0.095</b>	<b>J</b>	0.30	0.095	ppb v/v			02/05/19 01:59	1
Chloromethane	ND		0.80	0.20	ppb v/v			02/05/19 01:59	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			02/05/19 01:59	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			02/05/19 01:59	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			02/05/19 01:59	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			02/05/19 01:59	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			02/05/19 01:59	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			02/05/19 01:59	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			02/05/19 01:59	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			02/05/19 01:59	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			02/05/19 01:59	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			02/05/19 01:59	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			02/05/19 01:59	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			02/05/19 01:59	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			02/05/19 01:59	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			02/05/19 01:59	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			02/05/19 01:59	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			02/05/19 01:59	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			02/05/19 01:59	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			02/05/19 01:59	1
2-Hexanone	ND		0.40	0.087	ppb v/v			02/05/19 01:59	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			02/05/19 01:59	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			02/05/19 01:59	1
Styrene	ND		0.40	0.059	ppb v/v			02/05/19 01:59	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			02/05/19 01:59	1
<b>Tetrachloroethene</b>	<b>0.062</b>	<b>J</b>	0.40	0.051	ppb v/v			02/05/19 01:59	1
Toluene	ND		0.40	0.051	ppb v/v			02/05/19 01:59	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			02/05/19 01:59	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			02/05/19 01:59	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			02/05/19 01:59	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			02/05/19 01:59	1
<b>Trichloroethene</b>	<b>0.99</b>		0.40	0.11	ppb v/v			02/05/19 01:59	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			02/05/19 01:59	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			02/05/19 01:59	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			02/05/19 01:59	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			02/05/19 01:59	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			02/05/19 01:59	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			02/05/19 01:59	1
o-Xylene	ND		0.40	0.054	ppb v/v			02/05/19 01:59	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		70 - 130		02/05/19 01:59	1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106977-001/CWL-QC3**

**Lab Sample ID: 320-47154-11**

**Date Collected: 01/17/19 09:07**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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		02/05/19 01:59	1
Toluene-d8 (Surr)	97		70 - 130		02/05/19 01:59	1

**Client Sample ID: 106978-001/CWL-D1-470**

**Lab Sample ID: 320-47154-12**

**Date Collected: 01/17/19 09:25**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		18	0.65	ppb v/v			02/05/19 02:54	3.65
Benzene	ND		1.5	0.29	ppb v/v			02/05/19 02:54	3.65
Benzyl chloride	ND		2.9	0.59	ppb v/v			02/05/19 02:54	3.65
Bromodichloromethane	ND		1.1	0.24	ppb v/v			02/05/19 02:54	3.65
Bromoform	ND		1.5	0.26	ppb v/v			02/05/19 02:54	3.65
Bromomethane	ND		2.9	1.2	ppb v/v			02/05/19 02:54	3.65
2-Butanone (MEK)	ND		2.9	0.73	ppb v/v			02/05/19 02:54	3.65
<b>Carbon disulfide</b>	<b>1.2</b>	<b>J</b>	2.9	0.28	ppb v/v			02/05/19 02:54	3.65
<b>Carbon tetrachloride</b>	<b>2.0</b>	<b>J</b>	2.9	0.23	ppb v/v			02/05/19 02:54	3.65
Chlorobenzene	ND		1.1	0.23	ppb v/v			02/05/19 02:54	3.65
Chloroethane	ND		2.9	1.1	ppb v/v			02/05/19 02:54	3.65
<b>Chloroform</b>	<b>0.71</b>	<b>J</b>	1.1	0.35	ppb v/v			02/05/19 02:54	3.65
Chloromethane	ND		2.9	0.72	ppb v/v			02/05/19 02:54	3.65
Dibromochloromethane	ND		1.5	0.29	ppb v/v			02/05/19 02:54	3.65
1,2-Dibromoethane (EDB)	ND		2.9	0.27	ppb v/v			02/05/19 02:54	3.65
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.5	0.57	ppb v/v			02/05/19 02:54	3.65
1,2-Dichlorobenzene	ND		1.5	0.47	ppb v/v			02/05/19 02:54	3.65
1,3-Dichlorobenzene	ND		1.5	0.40	ppb v/v			02/05/19 02:54	3.65
1,4-Dichlorobenzene	ND		1.5	0.54	ppb v/v			02/05/19 02:54	3.65
<b>Dichlorodifluoromethane</b>	<b>8.6</b>		1.5	0.53	ppb v/v			02/05/19 02:54	3.65
1,1-Dichloroethane	ND		1.1	0.26	ppb v/v			02/05/19 02:54	3.65
1,2-Dichloroethane	ND		2.9	0.32	ppb v/v			02/05/19 02:54	3.65
<b>1,1-Dichloroethene</b>	<b>26</b>		2.9	0.47	ppb v/v			02/05/19 02:54	3.65
cis-1,2-Dichloroethene	ND		1.5	0.32	ppb v/v			02/05/19 02:54	3.65
trans-1,2-Dichloroethene	ND		1.5	0.37	ppb v/v			02/05/19 02:54	3.65
1,2-Dichloropropane	ND		1.5	0.88	ppb v/v			02/05/19 02:54	3.65
cis-1,3-Dichloropropene	ND		1.5	0.38	ppb v/v			02/05/19 02:54	3.65
trans-1,3-Dichloropropene	ND		1.5	0.32	ppb v/v			02/05/19 02:54	3.65
Ethylbenzene	ND		1.5	0.23	ppb v/v			02/05/19 02:54	3.65
4-Ethyltoluene	ND		1.5	0.68	ppb v/v			02/05/19 02:54	3.65
Hexachlorobutadiene	ND		7.3	1.6	ppb v/v			02/05/19 02:54	3.65
2-Hexanone	ND		1.5	0.32	ppb v/v			02/05/19 02:54	3.65
4-Methyl-2-pentanone (MIBK)	ND		1.5	0.49	ppb v/v			02/05/19 02:54	3.65
<b>Methylene Chloride</b>	<b>2.6</b>		1.5	0.26	ppb v/v			02/05/19 02:54	3.65
Styrene	ND		1.5	0.22	ppb v/v			02/05/19 02:54	3.65
1,1,2,2-Tetrachloroethane	ND		1.5	0.25	ppb v/v			02/05/19 02:54	3.65
<b>Tetrachloroethene</b>	<b>5.7</b>		1.5	0.19	ppb v/v			02/05/19 02:54	3.65
Toluene	ND		1.5	0.19	ppb v/v			02/05/19 02:54	3.65

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106978-001/CWL-D1-470**

**Lab Sample ID: 320-47154-12**

**Date Collected: 01/17/19 09:25**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>170</b>		1.5	0.59	ppb v/v			02/05/19 02:54	3.65
1,2,4-Trichlorobenzene	ND		7.3	1.6	ppb v/v			02/05/19 02:54	3.65
1,1,1-Trichloroethane	ND		1.1	0.24	ppb v/v			02/05/19 02:54	3.65
1,1,2-Trichloroethane	ND		1.5	0.24	ppb v/v			02/05/19 02:54	3.65
<b>Trichloroethene</b>	<b>130</b>		1.5	0.38	ppb v/v			02/05/19 02:54	3.65
<b>Trichlorofluoromethane</b>	<b>48</b>		1.5	0.72	ppb v/v			02/05/19 02:54	3.65
1,2,4-Trimethylbenzene	ND		2.9	0.59	ppb v/v			02/05/19 02:54	3.65
1,3,5-Trimethylbenzene	ND		1.5	0.46	ppb v/v			02/05/19 02:54	3.65
Vinyl acetate	ND		2.9	0.53	ppb v/v			02/05/19 02:54	3.65
Vinyl chloride	ND		1.5	0.44	ppb v/v			02/05/19 02:54	3.65
m,p-Xylene	ND		2.9	0.37	ppb v/v			02/05/19 02:54	3.65
o-Xylene	ND		1.5	0.20	ppb v/v			02/05/19 02:54	3.65
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	88		70 - 130					02/05/19 02:54	3.65
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					02/05/19 02:54	3.65
Toluene-d8 (Surr)	98		70 - 130					02/05/19 02:54	3.65

**Client Sample ID: 106979-001/CWL-D1-350**

**Lab Sample ID: 320-47154-13**

**Date Collected: 01/17/19 09:27**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**Sample Container: Summa Canister 6L**

Note: These results are not presented in Annual Report Table 5-1 (see Sect. 5.1); they are replaced by March 2019 sample results. Certificates of Analysis for the March 2019 samples are presented later in this annex.

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		230	8.2	ppb v/v			02/05/19 15:01	46.1
Benzene	ND		18	3.6	ppb v/v			02/05/19 15:01	46.1
Benzyl chloride	ND		37	7.5	ppb v/v			02/05/19 15:01	46.1
Bromodichloromethane	ND		14	3.0	ppb v/v			02/05/19 15:01	46.1
Bromoform	ND		18	3.2	ppb v/v			02/05/19 15:01	46.1
Bromomethane	ND		37	15	ppb v/v			02/05/19 15:01	46.1
2-Butanone (MEK)	ND		37	9.2	ppb v/v			02/05/19 15:01	46.1
Carbon disulfide	ND		37	3.6	ppb v/v			02/05/19 15:01	46.1
Carbon tetrachloride	ND		37	3.0	ppb v/v			02/05/19 15:01	46.1
Chlorobenzene	ND		14	3.0	ppb v/v			02/05/19 15:01	46.1
Chloroethane	ND		37	14	ppb v/v			02/05/19 15:01	46.1
Chloroform	ND		14	4.4	ppb v/v			02/05/19 15:01	46.1
Chloromethane	ND		37	9.1	ppb v/v			02/05/19 15:01	46.1
Dibromochloromethane	ND		18	3.6	ppb v/v			02/05/19 15:01	46.1
1,2-Dibromoethane (EDB)	ND		37	3.5	ppb v/v			02/05/19 15:01	46.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		18	7.1	ppb v/v			02/05/19 15:01	46.1
1,2-Dichlorobenzene	ND		18	6.0	ppb v/v			02/05/19 15:01	46.1
1,3-Dichlorobenzene	ND		18	5.1	ppb v/v			02/05/19 15:01	46.1
1,4-Dichlorobenzene	ND		18	6.9	ppb v/v			02/05/19 15:01	46.1
Dichlorodifluoromethane	ND		18	6.7	ppb v/v			02/05/19 15:01	46.1
1,1-Dichloroethane	ND		14	3.3	ppb v/v			02/05/19 15:01	46.1
1,2-Dichloroethane	ND		37	4.1	ppb v/v			02/05/19 15:01	46.1
<b>1,1-Dichloroethene</b>	<b>11 J</b>		37	5.9	ppb v/v			02/05/19 15:01	46.1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106979-001/CWL-D1-350**

**Lab Sample ID: 320-47154-13**

**Date Collected: 01/17/19 09:27**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		18	4.1	ppb v/v			02/05/19 15:01	46.1
trans-1,2-Dichloroethene	ND		18	4.6	ppb v/v			02/05/19 15:01	46.1
1,2-Dichloropropane	ND		18	11	ppb v/v			02/05/19 15:01	46.1
cis-1,3-Dichloropropene	ND		18	4.8	ppb v/v			02/05/19 15:01	46.1
trans-1,3-Dichloropropene	ND		18	4.1	ppb v/v			02/05/19 15:01	46.1
Ethylbenzene	ND		18	2.9	ppb v/v			02/05/19 15:01	46.1
4-Ethyltoluene	ND		18	8.6	ppb v/v			02/05/19 15:01	46.1
Hexachlorobutadiene	ND		92	20	ppb v/v			02/05/19 15:01	46.1
2-Hexanone	ND		18	4.0	ppb v/v			02/05/19 15:01	46.1
4-Methyl-2-pentanone (MIBK)	ND		18	6.2	ppb v/v			02/05/19 15:01	46.1
Methylene Chloride	ND		18	3.3	ppb v/v			02/05/19 15:01	46.1
Styrene	ND		18	2.7	ppb v/v			02/05/19 15:01	46.1
1,1,2,2-Tetrachloroethane	ND		18	3.2	ppb v/v			02/05/19 15:01	46.1
<b>Tetrachloroethene</b>	<b>3.6</b>	<b>J</b>	18	2.4	ppb v/v			02/05/19 15:01	46.1
Toluene	ND		18	2.4	ppb v/v			02/05/19 15:01	46.1
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>60</b>		18	7.5	ppb v/v			02/05/19 15:01	46.1
1,2,4-Trichlorobenzene	ND		92	20	ppb v/v			02/05/19 15:01	46.1
1,1,1-Trichloroethane	ND		14	3.0	ppb v/v			02/05/19 15:01	46.1
1,1,2-Trichloroethane	ND		18	3.1	ppb v/v			02/05/19 15:01	46.1
<b>Trichloroethene</b>	<b>51</b>		18	4.8	ppb v/v			02/05/19 15:01	46.1
<b>Trichlorofluoromethane</b>	<b>17</b>	<b>J</b>	18	9.0	ppb v/v			02/05/19 15:01	46.1
1,2,4-Trimethylbenzene	ND		37	7.5	ppb v/v			02/05/19 15:01	46.1
1,3,5-Trimethylbenzene	ND		18	5.8	ppb v/v			02/05/19 15:01	46.1
Vinyl acetate	ND		37	6.7	ppb v/v			02/05/19 15:01	46.1
Vinyl chloride	ND		18	5.5	ppb v/v			02/05/19 15:01	46.1
m,p-Xylene	ND		37	4.6	ppb v/v			02/05/19 15:01	46.1
o-Xylene	ND		18	2.5	ppb v/v			02/05/19 15:01	46.1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130		02/05/19 15:01	46.1
1,2-Dichloroethane-d4 (Surr)	97		70 - 130		02/05/19 15:01	46.1
Toluene-d8 (Surr)	94		70 - 130		02/05/19 15:01	46.1

**Client Sample ID: 106980-001/CWL-D1-240**

**Lab Sample ID: 320-47154-14**

**Date Collected: 01/17/19 09:35**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		930	33	ppb v/v			02/05/19 15:55	186
Benzene	ND		74	15	ppb v/v			02/05/19 15:55	186
Benzyl chloride	ND		150	30	ppb v/v			02/05/19 15:55	186
Bromodichloromethane	ND		56	12	ppb v/v			02/05/19 15:55	186
Bromoform	ND		74	13	ppb v/v			02/05/19 15:55	186
Bromomethane	ND		150	62	ppb v/v			02/05/19 15:55	186
2-Butanone (MEK)	ND		150	37	ppb v/v			02/05/19 15:55	186
Carbon disulfide	ND		150	15	ppb v/v			02/05/19 15:55	186

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106980-001/CWL-D1-240**

**Lab Sample ID: 320-47154-14**

**Date Collected: 01/17/19 09:35**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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
<b>Carbon tetrachloride</b>	<b>35</b>	<b>J</b>	150	12	ppb v/v			02/05/19 15:55	186
Chlorobenzene	ND		56	12	ppb v/v			02/05/19 15:55	186
Chloroethane	ND		150	57	ppb v/v			02/05/19 15:55	186
<b>Chloroform</b>	<b>330</b>		56	18	ppb v/v			02/05/19 15:55	186
Chloromethane	ND		150	37	ppb v/v			02/05/19 15:55	186
Dibromochloromethane	ND		74	15	ppb v/v			02/05/19 15:55	186
1,2-Dibromoethane (EDB)	ND		150	14	ppb v/v			02/05/19 15:55	186
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		74	29	ppb v/v			02/05/19 15:55	186
1,2-Dichlorobenzene	ND		74	24	ppb v/v			02/05/19 15:55	186
1,3-Dichlorobenzene	ND		74	20	ppb v/v			02/05/19 15:55	186
1,4-Dichlorobenzene	ND		74	28	ppb v/v			02/05/19 15:55	186
<b>Dichlorodifluoromethane</b>	<b>61</b>	<b>J</b>	74	27	ppb v/v			02/05/19 15:55	186
<b>1,1-Dichloroethane</b>	<b>24</b>	<b>J</b>	56	13	ppb v/v			02/05/19 15:55	186
<b>1,2-Dichloroethane</b>	<b>20</b>	<b>J</b>	150	16	ppb v/v			02/05/19 15:55	186
<b>1,1-Dichloroethene</b>	<b>560</b>		150	24	ppb v/v			02/05/19 15:55	186
cis-1,2-Dichloroethene	ND		74	17	ppb v/v			02/05/19 15:55	186
trans-1,2-Dichloroethene	ND		74	19	ppb v/v			02/05/19 15:55	186
<b>1,2-Dichloropropane</b>	<b>140</b>		74	45	ppb v/v			02/05/19 15:55	186
cis-1,3-Dichloropropene	ND		74	19	ppb v/v			02/05/19 15:55	186
trans-1,3-Dichloropropene	ND		74	16	ppb v/v			02/05/19 15:55	186
Ethylbenzene	ND		74	12	ppb v/v			02/05/19 15:55	186
4-Ethyltoluene	ND		74	35	ppb v/v			02/05/19 15:55	186
Hexachlorobutadiene	ND		370	80	ppb v/v			02/05/19 15:55	186
2-Hexanone	ND		74	16	ppb v/v			02/05/19 15:55	186
4-Methyl-2-pentanone (MIBK)	ND		74	25	ppb v/v			02/05/19 15:55	186
<b>Methylene Chloride</b>	<b>21</b>	<b>J</b>	74	13	ppb v/v			02/05/19 15:55	186
Styrene	ND		74	11	ppb v/v			02/05/19 15:55	186
1,1,2,2-Tetrachloroethane	ND		74	13	ppb v/v			02/05/19 15:55	186
<b>Tetrachloroethene</b>	<b>390</b>		74	9.5	ppb v/v			02/05/19 15:55	186
Toluene	ND		74	9.5	ppb v/v			02/05/19 15:55	186
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>1300</b>		74	30	ppb v/v			02/05/19 15:55	186
1,2,4-Trichlorobenzene	ND		370	81	ppb v/v			02/05/19 15:55	186
<b>1,1,1-Trichloroethane</b>	<b>23</b>	<b>J</b>	56	12	ppb v/v			02/05/19 15:55	186
1,1,2-Trichloroethane	ND		74	12	ppb v/v			02/05/19 15:55	186
<b>Trichloroethene</b>	<b>12000</b>		74	20	ppb v/v			02/05/19 15:55	186
<b>Trichlorofluoromethane</b>	<b>320</b>		74	36	ppb v/v			02/05/19 15:55	186
1,2,4-Trimethylbenzene	ND		150	30	ppb v/v			02/05/19 15:55	186
1,3,5-Trimethylbenzene	ND		74	23	ppb v/v			02/05/19 15:55	186
Vinyl acetate	ND		150	27	ppb v/v			02/05/19 15:55	186
Vinyl chloride	ND		74	22	ppb v/v			02/05/19 15:55	186
m,p-Xylene	ND		150	19	ppb v/v			02/05/19 15:55	186
o-Xylene	ND		74	10	ppb v/v			02/05/19 15:55	186

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	72		70 - 130		02/05/19 15:55	186
1,2-Dichloroethane-d4 (Surr)	100		70 - 130		02/05/19 15:55	186
Toluene-d8 (Surr)	98		70 - 130		02/05/19 15:55	186

# Client Sample Results

Client: Sandia National Laboratories  
 Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
 SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106981-001/CWL-D1-160**

**Lab Sample ID: 320-47154-15**

**Date Collected: 01/17/19 09:40**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		790	28	ppb v/v			02/06/19 16:59	158
Benzene	ND		63	12	ppb v/v			02/06/19 16:59	158
Benzyl chloride	ND		130	26	ppb v/v			02/06/19 16:59	158
Bromodichloromethane	ND		47	10	ppb v/v			02/06/19 16:59	158
Bromoform	ND		63	11	ppb v/v			02/06/19 16:59	158
Bromomethane	ND		130	53	ppb v/v			02/06/19 16:59	158
2-Butanone (MEK)	ND		130	31	ppb v/v			02/06/19 16:59	158
Carbon disulfide	ND		130	12	ppb v/v			02/06/19 16:59	158
<b>Carbon tetrachloride</b>	<b>26</b>	<b>J</b>	130	10	ppb v/v			02/06/19 16:59	158
Chlorobenzene	ND		47	10	ppb v/v			02/06/19 16:59	158
Chloroethane	ND		130	49	ppb v/v			02/06/19 16:59	158
<b>Chloroform</b>	<b>400</b>		47	15	ppb v/v			02/06/19 16:59	158
Chloromethane	ND		130	31	ppb v/v			02/06/19 16:59	158
Dibromochloromethane	ND		63	12	ppb v/v			02/06/19 16:59	158
1,2-Dibromoethane (EDB)	ND		130	12	ppb v/v			02/06/19 16:59	158
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		63	24	ppb v/v			02/06/19 16:59	158
1,2-Dichlorobenzene	ND		63	21	ppb v/v			02/06/19 16:59	158
1,3-Dichlorobenzene	ND		63	17	ppb v/v			02/06/19 16:59	158
1,4-Dichlorobenzene	ND		63	24	ppb v/v			02/06/19 16:59	158
<b>Dichlorodifluoromethane</b>	<b>50</b>	<b>J</b>	63	23	ppb v/v			02/06/19 16:59	158
<b>1,1-Dichloroethane</b>	<b>20</b>	<b>J</b>	47	11	ppb v/v			02/06/19 16:59	158
<b>1,2-Dichloroethane</b>	<b>30</b>	<b>J</b>	130	14	ppb v/v			02/06/19 16:59	158
<b>1,1-Dichloroethene</b>	<b>420</b>		130	20	ppb v/v			02/06/19 16:59	158
cis-1,2-Dichloroethene	ND		63	14	ppb v/v			02/06/19 16:59	158
trans-1,2-Dichloroethene	ND		63	16	ppb v/v			02/06/19 16:59	158
<b>1,2-Dichloropropane</b>	<b>120</b>		63	38	ppb v/v			02/06/19 16:59	158
cis-1,3-Dichloropropene	ND		63	16	ppb v/v			02/06/19 16:59	158
trans-1,3-Dichloropropene	ND		63	14	ppb v/v			02/06/19 16:59	158
Ethylbenzene	ND		63	10	ppb v/v			02/06/19 16:59	158
4-Ethyltoluene	ND		63	30	ppb v/v			02/06/19 16:59	158
Hexachlorobutadiene	ND		320	68	ppb v/v			02/06/19 16:59	158
2-Hexanone	ND		63	14	ppb v/v			02/06/19 16:59	158
4-Methyl-2-pentanone (MIBK)	ND		63	21	ppb v/v			02/06/19 16:59	158
<b>Methylene Chloride</b>	<b>21</b>	<b>J</b>	63	11	ppb v/v			02/06/19 16:59	158
Styrene	ND		63	9.3	ppb v/v			02/06/19 16:59	158
1,1,2,2-Tetrachloroethane	ND		63	11	ppb v/v			02/06/19 16:59	158
<b>Tetrachloroethene</b>	<b>490</b>		63	8.1	ppb v/v			02/06/19 16:59	158
Toluene	ND		63	8.1	ppb v/v			02/06/19 16:59	158
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>1100</b>		63	26	ppb v/v			02/06/19 16:59	158
1,2,4-Trichlorobenzene	ND		320	68	ppb v/v			02/06/19 16:59	158
<b>1,1,1-Trichloroethane</b>	<b>28</b>	<b>J</b>	47	10	ppb v/v			02/06/19 16:59	158
1,1,2-Trichloroethane	ND		63	11	ppb v/v			02/06/19 16:59	158
<b>Trichloroethene</b>	<b>10000</b>		63	17	ppb v/v			02/06/19 16:59	158
<b>Trichlorofluoromethane</b>	<b>270</b>		63	31	ppb v/v			02/06/19 16:59	158
1,2,4-Trimethylbenzene	ND		130	26	ppb v/v			02/06/19 16:59	158
1,3,5-Trimethylbenzene	ND		63	20	ppb v/v			02/06/19 16:59	158
Vinyl acetate	ND		130	23	ppb v/v			02/06/19 16:59	158
Vinyl chloride	ND		63	19	ppb v/v			02/06/19 16:59	158

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106981-001/CWL-D1-160**

**Lab Sample ID: 320-47154-15**

**Date Collected: 01/17/19 09:40**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		130	16	ppb v/v			02/06/19 16:59	158
o-Xylene	ND		63	8.5	ppb v/v			02/06/19 16:59	158
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	70		70 - 130					02/06/19 16:59	158
1,2-Dichloroethane-d4 (Surr)	100		70 - 130					02/06/19 16:59	158
Toluene-d8 (Surr)	99		70 - 130					02/06/19 16:59	158

**Client Sample ID: 106982-001/CWL-D1-100**

**Lab Sample ID: 320-47154-16**

**Date Collected: 01/17/19 09:50**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		510	18	ppb v/v			02/05/19 17:42	101
Benzene	ND		40	8.0	ppb v/v			02/05/19 17:42	101
Benzyl chloride	ND		81	16	ppb v/v			02/05/19 17:42	101
Bromodichloromethane	ND		30	6.7	ppb v/v			02/05/19 17:42	101
Bromoform	ND		40	7.1	ppb v/v			02/05/19 17:42	101
Bromomethane	ND		81	34	ppb v/v			02/05/19 17:42	101
2-Butanone (MEK)	ND		81	20	ppb v/v			02/05/19 17:42	101
Carbon disulfide	ND		81	7.9	ppb v/v			02/05/19 17:42	101
<b>Carbon tetrachloride</b>	<b>16</b>	<b>J</b>	81	6.5	ppb v/v			02/05/19 17:42	101
Chlorobenzene	ND		30	6.5	ppb v/v			02/05/19 17:42	101
Chloroethane	ND		81	31	ppb v/v			02/05/19 17:42	101
<b>Chloroform</b>	<b>340</b>		30	9.6	ppb v/v			02/05/19 17:42	101
Chloromethane	ND		81	20	ppb v/v			02/05/19 17:42	101
Dibromochloromethane	ND		40	8.0	ppb v/v			02/05/19 17:42	101
1,2-Dibromoethane (EDB)	ND		81	7.6	ppb v/v			02/05/19 17:42	101
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		40	16	ppb v/v			02/05/19 17:42	101
1,2-Dichlorobenzene	ND		40	13	ppb v/v			02/05/19 17:42	101
1,3-Dichlorobenzene	ND		40	11	ppb v/v			02/05/19 17:42	101
1,4-Dichlorobenzene	ND		40	15	ppb v/v			02/05/19 17:42	101
<b>Dichlorodifluoromethane</b>	<b>30</b>	<b>J</b>	40	15	ppb v/v			02/05/19 17:42	101
<b>1,1-Dichloroethane</b>	<b>11</b>	<b>J</b>	30	7.3	ppb v/v			02/05/19 17:42	101
<b>1,2-Dichloroethane</b>	<b>16</b>	<b>J</b>	81	8.9	ppb v/v			02/05/19 17:42	101
<b>1,1-Dichloroethene</b>	<b>230</b>		81	13	ppb v/v			02/05/19 17:42	101
cis-1,2-Dichloroethene	ND		40	9.0	ppb v/v			02/05/19 17:42	101
trans-1,2-Dichloroethene	ND		40	10	ppb v/v			02/05/19 17:42	101
<b>1,2-Dichloropropane</b>	<b>79</b>		40	24	ppb v/v			02/05/19 17:42	101
cis-1,3-Dichloropropene	ND		40	11	ppb v/v			02/05/19 17:42	101
trans-1,3-Dichloropropene	ND		40	8.9	ppb v/v			02/05/19 17:42	101
Ethylbenzene	ND		40	6.4	ppb v/v			02/05/19 17:42	101
4-Ethyltoluene	ND		40	19	ppb v/v			02/05/19 17:42	101
Hexachlorobutadiene	ND		200	44	ppb v/v			02/05/19 17:42	101
2-Hexanone	ND		40	8.8	ppb v/v			02/05/19 17:42	101
4-Methyl-2-pentanone (MIBK)	ND		40	14	ppb v/v			02/05/19 17:42	101
<b>Methylene Chloride</b>	<b>16</b>	<b>J</b>	40	7.3	ppb v/v			02/05/19 17:42	101

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106982-001/CWL-D1-100**

**Lab Sample ID: 320-47154-16**

**Date Collected: 01/17/19 09:50**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		40	6.0	ppb v/v			02/05/19 17:42	101
1,1,2,2-Tetrachloroethane	ND		40	7.0	ppb v/v			02/05/19 17:42	101
<b>Tetrachloroethene</b>	<b>650</b>		40	5.2	ppb v/v			02/05/19 17:42	101
Toluene	ND		40	5.2	ppb v/v			02/05/19 17:42	101
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>630</b>		40	16	ppb v/v			02/05/19 17:42	101
1,2,4-Trichlorobenzene	ND		200	44	ppb v/v			02/05/19 17:42	101
<b>1,1,1-Trichloroethane</b>	<b>21</b>	<b>J</b>	30	6.6	ppb v/v			02/05/19 17:42	101
1,1,2-Trichloroethane	ND		40	6.8	ppb v/v			02/05/19 17:42	101
<b>Trichloroethene</b>	<b>5900</b>		40	11	ppb v/v			02/05/19 17:42	101
<b>Trichlorofluoromethane</b>	<b>170</b>		40	20	ppb v/v			02/05/19 17:42	101
1,2,4-Trimethylbenzene	ND		81	16	ppb v/v			02/05/19 17:42	101
1,3,5-Trimethylbenzene	ND		40	13	ppb v/v			02/05/19 17:42	101
Vinyl acetate	ND		81	15	ppb v/v			02/05/19 17:42	101
Vinyl chloride	ND		40	12	ppb v/v			02/05/19 17:42	101
m,p-Xylene	ND		81	10	ppb v/v			02/05/19 17:42	101
o-Xylene	ND		40	5.5	ppb v/v			02/05/19 17:42	101

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	81		70 - 130		02/05/19 17:42	101
1,2-Dichloroethane-d4 (Surr)	101		70 - 130		02/05/19 17:42	101
Toluene-d8 (Surr)	99		70 - 130		02/05/19 17:42	101

**Client Sample ID: 106983-001/CWL-QC4**

**Lab Sample ID: 320-47154-17**

**Date Collected: 01/17/19 11:35**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		5.0	0.18	ppb v/v			02/05/19 18:44	1
Benzene	ND		0.40	0.079	ppb v/v			02/05/19 18:44	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			02/05/19 18:44	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			02/05/19 18:44	1
Bromoform	ND		0.40	0.070	ppb v/v			02/05/19 18:44	1
Bromomethane	ND		0.80	0.34	ppb v/v			02/05/19 18:44	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			02/05/19 18:44	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			02/05/19 18:44	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			02/05/19 18:44	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			02/05/19 18:44	1
Chloroethane	ND		0.80	0.31	ppb v/v			02/05/19 18:44	1
Chloroform	ND		0.30	0.095	ppb v/v			02/05/19 18:44	1
Chloromethane	ND		0.80	0.20	ppb v/v			02/05/19 18:44	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			02/05/19 18:44	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			02/05/19 18:44	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			02/05/19 18:44	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			02/05/19 18:44	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			02/05/19 18:44	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			02/05/19 18:44	1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106983-001/CWL-QC4**

**Lab Sample ID: 320-47154-17**

**Date Collected: 01/17/19 11:35**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		0.40	0.15	ppb v/v			02/05/19 18:44	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			02/05/19 18:44	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			02/05/19 18:44	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			02/05/19 18:44	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			02/05/19 18:44	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			02/05/19 18:44	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			02/05/19 18:44	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			02/05/19 18:44	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			02/05/19 18:44	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			02/05/19 18:44	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			02/05/19 18:44	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			02/05/19 18:44	1
2-Hexanone	ND		0.40	0.087	ppb v/v			02/05/19 18:44	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			02/05/19 18:44	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			02/05/19 18:44	1
Styrene	ND		0.40	0.059	ppb v/v			02/05/19 18:44	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			02/05/19 18:44	1
<b>Tetrachloroethene</b>	<b>0.066</b>	<b>J</b>	0.40	0.051	ppb v/v			02/05/19 18:44	1
Toluene	ND		0.40	0.051	ppb v/v			02/05/19 18:44	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			02/05/19 18:44	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			02/05/19 18:44	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			02/05/19 18:44	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			02/05/19 18:44	1
<b>Trichloroethene</b>	<b>0.50</b>		0.40	0.11	ppb v/v			02/05/19 18:44	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			02/05/19 18:44	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			02/05/19 18:44	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			02/05/19 18:44	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			02/05/19 18:44	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			02/05/19 18:44	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			02/05/19 18:44	1
o-Xylene	ND		0.40	0.054	ppb v/v			02/05/19 18:44	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		70 - 130		02/05/19 18:44	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		02/05/19 18:44	1
Toluene-d8 (Surr)	96		70 - 130		02/05/19 18:44	1

**Client Sample ID: 106984-001/CWL-D2-120**

**Lab Sample ID: 320-47154-18**

**Date Collected: 01/17/19 11:45**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		740	26	ppb v/v			02/05/19 19:37	147
Benzene	ND		59	12	ppb v/v			02/05/19 19:37	147
Benzyl chloride	ND		120	24	ppb v/v			02/05/19 19:37	147
Bromodichloromethane	ND		44	9.7	ppb v/v			02/05/19 19:37	147
Bromoform	ND		59	10	ppb v/v			02/05/19 19:37	147

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106984-001/CWL-D2-120**

**Lab Sample ID: 320-47154-18**

**Date Collected: 01/17/19 11:45**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		120	49	ppb v/v			02/05/19 19:37	147
2-Butanone (MEK)	ND		120	29	ppb v/v			02/05/19 19:37	147
Carbon disulfide	ND		120	11	ppb v/v			02/05/19 19:37	147
<b>Carbon tetrachloride</b>	<b>25</b>	<b>J</b>	120	9.4	ppb v/v			02/05/19 19:37	147
Chlorobenzene	ND		44	9.4	ppb v/v			02/05/19 19:37	147
Chloroethane	ND		120	45	ppb v/v			02/05/19 19:37	147
<b>Chloroform</b>	<b>490</b>		44	14	ppb v/v			02/05/19 19:37	147
Chloromethane	ND		120	29	ppb v/v			02/05/19 19:37	147
Dibromochloromethane	ND		59	12	ppb v/v			02/05/19 19:37	147
1,2-Dibromoethane (EDB)	ND		120	11	ppb v/v			02/05/19 19:37	147
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		59	23	ppb v/v			02/05/19 19:37	147
1,2-Dichlorobenzene	ND		59	19	ppb v/v			02/05/19 19:37	147
1,3-Dichlorobenzene	ND		59	16	ppb v/v			02/05/19 19:37	147
1,4-Dichlorobenzene	ND		59	22	ppb v/v			02/05/19 19:37	147
<b>Dichlorodifluoromethane</b>	<b>44</b>	<b>J</b>	59	21	ppb v/v			02/05/19 19:37	147
<b>1,1-Dichloroethane</b>	<b>18</b>	<b>J</b>	44	11	ppb v/v			02/05/19 19:37	147
<b>1,2-Dichloroethane</b>	<b>38</b>	<b>J</b>	120	13	ppb v/v			02/05/19 19:37	147
<b>1,1-Dichloroethene</b>	<b>360</b>		120	19	ppb v/v			02/05/19 19:37	147
cis-1,2-Dichloroethene	ND		59	13	ppb v/v			02/05/19 19:37	147
trans-1,2-Dichloroethene	ND		59	15	ppb v/v			02/05/19 19:37	147
<b>1,2-Dichloropropane</b>	<b>160</b>		59	35	ppb v/v			02/05/19 19:37	147
cis-1,3-Dichloropropene	ND		59	15	ppb v/v			02/05/19 19:37	147
trans-1,3-Dichloropropene	ND		59	13	ppb v/v			02/05/19 19:37	147
Ethylbenzene	ND		59	9.3	ppb v/v			02/05/19 19:37	147
4-Ethyltoluene	ND		59	27	ppb v/v			02/05/19 19:37	147
Hexachlorobutadiene	ND		290	64	ppb v/v			02/05/19 19:37	147
2-Hexanone	ND		59	13	ppb v/v			02/05/19 19:37	147
4-Methyl-2-pentanone (MIBK)	ND		59	20	ppb v/v			02/05/19 19:37	147
Methylene Chloride	ND		59	11	ppb v/v			02/05/19 19:37	147
Styrene	ND		59	8.7	ppb v/v			02/05/19 19:37	147
1,1,2,2-Tetrachloroethane	ND		59	10	ppb v/v			02/05/19 19:37	147
<b>Tetrachloroethene</b>	<b>480</b>		59	7.5	ppb v/v			02/05/19 19:37	147
Toluene	ND		59	7.5	ppb v/v			02/05/19 19:37	147
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>930</b>		59	24	ppb v/v			02/05/19 19:37	147
1,2,4-Trichlorobenzene	ND		290	64	ppb v/v			02/05/19 19:37	147
<b>1,1,1-Trichloroethane</b>	<b>34</b>	<b>J</b>	44	9.6	ppb v/v			02/05/19 19:37	147
1,1,2-Trichloroethane	ND		59	9.8	ppb v/v			02/05/19 19:37	147
<b>Trichloroethene</b>	<b>9100</b>		59	15	ppb v/v			02/05/19 19:37	147
<b>Trichlorofluoromethane</b>	<b>250</b>		59	29	ppb v/v			02/05/19 19:37	147
1,2,4-Trimethylbenzene	ND		120	24	ppb v/v			02/05/19 19:37	147
1,3,5-Trimethylbenzene	ND		59	18	ppb v/v			02/05/19 19:37	147
Vinyl acetate	ND		120	21	ppb v/v			02/05/19 19:37	147
Vinyl chloride	ND		59	18	ppb v/v			02/05/19 19:37	147
m,p-Xylene	ND		120	15	ppb v/v			02/05/19 19:37	147
o-Xylene	ND		59	7.9	ppb v/v			02/05/19 19:37	147

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	72		70 - 130		02/05/19 19:37	147

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106984-001/CWL-D2-120**

**Lab Sample ID: 320-47154-18**

**Date Collected: 01/17/19 11:45**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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)	102		70 - 130		02/05/19 19:37	147
Toluene-d8 (Surr)	98		70 - 130		02/05/19 19:37	147

**Client Sample ID: 106985-001/CWL-D2-240**

**Lab Sample ID: 320-47154-19**

**Date Collected: 01/17/19 11:49**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		790	28	ppb v/v			02/05/19 20:31	158
Benzene	ND		63	12	ppb v/v			02/05/19 20:31	158
Benzyl chloride	ND		130	26	ppb v/v			02/05/19 20:31	158
Bromodichloromethane	ND		47	10	ppb v/v			02/05/19 20:31	158
Bromoform	ND		63	11	ppb v/v			02/05/19 20:31	158
Bromomethane	ND		130	53	ppb v/v			02/05/19 20:31	158
2-Butanone (MEK)	ND		130	31	ppb v/v			02/05/19 20:31	158
Carbon disulfide	ND		130	12	ppb v/v			02/05/19 20:31	158
<b>Carbon tetrachloride</b>	<b>28</b>	<b>J</b>	130	10	ppb v/v			02/05/19 20:31	158
Chlorobenzene	ND		47	10	ppb v/v			02/05/19 20:31	158
Chloroethane	ND		130	49	ppb v/v			02/05/19 20:31	158
<b>Chloroform</b>	<b>490</b>		47	15	ppb v/v			02/05/19 20:31	158
Chloromethane	ND		130	31	ppb v/v			02/05/19 20:31	158
Dibromochloromethane	ND		63	12	ppb v/v			02/05/19 20:31	158
1,2-Dibromoethane (EDB)	ND		130	12	ppb v/v			02/05/19 20:31	158
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		63	24	ppb v/v			02/05/19 20:31	158
1,2-Dichlorobenzene	ND		63	21	ppb v/v			02/05/19 20:31	158
1,3-Dichlorobenzene	ND		63	17	ppb v/v			02/05/19 20:31	158
1,4-Dichlorobenzene	ND		63	24	ppb v/v			02/05/19 20:31	158
<b>Dichlorodifluoromethane</b>	<b>47</b>	<b>J</b>	63	23	ppb v/v			02/05/19 20:31	158
<b>1,1-Dichloroethane</b>	<b>22</b>	<b>J</b>	47	11	ppb v/v			02/05/19 20:31	158
<b>1,2-Dichloroethane</b>	<b>38</b>	<b>J</b>	130	14	ppb v/v			02/05/19 20:31	158
<b>1,1-Dichloroethene</b>	<b>440</b>		130	20	ppb v/v			02/05/19 20:31	158
cis-1,2-Dichloroethene	ND		63	14	ppb v/v			02/05/19 20:31	158
trans-1,2-Dichloroethene	ND		63	16	ppb v/v			02/05/19 20:31	158
<b>1,2-Dichloropropane</b>	<b>190</b>		63	38	ppb v/v			02/05/19 20:31	158
cis-1,3-Dichloropropene	ND		63	16	ppb v/v			02/05/19 20:31	158
trans-1,3-Dichloropropene	ND		63	14	ppb v/v			02/05/19 20:31	158
Ethylbenzene	ND		63	10	ppb v/v			02/05/19 20:31	158
4-Ethyltoluene	ND		63	30	ppb v/v			02/05/19 20:31	158
Hexachlorobutadiene	ND		320	68	ppb v/v			02/05/19 20:31	158
2-Hexanone	ND		63	14	ppb v/v			02/05/19 20:31	158
4-Methyl-2-pentanone (MIBK)	ND		63	21	ppb v/v			02/05/19 20:31	158
<b>Methylene Chloride</b>	<b>14</b>	<b>J</b>	63	11	ppb v/v			02/05/19 20:31	158
Styrene	ND		63	9.3	ppb v/v			02/05/19 20:31	158
1,1,2,2-Tetrachloroethane	ND		63	11	ppb v/v			02/05/19 20:31	158
<b>Tetrachloroethene</b>	<b>480</b>		63	8.1	ppb v/v			02/05/19 20:31	158
Toluene	ND		63	8.1	ppb v/v			02/05/19 20:31	158

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106985-001/CWL-D2-240**

**Lab Sample ID: 320-47154-19**

**Date Collected: 01/17/19 11:49**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>1100</b>		63	26	ppb v/v			02/05/19 20:31	158
1,2,4-Trichlorobenzene	ND		320	68	ppb v/v			02/05/19 20:31	158
<b>1,1,1-Trichloroethane</b>	<b>29 J</b>		47	10	ppb v/v			02/05/19 20:31	158
1,1,2-Trichloroethane	ND		63	11	ppb v/v			02/05/19 20:31	158
<b>Trichloroethene</b>	<b>11000</b>		63	17	ppb v/v			02/05/19 20:31	158
<b>Trichlorofluoromethane</b>	<b>290</b>		63	31	ppb v/v			02/05/19 20:31	158
1,2,4-Trimethylbenzene	ND		130	26	ppb v/v			02/05/19 20:31	158
1,3,5-Trimethylbenzene	ND		63	20	ppb v/v			02/05/19 20:31	158
Vinyl acetate	ND		130	23	ppb v/v			02/05/19 20:31	158
Vinyl chloride	ND		63	19	ppb v/v			02/05/19 20:31	158
m,p-Xylene	ND		130	16	ppb v/v			02/05/19 20:31	158
o-Xylene	ND		63	8.5	ppb v/v			02/05/19 20:31	158
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	76		70 - 130					02/05/19 20:31	158
1,2-Dichloroethane-d4 (Surr)	104		70 - 130					02/05/19 20:31	158
Toluene-d8 (Surr)	99		70 - 130					02/05/19 20:31	158

**Client Sample ID: 106986-001/CWL-D2-350**

**Lab Sample ID: 320-47154-20**

**Date Collected: 01/17/19 11:52**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		640	23	ppb v/v			02/05/19 21:22	127
Benzene	ND		51	10	ppb v/v			02/05/19 21:22	127
Benzyl chloride	ND		100	21	ppb v/v			02/05/19 21:22	127
Bromodichloromethane	ND		38	8.4	ppb v/v			02/05/19 21:22	127
Bromoform	ND		51	8.9	ppb v/v			02/05/19 21:22	127
Bromomethane	ND		100	43	ppb v/v			02/05/19 21:22	127
2-Butanone (MEK)	ND		100	25	ppb v/v			02/05/19 21:22	127
Carbon disulfide	ND		100	9.9	ppb v/v			02/05/19 21:22	127
<b>Carbon tetrachloride</b>	<b>23 J</b>		100	8.1	ppb v/v			02/05/19 21:22	127
Chlorobenzene	ND		38	8.1	ppb v/v			02/05/19 21:22	127
Chloroethane	ND		100	39	ppb v/v			02/05/19 21:22	127
<b>Chloroform</b>	<b>290</b>		38	12	ppb v/v			02/05/19 21:22	127
Chloromethane	ND		100	25	ppb v/v			02/05/19 21:22	127
Dibromochloromethane	ND		51	10	ppb v/v			02/05/19 21:22	127
1,2-Dibromoethane (EDB)	ND		100	9.5	ppb v/v			02/05/19 21:22	127
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		51	20	ppb v/v			02/05/19 21:22	127
1,2-Dichlorobenzene	ND		51	17	ppb v/v			02/05/19 21:22	127
1,3-Dichlorobenzene	ND		51	14	ppb v/v			02/05/19 21:22	127
1,4-Dichlorobenzene	ND		51	19	ppb v/v			02/05/19 21:22	127
<b>Dichlorodifluoromethane</b>	<b>40 J</b>		51	18	ppb v/v			02/05/19 21:22	127
<b>1,1-Dichloroethane</b>	<b>15 J</b>		38	9.1	ppb v/v			02/05/19 21:22	127
<b>1,2-Dichloroethane</b>	<b>13 J</b>		100	11	ppb v/v			02/05/19 21:22	127
<b>1,1-Dichloroethene</b>	<b>360</b>		100	16	ppb v/v			02/05/19 21:22	127

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106986-001/CWL-D2-350**

**Lab Sample ID: 320-47154-20**

**Date Collected: 01/17/19 11:52**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		51	11	ppb v/v			02/05/19 21:22	127
trans-1,2-Dichloroethene	ND		51	13	ppb v/v			02/05/19 21:22	127
<b>1,2-Dichloropropane</b>	<b>98</b>		51	30	ppb v/v			02/05/19 21:22	127
cis-1,3-Dichloropropene	ND		51	13	ppb v/v			02/05/19 21:22	127
trans-1,3-Dichloropropene	ND		51	11	ppb v/v			02/05/19 21:22	127
Ethylbenzene	ND		51	8.0	ppb v/v			02/05/19 21:22	127
4-Ethyltoluene	ND		51	24	ppb v/v			02/05/19 21:22	127
Hexachlorobutadiene	ND		250	55	ppb v/v			02/05/19 21:22	127
2-Hexanone	ND		51	11	ppb v/v			02/05/19 21:22	127
4-Methyl-2-pentanone (MIBK)	ND		51	17	ppb v/v			02/05/19 21:22	127
<b>Methylene Chloride</b>	<b>42</b>	<b>J</b>	51	9.1	ppb v/v			02/05/19 21:22	127
Styrene	ND		51	7.5	ppb v/v			02/05/19 21:22	127
1,1,2,2-Tetrachloroethane	ND		51	8.8	ppb v/v			02/05/19 21:22	127
<b>Tetrachloroethene</b>	<b>330</b>		51	6.5	ppb v/v			02/05/19 21:22	127
Toluene	ND		51	6.5	ppb v/v			02/05/19 21:22	127
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>830</b>		51	21	ppb v/v			02/05/19 21:22	127
1,2,4-Trichlorobenzene	ND		250	55	ppb v/v			02/05/19 21:22	127
<b>1,1,1-Trichloroethane</b>	<b>21</b>	<b>J</b>	38	8.3	ppb v/v			02/05/19 21:22	127
1,1,2-Trichloroethane	ND		51	8.5	ppb v/v			02/05/19 21:22	127
<b>Trichloroethene</b>	<b>7400</b>		51	13	ppb v/v			02/05/19 21:22	127
<b>Trichlorofluoromethane</b>	<b>240</b>		51	25	ppb v/v			02/05/19 21:22	127
1,2,4-Trimethylbenzene	ND		100	21	ppb v/v			02/05/19 21:22	127
1,3,5-Trimethylbenzene	ND		51	16	ppb v/v			02/05/19 21:22	127
Vinyl acetate	ND		100	18	ppb v/v			02/05/19 21:22	127
Vinyl chloride	ND		51	15	ppb v/v			02/05/19 21:22	127
m,p-Xylene	ND		100	13	ppb v/v			02/05/19 21:22	127
o-Xylene	ND		51	6.9	ppb v/v			02/05/19 21:22	127
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	80		70 - 130					02/05/19 21:22	127
1,2-Dichloroethane-d4 (Surr)	105		70 - 130					02/05/19 21:22	127
Toluene-d8 (Surr)	98		70 - 130					02/05/19 21:22	127

**Client Sample ID: 106987-001/CWL-D2-440**

**Lab Sample ID: 320-47154-21**

**Date Collected: 01/17/19 11:55**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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
<b>Acetone</b>	<b>5.0</b>	<b>J</b>	8.5	0.30	ppb v/v			02/05/19 22:20	1.7
<b>Benzene</b>	<b>0.18</b>	<b>J</b>	0.68	0.13	ppb v/v			02/05/19 22:20	1.7
Benzyl chloride	ND		1.4	0.28	ppb v/v			02/05/19 22:20	1.7
Bromodichloromethane	ND		0.51	0.11	ppb v/v			02/05/19 22:20	1.7
Bromoform	ND		0.68	0.12	ppb v/v			02/05/19 22:20	1.7
Bromomethane	ND		1.4	0.57	ppb v/v			02/05/19 22:20	1.7
<b>2-Butanone (MEK)</b>	<b>1.6</b>		1.4	0.34	ppb v/v			02/05/19 22:20	1.7
Carbon disulfide	ND		1.4	0.13	ppb v/v			02/05/19 22:20	1.7

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106987-001/CWL-D2-440**

**Lab Sample ID: 320-47154-21**

**Date Collected: 01/17/19 11:55**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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
<b>Carbon tetrachloride</b>	<b>0.31</b>	<b>J</b>	1.4	0.11	ppb v/v			02/05/19 22:20	1.7
Chlorobenzene	ND		0.51	0.11	ppb v/v			02/05/19 22:20	1.7
Chloroethane	ND		1.4	0.52	ppb v/v			02/05/19 22:20	1.7
<b>Chloroform</b>	<b>2.6</b>		0.51	0.16	ppb v/v			02/05/19 22:20	1.7
<b>Chloromethane</b>	<b>0.46</b>	<b>J</b>	1.4	0.33	ppb v/v			02/05/19 22:20	1.7
Dibromochloromethane	ND		0.68	0.13	ppb v/v			02/05/19 22:20	1.7
1,2-Dibromoethane (EDB)	ND		1.4	0.13	ppb v/v			02/05/19 22:20	1.7
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.68	0.26	ppb v/v			02/05/19 22:20	1.7
1,2-Dichlorobenzene	ND		0.68	0.22	ppb v/v			02/05/19 22:20	1.7
1,3-Dichlorobenzene	ND		0.68	0.19	ppb v/v			02/05/19 22:20	1.7
1,4-Dichlorobenzene	ND		0.68	0.25	ppb v/v			02/05/19 22:20	1.7
<b>Dichlorodifluoromethane</b>	<b>0.75</b>		0.68	0.25	ppb v/v			02/05/19 22:20	1.7
<b>1,1-Dichloroethane</b>	<b>0.16</b>	<b>J</b>	0.51	0.12	ppb v/v			02/05/19 22:20	1.7
1,2-Dichloroethane	ND		1.4	0.15	ppb v/v			02/05/19 22:20	1.7
<b>1,1-Dichloroethene</b>	<b>5.2</b>		1.4	0.22	ppb v/v			02/05/19 22:20	1.7
cis-1,2-Dichloroethene	ND		0.68	0.15	ppb v/v			02/05/19 22:20	1.7
trans-1,2-Dichloroethene	ND		0.68	0.17	ppb v/v			02/05/19 22:20	1.7
<b>1,2-Dichloropropane</b>	<b>1.1</b>		0.68	0.41	ppb v/v			02/05/19 22:20	1.7
cis-1,3-Dichloropropene	ND		0.68	0.18	ppb v/v			02/05/19 22:20	1.7
trans-1,3-Dichloropropene	ND		0.68	0.15	ppb v/v			02/05/19 22:20	1.7
Ethylbenzene	ND		0.68	0.11	ppb v/v			02/05/19 22:20	1.7
4-Ethyltoluene	ND		0.68	0.32	ppb v/v			02/05/19 22:20	1.7
Hexachlorobutadiene	ND		3.4	0.73	ppb v/v			02/05/19 22:20	1.7
2-Hexanone	ND		0.68	0.15	ppb v/v			02/05/19 22:20	1.7
4-Methyl-2-pentanone (MIBK)	ND		0.68	0.23	ppb v/v			02/05/19 22:20	1.7
<b>Methylene Chloride</b>	<b>1.2</b>		0.68	0.12	ppb v/v			02/05/19 22:20	1.7
Styrene	ND		0.68	0.10	ppb v/v			02/05/19 22:20	1.7
1,1,2,2-Tetrachloroethane	ND		0.68	0.12	ppb v/v			02/05/19 22:20	1.7
<b>Tetrachloroethene</b>	<b>3.6</b>		0.68	0.087	ppb v/v			02/05/19 22:20	1.7
<b>Toluene</b>	<b>0.19</b>	<b>J</b>	0.68	0.087	ppb v/v			02/05/19 22:20	1.7
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>8.0</b>		0.68	0.28	ppb v/v			02/05/19 22:20	1.7
1,2,4-Trichlorobenzene	ND		3.4	0.74	ppb v/v			02/05/19 22:20	1.7
1,1,1-Trichloroethane	ND		0.51	0.11	ppb v/v			02/05/19 22:20	1.7
1,1,2-Trichloroethane	ND		0.68	0.11	ppb v/v			02/05/19 22:20	1.7
<b>Trichloroethene</b>	<b>84</b>		0.68	0.18	ppb v/v			02/05/19 22:20	1.7
<b>Trichlorofluoromethane</b>	<b>3.2</b>		0.68	0.33	ppb v/v			02/05/19 22:20	1.7
1,2,4-Trimethylbenzene	ND		1.4	0.28	ppb v/v			02/05/19 22:20	1.7
1,3,5-Trimethylbenzene	ND		0.68	0.21	ppb v/v			02/05/19 22:20	1.7
Vinyl acetate	ND		1.4	0.25	ppb v/v			02/05/19 22:20	1.7
Vinyl chloride	ND		0.68	0.20	ppb v/v			02/05/19 22:20	1.7
m,p-Xylene	ND		1.4	0.17	ppb v/v			02/05/19 22:20	1.7
o-Xylene	ND		0.68	0.092	ppb v/v			02/05/19 22:20	1.7

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130		02/05/19 22:20	1.7
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		02/05/19 22:20	1.7
Toluene-d8 (Surr)	94		70 - 130		02/05/19 22:20	1.7

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106988-001/CWL-D2-470**

**Lab Sample ID: 320-47154-22**

**Date Collected: 01/17/19 12:02**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		370	13	ppb v/v			02/05/19 23:12	74.4
Benzene	ND		30	5.9	ppb v/v			02/05/19 23:12	74.4
Benzyl chloride	ND		60	12	ppb v/v			02/05/19 23:12	74.4
Bromodichloromethane	ND		22	4.9	ppb v/v			02/05/19 23:12	74.4
Bromoform	ND		30	5.2	ppb v/v			02/05/19 23:12	74.4
Bromomethane	ND		60	25	ppb v/v			02/05/19 23:12	74.4
2-Butanone (MEK)	ND		60	15	ppb v/v			02/05/19 23:12	74.4
Carbon disulfide	ND		60	5.8	ppb v/v			02/05/19 23:12	74.4
<b>Carbon tetrachloride</b>	<b>10</b>	<b>J</b>	60	4.8	ppb v/v			02/05/19 23:12	74.4
Chlorobenzene	ND		22	4.8	ppb v/v			02/05/19 23:12	74.4
Chloroethane	ND		60	23	ppb v/v			02/05/19 23:12	74.4
<b>Chloroform</b>	<b>250</b>		22	7.1	ppb v/v			02/05/19 23:12	74.4
Chloromethane	ND		60	15	ppb v/v			02/05/19 23:12	74.4
Dibromochloromethane	ND		30	5.9	ppb v/v			02/05/19 23:12	74.4
1,2-Dibromoethane (EDB)	ND		60	5.6	ppb v/v			02/05/19 23:12	74.4
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		30	12	ppb v/v			02/05/19 23:12	74.4
1,2-Dichlorobenzene	ND		30	9.7	ppb v/v			02/05/19 23:12	74.4
1,3-Dichlorobenzene	ND		30	8.2	ppb v/v			02/05/19 23:12	74.4
1,4-Dichlorobenzene	ND		30	11	ppb v/v			02/05/19 23:12	74.4
<b>Dichlorodifluoromethane</b>	<b>19</b>	<b>J</b>	30	11	ppb v/v			02/05/19 23:12	74.4
<b>1,1-Dichloroethane</b>	<b>7.3</b>	<b>J</b>	22	5.4	ppb v/v			02/05/19 23:12	74.4
<b>1,2-Dichloroethane</b>	<b>11</b>	<b>J</b>	60	6.5	ppb v/v			02/05/19 23:12	74.4
<b>1,1-Dichloroethene</b>	<b>140</b>		60	9.6	ppb v/v			02/05/19 23:12	74.4
cis-1,2-Dichloroethene	ND		30	6.6	ppb v/v			02/05/19 23:12	74.4
trans-1,2-Dichloroethene	ND		30	7.4	ppb v/v			02/05/19 23:12	74.4
<b>1,2-Dichloropropane</b>	<b>71</b>		30	18	ppb v/v			02/05/19 23:12	74.4
cis-1,3-Dichloropropene	ND		30	7.7	ppb v/v			02/05/19 23:12	74.4
trans-1,3-Dichloropropene	ND		30	6.5	ppb v/v			02/05/19 23:12	74.4
Ethylbenzene	ND		30	4.7	ppb v/v			02/05/19 23:12	74.4
4-Ethyltoluene	ND		30	14	ppb v/v			02/05/19 23:12	74.4
Hexachlorobutadiene	ND		150	32	ppb v/v			02/05/19 23:12	74.4
2-Hexanone	ND		30	6.5	ppb v/v			02/05/19 23:12	74.4
4-Methyl-2-pentanone (MIBK)	ND		30	10	ppb v/v			02/05/19 23:12	74.4
Methylene Chloride	ND		30	5.4	ppb v/v			02/05/19 23:12	74.4
Styrene	ND		30	4.4	ppb v/v			02/05/19 23:12	74.4
1,1,2,2-Tetrachloroethane	ND		30	5.1	ppb v/v			02/05/19 23:12	74.4
<b>Tetrachloroethene</b>	<b>270</b>		30	3.8	ppb v/v			02/05/19 23:12	74.4
Toluene	ND		30	3.8	ppb v/v			02/05/19 23:12	74.4
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>370</b>		30	12	ppb v/v			02/05/19 23:12	74.4
1,2,4-Trichlorobenzene	ND		150	32	ppb v/v			02/05/19 23:12	74.4
<b>1,1,1-Trichloroethane</b>	<b>24</b>		22	4.8	ppb v/v			02/05/19 23:12	74.4
1,1,2-Trichloroethane	ND		30	5.0	ppb v/v			02/05/19 23:12	74.4
<b>Trichloroethene</b>	<b>4000</b>		30	7.8	ppb v/v			02/05/19 23:12	74.4
<b>Trichlorofluoromethane</b>	<b>120</b>		30	15	ppb v/v			02/05/19 23:12	74.4
1,2,4-Trimethylbenzene	ND		60	12	ppb v/v			02/05/19 23:12	74.4
1,3,5-Trimethylbenzene	ND		30	9.3	ppb v/v			02/05/19 23:12	74.4
Vinyl acetate	ND		60	11	ppb v/v			02/05/19 23:12	74.4
Vinyl chloride	ND		30	8.9	ppb v/v			02/05/19 23:12	74.4

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106988-001/CWL-D2-470**

**Lab Sample ID: 320-47154-22**

**Date Collected: 01/17/19 12:02**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		60	7.4	ppb v/v			02/05/19 23:12	74.4
o-Xylene	ND		30	4.0	ppb v/v			02/05/19 23:12	74.4
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	74		70 - 130					02/05/19 23:12	74.4
1,2-Dichloroethane-d4 (Surr)	105		70 - 130					02/05/19 23:12	74.4
Toluene-d8 (Surr)	99		70 - 130					02/05/19 23:12	74.4

**Client Sample ID: 106989-001/CWL-QC5**

**Lab Sample ID: 320-47154-23**

**Date Collected: 01/17/19 10:45**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		5.0	0.18	ppb v/v			02/06/19 00:14	1
Benzene	ND		0.40	0.079	ppb v/v			02/06/19 00:14	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			02/06/19 00:14	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			02/06/19 00:14	1
Bromoform	ND		0.40	0.070	ppb v/v			02/06/19 00:14	1
Bromomethane	ND		0.80	0.34	ppb v/v			02/06/19 00:14	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			02/06/19 00:14	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			02/06/19 00:14	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			02/06/19 00:14	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			02/06/19 00:14	1
Chloroethane	ND		0.80	0.31	ppb v/v			02/06/19 00:14	1
Chloroform	ND		0.30	0.095	ppb v/v			02/06/19 00:14	1
Chloromethane	ND		0.80	0.20	ppb v/v			02/06/19 00:14	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			02/06/19 00:14	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			02/06/19 00:14	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			02/06/19 00:14	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			02/06/19 00:14	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			02/06/19 00:14	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			02/06/19 00:14	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			02/06/19 00:14	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			02/06/19 00:14	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			02/06/19 00:14	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			02/06/19 00:14	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			02/06/19 00:14	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			02/06/19 00:14	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			02/06/19 00:14	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			02/06/19 00:14	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			02/06/19 00:14	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			02/06/19 00:14	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			02/06/19 00:14	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			02/06/19 00:14	1
2-Hexanone	ND		0.40	0.087	ppb v/v			02/06/19 00:14	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			02/06/19 00:14	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			02/06/19 00:14	1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106989-001/CWL-QC5**

**Lab Sample ID: 320-47154-23**

**Date Collected: 01/17/19 10:45**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		0.40	0.059	ppb v/v			02/06/19 00:14	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			02/06/19 00:14	1
<b>Tetrachloroethene</b>	<b>0.089</b>	<b>J</b>	0.40	0.051	ppb v/v			02/06/19 00:14	1
Toluene	ND		0.40	0.051	ppb v/v			02/06/19 00:14	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			02/06/19 00:14	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			02/06/19 00:14	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			02/06/19 00:14	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			02/06/19 00:14	1
<b>Trichloroethene</b>	<b>0.73</b>		0.40	0.11	ppb v/v			02/06/19 00:14	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			02/06/19 00:14	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			02/06/19 00:14	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			02/06/19 00:14	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			02/06/19 00:14	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			02/06/19 00:14	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			02/06/19 00:14	1
o-Xylene	ND		0.40	0.054	ppb v/v			02/06/19 00:14	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		70 - 130		02/06/19 00:14	1
1,2-Dichloroethane-d4 (Surr)	105		70 - 130		02/06/19 00:14	1
Toluene-d8 (Surr)	96		70 - 130		02/06/19 00:14	1

**Client Sample ID: 106990-001/CWL-D3-120**

**Lab Sample ID: 320-47154-24**

**Date Collected: 01/17/19 10:54**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		270	9.5	ppb v/v			02/06/19 01:08	53.6
Benzene	ND		21	4.2	ppb v/v			02/06/19 01:08	53.6
Benzyl chloride	ND		43	8.7	ppb v/v			02/06/19 01:08	53.6
Bromodichloromethane	ND		16	3.5	ppb v/v			02/06/19 01:08	53.6
Bromoform	ND		21	3.8	ppb v/v			02/06/19 01:08	53.6
Bromomethane	ND		43	18	ppb v/v			02/06/19 01:08	53.6
2-Butanone (MEK)	ND		43	11	ppb v/v			02/06/19 01:08	53.6
Carbon disulfide	ND		43	4.2	ppb v/v			02/06/19 01:08	53.6
<b>Carbon tetrachloride</b>	<b>8.6</b>	<b>J</b>	43	3.4	ppb v/v			02/06/19 01:08	53.6
Chlorobenzene	ND		16	3.4	ppb v/v			02/06/19 01:08	53.6
Chloroethane	ND		43	17	ppb v/v			02/06/19 01:08	53.6
<b>Chloroform</b>	<b>140</b>		16	5.1	ppb v/v			02/06/19 01:08	53.6
Chloromethane	ND		43	11	ppb v/v			02/06/19 01:08	53.6
Dibromochloromethane	ND		21	4.2	ppb v/v			02/06/19 01:08	53.6
1,2-Dibromoethane (EDB)	ND		43	4.0	ppb v/v			02/06/19 01:08	53.6
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		21	8.3	ppb v/v			02/06/19 01:08	53.6
1,2-Dichlorobenzene	ND		21	7.0	ppb v/v			02/06/19 01:08	53.6
1,3-Dichlorobenzene	ND		21	5.9	ppb v/v			02/06/19 01:08	53.6
1,4-Dichlorobenzene	ND		21	8.0	ppb v/v			02/06/19 01:08	53.6
<b>Dichlorodifluoromethane</b>	<b>19</b>	<b>J</b>	21	7.8	ppb v/v			02/06/19 01:08	53.6

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106990-001/CWL-D3-120**

**Lab Sample ID: 320-47154-24**

**Date Collected: 01/17/19 10:54**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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
<b>1,1-Dichloroethane</b>	<b>5.8</b>	<b>J</b>	16	3.9	ppb v/v			02/06/19 01:08	53.6
<b>1,2-Dichloroethane</b>	<b>16</b>	<b>J</b>	43	4.7	ppb v/v			02/06/19 01:08	53.6
<b>1,1-Dichloroethene</b>	<b>130</b>		43	6.9	ppb v/v			02/06/19 01:08	53.6
cis-1,2-Dichloroethene	ND		21	4.8	ppb v/v			02/06/19 01:08	53.6
trans-1,2-Dichloroethene	ND		21	5.4	ppb v/v			02/06/19 01:08	53.6
<b>1,2-Dichloropropane</b>	<b>64</b>		21	13	ppb v/v			02/06/19 01:08	53.6
cis-1,3-Dichloropropene	ND		21	5.6	ppb v/v			02/06/19 01:08	53.6
trans-1,3-Dichloropropene	ND		21	4.7	ppb v/v			02/06/19 01:08	53.6
Ethylbenzene	ND		21	3.4	ppb v/v			02/06/19 01:08	53.6
4-Ethyltoluene	ND		21	10	ppb v/v			02/06/19 01:08	53.6
Hexachlorobutadiene	ND		110	23	ppb v/v			02/06/19 01:08	53.6
2-Hexanone	ND		21	4.7	ppb v/v			02/06/19 01:08	53.6
4-Methyl-2-pentanone (MIBK)	ND		21	7.2	ppb v/v			02/06/19 01:08	53.6
<b>Methylene Chloride</b>	<b>12</b>	<b>J</b>	21	3.9	ppb v/v			02/06/19 01:08	53.6
Styrene	ND		21	3.2	ppb v/v			02/06/19 01:08	53.6
1,1,2,2-Tetrachloroethane	ND		21	3.7	ppb v/v			02/06/19 01:08	53.6
<b>Tetrachloroethene</b>	<b>68</b>		21	2.7	ppb v/v			02/06/19 01:08	53.6
Toluene	ND		21	2.7	ppb v/v			02/06/19 01:08	53.6
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>360</b>		21	8.7	ppb v/v			02/06/19 01:08	53.6
1,2,4-Trichlorobenzene	ND		110	23	ppb v/v			02/06/19 01:08	53.6
<b>1,1,1-Trichloroethane</b>	<b>8.0</b>	<b>J</b>	16	3.5	ppb v/v			02/06/19 01:08	53.6
1,1,2-Trichloroethane	ND		21	3.6	ppb v/v			02/06/19 01:08	53.6
<b>Trichloroethene</b>	<b>3000</b>		21	5.6	ppb v/v			02/06/19 01:08	53.6
<b>Trichlorofluoromethane</b>	<b>110</b>		21	11	ppb v/v			02/06/19 01:08	53.6
1,2,4-Trimethylbenzene	ND		43	8.7	ppb v/v			02/06/19 01:08	53.6
1,3,5-Trimethylbenzene	ND		21	6.7	ppb v/v			02/06/19 01:08	53.6
Vinyl acetate	ND		43	7.8	ppb v/v			02/06/19 01:08	53.6
Vinyl chloride	ND		21	6.4	ppb v/v			02/06/19 01:08	53.6
m,p-Xylene	ND		43	5.4	ppb v/v			02/06/19 01:08	53.6
o-Xylene	ND		21	2.9	ppb v/v			02/06/19 01:08	53.6

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	71		70 - 130		02/06/19 01:08	53.6
1,2-Dichloroethane-d4 (Surr)	104		70 - 130		02/06/19 01:08	53.6
Toluene-d8 (Surr)	99		70 - 130		02/06/19 01:08	53.6

**Client Sample ID: 106991-001/CWL-D3-170**

**Lab Sample ID: 320-47154-25**

**Date Collected: 01/17/19 10:59**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		310	11	ppb v/v			02/06/19 17:52	61.4
Benzene	ND		25	4.9	ppb v/v			02/06/19 17:52	61.4
Benzyl chloride	ND		49	10	ppb v/v			02/06/19 17:52	61.4
Bromodichloromethane	ND		18	4.1	ppb v/v			02/06/19 17:52	61.4
Bromoform	ND		25	4.3	ppb v/v			02/06/19 17:52	61.4

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106991-001/CWL-D3-170**

**Lab Sample ID: 320-47154-25**

**Date Collected: 01/17/19 10:59**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		49	21	ppb v/v			02/06/19 17:52	61.4
2-Butanone (MEK)	ND		49	12	ppb v/v			02/06/19 17:52	61.4
Carbon disulfide	ND		49	4.8	ppb v/v			02/06/19 17:52	61.4
<b>Carbon tetrachloride</b>	<b>9.8</b>	<b>J</b>	49	3.9	ppb v/v			02/06/19 17:52	61.4
Chlorobenzene	ND		18	3.9	ppb v/v			02/06/19 17:52	61.4
Chloroethane	ND		49	19	ppb v/v			02/06/19 17:52	61.4
<b>Chloroform</b>	<b>120</b>		18	5.8	ppb v/v			02/06/19 17:52	61.4
Chloromethane	ND		49	12	ppb v/v			02/06/19 17:52	61.4
Dibromochloromethane	ND		25	4.9	ppb v/v			02/06/19 17:52	61.4
1,2-Dibromoethane (EDB)	ND		49	4.6	ppb v/v			02/06/19 17:52	61.4
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		25	9.5	ppb v/v			02/06/19 17:52	61.4
1,2-Dichlorobenzene	ND		25	8.0	ppb v/v			02/06/19 17:52	61.4
1,3-Dichlorobenzene	ND		25	6.8	ppb v/v			02/06/19 17:52	61.4
1,4-Dichlorobenzene	ND		25	9.1	ppb v/v			02/06/19 17:52	61.4
<b>Dichlorodifluoromethane</b>	<b>23</b>	<b>J</b>	25	8.9	ppb v/v			02/06/19 17:52	61.4
<b>1,1-Dichloroethane</b>	<b>6.5</b>	<b>J</b>	18	4.4	ppb v/v			02/06/19 17:52	61.4
<b>1,2-Dichloroethane</b>	<b>16</b>	<b>J</b>	49	5.4	ppb v/v			02/06/19 17:52	61.4
<b>1,1-Dichloroethene</b>	<b>150</b>		49	7.9	ppb v/v			02/06/19 17:52	61.4
cis-1,2-Dichloroethene	ND		25	5.5	ppb v/v			02/06/19 17:52	61.4
trans-1,2-Dichloroethene	ND		25	6.1	ppb v/v			02/06/19 17:52	61.4
<b>1,2-Dichloropropane</b>	<b>74</b>		25	15	ppb v/v			02/06/19 17:52	61.4
cis-1,3-Dichloropropene	ND		25	6.4	ppb v/v			02/06/19 17:52	61.4
trans-1,3-Dichloropropene	ND		25	5.4	ppb v/v			02/06/19 17:52	61.4
Ethylbenzene	ND		25	3.9	ppb v/v			02/06/19 17:52	61.4
4-Ethyltoluene	ND		25	11	ppb v/v			02/06/19 17:52	61.4
Hexachlorobutadiene	ND		120	27	ppb v/v			02/06/19 17:52	61.4
2-Hexanone	ND		25	5.3	ppb v/v			02/06/19 17:52	61.4
4-Methyl-2-pentanone (MIBK)	ND		25	8.3	ppb v/v			02/06/19 17:52	61.4
<b>Methylene Chloride</b>	<b>14</b>	<b>J</b>	25	4.4	ppb v/v			02/06/19 17:52	61.4
Styrene	ND		25	3.6	ppb v/v			02/06/19 17:52	61.4
1,1,2,2-Tetrachloroethane	ND		25	4.2	ppb v/v			02/06/19 17:52	61.4
<b>Tetrachloroethene</b>	<b>100</b>		25	3.1	ppb v/v			02/06/19 17:52	61.4
Toluene	ND		25	3.1	ppb v/v			02/06/19 17:52	61.4
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>390</b>		25	10	ppb v/v			02/06/19 17:52	61.4
1,2,4-Trichlorobenzene	ND		120	27	ppb v/v			02/06/19 17:52	61.4
<b>1,1,1-Trichloroethane</b>	<b>5.7</b>	<b>J</b>	18	4.0	ppb v/v			02/06/19 17:52	61.4
1,1,2-Trichloroethane	ND		25	4.1	ppb v/v			02/06/19 17:52	61.4
<b>Trichloroethene</b>	<b>3400</b>		25	6.4	ppb v/v			02/06/19 17:52	61.4
<b>Trichlorofluoromethane</b>	<b>120</b>		25	12	ppb v/v			02/06/19 17:52	61.4
1,2,4-Trimethylbenzene	ND		49	9.9	ppb v/v			02/06/19 17:52	61.4
1,3,5-Trimethylbenzene	ND		25	7.7	ppb v/v			02/06/19 17:52	61.4
Vinyl acetate	ND		49	8.9	ppb v/v			02/06/19 17:52	61.4
Vinyl chloride	ND		25	7.4	ppb v/v			02/06/19 17:52	61.4
m,p-Xylene	ND		49	6.1	ppb v/v			02/06/19 17:52	61.4
o-Xylene	ND		25	3.3	ppb v/v			02/06/19 17:52	61.4

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	75		70 - 130		02/06/19 17:52	61.4

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106991-001/CWL-D3-170**

**Lab Sample ID: 320-47154-25**

**Date Collected: 01/17/19 10:59**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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)	101		70 - 130		02/06/19 17:52	61.4
Toluene-d8 (Surr)	98		70 - 130		02/06/19 17:52	61.4

**Client Sample ID: 106992-001/CWL-D3-350**

**Lab Sample ID: 320-47154-26**

**Date Collected: 01/17/19 11:02**

**Matrix: Air**  
Note: These results are not presented in Annual Report Table 5-1 (see Sect. 5.1); they are replaced by March 2019 sample results. Certificates of Analysis for the March 2019 samples are presented later in this annex.

**Date Received: 01/28/19 10:45**

**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	ND		85	3.0	ppb v/v			02/06/19 18:46	16.9
Benzene	ND		6.8	1.3	ppb v/v			02/06/19 18:46	16.9
Benzyl chloride	ND		14	2.8	ppb v/v			02/06/19 18:46	16.9
Bromodichloromethane	ND		5.1	1.1	ppb v/v			02/06/19 18:46	16.9
Bromoform	ND		6.8	1.2	ppb v/v			02/06/19 18:46	16.9
Bromomethane	ND		14	5.7	ppb v/v			02/06/19 18:46	16.9
2-Butanone (MEK)	ND		14	3.4	ppb v/v			02/06/19 18:46	16.9
Carbon disulfide	ND		14	1.3	ppb v/v			02/06/19 18:46	16.9
<b>Carbon tetrachloride</b>	<b>2.8</b>	<b>J</b>	14	1.1	ppb v/v			02/06/19 18:46	16.9
Chlorobenzene	ND		5.1	1.1	ppb v/v			02/06/19 18:46	16.9
Chloroethane	ND		14	5.2	ppb v/v			02/06/19 18:46	16.9
<b>Chloroform</b>	<b>29</b>		5.1	1.6	ppb v/v			02/06/19 18:46	16.9
Chloromethane	ND		14	3.3	ppb v/v			02/06/19 18:46	16.9
Dibromochloromethane	ND		6.8	1.3	ppb v/v			02/06/19 18:46	16.9
1,2-Dibromoethane (EDB)	ND		14	1.3	ppb v/v			02/06/19 18:46	16.9
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		6.8	2.6	ppb v/v			02/06/19 18:46	16.9
1,2-Dichlorobenzene	ND		6.8	2.2	ppb v/v			02/06/19 18:46	16.9
1,3-Dichlorobenzene	ND		6.8	1.9	ppb v/v			02/06/19 18:46	16.9
1,4-Dichlorobenzene	ND		6.8	2.5	ppb v/v			02/06/19 18:46	16.9
<b>Dichlorodifluoromethane</b>	<b>7.6</b>		6.8	2.5	ppb v/v			02/06/19 18:46	16.9
<b>1,1-Dichloroethane</b>	<b>1.8</b>	<b>J</b>	5.1	1.2	ppb v/v			02/06/19 18:46	16.9
<b>1,2-Dichloroethane</b>	<b>3.0</b>	<b>J</b>	14	1.5	ppb v/v			02/06/19 18:46	16.9
<b>1,1-Dichloroethene</b>	<b>47</b>		14	2.2	ppb v/v			02/06/19 18:46	16.9
cis-1,2-Dichloroethene	ND		6.8	1.5	ppb v/v			02/06/19 18:46	16.9
trans-1,2-Dichloroethene	ND		6.8	1.7	ppb v/v			02/06/19 18:46	16.9
<b>1,2-Dichloropropane</b>	<b>21</b>		6.8	4.1	ppb v/v			02/06/19 18:46	16.9
cis-1,3-Dichloropropene	ND		6.8	1.8	ppb v/v			02/06/19 18:46	16.9
trans-1,3-Dichloropropene	ND		6.8	1.5	ppb v/v			02/06/19 18:46	16.9
Ethylbenzene	ND		6.8	1.1	ppb v/v			02/06/19 18:46	16.9
4-Ethyltoluene	ND		6.8	3.2	ppb v/v			02/06/19 18:46	16.9
Hexachlorobutadiene	ND		34	7.3	ppb v/v			02/06/19 18:46	16.9
2-Hexanone	ND		6.8	1.5	ppb v/v			02/06/19 18:46	16.9
4-Methyl-2-pentanone (MIBK)	ND		6.8	2.3	ppb v/v			02/06/19 18:46	16.9
<b>Methylene Chloride</b>	<b>8.8</b>		6.8	1.2	ppb v/v			02/06/19 18:46	16.9
Styrene	ND		6.8	1.0	ppb v/v			02/06/19 18:46	16.9
1,1,2,2-Tetrachloroethane	ND		6.8	1.2	ppb v/v			02/06/19 18:46	16.9
<b>Tetrachloroethene</b>	<b>23</b>		6.8	0.86	ppb v/v			02/06/19 18:46	16.9
Toluene	ND		6.8	0.86	ppb v/v			02/06/19 18:46	16.9

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106992-001/CWL-D3-350**

**Lab Sample ID: 320-47154-26**

**Date Collected: 01/17/19 11:02**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>110</b>		6.8	2.8	ppb v/v			02/06/19 18:46	16.9
1,2,4-Trichlorobenzene	ND		34	7.3	ppb v/v			02/06/19 18:46	16.9
<b>1,1,1-Trichloroethane</b>	<b>1.2</b>	<b>J</b>	5.1	1.1	ppb v/v			02/06/19 18:46	16.9
1,1,2-Trichloroethane	ND		6.8	1.1	ppb v/v			02/06/19 18:46	16.9
<b>Trichloroethene</b>	<b>890</b>		6.8	1.8	ppb v/v			02/06/19 18:46	16.9
<b>Trichlorofluoromethane</b>	<b>36</b>		6.8	3.3	ppb v/v			02/06/19 18:46	16.9
1,2,4-Trimethylbenzene	ND		14	2.7	ppb v/v			02/06/19 18:46	16.9
1,3,5-Trimethylbenzene	ND		6.8	2.1	ppb v/v			02/06/19 18:46	16.9
Vinyl acetate	ND		14	2.5	ppb v/v			02/06/19 18:46	16.9
Vinyl chloride	ND		6.8	2.0	ppb v/v			02/06/19 18:46	16.9
m,p-Xylene	ND		14	1.7	ppb v/v			02/06/19 18:46	16.9
o-Xylene	ND		6.8	0.91	ppb v/v			02/06/19 18:46	16.9
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	81		70 - 130					02/06/19 18:46	16.9
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					02/06/19 18:46	16.9
Toluene-d8 (Surr)	97		70 - 130					02/06/19 18:46	16.9

**Client Sample ID: 106993-001/CWL-D3-440**

**Lab Sample ID: 320-47154-27**

**Date Collected: 01/17/19 11:07**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		370	13	ppb v/v			02/06/19 19:39	74.8
Benzene	ND		30	5.9	ppb v/v			02/06/19 19:39	74.8
Benzyl chloride	ND		60	12	ppb v/v			02/06/19 19:39	74.8
Bromodichloromethane	ND		22	4.9	ppb v/v			02/06/19 19:39	74.8
Bromoform	ND		30	5.2	ppb v/v			02/06/19 19:39	74.8
Bromomethane	ND		60	25	ppb v/v			02/06/19 19:39	74.8
2-Butanone (MEK)	ND		60	15	ppb v/v			02/06/19 19:39	74.8
Carbon disulfide	ND		60	5.8	ppb v/v			02/06/19 19:39	74.8
<b>Carbon tetrachloride</b>	<b>14</b>	<b>J</b>	60	4.8	ppb v/v			02/06/19 19:39	74.8
Chlorobenzene	ND		22	4.8	ppb v/v			02/06/19 19:39	74.8
Chloroethane	ND		60	23	ppb v/v			02/06/19 19:39	74.8
<b>Chloroform</b>	<b>130</b>		22	7.1	ppb v/v			02/06/19 19:39	74.8
Chloromethane	ND		60	15	ppb v/v			02/06/19 19:39	74.8
Dibromochloromethane	ND		30	5.9	ppb v/v			02/06/19 19:39	74.8
1,2-Dibromoethane (EDB)	ND		60	5.6	ppb v/v			02/06/19 19:39	74.8
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		30	12	ppb v/v			02/06/19 19:39	74.8
1,2-Dichlorobenzene	ND		30	9.7	ppb v/v			02/06/19 19:39	74.8
1,3-Dichlorobenzene	ND		30	8.2	ppb v/v			02/06/19 19:39	74.8
1,4-Dichlorobenzene	ND		30	11	ppb v/v			02/06/19 19:39	74.8
<b>Dichlorodifluoromethane</b>	<b>27</b>	<b>J</b>	30	11	ppb v/v			02/06/19 19:39	74.8
<b>1,1-Dichloroethane</b>	<b>7.7</b>	<b>J</b>	22	5.4	ppb v/v			02/06/19 19:39	74.8
<b>1,2-Dichloroethane</b>	<b>15</b>	<b>J</b>	60	6.6	ppb v/v			02/06/19 19:39	74.8
<b>1,1-Dichloroethene</b>	<b>190</b>		60	9.6	ppb v/v			02/06/19 19:39	74.8

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106993-001/CWL-D3-440**

**Lab Sample ID: 320-47154-27**

**Date Collected: 01/17/19 11:07**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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	ND		30	6.7	ppb v/v			02/06/19 19:39	74.8
trans-1,2-Dichloroethene	ND		30	7.5	ppb v/v			02/06/19 19:39	74.8
<b>1,2-Dichloropropane</b>	<b>110</b>		30	18	ppb v/v			02/06/19 19:39	74.8
cis-1,3-Dichloropropene	ND		30	7.8	ppb v/v			02/06/19 19:39	74.8
trans-1,3-Dichloropropene	ND		30	6.6	ppb v/v			02/06/19 19:39	74.8
Ethylbenzene	ND		30	4.7	ppb v/v			02/06/19 19:39	74.8
4-Ethyltoluene	ND		30	14	ppb v/v			02/06/19 19:39	74.8
Hexachlorobutadiene	ND		150	32	ppb v/v			02/06/19 19:39	74.8
2-Hexanone	ND		30	6.5	ppb v/v			02/06/19 19:39	74.8
4-Methyl-2-pentanone (MIBK)	ND		30	10	ppb v/v			02/06/19 19:39	74.8
<b>Methylene Chloride</b>	<b>7.8</b>	<b>J</b>	30	5.4	ppb v/v			02/06/19 19:39	74.8
Styrene	ND		30	4.4	ppb v/v			02/06/19 19:39	74.8
1,1,2,2-Tetrachloroethane	ND		30	5.2	ppb v/v			02/06/19 19:39	74.8
<b>Tetrachloroethene</b>	<b>110</b>		30	3.8	ppb v/v			02/06/19 19:39	74.8
Toluene	ND		30	3.8	ppb v/v			02/06/19 19:39	74.8
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>500</b>		30	12	ppb v/v			02/06/19 19:39	74.8
1,2,4-Trichlorobenzene	ND		150	32	ppb v/v			02/06/19 19:39	74.8
1,1,1-Trichloroethane	ND		22	4.9	ppb v/v			02/06/19 19:39	74.8
1,1,2-Trichloroethane	ND		30	5.0	ppb v/v			02/06/19 19:39	74.8
<b>Trichloroethene</b>	<b>4300</b>		30	7.9	ppb v/v			02/06/19 19:39	74.8
<b>Trichlorofluoromethane</b>	<b>140</b>		30	15	ppb v/v			02/06/19 19:39	74.8
1,2,4-Trimethylbenzene	ND		60	12	ppb v/v			02/06/19 19:39	74.8
1,3,5-Trimethylbenzene	ND		30	9.4	ppb v/v			02/06/19 19:39	74.8
Vinyl acetate	ND		60	11	ppb v/v			02/06/19 19:39	74.8
Vinyl chloride	ND		30	9.0	ppb v/v			02/06/19 19:39	74.8
m,p-Xylene	ND		60	7.5	ppb v/v			02/06/19 19:39	74.8
o-Xylene	ND		30	4.0	ppb v/v			02/06/19 19:39	74.8
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	73		70 - 130					02/06/19 19:39	74.8
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					02/06/19 19:39	74.8
Toluene-d8 (Surr)	97		70 - 130					02/06/19 19:39	74.8

**Client Sample ID: 106994-001/CWL-D3-480**

**Lab Sample ID: 320-47154-28**

**Date Collected: 01/17/19 11:20**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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
<b>Acetone</b>	<b>1.7</b>	<b>J</b>	5.0	0.18	ppb v/v			02/06/19 20:42	1
Benzene	ND		0.40	0.079	ppb v/v			02/06/19 20:42	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			02/06/19 20:42	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			02/06/19 20:42	1
Bromoform	ND		0.40	0.070	ppb v/v			02/06/19 20:42	1
Bromomethane	ND		0.80	0.34	ppb v/v			02/06/19 20:42	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			02/06/19 20:42	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			02/06/19 20:42	1

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

TestAmerica Job ID: 320-47154-1  
SDG: 619395,619396,619397,619398,619399

**Client Sample ID: 106994-001/CWL-D3-480**

**Lab Sample ID: 320-47154-28**

**Date Collected: 01/17/19 11:20**

**Matrix: Air**

**Date Received: 01/28/19 10:45**

**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
<b>Carbon tetrachloride</b>	<b>0.20</b>	<b>J</b>	0.80	0.064	ppb v/v			02/06/19 20:42	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			02/06/19 20:42	1
Chloroethane	ND		0.80	0.31	ppb v/v			02/06/19 20:42	1
<b>Chloroform</b>	<b>1.2</b>		0.30	0.095	ppb v/v			02/06/19 20:42	1
<b>Chloromethane</b>	<b>0.41</b>	<b>J</b>	0.80	0.20	ppb v/v			02/06/19 20:42	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			02/06/19 20:42	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			02/06/19 20:42	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			02/06/19 20:42	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			02/06/19 20:42	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			02/06/19 20:42	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			02/06/19 20:42	1
<b>Dichlorodifluoromethane</b>	<b>0.43</b>		0.40	0.15	ppb v/v			02/06/19 20:42	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			02/06/19 20:42	1
<b>1,2-Dichloroethane</b>	<b>0.17</b>	<b>J</b>	0.80	0.088	ppb v/v			02/06/19 20:42	1
<b>1,1-Dichloroethene</b>	<b>1.4</b>		0.80	0.13	ppb v/v			02/06/19 20:42	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			02/06/19 20:42	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			02/06/19 20:42	1
<b>1,2-Dichloropropane</b>	<b>0.95</b>		0.40	0.24	ppb v/v			02/06/19 20:42	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			02/06/19 20:42	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			02/06/19 20:42	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			02/06/19 20:42	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			02/06/19 20:42	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			02/06/19 20:42	1
2-Hexanone	ND		0.40	0.087	ppb v/v			02/06/19 20:42	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			02/06/19 20:42	1
<b>Methylene Chloride</b>	<b>0.18</b>	<b>J</b>	0.40	0.072	ppb v/v			02/06/19 20:42	1
Styrene	ND		0.40	0.059	ppb v/v			02/06/19 20:42	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			02/06/19 20:42	1
<b>Tetrachloroethene</b>	<b>1.6</b>		0.40	0.051	ppb v/v			02/06/19 20:42	1
Toluene	ND		0.40	0.051	ppb v/v			02/06/19 20:42	1
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>3.9</b>		0.40	0.16	ppb v/v			02/06/19 20:42	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			02/06/19 20:42	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			02/06/19 20:42	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			02/06/19 20:42	1
<b>Trichloroethene</b>	<b>38</b>		0.40	0.11	ppb v/v			02/06/19 20:42	1
<b>Trichlorofluoromethane</b>	<b>1.4</b>		0.40	0.20	ppb v/v			02/06/19 20:42	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			02/06/19 20:42	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			02/06/19 20:42	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			02/06/19 20:42	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			02/06/19 20:42	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			02/06/19 20:42	1
o-Xylene	ND		0.40	0.054	ppb v/v			02/06/19 20:42	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130		02/06/19 20:42	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 130		02/06/19 20:42	1
Toluene-d8 (Surr)	97		70 - 130		02/06/19 20:42	1

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

**Chemical Waste Landfill**

**March 2019 Samples**

# Client Sample Results

Client: Sandia National Laboratories  
 Project/Site: CWL PCCP

Job ID: 320-48958-1  
 SDG: AR/COC 619618

**Client Sample ID: 107997-001/CWL-D1-350**

**Lab Sample ID: 320-48958-1**

**Date Collected: 03/28/19 09:14**

**Matrix: Air**

**Date Received: 04/04/19 08:00**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1300	47	ppb v/v			04/19/19 01:48	263
Benzene	ND		110	21	ppb v/v			04/19/19 01:48	263
Benzyl chloride	ND		210	43	ppb v/v			04/19/19 01:48	263
Bromodichloromethane	ND		79	17	ppb v/v			04/19/19 01:48	263
Bromoform	ND		110	18	ppb v/v			04/19/19 01:48	263
Bromomethane	ND		210	88	ppb v/v			04/19/19 01:48	263
2-Butanone (MEK)	ND		210	52	ppb v/v			04/19/19 01:48	263
Carbon disulfide	ND		210	21	ppb v/v			04/19/19 01:48	263
<b>Carbon tetrachloride</b>	<b>33</b>	<b>J</b>	210	17	ppb v/v			04/19/19 01:48	263
Chlorobenzene	ND		79	17	ppb v/v			04/19/19 01:48	263
Chloroethane	ND		210	81	ppb v/v			04/19/19 01:48	263
<b>Chloroform</b>	<b>210</b>		79	25	ppb v/v			04/19/19 01:48	263
Chloromethane	ND		210	52	ppb v/v			04/19/19 01:48	263
Dibromochloromethane	ND		110	21	ppb v/v			04/19/19 01:48	263
1,2-Dibromoethane (EDB)	ND		210	20	ppb v/v			04/19/19 01:48	263
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		110	41	ppb v/v			04/19/19 01:48	263
1,2-Dichlorobenzene	ND		110	34	ppb v/v			04/19/19 01:48	263
1,3-Dichlorobenzene	ND		110	29	ppb v/v			04/19/19 01:48	263
1,4-Dichlorobenzene	ND		110	39	ppb v/v			04/19/19 01:48	263
<b>Dichlorodifluoromethane</b>	<b>84</b>	<b>J B</b>	110	38	ppb v/v			04/19/19 01:48	263
<b>1,1-Dichloroethane</b>	<b>31</b>	<b>J</b>	79	19	ppb v/v			04/19/19 01:48	263
1,2-Dichloroethane	ND		210	23	ppb v/v			04/19/19 01:48	263
<b>1,1-Dichloroethene</b>	<b>670</b>		210	34	ppb v/v			04/19/19 01:48	263
cis-1,2-Dichloroethene	ND		110	23	ppb v/v			04/19/19 01:48	263
trans-1,2-Dichloroethene	ND		110	26	ppb v/v			04/19/19 01:48	263
<b>1,2-Dichloropropane</b>	<b>66</b>	<b>J</b>	110	63	ppb v/v			04/19/19 01:48	263
cis-1,3-Dichloropropene	ND		110	27	ppb v/v			04/19/19 01:48	263
trans-1,3-Dichloropropene	ND		110	23	ppb v/v			04/19/19 01:48	263
Ethylbenzene	ND		110	17	ppb v/v			04/19/19 01:48	263
4-Ethyltoluene	ND		110	49	ppb v/v			04/19/19 01:48	263
Hexachlorobutadiene	ND		530	110	ppb v/v			04/19/19 01:48	263
2-Hexanone	ND		110	23	ppb v/v			04/19/19 01:48	263
4-Methyl-2-pentanone (MIBK)	ND		110	36	ppb v/v			04/19/19 01:48	263
<b>Methylene Chloride</b>	<b>53</b>	<b>J B</b>	110	19	ppb v/v			04/19/19 01:48	263
Styrene	ND		110	16	ppb v/v			04/19/19 01:48	263
1,1,2,2-Tetrachloroethane	ND		110	18	ppb v/v			04/19/19 01:48	263
<b>Tetrachloroethene</b>	<b>320</b>		110	13	ppb v/v			04/19/19 01:48	263
<b>Toluene</b>	<b>21</b>	<b>J</b>	110	13	ppb v/v			04/19/19 01:48	263
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>1500</b>		110	43	ppb v/v			04/19/19 01:48	263
1,2,4-Trichlorobenzene	ND		530	110	ppb v/v			04/19/19 01:48	263
1,1,1-Trichloroethane	ND		79	17	ppb v/v			04/19/19 01:48	263
1,1,2-Trichloroethane	ND		110	18	ppb v/v			04/19/19 01:48	263
<b>Trichloroethene</b>	<b>13000</b>		110	28	ppb v/v			04/19/19 01:48	263
<b>Trichlorofluoromethane</b>	<b>390</b>		110	52	ppb v/v			04/19/19 01:48	263
1,2,4-Trimethylbenzene	ND		210	43	ppb v/v			04/19/19 01:48	263
1,3,5-Trimethylbenzene	ND		110	33	ppb v/v			04/19/19 01:48	263
Vinyl acetate	ND		210	38	ppb v/v			04/19/19 01:48	263
Vinyl chloride	ND		110	32	ppb v/v			04/19/19 01:48	263

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

Job ID: 320-48958-1  
SDG: AR/COC 619618

**Client Sample ID: 107997-001/CWL-D1-350**

**Lab Sample ID: 320-48958-1**

**Date Collected: 03/28/19 09:14**

**Matrix: Air**

**Date Received: 04/04/19 08:00**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		210	26	ppb v/v			04/19/19 01:48	263
o-Xylene	ND		110	14	ppb v/v			04/19/19 01:48	263
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	73		70 - 130					04/19/19 01:48	263
1,2-Dichloroethane-d4 (Surr)	78		70 - 130					04/19/19 01:48	263
Toluene-d8 (Surr)	98		70 - 130					04/19/19 01:48	263

**Client Sample ID: 107998-001/CWL-QC1**

**Lab Sample ID: 320-48958-2**

**Date Collected: 03/28/19 09:04**

**Matrix: Air**

**Date Received: 04/04/19 08:00**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			04/19/19 02:46	1
Benzene	ND		0.40	0.079	ppb v/v			04/19/19 02:46	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			04/19/19 02:46	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			04/19/19 02:46	1
Bromoform	ND		0.40	0.070	ppb v/v			04/19/19 02:46	1
Bromomethane	ND		0.80	0.34	ppb v/v			04/19/19 02:46	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			04/19/19 02:46	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			04/19/19 02:46	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			04/19/19 02:46	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			04/19/19 02:46	1
Chloroethane	ND		0.80	0.31	ppb v/v			04/19/19 02:46	1
Chloroform	ND		0.30	0.095	ppb v/v			04/19/19 02:46	1
Chloromethane	ND		0.80	0.20	ppb v/v			04/19/19 02:46	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			04/19/19 02:46	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			04/19/19 02:46	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			04/19/19 02:46	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			04/19/19 02:46	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			04/19/19 02:46	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			04/19/19 02:46	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			04/19/19 02:46	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			04/19/19 02:46	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			04/19/19 02:46	1
<b>1,1-Dichloroethene</b>	<b>0.27</b>	<b>J</b>	0.80	0.13	ppb v/v			04/19/19 02:46	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			04/19/19 02:46	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			04/19/19 02:46	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			04/19/19 02:46	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			04/19/19 02:46	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			04/19/19 02:46	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			04/19/19 02:46	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			04/19/19 02:46	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			04/19/19 02:46	1
2-Hexanone	ND		0.40	0.087	ppb v/v			04/19/19 02:46	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			04/19/19 02:46	1
<b>Methylene Chloride</b>	<b>0.089</b>	<b>J B</b>	0.40	0.072	ppb v/v			04/19/19 02:46	1

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

Job ID: 320-48958-1  
SDG: AR/COC 619618

**Client Sample ID: 107998-001/CWL-QC1**

**Lab Sample ID: 320-48958-2**

**Date Collected: 03/28/19 09:04**

**Matrix: Air**

**Date Received: 04/04/19 08:00**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		0.40	0.059	ppb v/v			04/19/19 02:46	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			04/19/19 02:46	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			04/19/19 02:46	1
Toluene	ND		0.40	0.051	ppb v/v			04/19/19 02:46	1
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.36</b>	<b>J</b>	0.40	0.16	ppb v/v			04/19/19 02:46	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			04/19/19 02:46	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			04/19/19 02:46	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			04/19/19 02:46	1
<b>Trichloroethene</b>	<b>1.9</b>		0.40	0.11	ppb v/v			04/19/19 02:46	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			04/19/19 02:46	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			04/19/19 02:46	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			04/19/19 02:46	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			04/19/19 02:46	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			04/19/19 02:46	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			04/19/19 02:46	1
o-Xylene	ND		0.40	0.054	ppb v/v			04/19/19 02:46	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	79		70 - 130		04/19/19 02:46	1
1,2-Dichloroethane-d4 (Surr)	86		70 - 130		04/19/19 02:46	1
Toluene-d8 (Surr)	100		70 - 130		04/19/19 02:46	1

**Client Sample ID: 107999-001/CWL-D3-350**

**Lab Sample ID: 320-48959-1**

**Date Collected: 03/28/19 09:50**

**Matrix: Air**

**Date Received: 04/04/19 08:00**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		140	5.1	ppb v/v			04/19/19 03:39	28.5
Benzene	ND		11	2.3	ppb v/v			04/19/19 03:39	28.5
Benzyl chloride	ND		23	4.6	ppb v/v			04/19/19 03:39	28.5
Bromodichloromethane	ND		8.6	1.9	ppb v/v			04/19/19 03:39	28.5
Bromoform	ND		11	2.0	ppb v/v			04/19/19 03:39	28.5
Bromomethane	ND		23	9.5	ppb v/v			04/19/19 03:39	28.5
2-Butanone (MEK)	ND		23	5.7	ppb v/v			04/19/19 03:39	28.5
Carbon disulfide	ND		23	2.2	ppb v/v			04/19/19 03:39	28.5
<b>Carbon tetrachloride</b>	<b>3.3</b>	<b>J</b>	23	1.8	ppb v/v			04/19/19 03:39	28.5
Chlorobenzene	ND		8.6	1.8	ppb v/v			04/19/19 03:39	28.5
Chloroethane	ND		23	8.8	ppb v/v			04/19/19 03:39	28.5
<b>Chloroform</b>	<b>32</b>		8.6	2.7	ppb v/v			04/19/19 03:39	28.5
Chloromethane	ND		23	5.6	ppb v/v			04/19/19 03:39	28.5
Dibromochloromethane	ND		11	2.3	ppb v/v			04/19/19 03:39	28.5
1,2-Dibromoethane (EDB)	ND		23	2.1	ppb v/v			04/19/19 03:39	28.5
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		11	4.4	ppb v/v			04/19/19 03:39	28.5
1,2-Dichlorobenzene	ND		11	3.7	ppb v/v			04/19/19 03:39	28.5
1,3-Dichlorobenzene	ND		11	3.1	ppb v/v			04/19/19 03:39	28.5
1,4-Dichlorobenzene	ND		11	4.2	ppb v/v			04/19/19 03:39	28.5

Eurofins TestAmerica, Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

Job ID: 320-48958-1  
SDG: AR/COC 619618

**Client Sample ID: 107999-001/CWL-D3-350**

**Lab Sample ID: 320-48959-1**

Date Collected: 03/28/19 09:50

Matrix: Air

Date Received: 04/04/19 08:00

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	8.9	J B	11	4.1	ppb v/v			04/19/19 03:39	28.5
1,1-Dichloroethane	2.9	J	8.6	2.1	ppb v/v			04/19/19 03:39	28.5
1,2-Dichloroethane	3.3	J	23	2.5	ppb v/v			04/19/19 03:39	28.5
1,1-Dichloroethene	47		23	3.7	ppb v/v			04/19/19 03:39	28.5
cis-1,2-Dichloroethene	ND		11	2.5	ppb v/v			04/19/19 03:39	28.5
trans-1,2-Dichloroethene	ND		11	2.9	ppb v/v			04/19/19 03:39	28.5
1,2-Dichloropropane	21		11	6.8	ppb v/v			04/19/19 03:39	28.5
cis-1,3-Dichloropropene	ND		11	3.0	ppb v/v			04/19/19 03:39	28.5
trans-1,3-Dichloropropene	ND		11	2.5	ppb v/v			04/19/19 03:39	28.5
Ethylbenzene	ND		11	1.8	ppb v/v			04/19/19 03:39	28.5
4-Ethyltoluene	ND		11	5.3	ppb v/v			04/19/19 03:39	28.5
Hexachlorobutadiene	ND		57	12	ppb v/v			04/19/19 03:39	28.5
2-Hexanone	ND		11	2.5	ppb v/v			04/19/19 03:39	28.5
4-Methyl-2-pentanone (MIBK)	ND		11	3.8	ppb v/v			04/19/19 03:39	28.5
Methylene Chloride	9.4	J B	11	2.1	ppb v/v			04/19/19 03:39	28.5
Styrene	ND		11	1.7	ppb v/v			04/19/19 03:39	28.5
1,1,2,2-Tetrachloroethane	ND		11	2.0	ppb v/v			04/19/19 03:39	28.5
Tetrachloroethene	26		11	1.5	ppb v/v			04/19/19 03:39	28.5
Toluene	ND		11	1.5	ppb v/v			04/19/19 03:39	28.5
1,1,2-Trichloro-1,2,2-trifluoroethane	130		11	4.6	ppb v/v			04/19/19 03:39	28.5
1,2,4-Trichlorobenzene	ND		57	12	ppb v/v			04/19/19 03:39	28.5
1,1,1-Trichloroethane	ND		8.6	1.9	ppb v/v			04/19/19 03:39	28.5
1,1,2-Trichloroethane	ND		11	1.9	ppb v/v			04/19/19 03:39	28.5
Trichloroethene	1100		11	3.0	ppb v/v			04/19/19 03:39	28.5
Trichlorofluoromethane	37		11	5.6	ppb v/v			04/19/19 03:39	28.5
1,2,4-Trimethylbenzene	ND		23	4.6	ppb v/v			04/19/19 03:39	28.5
1,3,5-Trimethylbenzene	ND		11	3.6	ppb v/v			04/19/19 03:39	28.5
Vinyl acetate	ND		23	4.1	ppb v/v			04/19/19 03:39	28.5
Vinyl chloride	ND		11	3.4	ppb v/v			04/19/19 03:39	28.5
m,p-Xylene	ND		23	2.9	ppb v/v			04/19/19 03:39	28.5
o-Xylene	ND		11	1.5	ppb v/v			04/19/19 03:39	28.5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	73		70 - 130		04/19/19 03:39	28.5
1,2-Dichloroethane-d4 (Surr)	80		70 - 130		04/19/19 03:39	28.5
Toluene-d8 (Surr)	99		70 - 130		04/19/19 03:39	28.5

**Client Sample ID: 108000-001/CWL-QC2**

**Lab Sample ID: 320-48959-2**

Date Collected: 03/28/19 09:41

Matrix: Air

Date Received: 04/04/19 08:00

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	0.26	J	5.0	0.18	ppb v/v			04/19/19 04:38	1
Benzene	ND		0.40	0.079	ppb v/v			04/19/19 04:38	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			04/19/19 04:38	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			04/19/19 04:38	1

Eurofins TestAmerica, Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

Job ID: 320-48958-1  
SDG: AR/COC 619618

**Client Sample ID: 108000-001/CWL-QC2**

**Lab Sample ID: 320-48959-2**

**Date Collected: 03/28/19 09:41**

**Matrix: Air**

**Date Received: 04/04/19 08:00**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromoform	ND		0.40	0.070	ppb v/v			04/19/19 04:38	1
Bromomethane	ND		0.80	0.34	ppb v/v			04/19/19 04:38	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			04/19/19 04:38	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			04/19/19 04:38	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			04/19/19 04:38	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			04/19/19 04:38	1
Chloroethane	ND		0.80	0.31	ppb v/v			04/19/19 04:38	1
Chloroform	ND		0.30	0.095	ppb v/v			04/19/19 04:38	1
Chloromethane	ND		0.80	0.20	ppb v/v			04/19/19 04:38	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			04/19/19 04:38	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			04/19/19 04:38	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			04/19/19 04:38	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			04/19/19 04:38	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			04/19/19 04:38	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			04/19/19 04:38	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			04/19/19 04:38	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			04/19/19 04:38	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			04/19/19 04:38	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			04/19/19 04:38	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			04/19/19 04:38	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			04/19/19 04:38	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			04/19/19 04:38	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			04/19/19 04:38	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			04/19/19 04:38	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			04/19/19 04:38	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			04/19/19 04:38	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			04/19/19 04:38	1
2-Hexanone	ND		0.40	0.087	ppb v/v			04/19/19 04:38	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			04/19/19 04:38	1
<b>Methylene Chloride</b>	<b>0.11</b>	<b>J B</b>	0.40	0.072	ppb v/v			04/19/19 04:38	1
Styrene	ND		0.40	0.059	ppb v/v			04/19/19 04:38	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			04/19/19 04:38	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			04/19/19 04:38	1
Toluene	ND		0.40	0.051	ppb v/v			04/19/19 04:38	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			04/19/19 04:38	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			04/19/19 04:38	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			04/19/19 04:38	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			04/19/19 04:38	1
<b>Trichloroethene</b>	<b>0.64</b>		0.40	0.11	ppb v/v			04/19/19 04:38	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			04/19/19 04:38	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			04/19/19 04:38	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			04/19/19 04:38	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			04/19/19 04:38	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			04/19/19 04:38	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			04/19/19 04:38	1
o-Xylene	ND		0.40	0.054	ppb v/v			04/19/19 04:38	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	76		70 - 130		04/19/19 04:38	1

Eurofins TestAmerica, Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

Job ID: 320-48958-1  
SDG: AR/COC 619618

**Client Sample ID: 108000-001/CWL-QC2**

**Lab Sample ID: 320-48959-2**

Date Collected: 03/28/19 09:41

Matrix: Air

Date Received: 04/04/19 08:00

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)	86		70 - 130		04/19/19 04:38	1
Toluene-d8 (Surr)	99		70 - 130		04/19/19 04:38	1

**Client Sample ID: 108038-001/CWL-TRUCK-QC**

**Lab Sample ID: 320-48959-3**

Date Collected: 03/28/19 09:45

Matrix: Air

Date Received: 04/04/19 08:00

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
<b>Acetone</b>	<b>9.3</b>		5.0	0.18	ppb v/v			04/19/19 05:37	1
Benzene	ND		0.40	0.079	ppb v/v			04/19/19 05:37	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			04/19/19 05:37	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			04/19/19 05:37	1
Bromoform	ND		0.40	0.070	ppb v/v			04/19/19 05:37	1
Bromomethane	ND		0.80	0.34	ppb v/v			04/19/19 05:37	1
<b>2-Butanone (MEK)</b>	<b>0.39</b>	<b>J</b>	0.80	0.20	ppb v/v			04/19/19 05:37	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			04/19/19 05:37	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			04/19/19 05:37	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			04/19/19 05:37	1
Chloroethane	ND		0.80	0.31	ppb v/v			04/19/19 05:37	1
Chloroform	ND		0.30	0.095	ppb v/v			04/19/19 05:37	1
<b>Chloromethane</b>	<b>0.65</b>	<b>J</b>	0.80	0.20	ppb v/v			04/19/19 05:37	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			04/19/19 05:37	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			04/19/19 05:37	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			04/19/19 05:37	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			04/19/19 05:37	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			04/19/19 05:37	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			04/19/19 05:37	1
<b>Dichlorodifluoromethane</b>	<b>0.40</b>	<b>B</b>	0.40	0.15	ppb v/v			04/19/19 05:37	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			04/19/19 05:37	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			04/19/19 05:37	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			04/19/19 05:37	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			04/19/19 05:37	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			04/19/19 05:37	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			04/19/19 05:37	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			04/19/19 05:37	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			04/19/19 05:37	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			04/19/19 05:37	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			04/19/19 05:37	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			04/19/19 05:37	1
2-Hexanone	ND		0.40	0.087	ppb v/v			04/19/19 05:37	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			04/19/19 05:37	1
<b>Methylene Chloride</b>	<b>0.13</b>	<b>J B</b>	0.40	0.072	ppb v/v			04/19/19 05:37	1
Styrene	ND		0.40	0.059	ppb v/v			04/19/19 05:37	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			04/19/19 05:37	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			04/19/19 05:37	1
<b>Toluene</b>	<b>0.055</b>	<b>J</b>	0.40	0.051	ppb v/v			04/19/19 05:37	1

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

Job ID: 320-48958-1  
SDG: AR/COC 619618

**Client Sample ID: 108038-001/CWL-TRUCK-QC**

**Lab Sample ID: 320-48959-3**

Date Collected: 03/28/19 09:45

Matrix: Air

Date Received: 04/04/19 08:00

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
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.18</b>	<b>J</b>	0.40	0.16	ppb v/v			04/19/19 05:37	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			04/19/19 05:37	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			04/19/19 05:37	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			04/19/19 05:37	1
<b>Trichloroethene</b>	<b>0.22</b>	<b>J</b>	0.40	0.11	ppb v/v			04/19/19 05:37	1
<b>Trichlorofluoromethane</b>	<b>0.29</b>	<b>J</b>	0.40	0.20	ppb v/v			04/19/19 05:37	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			04/19/19 05:37	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			04/19/19 05:37	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			04/19/19 05:37	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			04/19/19 05:37	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			04/19/19 05:37	1
o-Xylene	ND		0.40	0.054	ppb v/v			04/19/19 05:37	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	87		70 - 130					04/19/19 05:37	1
1,2-Dichloroethane-d4 (Surr)	88		70 - 130					04/19/19 05:37	1
Toluene-d8 (Surr)	102		70 - 130					04/19/19 05:37	1

**Client Sample ID: 108039-001/CWL-AMB-QC**

**Lab Sample ID: 320-48959-4**

Date Collected: 03/28/19 09:42

Matrix: Air

Date Received: 04/04/19 08:00

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
<b>Acetone</b>	<b>4.4</b>	<b>J</b>	5.0	0.18	ppb v/v			04/19/19 06:36	1
Benzene	ND		0.40	0.079	ppb v/v			04/19/19 06:36	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			04/19/19 06:36	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			04/19/19 06:36	1
Bromoform	ND		0.40	0.070	ppb v/v			04/19/19 06:36	1
Bromomethane	ND		0.80	0.34	ppb v/v			04/19/19 06:36	1
<b>2-Butanone (MEK)</b>	<b>0.45</b>	<b>J</b>	0.80	0.20	ppb v/v			04/19/19 06:36	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			04/19/19 06:36	1
<b>Carbon tetrachloride</b>	<b>0.11</b>	<b>J</b>	0.80	0.064	ppb v/v			04/19/19 06:36	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			04/19/19 06:36	1
Chloroethane	ND		0.80	0.31	ppb v/v			04/19/19 06:36	1
Chloroform	ND		0.30	0.095	ppb v/v			04/19/19 06:36	1
<b>Chloromethane</b>	<b>0.63</b>	<b>J</b>	0.80	0.20	ppb v/v			04/19/19 06:36	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			04/19/19 06:36	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			04/19/19 06:36	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			04/19/19 06:36	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			04/19/19 06:36	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			04/19/19 06:36	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			04/19/19 06:36	1
<b>Dichlorodifluoromethane</b>	<b>0.50</b>	<b>B</b>	0.40	0.15	ppb v/v			04/19/19 06:36	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			04/19/19 06:36	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			04/19/19 06:36	1
<b>1,1-Dichloroethene</b>	<b>0.36</b>	<b>J</b>	0.80	0.13	ppb v/v			04/19/19 06:36	1

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: CWL PCCP

Job ID: 320-48958-1  
SDG: AR/COC 619618

**Client Sample ID: 108039-001/CWL-AMB-QC**

**Lab Sample ID: 320-48959-4**

**Date Collected: 03/28/19 09:42**

**Matrix: Air**

**Date Received: 04/04/19 08:00**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			04/19/19 06:36	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			04/19/19 06:36	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			04/19/19 06:36	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			04/19/19 06:36	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			04/19/19 06:36	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			04/19/19 06:36	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			04/19/19 06:36	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			04/19/19 06:36	1
2-Hexanone	ND		0.40	0.087	ppb v/v			04/19/19 06:36	1
<b>4-Methyl-2-pentanone (MIBK)</b>	<b>0.15</b>	<b>J</b>	0.40	0.14	ppb v/v			04/19/19 06:36	1
<b>Methylene Chloride</b>	<b>0.14</b>	<b>J B</b>	0.40	0.072	ppb v/v			04/19/19 06:36	1
Styrene	ND		0.40	0.059	ppb v/v			04/19/19 06:36	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			04/19/19 06:36	1
<b>Tetrachloroethene</b>	<b>0.30</b>	<b>J</b>	0.40	0.051	ppb v/v			04/19/19 06:36	1
Toluene	ND		0.40	0.051	ppb v/v			04/19/19 06:36	1
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>1.9</b>		0.40	0.16	ppb v/v			04/19/19 06:36	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			04/19/19 06:36	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			04/19/19 06:36	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			04/19/19 06:36	1
<b>Trichloroethene</b>	<b>4.1</b>		0.40	0.11	ppb v/v			04/19/19 06:36	1
<b>Trichlorofluoromethane</b>	<b>0.68</b>		0.40	0.20	ppb v/v			04/19/19 06:36	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			04/19/19 06:36	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			04/19/19 06:36	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			04/19/19 06:36	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			04/19/19 06:36	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			04/19/19 06:36	1
o-Xylene	ND		0.40	0.054	ppb v/v			04/19/19 06:36	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	84		70 - 130					04/19/19 06:36	1
1,2-Dichloroethane-d4 (Surr)	87		70 - 130					04/19/19 06:36	1
Toluene-d8 (Surr)	101		70 - 130					04/19/19 06:36	1

**ANNEX C**

**Chemical Waste Landfill**

**Calendar Year 2019**

**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 March 4, 2019
2. Time of Inspection 10:48 to 11:15
3. Name of Inspector Robert Zock, Danielle Michel

**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: RZ  
(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.

<b>I. COVER SYSTEM [Quarterly]</b>			
<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 <sup>2</sup> . Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	yes	No	

<b>II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]</b>			
<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)**

<b>III. SECURITY FENCE [Quarterly]</b>			
<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	yes	3.

<b>IV. PREVIOUS DEFICIENCIES</b>			
<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.	Drainage culverts on south side of CWL need to be cleared of wind-blown plant debris.
2.	Wind-blown plant debris needs to be removed from the security fence.
3.	Far west bench mark (survey monument) was cleared of wind-blown plant debris and sediment at time of the inspection.
NA	Observed winter annual weeds growing through <del>at</del> the open areas between the native grasses,

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

Action (Note Number) 1. assigned to Robert Zick Date action completed 3/27/19  
Action (Note Number) 2. assigned to Robert Zick Date action completed 4/4/19  
Action (Note Number) 3. assigned to Robert Zick Date action completed 3/4/2019.  
Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_  
Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

**Additional Comments:**

(3.) Survey monument was cleared of wind-blown plant debris and sediment at time of the inspection. RZ 3/4/19

(1. & 2.) B&I was contracted to remove wind-blown plant debris. As a "best management practice," B&I also applied pre-emergent SurfLan to the ET Cover and along the fence lines which was completed on April 1, 2019. RZ 4/5/19

Inspector's Signature



Original to: Chemical Waste Landfill Operating Record

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



*date:* April 1, 2019

*to:* Mike Mitchell (08854)

*from:* Jennifer Payne (00643) [jjpayne@sandia.gov](mailto:jjpayne@sandia.gov)

*subject:* **March 2019 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 would be conducted according to applicable requirements identified in ESH001, ES&H Policy. Detailed instruction can be found in the ES&H Manual, MN471022: "Migratory Birds, Protected Species, and Other Biota".

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**ET Covers Observations and Recommendations**

The biology quarterly evaluation of the three ET Covers was conducted on March 26, 2019.

**CAMU**

- The ET Cover is in excellent condition. The bases of the perennial native bunch grasses are becoming green, displaying an early warm season growth stage.
- Few tumbleweeds or partial tumbleweeds observed on the ET Cover, tumbleweeds along the fence lines.
- Significantly more weeds at this time than is typical for March, due to above normal winter precipitation. Weeds remain as a very small percentage of the overall foliar coverage and are not of significant concern.
- Observed bird droppings frequently across the cover, evidence of frequent bird usage.
- Scrap metal observed at the SW corner of the ET Cover.

**CAMU Recommendations**

- Post-emergent herbicide application is not recommended at this time because the weeds are too large. Post-emergent herbicides are only effective when weeds are very small.
- Current weeds could be removed by hand, but not necessary. Although the weed presence is much greater than normal, weeds remain a small percentage of the total vegetative cover.
- A greater than normal number of weeds are anticipated to continue across the ET Cover throughout the 2019 growing season. This is due to above normal winter precipitation and the current above normal chance of precipitation for April-June 2019. Although a pre-emergent is not necessary due to the very established community of native grasses across the ET Cover, a pre-emergent could be applied as a proactive measure against expected 2019 warm season weed growth.
- Apply a pre-emergent across the cover in December 2019. If no is applied in the spring/early summer of 2019, apply pre-emergent in April 2020. According to Sequoia, Surflan is effective for 6 months. Two applications (both next year or one in the near future and one in December 2019) should provide nearly complete weed control for many upcoming years.

### CWL

- Currently there is heavy weed presence across the CWL. The larger weeds have already gone to seed. Overall the weeds are too large for a post-emergent herbicide application to be effective.
- The native grasses look good and the bases of most native grass clumps are beginning to green up, showing early warm season growth.

### CWL Recommendations

- Overall the weeds are too large for a post-emergent herbicide application to be effective.
- If a weed removal event is preferred at this time, I suggest only pulling the larger, easier to remove weeds. Removing the weeds would benefit the native plants. Although the weeds are taking soil moisture that could entirely benefit the grasses, the roots of the native grasses have also been able to make use of the soil moisture. It's currently not an intense competition for limited soil moisture.
- I think it might be most effective to schedule a second weed removal event of the larger weeds in a month. The smaller weeds that remain after the second effort could just be raked out after they die.
- In future years: The most time and cost-effective weed reduction strategy over the long term for the CWL is to have pre-emergent applied very early, before Winter Shutdown. The first week of January 2019 I observed a high density of very small winter across the cover. Although I wouldn't expect such a high weed density during the winter and spring of most years; the current unusually wet conditions are adding to the weed seed bank in the soil for future years. According to Sequoia, Surflan is effective for 6 months. For complete annual control we should plan to apply it across the CWL in early December 2019 and then plan for 5 months later, in early April. If we repeat this process for two years (minimum) – three years, the site should be on a self-sustaining trajectory.

### MWL

- The ET Cover is in excellent condition.
- The base of most native grass clumps are beginning to green up, showing early warm season growth.
- Few tumbleweeds or partial tumbleweeds observed on the ET Cover and along the fence lines.

- Observed bird droppings frequently across the cover and as I walked across the ET Cover I unintentionally flushed mourning doves at two different locations but did not observe nests at either location. I also heard a eastern meadowlark singing, all collective evidence of frequent bird usage.
- Weeds are present on the cover in greater numbers typical for March but remain as a very small percentage of the overall foliar coverage and are not of significant concern.

#### MWL Recommendations

- Post-emergent herbicide application is not recommended at this time because the weeds are too large. Post-emergent herbicides are only effective when weeds are very small.
- Current weeds could be removed by hand, but not necessary. Although the weed presence is much greater than normal, weeds remain a small percentage of the total vegetative cover.
- A greater than normal number of weeds are anticipated to continue across the ET Cover throughout the 2019 growing season. This is due to above normal winter precipitation and the current above normal chance of precipitation for April-June 2019. Although a pre-emergent is not necessary due to the very established community of native grasses across the ET Cover, a pre-emergent could be applied as a proactive measure against expected 2019 warm season weed growth.
- Apply a pre-emergent across the cover in December 2019. If no is applied in the spring/early summer of 2019, apply pre-emergent in April 2020. According to Sequoia, Surflan is effective for 6 months. Two applications (both next year or one in the near future and one in December 2019) should provide nearly complete weed control for many upcoming years.

#### Planning for 2020 Weed Control

A pre-emergent should be applied to all three covers during the month of December 2020. In early January 2019 I observed small winter weeds widely across the CWL, December is a good time to get ahead of the winter weeds. The length of time that the pre-emergent herbicide is effective will need to be noted so that a follow-up pre-emergent application can be scheduled later in 2020 to remain ahead of the summer and fall weeds. I have sent a reminder to our calendars (Mitchell, Ziock, Payne) for the beginning of November to start the process for a December herbicide application.

According to Sequoia, Surflan is effective for 6 months. For complete annual control using Surflan at the CWL, we should plan to apply it across the CWL in early December 2019 and then plan for 5 months later, in early April. If we repeat this process for two years (minimum) – three years, the site should be on a self-sustaining trajectory.

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](mailto:jjpayne@sandia.gov).

cc: Customer Funded Records Center  
Ecology Library  
Matt Baumann  
Robert Ziock  
Rick Dotson

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

1. Date of Inspection 6/3/2019
2. Time of Inspection 09:50 to 11:20
3. Name of Inspector Robert Ziock, Danielle Michel

**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: RZ  
 (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.

<b>I. COVER SYSTEM [Quarterly]</b>			
<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 <sup>2</sup> . Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	yes	No	

<b>II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]</b>			
<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)**

<b>III. SECURITY FENCE [Quarterly]</b>			
<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	yes	3
F. Survey monuments in vicinity of CWL visible.	yes	yes	4

<b>IV. PREVIOUS DEFICIENCIES</b>			
<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.	6/3/1979 Wind blown plant debris in all southern drainage culverts.
2.	Wind blown plant debris on security fence.
3.	A warning sign on east fence line was loose.
4.	Western most survey monument covered with windblown plant debris and sediment.

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

Action (Note Number) 1 assigned to R. Zick, D. Michel Date action completed 6/3/2019  
Action (Note Number) 2 assigned to R. Zick, D. Michel Date action completed 6/3/2019  
Action (Note Number) 3 assigned to R. Zick, D. Michel Date action completed 6/3/2019  
Action (Note Number) 4 assigned to R. Zick, D. Michel Date action completed 6/3/2019  
Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

**Additional Comments:**

1. Windblown plant debris was removed from southern drainage culverts at time of the inspection. RZ 6/3/19
2. Windblown plant debris was removed from security fence at time of the inspection. RZ 6/3/19
3. A loose warning sign was secured at time of the inspection. RZ 6/3/19
4. Windblown plant debris and sediment were removed from western most survey monument at time of the inspection. RZ 6/3/19

Inspector's Signature

R. Zick 6/3/19

Original to: Chemical Waste Landfill Operating Record

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



*date:* June 13, 2019

*to:* Mike Mitchell (08854)  
Robert Ziock (08888)

*from:* Jennifer Payne (00643) [jjpayne@sandia.gov](mailto:jjpayne@sandia.gov)

*subject:* **June 2019 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 would be conducted according to applicable requirements identified in ESH001, ES&H Policy. Detailed instruction can be found in the ES&H Manual, MN471022: "Migratory Birds, Protected Species, and Other Biota".

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**ET Covers Observations and Recommendations**

The biology quarterly evaluation of the three ET Covers was conducted on June 11, 2019.

**CAMU**

Overall the cover looks very healthy.

- Grasses on the side slopes have greened up and many of the grasses near the bottom of the slopes have already set seed. Grasses on the top of the cover are beginning to green up.
- Whiptail lizards observed on the cover and butterflies are utilizing native vegetation across the entire ET cover.
- Russian thistles were observed to be growing on the southern slope, at the base of the west slope, and very small Russian thistle plants are scattered throughout the drainage swale at the base of

the cover on the east side (mostly in the northern portion of the eastern drainage swale). Very few Russian thistles are growing on top of the cover.

- No deeply rooted plants observed.
- Pin flags were removed from north end that marked the bird nest that was active earlier in the season.
- At the north east corner there appears to be an abandoned digging in the drainage swale at the base of the cover.



#### CAMU Recommendations

- Backfill the hole in the drainage swale at the northeast corner of the ET Cover. Check it for signs of recent animal activity before backfilling.
- Apply a pre-emergent across the cover in December 2019. Apply a pre-emergent again in April 2020. According to Sequoia, Surflan is effective for 6 months.

#### CWL

- The recent weeding event was extremely successful, the crew did a great job.
- The bunchgrasses are not greening up very well. The native bunchgrasses are struggling a surprising amount considering the health of the native bunchgrasses surrounding the CWL and at the other two ET Covers.

- The CWL surface is covered with increasingly compacted gravel and soil. The soil is much more compacted than the CAMU or the MWL, both other Covers have lightly compacted soil. Divots are notable across the entire cover where weedy plants have been dug out.
- Overall the cover is not robust. No thick dark green leaf blades were observed. The green grass blades were observed to be relatively thin and a weak shade of green. I anticipate the bunchgrasses will make it through the summer but I am concerned about their long-term health. They have had intense competition from weedy plants since 2013. Intense foot traffic in the area from weeding events could possibly be contributing to soil compaction and affecting root health.

#### CWL Recommendations

- If there is not adequate monsoon precipitation, supplemental water should be applied in late September/Oct to provide bolster root health over the winter with soil moisture.
- In future years: The most time and cost-effective weed reduction strategy over the long term for the CWL is to have pre-emergent applied very early, before Winter Shutdown. The first week of January 2019 I observed a high density of very small winter across the cover. Weed seeds from 2019 winter and spring, and from previous years have created a high weed seed bank in the soil. According to Sequoia, Surflan is effective for 6 months. For complete annual control we should plan to apply it across the CWL in early December 2019 and then plan for 5 months later, in early April. If we repeat this process for two years (minimum) – three years, the site should be on a self-sustaining trajectory.

#### MWL

Overall the cover looks very healthy.

- The native bunchgrasses are beginning to green up nicely across the Cover. The native bunchgrasses have greened up more on the slide slopes.
- A lot of grasshoppers were present across the Cover and butterflies were commonly observed.
- Russian thistles are scattered throughout the western slope of the cover. The Russian thistles are most easily observed near the well pads, but they are also widely scattered among the grasses on the western MWL slope. Russian thistles are similarly scattered among the bunchgrasses on the south facing slope, the south west corner of the cover, and up onto the top of the cover along these areas. Russian thistles are similarly scattered among the bunchgrasses on the northern portion of the east slope. And *very* small Russian thistles were observed to be clustered just inside the north entrance gate.

#### MWL Recommendations

- Apply a pre-emergent across the cover in December 2019. Apply a pre-emergent again in April 2020. According to Sequoia, Surflan is effective for 6 months.

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](mailto:jjpayne@sandia.gov).

cc: Customer Funded Records Center  
Ecology Library  
Matt Baumann

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

1. Date of Inspection September 9, 2019
2. Time of Inspection 13:09 to 13:42
3. Name of Inspector Robert Zock, Danielle Michel

**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.

<b>I. COVER SYSTEM [Quarterly]</b>			
<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 <sup>2</sup> . Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	yes	No	

<b>II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]</b>			
<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	No	

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

<b>III. SECURITY FENCE [Quarterly]</b>			
<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	yes	1

<b>IV. PREVIOUS DEFICIENCIES</b>			
<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)**

Action (Note Number) 1 assigned to Robert Ziock Date action completed 9/9/19

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

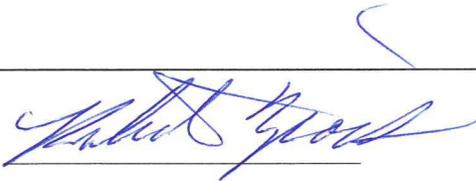
Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

**Additional Comments:**

1. Windblown debris and sediment removed from western most benchmark at time of this inspection.

Inspector's Signature



Original to: Chemical Waste Landfill Operating Record

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

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

1. Date of Inspection 12/3/2019
2. Time of Inspection 10:13 - 11:05
3. Name of Inspector Robert Gock

**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.

*RG*

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

<b>I. COVER SYSTEM [Quarterly]</b>			
<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 <sup>2</sup> . Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	<i>yes</i>	<i>No</i>	

<b>II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]</b>			
<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)**

<b>III. SECURITY FENCE [Quarterly]</b>			
<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	yes	3

<b>IV. PREVIOUS DEFICIENCIES</b>			
<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**

<b>Note Number</b>	<b>Description</b>
1.	<i>Wind blown plant debris in southern drainage culverts.</i>
2.	<i>Wind blown plant debris on security fence</i>
3.	<i>Survey monuments covered with sediment.</i>

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

Action (Note Number) 1 assigned to Robert Zook Date action completed 12/3/19

Action (Note Number) 2 assigned to Robert Zook Date action completed 12/3/19

Action (Note Number) 3 assigned to Robert Zook Date action completed 12/3/19

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

**Additional Comments:**

1. Wind blown plant debris removed from drainage culverts at time of the inspection. ytz 12/3/19

2. Wind blown plant debris removed from security fence at time of the inspection. ytz 12/3/19

3. Sediment removed from survey monuments at time of the inspection. ytz 12/3/19

Inspector's Signature



Original to: Chemical Waste Landfill Operating Record

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



*date:* January 13, 2019

*to:* Mike Mitchell (08888)  
Robert Ziock (00641)

*from:* Jennifer Payne (00643) [jjpayne@sandia.gov](mailto:jjpayne@sandia.gov)

*subject:* **December 2019 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".

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**ET Covers Observations and Recommendations**

The biology quarterly evaluation of the three ET Covers was conducted on December 19, 2019.

**CAMU**

- The ET Cover appears to be in very good condition.
- The mature native perennial grasses continue to have good, even spacing across the cover and a small amount of green photosynthesis was observed occurring at the base of the grasses.
- No winter annuals (weedy species) observed on the cover and very little windblown plant debris from tumbleweeds was present on the ET Cover.
- The fence lines were clear of windblown plant debris.
- Frost heave was observed across the flat soil areas within the fence line surrounding the ET Cover. This naturally occurring winter soil loosening can promote plant establishment and growth.

**CWL**

- Overall the ET Cover appears to be in good condition during winter dormancy.
- The native perennial grasses continue to be in a middle to older juvenile stage of development and a small amount of green photosynthesis was observed occurring at the base of the grasses.
- The ET Cover looks very tidy, the weed removal event was very effective.
- No winter annuals (weedy species) were observed on the ET Cover.
- Only a small amount of windblown plant debris was observed on the west fence.

**MWL**

- The ET Cover appears to be in very good condition.
- The mature native perennial grasses continue to have good, even spacing across the cover and a small amount of green photosynthesis was observed occurring at the base of the grasses.
- No winter annuals (weedy species) observed on the cover and very little windblown plant debris from tumbleweeds was present on the ET Cover.
- The fence lines were clear of windblown plant debris.
- Frost heave was observed across the flat soil areas within the fence line surrounding the ET Cover and on the ET Cover, including the side-slopes. This naturally occurring winter soil loosening can promote plant establishment and growth.

**ET Covers Recommendations**

- All of the EUs appeared to be in very good winter conditions.
- The only current recommendation is to follow the current plan for a second pre-emergent herbicide application in late spring 2020. The first pre-emergent herbicide application was in the first week of December 2019. November 2019 received more than 4 times the mean monthly precipitation; this late autumn rainfall will bolster soil moisture throughout the winter months. Improved winter soil moisture will benefit both the native perennial plants and weedy winter annuals. With the large quantity of weed seed in the CWL soil, the December 2019 pre-emergent herbicide application is excellent timing and will be hugely beneficial to prevent a large crop of winter weeds from germinating on the CWL and potentially on the MWL and CAMU as well.

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](mailto:jjpayne@sandia.gov).

cc: Customer Funded Records Center  
Ecology Library  
Steve Cox  
Robert Ziock  
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 01/14/19
2. Time of Inspection 0759
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.

<b>I. GROUNDWATER MONITORING LOCATIONS [Semi-annually]</b>			
<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	

<b>II. GROUNDWATER SAMPLING EQUIPMENT [Semi-annually]</b>			
<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	





### Soil Vapor Monitoring Inspection Form

1. Soil vapor monitoring site CWL
2. Date of Inspection 01/17/19
3. Time of Inspection 0830
4. Name of Inspector Robert Lynch

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

<b>SOIL VAPOR MONITORING LOCATIONS</b>				
<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.	YES	YES	NO	
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	

<b>SAMPLING EQUIPMENT</b>				
<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

1. Soil vapor monitoring site Chemical Waste Landfill 11
2. Date of Inspection 3/28/19
3. Time of Inspection 0830
4. Name of Inspector Tim Jackson

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

<b>SOIL VAPOR MONITORING LOCATIONS</b>				
<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.	Yes	Yes	No	
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	

<b>SAMPLING EQUIPMENT</b>				
<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

<b>PREVIOUS DEFICIENCIES</b>			
<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	

### NOTES

<b>Note Number</b>	<b>Description</b>

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.

### Soil Vapor Monitoring Inspection Form

**Additional Comments:**

This inspection is specific to monitoring wells CWL-D1 and CWL-D3

Inspector's Signature



Original to: Site's Operating Record

Copy to: SNL/NM Records Center

## Chemical Waste Landfill Post-Closure Inspection Form Checklist for Groundwater Monitoring Locations / Sampling Equipment

1. Date of Inspection 07/15/19
2. Time of Inspection 0818
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.

<b>I. GROUNDWATER MONITORING LOCATIONS [Semi-annually]</b>			
<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	

<b>II. GROUNDWATER SAMPLING EQUIPMENT [Semi-annually]</b>			
<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:**

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Inspector's Signature 

Original to: Chemical Waste Landfill Operating Record  
Copy to: Environmental Safety and Health (ES&H) and Security Records Center

## **BIOLOGY INSPECTION**

### Chemical Waste Landfill Post-Closure Inspection Form Biology Inspection Checklist for the CWL Cover

**Mandatory requirement:**

The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training:  
*(Inspector must initial box before proceeding with the inspection.)*



Approximate vegetative coverage (i.e., living plants): 30 %<sup>1</sup>

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>6 %</u>
<u>Bouteloua gracilis</u>	<u>Blue grama</u>	<u>15 %</u>
<u>Pleuraphis jamesii</u>	<u>Galleta grass</u>	<u>6 %</u>
<u>Sporobolus flexuusus</u>	<u>Mesa dropseed</u>	<u>3 %</u>
<u>Sphaeralcea hastulata</u>	<u>Wrinkled globemallow</u>	<u>&lt;0.5 %</u>
<u>Euphorbia exstipulata</u>	<u>Square-seed spurge</u>	<u>&lt;0.5 %</u>
<u>Salsola tragus</u>	<u>Russian thistle</u>	<u>&lt;0.5 %</u>
<u>Opuntia phaeacantha</u>	<u>Brown-spined prickly pear</u>	<u>&lt;0.5 %</u>
<u>Chenopodium species</u>	<u>Goosefoot species</u>	<u>&lt;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>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>

Note: <sup>1</sup>All species observed to be present at less than one-half of one-percent are not calculated into the total vegetative coverage

## Chemical Waste Landfill Biology Inspection Checklist for the CWL Cover (Continued)

**Permit Requirements:**

- 1) Is the total foliar coverage (i.e., land surface covered with living plants) greater than or equal to 20%? Yes If "No," explain below.

Notes: \_\_\_\_\_

- 2) Of the 20% total foliar coverage, is 50% or greater comprised of native perennial species, and 50% or less comprised of annual species? Yes If "No," explain below.

Notes: \_\_\_\_\_

- 3) Are there any contiguous areas of no vegetation greater than 200 square feet (approximately 14 x14 ft.)? No If "Yes," mark such areas on a map and attach to this checklist. Describe area(s) and plans to actively improve/repair area(s) as detailed in Permit Attachment 1, Section 1.9.1.3 below.

Notes: \_\_\_\_\_

- 4) Are there any animal burrow entrances on the cover in excess of 4 inches in diameter? No If "Yes," mark such areas on a map and provide additional information below.

Notes: \_\_\_\_\_

**General Cover Information:**

Are any burrows smaller than 4 inches in diameter present on the cover? 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, all ant burrows have normal ant-size entrances that are much smaller than 4 inches in diameter. No map is attached because there are no burrow entrances in excess of 4 inches in diameter.

Are there any potentially deep-rooted plants (roots greater than 8 feet deep at maturity) or other undesirable plants (i.e., weeds) present on the cover? Yes If "Yes," describe below.

Plant Notes: No deeply rooted plant species are present on the cover. There is a very low presence of weedy species including square-seed spurge and Russian thistle on the cover.

## Chemical Waste Landfill

### Biology Inspection Checklist for the CWL Cover (Concluded)

#### General Observations:

Overall the CWL Cover is in good condition. Adult and juvenile native grass clumps are present across the CWL Cover, providing a healthy, varied-age plant community.

The leaf blades of the native grasses are not as robust as observed in previous seasons, this is due to an extremely brief 2019 monsoon season. Even with the lack of summer moisture the native grass bunches are displaying some green leaf blades, indicating photosynthesis is occurring. Due to the lack of summer rain soil moisture, very few grass clumps produced any seed in 2019. Grasses are primarily identified to species by the structure of their seed heads (inflorescence). When only the stalk of the inflorescence remains from previous years, grass species identification is made much more difficult and quantification is typically less accurate.

A weeding activity occurred prior to this inspection. Although the weeds on the CWL cover in 2019 were only a small fraction of what they were in 2018, the weed removal benefits the native grasses by removing competition for soil moisture and other soil nutrients.

Pre-emergent herbicide application in December 2019 and again in late spring 2020 will help to proactively control weed growth on the cover by interfering with weed seed germination. Preventing weed growth will aid in the overall health of the native grasses by significantly reducing competition for soil moisture and other soil nutrients by non-native plant species. The native clump grasses have formed good spacing; currently no additional native plant recruitment is needed onsite from seed. Continued development of the established bunch grasses to more fully occupy interspaces on the CWL will help to reduce future maintenance and improve the overall health of the established native grasses.

**Biological Aspects Map – [note: sketch map to locate specific features described above is attached if needed – see notes above]**

Survey Biologist Name: Jennifer Payne

Date: 9/5/2019

Original to: Chemical Waste Landfill Operating Record

**ANNEX D**

**Chemical Waste Landfill**

**Calendar Year 2019**

**Biology Report**

## 2020 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) 2019 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 2019 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 2019 was conducted on September 5, 2019. 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 2019 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 2019 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 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 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 ET Cover 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 2019 CWL Biology Inspections document ET Cover conditions that continue to meet the criteria for successful revegetation. ET 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 ET Cover has developed into a more mature plant community, the native species composition has varied from year to year. However, blue grama and sand dropseed have remained the dominant

## 2020 Chemical Waste Landfill Biology Report

grass species. As documented in the 2016-2019 CWL Biology Inspections, the ET Cover continues to display healthy, even coverage of mixed-age native perennial clump grasses.

### Local Climate Trends for 2019 Growing Season

Climate trends for north-central New Mexico are presented in this section as they have a significant impact on the ET Cover vegetation. Since the reseeding effort in August 2009, the local climate has generally experienced below average precipitation and warmer than average temperatures. As of December 9, 2019, the CWL area remained classified as “Abnormally Dry” according to the U.S. Drought Monitor (December 2019).

Vegetation during the growing season is directly affected by the summer (June-July-August) 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. For this reason, the following discussion of meteorological conditions includes the last three months of CY 2018.

### *Precipitation, Relative Humidity and Winds*

Tables 1 and 2 provide meteorological data for the period preceding and including the CY 2019 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 later in 2020, when a 25-year data set will be created for the 1994-2019 time period.

Meteorological conditions during the nine months preceding the monsoon season were favorable for the health of perennial native vegetation. The months of October 2018 through June 2019 was a period of above average precipitation and relative humidity. Total precipitation for this period was 6.38 inches, which is 41 percent (%) above normal and 1.87 inches above the mean precipitation of 4.51 inches. The average relative humidity for this period was 44.5% versus the mean monthly relative humidity of 39.5%; 12.7% above normal. Above normal precipitation provides additional soil moisture, and above normal relative humidity benefits soil moisture retention.

The monsoon season begins July 1 and ends September 30. The North American Monsoon is an important feature of New Mexico’s summer climate. In the CWL area monsoonal moisture typically provides approximately half of the annual precipitation. The 2019 monsoon season experienced below normal precipitation and relative humidity. The CWL area received 2.55 inches of rain during this timeframe which is 1.66 inches, or 39%, below the mean monsoon season rainfall of 4.21 inches. July received almost exactly the mean precipitation for the month, but August and September received far less than their respective means. The average relative humidity for the 3-month monsoon timeframe was 37.9% versus the 20-year mean of 43.7%; approximately 13.3% below normal.

## 2020 Chemical Waste Landfill Biology Report

**Table 1**  
**October-December 2018 Meteorological Data Summary for the Chemical Waste Landfill<sup>a</sup>**

Month	October	November	December	
<b>Temperature (°F)</b>				3-Month Avg
Monthly Mean	57.9	44.6	37.2	46.6
20-year Temp Means	57.9	46.4	37.0	47.1
<b>Precipitation (Inches)</b>				3-Month Total
Monthly Total	1.85	0.00	0.81	2.66
20-year Precip Means	0.93	0.41	0.57	1.91
<b>Relative Humidity (RH) (%)</b>				3-Month Avg
Monthly Mean	55.9	41.2	52.7	49.9
20-year RH Means	46.6	47.6	48.6	47.6
<b>Wind (Miles/hour)</b>				3-Month Avg
Monthly Mean	9.0	6.6	6.8	7.5
20-year Wind Means	7.8	7.1	6.8	7.2

<sup>a</sup>Information Source: SNL/NM Meteorological Monitoring Program.

% = Percent.

°F = Fahrenheit.

SNL/NM = Sandia National Laboratories/New Mexico.

## 2020 Chemical Waste Landfill Biology Report

**Table 2**  
**2019 Meteorological Data Summary for the Chemical Waste Landfill<sup>a</sup>**

<b>Month</b>	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	
<b>Year</b>	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	
<b>Temperature (°F)</b>													Annual <sup>b</sup>
Monthly Mean	35.9	39.9	50.0	57.6	61.5	73.9	79.3	78.8	72.7	57.9	45.5	41.1	57.8
20-year Temp Means	37.7	41.7	48.8	55.8	66.1	75.4	76.7	74.8	68.9	57.9	46.4	37.0	57.3
<b>Precipitation (Inches)</b>													Annual <sup>c</sup>
Monthly Total	0.60	0.46	0.67	1.21	0.57	0.21	1.61	.66	0.28	0.73	1.73	0.35	9.08
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
<b>Relative Humidity (%)</b>													Annual <sup>b</sup>
Monthly Mean	61.2	47.3	41.5	38.3	33.7	28.4	35.4	37.9	40.4	35.0	50.5	58.2	42.3
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
<b>Wind (Miles/hour)</b>													Annual <sup>b</sup>
Monthly Mean	6.3	8.9	9.9	9.1	9.8	10.0	9.0	7.9	8.0	8.6	7.0	6.1	8.2
20-year Wind Means	6.9	8.1	9.1	10.5	10.0	9.8	8.4	7.9	8.0	7.8	7.1	6.8	8.4

<sup>a</sup>Information Source: SNL/NM Meteorological Monitoring Program.

<sup>b</sup>Values provided are averages of the monthly data.

<sup>c</sup>Values provided are totals of the monthly data.

% = Percent.

°F = Fahrenheit.

SNL/NM = Sandia National Laboratories/New Mexico.

## 2020 Chemical Waste Landfill Biology Report

Total precipitation in 2019 was very close to the 20-year annual mean; however, the timing of significant precipitation events was very different than the 20-year monthly means as previously discussed. The below normal monsoon precipitation resulted in lower-than-normal native grass seed production and photosynthetic activity as documented in the September 2019 annual inspection. However, the wetter autumn-winter-spring months before the 2019 growing season (October and December 2018, and January through May 2019) and after (November 2019) benefitted root growth and the health of the native vegetation. In arid and semiarid climates such as New Mexico, plant functions such as growth and photosynthesis are limited by low soil moisture conditions (Xu January 2011).

Generally, the 2019 monthly and annual wind speed means were very close to 20-year monthly and annual means. The only month with variation between the monthly and 20-year means exceeding 1.0 miles per hour was April (monthly average was 1.4 miles per hour lower). Higher than normal winds can increase the rate of soil moisture evaporation.

### *Temperature*

Average monthly temperature for October 2018 through June 2019 was one degree cooler than normal. Average annual temperature for 2019 was 57.8 degrees Fahrenheit (°F), 0.5°F above the 20-year annual mean of 57.3°F

In CY 2019 the CWL experienced 92.5 degrees of temperature variability, with a low of 6.2°F in January 2019 and a high of 98.7°F in July 2019. In comparing mean monthly temperatures, May 2019 experienced the greatest departure from its historical mean monthly temperature, 4.6°F below its historical mean temperature. Four other months in 2019 experienced a greater than 2°F departure from their mean temperatures. July, August, September, and December 2019 were 2.6°F, 4.0°F, 3.8°F, and 4.1°F above their respective historical mean temperatures.

### ET Cover Development and Maintenance

The successional development of the native grasses on the 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 are gradually maturing in these open areas.

ET Cover maintenance activities performed by the ET Cover maintenance contractor in CY 2019 are presented in Section 6.6 of this report and were performed in response to inspections, general site conditions, and recommendations by the staff biologist. The five maintenance events conducted in March/April, May, August, October, and December 2019 were designed to achieve the long-term goal of establishing healthy, self-sustaining native grasses on the ET Cover by reducing competition with weedy species for limited moisture and nutrients. This work included removal live and dead weeds from the ET Cover, storm-water diversion features, and perimeter areas, applying preventive herbicides for invasive weed control, and providing supplemental water to the ET Cover after a monsoon season with below normal precipitation.

## 2020 Chemical Waste Landfill Biology Report

### September 2019 Inspection Results

The September 2019 biology inspection determined the ET Cover continues to meet or exceed all permit requirements related to biological parameters. These criteria are provided below.

- Total foliar coverage equal to or greater than 20%
- Of the 20% 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 ET Cover foliar coverage was approximately 30%, of which approximately 99% was native perennial grasses (Figure 1). Blue grama was the dominant grass species (15% total foliar coverage). The four native grass species present on the ET Cover accounted for 30% total foliar coverage. Identification of each native grass species and its foliar coverage was more difficult in 2019 due to the extremely brief monsoon season. The low amount of summer precipitation resulted in only a small quantity of seed produced by very few native grass clumps. Grasses are primarily identified to species by the structure of their seed heads (inflorescence). When only the stalk of the inflorescence remains from previous years, grass species identification is made much more difficult and quantification is typically less accurate. And, as is also typical with reduced warm season precipitation, photosynthetic activity was significantly reduced with the grasses displaying a much lower than normal quantity of green leaf blades.

The total foliar coverage was lower in 2019 relative to 2018 due to less foliar coverage of annual native weedy forb species across the ET Cover (i.e., less desirable native species).

Overall the ET Cover was observed to be in good condition. Adult and juvenile native grass clumps were present across the ET Cover, providing a healthy varied-age plant community. As the ET Cover develops into a more mature plant community, the native species composition will likely continue to gradually change (i.e., foliar coverage of different native grasses will shift over time).

### Recommendations

Based on vegetation inspection and monitoring conducted during CY 2019, the existing native grasses could benefit from reduced competition with annual weedy species and other less desirable native 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 ET Cover (i.e., allow existing native grass clumps to expand). To achieve this, pre-emergent herbicide application in December 2019 (already implemented, see Section 6.6 of this report) and again in late spring 2020 will help to proactively control weed growth on the ET Cover by limiting weed seed germination. Preventing weed growth will aid in the overall health of the native grasses by significantly reducing competition for soil moisture and other soil nutrients by non-native plant species.

## 2020 Chemical Waste Landfill Biology Report

The native clump grasses have formed good spacing; currently no additional native plant recruitment is needed onsite from seed. Continued development of the established bunch grasses to more fully occupy interspaces on the CWL will help to reduce future maintenance and improve the overall health of the established native grasses.

### 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 2019)  
<http://droughtmonitor.unl.edu/>

Xu, Zhenzhu, Guangsheng Zhou, January 2011. "Responses of photosynthetic capacity to soil moisture gradient in perennial rhizome grass and perennial bunchgrass," BMC Plant Biology, 11 (21). <https://bmcpantbiol.biomedcentral.com/articles/10.1186/1471-2229-11-21> Accessed December 16, 2019.

## 2020 Chemical Waste Landfill Biology Report



Southwest portion of the ET Cover



Northwest portion of the ET Cover



Southeast portion of the ET Cover



Northeast portion of the ET Cover

**Figure 1 September 5, 2019 CWL ET Cover Photos**