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MAR 16 2021



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Subject: Submittal of Chemical Waste Landfill Annual Post-Closure Care Report, Calendar Year 2020, Chemical Waste Landfill Post-Closure Care Permit for Sandia National Laboratories/New Mexico, Environmental Protection Agency Identification Number NM5890110518

Dear Mr. Pierard:

The Department of Energy, National Nuclear Security Administration and National Technology and Engineering Solutions of Sandia, LLC are submitting the *Chemical Waste Landfill Post-Closure Care Report, Calendar Year 2020*, dated March 2021, to the New Mexico Environment Department. This submittal is required by Part 2, Section 2.6.3, of the Chemical Waste Landfill (CWL) Post-Closure Care Permit.

This document is comprised of a main report and four annexes that provide information for post-closure care activities conducted at the CWL during Calendar Year 2020. The report and supporting documentation satisfy requirements listed in Permit Attachment 1, Sections 1.9 and 1.12.

If you have questions, please contact Anastasia Fox of our staff at (505) 553-4054.

Sincerely,


Jeffrey P. Harrell
Manager

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NNSA-2021-001306

**Chemical Waste Landfill Annual Post-Closure Care Report
Calendar Year 2020
Chemical Waste Landfill Post-Closure Care Permit**

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

CERTIFICATION STATEMENT

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


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**Sandia
National
Laboratories**

**CHEMICAL WASTE LANDFILL
ANNUAL POST-CLOSURE CARE REPORT
CALENDAR YEAR 2020**

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

MARCH 2021



**U.S. DEPARTMENT OF
ENERGY**



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

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**ANNUAL CHEMICAL WASTE LANDFILL
POST-CLOSURE CARE REPORT
CALENDAR YEAR 2020**

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 2020 Soil-Gas Monitoring Forms and Reports
- Annex C Chemical Waste Landfill Calendar Year 2020 Post-Closure Inspection Forms
- Annex D Chemical Waste Landfill Calendar Year 2020 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
NNSA	National Nuclear Security Administration
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
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
SAP	sampling and analysis plan
SNL	Sandia National Laboratories
SNL/NM	Sandia National Laboratories/New Mexico
TCE	trichloroethene
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) 2020. 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 2020 with resampling of one sampling port in March 2020 due to sample container issue with the corresponding January sample. 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 the residual volatile organic compound soil-gas plume is stable, slowly diffusing in three-dimensions in the vadose zone beneath the CWL, and is not a threat to groundwater.

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 2020 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 2020 included one submittal of an updated reference document cited in the PCCP (Harrell June 2020), submittal of the Chemical Waste Landfill Annual Post-Closure Care Report, CY 2019 (SNL/NM March 2020), and submittal of an application for renewal of the PCCP (Harrell November 2020) without any operational changes.

All PCCP requirements have been met for CY 2020 and the required application for renewal of the PCCP was submitted ahead of the required deadline of December 4, 2020. 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 multimission engineering and science laboratory owned by the U.S. Department of Energy (DOE)/National Nuclear Security Administration (NNSA). 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) 2020. The modification history of the PCCP through CY 2020 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 2020.

All PCCP monitoring, inspection, and maintenance/repair requirements have been met for CY 2020 and are documented in this CWL Annual Post-Closure Care Report in accordance with PCCP Attachment 1, Section 1.12. 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 2020 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 2020 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 the ET Cover system and monitoring networks perform as designed.

This CY 2020 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 2020 reporting period.
- Chapter 9 lists the references cited in this report.

Annexes are provided that include CY 2020 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 then 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 Corrective Measures Study Report (SNL/NM December 2004), the CWL Final Resource Conservation and Recovery Act (RCRA) Closure Report (SNL/NM September 2010), the PCCP, and previous annual reports (2012 through 2020). Detailed information on residual soil contamination at the CWL can be found in the CWL Final RCRA Closure Report and Part 3, Section 3.1 of the PCCP.

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

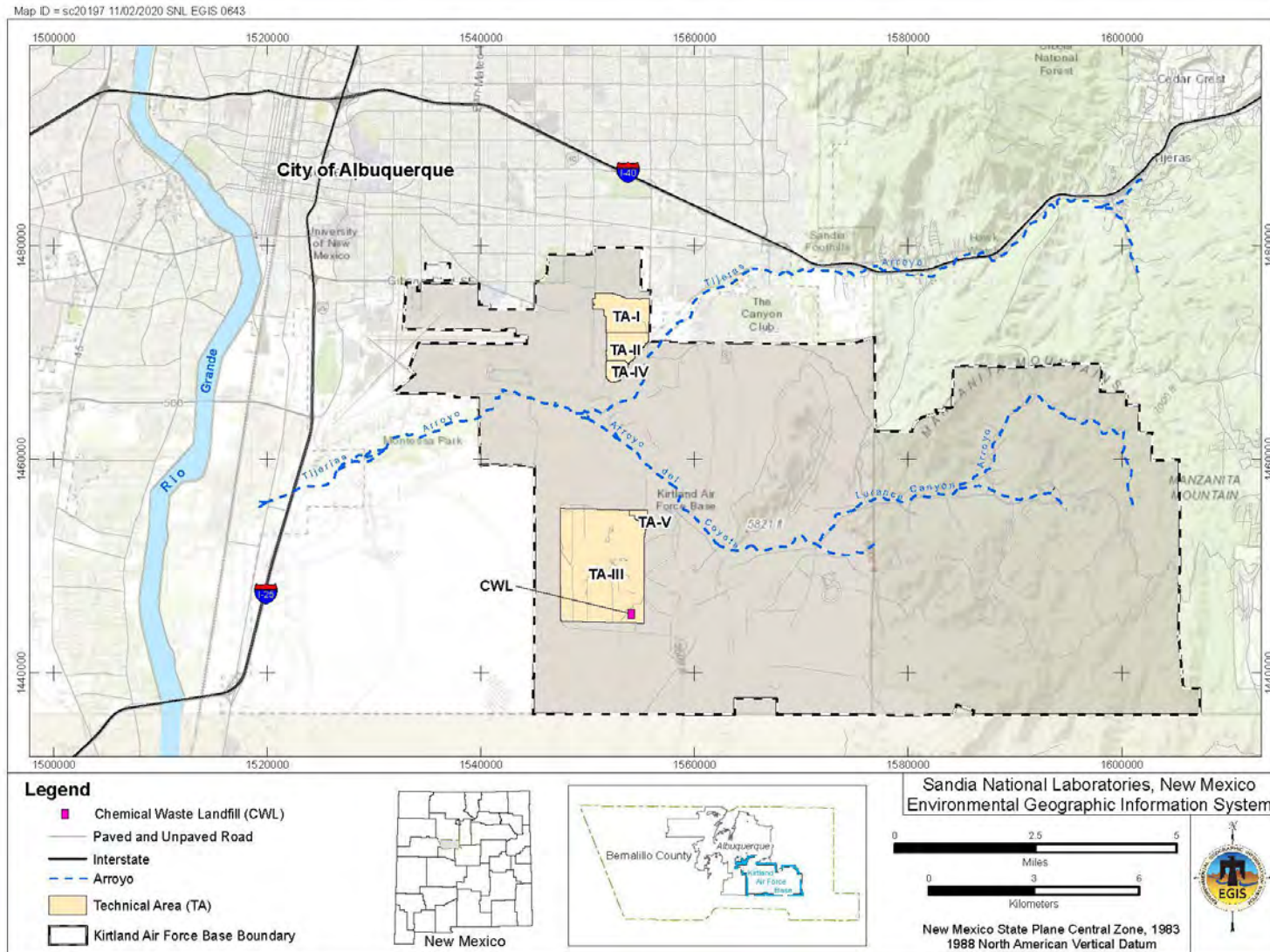


Figure 2-1
 Location of the Chemical Waste Landfill with Respect to Kirtland Air Force Base and the City of Albuquerque

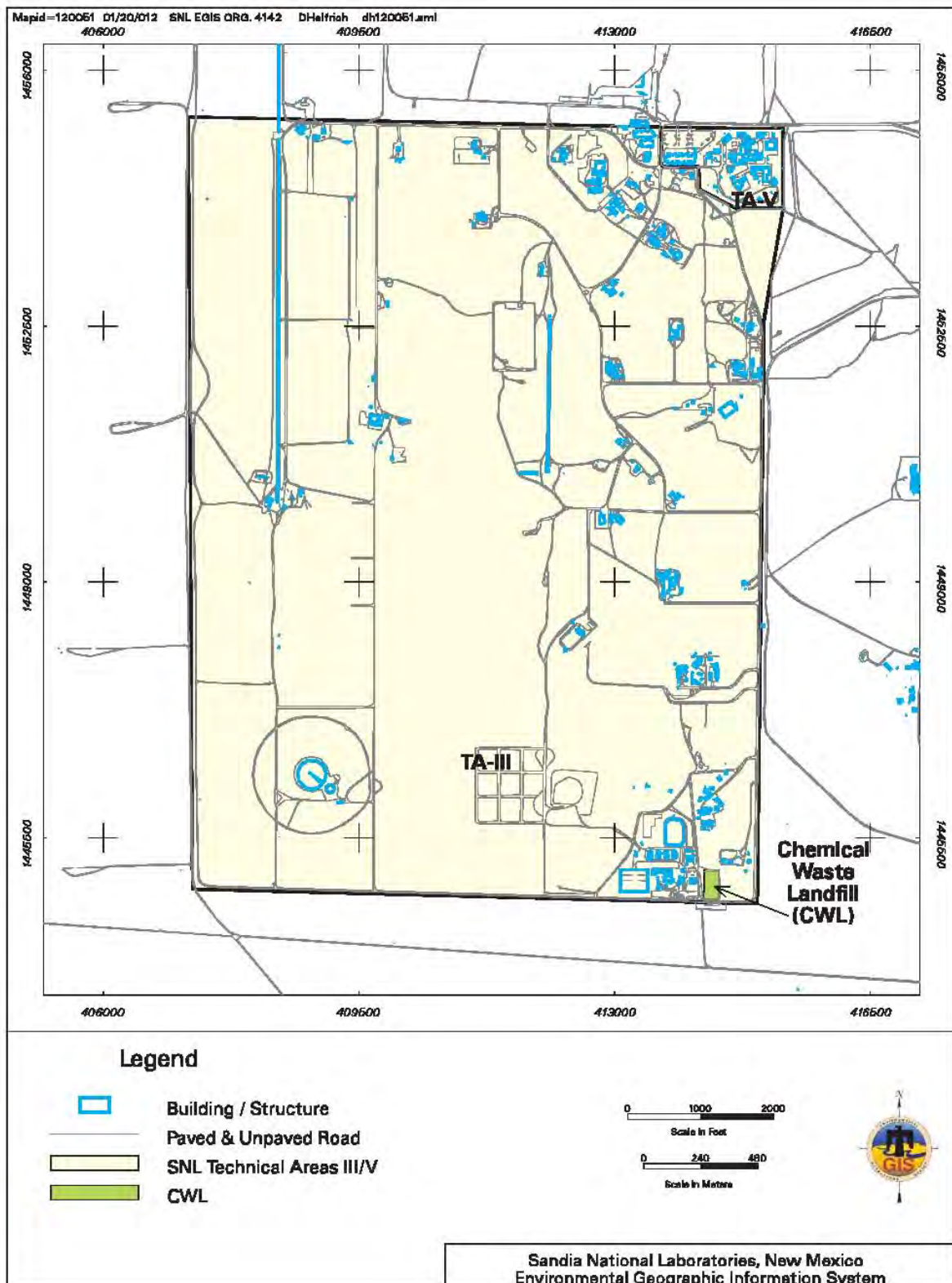


Figure 2-2
Location of the Chemical Waste Landfill within Technical Area III

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.

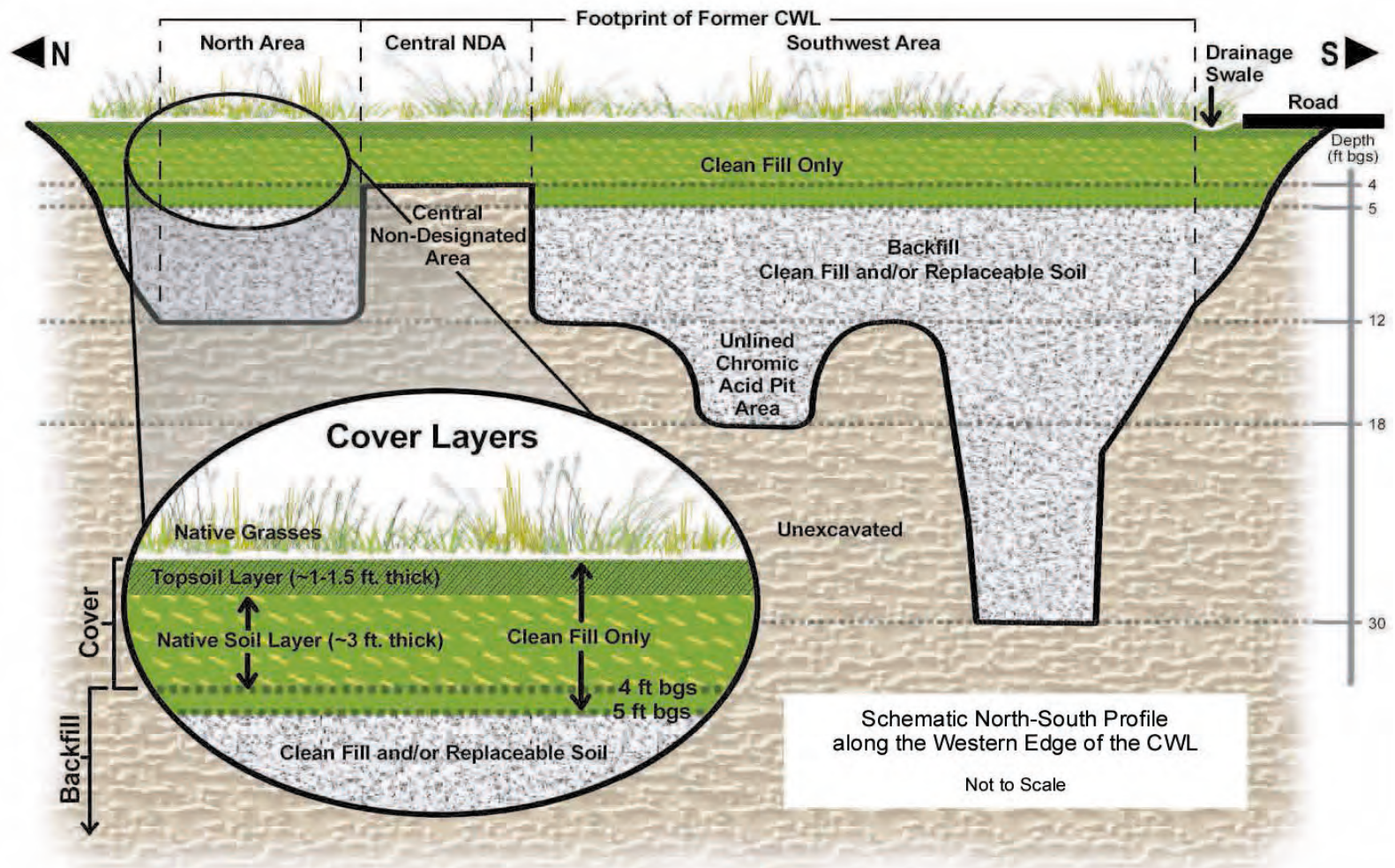
Well-completion diagrams for the groundwater monitoring wells are provided in PCCP Attachment 2.

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

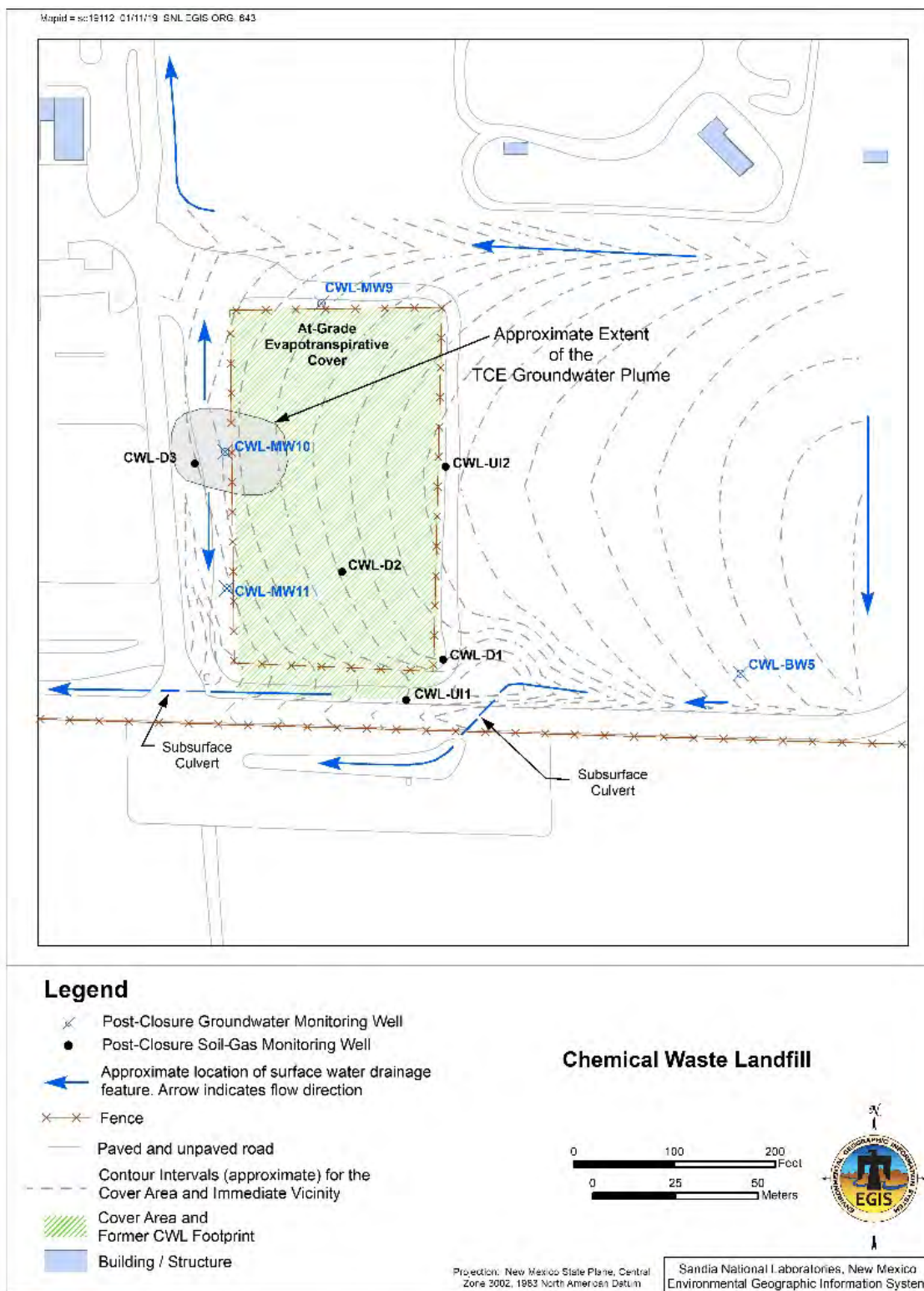


Figure 2-4
 Chemical Waste Landfill Surface Drainage Patterns and Monitoring Networks

2.4 Storm-Water Diversion Structures

The function of the storm-water diversion structures 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 repairs 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 2020 in accordance with PCCP Attachment 1, Sections 1.8 through 1.10. Results of CY 2020 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.

Groundwater monitoring must be performed semiannually, or twice a year, in accordance with the Groundwater SAP (PCCP Attachment 2) using U.S. Environmental Protection Agency (EPA) methods. 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 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 ^a	TCE by EPA Method 8260 ^b and Cr and Ni by EPA Method 6020 ^b	Sampling and Analysis per PCCP Attachment 2
Soil-Gas	Annual	VOCs ^c by EPA Compendium Method TO-15 or equivalent	Sampling and Analysis per PCCP Attachment 3

Notes:

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

^bEPA November 1986.

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

Cr = Chromium.

EPA = U.S. Environmental Protection Agency.

Ni = Nickel.

PCCP = Post-Closure Care Permit.

TCE = Trichloroethene.

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 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 presence of deep-rooted plants. Repairs required to address vegetation parameters not meeting PCCP specifications documented during the inspections are 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 that is included in the CWL Annual Post-Closure Care Report submitted to NMED.

3.2.1.2 Cover Inspection Requirements

Cover inspections are 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 must 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 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 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 windblown 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 performed concurrently with the cover inspection. The condition of the fence, including fence wires, posts, gates, locks, and warning signs, is inspected and documented on the Post-Closure Inspection Form/Inspection Checklist (PCCP Attachment 4 or equivalent). Accumulation of windblown 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 2020 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 Regional 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 2020.

- The first sampling event was conducted January 20-27, 2020. Groundwater samples were collected from monitoring wells CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11, and an environmental duplicate sample was collected from CWL-BW5. Samples collected from all wells were analyzed for TCE, chromium, nickel, and the enhanced list of VOCs. The enhanced list of VOCs includes 1,1-dichloroethene, 1,1,2-trichloro-1,2,2-trifluoroethane (commonly known as Freon 113), chloroform, PCE, and trichlorofluoromethane (commonly known as Freon 11) in addition to TCE.
- The second sampling event was conducted July 20-27, 2020. Groundwater samples were collected from monitoring wells CWL-BW5, CWL-MW9, CWL-MW10, and CWL-MW11, and an environmental duplicate sample was collected from CWL-MW9. Samples collected from all wells were analyzed for TCE, chromium, and nickel.

Per request of NMED (Kielling September 2019), groundwater samples were collected and analyzed during both events for 1,4-dioxane analysis in addition to PCCP-required analytes described above. The required two 1,4-dioxane sampling events were completed in CY 2020.

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 were 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 2020 water quality field measurement parameters were collected using an In-Situ Incorporated Aqua TROLL® 600 Multiparameter Water Quality Sonde and a HACH™ 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. For the July 2020 event the deionized water-nitric acid mixture rinse was eliminated and the final rinse was completed by pumping 20 gallons of deionized water through the system. The nitric acid rinse is not necessary for effective decontamination based upon additional testing results and the change was made to make the process safer.

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 2020, approximately 13.0 gallons were purged from monitoring well CWL-MW10 prior to the well going dry (purge volume requirement was approximately 22 gallons). The average estimated flow rate was 0.104 gallons per minute (gpm), and the estimated flow rate was 0.125 gpm during the final three gallons (equivalent to 0.394 and 0.473 liters per minute, respectively). During July 2020, approximately 13.0 gallons were purged from CWL-MW10 prior to the well going dry (purge volume requirement was approximately 22 gallons). The average

estimated flow rate was 0.130 gpm, and the estimated flow rate was 0.115 gpm during the final three gallons (equivalent to 0.492 and 0.435 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, field blank samples, and trip blank. An environmental duplicate sample was collected and analyzed to estimate the overall reproducibility of the sampling and analysis process. The environmental 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 2020 sampling events is provided below. Analytical results are presented in Section 4.2.2.

First Semiannual Sampling Event – January 20-27, 2020

A duplicate environmental sample was collected from CWL-BW5. One equipment blank sample was collected prior to sampling monitoring well CWL-BW5. The samples (equipment blank, environmental sample, and environmental duplicate sample) were submitted for all analyses. Two field blank samples were collected for VOC analysis (TCE and enhanced list VOCs) by pouring deionized water into sample containers at the CWL-MW9 and CWL-MW11 sampling locations to simulate the transfer of environmental samples from the sampling system to the sample container. A third field blank sample was collected from the deionized water source used for the equipment decontamination process. A total of six trip blank samples were submitted with the January 2020 groundwater samples and analyzed for TCE and the enhanced list of VOCs.

Second Semiannual Sampling Event – July 20-27, 2020

A duplicate environmental sample was collected from CWL-MW9. One equipment blank sample was collected prior to sampling CWL-MW9. The samples (equipment blank, environmental sample, and environmental duplicate sample) were submitted for all analyses. 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. A total of six trip blank samples were submitted with the July 2020 groundwater samples and analyzed for TCE.

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 230 gallons of wastewater were generated during the January 2020 sampling event and approximately 237 gallons of wastewater were generated during the July 2020 sampling event (total of 467 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 2020 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. 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 2020 groundwater sampling events. Table 4-3 summarizes results for the enhanced list VOCs included in the January 2020 event. Table 4-4 summarizes field water quality measurements collected prior to sampling for both events. Table 4-5 presents the January and July 2020 1,4-dioxane results. A summary of the results from the January and July 2020 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 20-27, 2020

TCE was detected above the laboratory MDL in the CWL-MW10 environmental sample at a concentration of 0.650 µg/L. There were no other detections of TCE or enhanced list VOCs. 1,4-dioxane was not detected above the laboratory MDL in any of the groundwater samples. 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^a
 Calendar Year 2020

Well ID	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	Laboratory Qualifier ^b	Validation Qualifier ^b
January 2020 Sampling Event					
CWL-BW5	ND	0.300	5.00	U	--
CWL-BW5 (Duplicate)	ND	0.300	5.00	U	--
CWL-MW9	ND	0.300	5.00	U	--
CWL-MW10	0.650	0.300	5.00	J	--
CWL-MW11	ND	0.300	5.00	U	--
July 2020 Sampling Event					
CWL-BW5	ND	0.300	1.00	U	--
CWL-MW9	ND	0.300	1.00	U	--
CWL-MW9 (Duplicate)	ND	0.300	1.00	U	--
CWL-MW10	0.750	0.300	1.00	J	--
CWL-MW11	ND	0.300	1.00	U	--

Notes:

^aEPA November 1986.

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

EPA = U.S. Environmental Protection Agency.

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 = 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.

TCE = Trichloroethene.

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

Table 4-2
 Summary of Chromium and Nickel Results
 Chemical Waste Landfill Groundwater Monitoring
 Analytical Method SW846-6020^a
 Calendar Year 2020

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	Laboratory Qualifier ^b	Validation Qualifier ^b
January 2020 Sampling Event						
CWL-BW5	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0006	0.002	U	--
CWL-BW5 (Duplicate)	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-MW11	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0006	0.002	U	--
July 2020 Sampling Event						
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-MW9 (Duplicate)	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-MW11	Chromium	ND	0.003	0.010	U	--
	Nickel	ND	0.0006	0.002	U	--

Notes:

^aEPA November 1986.

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

Table 4-3
 Summary of Additional Volatile Organic Compound Results
 Chemical Waste Landfill Groundwater Monitoring
 Analytical Method SW846-8260B^a
 January 2020

Well ID	Analyte	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-BW5	1,1-Dichloroethene	ND	0.300	1.00	U	--
	Chloroform	ND	0.300	1.00	U	--
	Tetrachloroethene	ND	0.300	1.00	U	--
	Trichlorofluoromethane	ND	0.300	1.00	U	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	U	--
CWL-BW5 (Duplicate)	1,1-Dichloroethene	ND	0.300	1.00	U	--
	Chloroform	ND	0.300	1.00	U	--
	Tetrachloroethene	ND	0.300	1.00	U	--
	Trichlorofluoromethane	ND	0.300	1.00	U	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	U	--
CWL-MW9	1,1-Dichloroethene	ND	0.300	1.00	U	--
	Chloroform	ND	0.300	1.00	U	--
	Tetrachloroethene	ND	0.300	1.00	U	--
	Trichlorofluoromethane	ND	0.300	1.00	U	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	U	--
CWL-MW10	1,1-Dichloroethene	ND	0.300	1.00	U	--
	Chloroform	ND	0.300	1.00	U	--
	Tetrachloroethene	ND	0.300	1.00	U	--
	Trichlorofluoromethane	ND	0.300	1.00	U	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	U	--
CWL-MW11	1,1-Dichloroethene	ND	0.300	1.00	U	--
	Chloroform	ND	0.300	1.00	U	--
	Tetrachloroethene	ND	0.300	1.00	U	--
	Trichlorofluoromethane	ND	0.300	1.00	U	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	ND	2.00	5.00	U	--

Refer to footnotes at end of table.

Table 4-3 (*Concluded*)
Summary of Additional Volatile Organic Compound Results
Chemical Waste Landfill Groundwater Monitoring
Analytical Method SW846-8260B^a
January 2020

Notes:

^aEPA November 1986.

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

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^a
 Chemical Waste Landfill Groundwater Monitoring
 Calendar Year 2020

Well ID	Temperature (°C)	SC (µmho/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (% Sat)	DO (mg/L)
January 2020 Sampling Event							
CWL-BW5	16.92	1065.7	142.4	6.94	0.23	88.10	7.23
CWL-MW9	16.31	925.7	160.3	7.03	0.25	55.20	4.59
CWL-MW10	13.14	857.6	73.4	6.97	2.49	37.70	3.25
CWL-MW11	17.26	1001.0	39.0	7.01	0.30	68.20	5.67
July 2020 Sampling Event							
CWL-BW5	22.66	1141.0	252.7	7.05	0.87	92.95	6.08
CWL-MW9	23.00	958.4	272.7	7.07	0.19	62.52	4.05
CWL-MW10	18.65	937.4	91.1	6.83	2.90	35.96	2.62
CWL-MW11	26.54	1140.0	145.7	7.01	0.19	80.26	4.91

Notes:

^aField 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.

Table 4-5
 Summary of 1,4-Dioxane Results
 Chemical Waste Landfill Groundwater Monitoring
 Analytical Method SW846-8270D^a
 Calendar Year 2020

Well ID	Analyte	Result ^a (µg/L)	MDL ^b (µg/L)	PQL ^c (µg/L)	Laboratory Qualifier ^e	Validation Qualifier ^f
January 2020 Sampling Event						
CWL-BW5	1,4-Dioxane	ND	0.100	0.400	U	--
CWL-BW5 (Duplicate)	1,4-Dioxane	ND	0.100	0.400	U	--
CWL-MW9	1,4-Dioxane	ND	0.100	0.400	U	--
CWL-MW10	1,4-Dioxane	ND	0.100	0.400	U	--
CWL-MW11	1,4-Dioxane	ND	0.100	0.400	U	--

Refer to footnotes at end of table.

Table 4-5 (Concluded)
Summary of 1,4-Dioxane Results
Chemical Waste Landfill Groundwater Monitoring
Analytical Method SW846-8270D^a
Calendar Year 2020

Well ID	Analyte	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	Laboratory Qualifier ^b	Validation Qualifier ^b
July 2020 Sampling Event						
CWL-BW5	1,4-Dioxane	ND	0.100	0.400	U	--
CWL-MW9	1,4-Dioxane	ND	0.100	0.400	U	--
CWL-MW9 (Duplicate)	1,4-Dioxane	ND	0.100	0.400	U	--
CWL-MW10	1,4-Dioxane	ND	0.100	0.400	U	--
CWL-MW11	1,4-Dioxane	ND	0.100	0.400	U	--

Notes:

^aEPA November 1986.

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

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.

Second Semiannual Sampling Event – July 20-27, 2020

TCE was detected above the laboratory MDL in the CWL-MW10 sample at a concentration of 0.750 µg/L. 1,4-dioxane, chromium, and nickel were not detected above the laboratory MDL in any of the groundwater samples.

4.2.2 Field Quality Control Sample Results

For the environmental-duplicate sample pair collected at CWL-BW5 in January 2020, no VOCs, 1,4-dioxane, or metals were detected. Therefore, relative percent difference (RPD) values were not calculated. For the environmental-duplicate sample pair collected at CWL-MW9 in July 2020, no TCE, 1,4-dioxane, or metals were detected. Therefore, RPD values were not calculated.

One equipment blank sample was collected in January 2020 prior to sampling monitoring well CWL-BW5 and analyzed for all constituents. Chloroform and 1,4-dioxane were detected above MDLs in the equipment blank sample. No corrective action was necessary, since these compounds were not reported in associated environmental samples. No analysis was performed for the chromium and nickel sample fraction because it was collected in a sample container that did not contain the appropriate preservative. No corrective action was required as

chromium and nickel were not detected in the associated environmental samples. One equipment blank sample was collected in July 2020 prior to sampling monitoring well CWL-MW9 and analyzed for all constituents. No constituents were detected in the equipment blank sample.

Chloroform was detected above the associated laboratory MDLs in the three field blank samples associated with the January 2020 sampling event. No corrective action was necessary, since chloroform was not reported in the associated environmental samples. TCE was not detected above the MDL in the three field blank samples collected in July 2020.

No VOCs were detected in the six trip blank samples associated with the January 2020 VOC environmental samples. For the six trip blank samples associated with the July 2020 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 and June 2020a). 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 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 2020 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 are 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 twenty times as of July 2020 (November-December 2010, July-August 2011, January and July 2012 through 2020). 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 (referred to as CWL-BW5/4A in the following discussion).

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, although the lower value is included when determining the historical minimum and maximum range. 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 2020 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 2020 sample results are also compared to the historical range (minimum and maximum result derived from historical results not including CY 2020 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 2020 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 2020 sample result. Then, the January 2020 sample result is compared to the median value and determined to be above or below. For the next groundwater monitoring event (i.e., July 2020), the median value is recalculated by including the January 2020 sample result; and the July 2020 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 2020 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 twenty 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 2020 data sets and because of this the Median Test results continue to increase. Statistical results are presented below for all cases where evaluation was possible.

Prediction Intervals Results

Monitoring Well CWL-BW5/4A

CY 2020 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 2020 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. TCE has not been detected in any CWL-BW5 samples (CY 2010 through 2020).

Monitoring Well CWL-MW9

Chromium and TCE have not been detected in any CWL-MW9 samples (CY 2010 through 2020). Therefore, statistical evaluation of these constituents is not presented. The CY 2020 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 2020 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 and July 2020 environmental samples (0.650 and 0.750 µg/L, respectively) were below the prediction interval but within the historical range. The TCE results are representative of decreasing concentrations over time.

Table 4-7
 Statistical Assessment Results Summary
 Chemical Waste Landfill Groundwater Monitoring
 Calendar Year 2020

Hazardous Constituent ^a	Minimum ^b	Maximum ^b	Mean ^c	Standard Deviation ^c	Prediction Interval		Distribution Type ^c	Median Test ^d	Concentration Limit Exceeded ^e ?
					LCL ^c	UCL ^c			
CWL-BW5/4A									
Chromium (mg/L)	0.00038	0.0125	0.00312	0.00269	0.00244	0.0038	Normal	50%	No
Nickel (mg/L)	0.0005	0.049	0.00446	0.00736	0.00262	0.0063	Normal	36%	No
TCE (µg/L)	0.100	0.780	0.337	0.116	0.308	0.366	Normal	2%	No
CWL-MW9									
Chromium (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	No
Nickel (mg/L)	0.0005	0.00435	0.00192	0.00134	0.0014	0.00244	Normal	18%	No
TCE (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	No
CWL-MW10									
Chromium (mg/L)	0.002	0.00325	0.00252	0.000541	0.00231	0.00273	Normal	53%	No
Nickel (mg/L)	0.000501	0.00707	0.00194	0.00174	0.00127	0.00261	Normal	6%	No
TCE (µg/L)	0.300	4.68	1.469	1.447	0.909	2.029	Normal	12%	No
CWL-MW11									
Chromium (mg/L)	0.002	0.00304	0.00255	0.000482	0.00236	0.00274	Normal	65%	No
Nickel (mg/L)	0.0005	0.00449	0.00164	0.00122	0.00117	0.00211	Normal	12%	No
TCE (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	No

Notes:

- ^aHazardous Constituents from CWL Permit Attachment 1, Section 1.4.1, Table 1-2 (Table 4-6 of this report).
- ^bMinimum and maximum result determined from historical data not including 2020 sample results.
- ^cMean, Standard Deviation, LCL, UCL, and Distribution Type determined using ProUCL statistical program.
- ^dMedian Test is the cumulative percentage of sample results that are greater than the median.
- ^eExceedance determined by comparing the 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.

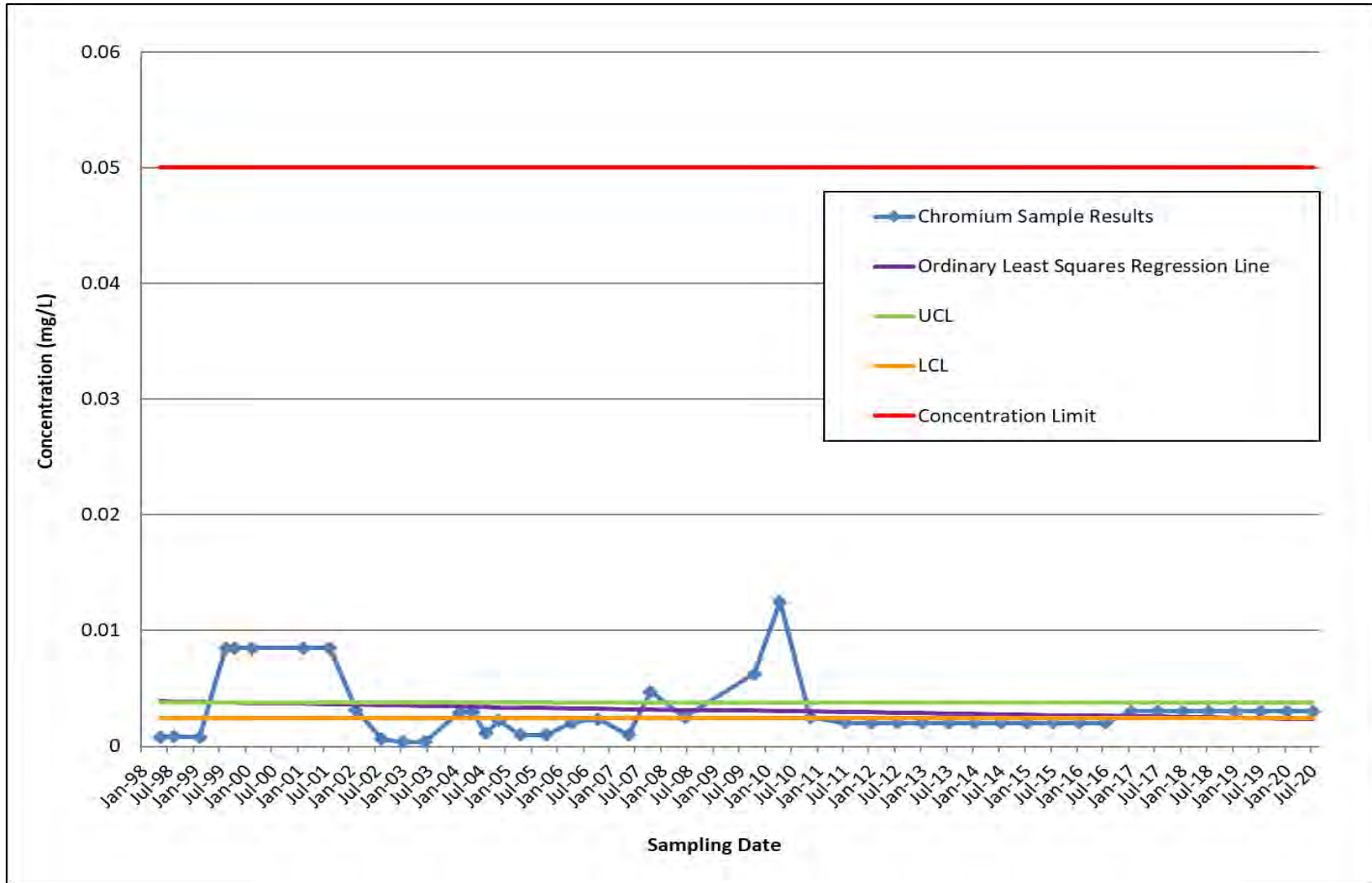


Figure 4-1
Chromium Control Chart for CWL-BW5/4A

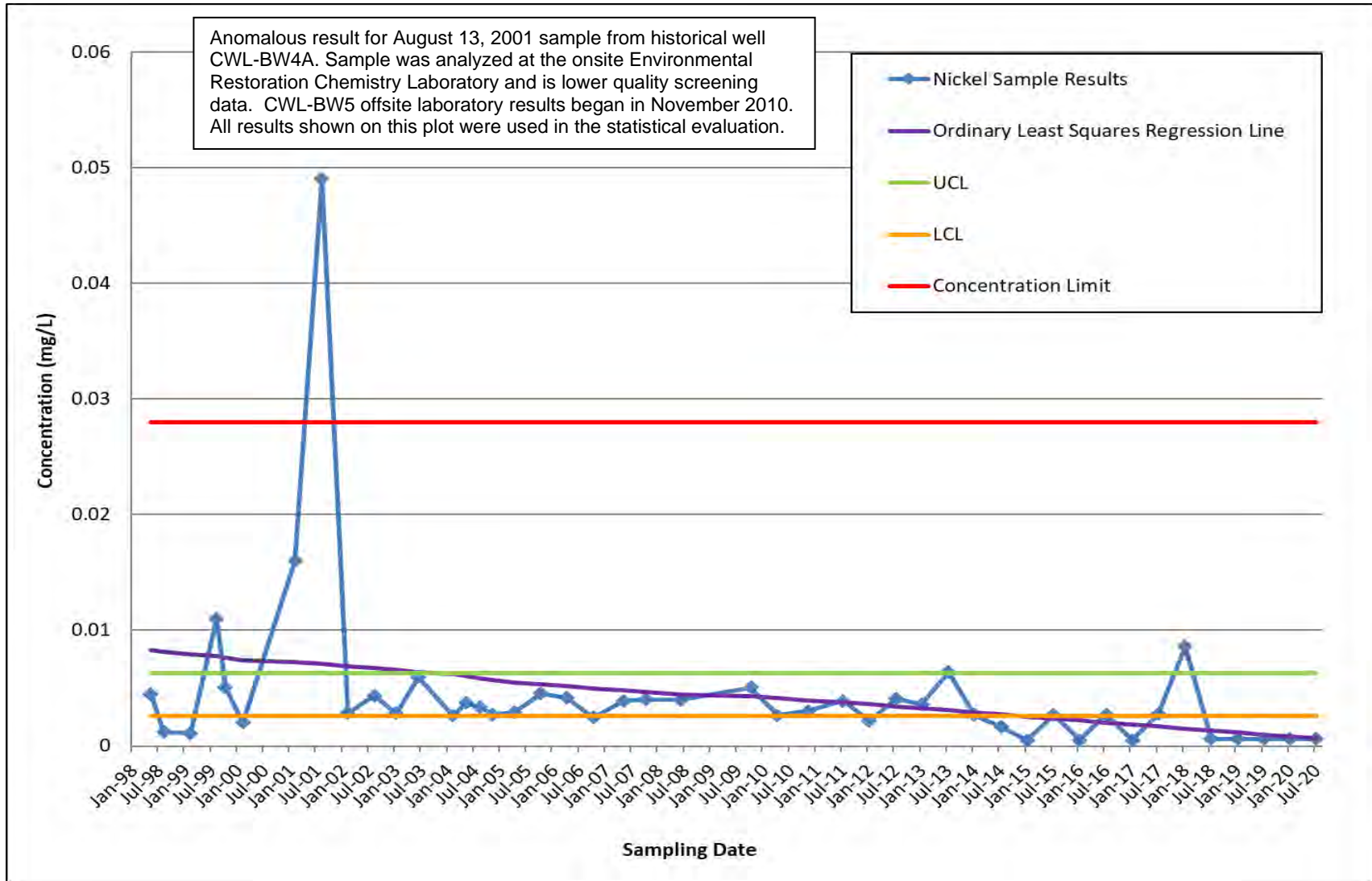


Figure 4-2
 Nickel Control Chart for CWL-BW5/4A

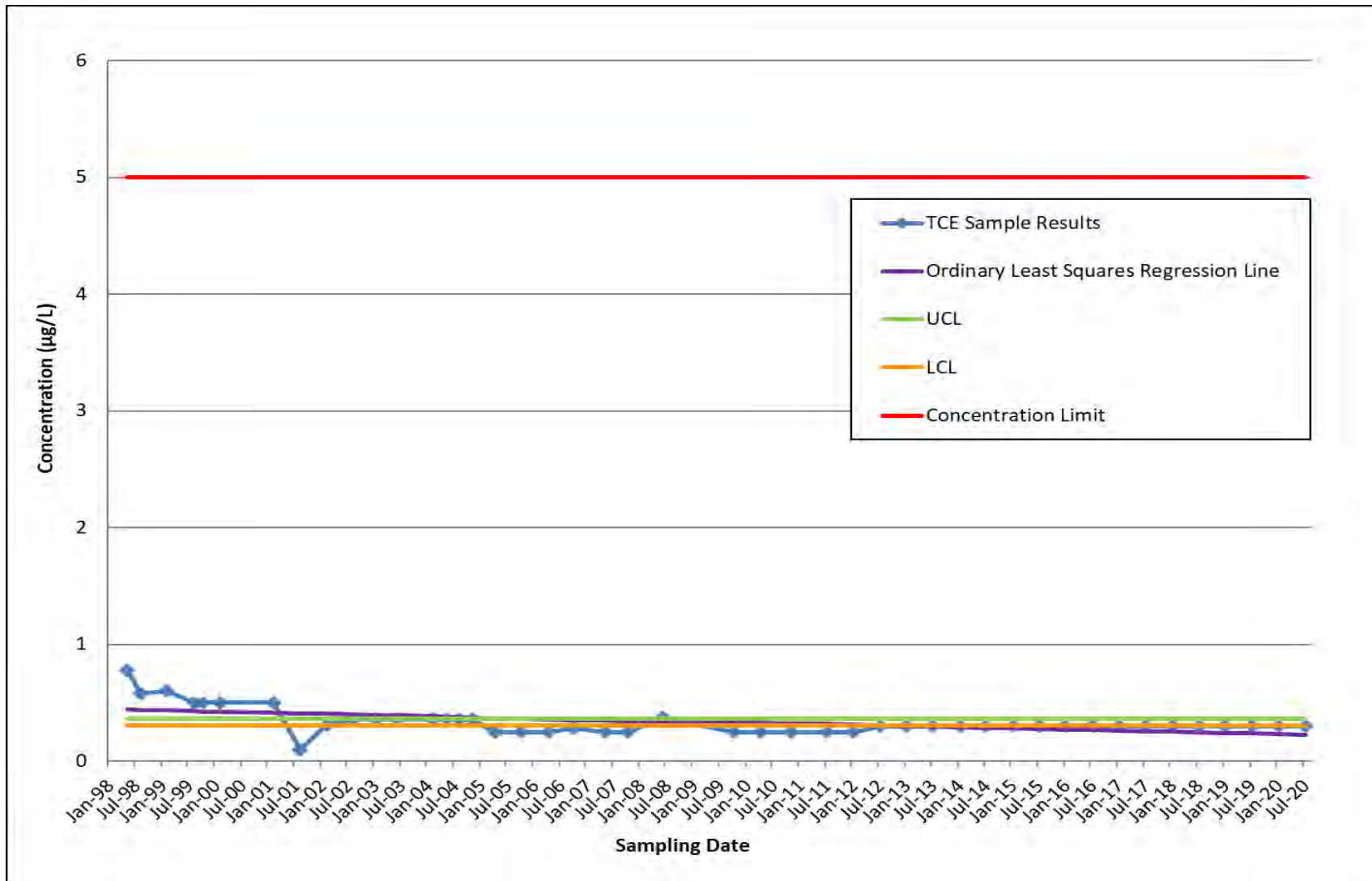


Figure 4-3
TCE Control Chart for CWL-BW5/4A

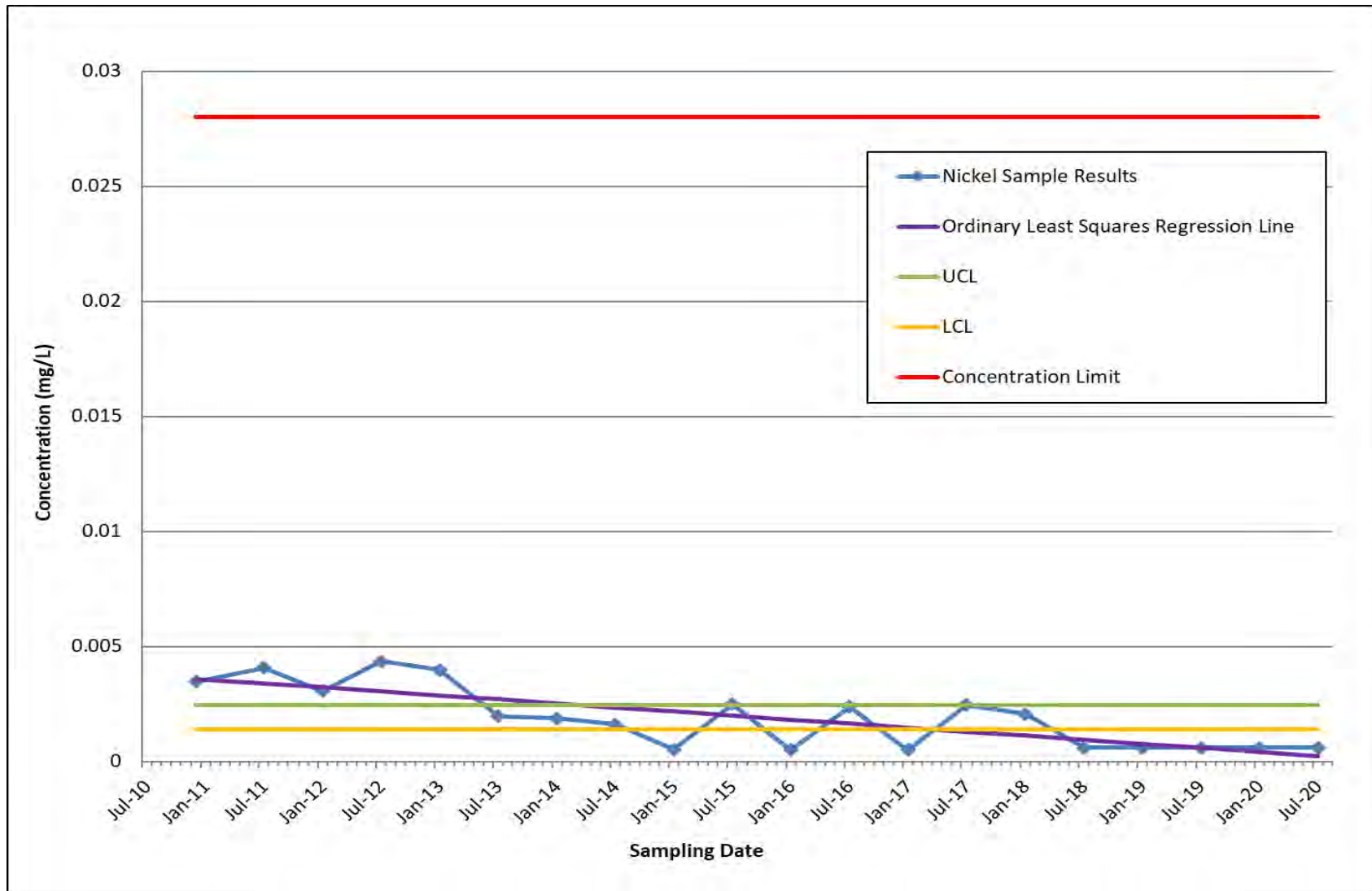


Figure 4-4
Nickel Control Chart for CWL-MW9

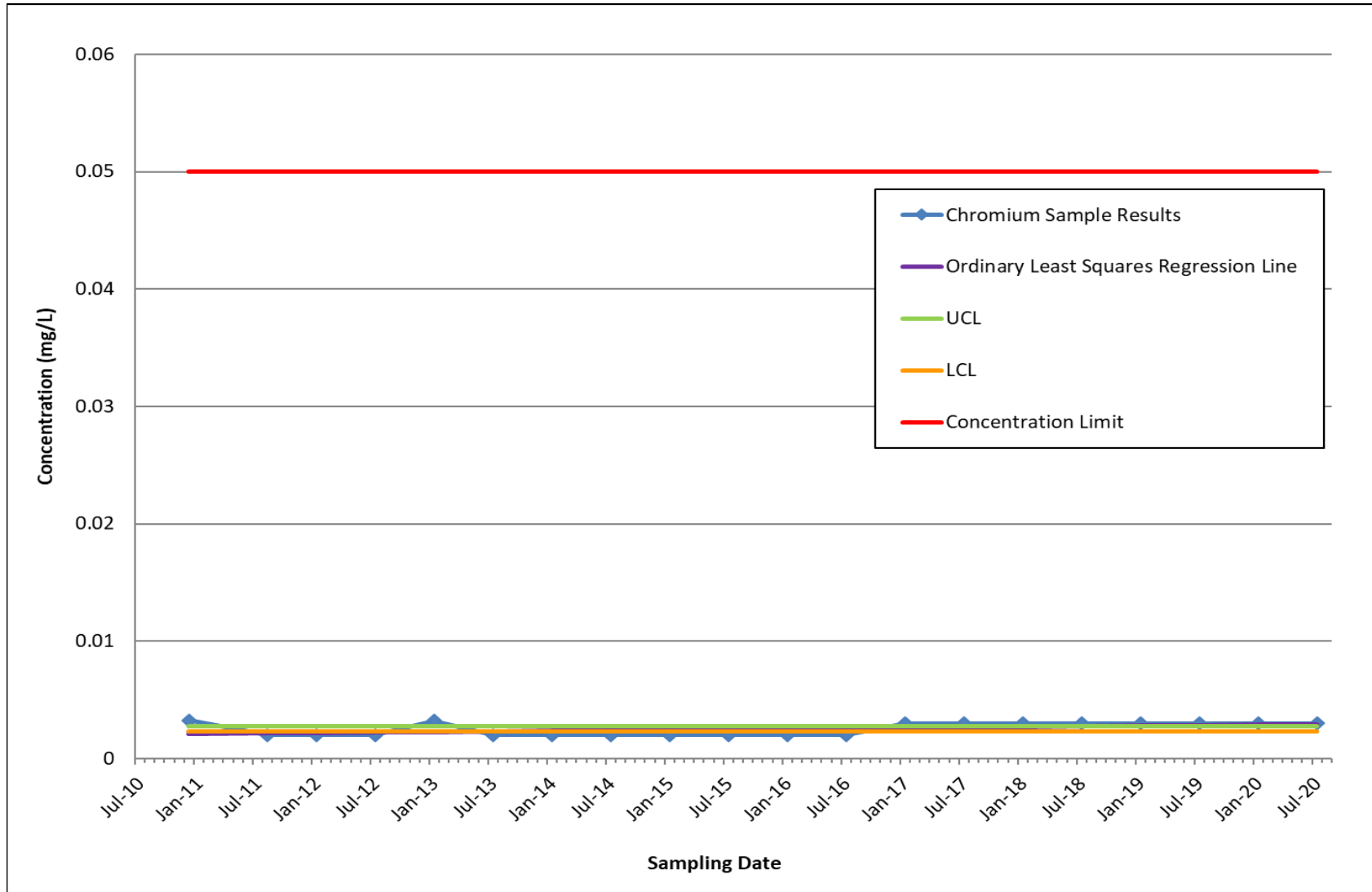


Figure 4-5
Chromium Control Chart for CWL-MW10

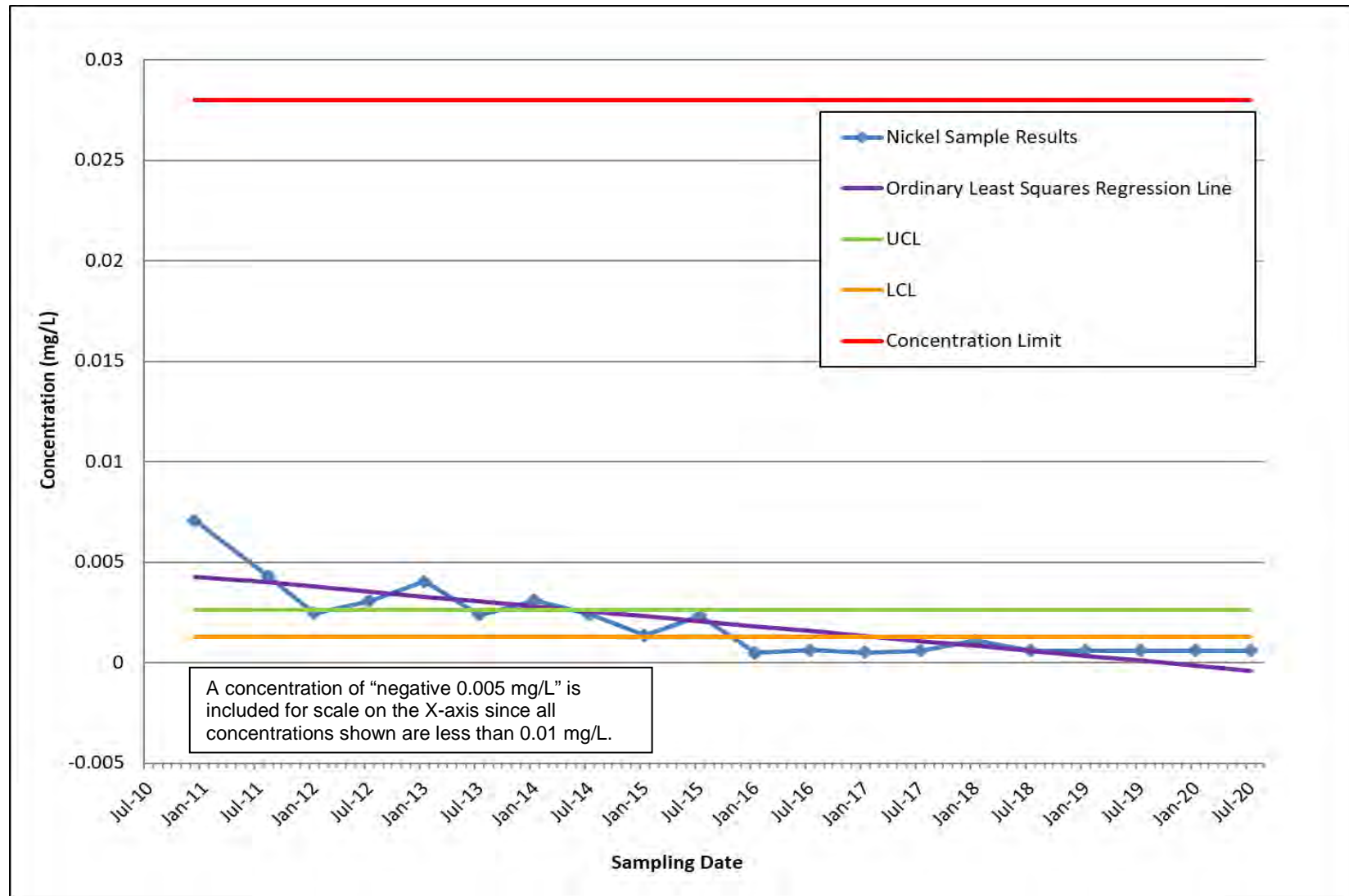


Figure 4-6
 Nickel Control Chart for CWL-MW10

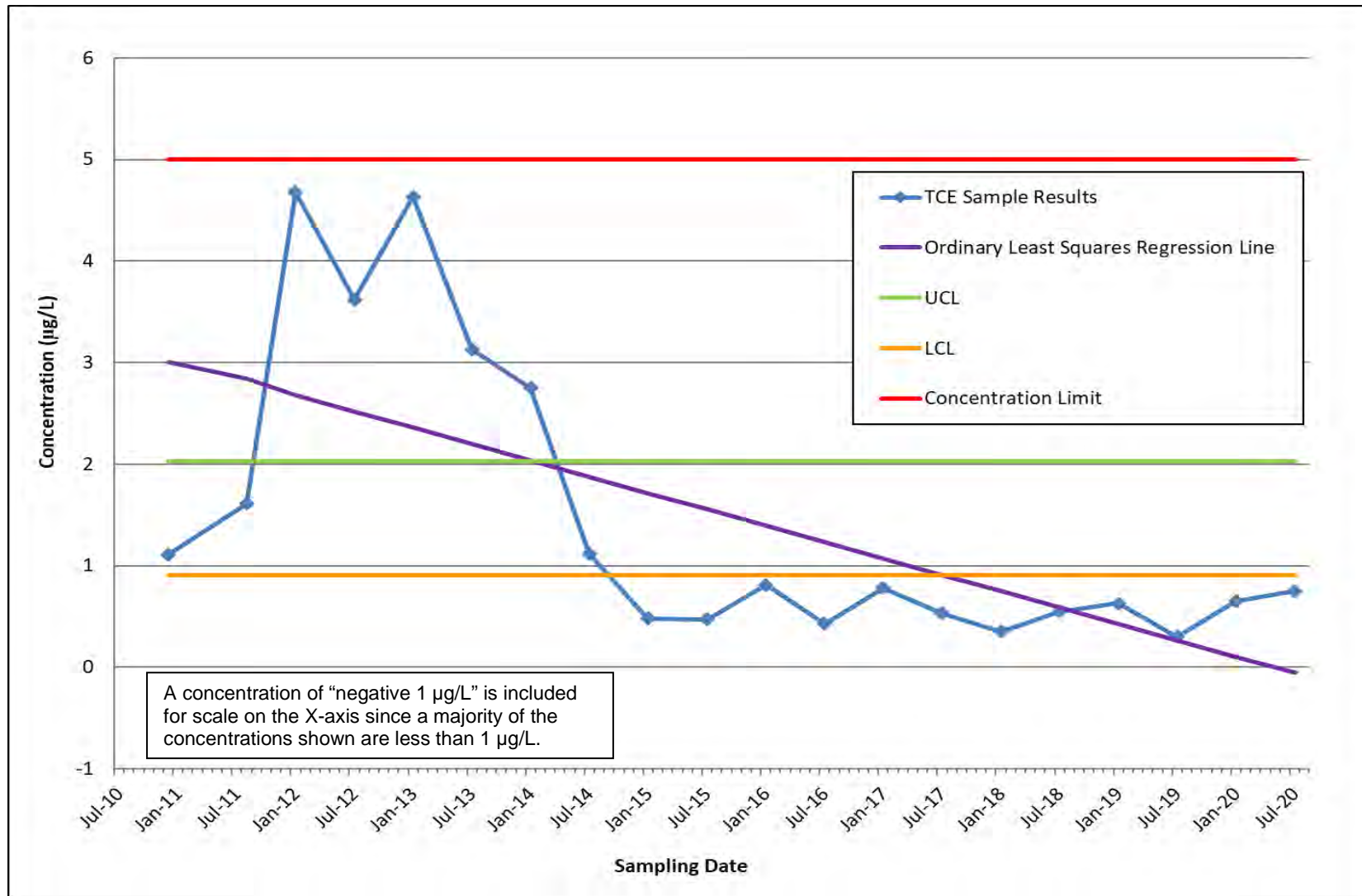


Figure 4-7
 TCE Control Chart for CWL-MW10

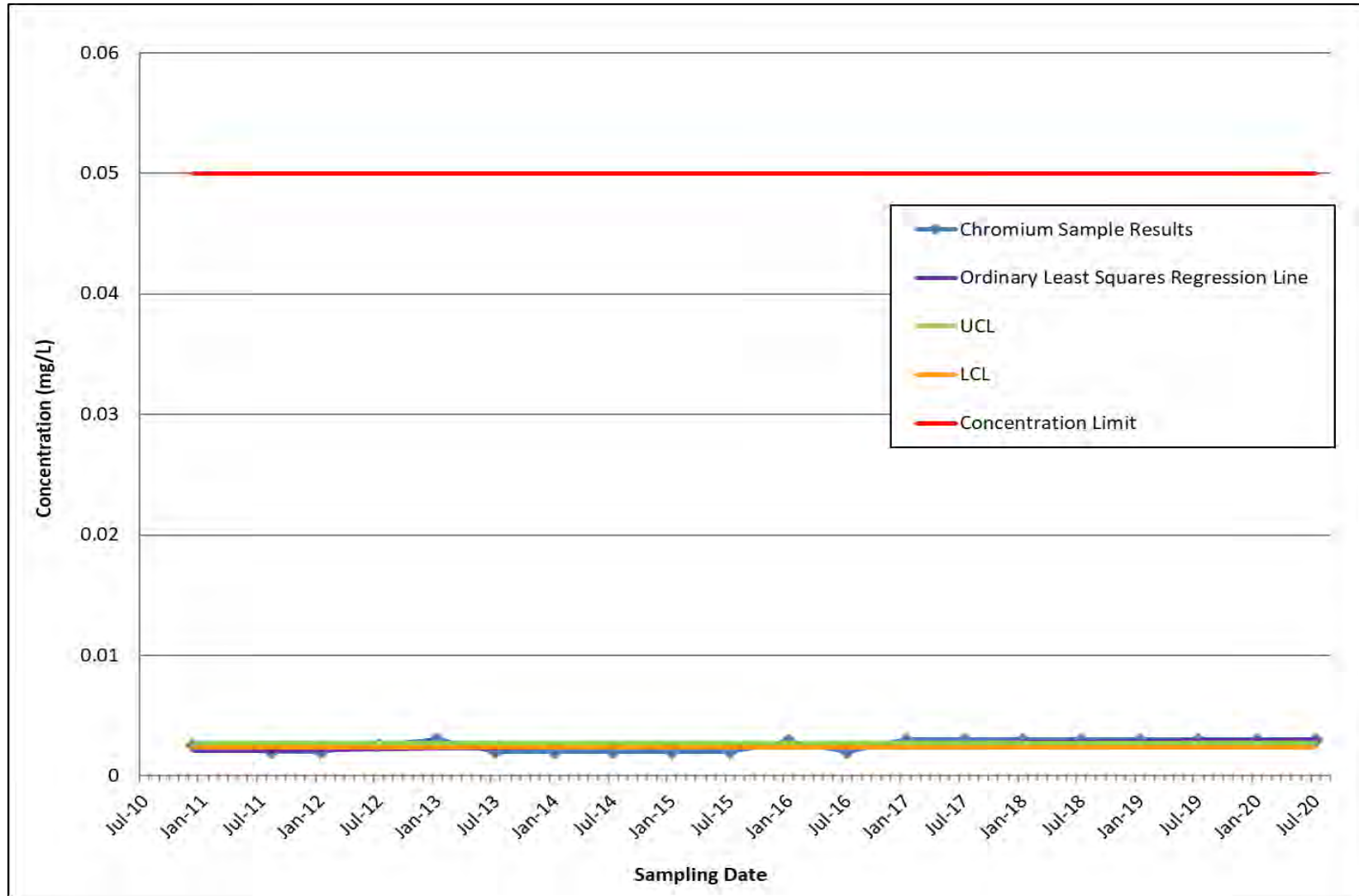


Figure 4-8
Chromium Control Chart for CWL-MW11

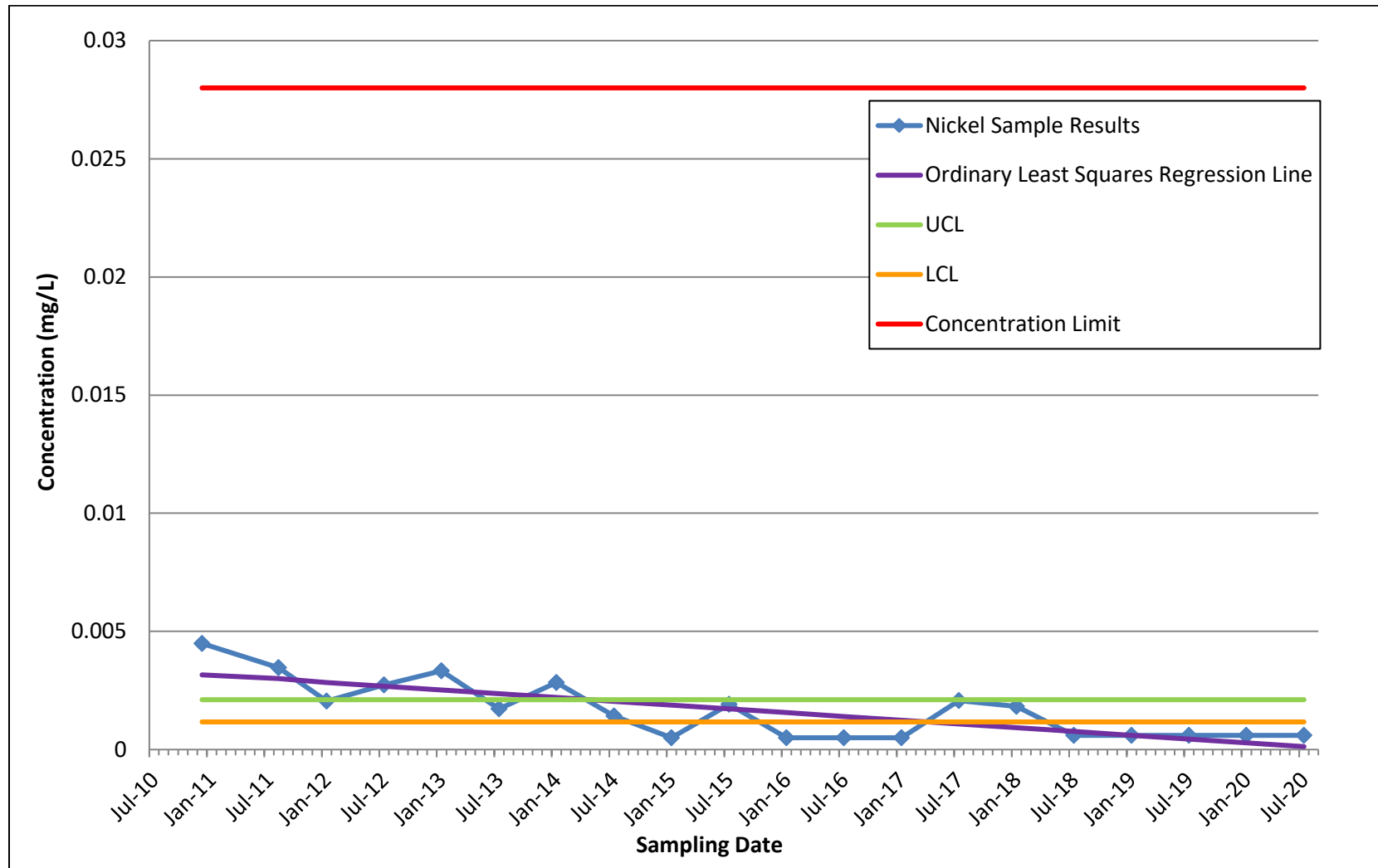


Figure 4-9
Nickel Control Chart for CWL-MW11

Monitoring Well CWL-MW11

CY 2020 CWL-MW11 sample results were all non-detections. The MDL for chromium (0.003 mg/L) was above the 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 2020); 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 65% for chromium (CWL-MW11); all CY 2020 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 (2%) 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). TCE has not been detected in CWL-BW5 (sampling began in 2010 after this well was installed as a replacement well for CWL-BW4A); the only detections are related to the CWL-BW4A historical data set.

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 15 sampling events (July 2013 through July 2020). The trend shown in Figure 4-7 indicates the two CWL VCMs were effective in remediating TCE in groundwater.

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 2019 and October 2020 was consistent at the four monitoring wells and ranged from 0.19 (CWL-MW11) to 0.30 (CWL-BW5) feet. This rate of decline was significantly lower than the rate of decline for CY 2018 to 2019, which ranged from 0.59 (CWL-MW11) to 0.69 (CWL-BW5).

In CY 2020, water levels were measured in the groundwater monitoring wells on a quarterly basis and during the January and July 2020 sampling events. Figure 4-10 depicts the potentiometric surface map of the Regional Aquifer beneath the CWL based upon the October 2020 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 that reflects site-specific geologic controls (i.e., vertical and lateral variability in permeability of the saturated Santa Fe Group alluvial sediments). 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 2020b).

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 1.8×10^{-4} to 2.8×10^{-3} feet per day (equivalent to 6.3×10^{-8} to 1.0×10^{-6} centimeters per second). The average groundwater velocity is 1×10^{-3} feet per day (equivalent to 4.1×10^{-7} centimeters per second). These very low values are consistent with previous estimates for horizontal groundwater flow at the water table in the CWL vicinity.

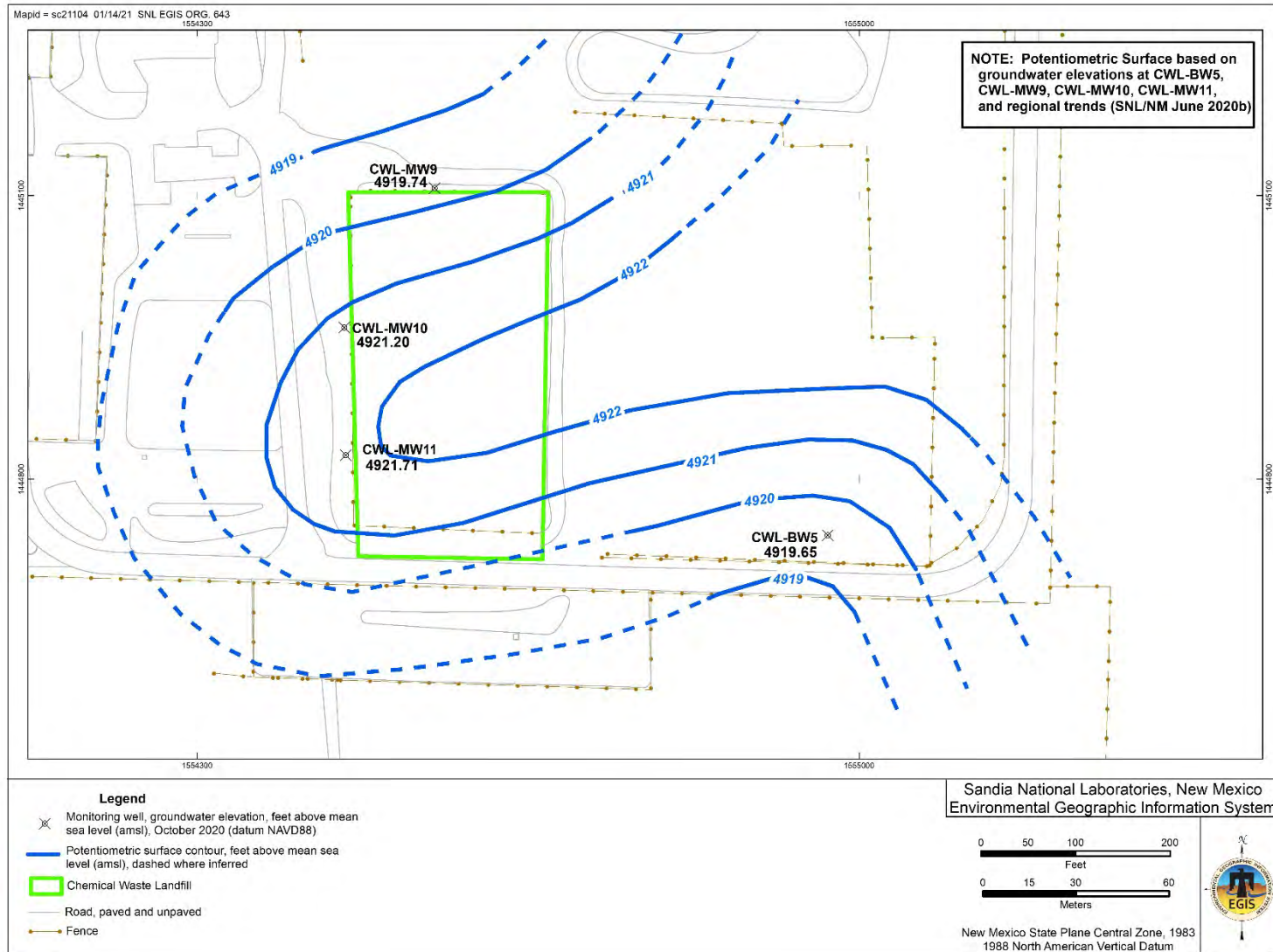


Figure 4-10
 Potentiometric Surface of the Regional Aquifer at the Chemical Waste Landfill, October 2020

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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 2020 in accordance with PCCP Attachment 1, Sections 1.8 and 1.12, and Attachment 3 (NMED October 2009 and subsequent revisions). The CY 2020 annual soil-gas sampling event was the ninth 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, data evaluation requirements and results are presented in Section 5.3, and a historical data evaluation is presented in Section 5.4. 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 all sampling ports of monitoring wells CWL-UI1, CWL-UI2, CWL-D1, CWL-D2, and CWL-D3 on January 30, 2020. The laboratory reported a broken valve stem on the SUMMA[®] canister used at CWL-UI2 (136 feet bgs sample port or CWL-UI2-136). This location was resampled on March 24, 2020; as a result, only the March resample results are presented for location CWL-UI2-136. 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 2020 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[®] 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 2020 monitoring event, environmental duplicate samples were collected from two CWL-D2 monitoring well sample ports (120 feet bgs and 470 feet bgs ports). The environmental duplicate samples were collected using the manifold system that allows for the simultaneous collection of the environmental and duplicate sample. The two environmental duplicate samples were submitted for analysis with the January 2020 environmental samples. The sample results are used to evaluate the reproducibility and precision of the sampling and analytical processes.

Field blank samples are prepared in the field during sampling activities by collecting an ultra-pure grade nitrogen gas sample in SUMMA[®] canisters at the wellheads. Results are used to assess whether contamination of the samples may have resulted from ambient field conditions. A total of six field blank samples were submitted for analysis with environmental samples; five for the January 2020 event and one for the March 2020 resample of CWL-UI2-136.

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 2020 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 Eurofins TestAmerica Laboratories, Inc. in Knoxville Tennessee 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 2020. The results are presented in Table 5-1.

Table 5-1
 Summary of Detected Volatile Organic Compounds
 Chemical Waste Landfill Soil-Gas Monitoring
 Analytical Method TO-15^a
 January 2020

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-UI1-40 30-Jan-20	Benzene	3.5	2.7	27	J	27U
	Carbon tetrachloride	11	2.3	27	J	--
	Chloroform	520	2.3	27	--	--
	Dichlorodifluoromethane	28	4.7	27	--	--
	1,1-Dichloroethane	8.8	2.3	27	J	--
	1,1-Dichloroethene	170	2.7	27	--	--
	1,2-Dichloropropane	44	3.3	27	--	J
	Tetrachloroethene	2500	2.3	27	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	650	2.7	27	--	--
	1,1,1-Trichloroethane	28	12	27	--	--
	1,1,2-Trichloroethane	6.6	2.3	27	J	--
	Trichloroethene	4600	2.0	13	--	--
	Trichlorofluoromethane	210	3.7	27	--	--
	Total Organics ^c	8776.4	NA	NA	NA	NA
CWL-UI1-80 30-Jan-20	Carbon tetrachloride	12	2.5	29	J	--
	Chloroform	390	2.5	29	--	--
	Dichlorodifluoromethane	27	5.0	29	J	--
	1,1-Dichloroethane	9.9	2.5	29	J	--
	1,2-Dichloroethane	10	3.6	29	J	--
	1,1-Dichloroethene	240	2.9	29	--	--
	1,2-Dichloropropane	36	3.6	29	--	J
	Tetrachloroethene	710	2.5	29	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	660	2.9	29	--	--
	1,1,1-Trichloroethane	27	13	29	J	--
	1,1,2-Trichloroethane	3.4	2.5	29	J	--
	Trichloroethene	5200	2.1	14	--	--
	Trichlorofluoromethane	190	3.9	29	--	--
	Total Organics ^c	7515.3	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
 Summary of Detected Volatile Organic Compounds
 Chemical Waste Landfill Soil-Gas Monitoring
 Analytical Method TO-15^a
 January 2020

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-UI1-120 30-Jan-20	Benzene	7.2	4.0	40	J	40U
	Carbon tetrachloride	21	3.5	40	J	--
	Chloroform	480	3.5	40	--	--
	1,2-Dibromoethane	5.7	3.5	40	J	--
	Dichlorodifluoromethane	38	7.0	40	J	--
	1,1-Dichloroethane	21	3.5	40	J	--
	1,2-Dichloroethane	51	5.0	40	--	--
	1,1-Dichloroethene	370	4.0	40	--	--
	1,2-Dichloropropane	160	5.0	40	CI	J
	Methylene chloride	140	81	200	J	200UJ
	Tetrachloroethene	700	3.5	40	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	950	4.0	40	--	--
	1,1,1-Trichloroethane	29	19	40	J	--
	1,1,2-Trichloroethane	7.4	3.5	40	J	--
	Trichloroethene	8800	3.8	26	--	--
	Trichlorofluoromethane	260	5.5	40	--	--
	Total Organics ^c	11893.1	NA	NA	NA	NA
CWL-UI2-36 30-Jan-20	Carbon tetrachloride	7.1	1.0	12	J	--
	Chloroform	370	1.0	12	--	--
	Dichlorodifluoromethane	16	2.0	12	--	--
	1,1-Dichloroethane	3.3	1.0	12	J	--
	1,1-Dichloroethene	36	1.2	12	--	--
	1,2-Dichloropropane	30	1.4	12	--	J
	Tetrachloroethene	110	1.0	12	--	J
	1,1,2-Trichloro-1,2,2-trifluoroethane	360	1.2	12	--	--
	1,1,1-Trichloroethane	14	5.3	12	--	--
	Trichloroethene	2300	0.86	5.8	--	J
	Trichlorofluoromethane	110	1.6	12	--	J
	Total Organics ^c	3356.4	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
 Summary of Detected Volatile Organic Compounds
 Chemical Waste Landfill Soil-Gas Monitoring
 Analytical Method TO-15^a
 January 2020

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-UI2-76 30-Jan-20	Carbon tetrachloride	12	4.2	48	J	--
	Chloroform	550	4.2	48	--	--
	Dichlorodifluoromethane	24	8.5	48	J	48U
	1,1-Dichloroethane	6.4	4.2	48	J	--
	1,2-Dichloroethane	7.7	6.1	48	J	--
	1,1-Dichloroethene	86	4.8	48	--	--
	1,2-Dichloropropane	110	6.1	48	CI	J
	Tetrachloroethene	190	4.2	48	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	560	4.8	48	--	--
	Trichloroethene	4600	3.6	24	--	--
	Trichlorofluoromethane	160	6.7	48	--	--
	Total Organics ^c	6282.1	NA	NA	NA	NA
CWL-UI2-136 24-Mar-20	Acetone	860	430	1500	J	1500UJ
	Benzene	12	6.0	60	J	60UJ
	2-Butanone	120	55	300	J	300UJ
	Carbon disulfide	64	8.3	150	J	J
	Carbon tetrachloride	15	5.3	60	J*	J+
	Chloroform	570	5.3	60	--	J
	Chloromethane	65	50	150	J	J
	Dichlorodifluoromethane	31	11	60	J	J+
	1,1-Dichloroethane	11	5.3	60	J	J
	1,2-Dichloroethane	21	7.5	60	J	J
	1,1-Dichloroethene	110	6.0	60	--	J
	1,2-Dichloropropane	180	7.5	60	CI	J
	Methylene chloride	210	120	300	J	300UJ
	4-Methyl-2-pentanone	50	41	150	J	J
	Tetrachloroethene	170	5.3	60	--	J
	1,1,2-Trichloro-1,2,2-trifluoroethane	590	6.0	60	--	J
	Trichloroethene	5000	4.5	30	--	J
	Trichlorofluoromethane	190	8.3	60	--	J+
	1,2,4-Trimethylbenzene	28	15	60	J	J
	m,p-Xylene	24	22	60	J	60UJ
	o-Xylene	15	11	60	J	J
Total Organics ^c	7110	NA	NA	NA	NA	

Refer to footnotes at end of table.

Table 5-1 (Continued)
 Summary of Detected Volatile Organic Compounds
 Chemical Waste Landfill Soil-Gas Monitoring
 Analytical Method TO-15^a
 January 2020

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D1-100 30-Jan-20	Benzene	9	7.1	71	J	71U
	Carbon tetrachloride	17	6.2	71	J	--
	Chloroform	340	6.2	71	--	--
	Dichlorodifluoromethane	29	12	71	J	--
	1,1-Dichloroethane	12	6.2	71	J	--
	1,2-Dichloroethane	16	8.9	71	J	--
	1,1-Dichloroethene	250	7.1	71	--	--
	1,2-Dichloropropane	86	8.9	71	--	J
	Tetrachloroethene	500	6.2	71	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	770	7.1	71	--	--
	Trichloroethene	7100	5.3	36	--	--
	Trichlorofluoromethane	210	9.8	71	--	--
	Total Organics ^c	9330	NA	NA	NA	NA
	CWL-D1-160 30-Jan-20	Benzene	13	13	130	J
Carbon tetrachloride		38	11	130	J	--
Chloroform		540	11	130	--	--
Dichlorodifluoromethane		59	23	130	J	--
1,1-Dichloroethane		29	11	130	J	--
1,2-Dichloroethane		46	16	130	J	--
1,1-Dichloroethene		580	13	130	--	--
1,2-Dichloropropane		250	16	130	--	J
Tetrachloroethene		610	11	130	--	--
1,1,2-Trichloro-1,2,2-trifluoroethane		1600	13	130	--	--
Trichloroethene		16000	9.6	64	--	--
Trichlorofluoromethane		430	18	130	--	--
Total Organics ^c		20182	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
 Summary of Detected Volatile Organic Compounds
 Chemical Waste Landfill Soil-Gas Monitoring
 Analytical Method TO-15^a
 January 2020

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D1-240 30-Jan-20	Benzene	11	11	110	J	110U
	Carbon tetrachloride	58	9.7	110	J	--
	Chloroform	490	9.7	110	--	--
	Dichlorodifluoromethane	84	19	110	J	--
	1,1-Dichloroethane	40	9.7	110	J	--
	1,2-Dichloroethane	20	14	110	J	--
	1,1-Dichloroethene	910	11	110	--	--
	1,2-Dichloropropane	220	14	110	--	J
	Tetrachloroethene	530	9.7	110	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	2200	11	110	--	--
	Trichloroethene	21000	8.3	55	--	--
	Trichlorofluoromethane	620	15	110	--	--
	Total Organics ^c	26172	NA	NA	NA	NA
CWL-D1-350 30-Jan-20	Benzene	8.5	5.1	51	J	51U
	Carbon tetrachloride	33	4.5	51	J	--
	Chloroform	190	4.5	51	--	--
	Dichlorodifluoromethane	63	8.9	51	--	--
	1,1-Dichloroethane	18	4.5	51	J	--
	1,1-Dichloroethene	610	5.1	51	--	--
	1,2-Dichloropropane	92	6.4	51	--	J
	Tetrachloroethene	240	4.5	51	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1400	5.1	51	--	--
	Trichloroethene	9100	6.3	42	--	--
	Trichlorofluoromethane	450	7.0	51	--	--
	Total Organics ^c	12196	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
 Summary of Detected Volatile Organic Compounds
 Chemical Waste Landfill Soil-Gas Monitoring
 Analytical Method TO-15^a
 January 2020

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D1-470 30-Jan-20	Benzene	0.46	0.21	2.1	J	2.1U
	Carbon disulfide	0.54	0.29	5.3	J	--
	Carbon tetrachloride	4.7	0.19	2.1	--	--
	Chloroform	2.3	0.19	2.1	--	--
	Dichlorodifluoromethane	30	0.37	2.1	--	--
	1,1-Dichloroethane	0.34	0.19	2.1	J	--
	1,1-Dichloroethene	63	0.21	2.1	--	--
	Tetrachloroethene	15	0.19	2.1	--	J
	1,1,2-Trichloro-1,2,2-trifluoroethane	520	0.32	3.2	--	--
	Trichloroethene	330	0.16	1.1	--	--
	Trichlorofluoromethane	130	0.29	2.1	--	J
	Total Organics ^c	1095.88	NA	NA	NA	NA
CWL-D2-120 30-Jan-20	Benzene	5.4	4.1	41	J	41U
	Carbon tetrachloride	26	3.6	41	J	--
	Chloroform	450	3.6	41	--	--
	Dichlorodifluoromethane	46	7.2	41	--	--
	1,1-Dichloroethane	17	3.6	41	J	--
	1,2-Dichloroethane	36	5.1	41	J	--
	1,1-Dichloroethene	420	4.1	41	--	--
	1,2-Dichloropropane	180	5.1	41	CI	J
	Tetrachloroethene	410	3.6	41	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1200	4.1	41	--	--
	1,1,1-Trichloroethane	23	19	41	J	--
	Trichloroethene	12000	4.5	30	--	--
	Trichlorofluoromethane	340	5.6	41	--	--
	Total Organics ^c	15148	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
 Summary of Detected Volatile Organic Compounds
 Chemical Waste Landfill Soil-Gas Monitoring
 Analytical Method TO-15^a
 January 2020

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D2-120 (Duplicate) 30-Jan-20	Carbon tetrachloride	32	5.4	62	J	--
	Chloroform	620	5.4	62	--	--
	Dichlorodifluoromethane	51	11	62	J	--
	1,1-Dichloroethane	25	5.4	62	J	--
	1,2-Dichloroethane	54	7.7	62	J	--
	1,1-Dichloroethene	460	6.2	62	--	--
	1,2-Dichloropropane	270	7.7	62	Cl	J
	Tetrachloroethene	550	5.4	62	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1300	6.2	62	--	--
	1,1,1-Trichloroethane	30	29	62	J	--
	Trichloroethene	13000	4.6	31	--	J
	Trichlorofluoromethane	370	8.5	62	--	--
	Total Organics ^c	16762	NA	NA	NA	NA
	CWL-D2-240 30-Jan-20	Carbon tetrachloride	26	5.7	65	J
Chloroform		360	5.7	65	--	--
Dichlorodifluoromethane		58	11	65	J	--
1,1-Dichloroethane		18	5.7	65	J	--
1,2-Dichloroethane		22	8.2	65	J	--
1,1-Dichloroethene		560	6.5	65	--	--
1,2-Dichloropropane		120	8.2	65	--	J
Tetrachloroethene		350	5.7	65	--	--
1,1,2-Trichloro-1,2,2-trifluoroethane		1400	6.5	65	--	--
Trichloroethene		10000	4.9	33	--	--
Trichlorofluoromethane		410	9.0	65	--	--
Total Organics ^c		13324	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
 Summary of Detected Volatile Organic Compounds
 Chemical Waste Landfill Soil-Gas Monitoring
 Analytical Method TO-15^a
 January 2020

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D2-350 30-Jan-20	Benzene	8.1	6.1	61	J	61U
	Carbon tetrachloride	27	5.3	61	J	--
	Chloroform	230	5.3	61	--	--
	Dichlorodifluoromethane	58	11	61	J	--
	1,1-Dichloroethane	16	5.3	61	J	--
	1,2-Dichloroethane	12	7.6	61	J	--
	1,1-Dichloroethene	500	6.1	61	--	--
	1,2-Dichloropropane	72	7.6	61	--	J
	Tetrachloroethene	280	5.3	61	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	1200	6.1	61	--	--
	Trichloroethene	9000	4.6	30	--	--
	Trichlorofluoromethane	380	8.4	61	--	--
	Total Organics ^c	11775	NA	NA	NA	NA
	CWL-D2-440 30-Jan-20	Benzene	3	2.1	21	J
Carbon tetrachloride		12	1.9	21	J	--
Chloroform		58	1.9	21	--	--
Dichlorodifluoromethane		31	3.7	21	--	--
1,1-Dichloroethane		4.4	1.9	21	J	--
1,1-Dichloroethene		230	2.1	21	--	--
1,2-Dichloropropane		18	2.7	21	J	J
Tetrachloroethene		94	1.9	21	--	--
1,1,2-Trichloro-1,2,2-trifluoroethane		660	2.1	21	--	--
Trichloroethene		2800	1.6	11	--	--
Trichlorofluoromethane		200	2.9	21	--	--
Total Organics ^c		4107.4	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
 Summary of Detected Volatile Organic Compounds
 Chemical Waste Landfill Soil-Gas Monitoring
 Analytical Method TO-15^a
 January 2020

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D2-470 30-Jan-20	Benzene	2.5	1.9	19	J	19U
	Carbon tetrachloride	9.4	1.6	19	J	--
	Chloroform	140	1.6	19	--	--
	Dichlorodifluoromethane	25	3.3	19	--	--
	1,1-Dichloroethane	5.1	1.6	19	J	--
	1,2-Dichloroethane	4.7	2.4	19	J	--
	1,1-Dichloroethene	160	1.9	19	--	--
	1,2-Dichloropropane	45	2.4	19	CI	J
	Tetrachloroethene	150	1.6	19	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	540	1.9	19	--	--
	1,1,1-Trichloroethane	11	8.7	19	J	--
	Trichloroethene	2900	1.4	9.4	--	--
	Trichlorofluoromethane	160	2.6	19	--	--
	Total Organics ^c	4150.2	NA	NA	NA	NA
CWL-D2-470 (Duplicate) 30-Jan-20	Benzene	2.6	1.9	19	J	19U
	Carbon tetrachloride	9.9	1.6	19	J	--
	Chloroform	150	1.6	19	--	--
	Dichlorodifluoromethane	25	3.3	19	--	--
	1,1-Dichloroethane	5.5	1.6	19	J	--
	1,2-Dichloroethane	6.2	2.4	19	J	--
	1,1-Dichloroethene	140	1.9	19	--	--
	1,2-Dichloropropane	34	2.4	19	--	J
	Tetrachloroethene	150	1.6	19	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	470	1.9	19	--	--
	1,1,1-Trichloroethane	11	8.7	19	J	--
	Trichloroethene	3100	1.4	9.4	--	--
	Trichlorofluoromethane	170	2.6	19	--	J+
	Total Organics ^c	4271.6	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
 Summary of Detected Volatile Organic Compounds
 Chemical Waste Landfill Soil-Gas Monitoring
 Analytical Method TO-15^a
 January 2020

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D3-120 30-Jan-20	Benzene	4.6	3.3	33	J	33U
	Carbon tetrachloride	16	2.9	33	J	--
	Chloroform	240	2.9	33	--	--
	Dichlorodifluoromethane	33	5.8	33	--	--
	1,1-Dichloroethane	11	2.9	33	J	--
	1,2-Dichloroethane	32	4.1	33	J	--
	1,1-Dichloroethene	200	3.3	33	--	--
	1,2-Dichloropropane	160	4.1	33	CI	J
	Tetrachloroethene	170	2.9	33	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	670	3.3	33	--	--
	Trichloroethene	6100	2.5	16	--	--
	Trichlorofluoromethane	210	4.5	33	--	--
	Total Organics ^c	7842	NA	NA	NA	NA
CWL-D3-170 30-Jan-20	Benzene	6	5.7	57	J	57U
	Carbon tetrachloride	12	5.0	57	J	--
	Chloroform	150	5.0	57	--	--
	Dichlorodifluoromethane	29	10	57	J	57U
	1,1-Dichloroethane	8.2	5.0	57	J	--
	1,2-Dichloroethane	18	7.2	57	J	--
	1,1-Dichloroethene	170	5.7	57	--	--
	1,2-Dichloropropane	110	7.2	57	--	J
	Tetrachloroethene	120	5.0	57	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	510	5.7	57	--	--
	Trichloroethene	4400	4.3	29	--	--
	Trichlorofluoromethane	190	7.9	57	--	J+
	Total Organics ^c	5688.2	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
 Summary of Detected Volatile Organic Compounds
 Chemical Waste Landfill Soil-Gas Monitoring
 Analytical Method TO-15^a
 January 2020

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D3-350 30-Jan-20	Benzene	3	2.1	21	J	21U
	Carbon tetrachloride	12	1.9	21	J	--
	Chloroform	150	1.9	21	--	--
	Dichlorodifluoromethane	32	3.7	21	--	--
	1,1-Dichloroethane	8.4	1.9	21	J	--
	1,2-Dichloroethane	18	2.7	21	J	--
	1,1-Dichloroethene	190	2.1	21	--	--
	1,2-Dichloropropane	83	2.7	21	CI	J
	Methylene chloride	45	43	110	J	J-
	Tetrachloroethene	27	1.9	21	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	560	2.1	21	--	--
	Trichloroethene	3600	1.6	11	--	--
	Trichlorofluoromethane	220	2.9	21	--	J+
	Total Organics ^c	4945.4	NA	NA	NA	NA
CWL-D3-440 30-Jan-20	Carbon tetrachloride	16	5.5	63	J	--
	Chloroform	140	5.5	63	--	--
	Dichlorodifluoromethane	41	11	63	J	63U
	1,1-Dichloroethane	6.4	5.5	63	J	--
	1,2-Dichloroethane	13	7.9	63	J	--
	1,1-Dichloroethene	250	6.3	63	--	--
	1,2-Dichloropropane	75	7.9	63	--	J
	Tetrachloroethene	110	5.5	63	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	780	6.3	63	--	--
	Trichloroethene	4700	4.7	32	--	--
	Trichlorofluoromethane	290	8.7	63	--	J+
	Total Organics ^c	6380.4	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
 Summary of Detected Volatile Organic Compounds
 Chemical Waste Landfill Soil-Gas Monitoring
 Analytical Method TO-15^a
 January 2020

Well ID/Sample Port	Analyte	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Laboratory Qualifier ^b	Validation Qualifier ^b
CWL-D3-480 30-Jan-20	Acetone	1.9	0.57	2.0	J	2.0U
	Benzene	0.24	0.0080	0.080	--	--
	2-Butanone	0.35	0.073	0.40	J	0.40U
	Carbon disulfide	0.029	0.011	0.20	J	0.20U
	Carbon tetrachloride	0.16	0.0070	0.080	--	--
	Chloroform	1.2	0.0070	0.080	--	--
	Chloromethane	0.45	0.066	0.20	--	J+
	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.015	0.012	0.080	J	--
	Dichlorodifluoromethane	0.66	0.014	0.080	--	--
	1,1-Dichloroethane	0.05	0.0070	0.080	J	--
	1,2-Dichloroethane	0.13	0.010	0.080	--	--
	1,1-Dichloroethene	1.0	0.0080	0.080	--	--
	1,2-Dichloropropane	0.95	0.010	0.080	--	J
	Ethylbenzene	0.037	0.013	0.080	J	--
	Methylene chloride	0.26	0.16	0.40	J	J-
	4-Methyl-2-pentanone	0.088	0.054	0.20	J	0.20U
	Tetrachloroethene	1.5	0.0070	0.080	--	J
	Toluene	0.30	0.078	0.12	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	3.1	0.0080	0.080	--	--
	1,1,1-Trichloroethane	0.047	0.037	0.080	J	--
	1,1,2-Trichloroethane	0.015	0.0070	0.080	J	--
	Trichloroethene	35	0.046	0.31	--	--
	Trichlorofluoromethane	1.2	0.011	0.080	--	J
	m,p-Xylene	0.086	0.029	0.080	--	--
	o-Xylene	0.035	0.015	0.080	J	--
	Total Organics ^c	46.435	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (*Concluded*)
Summary of Detected Volatile Organic Compounds
Chemical Waste Landfill Soil-Gas Monitoring
Analytical Method TO-15^a
January 2020

Notes:

^aEPA January 1999b.

^bLaboratory/Validation Qualifier – If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted samples.

Laboratory Qualifier

* = The laboratory control sample or laboratory control sample duplicate is outside acceptance limits.

CI = The peak identified by the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be a high bias.

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.

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

J+ = The associated numerical value is an estimated quantity with a suspected positive bias.

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 value is an estimate and may be inaccurate or imprecise.

^cTotal 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 30 and March 24, 2020 Soil-Gas Results

Twenty-three samples were collected from the 21 sampling ports (21 environmental samples and 2 environmental duplicate samples; 1 of the environmental samples from the March resample event). In general, the January and March 2020 soil-gas results were consistent with the CY 2019 data set. A total of 25 VOCs were detected in the 2020 data set compared to 20 VOCs detected in the CY 2019 data set. Acetone and 2-butanone are not included because they were qualified during data validation as not detected (see Section 5.2.2). The detected VOCs are listed below.

1,1-Dichloroethane	Carbon disulfide
1,1-Dichloroethene	Carbon tetrachloride
1,1,1-Trichloroethane	Chloroform
1,1,2-Trichloroethane	Chloromethane
1,1,2-Trichloro-1,2,2-trifluoroethane	Dichlorodifluoromethane
1,2-Dibromoethane	Ethylbenzene
1,2-Dichloroethane	Methylene chloride
1,2-Dichloropropane	Tetrachloroethene
1,2-Dichloro-1,1,2,2-tetrafluoroethane	Toluene
1,2,4-Trimethylbenzene	Trichloroethene
4-Methyl-2-pentanone	Trichlorofluoromethane
Benzene	m-, p-Xylene
	o-Xylene

TCE is the primary VOC of concern at the CWL and was detected in all 23 samples. TCE concentrations ranged from 35 parts per billion by volume (ppbv) to 21,000 ppbv (CWL-D3-480 and CWL-D1-240, respectively). PCE was also detected in all samples at concentrations ranging from 1.5 ppbv to 2,500 ppbv (CWL-D3-480 and CWL-UI1-40, respectively). Other VOCs detected in all samples, generally at lower concentrations, included carbon tetrachloride; chloroform; 1,1-dichloroethane; 1,1-dichloroethene; 1,1,2-trichloro-1,2,2-trifluoroethane; and trichlorofluoromethane. Total VOCs, as the sum of validated detected VOCs, were reported in all environmental samples at concentrations ranging from 46.435 ppbv at CWL-D3-480 to 26,172 ppbv at CWL-D1-240. The maximum TCE and Total VOC concentrations were reported in samples from CWL-D1-240.

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 3100 ppbv or 3.1 parts per million by volume (ppmv) from CWL-D2-470 (environmental duplicate sample).

5.2.2 Field Quality Control Sample Results

Table 5-2 presents field duplicate results for environmental-duplicate sample pairs collected from CWL-D2-120 and CWL-D2-470. 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. The environmental duplicate sample results show good agreement (i.e., RPDs less than 50), with RPDs ranging from less than 1 to 32.

Table 5-2
 Summary of January 2020 Duplicate Samples
 Chemical Waste Landfill Soil-Gas Monitoring

Well ID/Parameter	Environmental Sample (R1)	Duplicate Sample (R2)	RPD ^a (%)
	(ppbv)		
CWL-D2-120			
Chloroform	450	620	32
1,1-Dichloroethene	420	460	9
Tetrachloroethene	410	550	29
1,1,2-Trichloro-1,2,2-trifluoroethane	1200	1300	8
Trichloroethene	12000	13000	8
Trichlorofluoromethane	340	370	8
CWL-D2-470			
Chloroform	140	150	7
1,1-Dichloroethene	160	140	13
Tetrachloroethene	150	150	< 1
1,1,2-Trichloro-1,2,2-trifluoroethane	540	470	14
Trichloroethene	2900	3100	7
Trichlorofluoromethane	160	170	6

Notes:

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

- % = Percent.
- < = Less than.
- ID = Identification.
- ppbv = Parts per billion by volume.

A total of six field blank samples were submitted with the CY 2020 samples. VOCs detected above laboratory MDLs in field blank samples included acetone (6 samples), benzene (6 samples), 2-butanone (6 samples), carbon disulfide (3 samples), chloromethane (4 samples), dichlorodifluoromethane (2 samples), 2-hexanone (2 samples), 4-methyl-2-pentanone (2 samples), ethylbenzene (1 sample), methylene chloride (3 samples), PCE (4 samples), toluene (3 samples), TCE (2 samples), trichlorofluoromethane (6 samples), 1,2,4-trimethylbenzene (1 sample), m,p-xylene (2 samples), and o-xylene (1 sample). Acetone, benzene, 2-butanone, carbon disulfide, dichlorodifluoromethane, 4-methyl-2-pentanone, methylene chloride, and m,p-xylene in various samples from all wells were qualified as not detected during data validation since both field blank and environmental sample results were less than the laboratory reporting limit.

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 duplicates, 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.

Laboratory QC samples 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 as acceptable and reported QC measures met QC acceptance criteria except for methylene chloride. Methylene chloride results for all environmental samples that were non-detections were qualified as not usable due to an initial calibration issue. Methylene chloride was only detected above the MDL in four samples (CWL-UI1-120, CWL-UI2-136, and CWL-D3-350 and -480); only the CWL-D3-350 and CWL-D3-480 results were greater than the reporting limit and were qualified during data validation as estimated with a negative bias (i.e., "J-" in Table 5-1). The CWL-UI1-120 and CWL-UI2-136 methylene chloride results were greater than the MDL but less than the reporting limit and were therefore qualified during data validation as not detected at the reporting limit (i.e., "UJ" in Table 5-1) due to associated field blank QC sample results (see Section 5.2.2). Data Validation Reports and Contract Verification 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 2020 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 since implementation of the PCCP, 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.

5.3.1 Statistical Assessment Requirements

Only the CWL-D1-470 environmental sample 1,1,2-trichloro-1,2,2-trifluoroethane result of 0.52 ppmv, the CWL-D2-470 environmental duplicate sample TCE result of 3.1 ppmv, and the CWL-D2-470 environmental sample 1,1,2-trichloro-1,2,2-trifluoroethane result of 0.54 ppmv exceeded the 0.50 ppmv threshold for statistical assessment from the three deepest sampling ports of wells CWL-D1 through CWL-D3. In accordance with the PCCP Attachment 1, Section 1.8.2.2, confidence intervals (UCLs and LCLs) were calculated and the LCL was used to compare to the trigger level of 20 ppmv. If a result was below the analytical laboratory detection limit, the MDL for the constituent was used for statistical analysis. For duplicate analyses, only the highest detection for the environmental-duplicate sample pair was used for statistical analysis.

5.3.2 Statistical Assessment Results

CY 2020 soil-gas statistical assessment results are presented in Table 5-3. The calculated LCLs for 1,1,2-trichloro-1,2,2-trifluoroethane (CWL-D1-470 and CWL-D2-470) and TCE (CWL-D2-470) are below the trigger level of 20 ppmv. The highest calculated LCL was 3.892 ppmv for TCE from CWL-D2-470.

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. Historical soil-gas data includes results from June 1998, June 1999, August 2001, June 2004, September 2004, and October 2005 (post-VE VCM monitoring), as well as results from monitoring under the PCCP (January 2012 through January 2020). 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.

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 2020 (most current data set). For the January 2020 data set, the March 2020 resample result for CWL-UI2-136 was used as explained previously (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 2020 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 9.10 to 21.00 ppmv, with the highest result from the depth of

Table 5-3
 Statistical Assessment Results Summary
 Chemical Waste Landfill Soil-Gas Monitoring
 Calendar Year 2020

Soil-Gas Constituent Exceeding Threshold Concentration ^a	Minimum ^b (ppmv)	Maximum ^b (ppmv)	Mean ^c (ppmv)	Standard Deviation ^c	LCL ^c (ppmv)	UCL ^c (ppmv)	Distribution Type ^c	Trigger Level (ppmv)	Trigger Level Exceeded ^d
1,1,2-Trichloro-1,2,2-trifluoroethane (0.52 ppmv from CWL-D1-470)	0.11	0.52	0.2364	0.1141	0.1656	0.3072	Normal	20	No
1,1,2-Trichloro-1,2,2-trifluoroethane (0.54 ppmv from CWL-D2-470, environmental sample)	0.36	0.77	0.5637	0.1729	0.4566	0.6708	Normal	20	No
Trichloroethene (3.1 ppmv from CWL-D2-470, environmental duplicate sample)	2.9	7.1	4.559	1.076	3.892	5.226	Normal	20	No

Notes:

^aThe CWL-D1-470 environmental sample 1,1,2-trichloro-1,2,2-trifluoroethane result of 0.52 ppmv, the CWL-D2-470 environmental duplicate sample trichloroethene (TCE) result of 3.1 ppmv, and the CWL-D2-470 environmental sample 1,1,2-trichloro-1,2,2-trifluoroethane result of 0.54 ppmv were the only constituents 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 1,1,2-trichloro-1,2,2-trifluoroethane results from CWL-D1-470 and 1,1,2-trichloro-1,2,2-trifluoroethane and 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.

^bMinimum and maximum results determined from historical data (CY 2012 through 2020, environmental and environmental duplicate sample results, including any resample results) and include the CY 2020 results.

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

^dExceedance determined by comparing the constituent LCL against the trigger level of 20 ppmv.

CWL = Chemical Waste Landfill.

CY = Calendar year.

LCL = Lower confidence limit.

ppmv = Parts per million by volume.

UCL = Upper confidence limit.

Table 5-4
 Historical Soil-Gas Monitoring Summary – TCE Concentrations^a
 Chemical Waste Landfill

Well ID & Sample Port Depth ^b	EPA Method TO-14 ^a							EPA Method TO-15 ^a							
	June 1998	June 1999	Aug 2001	June 2004	Sept 2004	Oct 2005	Jan ^c 2012	Jan ^c 2013	Jan 2014	Jan ^c 2015	Jan 2016	Jan 2017	Jan 2018	Jan 2019	Jan 2020
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	4.60
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	5.20
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	8.80
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	2.30
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	4.60
CWL-UI2-136	5.5	1.9	4.6	3.0	1.9	3.0	8.50	6.60	6.20	5.40	7.30	6.76	6.70	4.60	5.00 ^e
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	7.10
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	16.00
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	21.00
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 ^d	9.10
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	0.33
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	13.00
CWL-D2-240	ND	40.0	38.0	26.0	13.0	17.0	18.00	23.00	16.00	13.00	14.00	14.8	9.70	11.00	10.00
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	9.00
CWL-D2-440	0.082	1.0	7.6	2.5	5.9	2.8	1.80	0.11	0.14	3.90	0.10	0.07	0.12	0.08	2.80
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	3.10
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	6.10
CWL-D3-170	ND	2.5	9.9	4.5	6.6	4.4	7.90	7.20	5.40	6.40	8.50	6.36	4.70	3.40	4.40
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 ^d	3.60
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	4.70
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	0.04

^aAll results are in ppmv. If a duplicate sample was collected, the maximum concentration of the environmental-duplicate sample pair is shown. January 2012 – 2020 concentrations have been rounded for significant digit consistency; they may not exactly match the concentrations in corresponding data tables. June 1998 through January 2012 are EPA Method TO-14 results (EPA January 1999a). January 2013 – 2020 are EPA Method TO-15 results (EPA January 1999b).

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

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

^dMarch 2019 resample result used due to data quality issues with the corresponding January 2019 sample (Section 5.1 of the March 2020 Annual Report [SNL/NM March 2020]).

^eMarch 2020 resample result used due to data quality issues with the corresponding January 2020 sample (Section 5.1 of this report).

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^a
 Chemical Waste Landfill

Well ID & Sample Port Depth ^b	EPA Method TO-14 ^a							EPA Method TO-15 ^a							
	June 1998	June 1999	Aug 2001	June 2004	Sept 2004	Oct 2005	Jan ^c 2012	Jan ^c 2013	Jan 2014	Jan ^c 2015	Jan 2016	Jan 2017	Jan 2018	Jan 2019	Jan 2020
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	8.78
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	7.52
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	11.89
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	3.36
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	6.28
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	7.11 ^e
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	9.33
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	20.18
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	26.17
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 ^d	12.20
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	1.10
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	16.76
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	13.32
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	11.78
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	4.11
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	4.27
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	7.84
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	5.69
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 ^d	4.95
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	6.38
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	0.05

^aAll results are in ppmv. The Total VOC concentration is the sum of all detected constituents. If a duplicate sample was collected, the maximum concentration of the environmental-duplicate sample pair is shown. June 1998 through January 2012 are EPA Method TO-14 results (EPA January 1999a). January 2013 – 2020 are EPA Method TO-15 results (EPA January 1999b). January 2012 - 2020 concentrations have been rounded for significant digit consistency; they may not exactly match the concentrations in corresponding data tables.

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

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

^dMarch 2019 resample result used due to data quality issues with the corresponding January 2019 sample (Section 5.1 of March 2020 Annual Report [SNL/NM March 2020]).

^eMarch 2020 resample result used due to data quality issues with the corresponding January 2020 sample (Section 5.1 of this report).

EPA = U.S. Environmental Protection Agency. VOC = Volatile organic compound. ppmv = Parts per million by volume.

240 feet bgs. CWL-D2 results for the depth of 120 to 350 feet bgs ranged from 9.00 to 13.00 ppmv, with the highest result from the depth of 120 feet bgs. CWL-D3 results for the depths of 120, 170, and 350 feet bgs ranged from 3.60 to 6.10 ppmv, with the highest result from the depth of 120 feet bgs.

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 2020 TCE and Total VOC results are compared (i.e., comparing current results to the first data set under the PCCP), the majority of the sampling ports show a decrease or an equivalent result. All CY 2020 TCE results below 350 feet bgs are low concentrations ranging from 4.70 ppmv (CWL-D3-440) to 0.04 ppmv (CWL-D3-480). All CY 2020 Total VOC results below 350 feet bgs are also low concentrations ranging from 6.38 ppmv (CWL-D3-440) to 0.05 ppmv (CWL-D3-480).

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 the LE VCM completed in February 2002.

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 other VOCs were also detected in all the January/March 2020 samples (see Section 5.2.1). Together with TCE, these VOCs comprise the majority of the Total VOC concentration calculated for each sample. TCE concentrations are generally steady or decreasing over time (Figures 5-3 and 5-4), including at the CWL-D3 location (Figure 5-5) that shows more fluctuations. However, results collected at CWL-D3 since the PCCP was implemented (January 2012 through January 2020 results) are generally stable with all ports showing CY 2020 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 CWL-D3-480) have been consistently observed at the CWL-D2-470 port.

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 2020 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 have remained below 1.0 µg/L since July 2015 (see Figure 4-7).

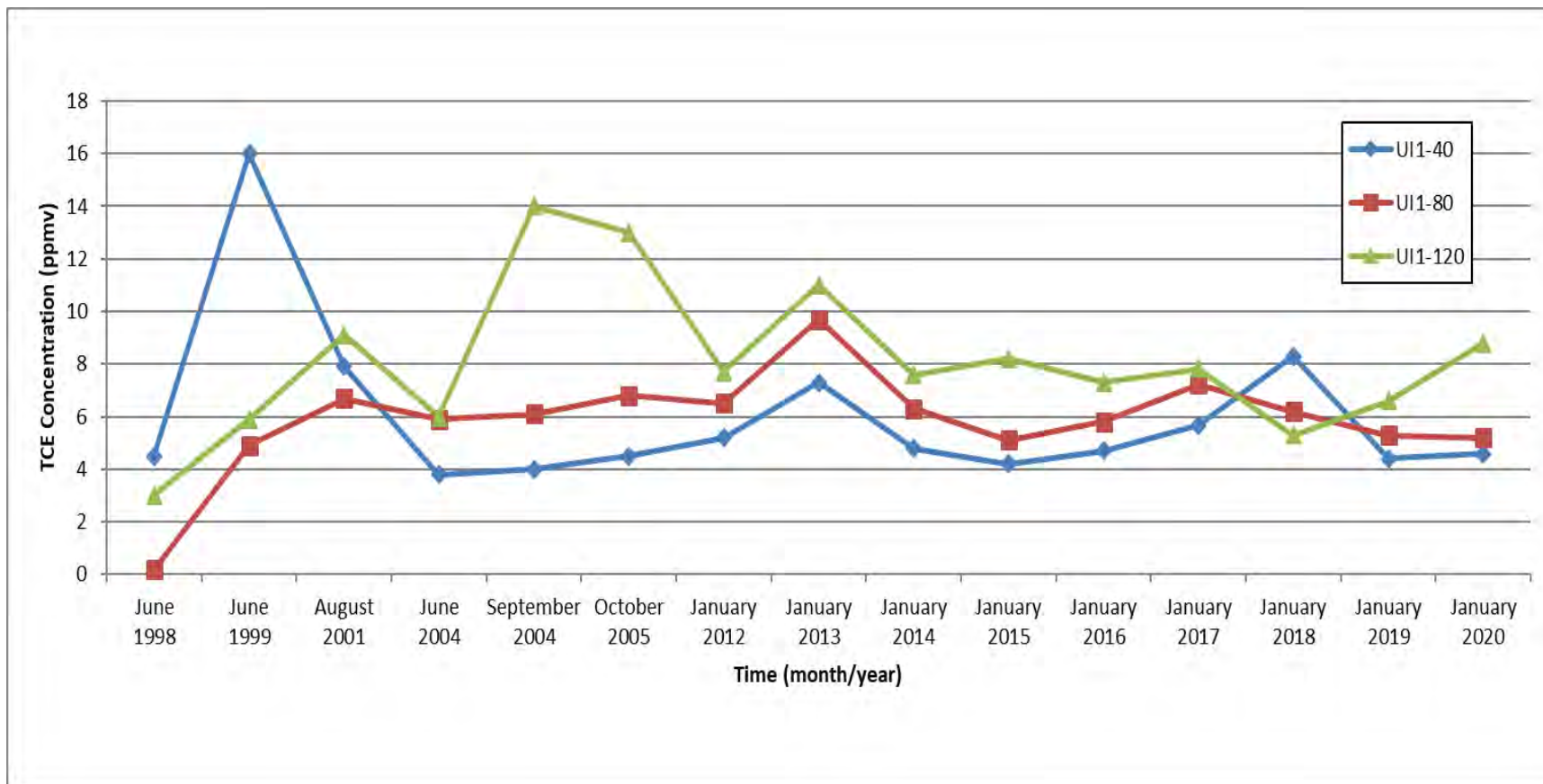


Figure 5-1
 Historical TCE Concentrations vs. Time
 Chemical Waste Landfill Well UI1 Ports

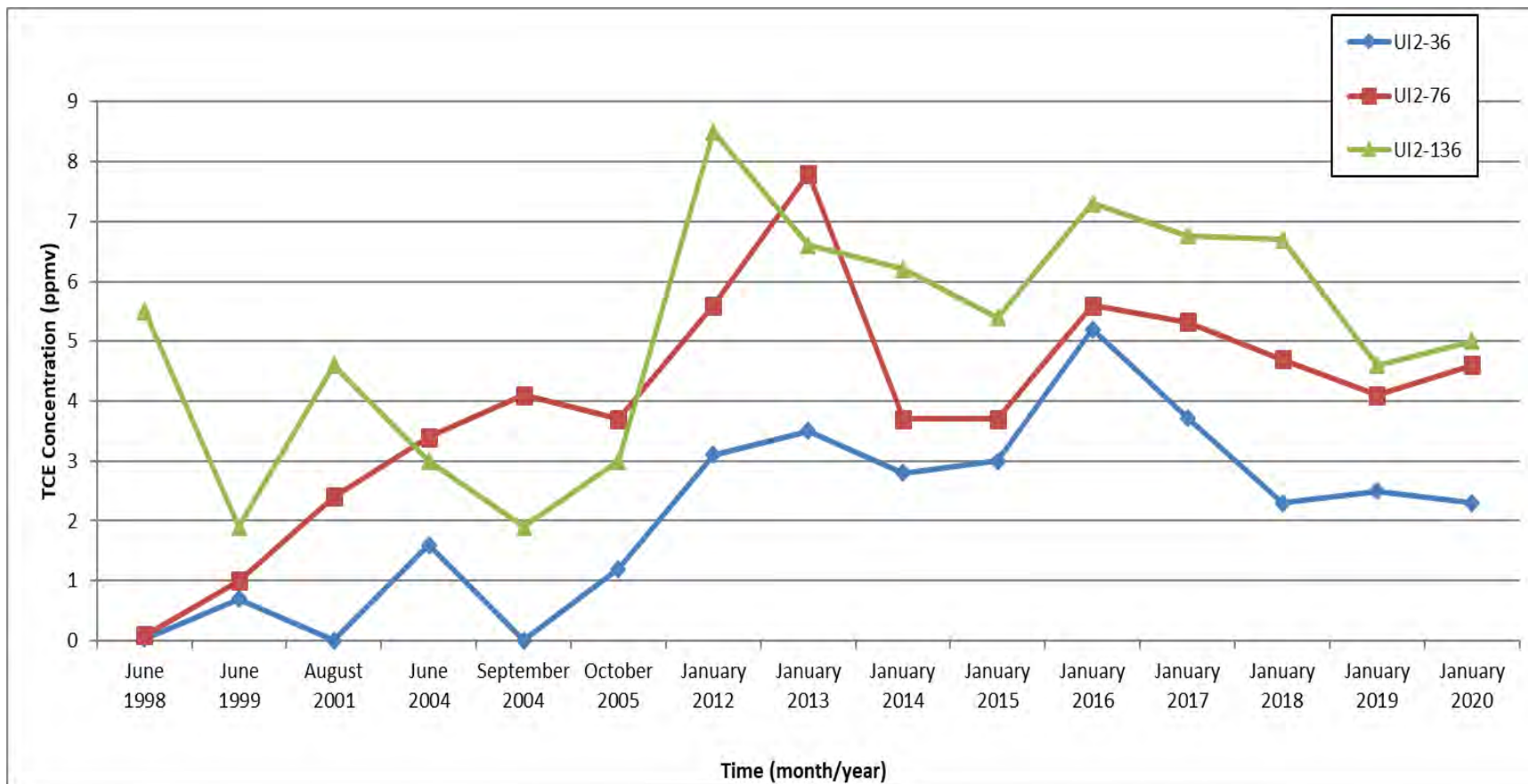


Figure 5-2
 Historical TCE Concentrations vs. Time
 Chemical Waste Landfill Well UI2 Ports

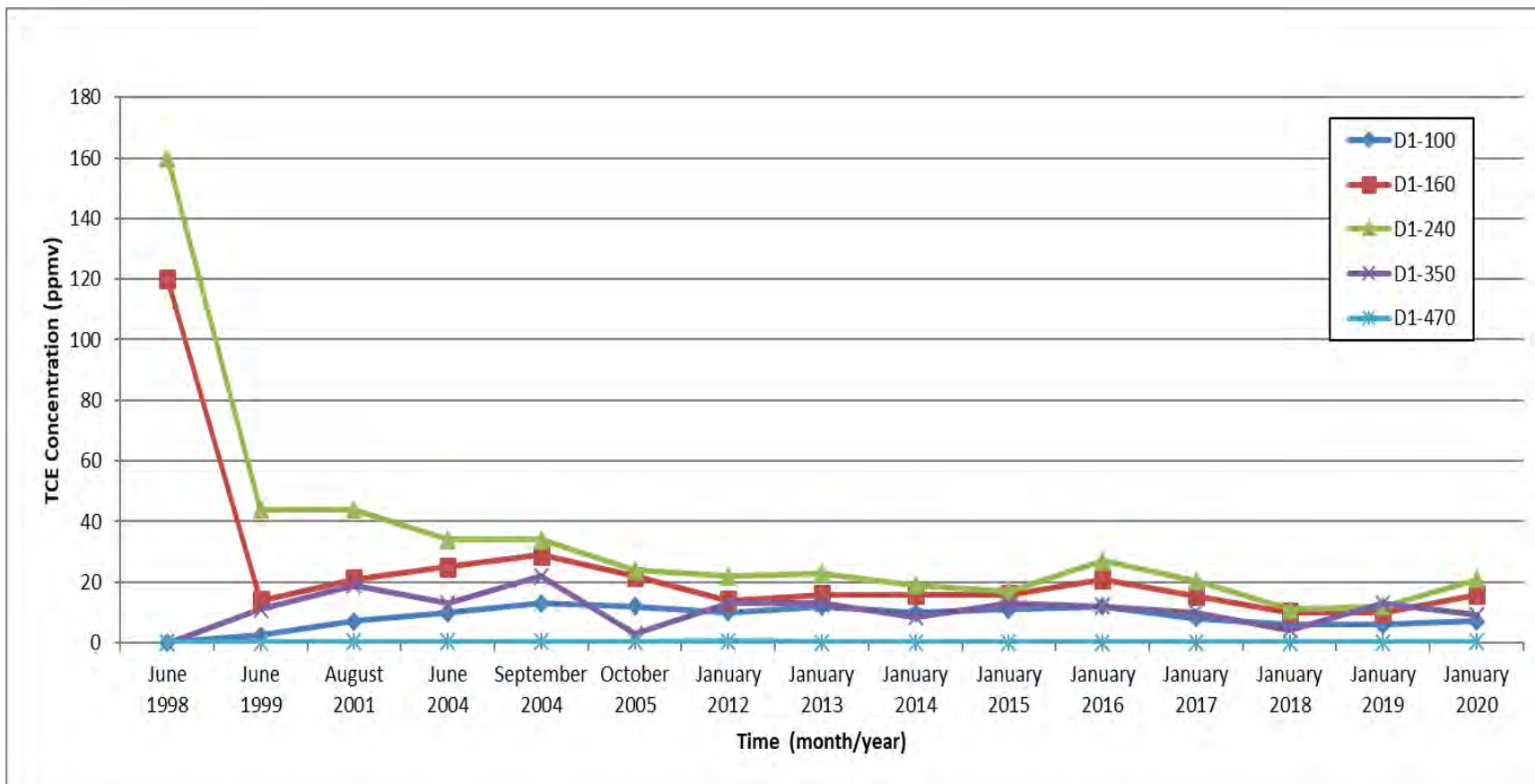


Figure 5-3
 Historical TCE Concentrations vs. Time
 Chemical Waste Landfill Well D1 Ports

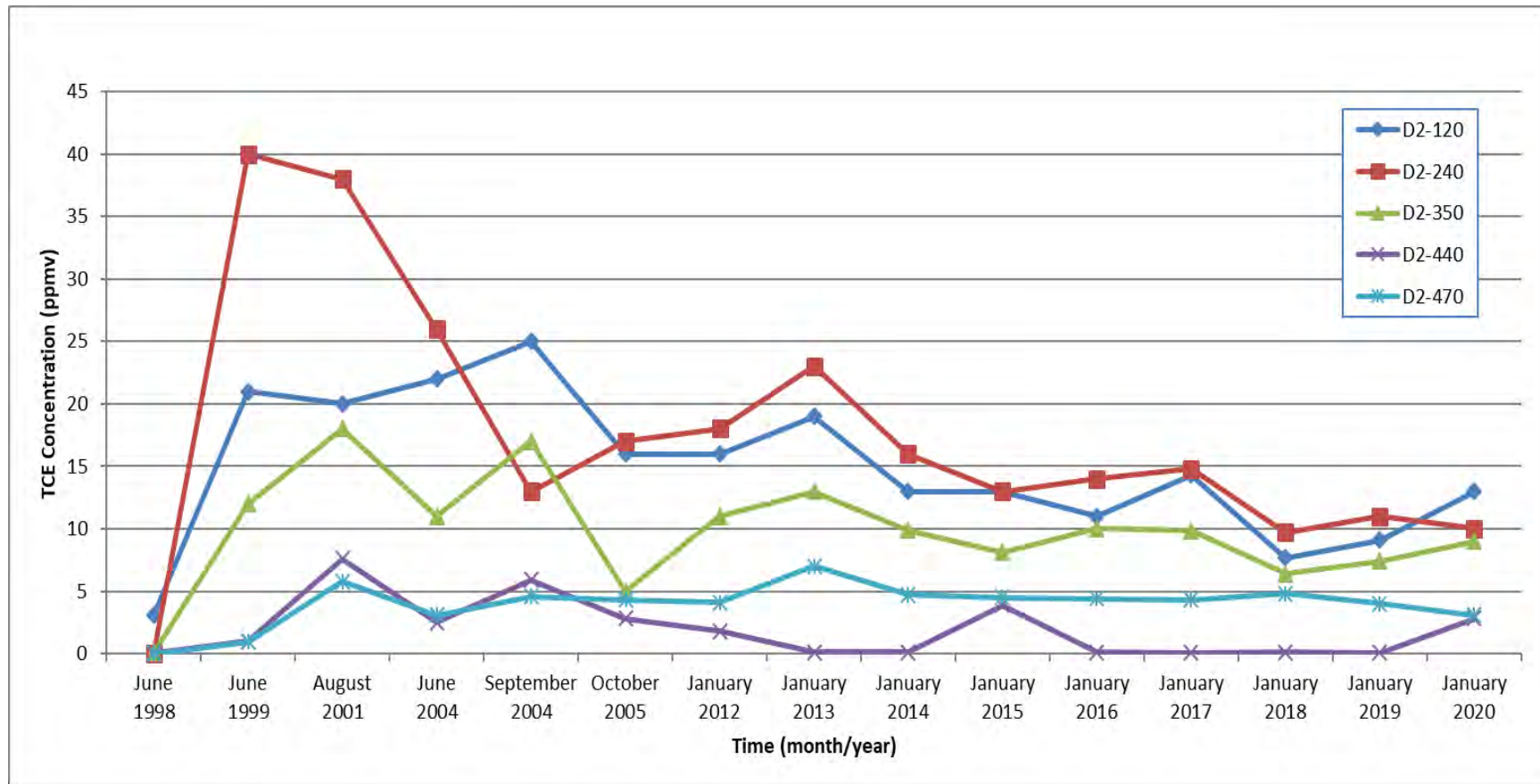


Figure 5-4
 Historical TCE Concentrations vs. Time
 Chemical Waste Landfill Well D2 Ports

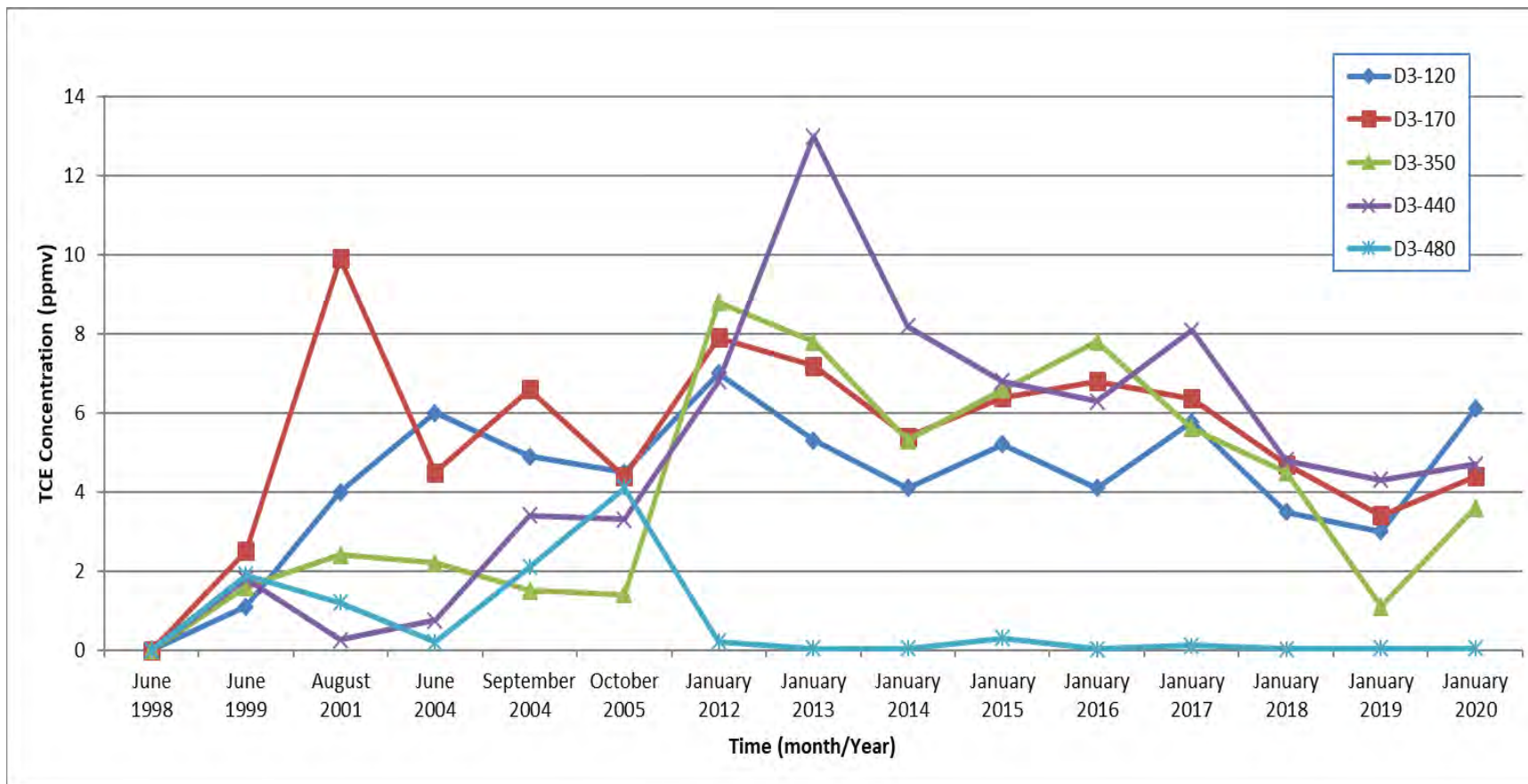


Figure 5-5
 Historical TCE Concentrations vs. Time
 Chemical Waste Landfill Well D3 Ports

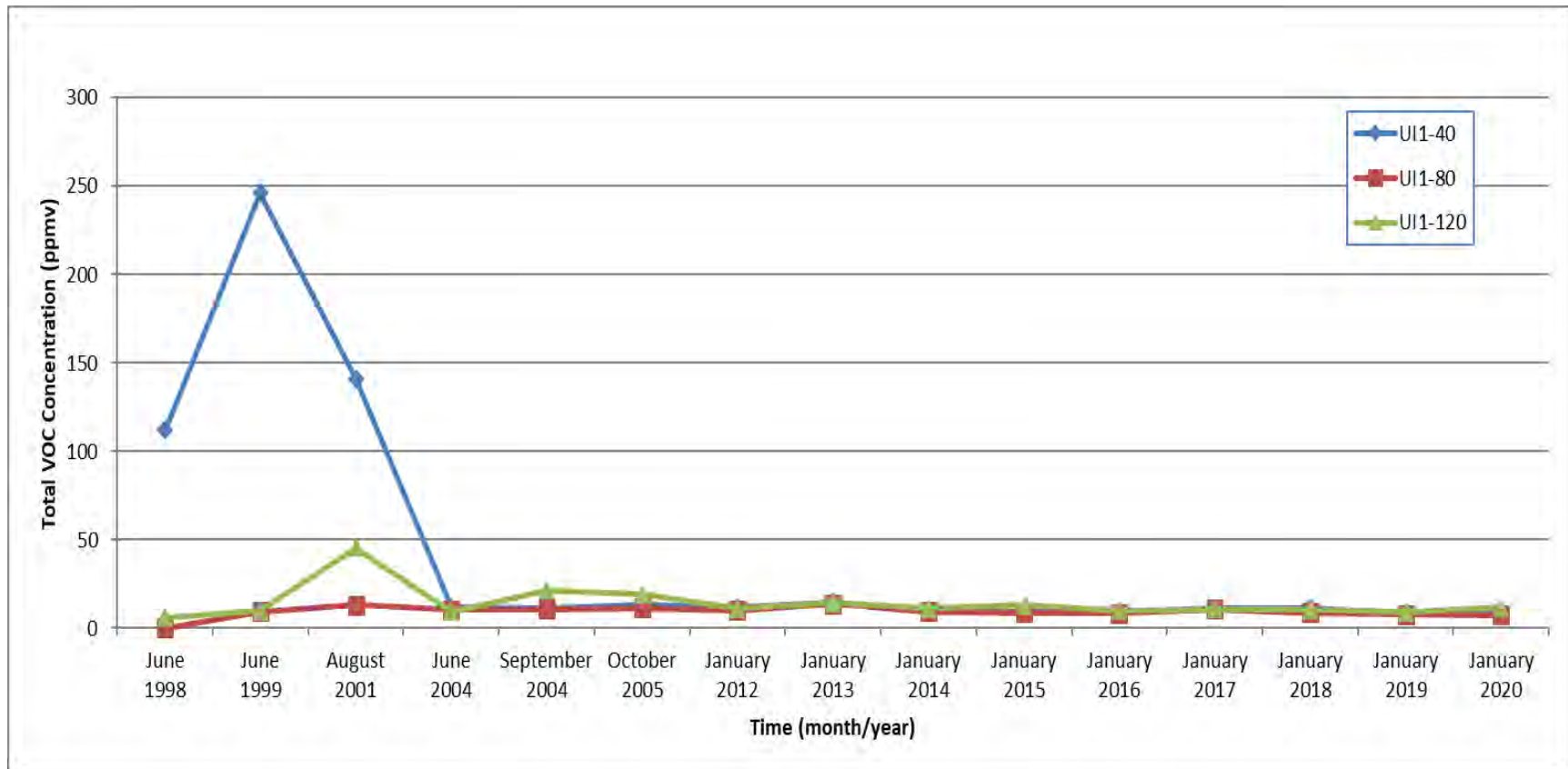


Figure 5-6
Historical Total Volatile Organic Compound Concentrations vs. Time
Chemical Waste Landfill Well UI1 Ports

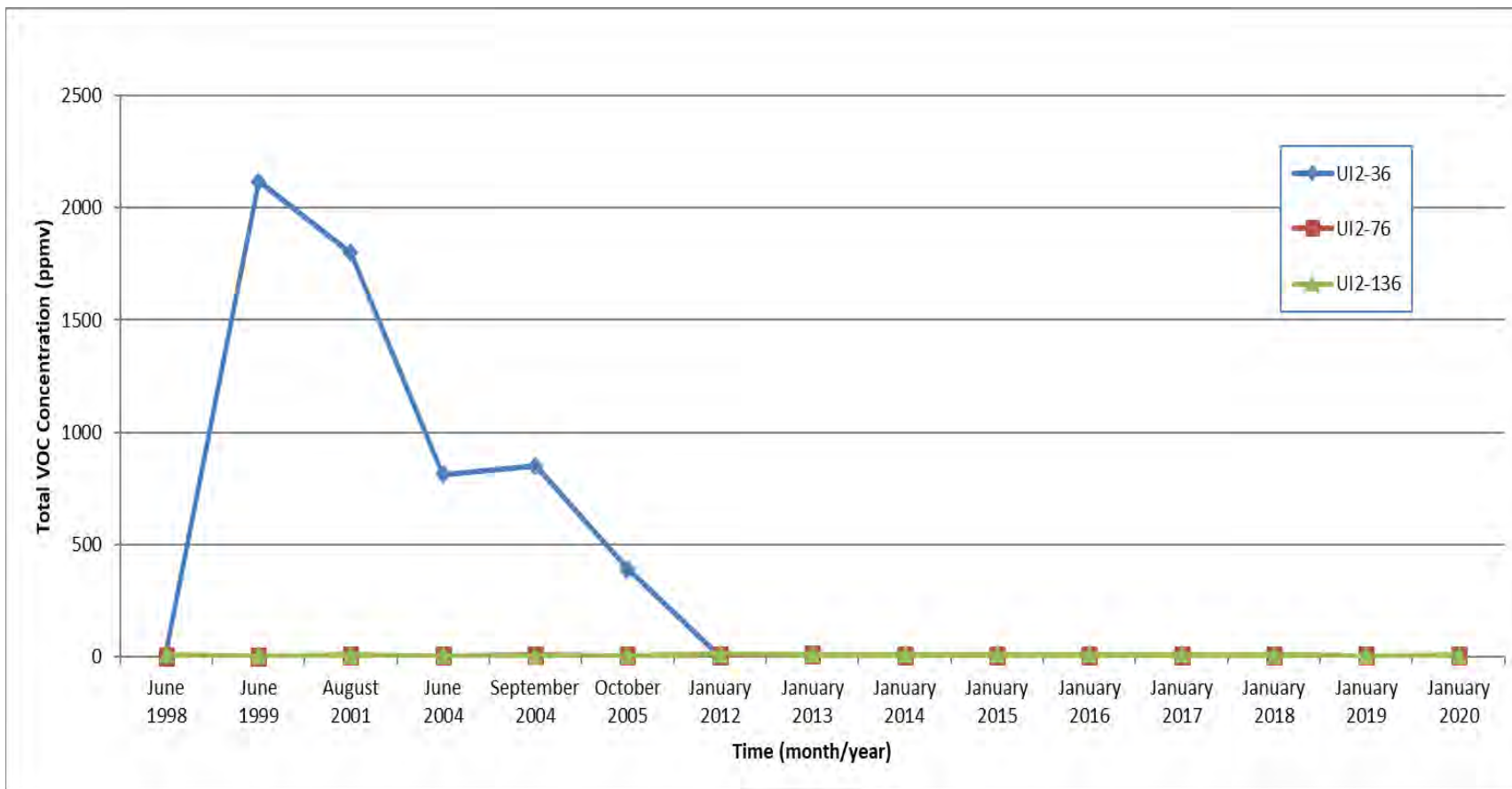


Figure 5-7
Historical Total Volatile Organic Compound Concentrations vs. Time
Chemical Waste Landfill Well UI2 Ports

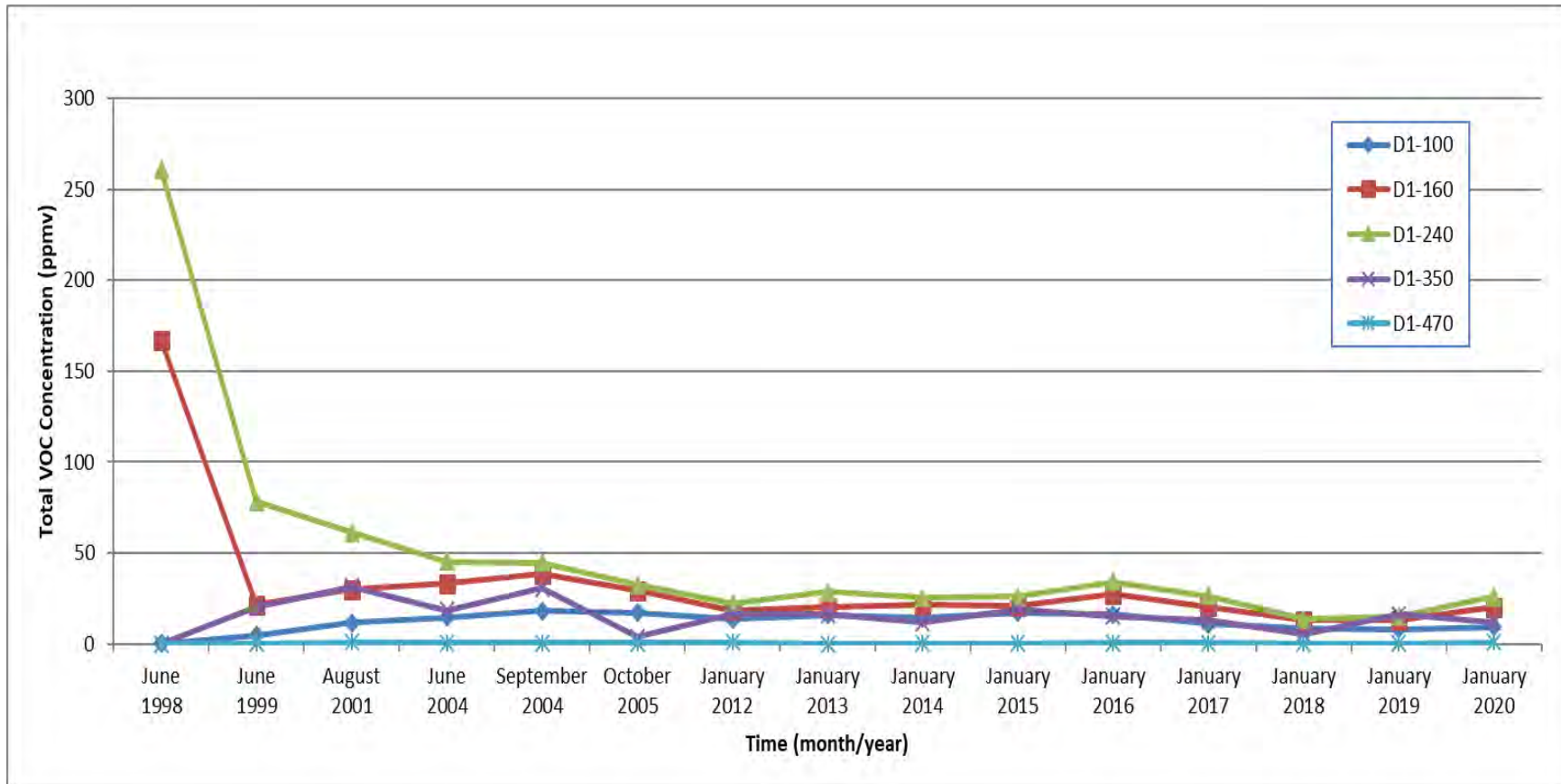


Figure 5-8
 Historical Total Volatile Organic Compound Concentrations vs. Time
 Chemical Waste Landfill Well D1 Ports

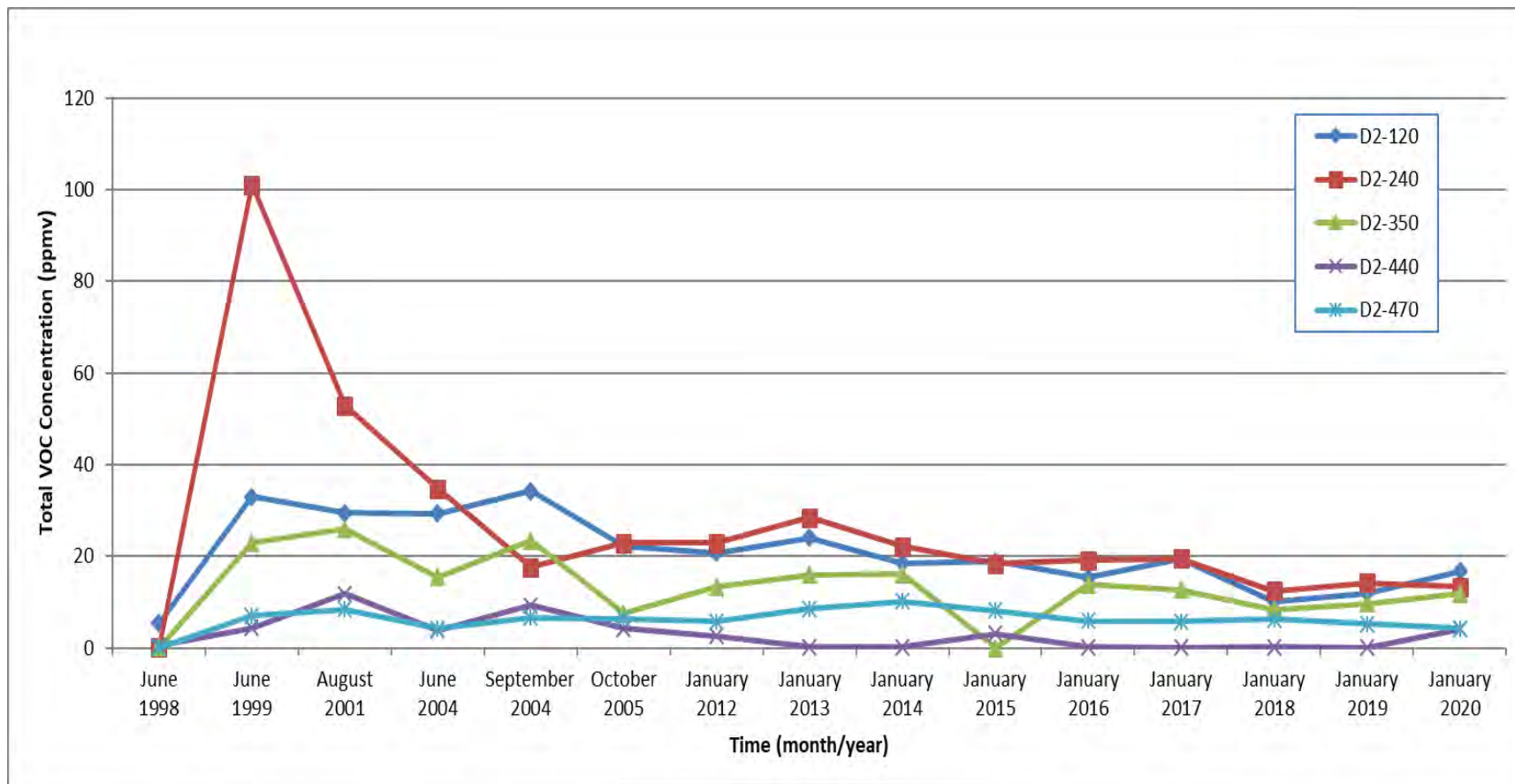


Figure 5-9
 Historical Total Volatile Organic Compound Concentrations vs. Time
 Chemical Waste Landfill Well D2 Ports

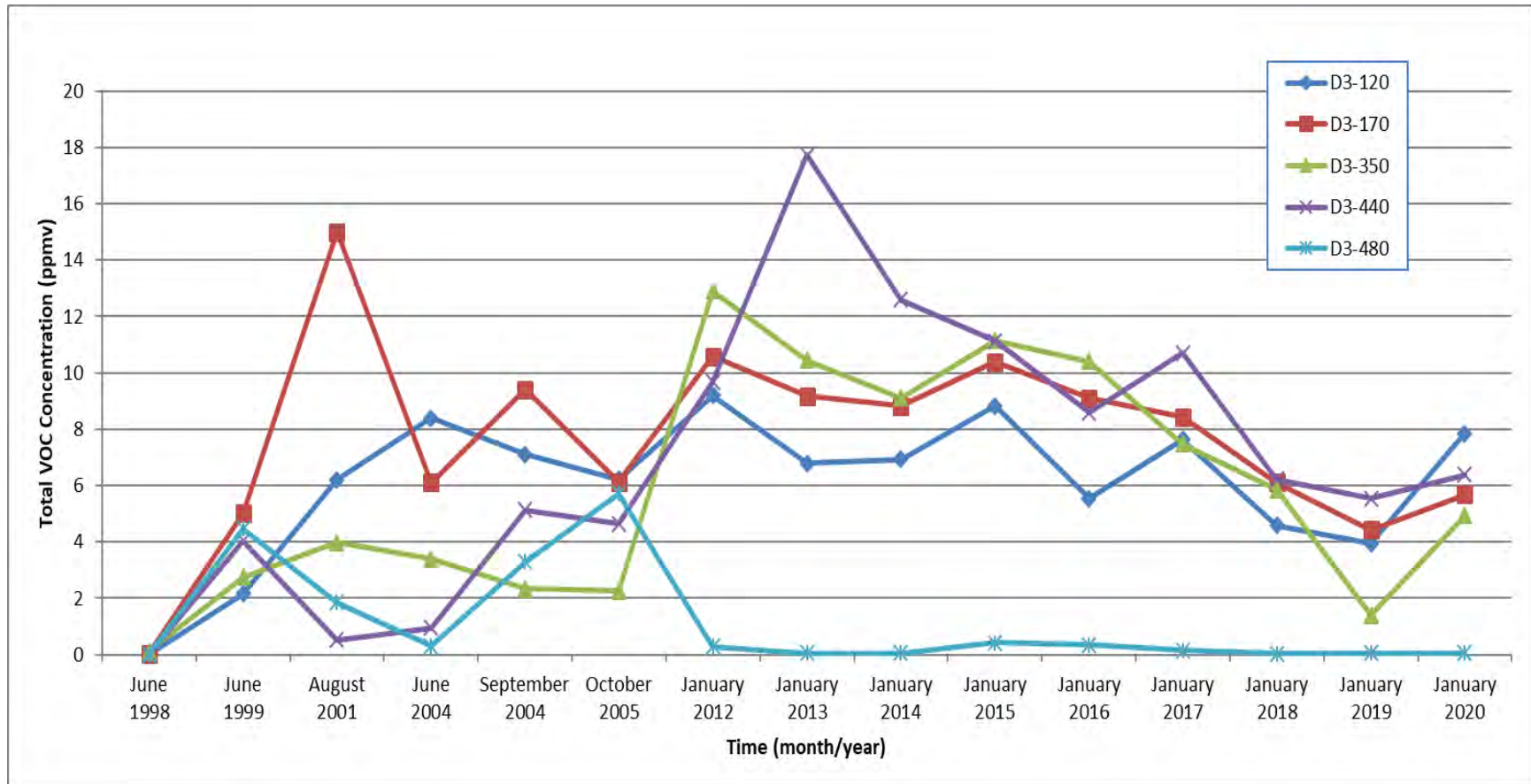


Figure 5-10
 Historical Total Volatile Organic Compound Concentrations vs. Time
 Chemical Waste Landfill Well D3 Ports

Twenty-two years of soil-gas monitoring since completion of the VE VCM in July 1998, including nine years of soil-gas monitoring under the PCCP (CY 2012 through 2020), confirm the residual VOC soil-gas plume beneath the CWL is stable and slowly dissipating in three dimensions through diffusion in the vadose zone. The current residual VOC soil-gas plume will not 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]). These conclusions are based upon historical and current soil-gas and groundwater monitoring results and are consistent with the conceptual site model presented in Annex E of the CWL Corrective Measures Study Report (SNL/NM December 2004).

6.0 INSPECTION, MAINTENANCE, AND REPAIR RESULTS

This chapter presents a summary of CY 2020 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 2020 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 SNL/NM 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/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 August 18, 2020 by the SNL/NM staff biologist (Inspection Form/Checklist 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 36% total foliar coverage, of which 99% is comprised of native species. In general, the level of weedy plant species present on the ET Cover was very low. 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.

The CY 2020 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 CY 2020 observations, and staff biologist recommendations.

6.1.2 Cover Inspection

Quarterly ET Cover surface inspections were performed by a field technician on March 3, June 1, September 2, and December 1, 2020. During all but the September inspection, a staff biologist also performed a supplemental quarterly biology inspection as best practice. During August, the more detailed annual ET Cover biology inspection (see Section 6.1.1) was performed as described in the previous section. Based on the quarterly inspections the ET Cover surface and vegetation was in good condition throughout CY 2020 and no maintenance and/or repairs were required. Cover and site maintenance performed during CY 2020 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 3, June 1, September 2, and December 1, 2020 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, September, and December inspections, windblown tumbleweeds were identified in the drainage culverts along the southern perimeter. Removal was performed by the field technician at the time of the inspections and documented on the respective inspection forms.

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 2020 monitoring events. In January, the annual inspection for the soil-gas monitoring wells and sampling equipment was also performed. In addition, the one well and equipment involved in the March 2020 soil-gas 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; there were no observations or follow-up actions associated with these additional inspections. The January and March 2020 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 3, June 1, September 2, and December 1, 2020 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, September, and December inspections, windblown tumbleweeds were identified on the perimeter fence. Removal was performed by the field technician at the time of the inspections and documented on the respective inspection forms. Windblown weeds (primarily tumbleweeds) and sediment partially covering the survey monuments were removed by the field technician during the September and December inspections.

6.5 Emergency Equipment Inspection

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

6.6 Cover and Site Maintenance

Cover and site maintenance performed during CY 2020 by the ET Cover maintenance contractor is summarized below. ET Cover maintenance continued in CY 2020 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 structures of windblown weeds (primarily tumbleweeds). The five maintenance events conducted in April, May, July, August, and October are described below and were mostly focused on best practice measures to minimize the presence of invasive weed species on the ET Cover. This work included removal of live and dead weeds from the ET Cover, perimeter fence, and perimeter areas, as well as applying preventive herbicides; all targeted on invasive weed control.

April 14-20, 2020

Windblown weeds (primarily tumbleweeds) were removed from the perimeter fence and all storm-water diversion structures by hand and/or using hand tools. In addition, windblown and live weeds were removed from the ET Cover using the same methods. A total of approximately seven cubic yards of compressed weeds were removed and disposed at the KAFB Landfill.

A pre-emergent herbicide (Prodiamine 65 WDG-water mixture) was applied following manufacturer's instructions to the entire ET Cover, 3-foot area outside the perimeter fence, and perimeter area from the western perimeter fence to the road after weed removal. The application was performed using a hand-sprayer attachment to apply the herbicide as discretely as possible between the native grass clumps on the ET Cover and perimeter areas.

May 18-19, 2020

Windblown weeds (primarily tumbleweeds) were removed from the ET Cover, perimeter fence, and all storm-water diversion structures by hand and/or using hand tools. Live weeds were also removed from the ET Cover and area between the fence and road on the west side of the ET Cover using the same methods. A total of approximately three cubic yards of compressed weeds were removed and disposed at the KAFB Landfill.

July 6-7, 2020

Windblown weeds (primarily tumbleweeds) and live weeds were removed from the ET Cover, perimeter fence, 3-foot area outside the fence, the area between the fence and road on the west side of the ET Cover, and all storm-water diversion structures by hand and/or using hand tools. A total of approximately nine cubic yards of highly compressed weeds were removed and disposed at the KAFB Landfill.

August 20 and 24, 2020

On August 20, 2020 a pre-emergent herbicide, Esplanade, was applied at two 20-by-20-foot test plots on the CWL ET Cover and the perimeter area from the fence to the road on the west side of the ET Cover. This was a test of Esplanade based on the recommendation of the staff biologist to try and determine if it provides better weed control than the pre-emergent herbicide previously used (Prodiamine). On August 24, 2020 the equivalent of approximately 0.25 inches of non-potable water was applied to the test plots and western perimeter area using conventional sprinklers and a 500-gallon water tank equipped with a sprayer. This was done to simulate a 0.25-inch precipitation event necessary to activate the Esplanade per the manufacturer's specifications.

Based upon results through CY 2020, the effectiveness of Prodiamine for invasive weed control at the CWL is limited; it will not be used in the future. The use of Esplanade will be further evaluated in CY 2021.

October 26 and 29, 2020

Windblown weeds (primarily tumbleweeds) were removed from the perimeter fence and all storm-water diversion structures by hand and/or using hand tools. In addition, windblown and live weeds (primarily tumbleweeds and late growing Russian thistle) were removed from the ET Cover, 3-foot area outside the fence, the area between the fence and road on the west side of the ET Cover using the same methods. A total of approximately seven cubic yards of compressed weeds were removed and disposed at the KAFB Landfill.

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 2020 consisted of one submittal of an updated reference document cited in the PCCP, submittal of the Chemical Waste Landfill Annual Post-Closure Care Report, CY 2019, and submittal of the CWL PCCP application for renewal. 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 2020 Permit Modification Requests

There were no modifications to the CWL PCCP in the CY 2020 reporting period.

7.2 2020 Permit Submittals

On June 26, 2020, DOE/NNSA and NTESS submitted an updated reference document 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 June 2020). This submittal included one updated reference document that was revised to keep it current and to incorporate improvements. The revised reference document became effective on June 19, 2020 and was submitted to the NMED within 30 days of the effective date.

DOE/NNSA and NTESS submitted the Chemical Waste Landfill Annual Post-Closure Care Report, CY 2019 (SNL/NM March 2020) to NMED in March 2020. NMED approved the report in May 2020 (Pierard May 2020).

Since the CWL PCCP became effective on June 2, 2011, submittal of an application for renewal of the PCCP was required by December 4, 2020. The application was prepared in accordance with the requirements of 20.4.1.900 NMAC, incorporating 40 CFR 270 Part B and 40 CFR 124 Subpart B and was submitted to the NMED on November 25, 2020 (Harrell November 2020). No operational changes to the existing PCCP were included in the application. Public involvement requirements were addressed as required, including a presentation by NTESS personnel at the October 29, 2020 joint Department of Defense/DOE semiannual public meeting.

7.3 2020 Technical Communication

DOE/NNSA and NTESS personnel notified NMED personnel in advance of plans to submit the PCCP application for renewal. There were no other technical communications with NMED staff regarding CWL activities in CY 2020.

7.4 Permit Modification and Submittal History

Table 7-1 summarizes the modification history of the PCCP through CY 2020. Table 7-2 summarizes all submittals associated with the PCCP through CY 2020, not including routine annual reports.

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

Date of Modification ^a	Affected Parts of PCCP	Description of Modification
September 26, 2011	Attachment 6 (Contingency Plan)	Updates to emergency response agreements, equipment, emergency coordinators, and inclusion of an evacuation route and assembly point figure and updated figure list.
November 16, 2011	Attachment 6 (Contingency Plan)	Correction of a typographical error in the telephone number for an emergency coordinator.
February 20, 2012	Attachments 1-5	Allow use of equivalent soil-gas passive venting devices and alternate method for analysis of soil-gas samples; clarification of cover inspection and repair specifications; updates to three figures for well locations; revisions to groundwater purging and stability requirements; inclusion of well completion diagrams for the four groundwater monitoring wells; updates to the list of operating procedures; clarification of soil-gas purging requirements; format updates to inspection forms; and correction of typographical errors.
November 7, 2013	Permit Part 3, Attachments 1-4	Provide clarification that alternative formats may be used to document inspections; provide additional detail regarding soil-gas passive venting devices; remove table and text references to the SNL/NM SOW for Analytical Laboratories, the SMO QAPP, and the Groundwater Monitoring HASP; and clarify data quality requirements for soil-gas samples.
February 23, 2017	Permit Parts 1 and 2, Permit Attachments 1, 2, 3, and 6	Revise, from two to one, the number of copies of submittals to be made to NMED; update the list of agencies with whom SNL/NM has coordination agreements; update reference test methods and revisions to certain laboratory quality control requirements in the groundwater sampling and analysis plan; revise the soil-gas sampling and analysis plan; and revise text in the Contingency Plan.
May 1, 2017	Permit Parts 1 and 2, 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).
November 24, 2020 ^b	Entire Permit	Application to renew the Chemical Waste Landfill PCCP.

Notes:

^aDate represents the effective date of modification.

^bDate is the date stamp on the U.S. Department of Energy transmittal letter, submittal mailed out on Nov. 25, 2020.

HASP = Health and Safety Plan.

SMO = Sample Management Office.

NMED = New Mexico Environment Department.

SNL/NM = Sandia National Laboratories/New Mexico.

PCCP = Post-Closure Care Permit.

SOW = Statement of Work.

QAPP = Quality Assurance Project Plan.

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

Date of Submittal ^b	PCCP Requirement	Description of Submittal
July 22, 2011	Permit Attachments 2 & 3	Procedures, plans, and documents cited in the PCCP used by SNL/NM personnel for groundwater and soil-gas monitoring.
February 7, 2012	Permit Attachment 2	Four procedures and one plan related to groundwater monitoring activities were updated to include minor changes that do not affect sampling procedures or protocols.
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.

Refer to footnotes at end of table.

Table 7-2 (*Concluded*)
 Chemical Waste Landfill Post-Closure Care Permit Document Submittal History^a

Date of Submittal ^b	PCCP Requirement	Description of Submittal
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.
June 26, 2020	Permit Attachments 2 & 3	One operating procedure cited in the PCCP used by SNL/NM personnel to validate analytical data from contract laboratories.

Notes:

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

^bDate represents the date stamp on the DOE transmittal letter for the submittal.

CWL = Chemical Waste Landfill.

DOE = U.S. Department of Energy.

PCCP = Post-Closure Care Permit.

SNL/NM = Sandia National Laboratories/New Mexico.

8.0 SUMMARY AND CONCLUSIONS

A summary of CY 2020 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 2020. There were no variances or non-conformances. The two required 1,4-dioxane sampling events were completed in CY 2020 per the NMED request (Kielling September 2019); 1,4-dioxane was not detected in the January or July environmental samples. 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 2020 with resampling of one sampling port, CWL-UI2-136 in March 2020 due to a broken valve stem on the corresponding January 2020 sample. There were no variances, analytical and statistical assessment results are consistent with previous years, and there were no exceedances of trigger levels. Nine years of soil-gas monitoring under the PCCP and previous historical 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, slowly dissipating in three dimensions through diffusion in the vadose zone, and is not a threat to groundwater.

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 windblown weeds (primarily tumbleweeds) from the storm-water diversion structures and the perimeter fence, and clearing tumbleweeds and soil from survey monuments.

The ET Cover continues to meet successful revegetation criteria. As documented in the August 2020 annual inspection, the ET Cover is in good condition with even coverage of mature, native perennial grasses. CY 2020 ET Cover maintenance was performed in April, May, July, August, and October in response to the inspections and as best practice for ET Cover vegetation. CY 2020 ET Cover maintenance included selective herbicide application and removal of dead and live weeds from the ET Cover, perimeter areas, security fence, and all storm-water diversion structures. The August maintenance event included the test of a different pre-emergent herbicide that was applied at two test plots on the ET Cover and western perimeter area to evaluate its effectiveness for 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 by controlling invasive weeds that compete with the desired native grasses for limited moisture and nutrients. The best practice maintenance efforts reduce the availability of weed seeds, future weed growth, and future maintenance efforts.

8.3 Regulatory Activities

Regulatory activities in CY 2020 included one submittal of an updated reference document cited in the PCCP (Harrell June 2020), submittal of the Chemical Waste Landfill Annual Post-Closure Care Report, CY 2019 (SNL/NM March 2020), and submittal of an application for renewal of the PCCP (Harrell November 2020).

8.4 Conclusions

All PCCP monitoring, inspection, and maintenance/repair requirements have been met for CY 2020. 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

EPA, see U.S. Environmental Protection Agency.

Harrell, J.P., June 2020. "Submittal of Updated Reference Document Cited in the Chemical Waste Landfill Post-Closure Care Permit, Sandia National Laboratories, New Mexico, Environmental Protection Agency Identification Number NM5890110518," U.S. Department of Energy, June 26, 2020.

Harrell, J.P., November 2020. "Application for Renewal of Post-Closure Care Permit for the Chemical Waste Landfill, Sandia National Laboratories, NM5890110518," U.S. Department of Energy, November 24, 2020.

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ANNEX A

**Chemical Waste Landfill
Calendar Year 2020
Groundwater Monitoring Forms and Reports**

Field Forms

Data Validation Reports

Contract Verification Files

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

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

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

FIELD SAMPLING FORMS
JANUARY 2020
GROUNDWATER MONITORING

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: <u>CWL</u>	
Well I.D.: <u>CWL-BW5</u>	Date: <u>1/20/20</u>
Method: Portable pump _____	Dedicated pump <u>X</u> _____ Pump depth: <u>522'</u>

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)
514.95	0837	—	—	—	—	—	—	—	—
516.30	0910	2	14.65	1006.4	139.8	6.80	0.22	87.4	7.61
516.78	0927	4	15.44	1025.3	137.5	6.87	0.25	86.7	7.42
517.11	0941	6	16.54	1055.0	136.7	6.91	0.28	87.7	7.34
517.36	0955	8	16.84	1058.3	138.1	6.93	0.30	88.1	7.32
517.44	1002	9	16.62	1054.8	139.9	6.93	0.38	87.8	7.33
517.54	1009	10	16.75	1057.7	141.1	6.94	0.37	87.7	7.31
517.61	1016	11	16.64	1054.4	141.8	6.94	0.29	87.6	7.32
517.67	1023	12	16.81	1057.8	143.1	6.94	0.20	87.5	7.27
517.73	1030	13	16.88	1067.4	142.8	6.94	0.45	88.1	7.26
517.77	1036	14	16.92	1065.7	142.4	6.94	0.23	88.1	7.23
	1037	Sampling →							

Comments:

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL	
Well I.D.: CWL-MW9	Date: 1/21/20
Method: Portable pump <u>X</u>	Dedicated pump <u>X_{31 1/2 1/20}</u> 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)
506.16	0837	—	—	—	—	—	—	—	—
508.28	0906	4	16.36	907.2	200.2	6.95	0.19	52.9	4.39
508.96	0925	8	16.84	903.4	188.7	7.02	0.20	50.4	4.15
509.14	0934	10	16.75	898.3	183.2	7.03	0.20	50.2	4.14
509.30	0944	12	16.96	911.9	176.3	7.04	0.21	51.5	4.23
509.41	0954	14	16.86	922.1	170.8	7.03	0.25	52.8	4.35
509.48	1004	16	16.66	926.9	166.3	7.03	0.49	54.3	4.48
509.52	1010 ^{10:20}	17	16.46	924.4	163.8	7.03	0.16	54.1	4.50
509.55	1014	18	16.35	925.6	162.3	7.03	0.17	54.6	4.54
509.57	1018	19	16.35	927.7	161.5	7.03	0.27	54.9	4.57
509.59	1023	20	16.31	925.7	160.3	7.03	0.25	55.2	4.59
	1024	Sampling →							

Comments: ~1.5 purged from tubing
 +220^{RL} 1/21/20 010220 FB Lot#

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL	
Well I.D.: CWL-MW10	Date: 01/24/20 <u>01/27/20</u>
Method: Portable pump <u>X</u>	Dedicated pump _____ Pump depth: 515'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO (mg/L)
503.04	0849	Start							
505.41	0917	2	17.37	928.6	167.2	6.96	1.39	43.5	3.45
506.98	0937	4	17.81	939.4	153.8	7.03	0.96	38.2	3.00
507.84	0946	5	17.98	942.7	145.7	7.04	0.67	34.2	2.68
508.56	0955	6	18.19	946.7	138.1	7.05	1.43	31.9	2.49
509.29	1004	7	18.26	947.2	137.0	7.06	1.69	33.7	2.63
509.99	1014	8	18.78	958.2	116.4	7.06	1.57	32.1	2.47
510.72	1024	9	18.93	959.8	106.1	7.07	2.00	30.8	2.37
511.48	1034	10	18.94	959.3	94.0	7.07	1.76	29.8	2.29
512.30	1044	11	18.80	954.0	84.3	7.07	2.24	29.0	2.23
513.21	1054	12	19.01	953.6	74.4	7.07	2.24	28.2	2.17
514.08	1104	13 ^{11/24/20}	19.34	960.2	65.6	7.07	3.12	27.1	2.07
514.41	1108	14 ^{11/24/20}	19.20	955.9	65.9	7.08	3.11	26.3	2.01
514.41	1108	well DRY							
503.67	0847	START							
505.18	0903	0.5	13.72	861.4	129.1	7.10	3.04	113.0	9.36
505.52	0907	1	13.19	857.9	78.4	6.97	3.44	48.2	4.10
506.11	0911	1.5	13.14	857.6	73.4	6.97	2.49	37.7	3.25
	0912		SAMPLING						

2.60
11/24/20

01/27-

Comments: ~1.5 gals purged from tubing 0900
0859 01/27/20

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL	
Well I.D.: CWL-MW11	Date: 1/22/20
Method: Portable pump <input checked="" type="checkbox"/> X	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)	
501.17	0834	—	—	—	—	—	—	—	—	
503.81	0900	4	14.82	944.6	203.9	6.88	0.17	73.6	6.34	
505.97	0930	8	14.83	947.3	192.6	6.96	0.29	71.8	6.18	
507.00	0945	10	16.67	992.6	182.0	6.99	0.28	74.7	6.18	
507.97	1001	12	17.49	1010.8	173.6	7.00	0.30	75.1	6.11	
508.99	1017	14	17.81	1057.8	165.4	7.01	0.36	75.6	6.11	
509.93	1033	16	18.05	1023.9	158.2	7.00	0.40	74.9	6.02	
510.44	1041	17	18.24	1027.9	155.1	7.01	0.31	74.8	6.00	
510.94	1049	18	17.73	1013.7	150.5	7.01	0.44	73.3	5.94	
511.30	1059	19	16.98	970.3	40.3	7.01	0.68	66.6	5.53	
511.79	1109	20	16.99	972.7	6.1	7.01	0.49	63.6	5.32	
512.06	1121	21	17.34	1005.1	23.8	7.02	0.39	67.9	5.55	
511.59	1129	22	17.26	1001.0	39.0	7.01	0.30	68.2	5.67	
	1130	—	sampling							—

Comments: ~ 1.5 gal. Purge from Tubing.

FB LOT# 010220

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: CWL						
Calibrations done by: D. Sanchez				Date: 1/20/20		
Make & Model: INSITU AT 600						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 506777						
Other (S/N): NA						
pH Calibration/Check						
pH Calibrated to (std): 7.00			pH sloped to (std): 10.00			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0653	4.00	20.2	7.02	20.6	10.04	20.5
2. Time: 1350	4.02	20.7	7.01	20.9	10.04	21.1
3. Time:						
4. Time:						
Standard lot no.:	9GI282		9GH1160		9GI454	
Expiration date:	SEP/21		AUG/21		SEP/21	
SC Calibration/Check						
Reference Value: 1413 uS/cm @ 25C			Standard Lot No.: 9GG910			
	Value	Temp	Expiration Date: JUL/20			
1. Time: 0648	1304.4	21.01				
2. Time: 1341	1307.0	21.1				
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV			Standard Lot No. 9GC752			
	Value	Temp	Expiration Date: DEC/10			
1. Time: 0658	220.0	20.6				
2. Time: 1343	220.1	20.9				
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value: 100%	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time: 0645	100		25.82			
2. Time: 1337	99.9		25.91			
3. Time:						
4. Time:						

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

SNL/NM Project Name: CWL				
Calibration done by: D. Sanchez			Date: 1/20/20	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 19050C076301	
Reference Value	10	20	100	800
Standard Lot No.	A8297	A8313	A834B	A8313
1. Time 1300 1340	9.79	19.7	103	798
2. Time	9.83	19.9	102	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: D. Sanchez				Date: 1/21/20		
Make & Model: INSITU AT 600						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 506777						
Other (S/N): NA						
pH Calibration/Check						
pH Calibrated to (std): 7.00			pH sloped to (std): 10.00			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0647	4.07	21.87	7.03	21.69	10.03	21.55
2. Time: 1309	4.04	20.24	7.00	20.60	10.05	20.64
3. Time:						
4. Time:						
Standard lot no.:	9GI282		9GH1160		9GI454	
Expiration date:	SEP/21		AUG/21		SEP/21	
SC Calibration/Check						
Reference Value: 1413 uS/cm @ 25C			Standard Lot No.: 9GG910			
	Value	Temp	Expiration Date: JUL/20			
1. Time: 0646	1384.5	22.26				
2. Time: 1308	1414.6	20.25				
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV			Standard Lot No. 9GC752			
	Value	Temp	Expiration Date: DEC/20			
1. Time: 0651	217.1	21.49				
2. Time: 1313	219.8	21.08				
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value: 100%	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time: 0645	100.21		25.57			
2. Time: 1307	102.84		25.00			
3. Time:						
4. Time:						

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

SNL/NM Project Name: CWL				
Calibration done by: D. Sanchez			Date: 1/21/20	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 19050C076301	
Reference Value	10	20	100	800
Standard Lot No.	A8297	A8313	A834B	A8313
1. Time 0643	10.2	20.3	98.9	794
2. Time 1307	9.9	20.8	101	795
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: D. Sanchez				Date: 1/22/20		
Make & Model: INSITU AT 600						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 506777						
Other (S/N): NA						
pH Calibration/Check						
pH Calibrated to (std): 7.00			pH sloped to (std): 10.00			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0625	4.05	21.53	7.03	21.59	10.02	21.27
2. Time: 1358	4.09	19.52	7.01	20.28	10.05	20.57
3. Time:						
4. Time:						
Standard lot no.:	9GI282		9GH1160		9GI454	
Expiration date:	SEP/21		AUG/21		SEP/21	
SC Calibration/Check						
Reference Value: 1413 uS/cm @ 25C			Standard Lot No.: 9GG910			
	Value	Temp	Expiration Date: JUL/20			
1. Time: 0624	1356.6	22.12				
2. Time: 1357	1406.6	20.25				
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV			Standard Lot No. 9GC752			
	Value	Temp	Expiration Date: DEC/20			
1. Time: 0630	219.1	21.40				
2. Time: 1404	220.2	20.60				
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value: 100%	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time: 0622	99.53		25.63			
2. Time: 1356	101.80		25.13			
3. Time:						
4. Time:						

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

SNL/NM Project Name: CWL				
Calibration done by: D. Sanchez			Date: 1/22/20	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 19050C076301	
Reference Value	10	20	100	800
Standard Lot No.	A8297	A8313	A834B	A8313
1. Time <i>0622</i>	9.9	20.5	99.8	800
2. Time <i>1355</i>	9.9	20.7	101	804
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: 01/24/20 01/27/20			
Make & Model: INSITU AT 600							
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 576777							
Other (S/N): NA							
pH Calibration/Check							
pH Calibrated to (std): 7.00			pH sloped to (std): 10.00				
Reference value:		4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp	
1. Time:	0639	4.02	21.1	7.00	21.3	10.03	21.4
2. Time:	1318	4.04	21.1	7.00	21.1	10.04	21.3
3. Time:	0639	4.03	20.7	7.01	20.9	10.00	20.6
4. Time:	1334	4.08	19.5	7.02	20.2	10.07	20.3
Standard lot no.:		9GI282		9GH1160		9GI454	
Expiration date:		SEP/21		AUG/21		SEP/21	
SC Calibration/Check							
Reference Value: 1413 uS/cm @ 25C			Standard Lot No.: 9GG910				
	Value	Temp	Expiration Date: JUL/20				
1. Time:	0632	1341.2	22.1				
2. Time:	1314	1338.6	22.0				
3. Time:	0637	1415.8	20.9				
4. Time:	1333	1439.9	19.25				
ORP Calibration/Check							
Reference Value: 220 mV			Standard Lot No. 9GC752				
	Value	Temp	Expiration Date: DEC/20				
1. Time:	0630	218.8	22.2				
2. Time:	1316	219.3	21.5				
3. Time:	0644	220.1	20.8				
4. Time:	1341	220.1	20.5				
DO Calibration/Check							
Calibration Value: 100%		81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0627	99.7	24.94				
2. Time:	1311	101.1	25.13				
3. Time:	0635	103.4	25.10				
4. Time:	1332	105.8	26.38				

1/27/20

1/27/20

1/27/20

1/27/20

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch			Date: 01/24/20 01/27/20	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 19050C076301	
Reference Value	10	20	100	800
Standard Lot No.	A8297	A8313	A8348	A8313
1. Time 0625	10.1	20.3	101	798
2. Time 1310	9.97	20.2	103	801
3. Time 0636	10.2	20.0	99.9	791
4. Time 1331	10.0	20.7	101	793
Comments:				

1/27/20

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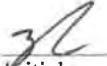

**Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form**

Project Name: <u>CWL</u>	Monitoring Well ID #: <u>Pre Decon</u>	Date: <u>1/17/2020</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: <u>Excellent</u>	Tubing Bundle: <u>Excellent</u>	Water Level Indicator: <u>Excellent</u>

List of Decontamination Materials	
<p align="center">Deionized Water</p> <p>Source: <u>Culligan</u></p> <p>Lot Number: <u>01/05/20</u></p>	<p align="center">HNO₃</p> <p>Grade: <u>Reagent</u></p> <p>UN #: <u>2031</u></p> <p>Manufacturer: <u>ACROS</u></p> <p>Lot Number: <u>A0398057</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>1/20/2020</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>280206</u>
--	---

Personnel Performing Decontamination:

William Gibson WJG
Initial:
 Print Name:

Denisha Sanchez [Signature]
Initial:
 Print Name:

Condition of Equipment

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

List of Decontamination Materials

Deionized Water	HNO ₃
Source: <u>Culligan</u>	Grade: <u>Reagent</u>
Lot Number: <u>01/05/20 12-05-19, 01-02-20</u> <u>WJG 01-20-20</u>	UN #: <u>2031</u>
	Manufacturer: <u>ACROS</u>
	Lot Number: <u>A0398057</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-MW9</u>	Date: <u>01/21/20</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>280206</u>
--	---

Personnel Performing Decontamination:

Robert Lynch Print Name: _____	 Initial: _____
Zachary Tenorio Print Name: _____	 Initial: _____

Condition of Equipment		
Pump: <u>Excellent</u> Good <i>1/23/20</i>	Tubing Bundle: <u>Excellent</u>	Water Level Indicator: <u>Good</u>

List of Decontamination Materials

<p align="center">Deionized Water</p> <p>Source: <u>Culligan</u></p> <p>Lot Number: <u>12/05/19-01/02/20</u></p>	<p align="center">HNO₃</p> <p>Grade: <u>Reagent</u></p> <p>UN #: <u>2031</u></p> <p>Manufacturer: <u>ACROS</u></p> <p>Lot Number: <u>A0398057</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-MW11</u>	Date: <u>01/22/20</u>
--------------------------	---------------------------------------	-----------------------

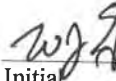
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03

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

Deionized Water	HNO ₃
Source: <u>Culligan</u>	Grade: <u>Reagent</u>
Lot Number: <u>01/02/20</u>	UN #: <u>2031</u>
	Manufacturer: <u>ACROS</u>
	Lot Number: <u>A0398057</u>



IMPORTANT NOTICE: A printed (and uncompleted) copy of this form may not be the most current form. The official version is located in the Long-Term Stewardship (LTS) ARAS document library, for which access is required. Upon completion, this document becomes record.

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

Project Name: <u>CWL</u>	Monitoring Well ID #: <u>CWL-MW10</u>	Date: <u>01/27/20</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>
--	---

<u>Personnel Performing Decontamination:</u>	
Robert Lynch 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">Deionized Water</p> <p>Source: <u>Culligan</u></p> <p>Lot Number: <u>01/02/20</u></p>	<p align="center">HNO₃</p> <p>Grade: <u>Reagent</u></p> <p>UN #: <u>2031</u></p> <p>Manufacturer: <u>ACROS</u></p> <p>Lot Number: <u>A0398057</u></p>
--	---

IMPORTANT NOTICE: A printed (and uncompleted) copy of this form may not be the most current form. The official version is located in the Long-Term Stewardship (LTS) ARAS document library, for which access is required. Upon completion, this document becomes record.

SUMMARY SHEET FOR JANUARY 2020 SAMPLES

Sample Summary for Chemical Waste Landfill Groundwater Monitoring
January 2020

Sample ID	Sample Date	ARCOC	Sample Number	Sample Type	Associated Equipment Blank (ARCOC #/Sample #)	Associated Trip Blank (ARCOC # / Sample #)	Associated Field Blank (ARCOC # / Sample #)	Comments
CWL GWM: Project Task # 195122.10.11.03. Service Order # CF 327-20								
Environmental Samples								
CWL-BW5	20-Jan-20	620744	112204	Environmental	620743 / 112186	620744 / 112206	n/a	
CWL-BW5	20-Jan-20	620744	112205	Duplicate	620743 / 112186	620744 / 112206	n/a	
CWL-MW9	21-Jan-20	620746	112210	Environmental	n/a	620746 / 112211	620746 / 112209	
CWL-MW10	27-Jan-20	620751	112221	Environmental	n/a	620751 / 112222	n/a	
CWL-MW11	22-Jan-20	620748	112215	Environmental	n/a	620748 / 112216	620748 / 112214	
CWL PCCP-EB	17-Jan-20	620743	112186	Equipment Blank	n/a	620743 / 112187	n/a	Decon prior to CWL-BW5 (no metals)
CWL-PCCP FB-1	21-Jan-20	620746	112209	Field Blank	n/a	620746 / 112211	n/a	at CWL-MW9
CWL-PCCP FB-2	22-Jan-20	620748	112214	Field Blank	n/a	620748 / 112216	n/a	at CWL-MW11
CWL-PCCP QC	27-Jan-20	620750	112219	QC-DIW	n/a	620750 / 112220	n/a	DIW source for CWL PCCP-EB
Waste Characterization Samples								
CWL-BW5	20-Jan-20	620745	112207	Waste	n/a	620745 / 112208	n/a	No data validation required
CWL-MW9	21-Jan-20	620747	112212	Waste	n/a	620747 / 112213	n/a	No data validation required
CWL-MW10	24-Jan-20	620752	112223	Waste	n/a	620752 / 112224	n/a	No data validation required
CWL-MW11	22-Jan-20	620749	112217	Waste	n/a	620749 / 112218	n/a	No data validation required

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

CHEMICAL WASTE LANDFILL

GROUNDWATER MONITORING

JANUARY 2020

AR/COC NUMBERS 620743, 620744

Memorandum

Date: March 2, 2020

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCOG: 620743 and 620744
SDG: 501660
Laboratory: GEL
Project/Task: 195122.10.11.03
Analysis: VOCs

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM SMO Procedure AOP 00-03 Rev 5.

Summary

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

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

Holding Times 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 except as follows. Chloroform was detected at > the PQL in the EB, sample 501660001 associated with samples -005 and -008. The associated sample results were non-detect and will not be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Two TBs were submitted, one for each ARCO. An EB was submitted with ARCO 620743 and was associated with the samples on ARCO 620744. A field duplicate pair was submitted with ARCO 620744. 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: 03/06/2020

Memorandum

Date: March 2, 2020
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCO: 620743 and 620744
SDG: 501660
Laboratory: GEL
Project/Task: 195122.10.11.03
Analysis: SVOCs

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 aqueous samples were prepared and analyzed with accepted procedures using method SW846 8270D SIM (SVOCs - 1,4-dioxane). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

Reporting Limit Verification

The CMDL (reporting level verification standard) recovery met QC acceptance criteria.

Blanks

No target analyte was detected in the method blank. 1,4-Dioxane was detected at \leq the PQL in the EB, sample 501660002 associated with samples -006 and -009. The associated sample results were non-detect and will not be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD met QC acceptance criteria for accuracy and precision.

Laboratory Control Sample

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

An EB was submitted with ARCOG 620743 and was associated with the samples on ARCOG 620744. A field duplicate pair was submitted with ARCOG 620744. 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: 03/06/2020

Memorandum

Date: March 2, 2020

To: File

From: Linda Thal

Subject: Inorganic Data Review and Validation – SNL
Site: CWL PCCP
ARCO: 620744
SDG: 501660
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 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 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 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 for samples 501660007 and -010 because the sample concentrations of Ca 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

A field duplicate pair was submitted with ARCOG 620744. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan

Level: I

Date: 03/06/2020



Sample Findings Summary



AR/COC: 620743, 620744

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#: 620743 and 620744	Site/Project: CWL PCCP	Validation Date: 03/02/2020
SDG #: 501660	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 11	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
112186-003 CWL PCCP-EB	501660003	Metals	Sample incorrectly preserved with NaOH instead of HNO3

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								

<p>Comments: Collected: 01/17 and 01/20/20 The ARCOG noted that the trip blank vials were received from the lab with headspace.</p>
<p>Validated by: <i>L Thal</i></p>

Sandia Organic Worksheet (GC/MS VOC)

ARCO #s: 620743 and 620744	SDG: 501660	Matrix: Aqueous
Laboratory Sample IDs: 501660001, -004, -005, -008, -011		
Method/Batch #s: 8260B 1963442	Tuning (pass/fail): pass	TICs Required? (yes/no): no

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	EB -001	TB 1 -004	TB 2 -011
	Int.	RF/ Slope	RSD/ r ²	(ICV)/CCV %D									
Chloroform	NA	✓	✓	✓	✓	NA	✓	NA	NA	NA	7.82	✓	✓

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. MS/MSD on SNL sample 502405007 on a different calibration
 Samples: ICAL VOA1.I 12/09/2019 All avg RF for SDG 501660 target analytes
 MS/MSD: ICAL VOA1.I 01/31/2020 All avg RF for SDG 501660 target analytes

Sandia Inorganic Metals Worksheet

ARCO #s: 620744	SDG #(s): 501660	Matrix: Aqueous
Laboratory Sample IDs: 501660007, -010		
Method/Batch #s: 3005A/6020B :1961677/1961678		

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		
	Int. ug/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L											
none																	

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

Comments: HTs OK; DUP/MS/SD performed on SNL sample 501663002.
Ca >100ppm

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

501660

SDG: 501660 Rev 3

Internal Lab		Batch No.		SMO Use		AR/COC		620743				
Project Name: CWL PCCP		Date Samples Shipped: <u>1/20/2020</u>		SMO Authorization:		<input type="checkbox"/> Waste Characterization						
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <u>309123</u>		SMO Contact Phone: <u>Wendy Palencia/505-844-3132</u>		<input type="checkbox"/> RMA						
Project/Task Number: 195122.10.11.03		Lab Contact: <u>Edie Kent/843-769-7385</u>		Send Report to SMO:		<input type="checkbox"/> Released by COC No.		<input checked="" type="checkbox"/> 4° Celsius				
Service Order: CF327-20		Lab Destination: <u>GEL</u>		Stephanie Montaño/505-284-2553		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154						
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					
112186	001	CWL PCCP- EB	NA	<u>1/17/20</u> 09:18	DIW	G	3x40 ml	HCl	G	EB	VOC-TCE,FREON 113,PCE,1,1-DCE,CHLOROFORM, FREON 11(SW846-8260B) [CWL PCCP]	001
112186	002	CWL PCCP- EB	NA	1/17/20 09:19	DIW	AG	500 ml	NaHSO4	G	EB	1,4-DIOXANE (EPA 8270 SIM)	002
112186	003	CWL PCCP- EB	NA	1/17/20 09:20	DIW	P	500 ml	HNO3	G	EB	CHROMIUM, NICKEL (SW846-6020)	003
112187	001	CWL PCCP- TB 1	NA	1/17/20 09:18	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE,FREON 113,PCE,1,1-DCE,CHLOROFORM, FREON 11(SW846-8260B) [CWL PCCP]	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				RL		SNL/08888/505-844-4013/505-250-7090		Return Samples By:			
	William Gibson				WG		SNL/08888/505-284-3307/505-239-7367		Comments: Received trip blanks from lab with head space.			
	Zachary Tenorio				ZT		SNL/08888/505-845-8636/505-259-5765					
Denisha Sanchez				DS		SNL/08888/505-845-7829/505-208-1375						
Relinquished by		Org. <u>8888</u> Date <u>1/17/20</u> Time <u>1020</u>		Relinquished by		Org.		Date		Time		
Received by		Org. <u>678</u> Date <u>1/17/20</u> Time <u>1020</u>		Received by		Org.		Date		Time		
Relinquished by		Org. <u>6628</u> Date <u>1/20/20</u> Time <u>1223</u>		Relinquished by		Org.		Date		Time		
Received by		Org. Date <u>1-21-20</u> Time <u>720</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

SDG: 501660 Rev 3

Internal Lab		AR/COC 620744	
Batch No. <i>n/A</i>		SMO Use	
Project Name: CWL PCCP	Date Samples Shipped: <i>1/20/2020</i>	SMO Authorization: <i>[Signature]</i>	
Project/Task Manager: Timmie Jackson	Carrier/Waybill No: <i>309123</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: CF327-20	Lab Destination: GEL	Send Report to SMO:	
	Contract No.: 1983530	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					
112204	001	CWL-BW5	522	1/20/20 10:37	GW	G	3x40 ml	HCl	G	SA	VOC-TCE, FREON 113, PCE, 1,1-DCE, CHLOROFORM, FREON 11(SW846-8260B) [CWL PCCP]	005
112204	002	CWL-BW5	522	1/20/20 10:38	GW	AG	500 ml	NaHSO4	G	SA	1,4-DIOXANE (EPA 8270 SIM)	006
112204	003	CWL-BW5	522	1/20/20 10:39	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	007
112205	001	CWL-BW5	522	1/20/20 10:40	GW	G	3x40 ml	HCl	G	DU	VOC-TCE, FREON 113, PCE, 1,1-DCE, CHLOROFORM, FREON 11(SW846-8260B) [CWL PCCP]	008
112205	002	CWL-BW5	522	1/20/20 10:41	GW	AG	500 ml	NaHSO4	G	DU	1,4-DIOXANE (EPA 8270 SIM)	009
112205	003	CWL-BW5	522	1/20/20 10:42	GW	P	500 ml	HNO3	G	DU	CHROMIUM, NICKEL (SW846-6020)	010
112206	001	CWL-PCCP TB 2	NA	1/20/20 10:37	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE, FREON 113, PCE, 1,1-DCE, CHLOROFORM, FREON 11(SW846-8260B) [CWL PCCP]	011

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		Lab Use
	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: Received trip blanks from lab with head space.		
	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>58588</i> Date <i>1/20/20</i> Time <i>1110</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i> Org. <i>00628</i> Date <i>1/20/20</i> Time <i>1110</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i> Org. <i>00628</i> Date <i>1/20/20</i> Time <i>1223</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i> Org. <i>00628</i> Date <i>1-21-20</i> Time <i>720</i>	Received by	Org.	Date	Time

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

AR/COC NUMBERS 620746, 620748

Memorandum

Date: March 2, 2020

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCOG: 620746 and 620748
SDG: 501888
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

Six 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 except as follows. Chloroform was detected at > the PQL in FB-1, sample 501888001 associated with sample -002 and FB-2, sample -006 associated with sample -007. The associated sample results were non-detect and will not be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Two TBs and two FBs were submitted, one for each ARCOG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/06/2020

Memorandum

Date: March 2, 2020

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCOG: 620746 and 620748
SDG: 501888
Laboratory: GEL
Project/Task: 195122.10.11.03
Analysis: SVOCs

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 aqueous samples were prepared and analyzed with accepted procedures using method SW846 8270D SIM (SVOCs - 1,4-dioxane). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

Reporting Limit Verification

The CMDL (reporting level verification standard) recovery met QC acceptance criteria.

Blanks

No target analyte was detected in the method blank.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD met QC acceptance criteria for accuracy and precision.

Laboratory Control Sample

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/06/2020

Memorandum

Date: March 2, 2020
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: CWL PCCP
ARCO: 620746 and 620748
SDG: 501888
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 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 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 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 for samples 501888004 and -009 because the sample concentrations of Ca 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

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/06/2020



Sample Findings Summary



AR/COC: 620746, 620748

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#: 620746 and 620748	Site/Project: CWL PCCP	Validation Date: 03/02/2020
SDG #: 501888	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 10	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 and 01/22/20
 ARCOG 620748 noted that the trip blank vials were received from the lab with headspace.

Validated by: *L. Thal*

Sandia Organic Worksheet (GC/MS VOC)

ARCO #s): 620746 and 620748	SDG: 501888	Matrix: Aqueous
Laboratory Sample IDs: 501888001, -002, -005, -006, -007, -010		
Method/Batch #s: 8260B 1963442	Tuning (pass/fail): pass	TICs Required? (yes/no): no

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	FB-1 -001	TB-4 -005	FB-2 -006	TB-6 -010
	Int.	RF/ Slope	RSD/ r ²	(ICV)/CCV %D										
Chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	NA	6.15	✓	5.54	✓

Surrogate Recovery Outliers									
Sample ID	1,2-DCA-d4 %R	Toluene-d8 %R	BFB %R		Sample ID	1,2-DCA-d4 %R	Toluene-d8 %R	BFB %R	
None									

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

Comments: HTs OK. MS/MSD on SNL sample 502405007 on a different calibration
 Samples: ICAL VOA1.I 12/09/2019 All avg RF for SDG 501888 target analytes
 MS/MSD: ICAL VOA1.I 01/31/2020 All avg RF for SDG 501888 target analytes

Sandia Inorganic Metals Worksheet

ARCO #s): 620746 and 620748	SDG #(s): 501888	Matrix: Aqueous
Laboratory Sample IDs: 501888004, -009		
Method/Batch #s: 3005A/6020B :1962100/1962101		

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		
	Int. ug/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L											
none																	

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

Comments: HTs OK; DUP/MS/SD performed on SNL sample 501889002.
Ca >100ppm

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

501888

Internal Lab

Batch No. <i>N/A</i>		SMO Use		AR/COC 620746	
Project Name: CWL PCCP		Date Samples Shipped: <i>1/22/2020</i>		SMO Authorization: <i>[Signature]</i>	
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>309226</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: CF327-20		Lab Destination: GEL		Send Report to SMO:	
		Contract No.: 1983530		Stephanie Montaño/505-284-2553	

<input type="checkbox"/> Waste Characterization
<input type="checkbox"/> RMA
<input type="checkbox"/> Released by COC No.
<input checked="" type="checkbox"/> 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					
112209	001	CWL-PCCP FB-1	NA	1/21/20 10:13	DIW	G	3x40 ml	HCl	G	FB	VOC-TCE,FREON 113,PCE,1,1-DCE,CHLOROFORM, FREON 11(SW846-8260B) [CWL PCCP]	001
112210	001	CWL-MW9	517	1/21/20 10:24	GW	G	3x40 ml	HCl	G	SA	VOC-TCE,FREON 113,PCE,1,1-DCE,CHLOROFORM, FREON 11(SW846-8260B) [CWL PCCP]	002
112210	002	CWL-MW9	517	1/21/20 10:25	GW	AG	500 ml	NaHSO4	G	SA	1,4-DIOXANE (EPA 8270 SIM)	003
112210	003	CWL-MW9	517	1/21/20 10:26	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	004
112211	001	CWL-PCCP TB-4	NA	1/21/20 10:13	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE,FREON 113,PCE,1,1-DCE,CHLOROFORM, FREON 11(SW846-8260B) [CWL PCCP]	005

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		Negotiated TAT <input type="checkbox"/>		
Confirmatory: <input type="checkbox"/> Yes		Name		Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		
Sample Team Members		Signature		Init.		Return Samples By:		
		Robert Lynch		[Signature]		[Signature]		
		William Gibson		[Signature]		[Signature]		
		Zachary Tenorio		[Signature]		Comments:		

Relinquished by				Received by				Lab Use			
3 [Signature]				[Signature]							
Org. 5888 Date 1/21/20 Time 1055				Org. 00626 Date 1/21/20 Time 1055							
[Signature]				[Signature]							
Org. 00628 Date 1/22/20 Time 0800				Org. 00628 Date 1/22/20 Time 0800							
[Signature]				[Signature]							
Org. Date 1/23/20 Time 750				Org. Date 1/23/20 Time 750							

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

SDG: 501888 Rev 1

Internal Lab		Page 1 of 1	
Batch No. <i>N/A</i>		AR/COC 620748	
Project Name: CWL PCCP		SMO Use	
Project/Task Manager: Timmie Jackson		Date Samples Shipped: <i>1/22/2020</i>	
Project/Task Number: 195122.10.11.03		Carrier/Waybill No. <i>309226</i>	
Service Order: CF327-20		Lab Contact: Edie Kent/843-769-7385	
Tech Area:		Lab Destination: GEL	
Building:		Contract No.: 1983530	
Room:		Operational Site:	
		SMO Authorization: <i>[Signature]</i>	
		SMO Contact Phone: <i>920</i>	
		Wendy Palencia/505-844-3132	
		Send Report to SMO: Stephanie Montaño/505-284-2553	
		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No.	
		<input checked="" type="checkbox"/> 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					
112214	001	CWL-PCCP FB-2	NA	1/22/20	10:56	DIW GW	WPA G	3x40 ml	HCl	G	FB	VOC-TCE,FREON 113,PCE,1,1-DCE,CHLOROFORM, FREON 11(SW846-8260B) [CWL PCCP]	006
112215	001	CWL-MW11	513	1/22/20	11:30	GW	G	3x40 ml	HCl	G	SA	VOC-TCE,FREON 113,PCE,1,1-DCE,CHLOROFORM, FREON 11(SW846-8260B) [CWL PCCP]	007
112215	002	CWL-MW11	513	1/22/20	11:31	GW	AG	500 ml	NaHSO4	G	SA	1,4-DIOXANE (EPA 8270 SIM)	008
112215	003	CWL-MW11	513	1/22/20	11:32	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	009
112216	001	CWL-PCCP TB-6	NA	1/22/20	10:56	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE,FREON 113,PCE,1,1-DCE,CHLOROFORM, FREON 11(SW846-8260B) [CWL PCCP]	010

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes				
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day				
Confirmatory: <input type="checkbox"/> Yes		QC initials:				Negotiated TAT <input type="checkbox"/>				
Sample Team Members		Signature		Init.		Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		
		<i>[Signature]</i>		<i>[Init]</i>		SNL/08888/505-844-4013/505-250-7090		Return Samples By:		
		<i>[Signature]</i>		<i>[Init]</i>		SNL/08888/505-284-3307/505-239-7367		Comments: Received trip blanks from lab with head space.		
		<i>[Signature]</i>		<i>[Init]</i>		SNL/08888/505-845-8636/505-259-5765				
		<i>[Signature]</i>		<i>[Init]</i>		SNL/08888/505-845-7829/505-208-1375				

Relinquished by <i>[Signature]</i>	Org. <i>08888</i>	Date <i>1/22/20</i>	Time <i>1210</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>00628</i>	Date <i>1/22/20</i>	Time <i>1210</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org. <i>00628</i>	Date <i>1/22/20</i>	Time <i>1235</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org.	Date <i>1-23-20</i>	Time <i>750</i>	Received by	Org.	Date	Time

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

AR/COC NUMBERS 620750, 620751

Memorandum

Date: March 5, 2020

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCOG: 620750 and 620751
SDG: 502294
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

Four 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, except as follows. Chloroform was detected at > the PQL in the QC-DIW sample, sample 502294005. No field sample results will be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

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

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

Two TBs were submitted, one for each ARCOG. A QC-DIW sample was submitted with ARCOG 620750 and was the source water for the EB submitted with ARCOG 620743.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 03/10/2020

Memorandum

Date: March 5, 2020
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCOG: 620750 and 620751
SDG: 502294
Laboratory: GEL
Project/Task: 195122.10.11.03
Analysis: SVOCs

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 aqueous samples were prepared and analyzed with accepted procedures using method SW846 8270D SIM (SVOCs - 1,4-dioxane). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

Reporting Limit Verification

The CMDL (reporting level verification standard) recovery met QC acceptance criteria.

Blanks

No target analyte was detected in the method blank.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD met QC acceptance criteria for accuracy and precision.

Laboratory Control Sample

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 QC-DIW sample was submitted with ARCOG 620750 and was the source water for the EB submitted with ARCOG 620743.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan

Level: I

Date: 03/10/2020

Memorandum

Date: March 5, 2020
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: CWL PCCP
ARCO: 620750 and 620751
SDG: 502294
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 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 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 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 for sample 502294003 because the sample concentration of Ca 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

A QC-DIW sample was submitted with ARCOG 620750 and was the source water for the EB submitted with ARCOG 620743.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan

Level: I

Date: 03/10/2020



Sample Findings Summary



AR/COC: 620750, 620751

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#: 620750 and 620751	Site/Project: CWL PCCP	Validation Date: 03/05/2020
SDG #: 502294	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 8	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								

<u>Comments:</u> Collected: 01/27/20 ARCOCs noted that the trip blank vials were received from the lab with headspace.
<u>Validated by:</u> <i>L Thal</i>

Sandia Organic Worksheet (GC/MS VOC)

ARCO #s: 620750 and 620751	SDG: 502294	Matrix: Aqueous
Laboratory Sample IDs: 502294001, -004, -005, -008		
Method/Batch #s: 8260B 1965338	Tuning (pass/fail): pass	TICs Required? (yes/no): no

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	TB 10 -004	QC- DIW -005	TB-8 -008	
	Int.	RF/ Slope	RSD/ r ²	(ICV)/CCV %D										
Chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	4.14	✓	

Surrogate Recovery Outliers

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

IS Outliers

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

Comments: HTs OK. MS/MSD on SNL Sample 501889001
ICAL VOA1.I 01/31/2020 All avg for 6 TAL

Sandia Organic Worksheet (GC/MS SVOC)

ARCO#(s): 620750 and 620751	SDG:502294	Matrix: Aqueous
Laboratory Sample IDs:502294002, -006		
Method/Batch #s: 3535A/8270D SIM 1963563/1963565	Tuning (pass/fail): pass	TICs Required? (yes/no): no

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	CMDL	QC- DIW -006		
	Int.	RF/ Slope	RSD/r ²	(ICV)/ CCV %D										
None														
Surrogate Recovery Outliers														
Sample ID	1,4-Dioxane-d8													
None														
IS Outliers														
	Tetrahydrofuran-d8													
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: GC/MS SIM with solid phase extraction. Samples preserved with NaHSO₄ to a pH ≤ 4 have 28 days to extraction.
 HT OK. MS/MSD -002
 ICAL: MSD6.I 01/17/2020

Sandia Inorganic Metals Worksheet

ARCO# #s): 620750 and 620751	SDG #(s): 502294	Matrix: Aqueous
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Laboratory Sample IDs: 502294003, -007

Method/Batch #s: **3005A/6020B**:1964038/1964039

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	QC-DIW -007	
	Int. ug/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L											
none																	

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

Comments: HTs OK; DUP/MS/SD performed on SNL sample 502295002
 Ca >100 mg/L -003

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

502294

SDG: 502294 Rev 2

Internal Lab		SMO Use		AR/COC 620751	
Batch No. <i>MA</i>		Date Samples Shipped: <i>1/27/2020</i>		SMO Authorization: <i>[Signature]</i>	
Project Name: CWL PCCP		Carrier/Waybill No. <i>309410</i>		SMO Contact Phone: Wendy Palencia/505-844-3132	
Project/Task Manager: Timmie Jackson		Lab Contact: Edie Kent/843-769-7385		Send Report to SMO: <input checked="" type="checkbox"/> 4° Celsius	
Project/Task Number: 195122.10.11.03		Lab Destination: GEL		Stephanie Montaño/505-284-2553	
Service Order: CF327-20		Contract No.: 1983530		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					
112221	001	CWL-MW10	515	1/27/20 09:12	GW	G	3x40 ml	HCl	G	SA	VOC-TCE,FREON 113,PCE,1,1-DCE,CHLOROFORM, FREON 11(SW846-8260B) [CWL PCCP]	001
112221	002	CWL-MW10	515	1/27/20 09:13	GW	AG	500 ml	NaHSO4	G	SA	1,4-DIOXANE (EPA 8270 SIM)	002
112221	003	CWL-MW10	515	1/27/20 09:14	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	003
112222	001	CWL-PCCP TB 10	NA	1/27/20 09:12	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE,FREON 113,PCE,1,1-DCE,CHLOROFORM, FREON 11(SW846-8260B) [CWL PCCP]	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:				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>		RL		SNL/08888/505-844-4013/505-250-7090		Return Samples By:		
	Denisha Sanchez		<i>[Signature]</i>		DS		SNL/08888/505-845-7829/505-208-1375		Comments: Received trip blanks from lab with head space.		
Relinquished by <i>[Signature]</i>		Org. <i>09888</i> Date <i>1/27/20</i> Time <i>0950</i>		Relinquished by		Org.		Date		Time	
Received by <i>[Signature]</i>		Org. <i>08628</i> Date <i>1/27/20</i> Time <i>0950</i>		Received by		Org.		Date		Time	
Relinquished by <i>[Signature]</i>		Org. <i>00628</i> Date <i>1/27/20</i> Time <i>1133</i>		Relinquished by		Org.		Date		Time	
Received by <i>[Signature]</i>		Org. Date <i>1-28-20</i> Time <i>725</i>		Received by		Org.		Date		Time	

Relinquished by <i>[Signature]</i>		Org. <i>09888</i> Date <i>1/27/20</i> Time <i>0950</i>		Relinquished by		Org.		Date		Time	
Received by <i>[Signature]</i>		Org. <i>08628</i> Date <i>1/27/20</i> Time <i>0950</i>		Received by		Org.		Date		Time	
Relinquished by <i>[Signature]</i>		Org. <i>00628</i> Date <i>1/27/20</i> Time <i>1133</i>		Relinquished by		Org.		Date		Time	
Received by <i>[Signature]</i>		Org. Date <i>1-28-20</i> Time <i>725</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

SDG: 502294 Rev 2

Internal Lab		Page 1 of 1										
Batch No. <i>NA</i>		AR/COC 620750										
Project Name: CWL PCCP		Date Samples Shipped: <i>1/27/2020</i>										
Project/Task Manager: Timmie Jackson		SMO Authorization: <i>[Signature]</i>										
Project/Task Number: 195122.10.11.03		SMO Contact Phone: Wendy Palencia/505-844-3132										
Service Order: CF327-20		Send Report to SMO: Stephanie Montaño/505-284-2553										
Carrier/Waybill No. <i>304410</i>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius										
Lab Contact: Edie Kent/843-769-7385		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154										
Lab Destination: GEL												
Contract No.: 1983530												
Tech Area:												
Building:		Operational Site:										
Room:												
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
112219	001	CWL-PCCP QC	NA	1/27/20 07:08	DIW	G	3x40 ml	HCl	G	FB	VOC-TCE,FREON 113,PCE,1,1-DCE,CHLOROFORM, FREON 11(SW846-8260B) [CWL PCCP]	005
112219	002	CWL-PCCP QC	NA	1/27/20 07:09	DIW	AG	500 ml	NaHSO4	G	FB	1,4-DIOXANE (EPA 8270 SIM)	006
112219	003	CWL-PCCP QC	NA	1/27/20 07:10	DIW	P	500 ml	HNO3	G	FB	CHROMIUM, NICKEL (SW846-6020)	007
112220	001	CWL-PCCP TB-8	NA	1/27/20 07:08	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE,FREON 113,PCE,1,1-DCE,CHLOROFORM, FREON 11(SW846-8260B) [CWL PCCP]	008
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				Lab Use		
	Denisha Sanchez	<i>[Signature]</i>	<i>[Init]</i>	SNL/08888/505-845-7829/505-208-1375		Return Samples By:						
	William Gibson	<i>[Signature]</i>	<i>[Init]</i>	SNL/08888/505-284-3307/505-239-7367		Comments: Received trip blank from lab with head space.						
Relinquished by <i>[Signature]</i>		Org. <i>08888</i>	Date <i>1/27/2020</i>	Time <i>0950</i>	Relinquished by		Org.	Date	Time			
Received by <i>[Signature]</i>		Org. <i>00628</i>	Date <i>1/27/2020</i>	Time <i>0950</i>	Received by		Org.	Date	Time			
Relinquished by <i>[Signature]</i>		Org. <i>00628</i>	Date <i>1/27/2020</i>	Time <i>1137</i>	Relinquished by		Org.	Date	Time			
Received by <i>[Signature]</i>		Org.	Date <i>1-28-20</i>	Time <i>725</i>	Received by		Org.	Date	Time			

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

CONTRACT VERIFICATION FORMS
CHEMICAL WASTE LANDFILL
GROUNDWATER MONITORING
JANUARY 2020

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

AR/COC Number	Sample Type
620743	Quality Control
620744	Environmental & Quality Control
620746	Environmental & Quality Control
620748	Environmental & Quality Control
620750	Environmental & Quality Control
620751	Environmental

Contract Verification Form (CVR)

Project Leader JACKSON

Project Name CWL PCCP

Project/Task No. 195122_10.11.03

ARCOG No. 620743 & 620744

Analytical Lab GEL

SDG No. 501660

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	Sample 112186-003 incorrectly preserved with NaOH instead of HNO3
1.5	Custody records continuous and complete	X		
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	X		
1.7	Date samples received	X		
1.8	Condition upon receipt information provided	X		

2.0 Analytical Laboratory Report

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

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	Metals results not reported for sample 112186-003 due to preservative error

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	Chloroform and 1,4-Dioxane detected in CWL PCCP- EB
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	X		

5.0 Data Anomaly Report

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

6.0 Problem Resolution

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

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions
112186-002, 112204-002 & 112205-002	1,4-Dioxane	Incorrect/missing detection limits reported
.	.	.

Were deficiencies unresolved? Yes No

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

If no, provide nonconformance report or correction request number and date correction request was submitted: 02-24-2020

Reviewed by: Wendy Palencia Date: 02-24-2020 09:18:00

Were resolutions adequate and data package complete? Yes No

Closed by: Wendy Palencia Date: 02-27-2020 09:10:00

Contract Verification Form (CVR)

Project Leader JACKSON

Project Name CWL PCCP

Project/Task No. 195122_10.11.03

ARCOG No. 620746 & 620748

Analytical Lab GEL

SDG No. 501888

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	Chloroform detected in CWL-PCCP FB-1 and CWL-PCCP FB-2
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
112210-002 & 112215-002	1,4-Dioxane	Incorrect/missing detection limits reported

Were deficiencies unresolved? Yes No

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

If no, provide nonconformance report or correction request number and date correction request was submitted: 02-25-2020

Reviewed by: Wendy Palencia Date: 02-25-2020 12:13:00

Were resolutions adequate and data package complete? Yes No

Closed by: Wendy Palencia Date: 02-27-2020 09:31:00

Contract Verification Form (CVR)

Project Leader JACKSON

Project Name CWL PCCP

Project/Task No. 195122_10.11.03

ARCOG No. 620750 & 620751

Analytical Lab GEL

SDG No. 502294

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	Chloroform detected in CWL-PCCP 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		
	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: Wendy Palencia Date: 03-02-2020 11:44:00

Closed by: Wendy Palencia Date: 03-02-2020 11:44:00

FIELD SAMPLING FORMS
JULY 2020
GROUNDWATER MONITORING

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL	
Well I.D.: CWL-BW5	Date: 07/20/20
Method: Portable pump <input checked="" type="checkbox"/>	Dedicated pump <input type="checkbox"/> Pump depth: 522'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (μS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO (mg/L)
514.94	0842	Start							
516.74	0902	2	22.34	1138.0	231.5	7.08	1.26	94.67	6.23
517.23	0913	4	22.11	1079.4	238.4	7.07	1.83	96.20	6.36
517.58	0924	6	22.12	1129.0	243.1	7.07	1.97	92.48	6.10
517.79	0935	8	22.39	1114.9	246.3	7.06	2.40	91.05	5.98
517.90	0946	10	22.60	1139.2	247.0	7.06	1.79	93.78	6.13
517.95	0952	11	22.70	1131.5	249.5	7.06	1.40	92.29	6.02
518.00	0958	12	22.78	1132.6	251.2	7.05	1.29	93.71	6.11
518.05	1003	13	22.68	1131.2	251.6	7.05	1.15	93.45	6.10
518.09	1009	14	22.66	1141.0	252.7	7.05	0.87	92.95	6.08
	1010	SAMPLING							

Comments: ~ 1.5 gals purged from tubing @ 0852

EB TAKEN at well location LOT# 061020

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL	
Well I.D.: CWL-MW9	Date: 07/21/20
Method: Portable pump <input checked="" type="checkbox"/> X	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)
506.16	0835	Start							
508.35	0914	5	22.54	977.23	274.9	7.11	0.26	58.96	3.86
508.84	0930	8	22.47	967.03	272.6	7.11	0.32	58.16	3.81
509.17	0939	10	22.23	962.91	272.2	7.10	0.21	58.34	3.83
509.39	0948	12	22.21	958.89	271.7	7.10	0.34	57.83	3.80
509.58	0957	14	22.85	968.00	271.5	7.09	0.36	60.23	3.91
509.72	1005	16	23.07	980.01	271.6	7.08	0.21	61.01	3.96
509.76	1010	17	23.03	958.56	271.8	7.08	0.16	61.53	3.98
509.79	1014	18	23.05	958.43	272.3	7.08	0.39	64.98	4.20
509.81	1018	19	23.10	951.70	272.7	7.08	0.24	62.44	4.04
509.84	1023	20	23.00	958.38	272.7	7.07	0.19	62.52	4.05
	1024	Sampling →							

Comments: ~1.5 gals purged from tubing @ 0848

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL		Date: 07/24/20	07/27/20
Well I.D.: CWL-MW10			
Method: Portable pump	X	Dedicated pump	Pump depth: 515'

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (Gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO (mg/L)
503.20	0850	Start							
506.17	0919	2	22.69	996.48	254.4	7.14	2.39	41.03	2.78
507.76	0933	4	22.89	983.95	224.4	7.13	1.77	35.09	2.38
509.23	0947	6	23.30	987.46	204.1	7.13	1.61	30.68	2.06
510.74	1003	8	23.98	1008.0	176.9	7.11	1.88	30.25	2.00
512.29	1020	10	24.41	1026.2	156.9	7.11	2.71	30.12	1.98
513.10	1029	11	24.66	1032.1	149.6	7.11	2.96	31.54	2.06
514.00	1038	12	24.76	1031.5	135.7	7.10	4.25	30.20	1.97
514.96	1046	13	24.84	1037.1	129.5	7.11	3.38	28.56	1.86
514.96	1046	Well	DRY						
07/27/20 503.92	0841	START							
505.48	0855	0.5	18.97	949.83	123.1	6.89	3.81	93.67	6.67
505.91	0859	1	18.74	941.54	89.5	6.84	2.84	51.06	3.70
506.34	0902	1.5	18.65	937.35	91.1	6.83	2.90	35.96	2.62
	0903		SAMPLING						

Comments: ~1.5 gals purged from tubing @ 0906 / 07/27/20 0850

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: CWL		
Well I.D.: CWL-MW11	Date: 07/22/20	
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)
501.34	0834	Start							
505.11	0918	5	22.66	1077.4	267.7	7.07	0.22	79.29	5.39
507.24	0946	10	22.78	1080.6	275.1	7.06	0.27	78.83	5.33
508.26	1000	12	23.16	1087.8	276.3	7.05	0.69	78.14	5.25
509.30	1016	14	23.40	1091.8	279.1	7.04	0.42	78.40	5.25
510.31	1031	16	23.51	1099.0	280.8	7.05	0.48	76.93	5.14
511.37	1047	18	23.38	1093.4	184.8	7.04	0.59	76.89	5.14
511.76	1056	19	24.23	1104.0	45.4	7.04	0.64	73.15	4.81
512.05	1109	20	25.43	1117.3	39.4	7.03	0.77	71.14	4.58
512.22	1127	21	26.34	1151.7	91.2	7.03	0.39	75.35	4.77
512.49	1141	22	26.24	1074.9	116.4	7.03	0.38	77.66	4.93
512.56	1144	22.25	26.00	1079.9	122.7	7.02	0.32	77.48	4.93
512.30	1149	22.50	26.54	1140.0	146.7	7.01	0.19	80.26	4.91
	1150	Sampling							

Comments: ~1.5 gals purged from tubing @ 0848

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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: 07/20/20		
Make & Model: INSITU AT 600						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 743841						
Other (S/N): NA						
pH Calibration/Check						
pH Calibrated to (std): NA			pH sloped to (std): NA			
Reference value:		4.00		7.00		10.00
	Value	Temp	Value	Temp	Value	Temp
1. Time:	0631	4.03	25.78	6.99	25.69	10.02
2. Time:	1346	4.03	24.55	6.98	25.61	10.01
3. Time:						
4. Time:						
Standard lot no.:		OGA042		OGA811		9GL150
Expiration date:		JAN/22		JAN/22		DEC/21
SC Calibration/Check						
Reference Value: 1413 uS/cm @ 25C				Standard Lot No.: 9GL652		
	Value	Temp	Expiration Date: DEC/20 T1 7/31/20			
1. Time:	0634	1437.2	25.57			
2. Time:	1339	1441.3	25.65			
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV				Standard Lot No. 9GL301		
	Value	Temp	Expiration Date: SEP/20			
1. Time:	0635	220.5	25.77			
2. Time:	1341	219.0	25.22			
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value: 100%		81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0630	102.31	22.93			
2. Time:	1338	101.73	23.83			
3. Time:						
4. Time:						

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch			Date: 07/20/20	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 19050C076301	
Reference Value	10	20	100	800
Standard Lot No.	A9156	A9155	A9156	A9157
1. Time 0628	9.93	20.0	99.1	801
2. Time 1337	9.96	20.1	99.8	801
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: 07/21/20		
Make & Model: INSITU AT 600						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 743841						
Other (S/N): NA						
pH Calibration/Check						
pH Calibrated to (std): NA			pH sloped to (std): NA			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0630	4.04	24.62	7.00	24.75	10.00	24.56
2. Time: 1245	4.05	24.28	7.02	24.42	10.03	24.22
3. Time:						
4. Time:						
Standard lot no.:	OGA042		OGA811		9GL150	
Expiration date:	JAN/22		JAN/22		DEF/21 7/31/20	
SC Calibration/Check						
Reference Value: 1413 uS/cm @ 25C			Standard Lot No.: 9GL652			
	Value	Temp	Expiration Date: DEF/20 7/31/20			
1. Time: 0635	1397.3	24.58				
2. Time: 1250	1386.4	24.40				
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV			Standard Lot No. 9GL301			
	Value	Temp	Expiration Date: SEP/20			
1. Time: 0627	221.4	24.92				
2. Time: 1249	221.1	24.51				
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value: 100%	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time: 0626	102.53		22.86			
2. Time: 1244	103.17		22.63			
3. Time:						
4. Time:						

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch			Date: 07/21/20	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 19050C076301	
Reference Value	10	20	100	800
Standard Lot No.	A9156	A9155	A9156	A9157
1. Time 0625	9.97	20.1	99.8	803
2. Time 1242	10.2	20.0	101	799
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: 07/22/20		
Make & Model: INSITU AT 600						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 743841						
Other (S/N): NA						
pH Calibration/Check						
pH Calibrated to (std): NA			pH sloped to (std): NA			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time: 0631	4.04	25.14	7.01	25.19	9.99	25.21
2. Time: 1333	4.04	24.77	7.00	24.80	10.02	24.78
3. Time:						
4. Time:						
Standard lot no.:	OGA042		OGA811		9GL150	
Expiration date:	JAN/22		JAN/22		DEF 21 7/13/20	
SC Calibration/Check						
Reference Value: 1413 uS/cm @ 25C			Standard Lot No.: 9GL652			
	Value	Temp	Expiration Date: DEF 20 7/31/20			
1. Time: 0635	1411.9	25.01				
2. Time: 1339	1390.1	24.77				
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV			Standard Lot No. 9GL301			
	Value	Temp	Expiration Date: SEP/20			
1. Time: 0636	220.4	25.03				
2. Time: 1337	220.3	24.82				
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value: 100%	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time: 0630	98.09		23.76			
2. Time: 1332	99.74		23.68			
3. Time:						
4. Time:						

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch			Date: 07/22/20	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 19050C076301	
Reference Value	10	20	100	800
Standard Lot No.	A9156	A9155	A9156	A9157
1. Time 0629	9.96	19.8	103	800
2. Time 1331	10.1	20.1	100	801
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: 07/24/20 07/27/20		
Make & Model: INSITU AT 600						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 743841						
Other (S/N): NA						
pH Calibration/Check						
pH Calibrated to (std): NA			pH sloped to (std): NA			
Reference value:		4.00		7.00		10.00
	Value	Temp	Value	Temp	Value	Temp
1. Time:	0626	4.04	24.26	7.01	24.31	9.97
2. Time:	1350	4.05	24.12	7.00	24.17	9.98
3. Time:	0634	4.05	24.79	6.98	24.78	9.97
4. Time:	1255	4.04	24.53	6.99	24.61	9.97
Standard lot no.:	OGA042		OGA811		9GL150	
Expiration date:	JAN/22		JAN/22		DEC/21	
SC Calibration/Check						
Reference Value: 1413 uS/cm @ 25C				Standard Lot No.: 9GL852		
	Value	Temp	Expiration Date: DEC/20 7/3/20			
1. Time:	0630	1375.5	24.28			
2. Time:	1349	1368.8	24.11			
3. Time:	0638	1370.2	24.77			
4. Time:	1252	1365.3	24.65			
ORP Calibration/Check						
Reference Value: 220 mV				Standard Lot No. 9GL301		
	Value	Temp	Expiration Date: SEP/20			
1. Time:	0635	221.4	24.29			
2. Time:	1340	221.3	24.05			
3. Time:	0639	220.1	24.81			
4. Time:	1253	220.2	24.57			
DO Calibration/Check						
Calibration Value: 100%	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0624	98.61	23.80			
2. Time:	1347	97.49	23.56			
3. Time:	0633	96.10	23.30			
4. Time:	1251	98.21	23.46			

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

SNL/NM Project Name: CWL				
Calibration done by: R Lynch			Date: 07/24/20 07/27/20	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 19050C076301	
Reference Value	10	20	100	800
Standard Lot No.	A9156	A9155	A9156	A9157
1. Time 0622	9.96	19.8	101	803
2. Time 1345	10.2	20.0	99.7	801
3. Time 0632	10.1	19.7	100	798
4. Time 1250	9.97	20.1	102	801
Comments:				

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

Project Name: <u>CWL</u>	Monitoring Well ID #: <u>Pre Decon</u>	Date: <u>7/17/2020</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>362617</u>
---	--

Personnel Performing Decontamination:

Zachary Tenorio

Print Name:

ZT
Initial:

Denisha Sanchez

Print Name:

DS
Initial:

Condition of Equipment

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

List of Decontamination Materials

<p align="center">Deionized Water</p> <p>Source: <u>Culligan</u></p> <p>Lot Number: <u>6/10/20</u></p>	<p align="center">HNO₃</p> <p>Grade: <u>NA</u></p> <p>UN #: <u>NA</u></p> <p>Manufacturer: <u>NA</u></p> <p>Lot Number: <u>NA</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-BW5</u>	Date: <u>07-20-20</u>
-------------------------------	--------------------------------------	-----------------------

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

Pump and Tubing Bundle ID #: <u>1806B-640</u>	Water Level Indicator ID #: <u>362617</u>
---	---

Personnel Performing Decontamination:

Robert Lynch

Print Name:


Initial:

William Gibson

Print Name:


Initial:

Condition of Equipment

Pump: Good

Tubing Bundle: Good

Water Level Indicator: Excellent

List of Decontamination Materials

Deionized Water	HNO ₃
Source: <u>Culligan</u>	Grade: <u>NA</u>
Lot Number: <u>6/10/20</u>	UN #: <u>NA</u>
	Manufacturer: <u>NA</u>
	Lot Number: <u>NA</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-MW9</u>	Date: <u>07-21-20</u>
--------------------------------------	---	------------------------------

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

Pump and Tubing Bundle ID #: <u>1806B-640</u>	Water Level Indicator ID #: <u>362617</u>
--	--

Personnel Performing Decontamination:



<u>Zach Tenorio</u> Print Name:	 Initial:
<u>Robert Lynch</u> Print Name:	 Initial:

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

List of Decontamination Materials	
<p align="center">Deionized Water</p> <p>Source: <u>Culligan</u></p> <p>Lot Number: <u>6/2/20 - 6/10/20</u></p>	<p align="center">HNO₃</p> <p>Grade: <u>NA</u></p> <p>UN #: <u>NA</u></p> <p>Manufacturer: <u>NA</u></p> <p>Lot Number: <u>NA</u></p>



IMPORTANT NOTICE: A printed (and uncompleted) copy of this form may not be the most current form. The official version is located in the Long-Term Stewardship (LTS) ARAS document library, for which access is required. Upon completion, this document becomes record.

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

Project Name: <u>CWL PCCP</u>	Monitoring Well ID # : <u>CWL-MW11</u>	Date: <u>07-22-20</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806B-640</u>	Water Level Indicator ID #: <u>362617</u>	
<u>Personnel Performing Decontamination:</u>		
William Gibson Print Name: _____	 Initial: _____	
Denisha Sanchez Print Name: _____	 Initial: _____	
Condition of Equipment		
Pump: <u>Good</u>	Tubing Bundle: <u>Good</u>	Water Level Indicator: <u>Excellent</u>
List of Decontamination Materials		
Deonized Water	HNO₃	
Source: <u>Culligan</u>	Grade: <u>NA</u>	
Lot Number: <u>6/2/20 - 6/10/20</u>	UN #: <u>NA</u>	
	Manufacturer: <u>NA</u>	
	Lot Number: <u>NA</u>	

IMPORTANT NOTICE: A printed (and uncompleted) copy of this form may not be the most current form. The official version is located in the Long-Term Stewardship (LTS) ARAS document library, for which access is required. Upon completion, this document becomes record.

**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>07-27-20</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806B-640</u>	Water Level Indicator ID #: <u>362617</u>	
<u>Personnel Performing Decontamination:</u>		
William Gibson Print Name: _____	 Initial: _____  Initial: _____	
Robert Lynch Print Name: _____		
Condition of Equipment		
Pump: <u>Good</u>	Tubing Bundle: <u>Good</u>	Water Level Indicator: <u>Excellent</u>
List of Decontamination Materials		
Deionized Water	HNO₃	
Source: <u>Culligan</u>	Grade: <u>NA</u>	
Lot Number: <u>6/2/20 - 6/10/20</u>	UN #: <u>NA</u>	
	Manufacturer: <u>NA</u>	
	Lot Number: <u>NA</u>	

IMPORTANT NOTICE: A printed (and uncompleted) copy of this form may not be the most current form. The official version is located in the Long-Term Stewardship (LTS) ARAS document library, for which access is required. Upon completion, this document becomes record.

SUMMARY SHEET FOR JULY 2020 SAMPLES

**Sample Summary for Chemical Waste Landfill Groundwater Monitoring
July 2020**

Sample ID	Sample Date	ARCOG	Sample Number	Sample Type	Associated Equipment Blank (ARCOG #/Sample #)	Associated Trip Blank (ARCOG # / Sample #)	Associated Field Blank (ARCOG # / Sample #)	Comments
CWL GWM: Project Task # 195122.10.11.03. Service Order # CF 327-20								
Environmental Samples								
CWL-BW5	20-Jul-20	621263	113377	Environmental	n/a	621263 / 113378	621263 / 113376	
CWL-MW9	21-Jul-20	621256	113357	Environmental	621255 / 113353	621256 / 113359	n/a	
CWL-MW9	21-Jul-20	621256	113358	Duplicate	621255 / 113353	621256 / 113359	n/a	
CWL-MW10	27-Jul-20	621261	113369	Environmental	n/a	621261 / 113370	621261 / 113368	
CWL-MW11	22-Jul-20	621258	113362	Environmental	n/a	621258 / 113363	n/a	
CWL-EB1	20-Jul-20	621255	113353	Equipment Blank	n/a	621255 / 113354	n/a	Decon prior to CWL-MW9
CWL-FB1	20-Jul-20	621263	113376	Field Blank	n/a	621263 / 113378	n/a	at CWL-BW5
CWL-FB2	27-Jul-20	621261	113368	Field Blank	n/a	621261 / 113370	n/a	at CWL-MW10
CWL-DIWQC	22-Jul-20	621259	113364	QC-DIW	n/a	621259 / 113365	n/a	DI Source for equipment decontamination
Waste Characterization Samples								
CWL-BW5	20-Jul-20	621254	113351	Waste	n/a	621254 / 113352	n/a	No data validation required
CWL-MW9	21-Jul-20	621257	113360	Waste	n/a	621257 / 113361	n/a	No data validation required
CWL-MW10	27-Jul-20	621262	113371	Waste	n/a	621262 / 113372	n/a	No data validation required
CWL-MW11	22-Jul-20	621260	113366	Waste	n/a	621260 / 113367	n/a	No data validation required

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

CHEMICAL WASTE LANDFILL

GROUNDWATER MONITORING

JULY 2020

AR/COC NUMBERS 621255, 621263

Memorandum

Date: August 29, 2020

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCO: 621255 and 621263
SDG: 516272
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 06.

Summary

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

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

Holding Times 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 recoveries and RPDs met QC acceptance criteria. It should be noted that the MS/MSD was 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 each ARCO. FB1 was submitted with ARCO 621263 and was associated with the sample on the same ARCO. EB1 was submitted with ARCO 621255 and was associated with the samples on ARCO 621256 submitted in another SDG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 08/31/2020

Memorandum

Date: August 29, 2020
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCO: 621255 and 621263
SDG: 516272
Laboratory: GEL
Project/Task: 195122.10.11.03
Analysis: SVOCs

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 06.

Summary

Two aqueous samples were prepared and analyzed with accepted procedures using method SW846 8270D SIM (SVOCs - 1,4-dioxane). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

Reporting Limit Verification

The CMDL (reporting level verification standard) recovery met QC acceptance criteria.

Blanks

No target analyte was detected in any of the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD met QC acceptance criteria for accuracy and precision.

Laboratory Control Sample

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

EB1 was submitted with ARCOG 621255 and was associated with the samples on ARCOG 621256 submitted in another SDG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 08/31/2020

Memorandum

Date: August 29, 2020
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: CWL PCCP
ARCOG: 621255 and 621263
SDG: 516272
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 06.

Summary

Two samples were 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 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 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 for sample 516272004 because the sample concentration for Ca 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

EB1 was submitted with ARCOG 621255 and was associated with the samples on ARCOG 621256 submitted in another SDG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan

Level: I

Date: 08/31/2020



Sample Findings Summary



AR/COC: 621255, 621263

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#: 621255 and 621263	Site/Project: CWL PCCP	Validation Date: 08/29/2020
SDG #: 516272	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 9	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: 07/20/20
 The ARCOGs noted that the trip blank vials were received from the lab with headspace.
 EB1 was submitted with ARCOG 621255 which was associated with the samples on ARCOG 621256, submitted in another SDG.

Validated by: *L Thal*

Sandia Organic Worksheet (GC/MS VOC)

ARCO #s: 621255 and 621263	SDG: 516272	Matrix: Aqueous
Laboratory Sample IDs: 516272001, -002, -005, -006, -009		
Method/Batch #s: 8260B 2025283	Tuning (pass/fail): pass	TICs Required? (yes/no): no

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	FB1 -001	TB1 -005	TB2 -009	EB1 -006
	Int.	RF/ Slope	RSD/ r ²	(ICV)/CCV %D										
None														

Surrogate Recovery Outliers

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

IS Outliers

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

Comments: HTs OK. TCE only. MS/MSD on SNL sample 516271001
 ICAL VOA2.I 07/22/20 TCE avg RF

Sandia Inorganic Metals Worksheet

ARCOG #(s): 621255 and 621263	SDG #(s): 516272	Matrix: Aqueous
Laboratory Sample IDs: 516272004, -008		
Method/Batch #s: 3005A/6020B :2022299/2022301		

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	EB1 -008
	Int. ug/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L										
None																

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

Comments: HTs OK; DUP/MS/SD performed on SNL sample 516271002.
 Ca >100ppm for sample -004; ICS A < MDL

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

516272

Page 5 of 203 SDG: 516272

Internal Lab

Batch No.

SMO Use

Page 1 of 1

AR/COC 621263

Project Name: CWL PCCP	Date Samples Shipped: 7-20-20	SMO Authorization:	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Timmie Jackson	Carrier/Waybill No: 316417	SMO Contact Phone: Wendy Palencia/505-844-3132	<input type="checkbox"/> RMA
Project/Task Number: 195122.10.11.03	Lab Contact: Edie Kent/843-769-7385	Send Report to SMO: Stephanie Montaño/505-284-2553	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF327-20	Lab Destination: GEL		
	Contract No.: 1983530		

Tech Area:	Building:	Room:	Operational Site:

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
113376	001	CWL-FB1	NA	7/20/20 10:00	DIW	G	3x40 ml	HCl	G	FB	VOC-TCE (SW846-8260B)	001
113377	001	CWL-BW5	522	7/20/20 10:10	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	002
113377	002	CWL-BW5	522	7/20/20 10:11	GW	AG	500 ml	NaHSO4	G	SA	1,4-DIOXANE (EPA 8270 SIM)	003
113377	003	CWL-BW5	522	7/20/20 10:12	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	004
113378	001	CWL-TB1	NA	7/20/20 10:00	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	005

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"/>			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch			SNL/08888/505-844-4013/505-250-7090	Return Samples By: Comments: Trip Blanks Received from Lab with head space.
	William Gibson			SNL/08888/505-284-3307/505-239-7367	
	Zachary Tenorio			SNL/08888/505-845-8636/505-259-5765	
	Denisha Sanchez			SNL/08888/505-845-7829/505-208-1375	

Relinquished by	Org. 8888	Date 7-20-20	Time 11:53	Relinquished by	Org.	Date	Time
Received by	Org. 0628	Date 7-20-20	Time 11:53	Received by	Org.	Date	Time
Relinquished by	Org. 0628	Date 7-20-20	Time 12:23	Relinquished by	Org.	Date	Time
Received by	Org.	Date 7/21/20	Time 8:00	Received by	Org.	Date	Time

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

516272

Internal Lab

Batch No.

SMO Use

AR/COC **621255**

Project Name: CWL PCCP	Date Samples Shipped: 7-20-20	SMO Authorization:	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Timmie Jackson	Carrier/Waybill No: 316417	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: CF327-20	Lab Destination: GEL		
	Contract No.: 1983530		

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					
113353	001	CWL-EB1	NA	7/20/20 11:32	DIW	G	3x40 ml	HCl	G	EB	VOC-TCE (SW846-8260B)	006
113353	002	CWL-EB1	NA	7/20/20 11:33	DIW	AG	500 ml	NaHSO4	G	EB	1,4-DIOXANE (EPA 8270 SIM)	007
113353	003	CWL-EB1	NA	7/20/20 11:34	DIW	P	500 ml	HNO3	G	EB	CHROMIUM, NICKEL (SW846-6020)	008
113354	001	CWL-TB2	NA	7/20/20 11:32	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	009

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	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	
	Robert Lynch		RL
	William Gibson		WG
	Zachary Tenorio		ZT
	Denisha Sanchez		DS
	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab	
	SNL/08888/505-844-4013/505-250-7090	Return Samples By:	
	SNL/08888/505-284-3307/505-239-7367	Comments: Trip Blanks received from lab with head space.	
	SNL/08888/505-845-8636/505-259-5765		
	SNL/08888/505-845-7829/505-208-1375		

Relinquished by:	Org. 8888	Date 7-20-20	Time 11:52	Relinquished by:	Org.	Date	Time
Received by:	Org. 0629	Date 7-20-20	Time 11:52	Received by:	Org.	Date	Time
Relinquished by:	Org. 0628	Date 7-20-20	Time 12:23	Relinquished by:	Org.	Date	Time
Received by:	Org.	Date 7/21/20	Time 8:00	Received by:	Org.	Date	Time

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

AR/COC NUMBER 621256

Memorandum

Date: August 29, 2020

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCOG: 621256
SDG: 516368
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 06.

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 recoveries and RPDs met QC acceptance criteria. It should be noted that the MS/MSD was performed on an SNL sample of similar matrix from another SDG. No data will be qualified.

Laboratory Control Sample (LCS)

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

A TB was submitted with ARCOG 621256. EB1 was submitted with ARCOG 621255 in another SDG and was associated with the samples on ARCOG 621256. A field duplicate pair was submitted with ARCOG 621256. 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: 08/31/2020

Memorandum

Date: August 29, 2020
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCOG: 621256
SDG: 516368
Laboratory: GEL
Project/Task: 195122.10.11.03
Analysis: SVOCs

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 06.

Summary

Two aqueous samples were prepared and analyzed with accepted procedures using method SW846 8270D SIM (SVOCs - 1,4-dioxane). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

Reporting Limit Verification

The CMDL (reporting level verification standard) recovery met QC acceptance criteria.

Blanks

No target analyte was detected in any of the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD met QC acceptance criteria for accuracy and precision. 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

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

EB1 was submitted with ARCOG 621255 in another SDG and was associated with the samples on ARCOG 621256. A field duplicate pair was submitted with ARCOG 621256. 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: 08/31/2020

Memorandum

Date: August 29, 2020
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: CWL PCCP
ARCO: 621256
SDG: 516368
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 06.

Summary

Two samples were 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 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 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 for both samples because the sample concentrations for Ca 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 621255 in another SDG and was associated with the samples on ARCOG 621256. A field duplicate pair was submitted with ARCOG 621256. 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: 08/31/2020



Sample Findings Summary



AR/COC: 621256

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#: 621256	Site/Project: CWL PCCP	Validation Date: 08/29/2020
SDG #: 516368	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 7	CVR present: Yes
ARCOG(s) present: Yes	Sample Container Integrity: OK	
Analysis Type: <input checked="" type="checkbox"/> Organic <input checked="" type="checkbox"/> Metals <input type="checkbox"/> Genchem <input type="checkbox"/> Rad		

Requested Analyses Not Reported			
Client Sample ID	Lab Sample ID	Analysis	Comments
None			

Hold Time/Preservation Outliers								
Client Sample ID	Lab Sample ID	Analysis	Pres.	Collection Date	Preparation Date	Analysis Date	Analysis <2X HT	Analysis ≥2X HT
None								

Comments: Collected: 07/21/20

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

EB1 was submitted with ARCOG 621255 in another SDG and was associated with the samples on ARCOG 621256

Validated by: *L Thal*

Sandia Organic Worksheet (GC/MS VOC)

ARCO # (s): 621256	SDG: 516368	Matrix: Aqueous
Laboratory Sample IDs: 516368001, -004, -007		
Method/Batch #s: 8260B 2025452	Tuning (pass/fail): pass	TICs Required? (yes/no): no

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	TB4 -007	EB1 516272 -006		
	Int.	RF/ Slope	RSD/ r ²	(ICV)/CCV %D										
None														

Surrogate Recovery Outliers

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

IS Outliers

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

Comments: HTs OK. TCE only. MS/MSD on SNL sample 516475001
ICAL VOA6.I 05/28/20 TCE avg RF

Sandia Organic Worksheet (GC/MS SVOC)

ARCO # (s): 621256	SDG:516368	Matrix: Aqueous
Laboratory Sample IDs:516368002, -005		
Method/Batch #s: 3535A/8270D SIM 2023173/2023176	Tuning (pass/fail): pass	TICs Required? (yes/no): no

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	CMDL	EB1 516272 -007		
	Int.	RF/ Slope	RSD/r ²	(ICV)/ CCV %D										
None														
Surrogate Recovery Outliers														
Sample ID	1,4-Dioxane-d8													
None														
IS Outliers														
Tetrahydrofuran-d8														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: GC/MS SIM with solid phase extraction. Samples preserved with NaHSO₄ to a pH ≤ 4 have 28 days to extraction.
 HT OK. Both samples pH 1 = 2. MS/MSD on SNL sample 516272003.
 ICAL: MSD6.I 05/07/2020

Sandia Inorganic Metals Worksheet

ARCO #:(s): 621256	SDG #(s): 516368	Matrix: Aqueous
Laboratory Sample IDs: 516368003, -006		
Method/Batch #s: 3005A/6020B :2022299/2022301		

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	EB1 516272 -008
	Int. ug/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L										
None																

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

Comments: HTs OK; DUP/MS/SD performed on SNL sample 516271002.
Ca >100ppm for both samples; ICS A < MDL

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

516368

SDG: 516368

Internal Lab		Page 1 of 1										
Batch No.		SMO Use										
Project Name: CWL PCCP		Date Samples Shipped: 7-21-20										
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. 311587										
Project/Task Number: 195122.10.11.03		Lab Contact: Edie Kent/843-769-7385										
Service Order: CF327-20		Lab Destination: GEL										
		Contract No.: 1983530										
Tech Area:		SMO Authorization:										
Building:		SMO Contact Phone: Wendy Palencia/505-844-3132										
Room:		Send Report to SMO: Stephanie Montaño/505-284-2553										
Operational Site:		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input checked="" type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 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					
113357	001	CWL-MW9	517	7/21/20 10:24	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	001
113357	002	CWL-MW9	517	7/21/20 10:26	GW	AG	500 ml	NaHSO4	G	SA	1,4-DIOXANE (EPA 8270 SIM)	002
113357	003	CWL-MW9	517	7/21/20 10:28	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	003
113358	001	CWL-MW9	517	7/21/20 10:25	GW	G	3x40 ml	HCl	G	DU	VOC-TCE (SW846-8260B)	004
113358	002	CWL-MW9	517	7/21/20 10:27	GW	AG	500 ml	NaHSO4	G	DU	1,4-DIOXANE (EPA 8270 SIM)	005
113358	003	CWL-MW9	517	7/21/20 10:29	GW	P	500 ml	HNO3	G	DU	CHROMIUM, NICKEL (SW846-6020)	006
113359	001	CWL-TB4	NA	7/21/20 10:24	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	007
Last Chain: <input type="checkbox"/> Yes				Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes				Date Entered:				EDD <input checked="" type="checkbox"/> Yes				
Background: <input type="checkbox"/> Yes				Entered by:				Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day				
Confirmatory: <input type="checkbox"/> Yes				QC inits.:				Negotiated TAT <input type="checkbox"/>				
Sample Team Members	Name		Signature		Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab				
	Robert Lynch				RL	SNL/08888/505-844-4013/505-250-7090		Return Samples By:				
	William Gibson				WG	SNL/08888/505-284-3307/505-239-7367		Comments: Trip Blanks received from Lab with head space. wfg 7-21-20				
	Zachary Tenorio				ZT	SNL/08888/505-845-8636/505-259-5765						
	Denisha Sanchez				DS	SNL/08888/505-845-7829/505-208-1375						
Relinquished by		Org. 08888	Date 7-21-20	Time 10:59	Relinquished by		Org.	Date	Time			
Received by		Org. 0628	Date 7-21-20	Time 10:59	Received by		Org.	Date	Time			
Relinquished by		Org. 0628	Date 7-21-20	Time 11:42	Relinquished by		Org.	Date	Time			
Received by		Org.	Date 7/22/20	Time 10:55	Received by		Org.	Date	Time			

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

AR/COC NUMBERS 621258, 621259

Memorandum

Date: August 29, 2020

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCOG: 621258 and 621259
SDG: 516473
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 06.

Summary

Four 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 recoveries and RPDs met QC acceptance criteria. It should be noted that the MS/MSD was 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 each ARCO. A DIWQC sample was submitted with ARCO 621259 and was the DI source for equipment decontamination and not associated with any field samples.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 08/31/2020

Memorandum

Date: August 29, 2020
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCO: 621258 and 621259
SDG: 516473
Laboratory: GEL
Project/Task: 195122.10.11.03
Analysis: SVOCs

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 06.

Summary

Two aqueous samples were prepared and analyzed with accepted procedures using method SW846 8270D SIM (SVOCs - 1,4-dioxane). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

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

Reporting Limit Verification

The CMDL (reporting level verification standard) recovery met QC acceptance criteria.

Blanks

No target analyte was detected in any of the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD met QC acceptance criteria for accuracy and precision. 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

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 DIWQC sample was submitted with ARCO 621259 and was the DI source for equipment decontamination and not associated with any field samples.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan **Level:** I **Date:** 08/31/2020

Memorandum

Date: August 29, 2020
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: CWL PCCP
ARCO: 621258 and 621259
SDG: 516473
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 06.

Summary

Two samples were 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 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 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 for sample 516473003 because the sample concentration for Ca 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

A DIWQC sample was submitted with ARCOG 621259 and was the DI source for equipment decontamination and not associated with any field samples.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan

Level: I

Date: 08/31/2020



Sample Findings Summary



AR/COC: 621258, 621259

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#: 621258 and 621259	Site/Project: CWL PCCP	Validation Date: 08/29/2020
SDG #: 516473	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 8	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: 07/22/20
 The ARCOGs noted that the trip blank vials were received from the lab with headspace.
 DIWQC was submitted with ARCOG 621259 and was not associated with any field samples.

Validated by: *L Thal*

Sandia Organic Worksheet (GC/MS VOC)

ARCO #s): 621258 and 621259	SDG: 516473	Matrix: Aqueous
Laboratory Sample IDs: 516473001, -004, -005, -008		
Method/Batch #s: 8260B 2025452	Tuning (pass/fail):pass	TICs Required? (yes/no):no

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	TB6 -004	TB7 -008	DIWQC -005
	Int.	RF/ Slope	RSD/ r ²	(ICV)/CCV %D									
None													

Surrogate Recovery Outliers									
Sample ID	1,2-DCA-d4 %R	Toluene-d8 %R	BFB %R		Sample ID	1,2-DCA-d4 %R	Toluene-d8 %R	BFB %R	
None									

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

Comments: HTs OK. TCE only. MS/MSD on SNL sample 516475001
 ICAL VOA6.I 05/28/20 TCE avg RF

Sandia Inorganic Metals Worksheet

ARCOG #(s): 621258 and 621259	SDG #(s): 516473	Matrix: Aqueous
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Laboratory Sample IDs: 516473003, -007

Method/Batch #s: **3005A/6020B**:2022299/2022301

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	DIWQC -007
	Int. ug/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L										
None																

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

Comments: HTs OK; DUP/MS/SD performed on SNL sample 516271002.
 Ca >100ppm for sample -003; ICS A < MDL

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

516473

Internal Lab

Batch No.		SMO Use		AR/COC		621258	
Project Name: CWL PCCP		Date Samples Shipped: 7-22-20		SMO Authorization:		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No.	
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. 316673		SMO Contact Phone: Wendy Palencia/505-844-3132		<input checked="" type="checkbox"/> 4° Celsius	
Project/Task Number: 195122.10.11.03		Lab Contact: Edie Kent/843-769-7385		Send Report to SMO: Stephanie Montaño/505-284-2553		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Service Order: CF327-20		Lab Destination: GEL		Contract No.: 1983530			
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					
113362	001	CWL-MW11	513	7/22/20	11:50	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	001
113362	002	CWL-MW11	513	7/22/20	11:51	GW	AG	500 ml	NaHSO4	G	SA	1,4-DIOXANE (EPA 8270 SIM)	002
113362	003	CWL-MW11	513	7/22/20	11:52	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	003
113363	001	CWL-TB6	NA	7/22/20	11:50	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				RL		SNL/08888/505-844-4013/505-250-7090		Return Samples By:			
	William Gibson				WG		SNL/08888/505-284-3307/505-239-7367		Comments: Trip Blanks received from lab with head space.			
	Zachary Tenorio				ZT		SNL/08888/505-845-8636/505-259-5765					
Relinquished by		Org. 09888		Date 7-22-20		Time 1232		Relinquished by		Org. Date Time		
Received by		Org. 0628		Date 7-22-20		Time 1232		Received by		Org. Date Time		
Relinquished by		Org. 0628		Date 7-22-20		Time 1320		Relinquished by		Org. Date Time		
Received by		Org.		Date 7-23-20		Time 750		Received by		Org. Date Time		

Relinquished by		Org. 09888		Date 7-22-20		Time 1232		Relinquished by		Org. Date Time	
Received by		Org. 0628		Date 7-22-20		Time 1232		Received by		Org. Date Time	
Relinquished by		Org. 0628		Date 7-22-20		Time 1320		Relinquished by		Org. Date Time	
Received by		Org.		Date 7-23-20		Time 750		Received by		Org. Date Time	

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC **621259**

Project Name: CWL PCCP	Date Samples Shipped: 7-22-20	SMO Authorization:	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Timmie Jackson	Carrier/Waybill No: 316673	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: CF327-20	Lab Destination: GEL		
	Contract No.: 1983530		

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					
113364	001	CWL-DIWQC	NA	7/22/20 11:01	DIW	G	3x40 ml	HCl	G	FB	VOC-TCE (SW846-8260B)	005
113364	002	CWL-DIWQC	NA	7/22/20 11:02	DIW	AG	500 ml	NaHSO4	G	FB	1,4-DIOXANE (EPA 8270 SIM)	006
113364	003	CWL-DIWQC	NA	7/22/20 11:03	DIW	P	500 ml	HNO3	G	FB	CHROMIUM, NICKEL (SW846-6020)	007
113365	001	CWL-TB7	NA	7/22/20 11:01	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	008

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
	Robert Lynch		RL	SNL/08888/505-844-4013/505-250-7090	Return Samples By: Comments: Trip Blanks received from lab with head space.
	William Gibson		WG	SNL/08888/505-284-3307/505-239-7367	
	Zachary Tenorio		ZT	SNL/08888/505-845-8636/505-259-5765	
	Denisha Sanchez		DS	SNL/08888/505-845-7829/505-208-1375	

Relinquished by	Org. 06288	Date 7-22-20	Time 1232	Relinquished by	Org.	Date	Time
Received by	Org. 0628	Date 7-22-20	Time 1232	Received by	Org.	Date	Time
Relinquished by	Org. 0628	Date 7-22-20	Time 1320	Relinquished by	Org.	Date	Time
Received by	Org.	Date 7/23-20	Time 750	Received by	Org.	Date	Time

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

AR/COC NUMBER 621261

Memorandum

Date: September 6, 2020

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCOG: 621261
SDG: 516813
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 06.

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 recoveries and RPDs met QC acceptance criteria. It should be noted that the MS/MSD was 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 a FB were submitted with ARCOG 621261 and were associated with the sample on the same ARCOG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 09/07/2020

Memorandum

Date: September 6, 2020

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCO: 621261
SDG: 516813
Laboratory: GEL
Project/Task: 195122.10.11.03
Analysis: SVOCs

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 06.

Summary

One aqueous sample was prepared and analyzed with accepted procedures using method SW846 8270D SIM (SVOCs - 1,4-dioxane). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

Holding Times

The sample was analyzed within the prescribed holding time but was received improperly preserved. Since the sample was extracted within the method specified holding time for unpreserved samples, no data will be qualified.

Instrument Tune

All instrument tune requirements were met.

Calibration

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

Reporting Limit Verification

The CMDL (reporting level verification standard) recovery met QC acceptance criteria.

Blanks

No target analyte was detected in any of the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD met QC acceptance criteria for accuracy and precision.

Laboratory Control Sample

All LCS acceptance criteria were met.

Detection Limits/Dilutions

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

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan

Level: I

Date: 09/07/2020

Memorandum

Date: September 6, 2020
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: CWL PCCP
ARCOG: 621261
SDG: 516813
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 06.

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 except as follows. The %R for the internal standard associated with Cr and Ni was slightly <80% for the CCB preceding the sample. No field sample results will be qualified.

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 for sample 516813004 because the sample concentration for Ca was > that 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: 09/07/2020

Sandia Data Validation Summary Worksheet

ARCOG#: 621261	Site/Project: CWL PCCP	Validation Date: 09/06/2020
SDG #: 516813	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
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								

<p><u>Comments:</u> Collected: 07/27/20 The ARCOG noted that the trip blank vials were received from the lab with headspace.</p>
<p><u>Validated by:</u> <i>L. Thal</i></p>

Sandia Inorganic Metals Worksheet

ARCO #s: 621261	SDG #(s): 516813	Matrix: Aqueous
Laboratory Sample IDs: 516813004		
Method/Batch #s: 3005A/6020B :2024374/2024375		

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		
	Int. ug/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L											
None																	

IS Outliers 60-125%				IS Outliers 80-120%			
Sample ID	%Recovery	%Recovery	%Recovery	CCV/CCB ID	%Recovery	%Recovery	%Recovery
None				CCB 21:45	Sc 79%		

Comments: HTs OK; DUP/MS/SD performed on -004.
Ca >100ppm for sample -004; ICS A < MDL

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

516813

Internal Lab

Batch No.

SMO Use

AR/COC

621261

Project Name: CWL PCCP	Date Samples Shipped: 7/27/20	SMO Authorization:	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. 316813	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: CF327-20	Lab Destination: GEL	Contract No.: 1983530	
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					
113368	001	CWL-FB2	NA	7/27/20 08:35	DIW	G	3x40 ml	HCl	G	FB	VOC-TCE (SW846-8260B)	001
113369	001	CWL-MW10	515	7/27/20 09:03	GW	G	3x40 ml	HCl	G	SA	VOC-TCE (SW846-8260B)	002
113369	002	CWL-MW10	515	7/27/20 09:04	GW	AG	500 ml	NaHSO4	G	SA	1,4-DIOXANE (EPA 8270 SIM)	003
113369	003	CWL-MW10	515	7/27/20 09:05	GW	P	500 ml	HNO3	G	SA	CHROMIUM, NICKEL (SW846-6020)	004
113370	001	CWL-TB9	NA	7/27/20 08:35	DIW	G	3x40 ml	HCl	G	TB	VOC-TCE (SW846-8260B)	005

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		RL	SNL/08888/505-844-4013/505-250-7090	Return Samples By: Comments: Trip blanks received from lab with head space.
	William Gibson		WG	SNL/08888/505-284-3307/505-239-7367	
	Denisha Sanchez		DS	SNL/08888/505-845-7829/505-208-1375	
Relinquished by	Org. 88888	Date 7/27/20	Time 09:42	Relinquished by	Org. _____ Date _____ Time _____
Received by	Org. 0628	Date 7/27/20	Time 09:42	Received by	Org. _____ Date _____ Time _____
Relinquished by	Org. 0628	Date 7/27/20	Time 16:16	Relinquished by	Org. _____ Date _____ Time _____
Received by	Org. _____	Date 7/28/20	Time 10:05	Received by	Org. _____ Date _____ Time _____

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

CONTRACT VERIFICATION FORMS
CHEMICAL WASTE LANDFILL
GROUNDWATER MONITORING
JULY 2020

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

AR/COC Number	Sample Type
621255	Quality Control
621256	Environmental & Quality Control
621258	Environmental & Quality Control
621259	Quality Control
621261	Environmental & Quality Control
621262*	Waste
621263	Environmental & Quality Control

*This AR/COC (waste characterization sample for CWL-MW10 purge water) is included because it was combined with AR/COC 621261 (field blank quality control sample) for the contract verification process; a copy of AR/COC 621262 is not included in the Data Validation Reports in this annex as the associated waste characterization samples do not require data validation.

Contract Verification Form (CVR)

Project Leader JACKSON

Project Name CWL PCCP

Project/Task No. 195122_10.11.03

ARCOG No. 621255 & 621263

Analytical Lab GEL

SDG No. 516272

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	X		

5.0 Data Anomaly Report

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

6.0 Problem Resolution

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

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

Were deficiencies unresolved? Yes No

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

Reviewed by: Wendy Palencia Date: 08-27-2020 07:25:00

Closed by: Wendy Palencia Date: 08-27-2020 07:25:00

Contract Verification Form (CVR)

Project Leader JACKSON

Project Name CWL PCCP

Project/Task No. 195122_10.11.03

ARCOG No. 621256

Analytical Lab GEL

SDG No. 516368

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	X		

5.0 Data Anomaly Report

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

6.0 Problem Resolution

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

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

Were deficiencies unresolved? Yes No

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

Reviewed by: Wendy Palencia Date: 08-27-2020 08:47:00

Closed by: Wendy Palencia Date: 08-27-2020 08:47:00

Contract Verification Form (CVR)

Project Leader JACKSON

Project Name CWL PCCP

Project/Task No. 195122_10.11.03

ARCOG No. 621258 & 621259

Analytical Lab GEL

SDG No. 516473

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	X		

5.0 Data Anomaly Report

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

6.0 Problem Resolution

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

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

Were deficiencies unresolved? Yes No

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

Reviewed by: Wendy Palencia Date: 08-27-2020 09:18:00

Closed by: Wendy Palencia Date: 08-27-2020 09:18:00

Contract Verification Form (CVR)

Project Leader JACKSON

Project Name CWL PCCP

Project/Task No. 195122_10.11.03

ARCOG No. 621261 & 621262

Analytical Lab GEL

SDG No. 516813

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	X		

5.0 Data Anomaly Report

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

6.0 Problem Resolution

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

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

Were deficiencies unresolved? Yes No

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

Reviewed by: Wendy Palencia Date: 09-03-2020 13:03:00

Closed by: Wendy Palencia Date: 09-03-2020 13:03:00

ANNEX B

**Chemical Waste Landfill
Calendar Year 2020
Soil-Gas Monitoring Forms and Reports**

Field Forms

Data Validation Reports

Contract Verification Forms

Certificates of Analysis

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

Form Title	Corresponding Procedure
Soil Vapor Sampling Log Form	FOP 08-22
Analysis Request and Chain of Custody*	LOP 94-03

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

FIELD SAMPLING FORMS

JANUARY 2020

SOIL-GAS MONITORING

Soil Vapor Sampling Log Form

Location	Date	Time	Canister #	PID (ppm)	Flow Rate (L/hr)	Initial Canister Vacuum (psi)	Ending Canister Vacuum (psi)	Comments
CWL-W-1-1	1/30/20	0835	10764	NA	NA	-23	-8	FBI
CWL-W-1-40 ↓		0842	NA		8	NA	NA	
		0843	↓		↓	↓		
		0844	11532		NA	-29	-8	
CWL-W-1-80 ↓		0847	NA		15	NA	NA	
		0848	↓		↓	↓		
		0848	909769		NA	-22	-8	
CWL-W-1-120 ↓	Y	0850	NA		8	NA	NA	
		0851	↓		↓	↓		
		0851	10984		NA	-28	-8	

Field Notes:

- Ground Elevation - 5306 fams
- NMED Sample Split @ 120ft Sample port

IMPORTANT NOTICE: A printed (and uncompleted) copy of this form may not be the most current form. The official version is located in the Long-Term Stewardship (LTS) ARAS document library, for which access is required. Upon completion, this document becomes record.

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-D1	1/30/20	0914	11700	NA	NA	-19	-8	F33
CWL-D1-100		0918	NA		LO	NA	NA	
↓		0919	↓		↓	↓	↓	
↓		0919	10701		NA	-23	-8	
CWL-D1-100		0920	NA		8	NA	NA	
↓		0922	↓		↓	↓	↓	
↓		0922	09671		NA	-28	-8	
CWL-D1-240		0924	NA		8	NA	NA	
↓		0928	↓		↓	↓	↓	
↓		0926	11560		NA	-22	-8	
CWL-D1-350		0926	NA		8	NA	NA	
↓		0929	↓		↓	↓	↓	
↓		0929	10330		NA	-28	-8	
CWL-D1-470		0931	NA		8	NA	NA	
↓		0935	↓		↓	↓	↓	
↓	↓	0935	11205	↓	NA	-28	-8	

Field Notes:

- Ground Elevation ~ 5300 fmsl
- NMED Sample Split @ 350 + 470 Sample ports
- CWL-D1-100 loose connection

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	1/30/20	1017	10191	NA	NA	-24	-8	FBS
CWL-D3-120	↓	1021	NA	↓	18	NA	NA	
↓		1023	↓		↓	↓	↓	
↓		1023	10568		NA	-25	-8	
CWL-D3-170	↓	1024	NA	↓	10	NA	NA	
↓		1028	↓		↓	↓	↓	
↓		1028	11688		NA	-21	-8	
CWL-D3-300	↓	1029	NA	↓	10	NA	NA	
↓		1031	↓		↓	↓	↓	
↓		1031	09782		NA	-24	-8	
CWL-D3-440	↓	1033	NA	↓	15	NA	NA	
↓		1034	↓		↓	↓	↓	
↓		1036	09780		NA	-22	-8	
CWL-D3-480	↓	1043	NA	↓	20	NA	NA	
↓		1045	↓		↓	↓	↓	
↓		1045	09981		NA	-22	-8	

Field Notes:

- Ground Elevation ~5300 fmsl
- NMED Split Samples @ 440 + 480 Sample ports

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-DZ	1/30/20	1052	09675	NA	NA	-23	-8	FB 4
CWL-DZ-170		1109	NA		8	NA	NA	
↓		1111	↓		↓	↓	↓	
↓		1111	10569		NA	-24	-8	
↓		1111	10399		NA	-24	-8	Duplicate
CWL-DZ-240		112	NA		10	NA	NA	
↓		114	↓		↓	↓	↓	
		114	34006612		NA	-24	-8	
CWL-DZ-350		1116	NA		8	NA	NA	
↓		1118	↓		↓	↓	↓	
		1119	11981		NA	-25	-8	
CWL-DZ-440		1121	NA		15	NA	NA	
↓		1122	↓		↓	↓	↓	
		1123	10093		NA	-24	-8	
CWL-DZ-470		1126	NA		10	NA	NA	
↓		1128	↓		↓	↓	↓	
↓		1129	12022		NA	-24	-8	
		1129	11561		NA	-24	-8	Duplicate

Field Notes:

- Ground Elevation ~ 5300 fmsl
- NMED Sample Split @ 440 + 470 Sample Ports.

SUMMARY SHEET FOR JANUARY 2020 SAMPLES

**Sample Summary for Chemical Waste Landfill Soil-Gas Monitoring
January 2020**

Well ID	Sample Date	Sample ID / Port	SUMMA Number	ARCOG	Sample Number	Sample Type	Associated Equipment Blank (ARCOG #/Sample #)	Associated Trip Blank (ARCOG #/Sample #)	Associated Field Blank (ARCOG #/Sample #)	Comments	
Chemical Waste Landfill Soil Vapor Monitoring: Project Task Number 195122.10.11.03 / Service Order Number CF 327-20											
CWL-U11	30-Jan-20	CWL-SV-U11-40	11532	620813	112298	Environmental	n/a	n/a	620813 / 112297		
		CWL-SV-U11-80	909769		112299	Environmental					
		CWL-SV-U11-120	10984		112300	Environmental					
		CWL-SV-FB1	10764		112297	Field QC					Ultra Pure N2
CWL-U12	30-Jan-20	CWL-UI-2-36	10212	620818	112302	Environmental	n/a	n/a	620818 / 112301		
		CWL-UI-2-76	10405		112303	Environmental					
		CWL-UI-2-136	09941*		n/a	Environmental					See note below
		CWL-SV-FB2	10384		112301	Field QC					Ultra Pure N2
CWL-D1	30-Jan-20	CWL-SV-D1-100	10701	620819	112306	Environmental	n/a	n/a	620819 / 112305		
		CWL-SV-D1-160	09671		112307	Environmental					
		CWL-SV-D1-240	11560		112308	Environmental					
		CWL-SV-D1-350	10330		112309	Environmental					
		CWL-SV-D1-470	11205		112310	Environmental					
		CWL-SV-FB 3	11700		112305	Field QC					Ultra Pure N2
CWL-D2	30-Jan-20	CWL-SV-D2-120	10569	620820	112312	Environmental	n/a	n/a	620820 / 112311		
		CWL-SV-D2-120	10399		112313	Duplicate					
		CWL-SV-D2-240	34000612		112314	Environmental					
		CWL-SV-D2-350	11981		112315	Environmental					
		CWL-SV-D2-440	10093		112316	Environmental					
		CWL-SV-D2-470	12022		112317	Environmental					
		CWL-SV-D2-470	11561		112318	Duplicate					
		CWL-SV-FB 4	09875		112311	Field QC					Ultra Pure N2
CWL-D3	30-Jan-20	CWL-SV-D3-120	10568	620821	112320	Environmental	n/a	n/a	620821 / 112319		
		CWL-SV-D3-170	11688		112321	Environmental					
		CWL-SV-D3-350	09782		112322	Environmental					
		CWL-SV-D3-440	09780		112323	Environmental					
		CWL-SV-D3-480	09981		112324	Environmental					
		CWL-SV-FB 5	10191		112319	Field QC					Ultra Pure N2

*Will be resampled in March due to broken valve stem issue reported by laboratory.

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

CHEMICAL WASTE LANDFILL

SOIL-GAS MONITORING

JANUARY 2020

AR/COC NUMBERS 620813, 620818, 620819, 620820, 620821

Memorandum

Date: March 16, 2020

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCOG: 620813, 620818, 620819, 620820 and 620821
SDG: 140-18189
Laboratory: Eurofins TestAmerica, Knoxville
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-seven samples were prepared and analyzed with accepted procedures using method EPA TO-15 (Determination of VOCs in Air collected in specially prepared canisters and analyzed by GC-MS). All compounds were successfully analyzed. Problems were identified with the data package that resulted in the qualification of data.

1. The initial calibration intercept was negative with an absolute value > the 3X the MDL for methylene chloride. The associated results for samples 140-18189-1, -4, -15, -26 and -28 were detects \leq 3X the value of the intercept and will be **qualified J,I5**. The remaining associated sample results were non-detect and will be **qualified R,I5**.
2. For the CCV associated with samples -22, -25, -26 and -27, the %D was >30% and positive for trichlorofluoromethane. The associated sample results were detects and will be **qualified J+,C2**.
3. Trichloroethene and m,p-xylene were detected at > the PQL and acetone; benzene; 2-butanone; carbon disulfide; chloromethane; ethylbenzene; methylene chloride; tetrachloroethene; toluene; trichlorofluoromethane; 1,2,4-trimethylbenzene and o-xylene were detected at \leq the PQL in FB1, sample -1, associated with samples -2, -3 and -4. The benzene result for samples -2 and -4 and the methylene chloride result for sample -4 were detects \leq the PQL and will be **qualified U,B2**; non-detect at their respective PQLs.
4. Acetone; benzene; 2-butanone; chloromethane; dichlorodifluoromethane; 2-hexanone; 4-methyl-2-pentanone; tetrachloroethene; toluene; trichloroethene and trichlorofluoromethane were detected at \leq the PQL in FB2, sample -5, associated with samples -6 and -7. The dichlorodifluoromethane result for sample -7 was a detect \leq the PQL and will be **qualified 48U,B2**; non-detect at the PQL.

5. Acetone was detected at > the PQL and benzene; 2-butanone; tetrachloroethene and trichlorofluoromethane were detected at ≤ the PQL in FB3, sample -9, associated with samples -10 through -14. The benzene result for all samples were detects ≤ the PQL and will be **qualified U,B2**; non-detect at their respective PQLs.
6. Acetone; benzene; 2-butanone; carbon disulfide; chloromethane; 2-hexanone; methylene chloride and trichlorofluoromethane were detected at ≤ the PQL in FB4, sample -15, associated with samples -16 through -22. The benzene result for samples -16, -19, -20, -21 and -22 were detects ≤ the PQL and will be **qualified U,B2**; non-detect at their respective PQLs.
7. Acetone; benzene; 2-butanone; carbon disulfide; chloromethane; dichlorodifluoromethane; 4-methyl-2-pentanone and trichlorofluoromethane were detected at ≤ the PQL in FB5, sample -23, associated with samples -24 through -28. The benzene result for samples -24 through -26; the dichlorodifluoromethane results for samples -25 and -27 and the acetone; 2-butanone; carbon disulfide and 4-methyl-2-pentanone results for sample -28 were detects ≤ the PQL and will be **qualified U,B2**; non-detect at their respective PQLs. The chloromethane result for sample -28 was a detect > the PQL but ≤5X the FB value and will be **qualified J+,B2**.
8. Neither a laboratory replicate nor an LCS/LCSD was associated with samples -1, -5, -6, -9, -14, -15, -23 and -28. Sample -28 was reanalyzed at a greater dilution on the same instrument on a different day. These results were manually compared to the original results for precision information for the original batch. The original sample results for tetrachloroethene and trichlorofluoromethane were >5X the PQL and the RPDs did not meet laboratory acceptance criteria. All associated sample results from the original batch that were detects will be **qualified J,RP1** and those that were non-detect will be **qualified UJ,RP1**.
9. The trichloroethene results for samples -6 and -17 were detects > the high standard and the samples were not reanalyzed at a dilution. The associated sample results will be **qualified J,FR1**.
10. All sample results, *except* samples -1, -5, -9, -14, -15 and -23, were reported as detects for 1,2-dichloropropane. The detected results exhibited interference with the quantitation ion and many required manual integration. Therefore, the associated sample results will be **qualified J,X1**.

Data are acceptable except as 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 except as noted above in the Summary section.

Blanks

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

Trichloroethene and m,p-xylene were detected at > the PQL and acetone; benzene; 2-butanone; carbon disulfide; chloromethane; ethylbenzene; methylene chloride; tetrachloroethene; toluene; trichlorofluoromethane; 1,2,4-trimethylbenzene and o-xylene were detected at ≤ the PQL in FB1 sample -1 associated with samples -2, -3 and -4. Tetrachloroethene; trichloroethene and trichlorofluoromethane were detected at > the PQL and > 5X the FB values in samples -2, -3 and -4 and will not be qualified. All remaining target analytes, excluding those already discussed, were non-detect and will not be qualified.

Acetone; benzene; 2-butanone; chloromethane; dichlorodifluoromethane; 2-hexanone; 4-methyl-2-pentanone; tetrachloroethene; toluene; trichloroethene and trichlorofluoromethane were detected at ≤ the PQL in FB2 sample -5 associated with samples -6 and -7. Dichlorodifluoromethane was detected at > the PQL and > 5X the FB value in sample -6 and tetrachloroethene; trichloroethene and trichlorofluoromethane were detected at > the PQL and > 5X the FB values in samples -6 and -7 and will not be qualified. All remaining target analytes, excluding those already discussed, were non-detect and will not be qualified.

Acetone was detected at > the PQL and benzene; 2-butanone; tetrachloroethene and trichlorofluoromethane were detected at ≤ the PQL in FB3 sample -9 associated with samples -10 through -14. Tetrachloroethene and trichlorofluoromethane were detected in all samples at > the PQL and > 5X the FB values and will not be qualified. All remaining target analytes, excluding those already discussed, were non-detect and will not be qualified.

Acetone; benzene; 2-butanone; carbon disulfide; chloromethane; 2-hexanone; methylene chloride and trichlorofluoromethane were detected at ≤ the PQL in FB4, sample -15, associated with samples -16 through -22. Trichlorofluoromethane was detected in all samples at > the PQL and > 5X the FB values and will not be qualified. All remaining target analytes, excluding those already discussed, were non-detect and will not be qualified.

Acetone; benzene; 2-butanone; carbon disulfide; chloromethane; dichlorodifluoromethane; 4-methyl-2-pentanone and trichlorofluoromethane were detected at ≤ the PQL in FB5, sample -13, associated with samples -24 through -28. Trichlorofluoromethane was detected in all samples at > the PQL and > 5X the FB values and will not be qualified. Benzene was detected in sample -28 at > the PQL and > 5X the FB value and dichlorodifluoromethane was detected in samples -24, -26 and -28 at > the PQL and > 5X the FB value and will not be qualified. All remaining target analytes, excluding those already discussed, were non-detect and will not be qualified.

Surrogates

All surrogate acceptance criteria were met.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

An MS/MSD was not performed.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Laboratory Replicate

Laboratory replicates met QC acceptance criteria except as noted above in the Summary section.

Detection Limits/Dilutions

All detection limits were properly reported and correctly adjusted for summa canister dilutions. The following canister dilutions were performed for all target analytes.

Sample -1 (2.01X); -2 (13.32X); -3 (14.28X); -4 (14.09X); -5 (1.88X); -6 (5.75X); -7 (13.32X); -9 (1.87X); -10 (19.58X); -11 (41.8X); -12 (55.32X); -13 (14.03X) and (41.91X); -14 (1.59X); -15 (1.91X); -16 (16.43X); -17 (17.02X); -18 (17.96X); -19 (16.76X); -20 (5.87X); -21 (5.18X); -22 (5.18X); -23 (1.81X); -24 (16.44X); -25 (15.74X); -26 (5.86X); -27 (17.4X) and -28 (2.29X).

MDLs and PQLs were further adjusted for sample volume used during analysis. Samples -4, -13, -16 and -28 required reanalysis using a reduced sample volume for trichloroethene and sample -14 required reanalysis using a reduced sample volume for 1,1,2-trichloro-1,2,2-trifluoroethane.

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 ARCOG and were associated with the samples on the same ARCOG. Two field duplicate pairs were submitted with ARCOG 620820. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donivan

Level: I

Date: 03/18/2020



Sample Findings Summary



AR/COC: 620813, 620818, 620819, 620820, 620821

Page 1 of 4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
TO15_LL_PF			
	112297-001/CWL-SV-FB1	METHYLENE CHLORIDE (75-09-2)	J-, I5
	112297-001/CWL-SV-FB1	TETRACHLOROETHENE (127-18-4)	J, RP1
	112297-001/CWL-SV-FB1	TRICHLOROFLUOROMETHANE (75-69-4)	J, RP1
	112298-001/CWL-SV-UI1-40	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112298-001/CWL-SV-UI1-40	BENZENE (71-43-2)	27U, B2
	112298-001/CWL-SV-UI1-40	METHYLENE CHLORIDE (75-09-2)	R, I5
	112299-001/CWL-SV-UI1-80	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112299-001/CWL-SV-UI1-80	METHYLENE CHLORIDE (75-09-2)	R, I5
	112300-001/CWL-SV-UI1-120	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112300-001/CWL-SV-UI1-120	BENZENE (71-43-2)	40U, B2
	112300-001/CWL-SV-UI1-120	METHYLENE CHLORIDE (75-09-2)	200UJ, B2,I5
	112301-001/CWL-SV-FB2	METHYLENE CHLORIDE (75-09-2)	R, I5
	112301-001/CWL-SV-FB2	TETRACHLOROETHENE (127-18-4)	J, RP1
	112301-001/CWL-SV-FB2	TRICHLOROFLUOROMETHANE (75-69-4)	J, RP1
	112302-001/CWL-UI-2-36	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112302-001/CWL-UI-2-36	METHYLENE CHLORIDE (75-09-2)	R, I5
	112302-001/CWL-UI-2-36	TETRACHLOROETHENE (127-18-4)	J, RP1
	112302-001/CWL-UI-2-36	TRICHLOROETHENE (79-01-6)	J, FR1
	112302-001/CWL-UI-2-36	TRICHLOROFLUOROMETHANE (75-69-4)	J, RP1
	112303-001/CWL-UI-2-76	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112303-001/CWL-UI-2-76	DICHLORODIFLUOROMETHANE (75-71-8)	48U, B2
	112303-001/CWL-UI-2-76	METHYLENE CHLORIDE (75-09-2)	R, I5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	112305-001/CWL-SV-FB 3	METHYLENE CHLORIDE (75-09-2)	R, I5
	112305-001/CWL-SV-FB 3	TETRACHLOROETHENE (127-18-4)	J, RP1
	112305-001/CWL-SV-FB 3	TRICHLOROFLUOROMETHANE (75-69-4)	J, RP1
	112306-001/CWL-SV-D1-100	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112306-001/CWL-SV-D1-100	BENZENE (71-43-2)	71U, B2
	112306-001/CWL-SV-D1-100	METHYLENE CHLORIDE (75-09-2)	R, I5
	112307-001/CWL-SV-D1-160	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112307-001/CWL-SV-D1-160	BENZENE (71-43-2)	130U, B2
	112307-001/CWL-SV-D1-160	METHYLENE CHLORIDE (75-09-2)	R, I5
	112308-001/CWL-SV-D1-240	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112308-001/CWL-SV-D1-240	BENZENE (71-43-2)	110U, B2
	112308-001/CWL-SV-D1-240	METHYLENE CHLORIDE (75-09-2)	R, I5
	112309-001/CWL-SV-D1-350	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112309-001/CWL-SV-D1-350	BENZENE (71-43-2)	51U, B2
	112309-001/CWL-SV-D1-350	METHYLENE CHLORIDE (75-09-2)	R, I5
	112310-001/CWL-SV-D1-470	BENZENE (71-43-2)	2.1U, B2
	112310-001/CWL-SV-D1-470	METHYLENE CHLORIDE (75-09-2)	R, I5
	112310-001/CWL-SV-D1-470	TETRACHLOROETHENE (127-18-4)	J, RP1
	112310-001/CWL-SV-D1-470	TRICHLOROFLUOROMETHANE (75-69-4)	J, RP1
	112311-001/CWL-SV-FB 4	METHYLENE CHLORIDE (75-09-2)	J-, I5
	112311-001/CWL-SV-FB 4	TETRACHLOROETHENE (127-18-4)	UJ, RP1
	112311-001/CWL-SV-FB 4	TRICHLOROFLUOROMETHANE (75-69-4)	J, RP1
	112312-001/CWL-SV-D2-120	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112312-001/CWL-SV-D2-120	BENZENE (71-43-2)	41U, B2
	112312-001/CWL-SV-D2-120	METHYLENE CHLORIDE (75-09-2)	R, I5
	112313-001/CWL-SV-D2-120	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112313-001/CWL-SV-D2-120	METHYLENE CHLORIDE (75-09-2)	R, I5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	112313-001/CWL-SV-D2-120	TRICHLOROETHENE (79-01-6)	J, FR1
	112314-001/CWL-SV-D2-240	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112314-001/CWL-SV-D2-240	METHYLENE CHLORIDE (75-09-2)	R, I5
	112315-001/CWL-SV-D2-350	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112315-001/CWL-SV-D2-350	BENZENE (71-43-2)	61U, B2
	112315-001/CWL-SV-D2-350	METHYLENE CHLORIDE (75-09-2)	R, I5
	112316-001/CWL-SV-D2-440	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112316-001/CWL-SV-D2-440	BENZENE (71-43-2)	21U, B2
	112316-001/CWL-SV-D2-440	METHYLENE CHLORIDE (75-09-2)	R, I5
	112317-001/CWL-SV-D2-470	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112317-001/CWL-SV-D2-470	BENZENE (71-43-2)	19U, B2
	112317-001/CWL-SV-D2-470	METHYLENE CHLORIDE (75-09-2)	R, I5
	112318-001/CWL-SV-D2-470	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112318-001/CWL-SV-D2-470	BENZENE (71-43-2)	19U, B2
	112318-001/CWL-SV-D2-470	METHYLENE CHLORIDE (75-09-2)	R, I5
	112318-001/CWL-SV-D2-470	TRICHLOROFLUOROMETHANE (75-69-4)	J+, C2
	112319-001/CWL-SV-FB 5	METHYLENE CHLORIDE (75-09-2)	R, I5
	112319-001/CWL-SV-FB 5	TETRACHLOROETHENE (127-18-4)	UJ, RP1
	112319-001/CWL-SV-FB 5	TRICHLOROFLUOROMETHANE (75-69-4)	J, RP1
	112320-001/CWL-SV-D3-120	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112320-001/CWL-SV-D3-120	BENZENE (71-43-2)	33U, B2
	112320-001/CWL-SV-D3-120	METHYLENE CHLORIDE (75-09-2)	R, I5
	112321-001/CWL-SV-D3-170	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112321-001/CWL-SV-D3-170	BENZENE (71-43-2)	57U, B2
	112321-001/CWL-SV-D3-170	DICHLORODIFLUOROMETHANE (75-71-8)	57U, B2
	112321-001/CWL-SV-D3-170	METHYLENE CHLORIDE (75-09-2)	R, I5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	112321-001/CWL-SV-D3-170	TRICHLOROFLUOROMETHANE (75-69-4)	J+, C2
	112322-001/CWL-SV-D3-350	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112322-001/CWL-SV-D3-350	BENZENE (71-43-2)	21U, B2
	112322-001/CWL-SV-D3-350	METHYLENE CHLORIDE (75-09-2)	J-, I5
	112322-001/CWL-SV-D3-350	TRICHLOROFLUOROMETHANE (75-69-4)	J+, C2
	112323-001/CWL-SV-D3-440	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112323-001/CWL-SV-D3-440	DICHLORODIFLUOROMETHANE (75-71-8)	63U, B2
	112323-001/CWL-SV-D3-440	METHYLENE CHLORIDE (75-09-2)	R, I5
	112323-001/CWL-SV-D3-440	TRICHLOROFLUOROMETHANE (75-69-4)	J+, C2
	112324-001/CWL-SV-D3-480	1,2-DICHLOROPROPANE (78-87-5)	J, X1
	112324-001/CWL-SV-D3-480	2-BUTANONE (MEK) (78-93-3)	0.40U, B2
	112324-001/CWL-SV-D3-480	4-METHYL-2-PENTANONE (MIBK) (108-10-1)	0.20U, B2
	112324-001/CWL-SV-D3-480	ACETONE (67-64-1)	2.0U, B2
	112324-001/CWL-SV-D3-480	CARBON DISULFIDE (75-15-0)	0.20U, B2
	112324-001/CWL-SV-D3-480	CHLOROMETHANE (74-87-3)	J+, B2
	112324-001/CWL-SV-D3-480	METHYLENE CHLORIDE (75-09-2)	J-, I5
	112324-001/CWL-SV-D3-480	TETRACHLOROETHENE (127-18-4)	J, RP1
	112324-001/CWL-SV-D3-480	TRICHLOROFLUOROMETHANE (75-69-4)	J, RP1

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

Sandia Data Validation Summary Worksheet

ARCOG#: 620813, 620818, 620819, 620820 and 620821	Site/Project: CWL PCCP	Validation Date: 03/13/2020
SDG #:140-18189	Laboratory: Eurofins TestAmerica, Knoxville	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
112304-001/CWL-UI-2-136	140-18189-8	TO-15	Canister stem broke – test canceled

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 01/30/2020 Validated by: <i>L. Thal</i>
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Sandia Organic Worksheet (GC/MS VOC)

ARCOG #:620813, 620818, 620819, 620820 and 620821	SDG: 140-18189	Matrix: Air
Laboratory Sample IDs: 140-18189-1 through -28		
Method/Batch #s: TO-15/37456 (-1, -5, -6, -9, -14, -15, -23, -28); ; 37485 (-2 thru -4, -4DL, -7, -10 thru -13, -16 thru -21, -24); 37574 (-13DL, -14DL, -16DL, -22, -25, -26, 27, -28DL)	Tuning (pass/fail):pass	TICs Required? (yes/no):no

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	FB1 -1	FB2 -5	FB 3 -9	FB 4 -15	FB 5 -23
	Int.	RF/ Slope	RSD/r 2	(ICV)/ CCV %D								
37453 (-1, -5, -6, -9, -14, -15, -23, -28, MB, LCS)												
Acetone	NA	✓	✓	✓	✓	NA	✓	1.9J	1.8J	3.7	1.1J	1.0J
Benzene	NA	✓	✓	✓	✓	NA	✓	0.029J	0.036J	0.019J	0.020J	0.019J
2-Butanone (MEK)	NA	✓	✓	✓	✓	NA	✓	0.20J	0.23J	0.20J	0.14J	0.10J
Carbon disulfide	NA	✓	✓	✓	✓	NA	✓	0.03J	✓	✓	0.028J	0.016J
Chloromethane	NA	✓	✓	✓	✓	NA	✓	0.069J	0.073J	✓	0.082J	0.095J
Ethylbenzene	NA	✓	✓	✓	✓	NA	✓	0.019J	✓	✓	✓	✓
Methylene Chloride	-0.62	✓	✓	✓	✓	NA	✓	0.2J	✓	✓	0.27J	✓
Tetrachloroethene	NA	✓	✓	✓	✓	NA	✓	0.015J	0.053J	0.0092J	✓	✓
Toluene	NA	✓	✓	✓	✓	NA	✓	0.092J	0.078J	✓	✓	✓
Trichloroethene	NA	✓	✓	✓	✓	NA	✓	0.04	0.0077J	✓	✓	✓
Trichlorofluoromethane	NA	✓	✓	✓	✓	NA	✓	0.022J	0.023J	0.024J	0.015J	0.020J
1,2,4-Trimethylbenzene	NA	✓	✓	✓	✓	NA	✓	0.02J	✓	✓	✓	✓
m,p-Xylene	NA	✓	✓	✓	✓	NA	✓	0.087	✓	✓	✓	✓
o-Xylene	NA	✓	✓	✓	✓	NA	✓	0.032J	✓	✓	✓	✓
Dichlorodifluoromethane	NA	✓	✓	✓	✓	NA	✓	✓	0.022J	✓	✓	0.025J
2-Hexanone	NA	✓	✓	✓	✓	NA	✓	✓	0.028J	✓	0.027J	✓
4-Methyl-2-pentanone (MIBK)	NA	✓	✓	✓	✓	NA	✓	✓	0.10J	✓	✓	0.057J
37485 (-2 thru -4, -4DL, -7, -10 thru -13, -16 thru -21, -24, MB, LCS)(-2, -23(FB5) and -24 DUPs)												
Methylene Chloride	-0.62	✓	✓	✓	✓	NA	✓					
-37574 (-13DL, -14DL, -16DL, -22, -25, -26, 27, -28DL, MB, LCS) (-28DL DUP)												
Trichlorofluoromethane	NA	✓	✓	+33	✓	NA	✓					
Methylene Chloride	-0.62	✓	✓	✓	✓	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										
	FBZ		Chl-d5		1,4-DCB-d4					
Sample ID	Area	RT	Area	RT	Area	RT				
none										

Comments: HTs OK. LCS (CWL uses lab limits) RSDs and CCVs $\leq 30\%$. ICAL MG 02/11/2020; Methylene chloride linear2 intercept neg and $>3X$ MDL
 Samples missing ions that were "J" Qualified by the lab were not further qualified during DV. (eg 1,1-dichloroethane)
 Spot checked clean canisters and found them to be ND.
 Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by Eurofins TestAmerica Knoxville.

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.

SMO Use

AR/COC **620818**

Project Name: CWL PCCP	Date Samples Shipped: 2/3/20	SMO Authorization:	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Timmie Jackson	Carrier/Waybill No.: 309709	SMO Contact Phone: Wendy Palencia/505-844-3132	<input type="checkbox"/> RMA
Project/Task Number: 195122.10.11.03	Lab Contact: Ryan Henry/865-291-3006	Send Report to SMO: Stephanie Montaño/505-284-2553	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF327-20	Lab Destination: TAKX		
	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:
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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					
112301	001	CWL-SV-FB2	NA	1/30/20 09:50	SG	S	6 L	None	G	FB	VOC (TO-15)	
112302	001	CWL-UI-2-36	36	1/30/20 09:56	SG	S	6 L	None	G	SA	VOC (TO-15)	
112303	001	CWL-UI-2-76	76	1/30/20 09:59	SG	S	6 L	None	G	SA	VOC (TO-15)	
112304	001	CWL-UI-2-136	136	1/30/20 10:01	SG	S	6 L	None	G	SA	VOC (TO-15)	



Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
			Sample 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		RL	SNL/08888/505-844-4013/505-250-7090	Comments: Elevation and ambient pressure information on attached forms.
	William Gibson		WG	SNL/08888/505-284-3307/505-239-7367	
	Zachary Tenorio		ZT	SNL/08888/505-845-8636/505-259-5765	
	Denisha Sanchez		DS	SNL/08888/505-845-7829/505-208-1375	
Timmie Jackson		TJ	SNL/08888/505-284-2547/505-263-6639		

Relinquished by	Org. 08888	Date 1-31-20	Time 9:45	Relinquished by	Org.	Date	Time
Received by	Org. 00628	Date 1-31-20	Time 9:45	Received by	Org.	Date	Time
Relinquished by	Org. 00028	Date 2/3/20	Time 1:07	Relinquished by	Org.	Date	Time
Received by	Org.	Date 2/6/20	Time 12:10	Received by	Org.	Date	Time

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

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03/12/2020

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.	SMO Use	AR/COC	620819
Project Name: <u>CWL PCCP</u>	Date Samples Shipped: <u>2/31/20</u>	SMO Authorization:	<input type="checkbox"/> Waste Characterization
Project/Task Manager: <u>Timmie Jackson</u>	Carrier/Waybill No.: <u>309709</u>	SMO Contact Phone: <u>Wendy Palencia/505-844-3132</u>	<input type="checkbox"/> RMA
Project/Task Number: <u>195122.10.11.03</u>	Lab Contact: <u>Ryan Henry/865-291-3006</u>	Send Report to SMO:	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: <u>CF327-20</u>	Lab Destination: <u>TAKX</u>	<u>Stephanie Montaño/505-284-2553</u>	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Contract No.: <u>1636780</u>			

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					
112305	001	CWL-SV-FB 3	NA	1/30/20 09:14	SG	S	6 L	None	G	FB	VOC (TO-15)	
112306	001	CWL-SV-D1-100	100	1/30/20 09:19	SG	S	6 L	None	G	SA	VOC (TO-15)	
112307	001	CWL-SV-D1-160	160	1/30/20 09:22	SG	S	6 L	None	G	SA	VOC (TO-15)	
112308	001	CWL-SV-D1-240	240	1/30/20 09:26	SG	S	6 L	None	G	SA	VOC (TO-15)	
112309	001	CWL-SV-D1-350	350	1/30/20 09:29	SG	S	6 L	None	G	SA	VOC (TO-15)	
112310	001	CWL-SV-D1-470	470	1/30/20 09:35	SG	S	6 L	None	G	SA	VOC (TO-15)	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch		RL	SNL/08888/505-844-4013/505-250-7090	Return Samples By: Comments: Elevation and ambient pressure information on attached forms.
	William Gibson		WG	SNL/08888/505-284-3307/505-239-7367	
	Zachary Tenorio		ZT	SNL/08888/505-845-8636/505-259-5765	
	Denisha Sanchez		DS	SNL/08888/505-845-7829/505-208-1375	
Timmie Jackson		TJ	SNL/08888/505-284-2547/505-263-6639		

Relinquished by	Org. <u>006288</u>	Date <u>1-31-20</u>	Time <u>9:45</u>	Relinquished by	Org.	Date	Time
Received by	Org. <u>08888</u>	Date <u>1-31-20</u>	Time <u>9:45</u>	Received by	Org.	Date	Time
Relinquished by	Org. <u>00628</u>	Date <u>2-3-20</u>	Time <u>1007</u>	Relinquished by	Org.	Date	Time
Received by	Org. <u>ETA</u>	Date <u>2/6/20</u>	Time <u>1210</u>	Received by	Org.	Date	Time

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

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03/12/2020

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.	SMO Use	AR/COC	620820
Project Name: CWL PCCP	Date Samples Shipped: 2/3/20	SMO Authorization: <u>[Signature]</u>	
Project/Task Manager: Timmie Jackson	Carrier/Waybill No: 309709	SMO Contact Phone: Wendy Palencia/505-844-3132	
Project/Task Number: 195122.10.11.03	Lab Contact: Ryan Henry/865-291-3006	Send Report to SMO: <input checked="" type="checkbox"/> 4° Celsius	
Service Order: CF327-20	Lab Destination: TAKX	Stephanie Montaño/505-284-2553	
	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					
112311	001	CWL-SV-FB 4	NA	1/30/20 10:52	SG	S	6 L	None	G	FB	VOC (TO-15)	
112312	001	CWL-SV-D2-120	120	1/30/20 11:11	SG	S	6 L	None	G	SA	VOC (TO-15)	
112313	001	CWL-SV-D2-120	120	1/30/20 11:11	SG	S	6 L	None	G	DU	VOC (TO-15)	
112314	001	CWL-SV-D2-240	240	1/30/20 11:14	SG	S	6 L	None	G	SA	VOC (TO-15)	
112315	001	CWL-SV-D2-350	350	1/30/20 11:19	SG	S	6 L	None	G	SA	VOC (TO-15)	
112316	001	CWL-SV-D2-440	440	1/30/20 11:23	SG	S	6 L	None	G	SA	VOC (TO-15)	
112317	001	CWL-SV-D2-470	470	1/30/20 11:29	SG	S	6 L	None	G	SA	VOC (TO-15)	
112318	001	CWL-SV-D2-470	470	1/30/20 11:29	SG	S	6 L	None	G	DU	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>	RL	SNL/08888/505-844-4013/505-250-7090	
	William Gibson	<i>[Signature]</i>	WG	SNL/08888/505-284-3307/505-239-7367	
	Zachary Tenorio	<i>[Signature]</i>	ZT	SNL/08888/505-845-8636/505-259-5765	
	Denisha Sanchez	<i>[Signature]</i>	DS	SNL/08888/505-845-7829/505-208-1375	
Timmie Jackson	<i>[Signature]</i>	TJ	SNL/08888/505/284-2547/505-263-6639	Return Samples By:	
Comments: Elevation and ambient pressure information on attached forms.					Lab Use

Relinquished by: <i>[Signature]</i> Org. 09888 Date 1-31-20 Time 0946	Relinquished by: _____ Org. _____ Date _____ Time _____
Received by: <i>[Signature]</i> Org. 00628 Date 1-31-20 Time 0946	Received by: _____ Org. _____ Date _____ Time _____
Relinquished by: <i>[Signature]</i> Org. 00628 Date 2/3/20 Time 09:07	Relinquished by: _____ Org. _____ Date _____ Time _____
Received by: <i>[Signature]</i> Org. _____ Date 2/6/20 Time 1210	Received by: _____ Org. _____ Date _____ Time _____

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

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03/12/2020

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

AR/COC 620821

Batch No. _____		SMO Use		SMO Authorization:		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius	
Project Name: <u>CWL PCCP</u>		Date Samples Shipped: <u>1-3-20</u>		SMO Contact Phone: _____		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
Project/Task Manager: <u>Timmie Jackson</u>		Carrier/Waybill No. <u>309769</u>		Wendy Palencia/505-844-3132			
Project/Task Number: <u>195122.10.11.03</u>		Lab Contact: <u>Ryan Henry/865-291-3006</u>		Send Report to SMO: _____			
Service Order: <u>CF327-20</u>		Lab Destination: <u>TAKX</u>		Stephanie Montaño/505-284-2553			
Contract No.: <u>1636780</u>							

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						
112319	001	CWL-SV-FB 5	NA	1/30/20 10:17	SG	S	6 L	None	G	FB	VOC (TO-15)		
112320	001	CWL-SV-D3-120	120	1/30/20 10:23	SG	S	6 L	None	G	SA	VOC (TO-15)		
112321	001	CWL-SV-D3-170	170	1/30/20 10:28	SG	S	6 L	None	G	SA	VOC (TO-15)		
112322	001	CWL-SV-D3-350	350	1/30/20 10:31	SG	S	6 L	None	G	SA	VOC (TO-15)		
112323	001	CWL-SV-D3-440	440	1/30/20 10:36	SG	S	6 L	None	G	SA	VOC (TO-15)		
112324	001	CWL-SV-D3-480	480	1/30/20 10:45	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 initials:		Negotiated TAT		<input type="checkbox"/>				
Sample Team Members		Signature		Init.		Company/Organization/Phone/Cell		Sample Disposal		
		Name						Return Samples By:		
		Robert Lynch				SNL/08888/505-844-4013/505-250-7090		Comments: Elevation and ambient pressure information on attached forms.		
		William Gibson				SNL/08888/505-284-3307/505-239-7367				
		Zachary Tenorio				SNL/08888/505-845-8636/505-259-5765				
		Denisha Sanchez				SNL/08888/505-845-7829/505-208-1375				
		Timmie Jackson				SNL/08888/505/284-2547/505-263-6639				

Relinquished by	Org. <u>08888</u>	Date <u>1-31-20</u>	Time <u>0945</u>	Relinquished by _____	Org. _____	Date _____	Time _____
Received by	Org. <u>00628</u>	Date <u>1-31-20</u>	Time <u>0945</u>	Received by _____	Org. _____	Date _____	Time _____
Relinquished by	Org. <u>00628</u>	Date <u>2/3/20</u>	Time <u>1007</u>	Relinquished by _____	Org. _____	Date _____	Time _____
Received by	Org. _____	Date <u>2/6/20</u>	Time <u>1210</u>	Received by _____	Org. _____	Date _____	Time _____

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

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03/12/2020

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. _____		SMO Use		AR/COC	620813
Project Name: <u>CWL PCCP</u>		Date Samples Shipped: <u>2/3/20</u>		SMO Authorization:	
Project/Task Manager: <u>Timmie Jackson</u>		Carrier/Waybill No. <u>309709</u>		SMO Contact Phone: _____	
Project/Task Number: <u>195122.10.11.03</u>		Lab Contact: <u>Ryan Henry/865-291-3006</u>		Wendy Palencia/505-844-3132	
Service Order: <u>CF327-20</u>		Lab Destination: <u>TAKX</u>		Send Report to SMO: _____	
		Contract No.: <u>1636780</u>		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					
112297	001	CWL-SV- FB1	NA	1/30/20 08:33	SG	S	6 L	None	G	FB	VOC (TO-15)	
112298	001	CWL-SV-UI1-40	40	1/30/20 08:44	SG	S	6 L	None	G	SA	VOC (TO-15)	
112299	001	CWL-SV-UI1-80	80	1/30/20 08:48	SG	S	6 L	None	G	SA	VOC (TO-15)	
112300	001	CWL-SV-UI1-120	120	1/30/20 08:51	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: _____		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																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Sample Team Members</th> <th>Name</th> <th>Signature</th> <th>Init</th> <th>Company/Organization/Phone/Cell</th> </tr> </thead> <tbody> <tr> <td></td> <td>Robert Lynch</td> <td></td> <td>RL</td> <td>SNL/08888/505-844-4013/505-250-7090</td> </tr> <tr> <td></td> <td>William Gibson</td> <td></td> <td>WG</td> <td>SNL/08888/505-284-3307/505-239-7367</td> </tr> <tr> <td></td> <td>Zachary Tenorio</td> <td></td> <td>ZT</td> <td>SNL/08888/505-845-8636/505-259-5765</td> </tr> <tr> <td></td> <td>Denisha Sanchez</td> <td></td> <td>DS</td> <td>SNL/08888/505-845-7829/505-208-1375</td> </tr> <tr> <td></td> <td>Timmie Jackson</td> <td></td> <td>TJ</td> <td>SNL/08888/505-284-2547/505-263-6639</td> </tr> </tbody> </table>		Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cell		Robert Lynch			RL	SNL/08888/505-844-4013/505-250-7090		William Gibson		WG	SNL/08888/505-284-3307/505-239-7367		Zachary Tenorio		ZT	SNL/08888/505-845-8636/505-259-5765		Denisha Sanchez		DS	SNL/08888/505-845-7829/505-208-1375		Timmie Jackson		TJ	SNL/08888/505-284-2547/505-263-6639	Return Samples By: _____		Comments: Elevation and ambient pressure information on attached forms.	
Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cell																																
	Robert Lynch		RL	SNL/08888/505-844-4013/505-250-7090																																
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	Timmie Jackson		TJ	SNL/08888/505-284-2547/505-263-6639																																
Relinquished by		Org. <u>00628</u> Date <u>1-31-20</u> Time <u>9:45</u>		Relinquished by _____		Org. _____ Date _____ Time _____		Lab Use																												
Received by		Org. <u>08888</u> Date <u>1-31-20</u> Time <u>9:45</u>		Received by _____		Org. _____ Date _____ Time _____																														
Relinquished by		Org. <u>06628</u> Date <u>2/3/20</u> Time <u>1007</u>		Relinquished by _____		Org. _____ Date _____ Time _____																														
Received by		Org. _____ Date <u>2/6/20</u> Time <u>12/6</u>		Received by _____		Org. _____ Date _____ Time _____																														

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

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03/12/2020

CONTRACT VERIFICATION REVIEW FORMS

CHEMICAL WASTE LANDFILL

SOIL-GAS MONITORING

JANUARY 2020

AR/COC Number	Sample Type
620813	Environmental & Quality Control
620818	Environmental & Quality Control
620819	Environmental & Quality Control
620820	Environmental & Quality Control
620821	Environmental & Quality Control

Note: AR/COC forms are provided in the Data Validation Reports in this Annex.

Contract Verification Form (CVR)

Project Leader JACKSON

Project Name CWL PCCP

Project/Task No. 195122_10.11.03

ARCOC No. 620813, 620818, 620819, 620820 & 620821

Analytical Lab TAKX

SDG No. 140-18189-1

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

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

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

2.0 Analytical Laboratory Report

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

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	The canister stem for sample 112304-001 was received at lab broken. Sample was not analyzed.

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	Results incorrectly reported in ppm v/v
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	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	N/A		
	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	Several analytes detected in CWL-SV-FB1, CWL-SV-FB2, CWL-SV-FB 3, CWL-SV-FB 4 and CWL-SV-FB 5
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	N/A		
	b) Continuing calibration provided	N/A		
	c) ICP interference check sample data provided	N/A		
	d) ICP serial dilution provided	N/A		
	e) Instrument run logs provided	N/A		

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
All	VOC (TO-15)	Results reported in ppm v/v instead of ppb v/v

Were deficiencies unresolved? Yes No

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

If no, provide nonconformance report or correction request number and date correction request was submitted: 02-25-2020

Reviewed by: Wendy Palencia Date: 02-25-2020 10:58:00

Were resolutions adequate and data package complete? Yes No

Closed by: Wendy Palencia Date: 03-03-2020 14:40:00

SOIL-GAS MONITORING

**MARCH 2020
CWL-UI2-136 Resample**

Memorandum

Date: April 20, 2020

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: CWL PCCP
ARCOG: 620973
SDG: 140-18711
Laboratory: Eurofins TestAmerica, Knoxville
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

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

1. The initial calibration intercept was negative with an absolute value $>$ the 3X the MDL for methylene chloride. Both associated sample results were detects \leq 3X the absolute value of the intercept and will be **qualified J-,I5**.
2. The CCV %Ds were $>$ 30% and positive for trichlorofluoromethane, carbon tetrachloride and dichlorodifluoromethane. The trichlorofluoromethane result for sample -1, and all associated sample results for sample -2 were detects and will be **qualified J+,C2**.
3. The CCV %D was $>$ 30% but \leq 40% with negative bias for 2-butanone. The associated sample results were detects and will be **qualified J-,C3**.
4. The LCS recovery was $>$ laboratory acceptance criteria for carbon tetrachloride. The associated result for sample -2 was a detect and will be **qualified J+,L2**.
5. Benzene and methylene chloride were detected at $>$ the PQL and acetone, 2-butanone and m,p-xylene were detected at \leq the PQL in FB1, sample -1, associated with sample -2. The associated sample results were detects \leq the PQL and will be **qualified U,B2**; non-detect at their respective PQLs.

6. The 1,2-dichloropropane result for sample -2 was qualified by the laboratory due to a suspected high bias resulting from an unresolved interference. Therefore, the associated sample result will be **qualified J,X1**.
7. A duplicate was performed on the FB, sample -1. Therefore, all associated field sample results that were detects will be **qualified J,RP1** and all associated sample results that were non-detect will be **qualified UJ,RP1**.

Data are acceptable except as 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 except as noted above in the Summary section and as follows. The CCV %Ds were >30% and positive for carbon tetrachloride and dichlorodifluoromethane. The associated results for sample -1 were non-detect and will not be qualified.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Tetrachloroethene was detected at > the PQL and toluene and trichlorofluoromethane were detected at ≤ the PQL in FB1, sample -1, associated with sample -2. The toluene result for sample -2 was non-detect and will not be qualified. The tetrachloroethene and trichlorofluoromethane results for sample -2 were detects >5X the FB values and will not be qualified.

Surrogates

All surrogate acceptance criteria were met.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

An MS/MSD was not performed.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria except as noted above in the Summary section and as follows. The LCS recovery was > laboratory acceptance criteria for carbon tetrachloride. The associated result for sample -1 was non-detect and will not be qualified.

Laboratory Replicate

The laboratory replicate met QC acceptance criteria except as noted above in the Summary section.

Detection Limits/Dilutions

All detection limits were properly reported and correctly adjusted for summa canister dilutions. The following canister dilutions were performed for all target analytes.

Sample -1 was diluted 1.92X and sample -2 was diluted 2254.08X.

MDLs, PQLs and sample results were further adjusted for sample volume used during analysis.

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.

A FB was submitted with ARCOG 620973 and was associated with the sample on the same ARCOG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 04/21/2020



Sample Findings Summary



AR/COC: 620973

Page 1 of 3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
TO15_LL_PF			
	112645-001/CWL-SV-FB1	2-BUTANONE (MEK) (78-93-3)	J-, C3
	112645-001/CWL-SV-FB1	METHYLENE CHLORIDE (75-09-2)	J-, I5
	112645-001/CWL-SV-FB1	TRICHLOROFLUOROMETHANE (75-69-4)	J+, C2
	112646-001/CWL-UI-2-136	1,1,1-TRICHLOROETHANE (71-55-6)	UJ, RP1
	112646-001/CWL-UI-2-136	1,1,2,2-TETRACHLOROETHANE (79-34-5)	UJ, RP1
	112646-001/CWL-UI-2-136	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (76-13-1)	J, RP1
	112646-001/CWL-UI-2-136	1,1,2-TRICHLOROETHANE (79-00-5)	UJ, RP1
	112646-001/CWL-UI-2-136	1,1-DICHLOROETHANE (75-34-3)	J, RP1
	112646-001/CWL-UI-2-136	1,1-DICHLOROETHENE (75-35-4)	J, RP1
	112646-001/CWL-UI-2-136	1,2,4-TRICHLOROBENZENE (120-82-1)	UJ, RP1
	112646-001/CWL-UI-2-136	1,2,4-TRIMETHYLBENZENE (95-63-6)	J, RP1
	112646-001/CWL-UI-2-136	1,2-DIBROMOETHANE (EDB) (106-93-4)	UJ, RP1
	112646-001/CWL-UI-2-136	1,2-DICHLORO-1,1,2,2-TETRAFLUROETHANE (76-14-2)	UJ, RP1
	112646-001/CWL-UI-2-136	1,2-DICHLOROBENZENE (95-50-1)	UJ, RP1
	112646-001/CWL-UI-2-136	1,2-DICHLOROETHANE (107-06-2)	J, RP1
	112646-001/CWL-UI-2-136	1,2-DICHLOROPROPANE (78-87-5)	J, X1,RP1
	112646-001/CWL-UI-2-136	1,3,5-TRIMETHYLBENZENE (108-67-8)	UJ, RP1
	112646-001/CWL-UI-2-136	1,3-DICHLOROBENZENE (541-73-1)	UJ, RP1
	112646-001/CWL-UI-2-136	1,4-DICHLOROBENZENE (106-46-7)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	112646-001/CWL-UI-2-136	2-BUTANONE (MEK) (78-93-3)	300UJ, B2,C3,RP1
	112646-001/CWL-UI-2-136	2-HEXANONE (591-78-6)	UJ, RP1
	112646-001/CWL-UI-2-136	4-ETHYLTOLUENE (622-96-8)	UJ, RP1
	112646-001/CWL-UI-2-136	4-METHYL-2-PENTANONE (MIBK) (108-10-1)	J, RP1
	112646-001/CWL-UI-2-136	ACETONE (67-64-1)	1500UJ, B2,RP1
	112646-001/CWL-UI-2-136	BENZENE (71-43-2)	60UJ, B2,RP1
	112646-001/CWL-UI-2-136	BENZYL CHLORIDE (100-44-7)	UJ, RP1
	112646-001/CWL-UI-2-136	BROMODICHLOROMETHANE (75-27-4)	UJ, RP1
	112646-001/CWL-UI-2-136	BROMOFORM (75-25-2)	UJ, RP1
	112646-001/CWL-UI-2-136	BROMOMETHANE (74-83-9)	UJ, RP1
	112646-001/CWL-UI-2-136	CARBON DISULFIDE (75-15-0)	J, RP1
	112646-001/CWL-UI-2-136	CARBON TETRACHLORIDE (56-23-5)	J+, C2,L2,RP1
	112646-001/CWL-UI-2-136	CHLOROBENZENE (108-90-7)	UJ, RP1
	112646-001/CWL-UI-2-136	CHLOROETHANE (75-00-3)	UJ, RP1
	112646-001/CWL-UI-2-136	CHLOROFORM (67-66-3)	J, RP1
	112646-001/CWL-UI-2-136	CHLOROMETHANE (74-87-3)	J, RP1
	112646-001/CWL-UI-2-136	CIS-1,2-DICHLOROETHENE (156-59-2)	UJ, RP1
	112646-001/CWL-UI-2-136	CIS-1,3-DICHLOROPROPENE (10061-01-5)	UJ, RP1
	112646-001/CWL-UI-2-136	DIBROMOCHLOROMETHANE (124-48-1)	UJ, RP1
	112646-001/CWL-UI-2-136	DICHLORODIFLUOROMETHANE (75-71-8)	J+, C2,RP1
	112646-001/CWL-UI-2-136	ETHYLBENZENE (100-41-4)	UJ, RP1
	112646-001/CWL-UI-2-136	HEXACHLOROBUTADIENE (87-68-3)	UJ, RP1
	112646-001/CWL-UI-2-136	M,P-XYLENE (179601-23-1)	60UJ, B2,RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	112646-001/CWL-UI-2-136	METHYLENE CHLORIDE (75-09-2)	300UJ, B2,I5,RP1
	112646-001/CWL-UI-2-136	O-XYLENE (95-47-6)	J, RP1
	112646-001/CWL-UI-2-136	STYRENE (100-42-5)	UJ, RP1
	112646-001/CWL-UI-2-136	TETRACHLOROETHENE (127-18-4)	J, RP1
	112646-001/CWL-UI-2-136	TOLUENE (108-88-3)	UJ, RP1
	112646-001/CWL-UI-2-136	TRANS-1,2-DICHLOROETHENE (156-60-5)	UJ, RP1
	112646-001/CWL-UI-2-136	TRANS-1,3-DICHLOROPROPENE (10061-02-6)	UJ, RP1
	112646-001/CWL-UI-2-136	TRICHLOROETHENE (79-01-6)	J, RP1
	112646-001/CWL-UI-2-136	TRICHLOROFLUOROMETHANE (75-69-4)	J+, C2,RP1
	112646-001/CWL-UI-2-136	VINYL ACETATE (108-05-4)	UJ, RP1
	112646-001/CWL-UI-2-136	VINYL CHLORIDE (75-01-4)	UJ, RP1

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

Sandia Data Validation Summary Worksheet

ARCOG#: 620973	Site/Project: CWL PCCP	Validation Date: 04/20/2020
SDG #:140-18711	Laboratory: Eurofins TestAmerica, Knoxville	Validator: Linda Thal
Matrix: Air	# of Samples: 2	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 03/24/2020

No custody seals

Validated by: *L Thal*

Sandia Organic Worksheet (GC/MS VOC)

ARCOG #:620973	SDG: 140-18711	Matrix: Air
Laboratory Sample IDs: 140-18711-1 and -2		
Method/Batch #s: TO-15/38777	Tuning (pass/fail):pass	TICs Required? (yes/no):no

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	FB1 -1	DUP FB1				
	Int.	RF/ Slope	RSD/r ²	(ICV)/ CCV %D									
Acetone	NA	✓	✓	✓	✓	NA	✓	1.5J	1.37J				
Benzene	NA	✓	✓	✓	✓	NA	✓	0.11	0.101				
2-Butanone (MEK)	NA	✓	✓	-31	✓	NA	✓	0.15J	0.147J				
Carbon tetrachloride	NA	✓	✓	+33	✓	NA	133	✓	✓				
Chloromethane	NA	✓	✓	✓	✓	NA	✓	✓	0.0705J				
Methylene Chloride	-0.76	✓	✓	✓	✓	NA	✓	0.55	0.515				
Tetrachloroethene	NA	✓	✓	✓	✓	NA	✓	0.2	0.176				
Toluene	NA	✓	✓	✓	✓	NA	✓	0.078J	✓				
Trichlorofluoromethane	NA	✓	✓	+36	✓	NA	✓	0.015J	0.0123J				
m,p-Xylene	NA	✓	✓	✓	✓	NA	✓	0.043J	0.0351J				
Dichlorodifluoromethane	NA	✓	✓	+39	✓	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. Dup performed on FB – no precision.

LCS (CWL uses lab limits) RSDs and CCVs $\leq 30\%$. ICAL MG 03/12/2020; Methylene chloride linear2 intercept neg and $>3X$ MDL

Samples missing ions that were "J" qualified by the lab were not further qualified during DV

Canister #s 34002170 and 10262 both ND for all target compounds

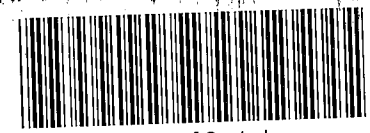
Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by Eurofins TestAmerica Knoxville.

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. <i>N/A</i>	SMO Use	AR/COC	620973
Project Name: CWL PCCP	Date Samples Shipped: <i>3/24/2020</i>	SMO Authorization: <i>[Signature]</i>	
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. <i>311918</i>	SMO Contact Phone: <i>[Signature]</i>	
Project/Task Number: 195122.10.11.03	Lab Contact: Jamie Mckinney/865-291-3006	Wendy Palencia/505-844-3132	
Service Order: CF327-20	Lab Destination: TAKX	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					
112645	001	CWL-SV-FB1 34002170	NA	3/24/20 09:14	SG	S	6 L	None	G	FB	VOC (TO-15)	
112646	001	CWL-UI-2-136 10262	136	3/24/20 09:20	SG	S	6 L	None	G	SA	VOC (TO-15)	
<p><i>NO CUSTODY SEALS</i></p> <p><i>RECEIVED AMBIENT</i></p> <p><i>BYO 3-30-20</i></p> <p><i>1 BOX FBOX# 444234533319 G</i></p> <p><i>4 CANS / 0 FLOW / 1 GAGE</i></p>												



140-18711 Chain of Custody

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/08888/505-844-4013/505-250-7090	Return Samples By: Comments: Elevation and ambient pressure information on attached forms.
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/08888/505-284-3307/505-239-7367	
	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>08888</i> Date <i>3/24/2020</i> Time <i>1000</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i> Org. <i>00628</i> Date <i>3/24/2020</i> Time <i>1000</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i> Org. <i>00628</i> Date <i>3/24/2020</i> Time <i>1130</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i> Org. <i>TAKX</i> Date <i>3-30-20</i> Time <i>12:20</i>	Received by	Org.	Date	Time

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

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04/13/2020

Contract Verification Form (CVR)

Project Leader JACKSON

Project Name CWL PCCP

Project/Task No. 195122_10.11.03

ARCOG No. 620973

Analytical Lab TAKX

SDG No. 140-18711-1

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	N/A		
1.5	Custody records continuous and complete	X		
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	X		
1.7	Date samples received	X		
1.8	Condition upon receipt information provided	X		

2.0 Analytical Laboratory Report

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

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	Carbon tetrachloride failed recovery limits for LCS (batch 38777)
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	N/A		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	X		

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	N/A		
	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	Several analytes detected in CWL-SV-FB1
3.6	Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits	X		
3.7	Narrative addresses planchet flaming for gross alpha/beta	N/A		
3.8	Narrative included, correct, and complete	X		
3.9	Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151.	N/A		

4.0 Calibration and Validation Documentation

Line No.	Item	Yes	No	Comments
4.1	GC/MS (8260 and 8270 and TO-15) a) 12-hour tune check provided	X		
	b) Initial calibration provided	X		
	c) Continuing calibration provided	X		2-Butanone, carbon tetrachloride, dichlorodifluoromethane and trichlorofluoromethane outside CCV acceptance limits
	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	N/A		
	b) Continuing calibration provided	N/A		
	c) ICP interference check sample data provided	N/A		
	d) ICP serial dilution provided	N/A		
	e) Instrument run logs provided	N/A		

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: Wendy Palencia Date: 04-16-2020 11:53:00

Closed by: Wendy Palencia Date: 04-16-2020 11:53:00

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

Chemical Waste Landfill

January 2020 Samples

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112297-001/CWL-SV-FB1

Lab Sample ID: 140-18189-1

Date Collected: 01/30/20 08:33

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	1.9	J	2.0	0.57	ppb v/v			02/12/20 21:05	2.01
Benzene	0.029	J	0.080	0.0080	ppb v/v			02/12/20 21:05	2.01
Benzyl chloride	ND		0.16	0.038	ppb v/v			02/12/20 21:05	2.01
Bromodichloromethane	ND		0.080	0.018	ppb v/v			02/12/20 21:05	2.01
Bromoform	ND		0.080	0.0090	ppb v/v			02/12/20 21:05	2.01
Bromomethane	ND		0.080	0.022	ppb v/v			02/12/20 21:05	2.01
2-Butanone (MEK)	0.20	J	0.40	0.073	ppb v/v			02/12/20 21:05	2.01
Carbon disulfide	0.030	J	0.20	0.011	ppb v/v			02/12/20 21:05	2.01
Carbon tetrachloride	ND		0.080	0.0070	ppb v/v			02/12/20 21:05	2.01
Chlorobenzene	ND		0.080	0.0060	ppb v/v			02/12/20 21:05	2.01
Chloroethane	ND		0.080	0.029	ppb v/v			02/12/20 21:05	2.01
Chloroform	ND		0.080	0.0070	ppb v/v			02/12/20 21:05	2.01
Chloromethane	0.069	J	0.20	0.066	ppb v/v			02/12/20 21:05	2.01
Dibromochloromethane	ND		0.080	0.0070	ppb v/v			02/12/20 21:05	2.01
1,2-Dibromoethane (EDB)	ND		0.080	0.0070	ppb v/v			02/12/20 21:05	2.01
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.080	0.012	ppb v/v			02/12/20 21:05	2.01
1,2-Dichlorobenzene	ND		0.080	0.031	ppb v/v			02/12/20 21:05	2.01
1,3-Dichlorobenzene	ND		0.080	0.016	ppb v/v			02/12/20 21:05	2.01
1,4-Dichlorobenzene	ND		0.080	0.016	ppb v/v			02/12/20 21:05	2.01
Dichlorodifluoromethane	ND		0.080	0.014	ppb v/v			02/12/20 21:05	2.01
1,1-Dichloroethane	ND		0.080	0.0070	ppb v/v			02/12/20 21:05	2.01
1,2-Dichloroethane	ND		0.080	0.010	ppb v/v			02/12/20 21:05	2.01
1,1-Dichloroethene	ND		0.080	0.0080	ppb v/v			02/12/20 21:05	2.01
cis-1,2-Dichloroethene	ND		0.080	0.010	ppb v/v			02/12/20 21:05	2.01
trans-1,2-Dichloroethene	ND		0.080	0.0070	ppb v/v			02/12/20 21:05	2.01
1,2-Dichloropropane	ND		0.080	0.010	ppb v/v			02/12/20 21:05	2.01
cis-1,3-Dichloropropene	ND		0.080	0.016	ppb v/v			02/12/20 21:05	2.01
trans-1,3-Dichloropropene	ND		0.080	0.0090	ppb v/v			02/12/20 21:05	2.01
Ethylbenzene	0.019	J	0.080	0.013	ppb v/v			02/12/20 21:05	2.01
4-Ethyltoluene	ND		0.16	0.021	ppb v/v			02/12/20 21:05	2.01
Hexachlorobutadiene	ND		0.40	0.032	ppb v/v			02/12/20 21:05	2.01
2-Hexanone	ND		0.20	0.016	ppb v/v			02/12/20 21:05	2.01
4-Methyl-2-pentanone (MIBK)	ND		0.20	0.054	ppb v/v			02/12/20 21:05	2.01
Methylene Chloride	0.20	J	0.40	0.16	ppb v/v			02/12/20 21:05	2.01
Styrene	ND		0.080	0.024	ppb v/v			02/12/20 21:05	2.01
1,1,2,2-Tetrachloroethane	ND		0.080	0.014	ppb v/v			02/12/20 21:05	2.01
Tetrachloroethene	0.015	J	0.080	0.0070	ppb v/v			02/12/20 21:05	2.01
Toluene	0.092	J	0.12	0.078	ppb v/v			02/12/20 21:05	2.01
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.080	0.0080	ppb v/v			02/12/20 21:05	2.01
1,2,4-Trichlorobenzene	ND		0.40	0.064	ppb v/v			02/12/20 21:05	2.01
1,1,1-Trichloroethane	ND		0.080	0.037	ppb v/v			02/12/20 21:05	2.01
1,1,2-Trichloroethane	ND		0.080	0.0070	ppb v/v			02/12/20 21:05	2.01
Trichloroethene	0.040		0.040	0.0060	ppb v/v			02/12/20 21:05	2.01
Trichlorofluoromethane	0.022	J	0.080	0.011	ppb v/v			02/12/20 21:05	2.01
1,2,4-Trimethylbenzene	0.020	J	0.080	0.020	ppb v/v			02/12/20 21:05	2.01
1,3,5-Trimethylbenzene	ND		0.080	0.022	ppb v/v			02/12/20 21:05	2.01
Vinyl acetate	ND		0.40	0.028	ppb v/v			02/12/20 21:05	2.01
Vinyl chloride	ND		0.040	0.026	ppb v/v			02/12/20 21:05	2.01

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112297-001/CWL-SV-FB1

Lab Sample ID: 140-18189-1

Date Collected: 01/30/20 08:33

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	0.087		0.080	0.029	ppb v/v			02/12/20 21:05	2.01
o-Xylene	0.032	J	0.080	0.015	ppb v/v			02/12/20 21:05	2.01
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		60 - 140					02/12/20 21:05	2.01

Client Sample ID: 112298-001/CWL-SV-UI1-40

Lab Sample ID: 140-18189-2

Date Collected: 01/30/20 08:44

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		670	190	ppb v/v			02/13/20 12:41	13.32
Benzene	3.5	J	27	2.7	ppb v/v			02/13/20 12:41	13.32
Benzyl chloride	ND		53	13	ppb v/v			02/13/20 12:41	13.32
Bromodichloromethane	ND		27	6.0	ppb v/v			02/13/20 12:41	13.32
Bromoform	ND		27	3.0	ppb v/v			02/13/20 12:41	13.32
Bromomethane	ND		27	7.3	ppb v/v			02/13/20 12:41	13.32
2-Butanone (MEK)	ND		130	24	ppb v/v			02/13/20 12:41	13.32
Carbon disulfide	ND		67	3.7	ppb v/v			02/13/20 12:41	13.32
Carbon tetrachloride	11	J	27	2.3	ppb v/v			02/13/20 12:41	13.32
Chlorobenzene	ND		27	2.0	ppb v/v			02/13/20 12:41	13.32
Chloroethane	ND		27	9.7	ppb v/v			02/13/20 12:41	13.32
Chloroform	520		27	2.3	ppb v/v			02/13/20 12:41	13.32
Chloromethane	ND		67	22	ppb v/v			02/13/20 12:41	13.32
Dibromochloromethane	ND		27	2.3	ppb v/v			02/13/20 12:41	13.32
1,2-Dibromoethane (EDB)	ND		27	2.3	ppb v/v			02/13/20 12:41	13.32
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		27	4.0	ppb v/v			02/13/20 12:41	13.32
1,2-Dichlorobenzene	ND		27	10	ppb v/v			02/13/20 12:41	13.32
1,3-Dichlorobenzene	ND		27	5.3	ppb v/v			02/13/20 12:41	13.32
1,4-Dichlorobenzene	ND		27	5.3	ppb v/v			02/13/20 12:41	13.32
Dichlorodifluoromethane	28		27	4.7	ppb v/v			02/13/20 12:41	13.32
1,1-Dichloroethane	8.8	J	27	2.3	ppb v/v			02/13/20 12:41	13.32
1,2-Dichloroethane	ND		27	3.3	ppb v/v			02/13/20 12:41	13.32
1,1-Dichloroethene	170		27	2.7	ppb v/v			02/13/20 12:41	13.32
cis-1,2-Dichloroethene	ND		27	3.3	ppb v/v			02/13/20 12:41	13.32
trans-1,2-Dichloroethene	ND		27	2.3	ppb v/v			02/13/20 12:41	13.32
1,2-Dichloropropane	44		27	3.3	ppb v/v			02/13/20 12:41	13.32
cis-1,3-Dichloropropene	ND		27	5.3	ppb v/v			02/13/20 12:41	13.32
trans-1,3-Dichloropropene	ND		27	3.0	ppb v/v			02/13/20 12:41	13.32
Ethylbenzene	ND		27	4.3	ppb v/v			02/13/20 12:41	13.32
4-Ethyltoluene	ND		53	7.0	ppb v/v			02/13/20 12:41	13.32
Hexachlorobutadiene	ND		130	11	ppb v/v			02/13/20 12:41	13.32
2-Hexanone	ND		67	5.3	ppb v/v			02/13/20 12:41	13.32
4-Methyl-2-pentanone (MIBK)	ND		67	18	ppb v/v			02/13/20 12:41	13.32
Methylene Chloride	ND		130	53	ppb v/v			02/13/20 12:41	13.32
Styrene	ND		27	8.0	ppb v/v			02/13/20 12:41	13.32
1,1,2,2-Tetrachloroethane	ND		27	4.7	ppb v/v			02/13/20 12:41	13.32

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112298-001/CWL-SV-UI1-40

Lab Sample ID: 140-18189-2

Date Collected: 01/30/20 08:44

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	2500		27	2.3	ppb v/v			02/13/20 12:41	13.32
Toluene	ND		40	26	ppb v/v			02/13/20 12:41	13.32
1,1,2-Trichloro-1,2,2-trifluoroethane	650		27	2.7	ppb v/v			02/13/20 12:41	13.32
1,2,4-Trichlorobenzene	ND		130	21	ppb v/v			02/13/20 12:41	13.32
1,1,1-Trichloroethane	28		27	12	ppb v/v			02/13/20 12:41	13.32
1,1,2-Trichloroethane	6.6	J	27	2.3	ppb v/v			02/13/20 12:41	13.32
Trichloroethene	4600		13	2.0	ppb v/v			02/13/20 12:41	13.32
Trichlorofluoromethane	210		27	3.7	ppb v/v			02/13/20 12:41	13.32
1,2,4-Trimethylbenzene	ND		27	6.7	ppb v/v			02/13/20 12:41	13.32
1,3,5-Trimethylbenzene	ND		27	7.3	ppb v/v			02/13/20 12:41	13.32
Vinyl acetate	ND		130	9.3	ppb v/v			02/13/20 12:41	13.32
Vinyl chloride	ND		13	8.7	ppb v/v			02/13/20 12:41	13.32
m,p-Xylene	ND		27	9.7	ppb v/v			02/13/20 12:41	13.32
o-Xylene	ND		27	5.0	ppb v/v			02/13/20 12:41	13.32
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		60 - 140					02/13/20 12:41	13.32

Client Sample ID: 112299-001/CWL-SV-UI1-80

Lab Sample ID: 140-18189-3

Date Collected: 01/30/20 08:48

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		710	200	ppb v/v			02/13/20 14:09	14.28
Benzene	ND		29	2.9	ppb v/v			02/13/20 14:09	14.28
Benzyl chloride	ND		57	14	ppb v/v			02/13/20 14:09	14.28
Bromodichloromethane	ND		29	6.4	ppb v/v			02/13/20 14:09	14.28
Bromoform	ND		29	3.2	ppb v/v			02/13/20 14:09	14.28
Bromomethane	ND		29	7.9	ppb v/v			02/13/20 14:09	14.28
2-Butanone (MEK)	ND		140	26	ppb v/v			02/13/20 14:09	14.28
Carbon disulfide	ND		71	3.9	ppb v/v			02/13/20 14:09	14.28
Carbon tetrachloride	12	J	29	2.5	ppb v/v			02/13/20 14:09	14.28
Chlorobenzene	ND		29	2.1	ppb v/v			02/13/20 14:09	14.28
Chloroethane	ND		29	10	ppb v/v			02/13/20 14:09	14.28
Chloroform	390		29	2.5	ppb v/v			02/13/20 14:09	14.28
Chloromethane	ND		71	24	ppb v/v			02/13/20 14:09	14.28
Dibromochloromethane	ND		29	2.5	ppb v/v			02/13/20 14:09	14.28
1,2-Dibromoethane (EDB)	ND		29	2.5	ppb v/v			02/13/20 14:09	14.28
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		29	4.3	ppb v/v			02/13/20 14:09	14.28
1,2-Dichlorobenzene	ND		29	11	ppb v/v			02/13/20 14:09	14.28
1,3-Dichlorobenzene	ND		29	5.7	ppb v/v			02/13/20 14:09	14.28
1,4-Dichlorobenzene	ND		29	5.7	ppb v/v			02/13/20 14:09	14.28
Dichlorodifluoromethane	27	J	29	5.0	ppb v/v			02/13/20 14:09	14.28
1,1-Dichloroethane	9.9	J	29	2.5	ppb v/v			02/13/20 14:09	14.28
1,2-Dichloroethane	10	J	29	3.6	ppb v/v			02/13/20 14:09	14.28
1,1-Dichloroethene	240		29	2.9	ppb v/v			02/13/20 14:09	14.28

Eurofins TestAmerica, Knoxville

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112299-001/CWL-SV-UI1-80

Lab Sample ID: 140-18189-3

Date Collected: 01/30/20 08:48

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		29	3.6	ppb v/v			02/13/20 14:09	14.28
trans-1,2-Dichloroethene	ND		29	2.5	ppb v/v			02/13/20 14:09	14.28
1,2-Dichloropropane	36		29	3.6	ppb v/v			02/13/20 14:09	14.28
cis-1,3-Dichloropropene	ND		29	5.7	ppb v/v			02/13/20 14:09	14.28
trans-1,3-Dichloropropene	ND		29	3.2	ppb v/v			02/13/20 14:09	14.28
Ethylbenzene	ND		29	4.6	ppb v/v			02/13/20 14:09	14.28
4-Ethyltoluene	ND		57	7.5	ppb v/v			02/13/20 14:09	14.28
Hexachlorobutadiene	ND		140	11	ppb v/v			02/13/20 14:09	14.28
2-Hexanone	ND		71	5.7	ppb v/v			02/13/20 14:09	14.28
4-Methyl-2-pentanone (MIBK)	ND		71	19	ppb v/v			02/13/20 14:09	14.28
Methylene Chloride	ND		140	57	ppb v/v			02/13/20 14:09	14.28
Styrene	ND		29	8.6	ppb v/v			02/13/20 14:09	14.28
1,1,2,2-Tetrachloroethane	ND		29	5.0	ppb v/v			02/13/20 14:09	14.28
Tetrachloroethene	710		29	2.5	ppb v/v			02/13/20 14:09	14.28
Toluene	ND		43	28	ppb v/v			02/13/20 14:09	14.28
1,1,2-Trichloro-1,2,2-trifluoroethane	660		29	2.9	ppb v/v			02/13/20 14:09	14.28
1,2,4-Trichlorobenzene	ND		140	23	ppb v/v			02/13/20 14:09	14.28
1,1,1-Trichloroethane	27 J		29	13	ppb v/v			02/13/20 14:09	14.28
1,1,2-Trichloroethane	3.4 J		29	2.5	ppb v/v			02/13/20 14:09	14.28
Trichloroethene	5200		14	2.1	ppb v/v			02/13/20 14:09	14.28
Trichlorofluoromethane	190		29	3.9	ppb v/v			02/13/20 14:09	14.28
1,2,4-Trimethylbenzene	ND		29	7.1	ppb v/v			02/13/20 14:09	14.28
1,3,5-Trimethylbenzene	ND		29	7.9	ppb v/v			02/13/20 14:09	14.28
Vinyl acetate	ND		140	10	ppb v/v			02/13/20 14:09	14.28
Vinyl chloride	ND		14	9.3	ppb v/v			02/13/20 14:09	14.28
m,p-Xylene	ND		29	10	ppb v/v			02/13/20 14:09	14.28
o-Xylene	ND		29	5.4	ppb v/v			02/13/20 14:09	14.28
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		60 - 140					02/13/20 14:09	14.28

Client Sample ID: 112300-001/CWL-SV-UI1-120

Lab Sample ID: 140-18189-4

Date Collected: 01/30/20 08:51

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1000	290	ppb v/v			02/13/20 14:54	14.09
Benzene	7.2 J		40	4.0	ppb v/v			02/13/20 14:54	14.09
Benzyl chloride	ND		81	19	ppb v/v			02/13/20 14:54	14.09
Bromodichloromethane	ND		40	9.1	ppb v/v			02/13/20 14:54	14.09
Bromoform	ND		40	4.5	ppb v/v			02/13/20 14:54	14.09
Bromomethane	ND		40	11	ppb v/v			02/13/20 14:54	14.09
2-Butanone (MEK)	ND		200	37	ppb v/v			02/13/20 14:54	14.09
Carbon disulfide	ND		100	5.5	ppb v/v			02/13/20 14:54	14.09
Carbon tetrachloride	21 J		40	3.5	ppb v/v			02/13/20 14:54	14.09
Chlorobenzene	ND		40	3.0	ppb v/v			02/13/20 14:54	14.09

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112300-001/CWL-SV-UI1-120

Lab Sample ID: 140-18189-4

Date Collected: 01/30/20 08:51

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		40	15	ppb v/v			02/13/20 14:54	14.09
Chloroform	480		40	3.5	ppb v/v			02/13/20 14:54	14.09
Chloromethane	ND		100	33	ppb v/v			02/13/20 14:54	14.09
Dibromochloromethane	ND		40	3.5	ppb v/v			02/13/20 14:54	14.09
1,2-Dibromoethane (EDB)	5.7	J	40	3.5	ppb v/v			02/13/20 14:54	14.09
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		40	6.0	ppb v/v			02/13/20 14:54	14.09
1,2-Dichlorobenzene	ND		40	16	ppb v/v			02/13/20 14:54	14.09
1,3-Dichlorobenzene	ND		40	8.1	ppb v/v			02/13/20 14:54	14.09
1,4-Dichlorobenzene	ND		40	8.1	ppb v/v			02/13/20 14:54	14.09
Dichlorodifluoromethane	38	J	40	7.0	ppb v/v			02/13/20 14:54	14.09
1,1-Dichloroethane	21	J	40	3.5	ppb v/v			02/13/20 14:54	14.09
1,2-Dichloroethane	51		40	5.0	ppb v/v			02/13/20 14:54	14.09
1,1-Dichloroethene	370		40	4.0	ppb v/v			02/13/20 14:54	14.09
cis-1,2-Dichloroethene	ND		40	5.0	ppb v/v			02/13/20 14:54	14.09
trans-1,2-Dichloroethene	ND		40	3.5	ppb v/v			02/13/20 14:54	14.09
1,2-Dichloropropane	160	CI	40	5.0	ppb v/v			02/13/20 14:54	14.09
cis-1,3-Dichloropropene	ND		40	8.1	ppb v/v			02/13/20 14:54	14.09
trans-1,3-Dichloropropene	ND		40	4.5	ppb v/v			02/13/20 14:54	14.09
Ethylbenzene	ND		40	6.5	ppb v/v			02/13/20 14:54	14.09
4-Ethyltoluene	ND		81	11	ppb v/v			02/13/20 14:54	14.09
Hexachlorobutadiene	ND		200	16	ppb v/v			02/13/20 14:54	14.09
2-Hexanone	ND		100	8.1	ppb v/v			02/13/20 14:54	14.09
4-Methyl-2-pentanone (MIBK)	ND		100	27	ppb v/v			02/13/20 14:54	14.09
Methylene Chloride	140	J	200	81	ppb v/v			02/13/20 14:54	14.09
Styrene	ND		40	12	ppb v/v			02/13/20 14:54	14.09
1,1,2,2-Tetrachloroethane	ND		40	7.0	ppb v/v			02/13/20 14:54	14.09
Tetrachloroethene	700		40	3.5	ppb v/v			02/13/20 14:54	14.09
Toluene	ND		60	39	ppb v/v			02/13/20 14:54	14.09
1,1,2-Trichloro-1,2,2-trifluoroethane	950		40	4.0	ppb v/v			02/13/20 14:54	14.09
1,2,4-Trichlorobenzene	ND		200	32	ppb v/v			02/13/20 14:54	14.09
1,1,1-Trichloroethane	29	J	40	19	ppb v/v			02/13/20 14:54	14.09
1,1,2-Trichloroethane	7.4	J	40	3.5	ppb v/v			02/13/20 14:54	14.09
Trichlorofluoromethane	260		40	5.5	ppb v/v			02/13/20 14:54	14.09
1,2,4-Trimethylbenzene	ND		40	10	ppb v/v			02/13/20 14:54	14.09
1,3,5-Trimethylbenzene	ND		40	11	ppb v/v			02/13/20 14:54	14.09
Vinyl acetate	ND		200	14	ppb v/v			02/13/20 14:54	14.09
Vinyl chloride	ND		20	13	ppb v/v			02/13/20 14:54	14.09
m,p-Xylene	ND		40	15	ppb v/v			02/13/20 14:54	14.09
o-Xylene	ND		40	7.5	ppb v/v			02/13/20 14:54	14.09
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		60 - 140					02/13/20 14:54	14.09

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	8800		26	3.8	ppb v/v			02/14/20 04:15	14.09

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112300-001/CWL-SV-UI1-120

Lab Sample ID: 140-18189-4

Date Collected: 01/30/20 08:51

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		60 - 140		02/14/20 04:15	14.09

Client Sample ID: 112301-001/CWL-SV-FB2

Lab Sample ID: 140-18189-5

Date Collected: 01/30/20 09:50

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	1.8	J	2.0	0.57	ppb v/v			02/12/20 21:57	1.88
Benzene	0.036	J	0.080	0.0080	ppb v/v			02/12/20 21:57	1.88
Benzyl chloride	ND		0.16	0.038	ppb v/v			02/12/20 21:57	1.88
Bromodichloromethane	ND		0.080	0.018	ppb v/v			02/12/20 21:57	1.88
Bromoform	ND		0.080	0.0090	ppb v/v			02/12/20 21:57	1.88
Bromomethane	ND		0.080	0.022	ppb v/v			02/12/20 21:57	1.88
2-Butanone (MEK)	0.23	J	0.40	0.073	ppb v/v			02/12/20 21:57	1.88
Carbon disulfide	ND		0.20	0.011	ppb v/v			02/12/20 21:57	1.88
Carbon tetrachloride	ND		0.080	0.0070	ppb v/v			02/12/20 21:57	1.88
Chlorobenzene	ND		0.080	0.0060	ppb v/v			02/12/20 21:57	1.88
Chloroethane	ND		0.080	0.029	ppb v/v			02/12/20 21:57	1.88
Chloroform	ND		0.080	0.0070	ppb v/v			02/12/20 21:57	1.88
Chloromethane	0.073	J	0.20	0.066	ppb v/v			02/12/20 21:57	1.88
Dibromochloromethane	ND		0.080	0.0070	ppb v/v			02/12/20 21:57	1.88
1,2-Dibromoethane (EDB)	ND		0.080	0.0070	ppb v/v			02/12/20 21:57	1.88
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.080	0.012	ppb v/v			02/12/20 21:57	1.88
1,2-Dichlorobenzene	ND		0.080	0.031	ppb v/v			02/12/20 21:57	1.88
1,3-Dichlorobenzene	ND		0.080	0.016	ppb v/v			02/12/20 21:57	1.88
1,4-Dichlorobenzene	ND		0.080	0.016	ppb v/v			02/12/20 21:57	1.88
Dichlorodifluoromethane	0.022	J	0.080	0.014	ppb v/v			02/12/20 21:57	1.88
1,1-Dichloroethane	ND		0.080	0.0070	ppb v/v			02/12/20 21:57	1.88
1,2-Dichloroethane	ND		0.080	0.010	ppb v/v			02/12/20 21:57	1.88
1,1-Dichloroethene	ND		0.080	0.0080	ppb v/v			02/12/20 21:57	1.88
cis-1,2-Dichloroethene	ND		0.080	0.010	ppb v/v			02/12/20 21:57	1.88
trans-1,2-Dichloroethene	ND		0.080	0.0070	ppb v/v			02/12/20 21:57	1.88
1,2-Dichloropropane	ND		0.080	0.010	ppb v/v			02/12/20 21:57	1.88
cis-1,3-Dichloropropene	ND		0.080	0.016	ppb v/v			02/12/20 21:57	1.88
trans-1,3-Dichloropropene	ND		0.080	0.0090	ppb v/v			02/12/20 21:57	1.88
Ethylbenzene	ND		0.080	0.013	ppb v/v			02/12/20 21:57	1.88
4-Ethyltoluene	ND		0.16	0.021	ppb v/v			02/12/20 21:57	1.88
Hexachlorobutadiene	ND		0.40	0.032	ppb v/v			02/12/20 21:57	1.88
2-Hexanone	0.028	J	0.20	0.016	ppb v/v			02/12/20 21:57	1.88
4-Methyl-2-pentanone (MIBK)	0.10	J	0.20	0.054	ppb v/v			02/12/20 21:57	1.88
Methylene Chloride	ND		0.40	0.16	ppb v/v			02/12/20 21:57	1.88
Styrene	ND		0.080	0.024	ppb v/v			02/12/20 21:57	1.88
1,1,2,2-Tetrachloroethane	ND		0.080	0.014	ppb v/v			02/12/20 21:57	1.88
Tetrachloroethene	0.053	J	0.080	0.0070	ppb v/v			02/12/20 21:57	1.88
Toluene	0.078	J	0.12	0.078	ppb v/v			02/12/20 21:57	1.88
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.080	0.0080	ppb v/v			02/12/20 21:57	1.88
1,2,4-Trichlorobenzene	ND		0.40	0.064	ppb v/v			02/12/20 21:57	1.88

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112301-001/CWL-SV-FB2

Lab Sample ID: 140-18189-5

Date Collected: 01/30/20 09:50

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.080	0.037	ppb v/v			02/12/20 21:57	1.88
1,1,2-Trichloroethane	ND		0.080	0.0070	ppb v/v			02/12/20 21:57	1.88
Trichloroethene	0.0077	J	0.040	0.0060	ppb v/v			02/12/20 21:57	1.88
Trichlorofluoromethane	0.023	J	0.080	0.011	ppb v/v			02/12/20 21:57	1.88
1,2,4-Trimethylbenzene	ND		0.080	0.020	ppb v/v			02/12/20 21:57	1.88
1,3,5-Trimethylbenzene	ND		0.080	0.022	ppb v/v			02/12/20 21:57	1.88
Vinyl acetate	ND		0.40	0.028	ppb v/v			02/12/20 21:57	1.88
Vinyl chloride	ND		0.040	0.026	ppb v/v			02/12/20 21:57	1.88
m,p-Xylene	ND		0.080	0.029	ppb v/v			02/12/20 21:57	1.88
o-Xylene	ND		0.080	0.015	ppb v/v			02/12/20 21:57	1.88
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		60 - 140					02/12/20 21:57	1.88

Client Sample ID: 112302-001/CWL-UI-2-36

Lab Sample ID: 140-18189-6

Date Collected: 01/30/20 09:56

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		290	82	ppb v/v			02/12/20 22:40	5.75
Benzene	ND		12	1.2	ppb v/v			02/12/20 22:40	5.75
Benzyl chloride	ND		23	5.5	ppb v/v			02/12/20 22:40	5.75
Bromodichloromethane	ND		12	2.6	ppb v/v			02/12/20 22:40	5.75
Bromoform	ND		12	1.3	ppb v/v			02/12/20 22:40	5.75
Bromomethane	ND		12	3.2	ppb v/v			02/12/20 22:40	5.75
2-Butanone (MEK)	ND		58	10	ppb v/v			02/12/20 22:40	5.75
Carbon disulfide	ND		29	1.6	ppb v/v			02/12/20 22:40	5.75
Carbon tetrachloride	7.1	J	12	1.0	ppb v/v			02/12/20 22:40	5.75
Chlorobenzene	ND		12	0.86	ppb v/v			02/12/20 22:40	5.75
Chloroethane	ND		12	4.2	ppb v/v			02/12/20 22:40	5.75
Chloroform	370		12	1.0	ppb v/v			02/12/20 22:40	5.75
Chloromethane	ND		29	9.5	ppb v/v			02/12/20 22:40	5.75
Dibromochloromethane	ND		12	1.0	ppb v/v			02/12/20 22:40	5.75
1,2-Dibromoethane (EDB)	ND		12	1.0	ppb v/v			02/12/20 22:40	5.75
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		12	1.7	ppb v/v			02/12/20 22:40	5.75
1,2-Dichlorobenzene	ND		12	4.5	ppb v/v			02/12/20 22:40	5.75
1,3-Dichlorobenzene	ND		12	2.3	ppb v/v			02/12/20 22:40	5.75
1,4-Dichlorobenzene	ND		12	2.3	ppb v/v			02/12/20 22:40	5.75
Dichlorodifluoromethane	16		12	2.0	ppb v/v			02/12/20 22:40	5.75
1,1-Dichloroethane	3.3	J	12	1.0	ppb v/v			02/12/20 22:40	5.75
1,2-Dichloroethane	ND		12	1.4	ppb v/v			02/12/20 22:40	5.75
1,1-Dichloroethene	36		12	1.2	ppb v/v			02/12/20 22:40	5.75
cis-1,2-Dichloroethene	ND		12	1.4	ppb v/v			02/12/20 22:40	5.75
trans-1,2-Dichloroethene	ND		12	1.0	ppb v/v			02/12/20 22:40	5.75
1,2-Dichloropropane	30		12	1.4	ppb v/v			02/12/20 22:40	5.75
cis-1,3-Dichloropropene	ND		12	2.3	ppb v/v			02/12/20 22:40	5.75
trans-1,3-Dichloropropene	ND		12	1.3	ppb v/v			02/12/20 22:40	5.75

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112302-001/CWL-UI-2-36

Lab Sample ID: 140-18189-6

Date Collected: 01/30/20 09:56

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		12	1.9	ppb v/v			02/12/20 22:40	5.75
4-Ethyltoluene	ND		23	3.0	ppb v/v			02/12/20 22:40	5.75
Hexachlorobutadiene	ND		58	4.6	ppb v/v			02/12/20 22:40	5.75
2-Hexanone	ND		29	2.3	ppb v/v			02/12/20 22:40	5.75
4-Methyl-2-pentanone (MIBK)	ND		29	7.8	ppb v/v			02/12/20 22:40	5.75
Methylene Chloride	ND		58	23	ppb v/v			02/12/20 22:40	5.75
Styrene	ND		12	3.5	ppb v/v			02/12/20 22:40	5.75
1,1,2,2-Tetrachloroethane	ND		12	2.0	ppb v/v			02/12/20 22:40	5.75
Tetrachloroethene	110		12	1.0	ppb v/v			02/12/20 22:40	5.75
Toluene	ND		17	11	ppb v/v			02/12/20 22:40	5.75
1,1,2-Trichloro-1,2,2-trifluoroethane	360		12	1.2	ppb v/v			02/12/20 22:40	5.75
1,2,4-Trichlorobenzene	ND		58	9.2	ppb v/v			02/12/20 22:40	5.75
1,1,1-Trichloroethane	14		12	5.3	ppb v/v			02/12/20 22:40	5.75
1,1,2-Trichloroethane	ND		12	1.0	ppb v/v			02/12/20 22:40	5.75
Trichloroethene	2300		5.8	0.86	ppb v/v			02/12/20 22:40	5.75
Trichlorofluoromethane	110		12	1.6	ppb v/v			02/12/20 22:40	5.75
1,2,4-Trimethylbenzene	ND		12	2.9	ppb v/v			02/12/20 22:40	5.75
1,3,5-Trimethylbenzene	ND		12	3.2	ppb v/v			02/12/20 22:40	5.75
Vinyl acetate	ND		58	4.0	ppb v/v			02/12/20 22:40	5.75
Vinyl chloride	ND		5.8	3.7	ppb v/v			02/12/20 22:40	5.75
m,p-Xylene	ND		12	4.2	ppb v/v			02/12/20 22:40	5.75
o-Xylene	ND		12	2.2	ppb v/v			02/12/20 22:40	5.75
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		60 - 140					02/12/20 22:40	5.75

Client Sample ID: 112303-001/CWL-UI-2-76

Lab Sample ID: 140-18189-7

Date Collected: 01/30/20 09:59

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1200	340	ppb v/v			02/13/20 16:29	13.32
Benzene	ND		48	4.8	ppb v/v			02/13/20 16:29	13.32
Benzyl chloride	ND		97	23	ppb v/v			02/13/20 16:29	13.32
Bromodichloromethane	ND		48	11	ppb v/v			02/13/20 16:29	13.32
Bromoform	ND		48	5.4	ppb v/v			02/13/20 16:29	13.32
Bromomethane	ND		48	13	ppb v/v			02/13/20 16:29	13.32
2-Butanone (MEK)	ND		240	44	ppb v/v			02/13/20 16:29	13.32
Carbon disulfide	ND		120	6.7	ppb v/v			02/13/20 16:29	13.32
Carbon tetrachloride	12	J	48	4.2	ppb v/v			02/13/20 16:29	13.32
Chlorobenzene	ND		48	3.6	ppb v/v			02/13/20 16:29	13.32
Chloroethane	ND		48	18	ppb v/v			02/13/20 16:29	13.32
Chloroform	550		48	4.2	ppb v/v			02/13/20 16:29	13.32
Chloromethane	ND		120	40	ppb v/v			02/13/20 16:29	13.32
Dibromochloromethane	ND		48	4.2	ppb v/v			02/13/20 16:29	13.32
1,2-Dibromoethane (EDB)	ND		48	4.2	ppb v/v			02/13/20 16:29	13.32

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112303-001/CWL-UI-2-76

Lab Sample ID: 140-18189-7

Date Collected: 01/30/20 09:59

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		48	7.3	ppb v/v			02/13/20 16:29	13.32
1,2-Dichlorobenzene	ND		48	19	ppb v/v			02/13/20 16:29	13.32
1,3-Dichlorobenzene	ND		48	9.7	ppb v/v			02/13/20 16:29	13.32
1,4-Dichlorobenzene	ND		48	9.7	ppb v/v			02/13/20 16:29	13.32
Dichlorodifluoromethane	24	J	48	8.5	ppb v/v			02/13/20 16:29	13.32
1,1-Dichloroethane	6.4	J	48	4.2	ppb v/v			02/13/20 16:29	13.32
1,2-Dichloroethane	7.7	J	48	6.1	ppb v/v			02/13/20 16:29	13.32
1,1-Dichloroethene	86		48	4.8	ppb v/v			02/13/20 16:29	13.32
cis-1,2-Dichloroethene	ND		48	6.1	ppb v/v			02/13/20 16:29	13.32
trans-1,2-Dichloroethene	ND		48	4.2	ppb v/v			02/13/20 16:29	13.32
1,2-Dichloropropane	110	CI	48	6.1	ppb v/v			02/13/20 16:29	13.32
cis-1,3-Dichloropropene	ND		48	9.7	ppb v/v			02/13/20 16:29	13.32
trans-1,3-Dichloropropene	ND		48	5.4	ppb v/v			02/13/20 16:29	13.32
Ethylbenzene	ND		48	7.9	ppb v/v			02/13/20 16:29	13.32
4-Ethyltoluene	ND		97	13	ppb v/v			02/13/20 16:29	13.32
Hexachlorobutadiene	ND		240	19	ppb v/v			02/13/20 16:29	13.32
2-Hexanone	ND		120	9.7	ppb v/v			02/13/20 16:29	13.32
4-Methyl-2-pentanone (MIBK)	ND		120	33	ppb v/v			02/13/20 16:29	13.32
Methylene Chloride	ND		240	97	ppb v/v			02/13/20 16:29	13.32
Styrene	ND		48	15	ppb v/v			02/13/20 16:29	13.32
1,1,2,2-Tetrachloroethane	ND		48	8.5	ppb v/v			02/13/20 16:29	13.32
Tetrachloroethene	190		48	4.2	ppb v/v			02/13/20 16:29	13.32
Toluene	ND		73	47	ppb v/v			02/13/20 16:29	13.32
1,1,2-Trichloro-1,2,2-trifluoroethane	560		48	4.8	ppb v/v			02/13/20 16:29	13.32
1,2,4-Trichlorobenzene	ND		240	39	ppb v/v			02/13/20 16:29	13.32
1,1,1-Trichloroethane	ND		48	22	ppb v/v			02/13/20 16:29	13.32
1,1,2-Trichloroethane	ND		48	4.2	ppb v/v			02/13/20 16:29	13.32
Trichloroethene	4600		24	3.6	ppb v/v			02/13/20 16:29	13.32
Trichlorofluoromethane	160		48	6.7	ppb v/v			02/13/20 16:29	13.32
1,2,4-Trimethylbenzene	ND		48	12	ppb v/v			02/13/20 16:29	13.32
1,3,5-Trimethylbenzene	ND		48	13	ppb v/v			02/13/20 16:29	13.32
Vinyl acetate	ND		240	17	ppb v/v			02/13/20 16:29	13.32
Vinyl chloride	ND		24	16	ppb v/v			02/13/20 16:29	13.32
m,p-Xylene	ND		48	18	ppb v/v			02/13/20 16:29	13.32
o-Xylene	ND		48	9.1	ppb v/v			02/13/20 16:29	13.32
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		60 - 140					02/13/20 16:29	13.32

Client Sample ID: 112305-001/CWL-SV-FB 3

Lab Sample ID: 140-18189-9

Date Collected: 01/30/20 09:14

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	3.7		2.0	0.57	ppb v/v			02/13/20 00:15	1.87
Benzene	0.019	J	0.080	0.0080	ppb v/v			02/13/20 00:15	1.87

Client Sample Results

Client: Sandia National Laboratories
 Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112305-001/CWL-SV-FB 3

Lab Sample ID: 140-18189-9

Date Collected: 01/30/20 09:14

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzyl chloride	ND		0.16	0.038	ppb v/v			02/13/20 00:15	1.87
Bromodichloromethane	ND		0.080	0.018	ppb v/v			02/13/20 00:15	1.87
Bromoform	ND		0.080	0.0090	ppb v/v			02/13/20 00:15	1.87
Bromomethane	ND		0.080	0.022	ppb v/v			02/13/20 00:15	1.87
2-Butanone (MEK)	0.20	J	0.40	0.073	ppb v/v			02/13/20 00:15	1.87
Carbon disulfide	ND		0.20	0.011	ppb v/v			02/13/20 00:15	1.87
Carbon tetrachloride	ND		0.080	0.0070	ppb v/v			02/13/20 00:15	1.87
Chlorobenzene	ND		0.080	0.0060	ppb v/v			02/13/20 00:15	1.87
Chloroethane	ND		0.080	0.029	ppb v/v			02/13/20 00:15	1.87
Chloroform	ND		0.080	0.0070	ppb v/v			02/13/20 00:15	1.87
Chloromethane	ND		0.20	0.066	ppb v/v			02/13/20 00:15	1.87
Dibromochloromethane	ND		0.080	0.0070	ppb v/v			02/13/20 00:15	1.87
1,2-Dibromoethane (EDB)	ND		0.080	0.0070	ppb v/v			02/13/20 00:15	1.87
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.080	0.012	ppb v/v			02/13/20 00:15	1.87
1,2-Dichlorobenzene	ND		0.080	0.031	ppb v/v			02/13/20 00:15	1.87
1,3-Dichlorobenzene	ND		0.080	0.016	ppb v/v			02/13/20 00:15	1.87
1,4-Dichlorobenzene	ND		0.080	0.016	ppb v/v			02/13/20 00:15	1.87
Dichlorodifluoromethane	ND		0.080	0.014	ppb v/v			02/13/20 00:15	1.87
1,1-Dichloroethane	ND		0.080	0.0070	ppb v/v			02/13/20 00:15	1.87
1,2-Dichloroethane	ND		0.080	0.010	ppb v/v			02/13/20 00:15	1.87
1,1-Dichloroethene	ND		0.080	0.0080	ppb v/v			02/13/20 00:15	1.87
cis-1,2-Dichloroethene	ND		0.080	0.010	ppb v/v			02/13/20 00:15	1.87
trans-1,2-Dichloroethene	ND		0.080	0.0070	ppb v/v			02/13/20 00:15	1.87
1,2-Dichloropropane	ND		0.080	0.010	ppb v/v			02/13/20 00:15	1.87
cis-1,3-Dichloropropene	ND		0.080	0.016	ppb v/v			02/13/20 00:15	1.87
trans-1,3-Dichloropropene	ND		0.080	0.0090	ppb v/v			02/13/20 00:15	1.87
Ethylbenzene	ND		0.080	0.013	ppb v/v			02/13/20 00:15	1.87
4-Ethyltoluene	ND		0.16	0.021	ppb v/v			02/13/20 00:15	1.87
Hexachlorobutadiene	ND		0.40	0.032	ppb v/v			02/13/20 00:15	1.87
2-Hexanone	ND		0.20	0.016	ppb v/v			02/13/20 00:15	1.87
4-Methyl-2-pentanone (MIBK)	ND		0.20	0.054	ppb v/v			02/13/20 00:15	1.87
Methylene Chloride	ND		0.40	0.16	ppb v/v			02/13/20 00:15	1.87
Styrene	ND		0.080	0.024	ppb v/v			02/13/20 00:15	1.87
1,1,2,2-Tetrachloroethane	ND		0.080	0.014	ppb v/v			02/13/20 00:15	1.87
Tetrachloroethene	0.0092	J	0.080	0.0070	ppb v/v			02/13/20 00:15	1.87
Toluene	ND		0.12	0.078	ppb v/v			02/13/20 00:15	1.87
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.080	0.0080	ppb v/v			02/13/20 00:15	1.87
1,2,4-Trichlorobenzene	ND		0.40	0.064	ppb v/v			02/13/20 00:15	1.87
1,1,1-Trichloroethane	ND		0.080	0.037	ppb v/v			02/13/20 00:15	1.87
1,1,2-Trichloroethane	ND		0.080	0.0070	ppb v/v			02/13/20 00:15	1.87
Trichloroethene	ND		0.040	0.0060	ppb v/v			02/13/20 00:15	1.87
Trichlorofluoromethane	0.024	J	0.080	0.011	ppb v/v			02/13/20 00:15	1.87
1,2,4-Trimethylbenzene	ND		0.080	0.020	ppb v/v			02/13/20 00:15	1.87
1,3,5-Trimethylbenzene	ND		0.080	0.022	ppb v/v			02/13/20 00:15	1.87
Vinyl acetate	ND		0.40	0.028	ppb v/v			02/13/20 00:15	1.87
Vinyl chloride	ND		0.040	0.026	ppb v/v			02/13/20 00:15	1.87
m,p-Xylene	ND		0.080	0.029	ppb v/v			02/13/20 00:15	1.87
o-Xylene	ND		0.080	0.015	ppb v/v			02/13/20 00:15	1.87

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112305-001/CWL-SV-FB 3

Lab Sample ID: 140-18189-9

Date Collected: 01/30/20 09:14

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		60 - 140		02/13/20 00:15	1.87

Client Sample ID: 112306-001/CWL-SV-D1-100

Lab Sample ID: 140-18189-10

Date Collected: 01/30/20 09:19

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1800	510	ppb v/v			02/13/20 17:12	19.58
Benzene	9.0	J	71	7.1	ppb v/v			02/13/20 17:12	19.58
Benzyl chloride	ND		140	34	ppb v/v			02/13/20 17:12	19.58
Bromodichloromethane	ND		71	16	ppb v/v			02/13/20 17:12	19.58
Bromoform	ND		71	8.0	ppb v/v			02/13/20 17:12	19.58
Bromomethane	ND		71	20	ppb v/v			02/13/20 17:12	19.58
2-Butanone (MEK)	ND		360	65	ppb v/v			02/13/20 17:12	19.58
Carbon disulfide	ND		180	9.8	ppb v/v			02/13/20 17:12	19.58
Carbon tetrachloride	17	J	71	6.2	ppb v/v			02/13/20 17:12	19.58
Chlorobenzene	ND		71	5.3	ppb v/v			02/13/20 17:12	19.58
Chloroethane	ND		71	26	ppb v/v			02/13/20 17:12	19.58
Chloroform	340		71	6.2	ppb v/v			02/13/20 17:12	19.58
Chloromethane	ND		180	59	ppb v/v			02/13/20 17:12	19.58
Dibromochloromethane	ND		71	6.2	ppb v/v			02/13/20 17:12	19.58
1,2-Dibromoethane (EDB)	ND		71	6.2	ppb v/v			02/13/20 17:12	19.58
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		71	11	ppb v/v			02/13/20 17:12	19.58
1,2-Dichlorobenzene	ND		71	28	ppb v/v			02/13/20 17:12	19.58
1,3-Dichlorobenzene	ND		71	14	ppb v/v			02/13/20 17:12	19.58
1,4-Dichlorobenzene	ND		71	14	ppb v/v			02/13/20 17:12	19.58
Dichlorodifluoromethane	29	J	71	12	ppb v/v			02/13/20 17:12	19.58
1,1-Dichloroethane	12	J	71	6.2	ppb v/v			02/13/20 17:12	19.58
1,2-Dichloroethane	16	J	71	8.9	ppb v/v			02/13/20 17:12	19.58
1,1-Dichloroethene	250		71	7.1	ppb v/v			02/13/20 17:12	19.58
cis-1,2-Dichloroethene	ND		71	8.9	ppb v/v			02/13/20 17:12	19.58
trans-1,2-Dichloroethene	ND		71	6.2	ppb v/v			02/13/20 17:12	19.58
1,2-Dichloropropane	86		71	8.9	ppb v/v			02/13/20 17:12	19.58
cis-1,3-Dichloropropene	ND		71	14	ppb v/v			02/13/20 17:12	19.58
trans-1,3-Dichloropropene	ND		71	8.0	ppb v/v			02/13/20 17:12	19.58
Ethylbenzene	ND		71	12	ppb v/v			02/13/20 17:12	19.58
4-Ethyltoluene	ND		140	19	ppb v/v			02/13/20 17:12	19.58
Hexachlorobutadiene	ND		360	28	ppb v/v			02/13/20 17:12	19.58
2-Hexanone	ND		180	14	ppb v/v			02/13/20 17:12	19.58
4-Methyl-2-pentanone (MIBK)	ND		180	48	ppb v/v			02/13/20 17:12	19.58
Methylene Chloride	ND		360	140	ppb v/v			02/13/20 17:12	19.58
Styrene	ND		71	21	ppb v/v			02/13/20 17:12	19.58
1,1,2,2-Tetrachloroethane	ND		71	12	ppb v/v			02/13/20 17:12	19.58
Tetrachloroethene	500		71	6.2	ppb v/v			02/13/20 17:12	19.58
Toluene	ND		110	69	ppb v/v			02/13/20 17:12	19.58
1,1,2-Trichloro-1,2,2-trifluoroethane	770		71	7.1	ppb v/v			02/13/20 17:12	19.58
1,2,4-Trichlorobenzene	ND		360	57	ppb v/v			02/13/20 17:12	19.58

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112306-001/CWL-SV-D1-100

Lab Sample ID: 140-18189-10

Date Collected: 01/30/20 09:19

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		71	33	ppb v/v			02/13/20 17:12	19.58
1,1,2-Trichloroethane	ND		71	6.2	ppb v/v			02/13/20 17:12	19.58
Trichloroethene	7100		36	5.3	ppb v/v			02/13/20 17:12	19.58
Trichlorofluoromethane	210		71	9.8	ppb v/v			02/13/20 17:12	19.58
1,2,4-Trimethylbenzene	ND		71	18	ppb v/v			02/13/20 17:12	19.58
1,3,5-Trimethylbenzene	ND		71	20	ppb v/v			02/13/20 17:12	19.58
Vinyl acetate	ND		360	25	ppb v/v			02/13/20 17:12	19.58
Vinyl chloride	ND		36	23	ppb v/v			02/13/20 17:12	19.58
m,p-Xylene	ND		71	26	ppb v/v			02/13/20 17:12	19.58
o-Xylene	ND		71	13	ppb v/v			02/13/20 17:12	19.58
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		60 - 140					02/13/20 17:12	19.58

Client Sample ID: 112307-001/CWL-SV-D1-160

Lab Sample ID: 140-18189-11

Date Collected: 01/30/20 09:22

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		3200	910	ppb v/v			02/13/20 17:55	41.8
Benzene	13	J	130	13	ppb v/v			02/13/20 17:55	41.8
Benzyl chloride	ND		260	61	ppb v/v			02/13/20 17:55	41.8
Bromodichloromethane	ND		130	29	ppb v/v			02/13/20 17:55	41.8
Bromoform	ND		130	14	ppb v/v			02/13/20 17:55	41.8
Bromomethane	ND		130	35	ppb v/v			02/13/20 17:55	41.8
2-Butanone (MEK)	ND		640	120	ppb v/v			02/13/20 17:55	41.8
Carbon disulfide	ND		320	18	ppb v/v			02/13/20 17:55	41.8
Carbon tetrachloride	38	J	130	11	ppb v/v			02/13/20 17:55	41.8
Chlorobenzene	ND		130	9.6	ppb v/v			02/13/20 17:55	41.8
Chloroethane	ND		130	47	ppb v/v			02/13/20 17:55	41.8
Chloroform	540		130	11	ppb v/v			02/13/20 17:55	41.8
Chloromethane	ND		320	110	ppb v/v			02/13/20 17:55	41.8
Dibromochloromethane	ND		130	11	ppb v/v			02/13/20 17:55	41.8
1,2-Dibromoethane (EDB)	ND		130	11	ppb v/v			02/13/20 17:55	41.8
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		130	19	ppb v/v			02/13/20 17:55	41.8
1,2-Dichlorobenzene	ND		130	50	ppb v/v			02/13/20 17:55	41.8
1,3-Dichlorobenzene	ND		130	26	ppb v/v			02/13/20 17:55	41.8
1,4-Dichlorobenzene	ND		130	26	ppb v/v			02/13/20 17:55	41.8
Dichlorodifluoromethane	59	J	130	23	ppb v/v			02/13/20 17:55	41.8
1,1-Dichloroethane	29	J	130	11	ppb v/v			02/13/20 17:55	41.8
1,2-Dichloroethane	46	J	130	16	ppb v/v			02/13/20 17:55	41.8
1,1-Dichloroethene	580		130	13	ppb v/v			02/13/20 17:55	41.8
cis-1,2-Dichloroethene	ND		130	16	ppb v/v			02/13/20 17:55	41.8
trans-1,2-Dichloroethene	ND		130	11	ppb v/v			02/13/20 17:55	41.8
1,2-Dichloropropane	250		130	16	ppb v/v			02/13/20 17:55	41.8
cis-1,3-Dichloropropene	ND		130	26	ppb v/v			02/13/20 17:55	41.8
trans-1,3-Dichloropropene	ND		130	14	ppb v/v			02/13/20 17:55	41.8

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112307-001/CWL-SV-D1-160

Lab Sample ID: 140-18189-11

Date Collected: 01/30/20 09:22

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		130	21	ppb v/v			02/13/20 17:55	41.8
4-Ethyltoluene	ND		260	34	ppb v/v			02/13/20 17:55	41.8
Hexachlorobutadiene	ND		640	51	ppb v/v			02/13/20 17:55	41.8
2-Hexanone	ND		320	26	ppb v/v			02/13/20 17:55	41.8
4-Methyl-2-pentanone (MIBK)	ND		320	87	ppb v/v			02/13/20 17:55	41.8
Methylene Chloride	ND		640	260	ppb v/v			02/13/20 17:55	41.8
Styrene	ND		130	39	ppb v/v			02/13/20 17:55	41.8
1,1,2,2-Tetrachloroethane	ND		130	23	ppb v/v			02/13/20 17:55	41.8
Tetrachloroethene	610		130	11	ppb v/v			02/13/20 17:55	41.8
Toluene	ND		190	130	ppb v/v			02/13/20 17:55	41.8
1,1,2-Trichloro-1,2,2-trifluoroethane	1600		130	13	ppb v/v			02/13/20 17:55	41.8
1,2,4-Trichlorobenzene	ND		640	100	ppb v/v			02/13/20 17:55	41.8
1,1,1-Trichloroethane	ND		130	59	ppb v/v			02/13/20 17:55	41.8
1,1,2-Trichloroethane	ND		130	11	ppb v/v			02/13/20 17:55	41.8
Trichloroethene	16000		64	9.6	ppb v/v			02/13/20 17:55	41.8
Trichlorofluoromethane	430		130	18	ppb v/v			02/13/20 17:55	41.8
1,2,4-Trimethylbenzene	ND		130	32	ppb v/v			02/13/20 17:55	41.8
1,3,5-Trimethylbenzene	ND		130	35	ppb v/v			02/13/20 17:55	41.8
Vinyl acetate	ND		640	45	ppb v/v			02/13/20 17:55	41.8
Vinyl chloride	ND		64	42	ppb v/v			02/13/20 17:55	41.8
m,p-Xylene	ND		130	47	ppb v/v			02/13/20 17:55	41.8
o-Xylene	ND		130	24	ppb v/v			02/13/20 17:55	41.8
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		60 - 140					02/13/20 17:55	41.8

Client Sample ID: 112308-001/CWL-SV-D1-240

Lab Sample ID: 140-18189-12

Date Collected: 01/30/20 09:26

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		2800	790	ppb v/v			02/13/20 18:40	55.32
Benzene	11	J	110	11	ppb v/v			02/13/20 18:40	55.32
Benzyl chloride	ND		220	53	ppb v/v			02/13/20 18:40	55.32
Bromodichloromethane	ND		110	25	ppb v/v			02/13/20 18:40	55.32
Bromoform	ND		110	12	ppb v/v			02/13/20 18:40	55.32
Bromomethane	ND		110	30	ppb v/v			02/13/20 18:40	55.32
2-Butanone (MEK)	ND		550	100	ppb v/v			02/13/20 18:40	55.32
Carbon disulfide	ND		280	15	ppb v/v			02/13/20 18:40	55.32
Carbon tetrachloride	58	J	110	9.7	ppb v/v			02/13/20 18:40	55.32
Chlorobenzene	ND		110	8.3	ppb v/v			02/13/20 18:40	55.32
Chloroethane	ND		110	40	ppb v/v			02/13/20 18:40	55.32
Chloroform	490		110	9.7	ppb v/v			02/13/20 18:40	55.32
Chloromethane	ND		280	91	ppb v/v			02/13/20 18:40	55.32
Dibromochloromethane	ND		110	9.7	ppb v/v			02/13/20 18:40	55.32
1,2-Dibromoethane (EDB)	ND		110	9.7	ppb v/v			02/13/20 18:40	55.32

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112308-001/CWL-SV-D1-240

Lab Sample ID: 140-18189-12

Date Collected: 01/30/20 09:26

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		110	17	ppb v/v			02/13/20 18:40	55.32
1,2-Dichlorobenzene	ND		110	43	ppb v/v			02/13/20 18:40	55.32
1,3-Dichlorobenzene	ND		110	22	ppb v/v			02/13/20 18:40	55.32
1,4-Dichlorobenzene	ND		110	22	ppb v/v			02/13/20 18:40	55.32
Dichlorodifluoromethane	84	J	110	19	ppb v/v			02/13/20 18:40	55.32
1,1-Dichloroethane	40	J	110	9.7	ppb v/v			02/13/20 18:40	55.32
1,2-Dichloroethane	20	J	110	14	ppb v/v			02/13/20 18:40	55.32
1,1-Dichloroethene	910		110	11	ppb v/v			02/13/20 18:40	55.32
cis-1,2-Dichloroethene	ND		110	14	ppb v/v			02/13/20 18:40	55.32
trans-1,2-Dichloroethene	ND		110	9.7	ppb v/v			02/13/20 18:40	55.32
1,2-Dichloropropane	220		110	14	ppb v/v			02/13/20 18:40	55.32
cis-1,3-Dichloropropene	ND		110	22	ppb v/v			02/13/20 18:40	55.32
trans-1,3-Dichloropropene	ND		110	12	ppb v/v			02/13/20 18:40	55.32
Ethylbenzene	ND		110	18	ppb v/v			02/13/20 18:40	55.32
4-Ethyltoluene	ND		220	29	ppb v/v			02/13/20 18:40	55.32
Hexachlorobutadiene	ND		550	44	ppb v/v			02/13/20 18:40	55.32
2-Hexanone	ND		280	22	ppb v/v			02/13/20 18:40	55.32
4-Methyl-2-pentanone (MIBK)	ND		280	75	ppb v/v			02/13/20 18:40	55.32
Methylene Chloride	ND		550	220	ppb v/v			02/13/20 18:40	55.32
Styrene	ND		110	33	ppb v/v			02/13/20 18:40	55.32
1,1,2,2-Tetrachloroethane	ND		110	19	ppb v/v			02/13/20 18:40	55.32
Tetrachloroethene	530		110	9.7	ppb v/v			02/13/20 18:40	55.32
Toluene	ND		170	110	ppb v/v			02/13/20 18:40	55.32
1,1,2-Trichloro-1,2,2-trifluoroethane	2200		110	11	ppb v/v			02/13/20 18:40	55.32
1,2,4-Trichlorobenzene	ND		550	89	ppb v/v			02/13/20 18:40	55.32
1,1,1-Trichloroethane	ND		110	51	ppb v/v			02/13/20 18:40	55.32
1,1,2-Trichloroethane	ND		110	9.7	ppb v/v			02/13/20 18:40	55.32
Trichloroethene	21000		55	8.3	ppb v/v			02/13/20 18:40	55.32
Trichlorofluoromethane	620		110	15	ppb v/v			02/13/20 18:40	55.32
1,2,4-Trimethylbenzene	ND		110	28	ppb v/v			02/13/20 18:40	55.32
1,3,5-Trimethylbenzene	ND		110	30	ppb v/v			02/13/20 18:40	55.32
Vinyl acetate	ND		550	39	ppb v/v			02/13/20 18:40	55.32
Vinyl chloride	ND		55	36	ppb v/v			02/13/20 18:40	55.32
m,p-Xylene	ND		110	40	ppb v/v			02/13/20 18:40	55.32
o-Xylene	ND		110	21	ppb v/v			02/13/20 18:40	55.32
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		60 - 140					02/13/20 18:40	55.32

Client Sample ID: 112309-001/CWL-SV-D1-350

Lab Sample ID: 140-18189-13

Date Collected: 01/30/20 09:29

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1300	360	ppb v/v			02/13/20 19:26	14.03
Benzene	8.5	J	51	5.1	ppb v/v			02/13/20 19:26	14.03

Eurofins TestAmerica, Knoxville

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112309-001/CWL-SV-D1-350

Lab Sample ID: 140-18189-13

Date Collected: 01/30/20 09:29

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzyl chloride	ND		100	24	ppb v/v			02/13/20 19:26	14.03
Bromodichloromethane	ND		51	11	ppb v/v			02/13/20 19:26	14.03
Bromoform	ND		51	5.7	ppb v/v			02/13/20 19:26	14.03
Bromomethane	ND		51	14	ppb v/v			02/13/20 19:26	14.03
2-Butanone (MEK)	ND		260	47	ppb v/v			02/13/20 19:26	14.03
Carbon disulfide	ND		130	7.0	ppb v/v			02/13/20 19:26	14.03
Carbon tetrachloride	33	J	51	4.5	ppb v/v			02/13/20 19:26	14.03
Chlorobenzene	ND		51	3.8	ppb v/v			02/13/20 19:26	14.03
Chloroethane	ND		51	18	ppb v/v			02/13/20 19:26	14.03
Chloroform	190		51	4.5	ppb v/v			02/13/20 19:26	14.03
Chloromethane	ND		130	42	ppb v/v			02/13/20 19:26	14.03
Dibromochloromethane	ND		51	4.5	ppb v/v			02/13/20 19:26	14.03
1,2-Dibromoethane (EDB)	ND		51	4.5	ppb v/v			02/13/20 19:26	14.03
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		51	7.7	ppb v/v			02/13/20 19:26	14.03
1,2-Dichlorobenzene	ND		51	20	ppb v/v			02/13/20 19:26	14.03
1,3-Dichlorobenzene	ND		51	10	ppb v/v			02/13/20 19:26	14.03
1,4-Dichlorobenzene	ND		51	10	ppb v/v			02/13/20 19:26	14.03
Dichlorodifluoromethane	63		51	8.9	ppb v/v			02/13/20 19:26	14.03
1,1-Dichloroethane	18	J	51	4.5	ppb v/v			02/13/20 19:26	14.03
1,2-Dichloroethane	ND		51	6.4	ppb v/v			02/13/20 19:26	14.03
1,1-Dichloroethene	610		51	5.1	ppb v/v			02/13/20 19:26	14.03
cis-1,2-Dichloroethene	ND		51	6.4	ppb v/v			02/13/20 19:26	14.03
trans-1,2-Dichloroethene	ND		51	4.5	ppb v/v			02/13/20 19:26	14.03
1,2-Dichloropropane	92		51	6.4	ppb v/v			02/13/20 19:26	14.03
cis-1,3-Dichloropropene	ND		51	10	ppb v/v			02/13/20 19:26	14.03
trans-1,3-Dichloropropene	ND		51	5.7	ppb v/v			02/13/20 19:26	14.03
Ethylbenzene	ND		51	8.3	ppb v/v			02/13/20 19:26	14.03
4-Ethyltoluene	ND		100	13	ppb v/v			02/13/20 19:26	14.03
Hexachlorobutadiene	ND		260	20	ppb v/v			02/13/20 19:26	14.03
2-Hexanone	ND		130	10	ppb v/v			02/13/20 19:26	14.03
4-Methyl-2-pentanone (MIBK)	ND		130	34	ppb v/v			02/13/20 19:26	14.03
Methylene Chloride	ND		260	100	ppb v/v			02/13/20 19:26	14.03
Styrene	ND		51	15	ppb v/v			02/13/20 19:26	14.03
1,1,2,2-Tetrachloroethane	ND		51	8.9	ppb v/v			02/13/20 19:26	14.03
Tetrachloroethene	240		51	4.5	ppb v/v			02/13/20 19:26	14.03
Toluene	ND		77	50	ppb v/v			02/13/20 19:26	14.03
1,1,2-Trichloro-1,2,2-trifluoroethane	1400		51	5.1	ppb v/v			02/13/20 19:26	14.03
1,2,4-Trichlorobenzene	ND		260	41	ppb v/v			02/13/20 19:26	14.03
1,1,1-Trichloroethane	ND		51	24	ppb v/v			02/13/20 19:26	14.03
1,1,2-Trichloroethane	ND		51	4.5	ppb v/v			02/13/20 19:26	14.03
Trichlorofluoromethane	450		51	7.0	ppb v/v			02/13/20 19:26	14.03
1,2,4-Trimethylbenzene	ND		51	13	ppb v/v			02/13/20 19:26	14.03
1,3,5-Trimethylbenzene	ND		51	14	ppb v/v			02/13/20 19:26	14.03
Vinyl acetate	ND		260	18	ppb v/v			02/13/20 19:26	14.03
Vinyl chloride	ND		26	17	ppb v/v			02/13/20 19:26	14.03
m,p-Xylene	ND		51	18	ppb v/v			02/13/20 19:26	14.03
o-Xylene	ND		51	9.6	ppb v/v			02/13/20 19:26	14.03

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112309-001/CWL-SV-D1-350

Lab Sample ID: 140-18189-13

Date Collected: 01/30/20 09:29

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		60 - 140		02/13/20 19:26	14.03

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	9100		42	6.3	ppb v/v			02/18/20 16:18	41.91

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		60 - 140		02/18/20 16:18	41.91

Client Sample ID: 112310-001/CWL-SV-D1-470

Lab Sample ID: 140-18189-14

Date Collected: 01/30/20 09:35

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		53	15	ppb v/v			02/13/20 00:58	1.59
Benzene	0.46	J	2.1	0.21	ppb v/v			02/13/20 00:58	1.59
Benzyl chloride	ND		4.2	1.0	ppb v/v			02/13/20 00:58	1.59
Bromodichloromethane	ND		2.1	0.48	ppb v/v			02/13/20 00:58	1.59
Bromoform	ND		2.1	0.24	ppb v/v			02/13/20 00:58	1.59
Bromomethane	ND		2.1	0.58	ppb v/v			02/13/20 00:58	1.59
2-Butanone (MEK)	ND		11	1.9	ppb v/v			02/13/20 00:58	1.59
Carbon disulfide	0.54	J	5.3	0.29	ppb v/v			02/13/20 00:58	1.59
Carbon tetrachloride	4.7		2.1	0.19	ppb v/v			02/13/20 00:58	1.59
Chlorobenzene	ND		2.1	0.16	ppb v/v			02/13/20 00:58	1.59
Chloroethane	ND		2.1	0.77	ppb v/v			02/13/20 00:58	1.59
Chloroform	2.3		2.1	0.19	ppb v/v			02/13/20 00:58	1.59
Chloromethane	ND		5.3	1.7	ppb v/v			02/13/20 00:58	1.59
Dibromochloromethane	ND		2.1	0.19	ppb v/v			02/13/20 00:58	1.59
1,2-Dibromoethane (EDB)	ND		2.1	0.19	ppb v/v			02/13/20 00:58	1.59
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.1	0.32	ppb v/v			02/13/20 00:58	1.59
1,2-Dichlorobenzene	ND		2.1	0.82	ppb v/v			02/13/20 00:58	1.59
1,3-Dichlorobenzene	ND		2.1	0.42	ppb v/v			02/13/20 00:58	1.59
1,4-Dichlorobenzene	ND		2.1	0.42	ppb v/v			02/13/20 00:58	1.59
Dichlorodifluoromethane	30		2.1	0.37	ppb v/v			02/13/20 00:58	1.59
1,1-Dichloroethane	0.34	J	2.1	0.19	ppb v/v			02/13/20 00:58	1.59
1,2-Dichloroethane	ND		2.1	0.27	ppb v/v			02/13/20 00:58	1.59
1,1-Dichloroethene	63		2.1	0.21	ppb v/v			02/13/20 00:58	1.59
cis-1,2-Dichloroethene	ND		2.1	0.27	ppb v/v			02/13/20 00:58	1.59
trans-1,2-Dichloroethene	ND		2.1	0.19	ppb v/v			02/13/20 00:58	1.59
1,2-Dichloropropane	ND		2.1	0.27	ppb v/v			02/13/20 00:58	1.59
cis-1,3-Dichloropropene	ND		2.1	0.42	ppb v/v			02/13/20 00:58	1.59
trans-1,3-Dichloropropene	ND		2.1	0.24	ppb v/v			02/13/20 00:58	1.59
Ethylbenzene	ND		2.1	0.34	ppb v/v			02/13/20 00:58	1.59
4-Ethyltoluene	ND		4.2	0.56	ppb v/v			02/13/20 00:58	1.59
Hexachlorobutadiene	ND		11	0.85	ppb v/v			02/13/20 00:58	1.59
2-Hexanone	ND		5.3	0.42	ppb v/v			02/13/20 00:58	1.59
4-Methyl-2-pentanone (MIBK)	ND		5.3	1.4	ppb v/v			02/13/20 00:58	1.59
Methylene Chloride	ND		11	4.2	ppb v/v			02/13/20 00:58	1.59

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112310-001/CWL-SV-D1-470

Lab Sample ID: 140-18189-14

Date Collected: 01/30/20 09:35

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		2.1	0.64	ppb v/v			02/13/20 00:58	1.59
1,1,2,2-Tetrachloroethane	ND		2.1	0.37	ppb v/v			02/13/20 00:58	1.59
Tetrachloroethene	15		2.1	0.19	ppb v/v			02/13/20 00:58	1.59
Toluene	ND		3.2	2.1	ppb v/v			02/13/20 00:58	1.59
1,2,4-Trichlorobenzene	ND		11	1.7	ppb v/v			02/13/20 00:58	1.59
1,1,1-Trichloroethane	ND		2.1	0.98	ppb v/v			02/13/20 00:58	1.59
1,1,2-Trichloroethane	ND		2.1	0.19	ppb v/v			02/13/20 00:58	1.59
Trichloroethene	330		1.1	0.16	ppb v/v			02/13/20 00:58	1.59
Trichlorofluoromethane	130		2.1	0.29	ppb v/v			02/13/20 00:58	1.59
1,2,4-Trimethylbenzene	ND		2.1	0.53	ppb v/v			02/13/20 00:58	1.59
1,3,5-Trimethylbenzene	ND		2.1	0.58	ppb v/v			02/13/20 00:58	1.59
Vinyl acetate	ND		11	0.74	ppb v/v			02/13/20 00:58	1.59
Vinyl chloride	ND		1.1	0.69	ppb v/v			02/13/20 00:58	1.59
m,p-Xylene	ND		2.1	0.77	ppb v/v			02/13/20 00:58	1.59
o-Xylene	ND		2.1	0.40	ppb v/v			02/13/20 00:58	1.59

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		60 - 140		02/13/20 00:58	1.59

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloro-1,2,2-trifluoroethane	520		3.2	0.32	ppb v/v			02/18/20 17:00	1.59

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		60 - 140		02/18/20 17:00	1.59

Client Sample ID: 112311-001/CWL-SV-FB 4

Lab Sample ID: 140-18189-15

Date Collected: 01/30/20 10:52

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	1.1	J	2.0	0.57	ppb v/v			02/13/20 01:51	1.91
Benzene	0.020	J	0.080	0.0080	ppb v/v			02/13/20 01:51	1.91
Benzyl chloride	ND		0.16	0.038	ppb v/v			02/13/20 01:51	1.91
Bromodichloromethane	ND		0.080	0.018	ppb v/v			02/13/20 01:51	1.91
Bromoform	ND		0.080	0.0090	ppb v/v			02/13/20 01:51	1.91
Bromomethane	ND		0.080	0.022	ppb v/v			02/13/20 01:51	1.91
2-Butanone (MEK)	0.14	J	0.40	0.073	ppb v/v			02/13/20 01:51	1.91
Carbon disulfide	0.028	J	0.20	0.011	ppb v/v			02/13/20 01:51	1.91
Carbon tetrachloride	ND		0.080	0.0070	ppb v/v			02/13/20 01:51	1.91
Chlorobenzene	ND		0.080	0.0060	ppb v/v			02/13/20 01:51	1.91
Chloroethane	ND		0.080	0.029	ppb v/v			02/13/20 01:51	1.91
Chloroform	ND		0.080	0.0070	ppb v/v			02/13/20 01:51	1.91
Chloromethane	0.082	J	0.20	0.066	ppb v/v			02/13/20 01:51	1.91
Dibromochloromethane	ND		0.080	0.0070	ppb v/v			02/13/20 01:51	1.91
1,2-Dibromoethane (EDB)	ND		0.080	0.0070	ppb v/v			02/13/20 01:51	1.91
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.080	0.012	ppb v/v			02/13/20 01:51	1.91

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112311-001/CWL-SV-FB 4

Lab Sample ID: 140-18189-15

Date Collected: 01/30/20 10:52

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene	ND		0.080	0.031	ppb v/v			02/13/20 01:51	1.91
1,3-Dichlorobenzene	ND		0.080	0.016	ppb v/v			02/13/20 01:51	1.91
1,4-Dichlorobenzene	ND		0.080	0.016	ppb v/v			02/13/20 01:51	1.91
Dichlorodifluoromethane	ND		0.080	0.014	ppb v/v			02/13/20 01:51	1.91
1,1-Dichloroethane	ND		0.080	0.0070	ppb v/v			02/13/20 01:51	1.91
1,2-Dichloroethane	ND		0.080	0.010	ppb v/v			02/13/20 01:51	1.91
1,1-Dichloroethene	ND		0.080	0.0080	ppb v/v			02/13/20 01:51	1.91
cis-1,2-Dichloroethene	ND		0.080	0.010	ppb v/v			02/13/20 01:51	1.91
trans-1,2-Dichloroethene	ND		0.080	0.0070	ppb v/v			02/13/20 01:51	1.91
1,2-Dichloropropane	ND		0.080	0.010	ppb v/v			02/13/20 01:51	1.91
cis-1,3-Dichloropropene	ND		0.080	0.016	ppb v/v			02/13/20 01:51	1.91
trans-1,3-Dichloropropene	ND		0.080	0.0090	ppb v/v			02/13/20 01:51	1.91
Ethylbenzene	ND		0.080	0.013	ppb v/v			02/13/20 01:51	1.91
4-Ethyltoluene	ND		0.16	0.021	ppb v/v			02/13/20 01:51	1.91
Hexachlorobutadiene	ND		0.40	0.032	ppb v/v			02/13/20 01:51	1.91
2-Hexanone	0.027	J	0.20	0.016	ppb v/v			02/13/20 01:51	1.91
4-Methyl-2-pentanone (MIBK)	ND		0.20	0.054	ppb v/v			02/13/20 01:51	1.91
Methylene Chloride	0.27	J	0.40	0.16	ppb v/v			02/13/20 01:51	1.91
Styrene	ND		0.080	0.024	ppb v/v			02/13/20 01:51	1.91
1,1,2,2-Tetrachloroethane	ND		0.080	0.014	ppb v/v			02/13/20 01:51	1.91
Tetrachloroethene	ND		0.080	0.0070	ppb v/v			02/13/20 01:51	1.91
Toluene	ND		0.12	0.078	ppb v/v			02/13/20 01:51	1.91
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.080	0.0080	ppb v/v			02/13/20 01:51	1.91
1,2,4-Trichlorobenzene	ND		0.40	0.064	ppb v/v			02/13/20 01:51	1.91
1,1,1-Trichloroethane	ND		0.080	0.037	ppb v/v			02/13/20 01:51	1.91
1,1,2-Trichloroethane	ND		0.080	0.0070	ppb v/v			02/13/20 01:51	1.91
Trichloroethene	ND		0.040	0.0060	ppb v/v			02/13/20 01:51	1.91
Trichlorofluoromethane	0.015	J	0.080	0.011	ppb v/v			02/13/20 01:51	1.91
1,2,4-Trimethylbenzene	ND		0.080	0.020	ppb v/v			02/13/20 01:51	1.91
1,3,5-Trimethylbenzene	ND		0.080	0.022	ppb v/v			02/13/20 01:51	1.91
Vinyl acetate	ND		0.40	0.028	ppb v/v			02/13/20 01:51	1.91
Vinyl chloride	ND		0.040	0.026	ppb v/v			02/13/20 01:51	1.91
m,p-Xylene	ND		0.080	0.029	ppb v/v			02/13/20 01:51	1.91
o-Xylene	ND		0.080	0.015	ppb v/v			02/13/20 01:51	1.91

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		60 - 140		02/13/20 01:51	1.91

Client Sample ID: 112312-001/CWL-SV-D2-120

Lab Sample ID: 140-18189-16

Date Collected: 01/30/20 11:11

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1000	290	ppb v/v			02/13/20 20:12	16.43
Benzene	5.4	J	41	4.1	ppb v/v			02/13/20 20:12	16.43
Benzyl chloride	ND		82	20	ppb v/v			02/13/20 20:12	16.43
Bromodichloromethane	ND		41	9.2	ppb v/v			02/13/20 20:12	16.43

Eurofins TestAmerica, Knoxville

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112312-001/CWL-SV-D2-120

Lab Sample ID: 140-18189-16

Date Collected: 01/30/20 11:11

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromoform	ND		41	4.6	ppb v/v			02/13/20 20:12	16.43
Bromomethane	ND		41	11	ppb v/v			02/13/20 20:12	16.43
2-Butanone (MEK)	ND		210	37	ppb v/v			02/13/20 20:12	16.43
Carbon disulfide	ND		100	5.6	ppb v/v			02/13/20 20:12	16.43
Carbon tetrachloride	26	J	41	3.6	ppb v/v			02/13/20 20:12	16.43
Chlorobenzene	ND		41	3.1	ppb v/v			02/13/20 20:12	16.43
Chloroethane	ND		41	15	ppb v/v			02/13/20 20:12	16.43
Chloroform	450		41	3.6	ppb v/v			02/13/20 20:12	16.43
Chloromethane	ND		100	34	ppb v/v			02/13/20 20:12	16.43
Dibromochloromethane	ND		41	3.6	ppb v/v			02/13/20 20:12	16.43
1,2-Dibromoethane (EDB)	ND		41	3.6	ppb v/v			02/13/20 20:12	16.43
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		41	6.2	ppb v/v			02/13/20 20:12	16.43
1,2-Dichlorobenzene	ND		41	16	ppb v/v			02/13/20 20:12	16.43
1,3-Dichlorobenzene	ND		41	8.2	ppb v/v			02/13/20 20:12	16.43
1,4-Dichlorobenzene	ND		41	8.2	ppb v/v			02/13/20 20:12	16.43
Dichlorodifluoromethane	46		41	7.2	ppb v/v			02/13/20 20:12	16.43
1,1-Dichloroethane	17	J	41	3.6	ppb v/v			02/13/20 20:12	16.43
1,2-Dichloroethane	36	J	41	5.1	ppb v/v			02/13/20 20:12	16.43
1,1-Dichloroethene	420		41	4.1	ppb v/v			02/13/20 20:12	16.43
cis-1,2-Dichloroethene	ND		41	5.1	ppb v/v			02/13/20 20:12	16.43
trans-1,2-Dichloroethene	ND		41	3.6	ppb v/v			02/13/20 20:12	16.43
1,2-Dichloropropane	180	CI	41	5.1	ppb v/v			02/13/20 20:12	16.43
cis-1,3-Dichloropropene	ND		41	8.2	ppb v/v			02/13/20 20:12	16.43
trans-1,3-Dichloropropene	ND		41	4.6	ppb v/v			02/13/20 20:12	16.43
Ethylbenzene	ND		41	6.7	ppb v/v			02/13/20 20:12	16.43
4-Ethyltoluene	ND		82	11	ppb v/v			02/13/20 20:12	16.43
Hexachlorobutadiene	ND		210	16	ppb v/v			02/13/20 20:12	16.43
2-Hexanone	ND		100	8.2	ppb v/v			02/13/20 20:12	16.43
4-Methyl-2-pentanone (MIBK)	ND		100	28	ppb v/v			02/13/20 20:12	16.43
Methylene Chloride	ND		210	82	ppb v/v			02/13/20 20:12	16.43
Styrene	ND		41	12	ppb v/v			02/13/20 20:12	16.43
1,1,2,2-Tetrachloroethane	ND		41	7.2	ppb v/v			02/13/20 20:12	16.43
Tetrachloroethene	410		41	3.6	ppb v/v			02/13/20 20:12	16.43
Toluene	ND		62	40	ppb v/v			02/13/20 20:12	16.43
1,1,2-Trichloro-1,2,2-trifluoroethane	1200		41	4.1	ppb v/v			02/13/20 20:12	16.43
1,2,4-Trichlorobenzene	ND		210	33	ppb v/v			02/13/20 20:12	16.43
1,1,1-Trichloroethane	23	J	41	19	ppb v/v			02/13/20 20:12	16.43
1,1,2-Trichloroethane	ND		41	3.6	ppb v/v			02/13/20 20:12	16.43
Trichlorofluoromethane	340		41	5.6	ppb v/v			02/13/20 20:12	16.43
1,2,4-Trimethylbenzene	ND		41	10	ppb v/v			02/13/20 20:12	16.43
1,3,5-Trimethylbenzene	ND		41	11	ppb v/v			02/13/20 20:12	16.43
Vinyl acetate	ND		210	14	ppb v/v			02/13/20 20:12	16.43
Vinyl chloride	ND		21	13	ppb v/v			02/13/20 20:12	16.43
m,p-Xylene	ND		41	15	ppb v/v			02/13/20 20:12	16.43
o-Xylene	ND		41	7.7	ppb v/v			02/13/20 20:12	16.43

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		60 - 140		02/13/20 20:12	16.43

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112312-001/CWL-SV-D2-120

Lab Sample ID: 140-18189-16

Date Collected: 01/30/20 11:11

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	12000		30	4.5	ppb v/v			02/18/20 17:43	16.43
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		60 - 140					02/18/20 17:43	16.43

Client Sample ID: 112313-001/CWL-SV-D2-120

Lab Sample ID: 140-18189-17

Date Collected: 01/30/20 11:11

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1500	440	ppb v/v			02/13/20 20:56	17.02
Benzene	ND		62	6.2	ppb v/v			02/13/20 20:56	17.02
Benzyl chloride	ND		120	29	ppb v/v			02/13/20 20:56	17.02
Bromodichloromethane	ND		62	14	ppb v/v			02/13/20 20:56	17.02
Bromoform	ND		62	7.0	ppb v/v			02/13/20 20:56	17.02
Bromomethane	ND		62	17	ppb v/v			02/13/20 20:56	17.02
2-Butanone (MEK)	ND		310	56	ppb v/v			02/13/20 20:56	17.02
Carbon disulfide	ND		150	8.5	ppb v/v			02/13/20 20:56	17.02
Carbon tetrachloride	32	J	62	5.4	ppb v/v			02/13/20 20:56	17.02
Chlorobenzene	ND		62	4.6	ppb v/v			02/13/20 20:56	17.02
Chloroethane	ND		62	22	ppb v/v			02/13/20 20:56	17.02
Chloroform	620		62	5.4	ppb v/v			02/13/20 20:56	17.02
Chloromethane	ND		150	51	ppb v/v			02/13/20 20:56	17.02
Dibromochloromethane	ND		62	5.4	ppb v/v			02/13/20 20:56	17.02
1,2-Dibromoethane (EDB)	ND		62	5.4	ppb v/v			02/13/20 20:56	17.02
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		62	9.3	ppb v/v			02/13/20 20:56	17.02
1,2-Dichlorobenzene	ND		62	24	ppb v/v			02/13/20 20:56	17.02
1,3-Dichlorobenzene	ND		62	12	ppb v/v			02/13/20 20:56	17.02
1,4-Dichlorobenzene	ND		62	12	ppb v/v			02/13/20 20:56	17.02
Dichlorodifluoromethane	51	J	62	11	ppb v/v			02/13/20 20:56	17.02
1,1-Dichloroethane	25	J	62	5.4	ppb v/v			02/13/20 20:56	17.02
1,2-Dichloroethane	54	J	62	7.7	ppb v/v			02/13/20 20:56	17.02
1,1-Dichloroethene	460		62	6.2	ppb v/v			02/13/20 20:56	17.02
cis-1,2-Dichloroethene	ND		62	7.7	ppb v/v			02/13/20 20:56	17.02
trans-1,2-Dichloroethene	ND		62	5.4	ppb v/v			02/13/20 20:56	17.02
1,2-Dichloropropane	270	CI	62	7.7	ppb v/v			02/13/20 20:56	17.02
cis-1,3-Dichloropropene	ND		62	12	ppb v/v			02/13/20 20:56	17.02
trans-1,3-Dichloropropene	ND		62	7.0	ppb v/v			02/13/20 20:56	17.02
Ethylbenzene	ND		62	10	ppb v/v			02/13/20 20:56	17.02
4-Ethyltoluene	ND		120	16	ppb v/v			02/13/20 20:56	17.02
Hexachlorobutadiene	ND		310	25	ppb v/v			02/13/20 20:56	17.02
2-Hexanone	ND		150	12	ppb v/v			02/13/20 20:56	17.02
4-Methyl-2-pentanone (MIBK)	ND		150	42	ppb v/v			02/13/20 20:56	17.02
Methylene Chloride	ND		310	120	ppb v/v			02/13/20 20:56	17.02
Styrene	ND		62	19	ppb v/v			02/13/20 20:56	17.02
1,1,2,2-Tetrachloroethane	ND		62	11	ppb v/v			02/13/20 20:56	17.02
Tetrachloroethene	550		62	5.4	ppb v/v			02/13/20 20:56	17.02

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112313-001/CWL-SV-D2-120

Lab Sample ID: 140-18189-17

Date Collected: 01/30/20 11:11

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toluene	ND		93	60	ppb v/v			02/13/20 20:56	17.02
1,1,2-Trichloro-1,2,2-trifluoroethane	1300		62	6.2	ppb v/v			02/13/20 20:56	17.02
1,2,4-Trichlorobenzene	ND		310	50	ppb v/v			02/13/20 20:56	17.02
1,1,1-Trichloroethane	30	J	62	29	ppb v/v			02/13/20 20:56	17.02
1,1,2-Trichloroethane	ND		62	5.4	ppb v/v			02/13/20 20:56	17.02
Trichloroethene	13000		31	4.6	ppb v/v			02/13/20 20:56	17.02
Trichlorofluoromethane	370		62	8.5	ppb v/v			02/13/20 20:56	17.02
1,2,4-Trimethylbenzene	ND		62	15	ppb v/v			02/13/20 20:56	17.02
1,3,5-Trimethylbenzene	ND		62	17	ppb v/v			02/13/20 20:56	17.02
Vinyl acetate	ND		310	22	ppb v/v			02/13/20 20:56	17.02
Vinyl chloride	ND		31	20	ppb v/v			02/13/20 20:56	17.02
m,p-Xylene	ND		62	22	ppb v/v			02/13/20 20:56	17.02
o-Xylene	ND		62	12	ppb v/v			02/13/20 20:56	17.02
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		60 - 140					02/13/20 20:56	17.02

Client Sample ID: 112314-001/CWL-SV-D2-240

Lab Sample ID: 140-18189-18

Date Collected: 01/30/20 11:14

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1600	460	ppb v/v			02/13/20 21:40	17.96
Benzene	ND		65	6.5	ppb v/v			02/13/20 21:40	17.96
Benzyl chloride	ND		130	31	ppb v/v			02/13/20 21:40	17.96
Bromodichloromethane	ND		65	15	ppb v/v			02/13/20 21:40	17.96
Bromoform	ND		65	7.3	ppb v/v			02/13/20 21:40	17.96
Bromomethane	ND		65	18	ppb v/v			02/13/20 21:40	17.96
2-Butanone (MEK)	ND		330	60	ppb v/v			02/13/20 21:40	17.96
Carbon disulfide	ND		160	9.0	ppb v/v			02/13/20 21:40	17.96
Carbon tetrachloride	26	J	65	5.7	ppb v/v			02/13/20 21:40	17.96
Chlorobenzene	ND		65	4.9	ppb v/v			02/13/20 21:40	17.96
Chloroethane	ND		65	24	ppb v/v			02/13/20 21:40	17.96
Chloroform	360		65	5.7	ppb v/v			02/13/20 21:40	17.96
Chloromethane	ND		160	54	ppb v/v			02/13/20 21:40	17.96
Dibromochloromethane	ND		65	5.7	ppb v/v			02/13/20 21:40	17.96
1,2-Dibromoethane (EDB)	ND		65	5.7	ppb v/v			02/13/20 21:40	17.96
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		65	9.8	ppb v/v			02/13/20 21:40	17.96
1,2-Dichlorobenzene	ND		65	25	ppb v/v			02/13/20 21:40	17.96
1,3-Dichlorobenzene	ND		65	13	ppb v/v			02/13/20 21:40	17.96
1,4-Dichlorobenzene	ND		65	13	ppb v/v			02/13/20 21:40	17.96
Dichlorodifluoromethane	58	J	65	11	ppb v/v			02/13/20 21:40	17.96
1,1-Dichloroethane	18	J	65	5.7	ppb v/v			02/13/20 21:40	17.96
1,2-Dichloroethane	22	J	65	8.2	ppb v/v			02/13/20 21:40	17.96
1,1-Dichloroethene	560		65	6.5	ppb v/v			02/13/20 21:40	17.96
cis-1,2-Dichloroethene	ND		65	8.2	ppb v/v			02/13/20 21:40	17.96

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112314-001/CWL-SV-D2-240

Lab Sample ID: 140-18189-18

Date Collected: 01/30/20 11:14

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,2-Dichloroethene	ND		65	5.7	ppb v/v			02/13/20 21:40	17.96
1,2-Dichloropropane	120		65	8.2	ppb v/v			02/13/20 21:40	17.96
cis-1,3-Dichloropropene	ND		65	13	ppb v/v			02/13/20 21:40	17.96
trans-1,3-Dichloropropene	ND		65	7.3	ppb v/v			02/13/20 21:40	17.96
Ethylbenzene	ND		65	11	ppb v/v			02/13/20 21:40	17.96
4-Ethyltoluene	ND		130	17	ppb v/v			02/13/20 21:40	17.96
Hexachlorobutadiene	ND		330	26	ppb v/v			02/13/20 21:40	17.96
2-Hexanone	ND		160	13	ppb v/v			02/13/20 21:40	17.96
4-Methyl-2-pentanone (MIBK)	ND		160	44	ppb v/v			02/13/20 21:40	17.96
Methylene Chloride	ND		330	130	ppb v/v			02/13/20 21:40	17.96
Styrene	ND		65	20	ppb v/v			02/13/20 21:40	17.96
1,1,2,2-Tetrachloroethane	ND		65	11	ppb v/v			02/13/20 21:40	17.96
Tetrachloroethene	350		65	5.7	ppb v/v			02/13/20 21:40	17.96
Toluene	ND		98	64	ppb v/v			02/13/20 21:40	17.96
1,1,2-Trichloro-1,2,2-trifluoroethane	1400		65	6.5	ppb v/v			02/13/20 21:40	17.96
1,2,4-Trichlorobenzene	ND		330	52	ppb v/v			02/13/20 21:40	17.96
1,1,1-Trichloroethane	ND		65	30	ppb v/v			02/13/20 21:40	17.96
1,1,2-Trichloroethane	ND		65	5.7	ppb v/v			02/13/20 21:40	17.96
Trichloroethene	10000		33	4.9	ppb v/v			02/13/20 21:40	17.96
Trichlorofluoromethane	410		65	9.0	ppb v/v			02/13/20 21:40	17.96
1,2,4-Trimethylbenzene	ND		65	16	ppb v/v			02/13/20 21:40	17.96
1,3,5-Trimethylbenzene	ND		65	18	ppb v/v			02/13/20 21:40	17.96
Vinyl acetate	ND		330	23	ppb v/v			02/13/20 21:40	17.96
Vinyl chloride	ND		33	21	ppb v/v			02/13/20 21:40	17.96
m,p-Xylene	ND		65	24	ppb v/v			02/13/20 21:40	17.96
o-Xylene	ND		65	12	ppb v/v			02/13/20 21:40	17.96
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		60 - 140					02/13/20 21:40	17.96

Client Sample ID: 112315-001/CWL-SV-D2-350

Lab Sample ID: 140-18189-19

Date Collected: 01/30/20 11:19

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1500	430	ppb v/v			02/13/20 22:25	16.76
Benzene	8.1	J	61	6.1	ppb v/v			02/13/20 22:25	16.76
Benzyl chloride	ND		120	29	ppb v/v			02/13/20 22:25	16.76
Bromodichloromethane	ND		61	14	ppb v/v			02/13/20 22:25	16.76
Bromoform	ND		61	6.9	ppb v/v			02/13/20 22:25	16.76
Bromomethane	ND		61	17	ppb v/v			02/13/20 22:25	16.76
2-Butanone (MEK)	ND		300	56	ppb v/v			02/13/20 22:25	16.76
Carbon disulfide	ND		150	8.4	ppb v/v			02/13/20 22:25	16.76
Carbon tetrachloride	27	J	61	5.3	ppb v/v			02/13/20 22:25	16.76
Chlorobenzene	ND		61	4.6	ppb v/v			02/13/20 22:25	16.76
Chloroethane	ND		61	22	ppb v/v			02/13/20 22:25	16.76

Client Sample Results

Client: Sandia National Laboratories
 Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112315-001/CWL-SV-D2-350

Lab Sample ID: 140-18189-19

Date Collected: 01/30/20 11:19

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	230		61	5.3	ppb v/v			02/13/20 22:25	16.76
Chloromethane	ND		150	50	ppb v/v			02/13/20 22:25	16.76
Dibromochloromethane	ND		61	5.3	ppb v/v			02/13/20 22:25	16.76
1,2-Dibromoethane (EDB)	ND		61	5.3	ppb v/v			02/13/20 22:25	16.76
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		61	9.1	ppb v/v			02/13/20 22:25	16.76
1,2-Dichlorobenzene	ND		61	24	ppb v/v			02/13/20 22:25	16.76
1,3-Dichlorobenzene	ND		61	12	ppb v/v			02/13/20 22:25	16.76
1,4-Dichlorobenzene	ND		61	12	ppb v/v			02/13/20 22:25	16.76
Dichlorodifluoromethane	58 J		61	11	ppb v/v			02/13/20 22:25	16.76
1,1-Dichloroethane	16 J		61	5.3	ppb v/v			02/13/20 22:25	16.76
1,2-Dichloroethane	12 J		61	7.6	ppb v/v			02/13/20 22:25	16.76
1,1-Dichloroethene	500		61	6.1	ppb v/v			02/13/20 22:25	16.76
cis-1,2-Dichloroethene	ND		61	7.6	ppb v/v			02/13/20 22:25	16.76
trans-1,2-Dichloroethene	ND		61	5.3	ppb v/v			02/13/20 22:25	16.76
1,2-Dichloropropane	72		61	7.6	ppb v/v			02/13/20 22:25	16.76
cis-1,3-Dichloropropene	ND		61	12	ppb v/v			02/13/20 22:25	16.76
trans-1,3-Dichloropropene	ND		61	6.9	ppb v/v			02/13/20 22:25	16.76
Ethylbenzene	ND		61	9.9	ppb v/v			02/13/20 22:25	16.76
4-Ethyltoluene	ND		120	16	ppb v/v			02/13/20 22:25	16.76
Hexachlorobutadiene	ND		300	24	ppb v/v			02/13/20 22:25	16.76
2-Hexanone	ND		150	12	ppb v/v			02/13/20 22:25	16.76
4-Methyl-2-pentanone (MIBK)	ND		150	41	ppb v/v			02/13/20 22:25	16.76
Methylene Chloride	ND		300	120	ppb v/v			02/13/20 22:25	16.76
Styrene	ND		61	18	ppb v/v			02/13/20 22:25	16.76
1,1,2,2-Tetrachloroethane	ND		61	11	ppb v/v			02/13/20 22:25	16.76
Tetrachloroethene	280		61	5.3	ppb v/v			02/13/20 22:25	16.76
Toluene	ND		91	59	ppb v/v			02/13/20 22:25	16.76
1,1,2-Trichloro-1,2,2-trifluoroethane	1200		61	6.1	ppb v/v			02/13/20 22:25	16.76
1,2,4-Trichlorobenzene	ND		300	49	ppb v/v			02/13/20 22:25	16.76
1,1,1-Trichloroethane	ND		61	28	ppb v/v			02/13/20 22:25	16.76
1,1,2-Trichloroethane	ND		61	5.3	ppb v/v			02/13/20 22:25	16.76
Trichloroethene	9000		30	4.6	ppb v/v			02/13/20 22:25	16.76
Trichlorofluoromethane	380		61	8.4	ppb v/v			02/13/20 22:25	16.76
1,2,4-Trimethylbenzene	ND		61	15	ppb v/v			02/13/20 22:25	16.76
1,3,5-Trimethylbenzene	ND		61	17	ppb v/v			02/13/20 22:25	16.76
Vinyl acetate	ND		300	21	ppb v/v			02/13/20 22:25	16.76
Vinyl chloride	ND		30	20	ppb v/v			02/13/20 22:25	16.76
m,p-Xylene	ND		61	22	ppb v/v			02/13/20 22:25	16.76
o-Xylene	ND		61	11	ppb v/v			02/13/20 22:25	16.76
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		60 - 140					02/13/20 22:25	16.76

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112316-001/CWL-SV-D2-440

Lab Sample ID: 140-18189-20

Date Collected: 01/30/20 11:23

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		530	150	ppb v/v			02/13/20 23:09	5.87
Benzene	3.0	J	21	2.1	ppb v/v			02/13/20 23:09	5.87
Benzyl chloride	ND		43	10	ppb v/v			02/13/20 23:09	5.87
Bromodichloromethane	ND		21	4.8	ppb v/v			02/13/20 23:09	5.87
Bromoform	ND		21	2.4	ppb v/v			02/13/20 23:09	5.87
Bromomethane	ND		21	5.9	ppb v/v			02/13/20 23:09	5.87
2-Butanone (MEK)	ND		110	19	ppb v/v			02/13/20 23:09	5.87
Carbon disulfide	ND		53	2.9	ppb v/v			02/13/20 23:09	5.87
Carbon tetrachloride	12	J	21	1.9	ppb v/v			02/13/20 23:09	5.87
Chlorobenzene	ND		21	1.6	ppb v/v			02/13/20 23:09	5.87
Chloroethane	ND		21	7.7	ppb v/v			02/13/20 23:09	5.87
Chloroform	58		21	1.9	ppb v/v			02/13/20 23:09	5.87
Chloromethane	ND		53	18	ppb v/v			02/13/20 23:09	5.87
Dibromochloromethane	ND		21	1.9	ppb v/v			02/13/20 23:09	5.87
1,2-Dibromoethane (EDB)	ND		21	1.9	ppb v/v			02/13/20 23:09	5.87
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		21	3.2	ppb v/v			02/13/20 23:09	5.87
1,2-Dichlorobenzene	ND		21	8.3	ppb v/v			02/13/20 23:09	5.87
1,3-Dichlorobenzene	ND		21	4.3	ppb v/v			02/13/20 23:09	5.87
1,4-Dichlorobenzene	ND		21	4.3	ppb v/v			02/13/20 23:09	5.87
Dichlorodifluoromethane	31		21	3.7	ppb v/v			02/13/20 23:09	5.87
1,1-Dichloroethane	4.4	J	21	1.9	ppb v/v			02/13/20 23:09	5.87
1,2-Dichloroethane	ND		21	2.7	ppb v/v			02/13/20 23:09	5.87
1,1-Dichloroethene	230		21	2.1	ppb v/v			02/13/20 23:09	5.87
cis-1,2-Dichloroethene	ND		21	2.7	ppb v/v			02/13/20 23:09	5.87
trans-1,2-Dichloroethene	ND		21	1.9	ppb v/v			02/13/20 23:09	5.87
1,2-Dichloropropane	18	J	21	2.7	ppb v/v			02/13/20 23:09	5.87
cis-1,3-Dichloropropene	ND		21	4.3	ppb v/v			02/13/20 23:09	5.87
trans-1,3-Dichloropropene	ND		21	2.4	ppb v/v			02/13/20 23:09	5.87
Ethylbenzene	ND		21	3.5	ppb v/v			02/13/20 23:09	5.87
4-Ethyltoluene	ND		43	5.6	ppb v/v			02/13/20 23:09	5.87
Hexachlorobutadiene	ND		110	8.5	ppb v/v			02/13/20 23:09	5.87
2-Hexanone	ND		53	4.3	ppb v/v			02/13/20 23:09	5.87
4-Methyl-2-pentanone (MIBK)	ND		53	14	ppb v/v			02/13/20 23:09	5.87
Methylene Chloride	ND		110	43	ppb v/v			02/13/20 23:09	5.87
Styrene	ND		21	6.4	ppb v/v			02/13/20 23:09	5.87
1,1,2,2-Tetrachloroethane	ND		21	3.7	ppb v/v			02/13/20 23:09	5.87
Tetrachloroethene	94		21	1.9	ppb v/v			02/13/20 23:09	5.87
Toluene	ND		32	21	ppb v/v			02/13/20 23:09	5.87
1,1,2-Trichloro-1,2,2-trifluoroethane	660		21	2.1	ppb v/v			02/13/20 23:09	5.87
1,2,4-Trichlorobenzene	ND		110	17	ppb v/v			02/13/20 23:09	5.87
1,1,1-Trichloroethane	ND		21	9.9	ppb v/v			02/13/20 23:09	5.87
1,1,2-Trichloroethane	ND		21	1.9	ppb v/v			02/13/20 23:09	5.87
Trichloroethene	2800		11	1.6	ppb v/v			02/13/20 23:09	5.87
Trichlorofluoromethane	200		21	2.9	ppb v/v			02/13/20 23:09	5.87
1,2,4-Trimethylbenzene	ND		21	5.3	ppb v/v			02/13/20 23:09	5.87
1,3,5-Trimethylbenzene	ND		21	5.9	ppb v/v			02/13/20 23:09	5.87
Vinyl acetate	ND		110	7.5	ppb v/v			02/13/20 23:09	5.87
Vinyl chloride	ND		11	6.9	ppb v/v			02/13/20 23:09	5.87

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112316-001/CWL-SV-D2-440

Lab Sample ID: 140-18189-20

Date Collected: 01/30/20 11:23

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		21	7.7	ppb v/v			02/13/20 23:09	5.87
o-Xylene	ND		21	4.0	ppb v/v			02/13/20 23:09	5.87
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		60 - 140					02/13/20 23:09	5.87

Client Sample ID: 112317-001/CWL-SV-D2-470

Lab Sample ID: 140-18189-21

Date Collected: 01/30/20 11:29

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		470	130	ppb v/v			02/13/20 23:53	5.18
Benzene	2.5	J	19	1.9	ppb v/v			02/13/20 23:53	5.18
Benzyl chloride	ND		38	8.9	ppb v/v			02/13/20 23:53	5.18
Bromodichloromethane	ND		19	4.2	ppb v/v			02/13/20 23:53	5.18
Bromoform	ND		19	2.1	ppb v/v			02/13/20 23:53	5.18
Bromomethane	ND		19	5.2	ppb v/v			02/13/20 23:53	5.18
2-Butanone (MEK)	ND		94	17	ppb v/v			02/13/20 23:53	5.18
Carbon disulfide	ND		47	2.6	ppb v/v			02/13/20 23:53	5.18
Carbon tetrachloride	9.4	J	19	1.6	ppb v/v			02/13/20 23:53	5.18
Chlorobenzene	ND		19	1.4	ppb v/v			02/13/20 23:53	5.18
Chloroethane	ND		19	6.8	ppb v/v			02/13/20 23:53	5.18
Chloroform	140		19	1.6	ppb v/v			02/13/20 23:53	5.18
Chloromethane	ND		47	16	ppb v/v			02/13/20 23:53	5.18
Dibromochloromethane	ND		19	1.6	ppb v/v			02/13/20 23:53	5.18
1,2-Dibromoethane (EDB)	ND		19	1.6	ppb v/v			02/13/20 23:53	5.18
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		19	2.8	ppb v/v			02/13/20 23:53	5.18
1,2-Dichlorobenzene	ND		19	7.3	ppb v/v			02/13/20 23:53	5.18
1,3-Dichlorobenzene	ND		19	3.8	ppb v/v			02/13/20 23:53	5.18
1,4-Dichlorobenzene	ND		19	3.8	ppb v/v			02/13/20 23:53	5.18
Dichlorodifluoromethane	25		19	3.3	ppb v/v			02/13/20 23:53	5.18
1,1-Dichloroethane	5.1	J	19	1.6	ppb v/v			02/13/20 23:53	5.18
1,2-Dichloroethane	4.7	J	19	2.4	ppb v/v			02/13/20 23:53	5.18
1,1-Dichloroethene	160		19	1.9	ppb v/v			02/13/20 23:53	5.18
cis-1,2-Dichloroethene	ND		19	2.4	ppb v/v			02/13/20 23:53	5.18
trans-1,2-Dichloroethene	ND		19	1.6	ppb v/v			02/13/20 23:53	5.18
1,2-Dichloropropane	45	CI	19	2.4	ppb v/v			02/13/20 23:53	5.18
cis-1,3-Dichloropropene	ND		19	3.8	ppb v/v			02/13/20 23:53	5.18
trans-1,3-Dichloropropene	ND		19	2.1	ppb v/v			02/13/20 23:53	5.18
Ethylbenzene	ND		19	3.1	ppb v/v			02/13/20 23:53	5.18
4-Ethyltoluene	ND		38	4.9	ppb v/v			02/13/20 23:53	5.18
Hexachlorobutadiene	ND		94	7.5	ppb v/v			02/13/20 23:53	5.18
2-Hexanone	ND		47	3.8	ppb v/v			02/13/20 23:53	5.18
4-Methyl-2-pentanone (MIBK)	ND		47	13	ppb v/v			02/13/20 23:53	5.18
Methylene Chloride	ND		94	38	ppb v/v			02/13/20 23:53	5.18
Styrene	ND		19	5.7	ppb v/v			02/13/20 23:53	5.18
1,1,2,2-Tetrachloroethane	ND		19	3.3	ppb v/v			02/13/20 23:53	5.18

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112317-001/CWL-SV-D2-470

Lab Sample ID: 140-18189-21

Date Collected: 01/30/20 11:29

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	150		19	1.6	ppb v/v			02/13/20 23:53	5.18
Toluene	ND		28	18	ppb v/v			02/13/20 23:53	5.18
1,1,2-Trichloro-1,2,2-trifluoroethane	540		19	1.9	ppb v/v			02/13/20 23:53	5.18
1,2,4-Trichlorobenzene	ND		94	15	ppb v/v			02/13/20 23:53	5.18
1,1,1-Trichloroethane	11 J		19	8.7	ppb v/v			02/13/20 23:53	5.18
1,1,2-Trichloroethane	ND		19	1.6	ppb v/v			02/13/20 23:53	5.18
Trichloroethene	2900		9.4	1.4	ppb v/v			02/13/20 23:53	5.18
Trichlorofluoromethane	160		19	2.6	ppb v/v			02/13/20 23:53	5.18
1,2,4-Trimethylbenzene	ND		19	4.7	ppb v/v			02/13/20 23:53	5.18
1,3,5-Trimethylbenzene	ND		19	5.2	ppb v/v			02/13/20 23:53	5.18
Vinyl acetate	ND		94	6.6	ppb v/v			02/13/20 23:53	5.18
Vinyl chloride	ND		9.4	6.1	ppb v/v			02/13/20 23:53	5.18
m,p-Xylene	ND		19	6.8	ppb v/v			02/13/20 23:53	5.18
o-Xylene	ND		19	3.5	ppb v/v			02/13/20 23:53	5.18
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		60 - 140					02/13/20 23:53	5.18

Client Sample ID: 112318-001/CWL-SV-D2-470

Lab Sample ID: 140-18189-22

Date Collected: 01/30/20 11:29

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		470	130	ppb v/v			02/18/20 18:26	5.18
Benzene	2.6 J		19	1.9	ppb v/v			02/18/20 18:26	5.18
Benzyl chloride	ND		38	8.9	ppb v/v			02/18/20 18:26	5.18
Bromodichloromethane	ND		19	4.2	ppb v/v			02/18/20 18:26	5.18
Bromoform	ND		19	2.1	ppb v/v			02/18/20 18:26	5.18
Bromomethane	ND		19	5.2	ppb v/v			02/18/20 18:26	5.18
2-Butanone (MEK)	ND		94	17	ppb v/v			02/18/20 18:26	5.18
Carbon disulfide	ND		47	2.6	ppb v/v			02/18/20 18:26	5.18
Carbon tetrachloride	9.9 J		19	1.6	ppb v/v			02/18/20 18:26	5.18
Chlorobenzene	ND		19	1.4	ppb v/v			02/18/20 18:26	5.18
Chloroethane	ND		19	6.8	ppb v/v			02/18/20 18:26	5.18
Chloroform	150		19	1.6	ppb v/v			02/18/20 18:26	5.18
Chloromethane	ND		47	16	ppb v/v			02/18/20 18:26	5.18
Dibromochloromethane	ND		19	1.6	ppb v/v			02/18/20 18:26	5.18
1,2-Dibromoethane (EDB)	ND		19	1.6	ppb v/v			02/18/20 18:26	5.18
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		19	2.8	ppb v/v			02/18/20 18:26	5.18
1,2-Dichlorobenzene	ND		19	7.3	ppb v/v			02/18/20 18:26	5.18
1,3-Dichlorobenzene	ND		19	3.8	ppb v/v			02/18/20 18:26	5.18
1,4-Dichlorobenzene	ND		19	3.8	ppb v/v			02/18/20 18:26	5.18
Dichlorodifluoromethane	25		19	3.3	ppb v/v			02/18/20 18:26	5.18
1,1-Dichloroethane	5.5 J		19	1.6	ppb v/v			02/18/20 18:26	5.18
1,2-Dichloroethane	6.2 J		19	2.4	ppb v/v			02/18/20 18:26	5.18
1,1-Dichloroethene	140		19	1.9	ppb v/v			02/18/20 18:26	5.18

Eurofins TestAmerica, Knoxville

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112318-001/CWL-SV-D2-470

Lab Sample ID: 140-18189-22

Date Collected: 01/30/20 11:29

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		19	2.4	ppb v/v			02/18/20 18:26	5.18
trans-1,2-Dichloroethene	ND		19	1.6	ppb v/v			02/18/20 18:26	5.18
1,2-Dichloropropane	34		19	2.4	ppb v/v			02/18/20 18:26	5.18
cis-1,3-Dichloropropene	ND		19	3.8	ppb v/v			02/18/20 18:26	5.18
trans-1,3-Dichloropropene	ND		19	2.1	ppb v/v			02/18/20 18:26	5.18
Ethylbenzene	ND		19	3.1	ppb v/v			02/18/20 18:26	5.18
4-Ethyltoluene	ND		38	4.9	ppb v/v			02/18/20 18:26	5.18
Hexachlorobutadiene	ND		94	7.5	ppb v/v			02/18/20 18:26	5.18
2-Hexanone	ND		47	3.8	ppb v/v			02/18/20 18:26	5.18
4-Methyl-2-pentanone (MIBK)	ND		47	13	ppb v/v			02/18/20 18:26	5.18
Methylene Chloride	ND		94	38	ppb v/v			02/18/20 18:26	5.18
Styrene	ND		19	5.7	ppb v/v			02/18/20 18:26	5.18
1,1,2,2-Tetrachloroethane	ND		19	3.3	ppb v/v			02/18/20 18:26	5.18
Tetrachloroethene	150		19	1.6	ppb v/v			02/18/20 18:26	5.18
Toluene	ND		28	18	ppb v/v			02/18/20 18:26	5.18
1,1,2-Trichloro-1,2,2-trifluoroethane	470		19	1.9	ppb v/v			02/18/20 18:26	5.18
1,2,4-Trichlorobenzene	ND		94	15	ppb v/v			02/18/20 18:26	5.18
1,1,1-Trichloroethane	11 J		19	8.7	ppb v/v			02/18/20 18:26	5.18
1,1,2-Trichloroethane	ND		19	1.6	ppb v/v			02/18/20 18:26	5.18
Trichloroethene	3100		9.4	1.4	ppb v/v			02/18/20 18:26	5.18
Trichlorofluoromethane	170		19	2.6	ppb v/v			02/18/20 18:26	5.18
1,2,4-Trimethylbenzene	ND		19	4.7	ppb v/v			02/18/20 18:26	5.18
1,3,5-Trimethylbenzene	ND		19	5.2	ppb v/v			02/18/20 18:26	5.18
Vinyl acetate	ND		94	6.6	ppb v/v			02/18/20 18:26	5.18
Vinyl chloride	ND		9.4	6.1	ppb v/v			02/18/20 18:26	5.18
m,p-Xylene	ND		19	6.8	ppb v/v			02/18/20 18:26	5.18
o-Xylene	ND		19	3.5	ppb v/v			02/18/20 18:26	5.18
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		60 - 140					02/18/20 18:26	5.18

Client Sample ID: 112319-001/CWL-SV-FB 5

Lab Sample ID: 140-18189-23

Date Collected: 01/30/20 10:17

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	1.0 J		2.0	0.57	ppb v/v			02/13/20 02:41	1.81
Benzene	0.019 J		0.080	0.0080	ppb v/v			02/13/20 02:41	1.81
Benzyl chloride	ND		0.16	0.038	ppb v/v			02/13/20 02:41	1.81
Bromodichloromethane	ND		0.080	0.018	ppb v/v			02/13/20 02:41	1.81
Bromoform	ND		0.080	0.0090	ppb v/v			02/13/20 02:41	1.81
Bromomethane	ND		0.080	0.022	ppb v/v			02/13/20 02:41	1.81
2-Butanone (MEK)	0.10 J		0.40	0.073	ppb v/v			02/13/20 02:41	1.81
Carbon disulfide	0.016 J		0.20	0.011	ppb v/v			02/13/20 02:41	1.81
Carbon tetrachloride	ND		0.080	0.0070	ppb v/v			02/13/20 02:41	1.81
Chlorobenzene	ND		0.080	0.0060	ppb v/v			02/13/20 02:41	1.81

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112319-001/CWL-SV-FB 5

Lab Sample ID: 140-18189-23

Date Collected: 01/30/20 10:17

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		0.080	0.029	ppb v/v			02/13/20 02:41	1.81
Chloroform	ND		0.080	0.0070	ppb v/v			02/13/20 02:41	1.81
Chloromethane	0.095	J	0.20	0.066	ppb v/v			02/13/20 02:41	1.81
Dibromochloromethane	ND		0.080	0.0070	ppb v/v			02/13/20 02:41	1.81
1,2-Dibromoethane (EDB)	ND		0.080	0.0070	ppb v/v			02/13/20 02:41	1.81
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.080	0.012	ppb v/v			02/13/20 02:41	1.81
1,2-Dichlorobenzene	ND		0.080	0.031	ppb v/v			02/13/20 02:41	1.81
1,3-Dichlorobenzene	ND		0.080	0.016	ppb v/v			02/13/20 02:41	1.81
1,4-Dichlorobenzene	ND		0.080	0.016	ppb v/v			02/13/20 02:41	1.81
Dichlorodifluoromethane	0.025	J	0.080	0.014	ppb v/v			02/13/20 02:41	1.81
1,1-Dichloroethane	ND		0.080	0.0070	ppb v/v			02/13/20 02:41	1.81
1,2-Dichloroethane	ND		0.080	0.010	ppb v/v			02/13/20 02:41	1.81
1,1-Dichloroethene	ND		0.080	0.0080	ppb v/v			02/13/20 02:41	1.81
cis-1,2-Dichloroethene	ND		0.080	0.010	ppb v/v			02/13/20 02:41	1.81
trans-1,2-Dichloroethene	ND		0.080	0.0070	ppb v/v			02/13/20 02:41	1.81
1,2-Dichloropropane	ND		0.080	0.010	ppb v/v			02/13/20 02:41	1.81
cis-1,3-Dichloropropene	ND		0.080	0.016	ppb v/v			02/13/20 02:41	1.81
trans-1,3-Dichloropropene	ND		0.080	0.0090	ppb v/v			02/13/20 02:41	1.81
Ethylbenzene	ND		0.080	0.013	ppb v/v			02/13/20 02:41	1.81
4-Ethyltoluene	ND		0.16	0.021	ppb v/v			02/13/20 02:41	1.81
Hexachlorobutadiene	ND		0.40	0.032	ppb v/v			02/13/20 02:41	1.81
2-Hexanone	ND		0.20	0.016	ppb v/v			02/13/20 02:41	1.81
4-Methyl-2-pentanone (MIBK)	0.057	J	0.20	0.054	ppb v/v			02/13/20 02:41	1.81
Methylene Chloride	ND		0.40	0.16	ppb v/v			02/13/20 02:41	1.81
Styrene	ND		0.080	0.024	ppb v/v			02/13/20 02:41	1.81
1,1,2,2-Tetrachloroethane	ND		0.080	0.014	ppb v/v			02/13/20 02:41	1.81
Tetrachloroethene	ND		0.080	0.0070	ppb v/v			02/13/20 02:41	1.81
Toluene	ND		0.12	0.078	ppb v/v			02/13/20 02:41	1.81
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.080	0.0080	ppb v/v			02/13/20 02:41	1.81
1,2,4-Trichlorobenzene	ND		0.40	0.064	ppb v/v			02/13/20 02:41	1.81
1,1,1-Trichloroethane	ND		0.080	0.037	ppb v/v			02/13/20 02:41	1.81
1,1,2-Trichloroethane	ND		0.080	0.0070	ppb v/v			02/13/20 02:41	1.81
Trichloroethene	ND		0.040	0.0060	ppb v/v			02/13/20 02:41	1.81
Trichlorofluoromethane	0.020	J	0.080	0.011	ppb v/v			02/13/20 02:41	1.81
1,2,4-Trimethylbenzene	ND		0.080	0.020	ppb v/v			02/13/20 02:41	1.81
1,3,5-Trimethylbenzene	ND		0.080	0.022	ppb v/v			02/13/20 02:41	1.81
Vinyl acetate	ND		0.40	0.028	ppb v/v			02/13/20 02:41	1.81
Vinyl chloride	ND		0.040	0.026	ppb v/v			02/13/20 02:41	1.81
m,p-Xylene	ND		0.080	0.029	ppb v/v			02/13/20 02:41	1.81
o-Xylene	ND		0.080	0.015	ppb v/v			02/13/20 02:41	1.81

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		60 - 140		02/13/20 02:41	1.81

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112320-001/CWL-SV-D3-120

Lab Sample ID: 140-18189-24

Date Collected: 01/30/20 10:23

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		820	230	ppb v/v			02/14/20 00:35	16.44
Benzene	4.6	J	33	3.3	ppb v/v			02/14/20 00:35	16.44
Benzyl chloride	ND		66	16	ppb v/v			02/14/20 00:35	16.44
Bromodichloromethane	ND		33	7.4	ppb v/v			02/14/20 00:35	16.44
Bromoform	ND		33	3.7	ppb v/v			02/14/20 00:35	16.44
Bromomethane	ND		33	9.0	ppb v/v			02/14/20 00:35	16.44
2-Butanone (MEK)	ND		160	30	ppb v/v			02/14/20 00:35	16.44
Carbon disulfide	ND		82	4.5	ppb v/v			02/14/20 00:35	16.44
Carbon tetrachloride	16	J	33	2.9	ppb v/v			02/14/20 00:35	16.44
Chlorobenzene	ND		33	2.5	ppb v/v			02/14/20 00:35	16.44
Chloroethane	ND		33	12	ppb v/v			02/14/20 00:35	16.44
Chloroform	240		33	2.9	ppb v/v			02/14/20 00:35	16.44
Chloromethane	ND		82	27	ppb v/v			02/14/20 00:35	16.44
Dibromochloromethane	ND		33	2.9	ppb v/v			02/14/20 00:35	16.44
1,2-Dibromoethane (EDB)	ND		33	2.9	ppb v/v			02/14/20 00:35	16.44
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		33	4.9	ppb v/v			02/14/20 00:35	16.44
1,2-Dichlorobenzene	ND		33	13	ppb v/v			02/14/20 00:35	16.44
1,3-Dichlorobenzene	ND		33	6.6	ppb v/v			02/14/20 00:35	16.44
1,4-Dichlorobenzene	ND		33	6.6	ppb v/v			02/14/20 00:35	16.44
Dichlorodifluoromethane	33		33	5.8	ppb v/v			02/14/20 00:35	16.44
1,1-Dichloroethane	11	J	33	2.9	ppb v/v			02/14/20 00:35	16.44
1,2-Dichloroethane	32	J	33	4.1	ppb v/v			02/14/20 00:35	16.44
1,1-Dichloroethene	200		33	3.3	ppb v/v			02/14/20 00:35	16.44
cis-1,2-Dichloroethene	ND		33	4.1	ppb v/v			02/14/20 00:35	16.44
trans-1,2-Dichloroethene	ND		33	2.9	ppb v/v			02/14/20 00:35	16.44
1,2-Dichloropropane	160	CI	33	4.1	ppb v/v			02/14/20 00:35	16.44
cis-1,3-Dichloropropene	ND		33	6.6	ppb v/v			02/14/20 00:35	16.44
trans-1,3-Dichloropropene	ND		33	3.7	ppb v/v			02/14/20 00:35	16.44
Ethylbenzene	ND		33	5.3	ppb v/v			02/14/20 00:35	16.44
4-Ethyltoluene	ND		66	8.6	ppb v/v			02/14/20 00:35	16.44
Hexachlorobutadiene	ND		160	13	ppb v/v			02/14/20 00:35	16.44
2-Hexanone	ND		82	6.6	ppb v/v			02/14/20 00:35	16.44
4-Methyl-2-pentanone (MIBK)	ND		82	22	ppb v/v			02/14/20 00:35	16.44
Methylene Chloride	ND		160	66	ppb v/v			02/14/20 00:35	16.44
Styrene	ND		33	9.9	ppb v/v			02/14/20 00:35	16.44
1,1,2,2-Tetrachloroethane	ND		33	5.8	ppb v/v			02/14/20 00:35	16.44
Tetrachloroethene	170		33	2.9	ppb v/v			02/14/20 00:35	16.44
Toluene	ND		49	32	ppb v/v			02/14/20 00:35	16.44
1,1,2-Trichloro-1,2,2-trifluoroethane	670		33	3.3	ppb v/v			02/14/20 00:35	16.44
1,2,4-Trichlorobenzene	ND		160	26	ppb v/v			02/14/20 00:35	16.44
1,1,1-Trichloroethane	ND		33	15	ppb v/v			02/14/20 00:35	16.44
1,1,2-Trichloroethane	ND		33	2.9	ppb v/v			02/14/20 00:35	16.44
Trichloroethene	6100		16	2.5	ppb v/v			02/14/20 00:35	16.44
Trichlorofluoromethane	210		33	4.5	ppb v/v			02/14/20 00:35	16.44
1,2,4-Trimethylbenzene	ND		33	8.2	ppb v/v			02/14/20 00:35	16.44
1,3,5-Trimethylbenzene	ND		33	9.0	ppb v/v			02/14/20 00:35	16.44
Vinyl acetate	ND		160	12	ppb v/v			02/14/20 00:35	16.44
Vinyl chloride	ND		16	11	ppb v/v			02/14/20 00:35	16.44

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112320-001/CWL-SV-D3-120

Lab Sample ID: 140-18189-24

Date Collected: 01/30/20 10:23

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		33	12	ppb v/v			02/14/20 00:35	16.44
o-Xylene	ND		33	6.2	ppb v/v			02/14/20 00:35	16.44
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		60 - 140					02/14/20 00:35	16.44

Client Sample ID: 112321-001/CWL-SV-D3-170

Lab Sample ID: 140-18189-25

Date Collected: 01/30/20 10:28

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1400	410	ppb v/v			02/18/20 19:10	15.74
Benzene	6.0	J	57	5.7	ppb v/v			02/18/20 19:10	15.74
Benzyl chloride	ND		110	27	ppb v/v			02/18/20 19:10	15.74
Bromodichloromethane	ND		57	13	ppb v/v			02/18/20 19:10	15.74
Bromoform	ND		57	6.4	ppb v/v			02/18/20 19:10	15.74
Bromomethane	ND		57	16	ppb v/v			02/18/20 19:10	15.74
2-Butanone (MEK)	ND		290	52	ppb v/v			02/18/20 19:10	15.74
Carbon disulfide	ND		140	7.9	ppb v/v			02/18/20 19:10	15.74
Carbon tetrachloride	12	J	57	5.0	ppb v/v			02/18/20 19:10	15.74
Chlorobenzene	ND		57	4.3	ppb v/v			02/18/20 19:10	15.74
Chloroethane	ND		57	21	ppb v/v			02/18/20 19:10	15.74
Chloroform	150		57	5.0	ppb v/v			02/18/20 19:10	15.74
Chloromethane	ND		140	47	ppb v/v			02/18/20 19:10	15.74
Dibromochloromethane	ND		57	5.0	ppb v/v			02/18/20 19:10	15.74
1,2-Dibromoethane (EDB)	ND		57	5.0	ppb v/v			02/18/20 19:10	15.74
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		57	8.6	ppb v/v			02/18/20 19:10	15.74
1,2-Dichlorobenzene	ND		57	22	ppb v/v			02/18/20 19:10	15.74
1,3-Dichlorobenzene	ND		57	11	ppb v/v			02/18/20 19:10	15.74
1,4-Dichlorobenzene	ND		57	11	ppb v/v			02/18/20 19:10	15.74
Dichlorodifluoromethane	29	J	57	10	ppb v/v			02/18/20 19:10	15.74
1,1-Dichloroethane	8.2	J	57	5.0	ppb v/v			02/18/20 19:10	15.74
1,2-Dichloroethane	18	J	57	7.2	ppb v/v			02/18/20 19:10	15.74
1,1-Dichloroethene	170		57	5.7	ppb v/v			02/18/20 19:10	15.74
cis-1,2-Dichloroethene	ND		57	7.2	ppb v/v			02/18/20 19:10	15.74
trans-1,2-Dichloroethene	ND		57	5.0	ppb v/v			02/18/20 19:10	15.74
1,2-Dichloropropane	110		57	7.2	ppb v/v			02/18/20 19:10	15.74
cis-1,3-Dichloropropene	ND		57	11	ppb v/v			02/18/20 19:10	15.74
trans-1,3-Dichloropropene	ND		57	6.4	ppb v/v			02/18/20 19:10	15.74
Ethylbenzene	ND		57	9.3	ppb v/v			02/18/20 19:10	15.74
4-Ethyltoluene	ND		110	15	ppb v/v			02/18/20 19:10	15.74
Hexachlorobutadiene	ND		290	23	ppb v/v			02/18/20 19:10	15.74
2-Hexanone	ND		140	11	ppb v/v			02/18/20 19:10	15.74
4-Methyl-2-pentanone (MIBK)	ND		140	39	ppb v/v			02/18/20 19:10	15.74
Methylene Chloride	ND		290	110	ppb v/v			02/18/20 19:10	15.74
Styrene	ND		57	17	ppb v/v			02/18/20 19:10	15.74
1,1,2,2-Tetrachloroethane	ND		57	10	ppb v/v			02/18/20 19:10	15.74

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112321-001/CWL-SV-D3-170

Lab Sample ID: 140-18189-25

Date Collected: 01/30/20 10:28

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	120		57	5.0	ppb v/v			02/18/20 19:10	15.74
Toluene	ND		86	56	ppb v/v			02/18/20 19:10	15.74
1,1,2-Trichloro-1,2,2-trifluoroethane	510		57	5.7	ppb v/v			02/18/20 19:10	15.74
1,2,4-Trichlorobenzene	ND		290	46	ppb v/v			02/18/20 19:10	15.74
1,1,1-Trichloroethane	ND		57	26	ppb v/v			02/18/20 19:10	15.74
1,1,2-Trichloroethane	ND		57	5.0	ppb v/v			02/18/20 19:10	15.74
Trichloroethene	4400		29	4.3	ppb v/v			02/18/20 19:10	15.74
Trichlorofluoromethane	190		57	7.9	ppb v/v			02/18/20 19:10	15.74
1,2,4-Trimethylbenzene	ND		57	14	ppb v/v			02/18/20 19:10	15.74
1,3,5-Trimethylbenzene	ND		57	16	ppb v/v			02/18/20 19:10	15.74
Vinyl acetate	ND		290	20	ppb v/v			02/18/20 19:10	15.74
Vinyl chloride	ND		29	19	ppb v/v			02/18/20 19:10	15.74
m,p-Xylene	ND		57	21	ppb v/v			02/18/20 19:10	15.74
o-Xylene	ND		57	11	ppb v/v			02/18/20 19:10	15.74
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		60 - 140					02/18/20 19:10	15.74

Client Sample ID: 112322-001/CWL-SV-D3-350

Lab Sample ID: 140-18189-26

Date Collected: 01/30/20 10:31

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		530	150	ppb v/v			02/18/20 19:52	5.86
Benzene	3.0	J	21	2.1	ppb v/v			02/18/20 19:52	5.86
Benzyl chloride	ND		43	10	ppb v/v			02/18/20 19:52	5.86
Bromodichloromethane	ND		21	4.8	ppb v/v			02/18/20 19:52	5.86
Bromoform	ND		21	2.4	ppb v/v			02/18/20 19:52	5.86
Bromomethane	ND		21	5.9	ppb v/v			02/18/20 19:52	5.86
2-Butanone (MEK)	ND		110	19	ppb v/v			02/18/20 19:52	5.86
Carbon disulfide	ND		53	2.9	ppb v/v			02/18/20 19:52	5.86
Carbon tetrachloride	12	J	21	1.9	ppb v/v			02/18/20 19:52	5.86
Chlorobenzene	ND		21	1.6	ppb v/v			02/18/20 19:52	5.86
Chloroethane	ND		21	7.7	ppb v/v			02/18/20 19:52	5.86
Chloroform	150		21	1.9	ppb v/v			02/18/20 19:52	5.86
Chloromethane	ND		53	18	ppb v/v			02/18/20 19:52	5.86
Dibromochloromethane	ND		21	1.9	ppb v/v			02/18/20 19:52	5.86
1,2-Dibromoethane (EDB)	ND		21	1.9	ppb v/v			02/18/20 19:52	5.86
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		21	3.2	ppb v/v			02/18/20 19:52	5.86
1,2-Dichlorobenzene	ND		21	8.3	ppb v/v			02/18/20 19:52	5.86
1,3-Dichlorobenzene	ND		21	4.3	ppb v/v			02/18/20 19:52	5.86
1,4-Dichlorobenzene	ND		21	4.3	ppb v/v			02/18/20 19:52	5.86
Dichlorodifluoromethane	32		21	3.7	ppb v/v			02/18/20 19:52	5.86
1,1-Dichloroethane	8.4	J	21	1.9	ppb v/v			02/18/20 19:52	5.86
1,2-Dichloroethane	18	J	21	2.7	ppb v/v			02/18/20 19:52	5.86
1,1-Dichloroethene	190		21	2.1	ppb v/v			02/18/20 19:52	5.86

Eurofins TestAmerica, Knoxville

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112322-001/CWL-SV-D3-350

Lab Sample ID: 140-18189-26

Date Collected: 01/30/20 10:31

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		21	2.7	ppb v/v			02/18/20 19:52	5.86
trans-1,2-Dichloroethene	ND		21	1.9	ppb v/v			02/18/20 19:52	5.86
1,2-Dichloropropane	83	CI	21	2.7	ppb v/v			02/18/20 19:52	5.86
cis-1,3-Dichloropropene	ND		21	4.3	ppb v/v			02/18/20 19:52	5.86
trans-1,3-Dichloropropene	ND		21	2.4	ppb v/v			02/18/20 19:52	5.86
Ethylbenzene	ND		21	3.5	ppb v/v			02/18/20 19:52	5.86
4-Ethyltoluene	ND		43	5.6	ppb v/v			02/18/20 19:52	5.86
Hexachlorobutadiene	ND		110	8.5	ppb v/v			02/18/20 19:52	5.86
2-Hexanone	ND		53	4.3	ppb v/v			02/18/20 19:52	5.86
4-Methyl-2-pentanone (MIBK)	ND		53	14	ppb v/v			02/18/20 19:52	5.86
Methylene Chloride	45	J	110	43	ppb v/v			02/18/20 19:52	5.86
Styrene	ND		21	6.4	ppb v/v			02/18/20 19:52	5.86
1,1,2,2-Tetrachloroethane	ND		21	3.7	ppb v/v			02/18/20 19:52	5.86
Tetrachloroethene	27		21	1.9	ppb v/v			02/18/20 19:52	5.86
Toluene	ND		32	21	ppb v/v			02/18/20 19:52	5.86
1,1,2-Trichloro-1,2,2-trifluoroethane	560		21	2.1	ppb v/v			02/18/20 19:52	5.86
1,2,4-Trichlorobenzene	ND		110	17	ppb v/v			02/18/20 19:52	5.86
1,1,1-Trichloroethane	ND		21	9.9	ppb v/v			02/18/20 19:52	5.86
1,1,2-Trichloroethane	ND		21	1.9	ppb v/v			02/18/20 19:52	5.86
Trichloroethene	3600		11	1.6	ppb v/v			02/18/20 19:52	5.86
Trichlorofluoromethane	220		21	2.9	ppb v/v			02/18/20 19:52	5.86
1,2,4-Trimethylbenzene	ND		21	5.3	ppb v/v			02/18/20 19:52	5.86
1,3,5-Trimethylbenzene	ND		21	5.9	ppb v/v			02/18/20 19:52	5.86
Vinyl acetate	ND		110	7.5	ppb v/v			02/18/20 19:52	5.86
Vinyl chloride	ND		11	6.9	ppb v/v			02/18/20 19:52	5.86
m,p-Xylene	ND		21	7.7	ppb v/v			02/18/20 19:52	5.86
o-Xylene	ND		21	4.0	ppb v/v			02/18/20 19:52	5.86
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		60 - 140					02/18/20 19:52	5.86

Client Sample ID: 112323-001/CWL-SV-D3-440

Lab Sample ID: 140-18189-27

Date Collected: 01/30/20 10:36

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		1600	450	ppb v/v			02/18/20 20:35	17.4
Benzene	ND		63	6.3	ppb v/v			02/18/20 20:35	17.4
Benzyl chloride	ND		130	30	ppb v/v			02/18/20 20:35	17.4
Bromodichloromethane	ND		63	14	ppb v/v			02/18/20 20:35	17.4
Bromoform	ND		63	7.1	ppb v/v			02/18/20 20:35	17.4
Bromomethane	ND		63	17	ppb v/v			02/18/20 20:35	17.4
2-Butanone (MEK)	ND		320	58	ppb v/v			02/18/20 20:35	17.4
Carbon disulfide	ND		160	8.7	ppb v/v			02/18/20 20:35	17.4
Carbon tetrachloride	16	J	63	5.5	ppb v/v			02/18/20 20:35	17.4
Chlorobenzene	ND		63	4.7	ppb v/v			02/18/20 20:35	17.4

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112323-001/CWL-SV-D3-440

Lab Sample ID: 140-18189-27

Date Collected: 01/30/20 10:36

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		63	23	ppb v/v			02/18/20 20:35	17.4
Chloroform	140		63	5.5	ppb v/v			02/18/20 20:35	17.4
Chloromethane	ND		160	52	ppb v/v			02/18/20 20:35	17.4
Dibromochloromethane	ND		63	5.5	ppb v/v			02/18/20 20:35	17.4
1,2-Dibromoethane (EDB)	ND		63	5.5	ppb v/v			02/18/20 20:35	17.4
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		63	9.5	ppb v/v			02/18/20 20:35	17.4
1,2-Dichlorobenzene	ND		63	25	ppb v/v			02/18/20 20:35	17.4
1,3-Dichlorobenzene	ND		63	13	ppb v/v			02/18/20 20:35	17.4
1,4-Dichlorobenzene	ND		63	13	ppb v/v			02/18/20 20:35	17.4
Dichlorodifluoromethane	41 J		63	11	ppb v/v			02/18/20 20:35	17.4
1,1-Dichloroethane	6.4 J		63	5.5	ppb v/v			02/18/20 20:35	17.4
1,2-Dichloroethane	13 J		63	7.9	ppb v/v			02/18/20 20:35	17.4
1,1-Dichloroethene	250		63	6.3	ppb v/v			02/18/20 20:35	17.4
cis-1,2-Dichloroethene	ND		63	7.9	ppb v/v			02/18/20 20:35	17.4
trans-1,2-Dichloroethene	ND		63	5.5	ppb v/v			02/18/20 20:35	17.4
1,2-Dichloropropane	75		63	7.9	ppb v/v			02/18/20 20:35	17.4
cis-1,3-Dichloropropene	ND		63	13	ppb v/v			02/18/20 20:35	17.4
trans-1,3-Dichloropropene	ND		63	7.1	ppb v/v			02/18/20 20:35	17.4
Ethylbenzene	ND		63	10	ppb v/v			02/18/20 20:35	17.4
4-Ethyltoluene	ND		130	17	ppb v/v			02/18/20 20:35	17.4
Hexachlorobutadiene	ND		320	25	ppb v/v			02/18/20 20:35	17.4
2-Hexanone	ND		160	13	ppb v/v			02/18/20 20:35	17.4
4-Methyl-2-pentanone (MIBK)	ND		160	43	ppb v/v			02/18/20 20:35	17.4
Methylene Chloride	ND		320	130	ppb v/v			02/18/20 20:35	17.4
Styrene	ND		63	19	ppb v/v			02/18/20 20:35	17.4
1,1,2,2-Tetrachloroethane	ND		63	11	ppb v/v			02/18/20 20:35	17.4
Tetrachloroethene	110		63	5.5	ppb v/v			02/18/20 20:35	17.4
Toluene	ND		95	62	ppb v/v			02/18/20 20:35	17.4
1,1,2-Trichloro-1,2,2-trifluoroethane	780		63	6.3	ppb v/v			02/18/20 20:35	17.4
1,2,4-Trichlorobenzene	ND		320	51	ppb v/v			02/18/20 20:35	17.4
1,1,1-Trichloroethane	ND		63	29	ppb v/v			02/18/20 20:35	17.4
1,1,2-Trichloroethane	ND		63	5.5	ppb v/v			02/18/20 20:35	17.4
Trichloroethene	4700		32	4.7	ppb v/v			02/18/20 20:35	17.4
Trichlorofluoromethane	290		63	8.7	ppb v/v			02/18/20 20:35	17.4
1,2,4-Trimethylbenzene	ND		63	16	ppb v/v			02/18/20 20:35	17.4
1,3,5-Trimethylbenzene	ND		63	17	ppb v/v			02/18/20 20:35	17.4
Vinyl acetate	ND		320	22	ppb v/v			02/18/20 20:35	17.4
Vinyl chloride	ND		32	21	ppb v/v			02/18/20 20:35	17.4
m,p-Xylene	ND		63	23	ppb v/v			02/18/20 20:35	17.4
o-Xylene	ND		63	12	ppb v/v			02/18/20 20:35	17.4

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		60 - 140		02/18/20 20:35	17.4

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112324-001/CWL-SV-D3-480

Lab Sample ID: 140-18189-28

Date Collected: 01/30/20 10:45

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	1.9	J	2.0	0.57	ppb v/v			02/13/20 03:34	2.29
Benzene	0.24		0.080	0.0080	ppb v/v			02/13/20 03:34	2.29
Benzyl chloride	ND		0.16	0.038	ppb v/v			02/13/20 03:34	2.29
Bromodichloromethane	ND		0.080	0.018	ppb v/v			02/13/20 03:34	2.29
Bromoform	ND		0.080	0.0090	ppb v/v			02/13/20 03:34	2.29
Bromomethane	ND		0.080	0.022	ppb v/v			02/13/20 03:34	2.29
2-Butanone (MEK)	0.35	J	0.40	0.073	ppb v/v			02/13/20 03:34	2.29
Carbon disulfide	0.029	J	0.20	0.011	ppb v/v			02/13/20 03:34	2.29
Carbon tetrachloride	0.16		0.080	0.0070	ppb v/v			02/13/20 03:34	2.29
Chlorobenzene	ND		0.080	0.0060	ppb v/v			02/13/20 03:34	2.29
Chloroethane	ND		0.080	0.029	ppb v/v			02/13/20 03:34	2.29
Chloroform	1.2		0.080	0.0070	ppb v/v			02/13/20 03:34	2.29
Chloromethane	0.45		0.20	0.066	ppb v/v			02/13/20 03:34	2.29
Dibromochloromethane	ND		0.080	0.0070	ppb v/v			02/13/20 03:34	2.29
1,2-Dibromoethane (EDB)	ND		0.080	0.0070	ppb v/v			02/13/20 03:34	2.29
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.015	J	0.080	0.012	ppb v/v			02/13/20 03:34	2.29
1,2-Dichlorobenzene	ND		0.080	0.031	ppb v/v			02/13/20 03:34	2.29
1,3-Dichlorobenzene	ND		0.080	0.016	ppb v/v			02/13/20 03:34	2.29
1,4-Dichlorobenzene	ND		0.080	0.016	ppb v/v			02/13/20 03:34	2.29
Dichlorodifluoromethane	0.66		0.080	0.014	ppb v/v			02/13/20 03:34	2.29
1,1-Dichloroethane	0.050	J	0.080	0.0070	ppb v/v			02/13/20 03:34	2.29
1,2-Dichloroethane	0.13		0.080	0.010	ppb v/v			02/13/20 03:34	2.29
1,1-Dichloroethene	1.0		0.080	0.0080	ppb v/v			02/13/20 03:34	2.29
cis-1,2-Dichloroethene	ND		0.080	0.010	ppb v/v			02/13/20 03:34	2.29
trans-1,2-Dichloroethene	ND		0.080	0.0070	ppb v/v			02/13/20 03:34	2.29
1,2-Dichloropropane	0.95		0.080	0.010	ppb v/v			02/13/20 03:34	2.29
cis-1,3-Dichloropropene	ND		0.080	0.016	ppb v/v			02/13/20 03:34	2.29
trans-1,3-Dichloropropene	ND		0.080	0.0090	ppb v/v			02/13/20 03:34	2.29
Ethylbenzene	0.037	J	0.080	0.013	ppb v/v			02/13/20 03:34	2.29
4-Ethyltoluene	ND		0.16	0.021	ppb v/v			02/13/20 03:34	2.29
Hexachlorobutadiene	ND		0.40	0.032	ppb v/v			02/13/20 03:34	2.29
2-Hexanone	ND		0.20	0.016	ppb v/v			02/13/20 03:34	2.29
4-Methyl-2-pentanone (MIBK)	0.088	J	0.20	0.054	ppb v/v			02/13/20 03:34	2.29
Methylene Chloride	0.26	J	0.40	0.16	ppb v/v			02/13/20 03:34	2.29
Styrene	ND		0.080	0.024	ppb v/v			02/13/20 03:34	2.29
1,1,2,2-Tetrachloroethane	ND		0.080	0.014	ppb v/v			02/13/20 03:34	2.29
Tetrachloroethene	1.5		0.080	0.0070	ppb v/v			02/13/20 03:34	2.29
Toluene	0.30		0.12	0.078	ppb v/v			02/13/20 03:34	2.29
1,1,2-Trichloro-1,2,2-trifluoroethane	3.1		0.080	0.0080	ppb v/v			02/13/20 03:34	2.29
1,2,4-Trichlorobenzene	ND		0.40	0.064	ppb v/v			02/13/20 03:34	2.29
1,1,1-Trichloroethane	0.047	J	0.080	0.037	ppb v/v			02/13/20 03:34	2.29
1,1,2-Trichloroethane	0.015	J	0.080	0.0070	ppb v/v			02/13/20 03:34	2.29
Trichlorofluoromethane	1.2		0.080	0.011	ppb v/v			02/13/20 03:34	2.29
1,2,4-Trimethylbenzene	ND		0.080	0.020	ppb v/v			02/13/20 03:34	2.29
1,3,5-Trimethylbenzene	ND		0.080	0.022	ppb v/v			02/13/20 03:34	2.29
Vinyl acetate	ND		0.40	0.028	ppb v/v			02/13/20 03:34	2.29
Vinyl chloride	ND		0.040	0.026	ppb v/v			02/13/20 03:34	2.29

Client Sample Results

Client: Sandia National Laboratories
 Project/Site: CWL PCCP

Job ID: 140-18189-1

Client Sample ID: 112324-001/CWL-SV-D3-480

Lab Sample ID: 140-18189-28

Date Collected: 01/30/20 10:45

Matrix: Air

Date Received: 02/06/20 12:10

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	0.086		0.080	0.029	ppb v/v			02/13/20 03:34	2.29
o-Xylene	0.035	J	0.080	0.015	ppb v/v			02/13/20 03:34	2.29
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		60 - 140					02/13/20 03:34	2.29

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	35		0.31	0.046	ppb v/v			02/18/20 21:19	2.29
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	105		60 - 140					02/18/20 21:19	2.29

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

Chemical Waste Landfill

March 2020 Sample

Client Sample Results

Client: Sandia National Laboratories
 Project/Site: CWL PCCP

Job ID: 140-18711-1

Client Sample ID: 112645-001/CWL-SV-FB1

Lab Sample ID: 140-18711-1

Date Collected: 03/24/20 09:14

Matrix: Air

Date Received: 03/30/20 12:20

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	1.5	J	2.0	0.57	ppb v/v			04/01/20 16:25	1.92
Benzene	0.11		0.080	0.0080	ppb v/v			04/01/20 16:25	1.92
Benzyl chloride	ND		0.16	0.038	ppb v/v			04/01/20 16:25	1.92
Bromodichloromethane	ND		0.080	0.018	ppb v/v			04/01/20 16:25	1.92
Bromoform	ND		0.080	0.0090	ppb v/v			04/01/20 16:25	1.92
Bromomethane	ND		0.080	0.022	ppb v/v			04/01/20 16:25	1.92
2-Butanone (MEK)	0.15	J	0.40	0.073	ppb v/v			04/01/20 16:25	1.92
Carbon disulfide	ND		0.20	0.011	ppb v/v			04/01/20 16:25	1.92
Carbon tetrachloride	ND *		0.080	0.0070	ppb v/v			04/01/20 16:25	1.92
Chlorobenzene	ND		0.080	0.0060	ppb v/v			04/01/20 16:25	1.92
Chloroethane	ND		0.080	0.029	ppb v/v			04/01/20 16:25	1.92
Chloroform	ND		0.080	0.0070	ppb v/v			04/01/20 16:25	1.92
Chloromethane	ND		0.20	0.066	ppb v/v			04/01/20 16:25	1.92
Dibromochloromethane	ND		0.080	0.0070	ppb v/v			04/01/20 16:25	1.92
1,2-Dibromoethane (EDB)	ND		0.080	0.0070	ppb v/v			04/01/20 16:25	1.92
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.080	0.012	ppb v/v			04/01/20 16:25	1.92
1,2-Dichlorobenzene	ND		0.080	0.031	ppb v/v			04/01/20 16:25	1.92
1,3-Dichlorobenzene	ND		0.080	0.016	ppb v/v			04/01/20 16:25	1.92
1,4-Dichlorobenzene	ND		0.080	0.016	ppb v/v			04/01/20 16:25	1.92
Dichlorodifluoromethane	ND		0.080	0.014	ppb v/v			04/01/20 16:25	1.92
1,1-Dichloroethane	ND		0.080	0.0070	ppb v/v			04/01/20 16:25	1.92
1,2-Dichloroethane	ND		0.080	0.010	ppb v/v			04/01/20 16:25	1.92
1,1-Dichloroethene	ND		0.080	0.0080	ppb v/v			04/01/20 16:25	1.92
cis-1,2-Dichloroethene	ND		0.080	0.010	ppb v/v			04/01/20 16:25	1.92
trans-1,2-Dichloroethene	ND		0.080	0.0070	ppb v/v			04/01/20 16:25	1.92
1,2-Dichloropropane	ND		0.080	0.010	ppb v/v			04/01/20 16:25	1.92
cis-1,3-Dichloropropene	ND		0.080	0.016	ppb v/v			04/01/20 16:25	1.92
trans-1,3-Dichloropropene	ND		0.080	0.0090	ppb v/v			04/01/20 16:25	1.92
Ethylbenzene	ND		0.080	0.013	ppb v/v			04/01/20 16:25	1.92
4-Ethyltoluene	ND		0.16	0.021	ppb v/v			04/01/20 16:25	1.92
Hexachlorobutadiene	ND		0.40	0.032	ppb v/v			04/01/20 16:25	1.92
2-Hexanone	ND		0.20	0.016	ppb v/v			04/01/20 16:25	1.92
4-Methyl-2-pentanone (MIBK)	ND		0.20	0.054	ppb v/v			04/01/20 16:25	1.92
Methylene Chloride	0.55		0.40	0.16	ppb v/v			04/01/20 16:25	1.92
Styrene	ND		0.080	0.024	ppb v/v			04/01/20 16:25	1.92
1,1,2,2-Tetrachloroethane	ND		0.080	0.014	ppb v/v			04/01/20 16:25	1.92
Tetrachloroethene	0.20		0.080	0.0070	ppb v/v			04/01/20 16:25	1.92
Toluene	0.078	J	0.12	0.078	ppb v/v			04/01/20 16:25	1.92
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.080	0.0080	ppb v/v			04/01/20 16:25	1.92
1,2,4-Trichlorobenzene	ND		0.40	0.064	ppb v/v			04/01/20 16:25	1.92
1,1,1-Trichloroethane	ND		0.080	0.037	ppb v/v			04/01/20 16:25	1.92
1,1,2-Trichloroethane	ND		0.080	0.0070	ppb v/v			04/01/20 16:25	1.92
Trichloroethene	ND		0.040	0.0060	ppb v/v			04/01/20 16:25	1.92
Trichlorofluoromethane	0.015	J	0.080	0.011	ppb v/v			04/01/20 16:25	1.92
1,2,4-Trimethylbenzene	ND		0.080	0.020	ppb v/v			04/01/20 16:25	1.92
1,3,5-Trimethylbenzene	ND		0.080	0.022	ppb v/v			04/01/20 16:25	1.92
Vinyl acetate	ND		0.40	0.028	ppb v/v			04/01/20 16:25	1.92
Vinyl chloride	ND		0.040	0.026	ppb v/v			04/01/20 16:25	1.92

Client Sample Results

Client: Sandia National Laboratories
Project/Site: CWL PCCP

Job ID: 140-18711-1

Client Sample ID: 112645-001/CWL-SV-FB1

Lab Sample ID: 140-18711-1

Date Collected: 03/24/20 09:14

Matrix: Air

Date Received: 03/30/20 12:20

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	0.043	J	0.080	0.029	ppb v/v			04/01/20 16:25	1.92
o-Xylene	ND		0.080	0.015	ppb v/v			04/01/20 16:25	1.92
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		60 - 140					04/01/20 16:25	1.92

Client Sample ID: 112646-001/CWL-UI-2-136

Lab Sample ID: 140-18711-2

Date Collected: 03/24/20 09:20

Matrix: Air

Date Received: 03/30/20 12:20

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	860	J	1500	430	ppb v/v			04/02/20 07:37	2254.08
Benzene	12	J	60	6.0	ppb v/v			04/02/20 07:37	2254.08
Benzyl chloride	ND		120	29	ppb v/v			04/02/20 07:37	2254.08
Bromodichloromethane	ND		60	14	ppb v/v			04/02/20 07:37	2254.08
Bromoform	ND		60	6.8	ppb v/v			04/02/20 07:37	2254.08
Bromomethane	ND		60	17	ppb v/v			04/02/20 07:37	2254.08
2-Butanone (MEK)	120	J	300	55	ppb v/v			04/02/20 07:37	2254.08
Carbon disulfide	64	J	150	8.3	ppb v/v			04/02/20 07:37	2254.08
Carbon tetrachloride	15	J*	60	5.3	ppb v/v			04/02/20 07:37	2254.08
Chlorobenzene	ND		60	4.5	ppb v/v			04/02/20 07:37	2254.08
Chloroethane	ND		60	22	ppb v/v			04/02/20 07:37	2254.08
Chloroform	570		60	5.3	ppb v/v			04/02/20 07:37	2254.08
Chloromethane	65	J	150	50	ppb v/v			04/02/20 07:37	2254.08
Dibromochloromethane	ND		60	5.3	ppb v/v			04/02/20 07:37	2254.08
1,2-Dibromoethane (EDB)	ND		60	5.3	ppb v/v			04/02/20 07:37	2254.08
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		60	9.0	ppb v/v			04/02/20 07:37	2254.08
1,2-Dichlorobenzene	ND		60	23	ppb v/v			04/02/20 07:37	2254.08
1,3-Dichlorobenzene	ND		60	12	ppb v/v			04/02/20 07:37	2254.08
1,4-Dichlorobenzene	ND		60	12	ppb v/v			04/02/20 07:37	2254.08
Dichlorodifluoromethane	31	J	60	11	ppb v/v			04/02/20 07:37	2254.08
1,1-Dichloroethane	11	J	60	5.3	ppb v/v			04/02/20 07:37	2254.08
1,2-Dichloroethane	21	J	60	7.5	ppb v/v			04/02/20 07:37	2254.08
1,1-Dichloroethene	110		60	6.0	ppb v/v			04/02/20 07:37	2254.08
cis-1,2-Dichloroethene	ND		60	7.5	ppb v/v			04/02/20 07:37	2254.08
trans-1,2-Dichloroethene	ND		60	5.3	ppb v/v			04/02/20 07:37	2254.08
1,2-Dichloropropane	180	CI	60	7.5	ppb v/v			04/02/20 07:37	2254.08
cis-1,3-Dichloropropene	ND		60	12	ppb v/v			04/02/20 07:37	2254.08
trans-1,3-Dichloropropene	ND		60	6.8	ppb v/v			04/02/20 07:37	2254.08
Ethylbenzene	ND		60	9.8	ppb v/v			04/02/20 07:37	2254.08
4-Ethyltoluene	ND		120	16	ppb v/v			04/02/20 07:37	2254.08
Hexachlorobutadiene	ND		300	24	ppb v/v			04/02/20 07:37	2254.08
2-Hexanone	ND		150	12	ppb v/v			04/02/20 07:37	2254.08
4-Methyl-2-pentanone (MIBK)	50	J	150	41	ppb v/v			04/02/20 07:37	2254.08
Methylene Chloride	210	J	300	120	ppb v/v			04/02/20 07:37	2254.08
Styrene	ND		60	18	ppb v/v			04/02/20 07:37	2254.08
1,1,2,2-Tetrachloroethane	ND		60	11	ppb v/v			04/02/20 07:37	2254.08
Tetrachloroethene	170		60	5.3	ppb v/v			04/02/20 07:37	2254.08

Client Sample Results

Client: Sandia National Laboratories
 Project/Site: CWL PCCP

Job ID: 140-18711-1

Client Sample ID: 112646-001/CWL-UI-2-136

Lab Sample ID: 140-18711-2

Date Collected: 03/24/20 09:20

Matrix: Air

Date Received: 03/30/20 12:20

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toluene	ND		90	59	ppb v/v			04/02/20 07:37	2254.08
1,1,2-Trichloro-1,2,2-trifluoroethane	590		60	6.0	ppb v/v			04/02/20 07:37	2254.08
1,2,4-Trichlorobenzene	ND		300	48	ppb v/v			04/02/20 07:37	2254.08
1,1,1-Trichloroethane	ND		60	28	ppb v/v			04/02/20 07:37	2254.08
1,1,2-Trichloroethane	ND		60	5.3	ppb v/v			04/02/20 07:37	2254.08
Trichloroethene	5000		30	4.5	ppb v/v			04/02/20 07:37	2254.08
Trichlorofluoromethane	190		60	8.3	ppb v/v			04/02/20 07:37	2254.08
1,2,4-Trimethylbenzene	28 J		60	15	ppb v/v			04/02/20 07:37	2254.08
1,3,5-Trimethylbenzene	ND		60	17	ppb v/v			04/02/20 07:37	2254.08
Vinyl acetate	ND		300	21	ppb v/v			04/02/20 07:37	2254.08
Vinyl chloride	ND		30	20	ppb v/v			04/02/20 07:37	2254.08
m,p-Xylene	24 J		60	22	ppb v/v			04/02/20 07:37	2254.08
o-Xylene	15 J		60	11	ppb v/v			04/02/20 07:37	2254.08
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	106		60 - 140					04/02/20 07:37	2254.08

ANNEX C

Chemical Waste Landfill

Calendar Year 2020

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 3, 2020
2. Time of Inspection 0958 to 1030
3. Name of Inspector Robert Ziöck, Danielle Michel

<p><u>Mandatory requirement:</u> 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.</p>

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

I. COVER SYSTEM [Quarterly]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Visible settlement of the soil cover in excess of 6 inches.	yes	No	
B. Erosion of the soil cover in excess of 6 inches deep.	yes	No	
C. Evidence of water ponding on the CWL cover surface in excess of 100 square feet.	yes	No	
D. Animal intrusion burrows in excess of 4 inches in diameter. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	yes	No	
E. Contiguous areas of no vegetation greater than 200 ft ² . Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	yes	No	

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

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

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

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

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

NOTES

Note Number	Description
1.	<i>Windblown plant debris accumulated in southern drainage culverts.</i>
2.	<i>Wind blown plant debris accumulated on security fence.</i>

**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 3/3/2020

Action (Note Number) 2. assigned to Robert Zick Date action completed 3/3/2020

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

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

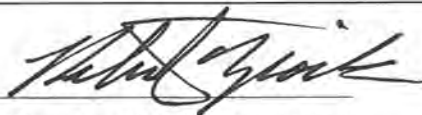
Action (Note Number) _____ assigned to _____ Date action completed _____

Additional Comments:

1. Windblown plant debris was removed from southern drainage culverts at time of the inspection.

2. Wind blown plant debris was removed from the security fence at time of the inspection.

Inspector's Signature



Original to: Chemical Waste Landfill Operating Record

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

date: March 26, 2020

to: Mike Mitchell (08854)

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

subject: **March 2020 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".

ET Covers Observations and Recommendations

The biology quarterly evaluation of the three ET Covers was conducted on March 10, 2020.

CAMU Observations

- The ET Cover is in excellent condition.
- The bases of some native grass clumps are beginning to green up, displaying a small amount of early warm season growth
- There are more seasonal annual weeds on the CAMU than I have typically observed in March, except in March 2019. In 2019 the more abundant late winter/early spring weeds were most likely due to the above average winter precipitation. The current March 2020 weeds are probably a result of the abundant 2019 weed seeds. At the time of my evaluation the weeds had developed moderate-sized basal rosettes. The weeds remain as a small percentage of the overall foliar coverage.

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 2020 growing season. This is due to above normal weed growth and weed seed deposition in 2019.
- Apply a 6-month pre-emergent across the entire cover in late October/early November 2020 to prevent pre-winter weed seed germination. Apply a pre/post-emergent combination in late March/early April 2021. These two planned applications should provide decent weed control for a handful of upcoming years.

Herbicide application note: herbicide must be carefully applied, including under the bunchgrass canopies. Most of the current weeds are growing close to bunch grasses: the seeds from these weeds most likely be at the edge of, and partially under, the bunchgrass canopies.

CWL Observations

- The native grasses look good. The bases of most native grass clumps are beginning to display some green, showing a modest amount of early warm season growth.
- Weeds were observed to be scattered across the CWL. Although the weeds are not present at such a high density as they were in March 2019, the weeds are regularly present across the ET Cover. The current late winter/spring weed seed bank in the soil is very high due to the abundance of weeds observed across the CWL in March 2019. With a significantly reduced spring weed density observed in March 2020, it appears that the early December 2019 pre-emergent application was beneficial.
- Most weeds observed were small- to moderate-sized, but many have already flowered and will set seed soon.
- The dominant weed has not yet been identified, it has an irregular yellow flower and is most likely in the Ranunculus Family. This weed is present at a much, much higher rate than the other two observed species of photosynthesizing weeds. Based on the abundance of the dominant weed, it most likely germinated in the fall before the pre-emergent was applied. The other two weed species have only formed basal rosettes at the time of inspection and it was not possible to identify either from their basal rosette. Based on the much lower presence of the other two weed species, they may have germinated in areas where the pre-emergent did not have complete soil coverage due to the gravel or above ground biomass intercepting the herbicide.

CWL Recommendations

- The current weeds are too large for a post-emergent herbicide application to be effective.
- Pre-emergent herbicide is planned to be applied across the CWL in April. This event may not be as effective as originally anticipated due to the unexpected weed presence after the early December 2019 pre-emergent herbicide application.
 - o The herbicide may need to be applied more attentively around the existing weeds and bunchgrasses in April than it is typically applied. It should be applied more thoroughly in the areas where above ground biomass intercepts the spray, including spraying under the canopies of bunchgrasses as much as possible.
 - The current 2020 weeds are growing in both open areas and close to bunchgrasses. The seeds from the current weeds located at the edge of, and partially under, the bunchgrass canopies are protected from the herbicide effects by the canopies if not carefully sprayed. If not addressed, the canopy areas are prime places for weeds to continue to grow and drop seeds in future years.
 - o And/or a higher application rate may be needed to achieve more even herbicide bonding across all portions of the soil.
 - o And/or more water may be needed to better wash the herbicide down past the biomass and the gravel, to help it bond more evenly across the soil.
- Apply a 6-month pre-emergent across the entire cover in late October/early November 2020 to prevent pre-winter weed seed germination. Apply a pre/post-emergent combination in late March/early April 2021.

Herbicide application note: similar to the CAMU herbicide must be carefully applied, including under the bunchgrass canopies.
- Due to the unexpected incomplete control provided by the early December 2019 application, the pre-emergent annual planned application process will need to be on the longer end of the projected timeline (3 years). Pre-emergent applications should plan to be repeated again in Oct/Nov 2021 and March/early April 2022. Repeated planned efforts will be required to move the CWL native vegetation community onto a self-sustaining trajectory.

MWL Observations

- The ET Cover is in excellent condition.
- The bases of some native grass clumps are beginning to green up, displaying a small amount of early warm season growth.
- Only a few small weeds were observed across the cover.

MWL Recommendations


- None based on March 10, 2020 observations

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

cc: Customer Funded Records Center
Ecology Library
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 June 1, 2020
2. Time of Inspection 10:52 - 11:17
3. Name of Inspector Robert Zook, Danielle Michel

<p>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.)</p> <p style="text-align: right; margin-right: 20px;"></p> <p>Training records maintained at CAMU Administrative Trailer.</p>

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

I. COVER SYSTEM [Quarterly]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Visible settlement of the soil cover in excess of 6 inches.	yes	No	
B. Erosion of the soil cover in excess of 6 inches deep.	yes	No	
C. Evidence of water ponding on the CWL cover surface in excess of 100 square feet.	yes	No	
D. Animal intrusion burrows in excess of 4 inches in diameter. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	yes	No	
E. Contiguous areas of no vegetation greater than 200 ft ² . Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	yes	No	

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

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

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

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

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

NOTES

Note Number	Description
1.	<i>Wind-blown plant debris removed from southern drainage culverts.</i>
2.	<i>Wind-blown plant debris removed from security fence.</i>

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

Action (Note Number) 1 assigned to Robert Ziak Date action completed 6/1/2020

Action (Note Number) 2 assigned to Robert Ziak Date action completed 6/1/2020

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

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


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

Additional Comments:

1. Wind-blown plant debris removed from drainage culverts at time of the inspection. Aug 6/1/2020

2. Windblown plant debris removed from security fence at time of the inspection. Aug 6/1/2020

Inspector's Signature



Original to: Chemical Waste Landfill Operating Record

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



date: June 22, 2020

to: Mike Mitchell (08854)
Robert Ziock (08854)

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

subject: **June 2020 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".

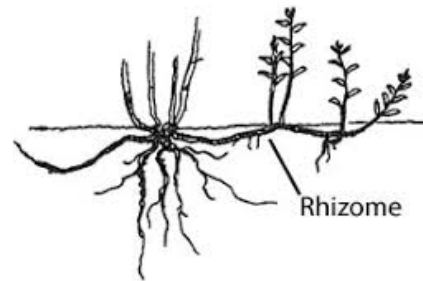
ET Covers Observations and Recommendations

The biology quarterly evaluation of the three ET Covers was conducted on June 8, 2020.

CAMU

- The ET Cover looks very good overall. Native bunchgrasses are green and there is a very low presence of weeds on the cover.
- I anticipate weeds to become established by next year where the swale earth disturbance is occurring, unless a sterilant or pre-emergent is applied.
- At the base of the cover on the east side there are some patches of silverleaf nightshade (*Solanum elaeagnifolium*). I'll share some information about this species, so that you will have it available for future management consideration. I will continue to monitor these patches. This is not an urgent issue but worth some discussion.

- Silverleaf nightshade is a prickly perennial plant native to Baja California and parts of Mexico that is toxic when consumed. Although it is not listed as a noxious weed in New Mexico, it is listed in 46 states. It can be very invasive, but I have also observed it to not spread widely when it occurs in a well-established native vegetation community. Due to where it is located at the CWL, it could continue to spread into the bare dirt areas. Eradication can be difficult due to the extremely deep taproot and deep, aggressive rhizomes that can sprout many above ground plants each year. The most effective control technique is to dig up as much of the root system as possible. It's pretty much impossible to get the entire root system, but repeatedly removing as much of the above and below ground parts of the plant as possible can eventually weaken and kill it. A sterilant may be effective against it, but pre-emergent herbicides are not effective because it is a perennial with very aggressive rhizomes



CWL

- The native grasses appear very healthy, displaying a lot of green foliage.
- The weed removal event was extremely good, only a minor presence of the yellow-flowered plant was observed.
- A surprisingly moderate amount of Russian thistle was observed to be present across the cover. This is quite surprising due to the two rounds of pre-emergent applied prior to the warm season.
 - I believe a more effective pre-emergent herbicide against Russian thistle would be Esplanade, whose active ingredient is Indaziflam. Indaziflam does not carry a bee precaution according to the UC IPM. Esplanade is a newer herbicide and to date it is pretty much the only effective herbicide against cheatgrass, a notoriously difficult weed to control. Cheatgrass seeds lie on top of the soil and Esplanade intercepts the root extension after germination, when the seed extends down into the soil, instead of up through the soil. I believe this method of interfering with root extension would also be more effective with the large seeds of Russian thistle, which are more likely to be on top of the soil. Bayer Vegetation Management highlights Esplanade as being very effective against Russian thistle. The main issue with Esplanade as a pre-emergent at Sandia may be working with SNL Facilities to have it listed as an approved herbicide. Since it is a

newer herbicide it may not currently be approved. An added bonus is that it provides 8 months of control.

<https://www.environmentalscience.bayer.us/vegetation-management/industrial-vegetation-management/products/esplanade-200-sc>

<https://www.environmentalscience.bayer.us/-/media/PRFUnitedStates/Documents/Resource-Library/Product-Labels/Esplanade-200-SC.ashx>

<https://www.environmentalscience.bayer.us/-/media/prfunitestates/documents/resource-library/white-paper/esplanade-200sc-stewardship-guide-for-natural-areas.ashx>

MWL


- The ET Cover is in excellent condition. The mature native bunchgrasses are green and appear very healthy. There appears to be an increase of black grama grass (*Bouteloua eriopoda*) across the cover. From an ecology perspective, this is excellent because it's an important perennial native grass that reproduces primarily by stolons due to a low ratio of viable seeds. This indicates that this species of grass is very healthy on the cover, and able to reproduce more broadly across the cover.
- The south portion of the cover had small Russian thistle plants dispersed across it. Based on the numbers of plants, I think it would be good to plan to apply a pre-emergent across at least the southern portion of the cover. Or, hand remove them during this summer or fall.
- On the north portion of the cover surrounding the pink pinflag is a patch of silverleaf nightshade. This is the same plant species discussed in the CAMU section of this memo. I'll also continue to monitor this patch on the MWL.

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

cc: Customer Funded Records Center
Ecology Library
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 September 2, 2020
2. Time of Inspection 13:39-14:04
3. Name of Inspector Robert Zioch, Darvella Michel

<p><u>Mandatory requirement:</u> 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.</p>	<div style="border: 1px solid black; width: 50px; height: 50px; margin: auto;">  </div>
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Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

I. COVER SYSTEM [Quarterly]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Visible settlement of the soil cover in excess of 6 inches.	yes	No	
B. Erosion of the soil cover in excess of 6 inches deep.	yes	No	
C. Evidence of water ponding on the CWL cover surface in excess of 100 square feet.	yes	No	
D. Animal intrusion burrows in excess of 4 inches in diameter. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	yes	No	
E. Contiguous areas of no vegetation greater than 200 ft ² . Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	yes	No	

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

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

III. SECURITY FENCE [Quarterly]			
<i>Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Accumulation of wind-blown plants and debris.	yes	yes	2
B. Fence wires and posts in need of repair/maintenance.	yes	No	
C. Gates in need of oiling/repair/maintenance.	yes	No	
D. Locks in need of cleaning or replacement.	yes	No	
E. Warning signs in need of repair or replacement.	yes	No	
F. Survey monuments in vicinity of CWL visible.	yes	yes	3

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

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

NOTES

Note Number	Description
1	Wind-blown plant debris in southern drainage culverts
2.	Wind-blown plant debris on security fence.
3.	Sediment and wind-blown plant debris accumulated on western most survey monument.

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

Action (Note Number) 1 assigned to Robert Zook Date action completed 9/2/2020

Action (Note Number) 2 assigned to Robert Zook Date action completed 9/2/2020

Action (Note Number) 3 assigned to Robert Zook Date action completed 9/2/2020

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

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

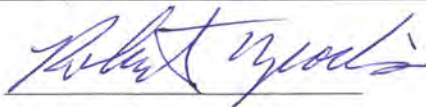
Additional Comments:

1. Wind-blown plant debris removed from southern drainage culverts at time of inspection.

2. Windblown plant debris removed from security fence at time of the inspection

3. Sediment and wind-blown plant debris removed from western most survey monument at time of the 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 12/1/2020
2. Time of Inspection 10:30-11:01
3. Name of Inspector Robert Ziock, Danielle Michel

<p>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.</p>

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

I. COVER SYSTEM [Quarterly]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Visible settlement of the soil cover in excess of 6 inches.	yes	No	
B. Erosion of the soil cover in excess of 6 inches deep.	yes	No	
C. Evidence of water ponding on the CWL cover surface in excess of 100 square feet.	yes	No	
D. Animal intrusion burrows in excess of 4 inches in diameter. Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	yes	No	
E. Contiguous areas of no vegetation greater than 200 ft ² . Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.	yes	No	

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

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

III. SECURITY FENCE [Quarterly]			
<i>Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Accumulation of wind-blown plants and debris.	yes	yes	2
B. Fence wires and posts in need of repair/maintenance.	yes	No	
C. Gates in need of oiling/repair/maintenance.	yes	No	
D. Locks in need of cleaning or replacement.	yes	No	
E. Warning signs in need of repair or replacement.	yes	No	
F. Survey monuments in vicinity of CWL visible.	yes	yes	3

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

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

Action (Note Number) 1 assigned to Robert Ziak Date action completed 12/1/2020
Action (Note Number) 2 assigned to Robert Ziak Date action completed 12/1/2020
Action (Note Number) 3 assigned to Robert Ziak Date action completed 12/1/2020
Action (Note Number) _____ assigned to _____ Date action completed _____
Action (Note Number) _____ assigned to _____ Date action completed _____

Additional Comments:

Action items #1, 2, 3 were completed at time
of the inspection. 12/1/2020

Inspector's Signature



Original to: Chemical Waste Landfill Operating Record

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



date: December 3, 2020

to: Mike Mitchell (08854)
Robert Ziock (08854)

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

subject: **December 2020 CWL Quarterly Inspection 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".

ET Cover Observations and Recommendations

The biology quarterly evaluation of the CWL ET Cover was conducted on December 1, 2020.

- Overall, the CWL looks excellent. The native bunchgrasses look healthy, most are quite a bit larger than they were in December last year.
- The maintenance event was very good, minimal vegetation debris observed.
- A few small burrows entrances were observed along the north and east fence lines in bare dirt areas. Due to the significant amount of gravel mulch on the CWL, burrows are not anticipated to be an issue on the cover if the gravel mulch is maintained.
- Due to the high amount of weed seed currently in the soil from many years of weeds dropping seeds on the cover, Esplanade pre-emergent should be applied as early as reasonably possible. Esplanade need to be irrigated into the soil after application, which requires the application process to occur above freezing temperatures. Targeting an early March 2021 application seems

optimal to get ahead of the spring weed germination, while most likely avoiding freezing lines. Esplanade is effective for up to 8 months, providing a long period of weed germination control. A second Esplanade application should occur in early October 2021 after a thorough debris removal event to prevent weed germination during the fall, winter, and spring.

cc: Customer Funded Records Center
Ecology Library
Matt Baumann
Robert Ziock

GROUNDWATER/SOIL-VAPOR EQUIPMENT INSPECTIONS

Chemical Waste Landfill Post-Closure Inspection Form Checklist for Groundwater Monitoring Locations / Sampling Equipment

1. Date of Inspection 01/20/20
2. Time of Inspection 0810
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: RL
(Inspector must initial box before proceeding with the inspection.)

Training records maintained at CAMU Administrative Trailer.

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

I. GROUNDWATER MONITORING LOCATIONS [Semi-annually]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	YES	NO	
B. Well cover caps (e.g., PVC caps, J-Plug, or equivalent) in need of repair/maintenance.	YES	NO	1
C. Well casing in need of repair/maintenance.	YES	NO	
D. Monitoring well properly labeled.	YES	NO	
E. Locks in need of cleaning or replacement.	YES	NO	

II. GROUNDWATER SAMPLING EQUIPMENT [Semi-annually]			
<i>Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Sampling pump in need of repair/maintenance.	YES	NO	
B. Sampling assembly (e.g., tubing, gauges, and valves) in need of repair/maintenance.	YES	NO	

**Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Groundwater Monitoring Locations / Sampling Equipment
(continued)**

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

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

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

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

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

Additional Comments:

Inspector's Signature



Original to: Chemical Waste Landfill Operating Record

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

Soil Vapor Monitoring Inspection Form

1. Soil vapor monitoring site CWL
2. Date of Inspection 01/30/2020
3. Time of Inspection 0950
4. Name of Inspector Denisha Sanchez

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

SOIL VAPOR MONITORING LOCATIONS				
<i>Inspection Parameter</i>	<i>Indicate if Applicable (Yes or No)</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	YES	YES	NO	
B. Above-ground enclosure in need of repair/maintenance.	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	

SAMPLING EQUIPMENT				
<i>Inspection Parameter</i>	<i>Indicate if Applicable (Yes or No)</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Sampling pump in need of repair/maintenance	YES	YES	NO	
B. Sampling manifold (tubing, gauges, and valves) in need of repair/maintenance.	YES	YES	NO	

IMPORTANT NOTICE: A printed (and uncompleted) copy of this form may not be the most current form. The official version is located in the Long-Term Stewardship (LTS) ARAS document library, for which access is required. Upon completion, this document becomes record.

Soil Vapor Monitoring Inspection Form

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

NOTES

Note Number	Description

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

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

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

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

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

IMPORTANT NOTICE: A printed (and uncompleted) copy of this form may not be the most current form. The official version is located in the Long-Term Stewardship (LTS) ARAS document library, for which access is required. Upon completion, this document becomes record.

Chemical Waste Landfill Post-Closure Inspection Form Checklist for Soil-Gas Monitoring Locations / Sampling Equipment

1. Date of Inspection 03/24/20
2. Time of Inspection 0900
3. Name of Inspector Robert Lynch

Mandatory requirement:

The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: *(Inspector must initial box before proceeding with the inspection.)*

RL

Training records maintained at CAMU Administrative Trailer.

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

I. SOIL-GAS MONITORING LOCATIONS [Annually]			
<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, Swagelok® dust caps, passive venting Baroballs™, or equivalent) in need of repair/maintenance.	YES	NO	
C. Well casing or sampling ports in need of repair/maintenance.	YES	NO	
D. Monitoring location and sampling ports properly labeled.	YES	NO	
E. Locks in need of cleaning or replacement.	YES	NO	

II. SAMPLING EQUIPMENT [Annually]			
<i>Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Sampling pump in need of repair/maintenance.	YES	NO	
B. Sampling assembly (e.g., tubing, gauges, and valves) in need of repair/maintenance.	YES	NO	

**Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Soil-Gas Monitoring Locations / Sampling Equipment
(continued)**

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

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

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

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

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

Additional Comments:

Inspector's Signature  _____

Original to: Chemical Waste Landfill Operating Record

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

Chemical Waste Landfill Post-Closure Inspection Form Checklist for Groundwater Monitoring Locations / Sampling Equipment

1. Date of Inspection 07-20-20
2. Time of Inspection 0845
3. Name of Inspector Zach Tenorio

<p><u>Mandatory requirement:</u> The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: <i>(Inspector must initial box before proceeding with the inspection.)</i></p> <p style="font-size: small;">Training records maintained at CAMU Administrative Trailer.</p>	<input checked="" type="checkbox"/>
---	-------------------------------------

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

I. GROUNDWATER MONITORING LOCATIONS [Semi-annually]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	Yes	NO	
B. Well cover caps (e.g., PVC caps, J-Plug, or equivalent) in need of repair/maintenance.	Yes	NO	1
C. Well casing in need of repair/maintenance.	Yes	NO	
D. Monitoring well properly labeled.	Yes	NO	
E. Locks in need of cleaning or replacement.	Yes	NO	

II. GROUNDWATER SAMPLING EQUIPMENT [Semi-annually]			
<i>Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Sampling pump in need of repair/maintenance.	Yes	NO	
B. Sampling assembly (e.g., tubing, gauges, and valves) in need of repair/maintenance.	Yes	NO	

**Chemical Waste Landfill
Post-Closure Inspection Form
Checklist for Groundwater Monitoring Locations / Sampling Equipment
(continued)**

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

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

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

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

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

Additional Comments:

Inspector's Signature  _____

Original to: Chemical Waste Landfill Operating Record

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

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: P
(Inspector must initial box before proceeding with the inspection.)

Approximate vegetative coverage (i.e., living plants): 36 %¹

Approximate percent native vegetation of the total vegetative cover: 99 %

Listed below are the main plant species identified growing on the CWL cover and the approximate percent cover for each species.

<u>Scientific Name</u>	<u>Common Name (optional)</u>	<u>%Total cover</u>
<u>Sporobolus cryptandrus</u>	<u>Sand dropseed</u>	<u>2 %</u>
<u>Bouteloua gracilis</u>	<u>Blue grama</u>	<u>18 %</u>
<u>Pleuraphis jamesii</u>	<u>Galleta grass</u>	<u>10 %</u>
<u>Sporobolus flexuusus</u>	<u>Mesa dropseed</u>	<u>6 %</u>
<u>Sphaeralcea hastulata</u>	<u>Wrinkled globemallow</u>	<u><0.5 %</u>
<u>Euphorbia exstipulata</u>	<u>Square-seed spurge</u>	<u><0.5 %</u>
<u>Salsola tragus</u>	<u>Russian thistle</u>	<u><0.5 %</u>
<u>Opuntia phaeacantha</u>	<u>Brown-spined prickly pear</u>	<u><0.5 %</u>
<u>Chenopodium species</u>	<u>Goosefoot species</u>	<u><0.5 %</u>
<u>Solanum elaeagnifolium</u>	<u>Silverleaf nightshade</u>	<u>< 0.5%</u>
<u>Xanthisma spinulosum</u>	<u>Spiny goldenweed</u>	<u>< 0.5%</u>
<u>Kallstroemia californica</u>	<u>California caltrop</u>	<u>< 0.5%</u>
<u>Chamaesyce maculata</u>	<u>Spotted sandmat</u>	<u>< 0.5%</u>
<u>Gutierrezia sarothrae</u>	<u>Broom snakeweed</u>	<u>< 0.5%</u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>

Note: ¹All species observed to be present at less than one-half of one-percent are not calculated into the total vegetative coverage

Chemical Waste Landfill Biology Inspection Checklist for the CWL Cover (Continued)

Permit Requirements:

1) Is the total foliar coverage (i.e., land surface covered with living plants) greater than or equal to 20%? Yes If "No," explain below.

Notes: _____

2) Of the 20% total foliar coverage, is 50% or greater comprised of native perennial species, and 50% or less comprised of annual species? Yes If "No," explain below.

Notes: _____

3) Are there any contiguous areas of no vegetation greater than 200 square feet (approximately 14 x14 ft.)? No If "Yes," mark such areas on a map and attach to this checklist. Describe area(s) and plans to actively improve/repair area(s) as detailed in Permit Attachment 1, Section 1.9.1.3 below.

Notes: _____

4) Are there any animal burrow entrances on the cover in excess of 4 inches in diameter? No If "Yes," mark such areas on a map and provide additional information below.

Notes: _____

General Cover Information:

Are any burrows smaller than 4 inches in diameter present on the cover? No

Does any burrow(s) appear to be active? Yes

Animal Burrow Notes: Ant burrows are distributed across the CWL cover with varied activity levels, 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. The ant burrows are very active this year, ants were widely observed across the cover to be actively harvesting seeds from the grasses and carrying them to their nests.

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 on the cover.

Chemical Waste Landfill

Biology Inspection Checklist for the CWL Cover (Concluded)

General Observations:

Overall the CWL Cover is in very good condition. The complexity of native grass species, ages, and spacing is very good. The native bunch grasses have matured across the cover in the past year. Adult and older juvenile native grass clumps are present across the CWL Cover, providing a healthy, varied-age plant community.

Although the 2020 monsoon season was brief and post-monsoon temperatures have been very high the native grasses are robust. The leaf blades of the native grasses are very green, indicating very good photosynthesis. Seed heads are abundant on the grasses, making positive identification much easier than in 2019 and allowing for more accurate species quantification. Grasses are primarily identified to species by the structure of their seed heads (inflorescence).

Maintenance events have occurred this year and are recommended to continue for the remainder of 2020 and likely in 2021. Pre-emergent herbicide applications 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 very good spacing and 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: 8/18/20

Original to: Chemical Waste Landfill Operating Record

2020 Chemical Waste Landfill Biology Report Photos



Northwest portion of the cover



Southwest portion of the cover

2020 Chemical Waste Landfill Biology Report Photos



Southeast portion of the cover



Northeast portion of the cover

2020 Chemical Waste Landfill Biology Report Photos



Looking north from the center of the cover



Looking east from the center of the cover

2020 Chemical Waste Landfill Biology Report Photos



Looking south from the center of the cover



Looking west from the center of the cover

ANNEX D

Chemical Waste Landfill

Calendar Year 2020

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) 2020 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 2020 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 2020 was conducted on August 18, 2020. 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 2020 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 2020 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 2020 CWL Biology Inspections document ET Cover conditions that continue to meet the criteria for successful revegetation.

2020 Chemical Waste Landfill Biology Report

Local Climate Trends for 2020 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 8, 2020, the CWL area was classified as “Extreme Drought” according to the U.S. Drought Monitor (December 2020).

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 2019.

Precipitation, Relative Humidity and Winds

Tables 1 and 2 provide meteorological data for the period preceding and including the CY 2020 growing season. A 25-year data set (1995-2019) provides the reference mean monthly meteorological data; this updated data set adds the five recent years of data to the previous 20-year data set.

Meteorological conditions during the nine months preceding the monsoon season were favorable for the health of perennial native vegetation. Precipitation for the months of October 2019 through June 2020 exceeded the mean precipitation for this period. Total precipitation for this period was 5.42 inches, which is 16 percent (%) above normal and 0.73 inches above the mean precipitation of 4.69 inches. Four of these nine months received above average precipitation. In November 2019 1.73 inches of precipitation occurred, which is 1.32 inches above the mean for the month. This November precipitation timing was very beneficial for perennial vegetation, as it was lower intensity precipitation that permeates the soil better than typical high-intensity monsoon rains. And with higher relative humidity during the cool season, evaporative losses are much lower which allows moisture to saturate deeply into the soil column.

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 2020 monsoon season experienced below normal precipitation (as established by the 25-year mean) and relative humidity. The CWL area received 3.41 inches of rain during this timeframe, which is 0.76 inches, or 18%, below the mean monsoon season rainfall of 4.17 inches. July received 0.53 inches above the mean precipitation for the month, but August and September received less than their respective means. This dry trend continued October through December 2020, with well-below normal precipitation. The August-December 2020 precipitation total was 1.56 inches, this is 65% below the 25-year mean of 4.44 inches for this 5-month period. Only 0.40 inches of precipitation fell in total during

2020 Chemical Waste Landfill Biology Report

Table 1
October-December 2019 Meteorological Data Summary for the Chemical Waste Landfill^a

Month	October	November	December	
Temperature (°F)				3-Month Avg
Monthly Mean	57.9	45.5	41.1	48.2
25-year Temp Means	58.0	46.6	37.3	47.3
Precipitation (Inches)				3-Month Total
Monthly Total	0.73	1.73	0.35	2.81
25-year Precip Means	0.95	0.47	0.57	1.99
Relative Humidity (RH) (%)				3-Month Avg
Monthly Mean	35.0	50.5	58.2	47.9
25-year RH Means	42.6	45.0	53.4	47.0
Wind (Miles/hour)				3-Month Avg
Monthly Mean	8.6	7.0	6.1	7.2
25-year Wind Means	7.9	7.1	6.7	7.2

^aInformation Source: SNL/NM Meteorological Monitoring Program.

% = Percent.

°F = Fahrenheit.

RH = Relative humidity.

SNL/NM = Sandia National Laboratories/New Mexico.

2020 Chemical Waste Landfill Biology Report

Table 2
2020 Meteorological Data Summary for the Chemical Waste Landfill^a

Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	
Year	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	
Temperature (°F)													Annual ^b
Monthly Mean	38.6	41.3	51.1	59.2	70.2	76.6	79.2	80.2	69.6	57.9	50.5	36.8	59.3
25-year Temp Means	37.7	42.1	49.3	56.0	65.7	75.7	76.8	74.8	69.3	58.0	46.6	37.3	57.4
Precipitation (Inches)													Annual ^c
Monthly Total	0.30	0.60	0.35	0.71	0.01	0.64	2.25	0.55	0.61	0.13	0.12	0.15	6.42
25-year Precip Means	0.39	0.43	0.50	0.52	0.34	0.52	1.72	1.46	0.99	0.95	0.47	0.57	8.86
Relative Humidity (%)													Annual ^b
Monthly Mean	51.9	51.2	43.2	27.6	22.5	24.8	37.7	31.9	34.0	28.4	39.0	43.7	36.3
25-year RH Means	51.1	44.5	35.8	30.7	27.2	25.3	40.6	44.3	42.3	42.6	45.0	53.4	40.2
Wind (Miles/hour)													Annual ^b
Monthly Mean	7.0	8.9	9.2	9.4	10.1	9.0	8.2	7.5	8.8	7.9	7.9	6.6	8.5
25-year Wind Means	6.9	8.2	9.1	10.3	9.9	9.7	8.4	7.9	8.0	7.9	7.1	6.7	8.3

^aInformation Source: SNL/NM Meteorological Monitoring Program.

^bValues provided are averages of the monthly data.

^cValues provided are totals of the monthly data.

% = Percent.

°F = Fahrenheit.

RH = Relative humidity.

SNL/NM = Sandia National Laboratories/New Mexico.

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the final three months of this timeframe, causing further drying of soils after a below normal monsoon season.

The average relative humidity for the 3-month monsoon timeframe was 34.5% versus the 25-year mean of 42.4%; approximately 19% below normal, mirroring the below average monsoon precipitation. Average relative humidity for August-December was 35.4%, below the 25-year mean of 45.5% for these five months. A 22% reduction in average relative humidity for this 5-month period is significant. Lower relative humidity for an extended time period can cause considerable plant stress. Relative humidity is the amount of water vapor present in air. Lower relative humidity increases plant moisture loss when plants open their stomata to intake carbon dioxide and release oxygen during photosynthesis. Reduced relative humidity stresses non-irrigated vegetation because plants lose more water to the environment during gas exchange. When coupled with reduced precipitation resulting in low soil moisture, plants can weaken. This late-2020 dry period will be considered for the 2021 maintenance plan.

Total precipitation in 2020 was only 6.42 inches, 28% below the 25-year annual mean. Above normal precipitation in July had a lasting beneficial soil moisture effect into August when the Annual Biological Inspection was conducted.

The 2020 monthly and annual wind speed means were very close to 25-year monthly and annual means. All monthly wind means were within 1.0 miles per hour of their respective 25-year means.

Temperature

Average monthly temperature for October 2019 through June 2020 was 1.4 degrees Fahrenheit (°F) warmer than the respective 25-year mean monthly average. Average annual temperature for 2020 was 59.3°F, 1.9°F above the 25-year annual mean of 57.4°F. The average annual temperature for 2020 was 3.2% above the mean. The monthly mean temperature for nine months in 2020 exceeded their 25-year monthly means. Five of these warmer months exceeded their respective means by 2.4°F or greater: April +3.2°F, May +4.5°F, July +2.4°F, August +5.4°F, and November +3.9°F. Of note for sustained plant stress is the +5.4°F difference for August (80.2°F versus 74.8°F).

In CY 2020 the CWL experienced 96.6 degrees of temperature variability, with a low of 6.8°F in February and a high of 103.4°F in July.

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. Many tightly spaced juvenile native grass clumps died off in large numbers in 2013; this allowed for improved spacing between the remaining resilient grass clumps, allowing for healthy growth of root systems and above ground biomass. Since 2013 additional native grass clumps have become established and are gradually maturing in these open areas.

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ET Cover best practice maintenance activities performed by the ET Cover maintenance contractor in CY 2020 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 April, May, July, August, and October 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 structures, and perimeter areas, applying preventive herbicides for invasive weed control. Based upon results through CY 2020, the effectiveness of the pre-emergent herbicide Proflaminate for invasive weed control at the CWL is limited; it will not be used in the future. The use of Esplanade was tested in selected areas at and around the ET Cover and will be further evaluated in CY 2021.

August 2020 Inspection Results

The August 2020 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 36%, of which approximately 99% was native perennial grasses (Figure 1). In general, the level of weedy plant species present on the ET Cover was very low, in part due to several well-timed weed removal events. Blue grama was the dominant grass species (18% total foliar coverage). The four native grass species present on the ET Cover accounted for 36% total foliar coverage. Identification of each native grass species and its foliar coverage was more accurate in 2020 than it was in 2019 due to robust seed head development during the 2020 growing season. Due to the extremely brief 2019 monsoon season, very few grass clumps produced seeds 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 and seeds are not present, grass species identification is made much more difficult and quantification is less accurate.

Overall, the ET Cover was observed to be in very good condition. Juvenile and more mature native grass clumps were robust across the ET Cover, providing a healthy varied-age plant community. Grasses had an abundance of seeds and the grass blades were very green, indicating strong photosynthetic activity. As the ET Cover develops into a 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).

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Recommendations

Based on vegetation inspection and monitoring conducted during CY 2020, the existing native grasses could benefit from further 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 and their root systems to expand and develop to maturity). To achieve this, pre-emergent herbicide application in February or March 2021, and again in Fall 2021 is recommended to 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. The native clump grasses have formed good spacing; currently no additional native plant recruitment is needed onsite from seed.

The below normal precipitation and below normal relative humidity experienced in August-December 2020 may have a lasting negative soil moisture effect on plants during the 2021 growing season. This is particularly likely if above normal precipitation does not occur sometime during the winter through summer 2021 to replenish soil moisture. 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). Due to the still maturing plant community on the CWL, supplemental watering may be needed in 2021 to assist soil moisture for continued growth and development.

The updated 25-year meteorological data set shows the following changes from the 20-year data set: a mean annual temperature rise of 0.2°F, a mean annual precipitation increase of 0.29 inches, a mean annual relative humidity increase of 0.11%, and a mean annual wind speed decrease of 0.02 miles per hour. These changes are a result of adding the most recent 5 years of meteorological data to the 20-year data set previously used. The mean annual temperature is expected to continue to rise in coming decades due to global climate change. Gradually increasing mean temperatures coupled with increased climate variability, such as periods of drought and/or periods of flooding, will continue to stress native vegetation at SNL/NM and across the southwestern United States. Mature, native perennial vegetation will continue to be the most resilient type of plant community with increasing meteorological stresses. Supporting the continued progression of an ET Cover native plant community that mimics the composition of the surrounding, naturally occurring plant community will provide future benefits under anticipated climate variability scenarios and increasing stresses.

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References

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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 August 18, 2020 CWL ET Cover Photos