



**Sandia  
National  
Laboratories**

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**MIXED WASTE LANDFILL  
ANNUAL LONG-TERM MONITORING & MAINTENANCE REPORT  
APRIL 2021 – MARCH 2022**

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

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**JUNE 2022**



**U.S. DEPARTMENT OF  
ENERGY**



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

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**MIXED WASTE LANDFILL ANNUAL  
LONG-TERM MONITORING & MAINTENANCE REPORT  
APRIL 2021 – MARCH 2022**

**Facility:** Mixed Waste Landfill

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

**EPA ID No.:** NM5890110518

**Permit Basis:** Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan,  
submitted March 2012, effective January 8, 2014

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## EXECUTIVE SUMMARY

The Mixed Waste Landfill (MWL) at Sandia National Laboratories, New Mexico is a solid waste management unit that underwent corrective action in accordance with Title 20, Chapter 4, Part 1, Section 500 of the New Mexico Administrative Code (20.4.1.500 NMAC), incorporating Title 40, Code of Federal Regulations Part 264.101 (40 CFR 264.101); regulatory criteria found in the Final Order No. HWB 04-11(M) State of New Mexico Before the Secretary of the Environment in the Matter of Request for a Class 3 Permit Modification for Corrective Measures for the Mixed Waste Landfill, Sandia National Laboratories, Bernalillo County, New Mexico, EPA ID# 5890110518 (NMED May 2005); the Compliance Order on Consent (NMED April 2004); and the Resource Conservation and Recovery Act Facility Operating Permit for Sandia National Laboratories, Environmental Protection Agency (EPA) Identification No. NM5890110518 (NMED January 2015, with all approved modifications).

As of March 13, 2016, the February 2016 Final Order No. HWB 15-18 (P), State of New Mexico Before the Secretary of the Environment in the Matter of Proposed Permit Modification for Sandia National Laboratories, EPA ID #5890110518, To Determine Corrective Action Complete with Controls at the Mixed Waste Landfill (NMED February 2016) became effective, granting the Class 3 Permit Modification to reflect that the MWL is Corrective Action Complete with Controls. The MWL Long-Term Monitoring and Maintenance Plan (LTMMMP) (SNL/NM March 2012), which became effective on January 8, 2014 (Blaine January 2014), defines all monitoring, inspection, maintenance/repair, and reporting requirements for the MWL. This ninth MWL Annual Long-Term Monitoring & Maintenance Report documents monitoring, inspection, maintenance, and repair activities conducted at the MWL during the April 1, 2021 through March 31, 2022 reporting period.

Sampling activities for this reporting period included two semiannual monitoring events each for groundwater, radon, and soil vapor. Annual soil-moisture monitoring was conducted in April 2021, and annual tritium surface soil sampling and annual biota sampling were conducted in August 2021. All monitoring activities were conducted in accordance with LTMMMP requirements and no monitoring results exceeded LTMMMP trigger levels. All monitoring results were consistent with historical MWL monitoring data.

Inspections of the MWL final cover system, storm-water diversion structures, compliance monitoring systems, and security fence were performed in accordance with LTMMMP requirements. Required maintenance and repairs were minor and completed during or shortly after the inspections.

The Evapotranspirative Cover continues to meet successful revegetation criteria and is in good condition with even coverage of mature, native perennial grasses. Minor maintenance was performed during the reporting period as best practice to promote the health of the desired native grass species by reducing competition with weedy species for limited moisture and nutrients.

Regulatory activities during the reporting period included submittal of the eighth MWL Annual Long-Term Monitoring & Maintenance Report, April 2020 - March 2021 and the first modification request for the LTMMP to the New Mexico Environment Department. The eighth annual report was approved in July 2021 and the LTMMP modification request was approved and became effective in February 2022.

All LTMMP requirements have been met for the April 1, 2021 through March 31, 2022 reporting period. Based upon monitoring, inspection, and maintenance results, the Evapotranspirative Cover and monitoring systems are functioning as designed and site conditions remain protective of human health and the environment.



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## ACRONYMS AND ABBREVIATIONS

ABCWUA	Albuquerque Bernalillo County Water Utility Authority
AOP	Administrative Operating Procedure
AR/COC	Analysis Request/Chain-of-Custody
CFR	Code of Federal Regulations
CY	calendar year
DOE	U.S. Department of Energy
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
ET	evapotranspirative
eV	electron volts
FLUTE™	Flexible Liner Underground Technology, Ltd.™
FOP	Field Operating Procedure
ft bgs	feet below ground surface
GEL	GEL Laboratories LLC.
gpm	gallons per minute
HWB	Hazardous Waste Bureau
KAFB	Kirtland Air Force Base
LTMM	Long-Term Monitoring & Maintenance
LTMMP	Long-Term Monitoring and Maintenance Plan
MDA	minimum detectable activity
MDL	method detection limit
mg/L	milligrams per liter
MWL	Mixed Waste Landfill
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
PCE	tetrachloroethene
pCi/L	picocuries per liter
Permit	RCRA Facility Operating Permit for Sandia National Laboratories, EPA ID No. NM5890110518
PID	photoionization detector
PPE	personal protective equipment
ppmv	parts per million by volume
PQL	practical quantitation limit
QC	quality control
RCRA	Resource Conservation and Recovery Act
RL	reporting limit
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SME	subject matter expert
SNL/NM	Sandia National Laboratories, New Mexico
TCE	trichloroethene
VOC	volatile organic compound

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## 1.0 INTRODUCTION

Sandia National Laboratories, New Mexico (SNL/NM) is a multimission laboratory owned by the U.S. Department of Energy (DOE)/National Nuclear Security Administration. SNL/NM is managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc. Primary SNL/NM operations are located within the boundaries of Kirtland Air Force Base (KAFB), southeast of the City of Albuquerque in Bernalillo County, New Mexico (Figure 1-1). The Mixed Waste Landfill (MWL) is located 4 miles south of SNL/NM central facilities and 5 miles southeast of the Albuquerque International Sunport, in the north-central portion of Technical Area-III (Figure 1-2).

The MWL disposal area comprises 2.6 acres. From March 1959 to December 1988, the MWL accepted low-level radioactive waste, hazardous waste, and mixed waste from SNL/NM research facilities and off-site DOE and U.S. Department of Defense generators. More specific information regarding the MWL inventory and past disposal practices is presented in the MWL Phase 2 Resource Conservation and Recovery Act (RCRA) Facility Investigation Report (Peace et al. September 2002) and the extensive MWL Administrative Record.

All monitoring, inspection, and maintenance/repair requirements are defined in the MWL Long-Term Monitoring and Maintenance Plan (LTMMMP) (SNL/NM March 2012) and have been met for the April 1, 2021 through March 31, 2022 reporting period. This ninth MWL Annual Long-Term Monitoring & Maintenance (LTMM) Report documents all activities and results as required by Section 4.8.1 of the LTMMMP. Based upon monitoring, inspection, and maintenance results, the MWL Evapotranspirative (ET) Cover and all monitoring systems are functioning as designed, and site conditions remain protective of human health and the environment. No monitoring trigger levels were exceeded. Industrial land use is being maintained for the MWL consistent with LTMMMP requirements.

The MWL is a solid waste management unit that underwent corrective action in accordance with the following regulatory criteria:

- New Mexico Environment Department (NMED) Hazardous Waste Bureau (HWB) *Final Order No. HWB 04-11(M), State of New Mexico Before the Secretary of the Environment in the Matter of Request for a Class 3 Permit Modification for Corrective Measures for the Mixed Waste Landfill, Sandia National Laboratories, Bernalillo County, New Mexico, EPA ID# 5890110518* (NMED May 2005)
- Compliance Order on Consent (NMED April 2004)
- SNL/NM RCRA Permit
  - Module IV of RCRA Permit No. NM5890110518 (EPA August 1993)
  - Facility Operating Permit U.S. Environmental Protection Agency (EPA) Identification No. NM5890110518 (Permit) (NMED January 2015)
- New Mexico Administrative Code (NMAC), Title 20, Chapter 4, Part 1, Section 500 (20.4.1.500 NMAC) incorporating Title 40 of the Code of Federal Regulations (CFR), Part 264.101 (40 CFR 264.101)

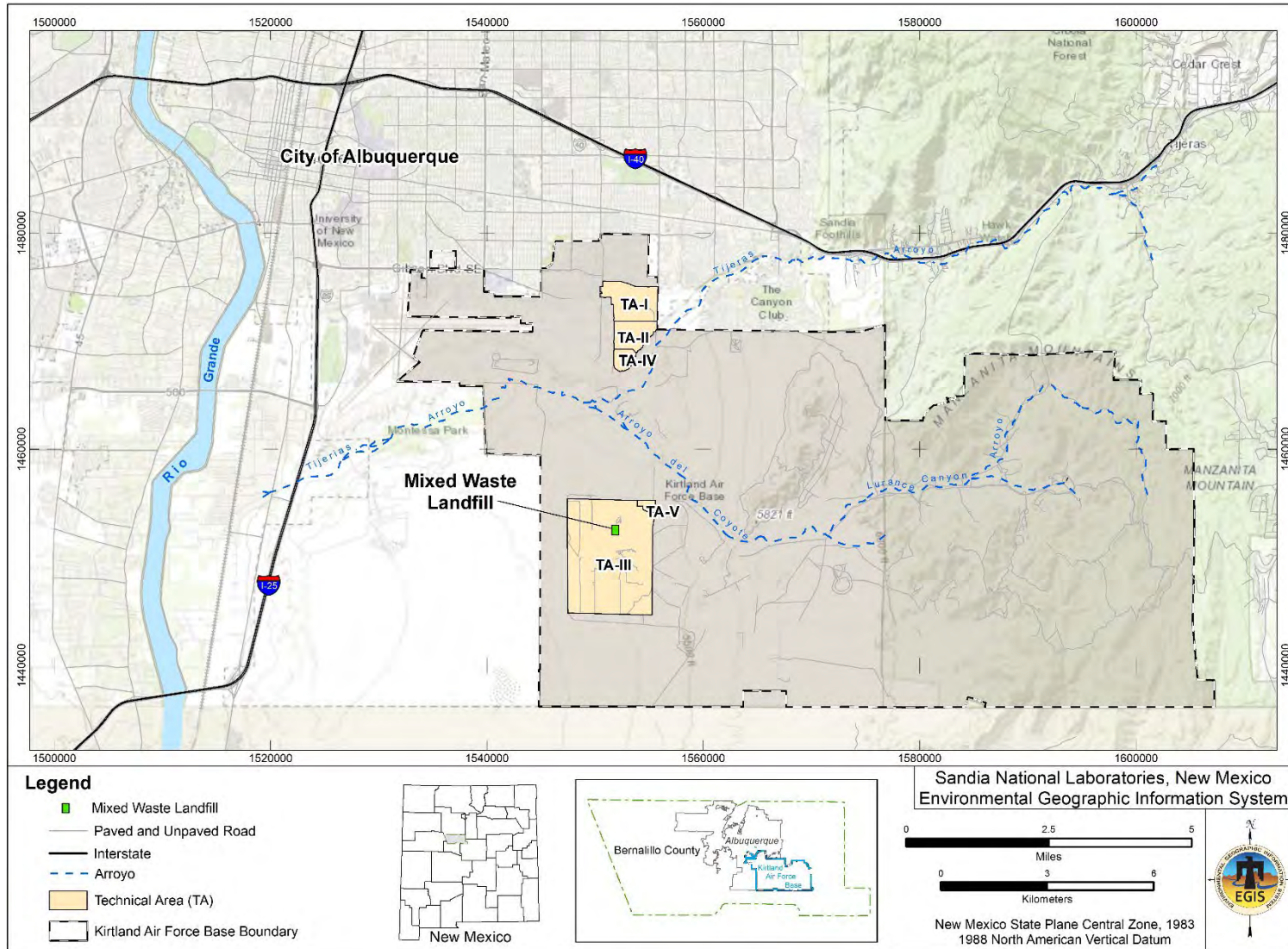


Figure 1-1  
Location of the Mixed Waste Landfill with Respect to Kirtland Air Force Base and the City of Albuquerque

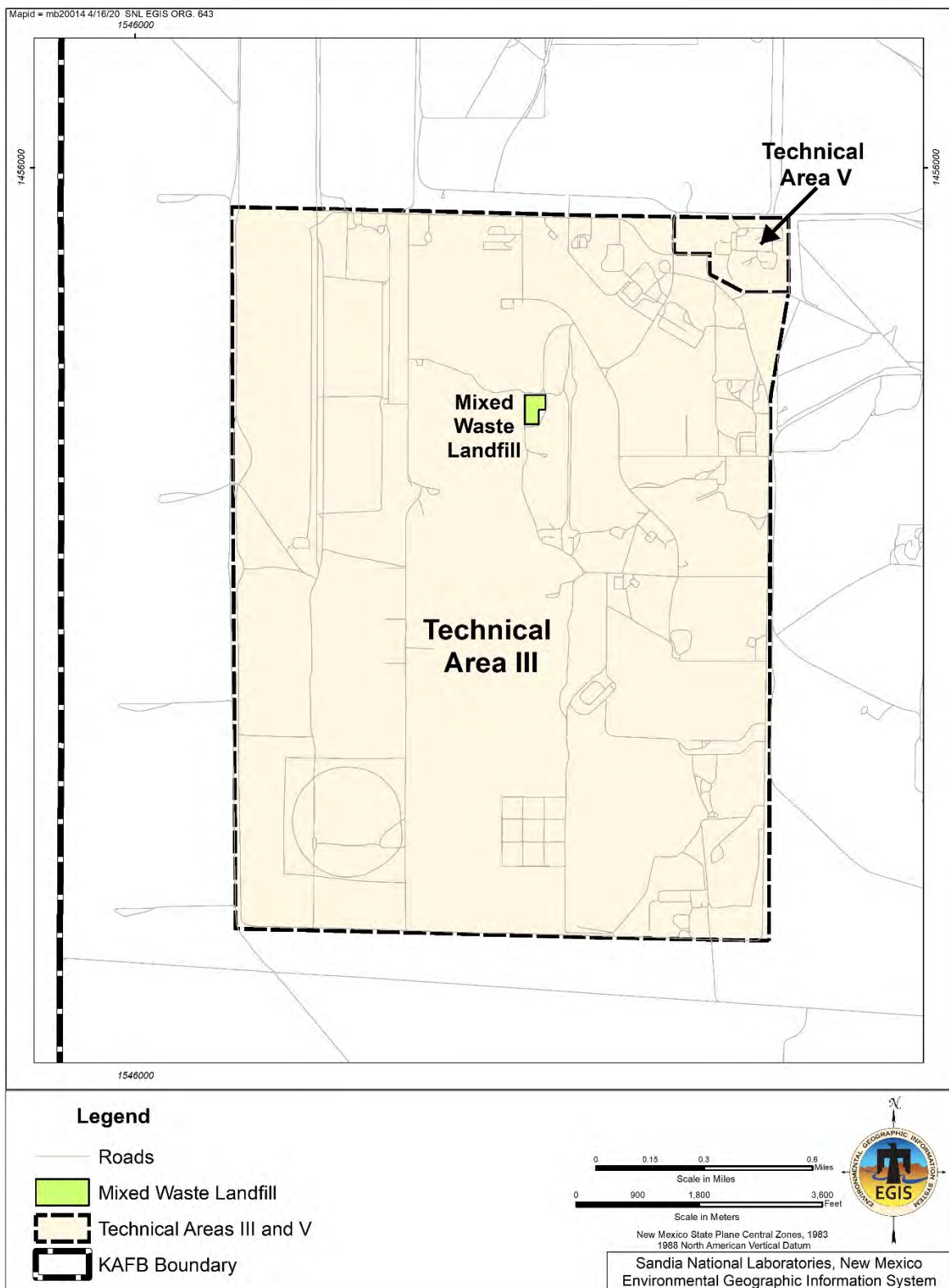


Figure 1-2  
Location of the Mixed Waste Landfill within Technical Area III

On February 12, 2016, the NMED issued the *Final Order No. HWB 15-18 (P), State of New Mexico Before the Secretary of the Environment in the Matter of Proposed Permit Modification for Sandia National Laboratories, EPA ID #5890110518, To Determine Corrective Action Complete with Controls at the Mixed Waste Landfill* (NMED February 2016). As of March 13, 2016, the February 2016 Final Order became effective, granting the Class 3 Permit Modification to reflect that the MWL is Corrective Action Complete with Controls. All controls required for the MWL are defined in the LTMMMP that was approved by the NMED on January 8, 2014 (Blaine January 2014) and is included by reference in Attachment M of the Permit (Kielling February 2016). Long-term monitoring and maintenance are conducted in accordance with the Permit (NMED January 2015, with all approved modifications).

## 1.1 Purpose and Scope

The purpose and scope of this Annual LTMM Report is to document monitoring, inspection, maintenance, and repair activities conducted during the April 1, 2021 through March 31, 2022 annual reporting period as required by Section 4.8.1 of the LTMMMP.

## 1.2 Report Organization

This report is organized as follows:

- Chapter 1 presents background information, purpose and scope, and report organization.
- Chapter 2 presents LTMMMP monitoring and inspection requirements.
- Chapter 3 presents radon monitoring activities and results.
- Chapter 4 presents tritium surface soil monitoring activities and results.
- Chapter 5 presents vadose zone soil-vapor monitoring activities and results.
- Chapter 6 presents vadose zone soil-moisture monitoring activities and results.
- Chapter 7 presents groundwater monitoring activities and results.
- Chapter 8 presents biota monitoring activities and results.
- Chapter 9 presents inspection, maintenance, and repair activities and results.
- Chapter 10 summarizes regulatory activities.
- Chapter 11 presents a general summary and conclusions for the reporting period.
- Chapter 12 lists the references cited in this report.

Annexes to this report provide supporting information as follows:

- Annex A – Radon Monitoring Forms and Reports
- Annex B – Surface Soil Tritium and Biota Monitoring Forms and Reports
- Annex C – Soil-Vapor Monitoring Forms and Reports
- Annex D – Soil-Moisture Monitoring Forms
- Annex E – Groundwater Monitoring Forms and Reports
- Annex F – Inspection Forms
- Annex G – Biology Report

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## **2.0 MONITORING AND INSPECTION REQUIREMENTS**

Monitoring, inspection, maintenance, and repair requirements are defined in Chapters 3 and 4 of the MWL LTMMP (SNL/NM March 2012) and are briefly summarized in this chapter. Monitoring requirements are described in Section 2.1 and resulting empirical data are evaluated to assess site conditions. Inspection requirements are described in Section 2.2 and include requirements to perform maintenance and/or repairs. These activities ensure the physical controls at the MWL are maintained, perform as designed, and provide the information needed to assess ET Cover performance and site conditions.

### **2.1 Monitoring Requirements**

The primary objective of MWL monitoring activities is to ensure that the ET Cover and site conditions are protective of human health and the environment. Monitoring activities include sampling and analysis of air, surface soil, vadose zone, groundwater, and biota. The multi-media monitoring program is summarized in Table 2-1, which presents information for each monitoring activity including the sampling media, monitoring parameters, frequency, number of samples, locations, and monitoring methods. Radon monitoring is performed over two six-month periods instead of one twelve-month period due to time exposure limitations of the detectors. Based upon experience, vadose zone soil-vapor monitoring is performed at a semiannual instead of annual frequency as a best practice to help keep the sample port and tubing clear.

The data quality objective (DQO) of all monitoring activities is to produce representative, accurate, defensible, and comparable analytical results to support the monitoring objective. The DQO is accomplished through implementation of standard operating procedures and analytical procedures/methods, including quality assurance measures, quality control (QC) samples, and data evaluation protocols. Monitoring results are compared to trigger levels defined in LTMMP Section 5.2 and historical MWL monitoring results.

Sampling and Analysis Plans (SAPs) for each monitoring activity are included in the LTMMP, Appendices C through G. Results for monitoring activities conducted at the MWL during the April 1, 2021 through March 31, 2022 reporting period are presented in Chapters 3 through 8.

### **2.2 Inspection, Maintenance, and Repair Requirements**

The primary objective of MWL inspection, maintenance, and repair activities is to ensure that the ET Cover, other physical controls at the site (e.g., surface-water diversion features and perimeter security fence), and the monitoring systems (groundwater and vadose zone networks) perform as designed.

Inspection parameters, specifications, frequency, and repair requirements are detailed in Chapter 4 of the LTMMP and summarized in Table 2-2. Repair work is initiated, as needed, based upon the results of the inspections and tracked to completion on the respective inspection forms. Long-term monitoring inspection checklists/forms are contained in the LTMMP, Appendix I. Results of inspection activities conducted at the MWL during the subject

Table 2-1  
Mixed Waste Landfill Monitoring Parameters, Frequencies, and Methods

Sampling Media	Monitoring Parameters <sup>a</sup> / Constituents of Concern	Monitoring Frequency <sup>a</sup>	Number of Samples Per Event	Monitoring Locations	Monitoring Method <sup>b</sup>	Comments
Air	Radon-222	Year 1 – Quarterly Year 2 – Quarterly Year 3 – Semiannual Year 4 – Semiannual Year 5 and subsequent years – Annual	17	10 detectors placed at corners and midpoints of perimeter fence 5 detectors placed on completed cover 2 detectors at background locations	Radon detectors (at breathing zone height) capable of long exposure periods; sampling and analysis per LTMMMP Appendix C	Samples are time-weighted average and will be collected over a 3-month to 1-year period. The first quarterly monitoring period begins in January of each year.
Surface Soil	Tritium	Annual	4	One sample collected from each corner of the ET Cover	Grab samples of soil collected; moisture extracted and analyzed for tritium using liquid scintillation per LTMMMP Appendix G	Samples collected from the MWL ground surface at the four corners of the ET Cover.
Vadose Zone	VOCs in soil vapor	Year 1 – Semiannual Year 2 – Semiannual Year 3 – Semiannual Year 4 and subsequent years – Annual	17	Samples collected from 2 single-port soil-vapor monitoring points installed through the ET Cover (MWL-SV01 and MWL-SV02) and 3 perimeter multi-port FLUTe™ wells (MWL-SV03, MWL-SV04, and MWL-SV05)	Sampling and analysis of soil vapor per LTMMMP Appendix D	MWL-SV01 and MWL-SV02 have a sampling port approximately 35 ft below the original ground surface. MWL-SV03, MWL-SV04, and MWL-SV05 have sampling ports at depths of approximately 50, 100, 200, 300, and 400 ft bgs.
Vadose Zone	Moisture content beneath the ET Cover	Year 1 – Semiannual Year 2 – Semiannual Year 3 and subsequent years – Annual	171	3 soil-moisture monitoring access tubes Measurements obtained at 1-ft increments from 4 ft to 25 ft bgs, then 5-ft increments to total depth of the access tube (200 linear ft)	Soil-moisture monitoring per LTMMMP Appendix E	Moisture content in vadose zone beneath the cover is measured using a neutron probe to evaluate moisture infiltration through the ET Cover.

Refer to footnotes at end of table.

Table 2-1 (Concluded)  
Mixed Waste Landfill Monitoring Parameters, Frequencies, and Methods

Sampling Media	Monitoring Parameters <sup>a</sup> / Constituents of Concern	Monitoring Frequency <sup>a</sup>	Number of Samples Per Event	Monitoring Locations	Monitoring Method <sup>b</sup>	Comments
Groundwater	VOCs, metals <sup>c</sup> , tritium, radon, gamma-emitting radionuclides <sup>d</sup> , and gross alpha/beta activity	Semiannual	4	MWL compliance groundwater monitoring well network: MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9	Sampling and analysis of groundwater samples per LTMMMP Appendix F	Monitoring wells MWL-MW4, MWL-MW5, and MWL-MW6 retained for monitoring groundwater elevation only.
Biota – Surface Soil	Metals <sup>e</sup> and gamma-emitting radionuclides <sup>f</sup>	Annual	Up to 4 (2 each, if they exist)	Variable - ant hills and animal burrows on the ET Cover located during ET Cover inspections, if present	Grab sampling and analysis of surface soil at animal burrow and/or ant hill features per LTMMMP Appendix G	If no features are identified, no samples will be collected.
Biota – Cover Vegetation	Gamma-emitting radionuclides <sup>f</sup> in vegetation	Annual	Up to 2 if they exist	Variable - potentially deep-rooted vegetation overlying former disposal areas located during ET Cover inspections, if present	Grab sampling and analysis of vegetation, including the plant and root system per LTMMMP Appendix G	If no potentially deep-rooted plants are present, no samples will be collected.

Notes:

<sup>a</sup>Monitoring parameters and frequency will be reevaluated every five years in the Five-Year Report. Frequency may be more conservative than required (e.g., Year 5 and subsequent years for radon air monitoring can be quarterly or semiannual versus annual).

<sup>b</sup>Sampling and Analysis Plans and sampling requirements are provided in appendices of the MWL LTMMMP (SNL/NM March 2012).

<sup>c</sup>Required metals analyses include cadmium, chromium, nickel, and uranium (SNL/NM March 2012).

<sup>d</sup>Radionuclide results reported for groundwater include americium-241, cesium-137, and cobalt-60.

<sup>e</sup>Required metals analyses include RCRA metals plus copper, nickel, vanadium, zinc, cobalt, and beryllium (SNL/NM March 2012).

<sup>f</sup>Radionuclide results reported for biota include cesium-137, cobalt-60, radium-226, thorium-232, uranium-235, and uranium-238.

bgs = Below ground surface.

ET = Evapotranspirative.

FLUTE™ = Flexible Liner Underground Technologies, Ltd.™

ft = Foot (feet).

LTMMMP

= Long-Term Monitoring and Maintenance Plan.

MWL

= Mixed Waste Landfill.

RCRA

= Resource Conservation and Recovery Act.

VOC

= Volatile organic compound.

Table 2-2  
Mixed Waste Landfill Inspection, Maintenance, and Repair Requirements

MWL System to be Inspected	Inspection Frequency/ Performed by	Inspection Parameters	Maintenance Implementation	Maintenance/ Repair Frequency <sup>a</sup>
ET Cover Surface  Biology Inspection  (Cover vegetation and signs of animal activity)	Quarterly until vegetation is established, annually thereafter by a staff biologist <sup>b</sup>	Vegetation Inventory	Soil augmentations and/or reseeding	Within 60 days of discovery of needed repairs. Reseeding repairs may be delayed to wait for the appropriate growing season.
		Contiguous areas of no vegetation >200 ft <sup>2</sup>	Revegetate barren areas that exceed prescribed limits	
		Animal intrusion burrows in excess of 4 inches in diameter	Repair cover system damage that exceeds prescribed limits	
ET Cover System (Surface)	Quarterly by a field technician	Settlement of cover surface in excess of 6 inches	Repair cover system damage that exceeds prescribed limits	Within 60 days of discovery of needed repairs. Reseeding repairs may be delayed to wait for the appropriate growing season.
		Erosion of cover soil in excess of 6 inches deep		
		Ponding of water on the ET Cover surface in excess of 100 ft <sup>2</sup>		
		Animal intrusion burrows in excess of 4 inches in diameter		
		Contiguous areas of no vegetation >200 ft <sup>2</sup> <sup>c</sup>	Revegetate barren areas that exceed prescribed limits <sup>c</sup>	Within 60 days of discovery of needed repairs.
ET Cover Surface-Water (Storm water) Drainage Features	Quarterly by a field technician	Channel or sidewall erosion in excess of 6 inches deep	Repair erosion that exceeds prescribed limits	Within 60 days of discovery of needed repairs.
		Accumulations of sediment in excess of 6 inches deep or debris that blocks more than 1/3 of the channel width	Remove sediment and debris accumulations that exceed prescribed limits	
Soil-Vapor Monitoring Wells, Soil-Moisture Monitoring Access Tubes, and Groundwater Monitoring Wells	Groundwater and Vadose Zone Network Components: Field technician to inspect at same frequency/time that monitoring occurs	Concrete pads, stanchions, and protective casings	Maintain, clean, repair, replace, re-label, as appropriate	Within 60 days of discovery of needed repairs.
		Well cover caps and Swagelok <sup>®</sup> (or equivalent) dust caps		
		Monitoring wells and soil-vapor sampling port labels		
		Locks		
		Sampling pumps and tubing		
		Neutron probe and cable system		

Refer to footnotes at end of table.

Table 2-2 (Concluded)  
Mixed Waste Landfill Inspection, Maintenance, and Repair Requirements

MWL System to be Inspected	Inspection Frequency/ Performed by	Inspection Parameters	Maintenance Implementation	Maintenance/ Repair Frequency <sup>a</sup>
ET Cover Physical Controls	Quarterly by a field technician	Presence of windblown plants and debris	Remove windblown plants and debris	Within 60 days of discovery of needed repairs.
		Condition of fence wires, posts, gates, gate locks, warning signs, and survey monuments in the local area	Repair broken wire sections and posts, repair/oil gates, clean/replace locks, repair/replace warning signs, clear dirt/debris from monuments	

Notes:

<sup>a</sup>Maintenance/repairs will be performed as necessary, based upon the results of inspections.

<sup>b</sup>The transition from quarterly to annual inspections by a staff biologist is based upon meeting successful revegetation criteria as determined by the staff biologist (SNL/NM March 2012), which occurred as of the August 2014 growing season inspection.

<sup>c</sup>Barren areas exceeding >200 ft<sup>2</sup> will not require corrective action after ET Cover vegetation is determined to have met successful revegetation criteria if they are the result of relatively short-term climate stresses (e.g., severe short-term drought), and the staff biologist determines they will naturally fill in over time. However, these areas will be noted and tracked during inspections and reviewed annually by the staff biologist to determine whether action is required based upon comparison to surrounding vegetation.

> = Greater than.

ET = Evapotranspirative.

ft<sup>2</sup> = Square feet.

MWL = Mixed Waste Landfill.

reporting period are presented in Chapter 9. The following sections provide additional background information on the ET Cover, inspections, and associated maintenance/repairs.

### 2.2.1 ET Cover

The ET Cover consists of four main layers: Compacted Subgrade, Rock Biointrusion, Compacted Native Soil, and Topsoil Layers (Figure 2-1). A thin soil layer was placed on top of the Biointrusion Layer to fill void space and create an even surface upon which the Native Soil Layer was constructed. The Compacted Subgrade varies in thickness from 0 to 3.3 feet and the combined average thickness of the overlying ET Cover layers is 5.37 feet. The Topsoil Layer was seeded with native grasses to mitigate surface erosion and promote evapotranspiration. The native grass species were selected based upon biological assessments of Technical Area-III (Sullivan and Knight 1992; Peace et al. November 2004). As shown in Figure 2-1, the as-constructed thickness of the ET Cover layers exceeds as-designed thicknesses, resulting in a more protective ET Cover. A conceptual schematic profile of the ET Cover and how it works is provided in Figure 2-2.

The ET Cover surface slopes gently to the west (2 percent slope) and sheds surface-water runoff to the west and down the side slopes. An engineered drainage swale located immediately east, north, and south of the ET Cover diverts surface run-on from the east (upgradient) side of the ET Cover and run-off from the side slopes around the northern and southern ends of the ET Cover to the west (Figure 2-3). As documented in the June 2017 MWL Annual LTMM Report, from November 2016 through February 2017 the site access and perimeter road was improved. The surface of the road was raised, road ditches were installed on each side, and culverts were installed (SNL/NM June 2017, Figure 9-1). These improvements provide additional site drainage control, intercepting surface water and channeling it away from the ET Cover area.

### 2.2.2 ET Cover Biology Inspection

ET Cover vegetation monitoring was accomplished in two phases. The first phase of quarterly inspections by the staff biologist focused on establishing native vegetation on the ET Cover such that successful revegetation criteria were met as defined in Section 4.1 of the LTMMP. The August 2014 Biology Inspection was the last quarterly inspection conducted as part of the first phase. After completion of the first phase, the second phase of annual inspections began that are performed near the end of the growing season (August–September) to determine the coverage of living plants. The staff biologist documents the flora coverage and signs of animal and insect activity during these annual inspections.

Damage to cover vegetation that exceeds the criteria listed in Section 4.2.2 of the LTMMP is noted on the Biology Inspection Checklist/Form and appropriate maintenance/repairs must be completed within 60 days of the inspection. Reseeding repairs may be delayed until the appropriate time during the growing season (Table 2-2).

At the end of each reporting year, the staff biologist summarizes the results of the annual inspection, presents local climate trends, and makes recommendations in a summary Biology

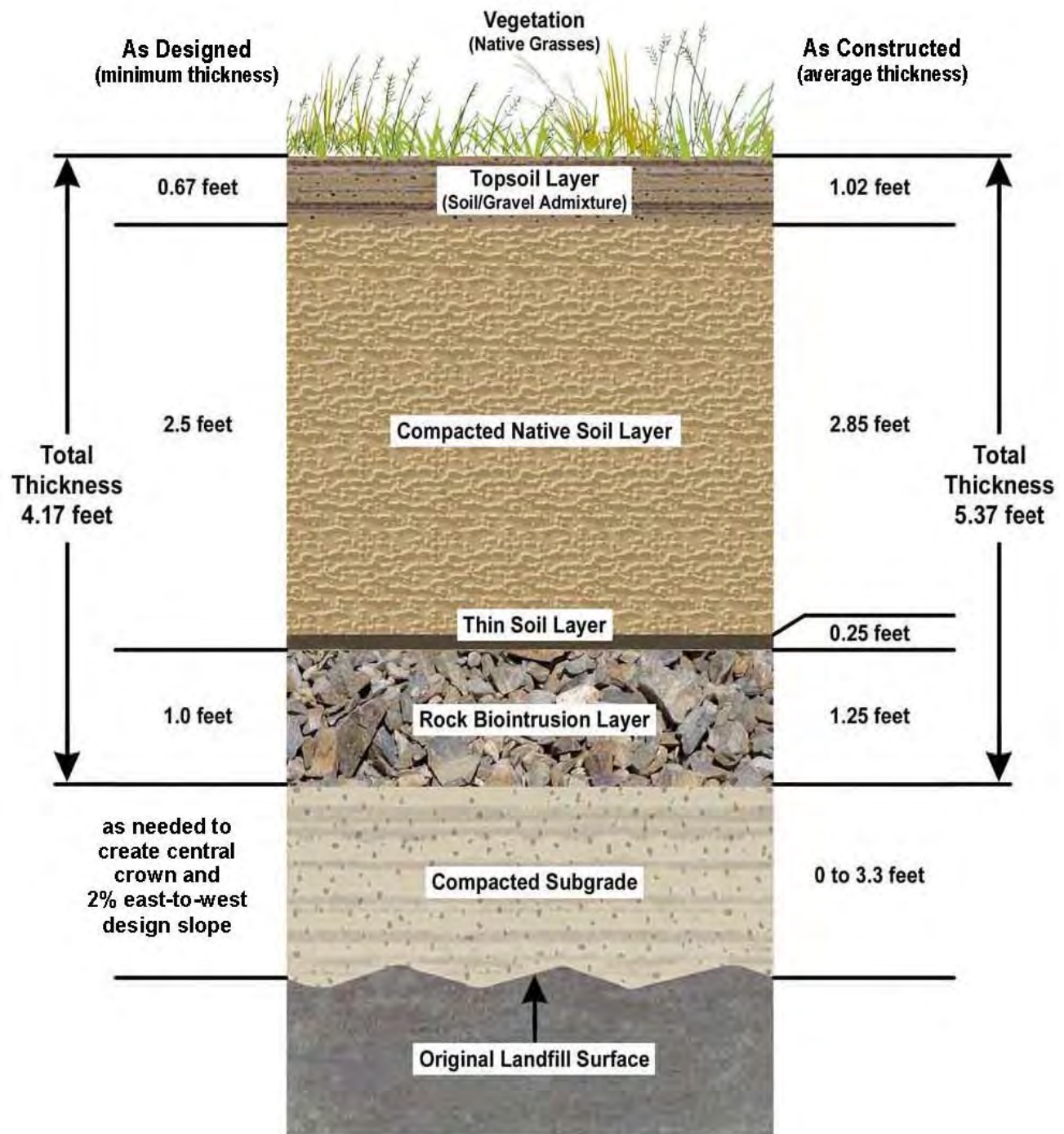


Figure 2-1  
Schematic Profile of the Mixed Waste Landfill Evapotranspirative Cover Layers



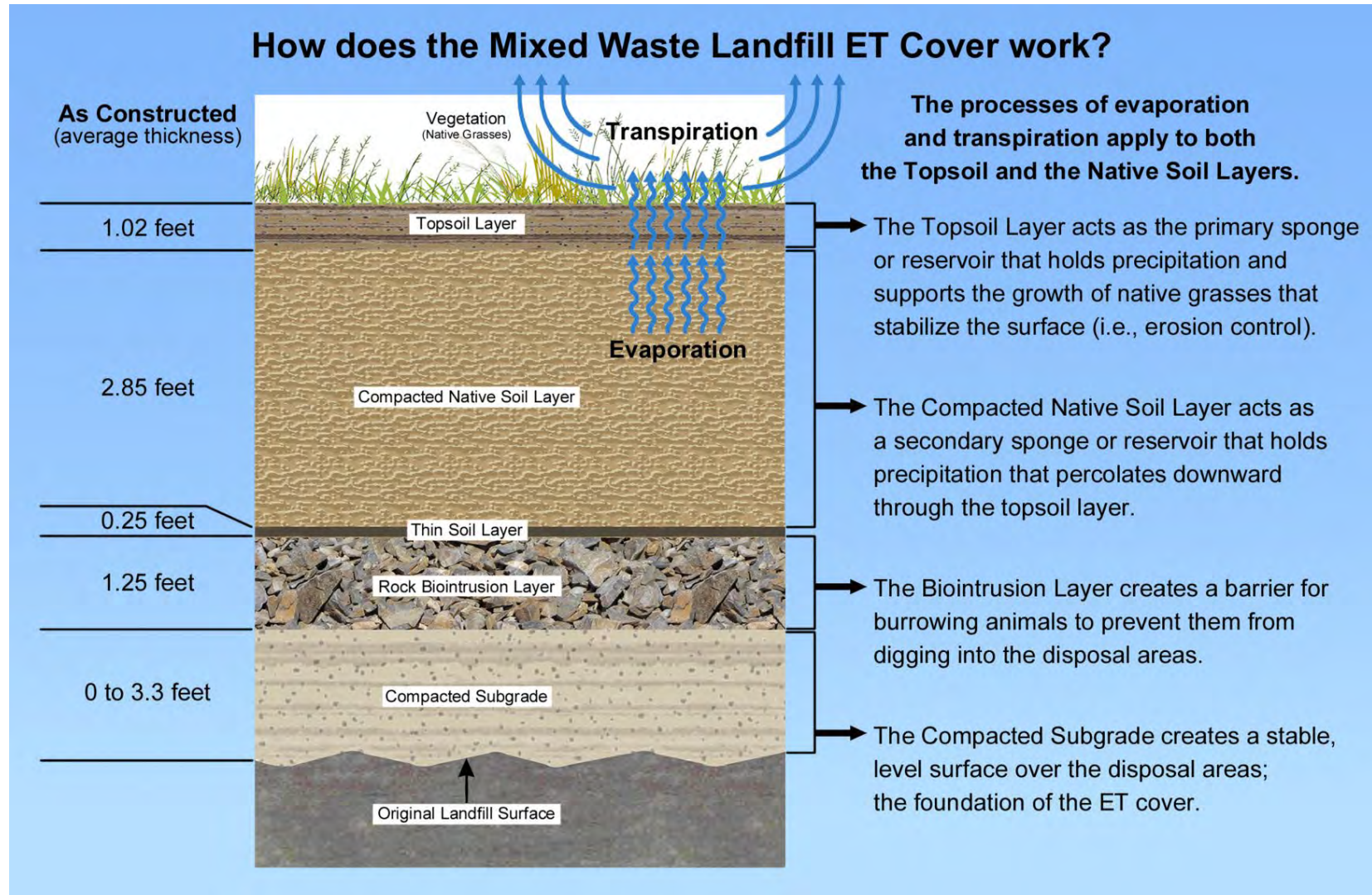


Figure 2-2  
Schematic Profile of the Mixed Waste Landfill Evapotranspirative Cover and How it Works



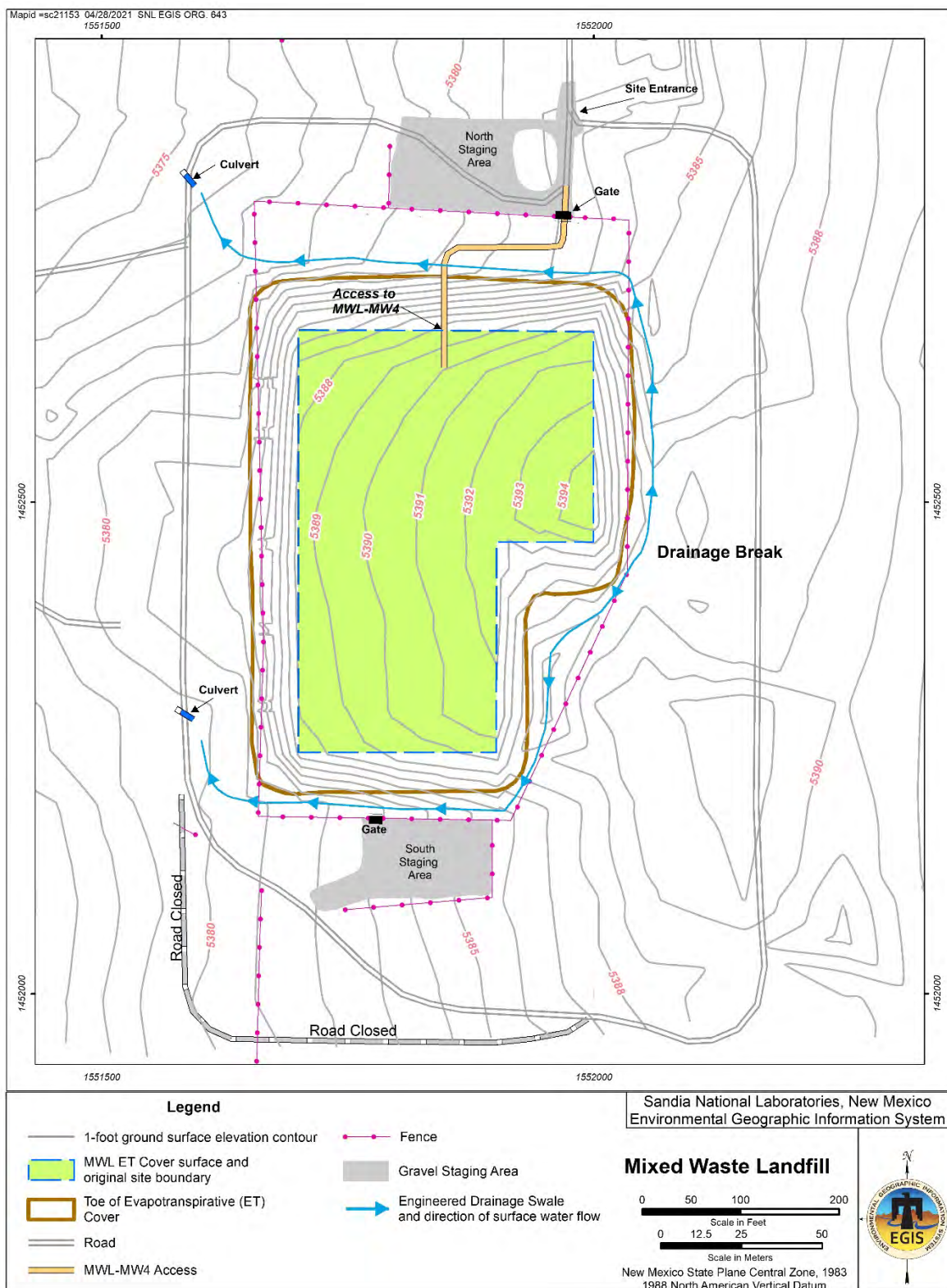


Figure 2-3  
Mixed Waste Landfill Engineered Storm-Water Drainage Swale

Report included in the Annual LTMM Report (Annex G). The annual Biology Inspection Checklist/Form is also included in the Annual LTMM Report (Annex F).

### 2.2.3 ET Cover Surface and Physical Controls Inspection

The ET Cover surface, side slopes, and physical controls (i.e., storm-water drainage swale, security fence, locks, gates, signs, and survey monuments) are inspected by a field technician on a quarterly basis. Inspection parameters, specifications, frequency, and required maintenance/repair activities for the ET Cover are summarized in Table 2-2. Documentation of animal burrows in excess of 4 inches in diameter and contiguous areas lacking vegetation in excess of 200 square feet are noted on both the quarterly Cover Inspection and annual Biology Inspection Checklists/Forms. If inspection item specifications are exceeded, they will be noted on the Cover Inspection Checklist/Form and appropriate maintenance/repairs will be completed within 60 days of the inspection. Reseeding repairs may be delayed until the appropriate time during the growing season (Table 2-2).

### 2.2.4 Monitoring Networks and Sampling Equipment

Groundwater monitoring wells, soil-vapor monitoring wells, soil-moisture monitoring access tubes, and associated sampling/monitoring equipment are inspected during each monitoring event (i.e., they are inspected at the same frequency as the required monitoring). All inspection parameters, specifications, and required maintenance/repair activities are detailed in Table 2-2. The inspections and any associated maintenance and repair activities are documented on monitoring network-specific inspection checklists/forms. There is a separate inspection checklist/form for each of the three monitoring networks and associated sampling/monitoring equipment.

If conditions are observed that require maintenance, repair, or replacement they will be noted on the associated Monitoring Network Inspection Checklist/Form and appropriate actions will be completed within 60 days (Table 2-2).

### **3.0 RADON MONITORING RESULTS**

This chapter presents radon monitoring activities (i.e., sampling and analysis), analytical results, and data evaluation in accordance with MWL LTMMMP Section 3.2.1 and Appendix C (SNL/NM March 2012). The monitoring objective is to collect data to evaluate radon gas flux (i.e., movement of radon-222) to the atmosphere at the MWL. This monitoring provides an early warning detection system for changing conditions so that timely action can be taken, if necessary. The trigger level defined in LTMMMP Section 5.2.1 applies only to results from the monitoring stations located along the perimeter security fence (locations RN1 through RN10).

Radon monitoring field activities are described in Section 3.1, analytical laboratory results and a discussion of data quality are presented in Section 3.2, and data evaluation requirements and a comparison of results to the trigger level are presented in Section 3.3. A summary of radon monitoring activities and results is provided in Section 11.1.

#### **3.1 Radon Sampling Field Activities**

Monitoring was conducted covering calendar year (CY) 2021, fulfilling the LTMMMP minimum requirement of annual monitoring. Radon monitoring presented for this April 1, 2021 through March 31, 2022 reporting period covers the period January 18, 2021 through January 17, 2022.

The radon air measurements were obtained using alpha-track radon gas detectors manufactured by Radonova (formerly Landauer® Nordic). Radtrak2® detectors were used for two six-month monitoring events during CY 2021. Radon sampling locations are designated as RN1 through RN17 and are shown in Figure 3-1. Locations RN1 through RN10 are located on the perimeter security fence and are the compliance locations to which the trigger level applies. Locations RN11 through RN15 are located on the ET Cover surface directly above pits and trenches with known sealed radium-226 sources. Radon is generated by the decay of radium-226, so results from these locations provide an early warning if sealed sources degrade. Locations RN16 and RN17 are background locations established away from the MWL, but in the general vicinity. Table 3-1 presents the dates of deployment and collection, location number, time-weighted average radon air concentrations in picocuries per liter (pCi/L) for each six-month period, and the CY 2021 range of radon air concentrations.

Radon monitoring results were reviewed and evaluated by an SNL/NM Health Physics subject matter expert (SME) and documented in a data evaluation memorandum. The SME data evaluation memoranda, which include the Analysis Request/Chain-of-Custody form (AR/COCs), the laboratory report, and a map showing all monitoring locations, are provided in Annex A. The results of CY 2021 radon monitoring are summarized in Section 3.2.1.

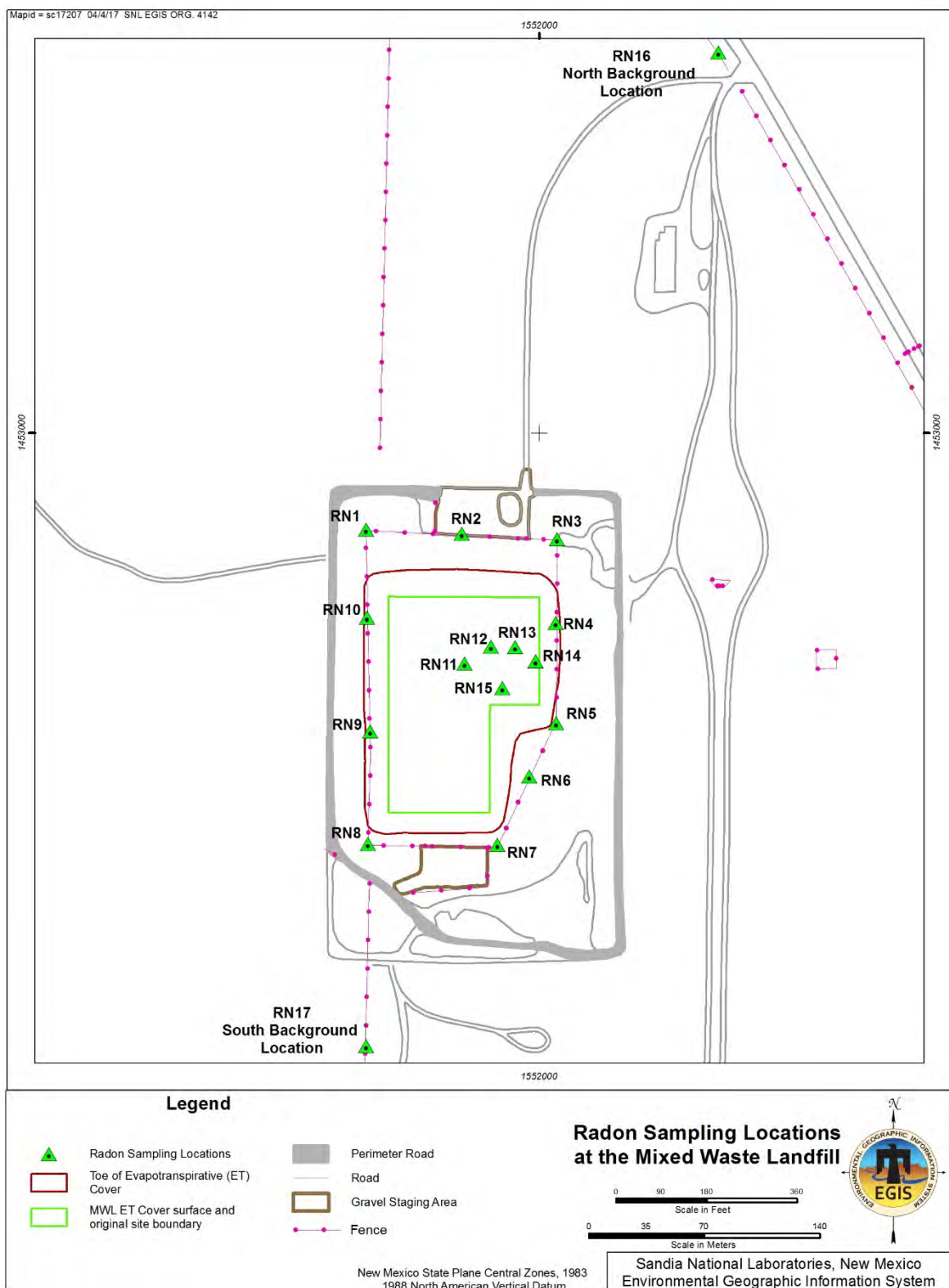


Figure 3-1  
Mixed Waste Landfill Radon Detector Locations

Table 3-1  
Summary of Radon Results  
Mixed Waste Landfill Air Monitoring  
Calendar Year 2021

Sample Location <sup>a</sup>	1 <sup>st</sup> Half CY 2021		2 <sup>nd</sup> Half CY 2021		CY 2021 Radon Air Concentration Range (pCi/L)	Trigger Level (pCi/L)
	Detector Deployment Date	Detector Collection Date	Detector Deployment Date	Detector Collection Date		
	1/18/2021	7/19/2021	7/19/2021	1/17/2022		
	Semiannual Time-Weighted Average Radon Air Concentration (pCi/L)					
RN1	0.3 ± 0.2		<0.3 <sup>b</sup>		<0.3 to 0.3	4
RN2	0.4 ± 0.2		0.4 ± 0.2		0.4	4
RN3	0.3 ± 0.2		0.3 ± 0.2		0.3	4
RN4	0.2 ± 0.2		<0.3 <sup>b</sup>		0.2 to <0.3	4
RN5	0.3 ± 0.2		0.4 ± 0.2		0.3 to 0.4	4
RN6	0.2 ± 0.2		0.3 ± 0.2		0.2 to 0.3	4
RN7	<0.2 <sup>b</sup>		0.4 ± 0.2		<0.2 to 0.4	4
RN8	0.5 ± 0.2		0.3 ± 0.2		0.3 to 0.5	4
RN9	<0.2 <sup>b</sup>		<0.2 <sup>b</sup>		<0.2	4
RN10	<0.3 <sup>b</sup>		0.2 ± 0.2		0.2 to <0.3	4
RN11	0.2 ± 0.2		0.3 ± 0.2		0.2 to 0.3	NA
RN12	0.3 ± 0.2		0.8 ± 0.2		0.3 to 0.8	NA
RN13	<0.2 <sup>b</sup>		<0.2 <sup>b</sup>		<0.2	NA
RN14	0.5 ± 0.2		<0.2 <sup>b</sup>		<0.2 to 0.5	NA
RN15	0.3 ± 0.2		0.3 ± 0.2		0.3	NA
RN16	0.2 ± 0.2		0.2 ± 0.2		0.2	NA
RN17	<0.2 <sup>b</sup>		<0.3 <sup>b</sup>		<0.2 to <0.3	NA
RNTB	0.3 ± 0.2		0.3 ± 0.2		0.3	NA

Notes:

<sup>a</sup>Bolded sample locations are the compliance locations where the trigger level applies.

<sup>b</sup>Not detected, result is less than the minimum detectable activity.

< = Less than.

CY = Calendar year.

NA = Not applicable.

pCi/L = Picocuries per liter.

RNTB = Trip blank.

### 3.1.1 Radon Monitoring Detector Deployment and Collection

The Radtrak2® radon detectors were deployed and collected on a semiannual schedule in CY 2021 at the 17 monitoring locations and represent the time periods January through June and July through December (Table 3-1). During the months between deployment and collection, inspections were conducted as a best practice to ensure the deployed detectors and associated protective housing were in good condition. All detectors were found in good condition during the monitoring period and at the times of collection. Minor maintenance to remove spider webs and maintain the protective housing at each monitoring location was performed at the time of the inspections. Deployment/collection and monthly inspection forms are included in Annex A.

### 3.1.2 Field Quality Control

Field QC measures associated with each monitoring period include two types of samples, one field control sample (trip blank) and two field background samples. The trip blank sample is used to confirm detectors were not contaminated during storage and shipment to the analytical laboratory. Two field background samples (RN16 and RN17) were collected at areas outside of the MWL, but within Technical Area-III, to confirm natural radon activities in the vicinity of the MWL (Figure 3-1). The two field background sample results were compared to results from detectors located immediately above the disposal areas (RN11 through RN15) and around the perimeter (RN1 through RN10).

### 3.1.3 Waste Management

No waste is generated during radon monitoring field activities.

## 3.2 Laboratory Results

This section summarizes radon air monitoring results for CY 2021. The detectors were submitted to Radonova (formerly Landauer® Nordic) for analysis. Laboratory reports and contract verification reviews are filed in the SNL/NM Record Center and included in Annex A.

### 3.2.1 Environmental Sample Results

The compiled semiannual monitoring results are presented in Table 3-1. The CY 2021 range of results for all monitoring locations was less than 0.2 (i.e., not detected) to 0.8 pCi/L. The two background location results were 0.2 pCi/L (both results for RN16) and less than 0.2 to less than 0.3 pCi/L (at RN17 both results were non-detections). No sample locations exceeded the trigger level of 4 pCi/L and all results confirm low levels of radon consistent with natural background levels and historical results.

### 3.2.2 Field Quality Control Sample Results

A trip blank (designated as RNTB in Table 3-1) was submitted with the detectors collected at the end of each semiannual sampling period. For the January through June and July through December 2021 monitoring periods, the trip blank results were 0.3 pCi/L. These results indicate the other detectors may have been potentially exposed to very low activities of radon during shipping and/or at the laboratory.

The two field background sample results (RN16 and RN17) for each semiannual period were similar to the semiannual monitoring results for detectors RN1 through RN15 and confirm radon activities in air at the MWL are equivalent to background conditions.

### 3.2.3 Data Quality

There were no data quality issues associated with RN1 through RN17 results for the two semiannual monitoring periods. All data were determined to be acceptable and met the DQOs.

### 3.2.4 Variances

There were no variances from the LTMMMP radon monitoring requirements.

## 3.3 Data Evaluation and Monitoring Trigger Level

The trigger level for radon in air is 4 pCi/L (time-weighted average), which applies to detectors RN1 through RN10 located on the perimeter fence. The trigger level of 4 pCi/L is the same as the EPA-recommended action level for radon in households. There was no exceedance of the 4 pCi/L trigger level at any of the radon monitoring locations during CY 2021. The highest reported CY 2021 result was 0.8 pCi/L at location RN12 (July through December) on the ET Cover. These results confirm low levels of radon activity in air at the MWL consistent with natural background levels and historical results and indicate there were no releases of radon gas from the disposal areas.

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## **4.0 TRITIUM SURFACE SOIL MONITORING RESULTS**

This chapter presents tritium monitoring field activities and results (i.e., sampling and analysis), analytical results, and data evaluation in accordance with MWL LTMMP Section 3.3 and Appendix G (SNL/NM March 2012). The monitoring objective is to collect data to evaluate tritium flux (i.e., movement) to the atmosphere from soil moisture in surface soil at the MWL. This monitoring provides an early warning detection system for changing conditions so that timely action can be taken, if necessary. Results are compared to the trigger level defined in LTMMP Section 5.2.2.1.

Tritium surface soil monitoring field activities are described in Section 4.1 and analytical laboratory results and a discussion of data quality are presented in Section 4.2. Data evaluation and a comparison of results to the trigger level are presented in Section 4.3. A summary of tritium surface soil monitoring activities and results is provided in Section 11.1.

### **4.1 Tritium Surface Soil Monitoring Field Activities**

Surface soil samples were collected at the four ET Cover corner monitoring locations on August 16, 2021, fulfilling the annual monitoring requirement (Figure 4-1). Samples were collected during the New Mexico monsoon season to ensure adequate soil moisture for analysis. Monitoring results were reviewed and evaluated by an SNL/NM Health Physics SME. Annex B contains the data evaluation memorandum prepared by the Health Physics SME, contract verification and data validation reviews, and AR/COC forms. The August 2021 results are presented in the following sections.

#### **4.1.1 Field Quality Control**

A field QC sample (environmental duplicate soil sample) was collected as part of the August 16, 2021 tritium sampling event in accordance with the Tritium and Biota SAP (Appendix G, Table G-4.2-1 of the LTMMP), which requires that one environmental and environmental duplicate sample pair be collected for every twenty environmental samples or one per sample batch sent to the laboratory. The environmental-duplicate sample pair for the August 2021 sampling event was collected at the southeast corner of the ET Cover, tritium monitoring location MWL TS-2SE (Figure 4-1).

#### **4.1.2 Waste Management**

Waste generated during sampling activities included personal protective equipment (PPE) (i.e., gloves) and decontamination wipes and was managed in accordance with all applicable requirements. Process knowledge and sampling event analytical results were used to characterize the waste. Based upon this information the waste was managed as non-hazardous solid waste.

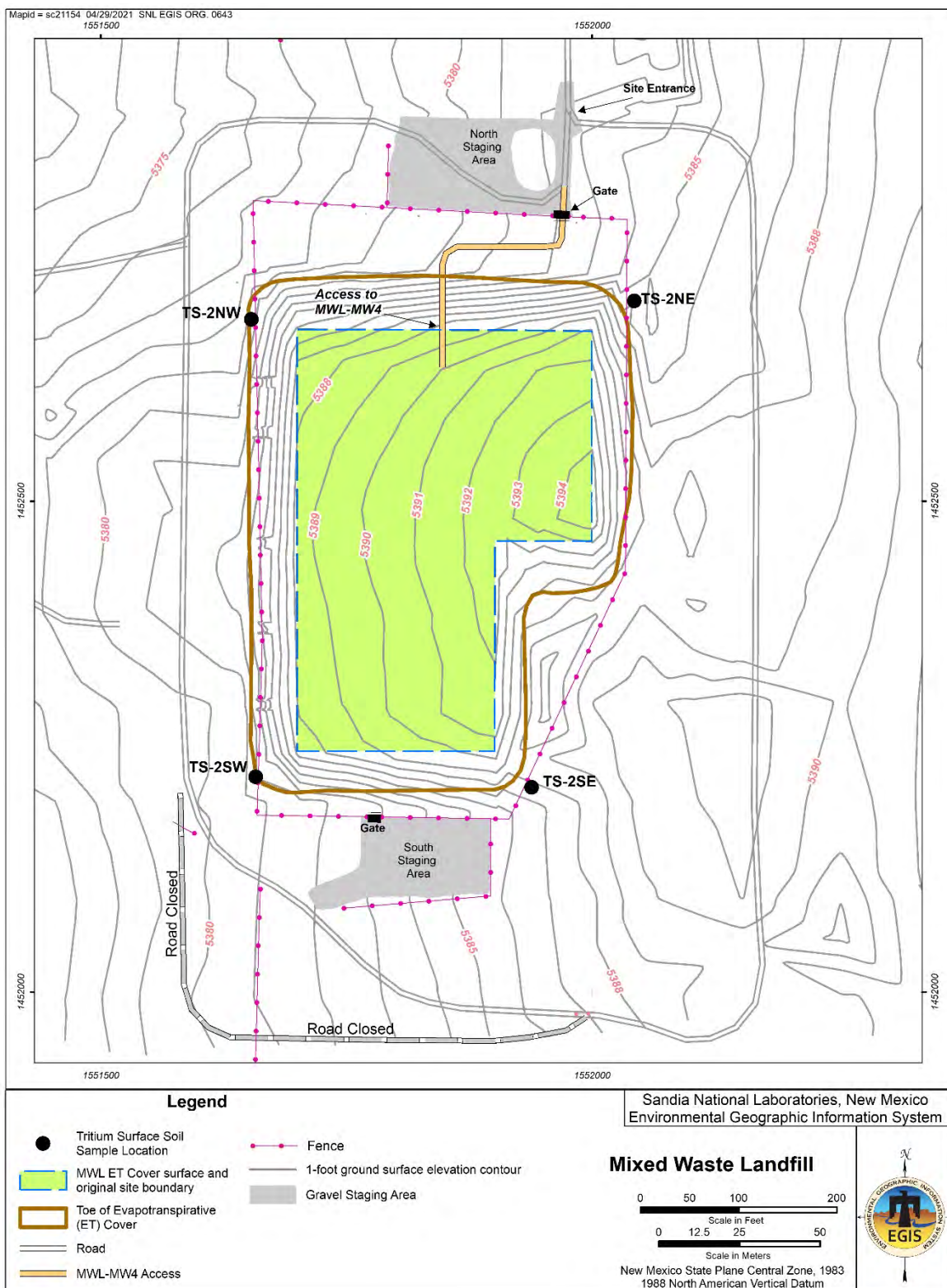


Figure 4-1  
Mixed Waste Landfill Tritium Surface Soil Sampling Locations

## 4.2 Laboratory Results

Soil samples and field QC samples were submitted to GEL Laboratories, LLC. (GEL) for analyses. Samples were analyzed by liquid scintillation in accordance with EPA Method 906.0. Tritium activity is measured in water extracted from the soil sample, so analytical results are sensitive to in-situ moisture content. Analytical results that are below the minimum detectable activity (MDA) are qualified with a “U” and are designated as below the detection level. Analytical laboratory reports, including certificates of analyses, analytical methods, sample results, dates of analyses, results of QC analyses, and data validation reports are filed in the SNL/NM Record Center.

### 4.2.1 Environmental Sample Results

Table 4-1 summarizes the tritium surface soil results for the August 2021 sampling event. Similar to previous years, tritium was not detected in any of the samples. Reported activities were all below the MDA. All samples had good soil-moisture content, ranging from 5.10 to 9.28 percent by mass, and the MDA ranged from 141 pCi/L to 182 pCi/L. The results are consistent with historical results and are below the trigger level of 20,000 pCi/L.

### 4.2.2 Field Quality Control Sample Results

The relative percent difference (RPD) between the environmental sample and corresponding environmental duplicate results is calculated if both samples have results greater than the MDA. Tritium was not detected above the MDA in the environmental-duplicate sample pair; therefore, an RPD value was not calculated.

### 4.2.3 Laboratory Quality Control and Data Quality

Internal laboratory QC samples were analyzed concurrently with all environmental samples in accordance with laboratory procedures and the EPA method. These included laboratory control samples, method blanks, matrix spike and matrix spike duplicate 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 radiochemical 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 2020).

Based upon data validation and review criteria, all tritium results were determined to be acceptable and met the DQOs. Laboratory QC sample results comply with analytical method and laboratory procedure requirements. Annex B includes data validation and contract verification reviews.

### 4.2.4 Variances

There were no variances from the LTMMMP tritium monitoring requirements.

Table 4-1  
Summary of Tritium Results (EPA Method 906.0<sup>a</sup>)  
Mixed Waste Landfill Surface Soil Monitoring  
August 2021

Sample Location	Result (pCi/L)	Percent Soil Moisture	MDA (pCi/L)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>	Trigger Level (pCi/L)
August 2021						
MWL TS-2NW	13.4	5.10	141	U	BD, FR3	20,000
MWL TS-2SW	7.57	6.34	177	U	BD, FR3	
MWL TS-2SE	50.6	7.87	144	U	BD, FR3	
MWL TS-2SE (Duplicate)	89.4	7.81	148	U	BD, FR3	
MWL TS-2NE	130	9.28	182	U	BD, FR3	

Notes:

<sup>a</sup>U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

<sup>b</sup>Laboratory/Validation Qualifier

Laboratory Qualifier

U = Analyte activity is below the detection limit.

Validation Qualifier

BD = Result that is not statistically different from zero.

FR3 = Result is less than the MDA or less than the 2-sigma total propagated uncertainty.

EPA = U.S. Environmental Protection Agency.

MDA = Minimum detectable activity.

MWL = Mixed Waste Landfill.

pCi/L = Picocuries per liter.

### 4.3 Data Evaluation and Monitoring Trigger Level

The trigger level for tritium as measured in soil moisture from surface soil samples is 20,000 pCi/L. No August 2021 sample results exceeded the trigger level.

Tritium is the primary contaminant of concern and the most mobile radionuclide at the MWL. Surface soil sampling for tritium has been conducted at the MWL since August 1985 at various locations at and around the perimeter of the MWL. The tritium sampling being performed under the LTMMMP is a continuation of this monitoring effort. The August 2021 results are consistent with historical data and reflect very low levels of tritium activity that are below the laboratory MDA. The results are consistent with the short half-life of tritium (12.30 years), indicate tritium is decaying over time, and that there are no new releases from the disposal areas.

## 5.0 SOIL-VAPOR MONITORING RESULTS

This chapter presents soil-vapor monitoring activities (i.e., sampling and analysis), analytical results, and data evaluation in accordance with MWL LTMMMP Section 3.4.1 and Appendix D (SNL/NM March 2012). The soil-vapor monitoring objective is to provide spatial and temporal concentration data for volatile organic compounds (VOCs) in the soil vapor at various depths throughout the approximately 500-foot-thick vadose zone (i.e., unsaturated soil and sediments above the Regional Aquifer) beneath the MWL. These monitoring data serve as an early warning detection system for the protection of groundwater so that timely action can be taken, if necessary. Results from the deepest sampling ports of the deepest soil-vapor wells are compared to trigger levels defined in LTMMMP Section 5.2.3.1.

Soil-vapor monitoring field activities are described in Section 5.1; analytical laboratory results, a comparison of results to monitoring trigger levels, and a discussion of data quality are presented in Section 5.2; and historical data evaluation is presented in Section 5.3. A summary of soil-vapor monitoring activities and results is provided in Section 11.1.

### 5.1 Soil-Vapor Monitoring Field Activities

MWL-SV01 and MWL-SV02 are single-sampling-port wells installed through the ET Cover; each has one sampling port at depths of 42.5 and 41.5 feet below ground surface (ft bgs), respectively. MWL-SV03, MWL-SV04, and MWL-SV05 are Flexible Liner Underground Technology, Ltd.<sup>TM</sup> (FLUTE<sup>TM</sup>) multi-sampling-port wells. Each has 5 sampling ports at depths of approximately 50, 100, 200, 300, and 400 ft bgs. The location of these five soil-vapor monitoring wells are shown in Figure 5-1.

Two soil-vapor monitoring events were conducted during the April 1, 2021 through March 31, 2022 reporting period exceeding the LTMMMP annual monitoring requirement. The semiannual frequency is being maintained based on experience; more frequent purging and sampling helps keep the sample ports and related tubing clear. Field forms and documentation that address well evacuation, purge volumes, and vacuum pressure readings for each sample container are provided in Annex C. The two soil-vapor monitoring events are described as follows.

- The first sampling event was conducted on May 6, 2021. Soil-vapor samples were collected from all monitoring well sampling ports. Duplicate samples were collected from two MWL-SV03 sampling ports (50 and 400 ft bgs).
- The second sampling event was conducted on November 5, 2021. Soil-vapor samples were collected from all monitoring well sampling ports. Environmental duplicate samples were collected from two MWL-SV04 sampling ports (200 and 400 ft bgs).

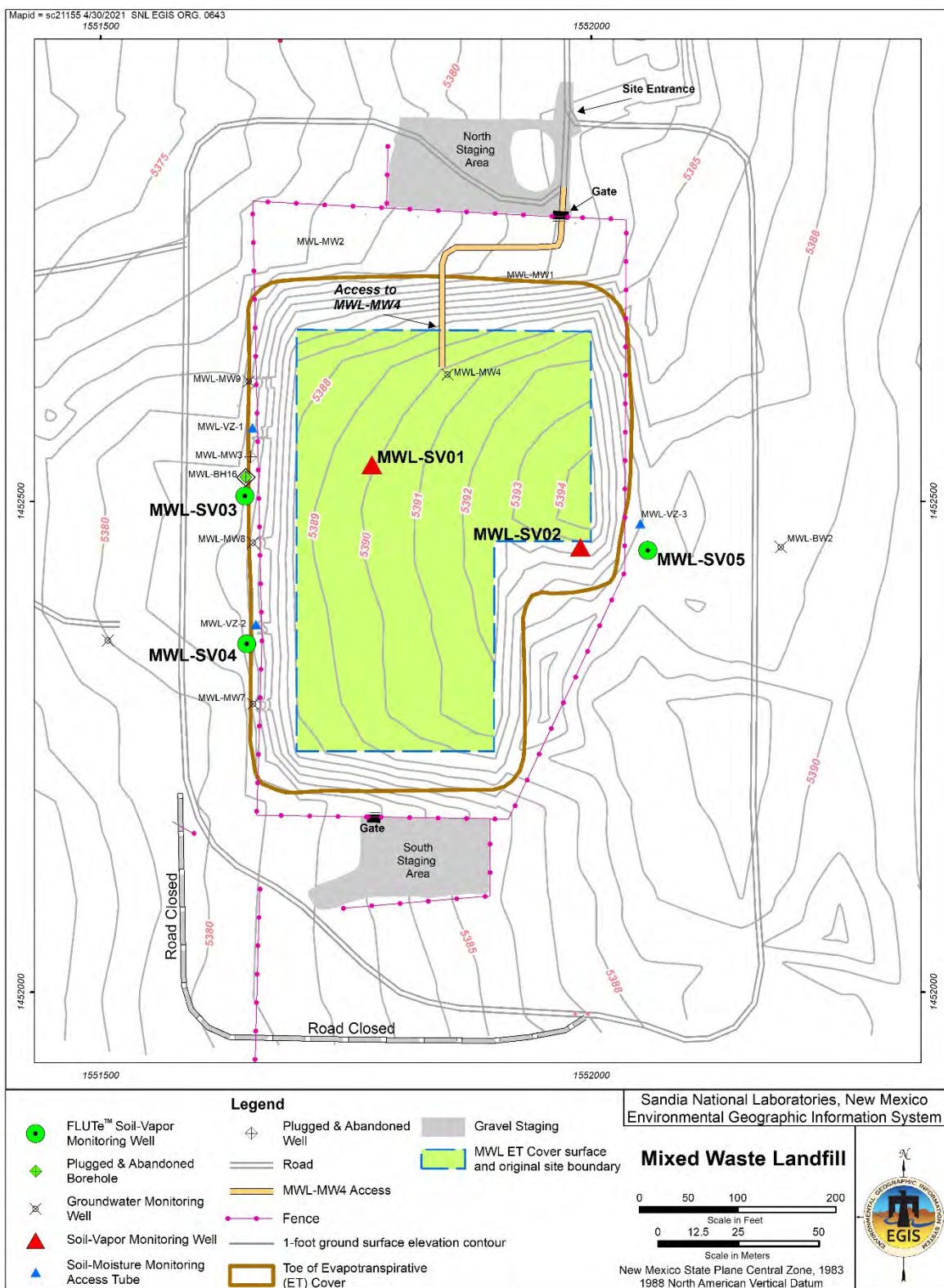


Figure 5-1  
Mixed Waste Landfill Soil-Vapor Monitoring Well Locations



### 5.1.1 Well Purging

Purging removes stagnant air from each sampling port and associated sample tubing and draws representative soil vapor from the soil/sediment pore space surrounding the sampling port in the subsurface. All wells were purged to remove a minimum of three tubing volumes of air, and until VOC levels stabilized (i.e., 3 photoionization detector [PID] measurements after purging 3 tubing volumes within plus or minus 10 percent), in accordance with procedures described in field operating procedure (FOP) FOP 08-22, "Soil-Vapor Monitoring" (SNL/NM October 2019) and LTMMMP Appendix D. All wells were purged using a dedicated MWL vacuum pump. Real time continuous VOC screening was performed with a PID to determine stabilization during the purging process.

### 5.1.2 Field Quality Control

Field QC samples include environmental duplicate samples (two per semiannual monitoring event) and field blank samples. Field QC samples were submitted for analysis with the environmental soil-vapor samples and analytical results are presented in Section 5.2.2 and Annex C. The environmental-duplicate sample pairs were collected simultaneously using a split-stream sampling manifold system (i.e., the duplicate samples were collected at the same time) to reduce variability caused by time and/or sampling mechanics.

Field blank samples were prepared in the field during sampling activities by collecting an ultra-pure grade nitrogen gas sample at each monitoring well. Results were used to assess whether contamination of the samples may have resulted from ambient field conditions and/or during shipment and analysis at the laboratory.

The field QC sampling protocol for the May and November 2021 sampling events included the collection of an environmental-duplicate sample pair from monitoring well MWL-SV03 (sampling ports located at 50 ft bgs and 400 ft bgs) in May, and the sampling ports located at 200 ft bgs and 400 ft bgs at monitoring well MWL-SV04 in November (i.e., MWL-SV04-200 and MWL-SV04-400). For both sampling events, a total of five QC field blank samples were associated with the environmental samples and submitted for analysis. Field QC sample results are presented in Section 5.2.2.

### 5.1.3 Waste Management

A small volume of solid waste (e.g., PPE that does not come into contact with contaminants) was generated during the two soil-vapor monitoring events. This waste was combined with solid waste generated during groundwater monitoring activities and managed as non-hazardous solid waste as described in Section 7.1.3.

## 5.2 Laboratory Results and Trigger Level Evaluation

Environmental and field QC soil-vapor samples were submitted to Eurofins TestAmerica for analyses. Samples were analyzed in accordance with EPA Method TO-15. Analytical laboratory reports, including certificates of analyses, analytical methods, method detection limits (MDLs),

reporting limits (RLs), dates of analyses, and data validation reports are filed in the SNL/NM Record Center.

As defined in the LTMMMP Section 5.2.3.1, trigger levels for VOCs in soil vapor are 20 parts per million by volume (ppmv) for tetrachloroethene (PCE), 20 ppmv for trichloroethene (TCE), and 25 ppmv for Total VOCs (i.e., the sum of validated detected VOC concentrations). The trigger levels apply only to samples collected from the deepest sampling port (i.e., 400 ft bgs port) in each of the three FLUTe™ multi-port soil-vapor monitoring wells (MWL-SV03, MWL-SV04, and MWL-SV05).

All VOC concentrations for the three deepest sampling ports are below the trigger levels. The PCE maximum concentration was 0.320 ppmv from the May MWL-SV03-400 environmental-duplicate sample pair. The TCE maximum concentration was 0.180 ppmv from the May MWL-SV03-400 environmental-duplicate sample pair. The maximum Total VOCs concentration was 0.55690 ppmv from the May MWL-SV03-400 environmental duplicate sample. All May and November 2021 VOC soil-vapor results are presented in Tables 5-1 and 5-2 at the end of this section.

### 5.2.1 Environmental Sample Results

This section summarizes soil-vapor monitoring results for the April 1, 2021 through March 31, 2022 reporting period. A summary of compounds detected in each semiannual event is provided below, and a summary of historical data (i.e., soil-vapor results collected since implementation of the LTMMMP in January 2014) is presented in Section 5.3.

#### First Sampling Event – May 6, 2021

A total of 18 compounds were detected above MDLs in May 2021 samples. All of these VOCs were also detected in the November 2021 samples.

Acetone	1,1-Dichloroethane
Benzene	1,1-Dichloroethene
2-Butanone	cis-1,2-Dichloroethene
Carbon Disulfide	Tetrachloroethene
Carbon Tetrachloride	1,1,2-Trichloro-1,2,2-trifluoroethane
Chlorobenzene	1,1,1-Trichloroethane
Chloroform	1,1,2-Trichloroethane
1,2-Dichloro-1,1,2,2-tetrafluoroethane	Trichloroethene
Dichlorodifluoromethane	Trichlorofluoromethane



PCE and TCE are the primary VOCs of concern, exhibit the highest concentrations, and were reported at low concentrations in all environmental samples from all sampling ports. PCE was detected at concentrations ranging from 0.042 ppmv (MWL-SV05-50) to 0.320 ppmv (MWL-SV03-400). TCE concentrations ranged from 0.044 ppmv (MWL-SV02-41.5) to 0.220 ppmv (MWL-SV03-200). Total VOCs concentrations ranged from 0.19377 ppmv (MWL-SV04-50) to 0.68124 ppmv (MWL-SV03-200). Other VOCs detected in all monitoring wells, generally at lower concentrations include chloroform; dichlorodifluoromethane; 1,1-dichloroethane; 1,1-dichloroethene; cis-1,2-dichloroethene; 1,1,2-trichloro-1,2,2-trifluoroethane; and trichlorofluoromethane. The highest sample port VOC concentration was the PCE result of 0.320 ppmv from MWL-SV03-400.

For the May 2021 results from the three deepest sampling ports of MWL-SV03, MWL-SV04, and MWL-SV05, PCE concentrations ranged from 0.080 ppmv (MWL-SV05-400) to 0.320 ppmv (MWL-SV03-400). TCE concentrations ranged from 0.067 ppmv (MWL-SV05-400) to 0.180 ppmv (MWL-SV03-400). Total VOCs concentrations ranged from 0.23766 ppmv (MWL-SV05-400) to 0.55690 ppmv (MWL-SV03-400 environmental duplicate sample).

#### Second Sampling Event – November 5, 2021

A total of 23 compounds were detected above MDLs in November 2021 samples. Eighteen of these compounds were detected in the May 2021 samples. Chlorobenzene was reported as a detected compound by the laboratory; however, all detections were subsequently qualified as not detected during the data validation process based on laboratory QC sample results as discussed in Section 5.2.3.

Acetone	1,1-Dichloroethene
Benzene	cis-1,2-Dichloroethene
Bromodichloromethane	2-Hexanone
2-Butanone	Tetrachloroethene
Carbon Disulfide	1,1,2-Trichloro-1,2,2-trifluoroethane
Carbon Tetrachloride	1,1,1-Trichloroethane
Chlorobenzene	1,1,2-Trichloroethane
Chloroform	Trichloroethene
1,2-Dibromoethane	Trichlorofluoromethane
1,2-Dichloro-1,1,2,2-tetrafluoroethane	Vinyl acetate
Dichlorodifluoromethane	m,p-Xylene
1,1-Dichloroethane	

PCE and TCE exhibited the highest concentrations and were reported in all environmental samples from all sampling ports. PCE was detected at concentrations ranging from 0.042 ppmv (MWL-SV05-50) to 0.310 ppmv (MWL-SV01-42.5). TCE concentrations ranged from 0.041 ppmv (MWL-SV04-50) to 0.170 ppmv (MWL-SV03-300). Total VOCs concentrations ranged from 0.19307 ppmv (MWL-SV04-50) to 0.64320 ppmv (MWL-SV01-42.5). Other VOCs detected in all monitoring wells, generally at lower concentrations include chloroform; dichlorodifluoromethane; 1,1-dichloroethane; 1,1-dichloroethene; cis-1,2-dichloroethene; 1,1,2-trichloro-1,2,2-trifluoroethane; 1,1,1-trichloroethane; and trichlorofluoromethane. The highest sample port VOC concentration was a PCE result of 0.310 ppmv from MWL-SV01-42.5.

For the November 2021 results from the three deepest sampling ports of MWL-SV03, MWL-SV04, and MWL-SV05, PCE concentrations ranged from 0.089 ppmv (MWL-SV05-400) to 0.140 ppmv (MWL-SV03-400). TCE concentrations ranged from 0.051 ppmv (MWL-SV04-400, environmental duplicate sample) to 0.120 ppmv (MWL-SV03-400). Total VOCs concentrations ranged from 0.25363 ppmv (MWL-SV04-400, environmental duplicate sample) to 0.32208 ppmv (MWL-SV05-400).

Tables 5-1 and 5-2 (provided at the end of this chapter) summarize detected VOCs results for the May 2021 and November 2021 sampling events, respectively, and include laboratory and data validation qualifiers.

### 5.2.2 Field Quality Control Sample Results

As described in Section 5.1.2, the field QC sampling protocol for the May and November 2021 sampling events included the collection and analysis of environmental-duplicate sample pairs and field blank samples. Field QC sample results met the sampling DQOs and validated the field sampling procedures and protocol. The analytical results for each field QC sample type are presented in this section.

Table 5-3 summarizes results of environmental-duplicate sample pair analyses and the calculated RPD values for the May and November 2021 sample pairs. An RPD was calculated when compounds were reported in both environmental and duplicate samples at concentrations greater than or equal to five times the laboratory RL. The environmental-duplicate sample pair results and QC field blank results are summarized below.

#### First Sampling Event – May 6, 2021

The two environmental-duplicate sample pairs collected during the May 2021 sampling event were analyzed for all analytical parameters. The calculated RPDs show good agreement for the environmental-duplicate sample pairs, ranging from less than 1 to 24. An RPD of 50 or less demonstrates acceptable precision of the sampling and analytical processes consistent with soil-vapor monitoring protocol established at the SNL/NM Chemical Waste Landfill (NMED October 2009 and subsequent revisions).

A total of five field blank samples were submitted for analysis with the May 2021 environmental samples. Validated VOC detections in field blank samples at very low concentrations include: acetone (3 samples); benzene (2 samples); 2-butanone (2 samples); carbon disulfide (4 samples); chlorobenzene (2 samples); methylene chloride (1 sample); PCE (2 samples); and trichlorofluoromethane (1 sample). No corrective action was required for methylene chloride, PCE, or trichlorofluoromethane since these compounds were not detected in associated environmental samples or detected at concentrations greater than five times the field blank concentration. As shown in Table 5-1, acetone, benzene, 2-butanone, carbon disulfide, and chlorobenzene results were qualified as not detected during data validation for various environmental samples when these compounds were reported at concentrations less than the RL in both the field blank and environmental samples.

Table 5-3  
Summary of Duplicate Samples  
Mixed Waste Landfill Soil-Vapor Monitoring  
May and November 2021

Well ID/Parameter	Environmental Sample (R <sub>1</sub> )	Duplicate Sample (R <sub>2</sub> )	RPD <sup>a</sup> (%)
	(ppmv)		
May 2021 Environmental-Duplicate Sample Pair Results			
MWL-SV03-50			
Dichlorodifluoromethane	0.023	0.022	4
1,1-Dichloroethene	0.0092	0.0091	1
Tetrachloroethene	0.14	0.11	24
1,1,2-Trichloro-1,2,2-trifluoroethane	0.058	0.057	2
Trichloroethene	0.10	0.10	< 1
Trichlorofluoromethane	0.021	0.020	5
MWL-SV03-400			
1,1-Dichloroethene	0.014	0.014	< 1
Tetrachloroethene	0.32	0.32	< 1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.025	0.025	< 1
Trichloroethene	0.18	0.18	< 1
November 2021 Environmental-Duplicate Sample Pair Results			
MWL-SV04-200			
Dichlorodifluoromethane	0.041	0.046	11
1,1-Dichloroethene	0.020	0.022	10
Tetrachloroethene	0.10	0.12	18
1,1,2-Trichloro-1,2,2-trifluoroethane	0.10	0.12	18
Trichloroethene	0.13	0.14	7
Trichlorofluoromethane	0.035	0.039	11
MWL-SV04-400			
Dichlorodifluoromethane	0.020	0.020	< 1
1,1-Dichloroethene	0.0067	0.0059	13
Tetrachloroethene	0.094	0.097	3
1,1,2-Trichloro-1,2,2-trifluoroethane	0.067	0.066	2
Trichloroethene	0.053	0.051	4
Trichlorofluoromethane	0.012	0.011	9

Notes:

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

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

where:

R<sub>1</sub> = Analysis result.  
R<sub>2</sub> = Duplicate analysis result.

% = Percent.  
< = Less than.  
ID = Identification.  
MWL = Mixed Waste Landfill.  
ppmv = Parts per million by volume.

### Second Sampling Event – November 5, 2021

The two environmental-duplicate sample pairs collected during the November 2021 sampling event were analyzed for all analytical parameters. The calculated RPDs show good agreement for the environmental-duplicate sample pairs. The RPD values ranged from less than 1 to 18.

A total of five field blank samples were submitted for analysis with the November 2021 samples. Validated VOC detections in field blank samples at very low concentrations included acetone (4 samples), 2-butanone (1 sample), chloromethane (1 sample), PCE (1 sample), and 1,1,2-trichloroethane (1 sample). No corrective action was required for chloromethane, PCE, or 1,1,2-trichloroethane since these compounds were not detected in associated environmental samples or detected at concentrations greater than five times the field blank sample concentration. As shown in Table 5-2, acetone and 2-butanone results for various environmental samples were qualified as not detected during data validation when they were detected at concentrations less than the RL in both the field blank and associated environmental samples.

#### 5.2.3 Laboratory Quality Control and Data Quality

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 spikes samples, and replicate samples. The results were used to evaluate potential contamination associated with the laboratory analytical process and to determine the accuracy and precision of the analytical methods. All laboratory control sample results met the accuracy (i.e., percent recovery [% recovery]) requirement of 50 to 130 for detected compounds (Section 2.2 of LTMMMP Appendix D), except as explained below.

For the May 2021 sampling event, the LTMMMP accuracy requirement for laboratory control samples of 50 to 130% recovery was not met for 1,2-dichloro-1,1,2,2-tetrafluoroethane and hexachlorobutadiene associated with all samples; bromomethane associated with specific samples from monitoring wells MWL-SV01, MWL-SV03, MWL-SV04, and MWL-SV05; and bromoform and vinyl chloride associated with the MWL-SV05-200 environmental sample. The % recovery was within the EPA Method TO-15 limits, which vary from the LTMMMP-specified limits, for some of the hexachlorobutadiene and bromoform analyses. In accordance with the data validation process, no environmental sample data were qualified and most associated results were non-detections. Due to laboratory method blank results, carbon disulfide and chlorobenzene were qualified as not detected during data validation in various environmental and field blank samples when they were detected at concentrations less than their respective RLs in the laboratory method blank and associated samples. The field blank results that were qualified as not detected for these two compounds were not applied to the associated environmental samples.

For the November 2021 sampling event, all laboratory control sample % recovery results were within the EPA Method TO-15 and LTMMMP-specified limits for detected compounds. Due to laboratory method blank results, benzene, carbon disulfide, chlorobenzene, and 1,2-dibromoethane were qualified as not detected during data validation in various environmental and field blank samples when they were detected at concentrations less than their respective RLs in the laboratory method blank and associated samples. The field blank results for these

compounds that were qualified as not detected were not applied to the associated environmental samples.

All chemical data were reviewed and qualified in accordance with SNL/NM AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data" (SNL/NM June 2020). Based upon the data validation and review criteria, the May and November 2021 environmental sample analytical data were determined to be acceptable and met the DQOs. Laboratory QC sample results comply with analytical method and laboratory procedure requirements except as noted above. Corrective action was implemented in accordance with the data validation procedure and included qualification of specific results as documented in Tables 5-1 and 5-2 and the data validation reviews. Data validation reviews that include AR/COC forms, contract verification reviews, and certificates of analysis are provided in Annex C.

#### 5.2.4 Variances

One variance from requirements in the LTMMMP was identified for the May and November 2021 soil-vapor monitoring activities. This variance is considered minor because it has no adverse impact on data quality. During the purging process, a PID with an 11.7 electron volts (eV) lamp was used instead of an 11.8 eV lamp as specified in Section 3.3 in Appendix D of the LTMMMP. 11.8 eV lamps are not currently available from the manufacturer or distributors. A permit modification request that addresses this minor variance was submitted to the NMED and approved during the reporting period as detailed in Section 10.2.

### 5.3 Historical Data Evaluation

Tables 5-4, 5-5, and 5-6 summarize the 2021 and historical results for PCE, TCE, and Total VOCs, respectively, which are graphically presented in Figures 5-2 through 5-13. Trigger levels are not shown on the figures due to scale. Each table presents results for the 16 semiannual monitoring events conducted since implementation of the LTMMMP in 2014. Key points from the evaluation of the 2014 through 2021 soil-vapor monitoring results are summarized below.

- All individual VOC results for all monitoring well sampling ports are low concentrations, less than 0.600 ppmv.
- Concentrations throughout the 500-foot thick vadose zone are relatively consistent; shallow results do not vary considerably from deeper results.
- The soil-vapor monitoring results are consistent with an old source that has slowly dissipated throughout the vadose zone through diffusion.
- The distribution of concentrations in the vadose zone indicates the VOC soil-vapor plume is stable, with no evidence of new releases from the disposal area.
- Results for the three deepest sampling ports of MWL-SV03 through MWL-SV05 (400 ft bgs) are stable and below the trigger levels.
- The VOC concentrations indicate the VOC soil-vapor plume is not a threat to groundwater.

Table 5-4  
Summary of Historical PCE Concentrations  
Mixed Waste Landfill Soil-Vapor Monitoring

Well ID & Sample Port Depth <sup>a</sup>	Sept. 2014 <sup>b</sup> (ppmv)	Oct. 2014 <sup>b</sup> (ppmv)	April 2015 <sup>b</sup> (ppmv)	Oct. 2015 <sup>b</sup> (ppmv)	April 2016 <sup>b</sup> (ppmv)	Oct. 2016 <sup>b</sup> (ppmv)	May 2017 <sup>b</sup> (ppmv)	Oct. 2017 <sup>b</sup> (ppmv)	April 2018 <sup>b</sup> (ppmv)	Oct. 2018 <sup>b</sup> (ppmv)	May 2019 <sup>b</sup> (ppmv)	Oct. 2019 <sup>b</sup> (ppmv)	May 2020 <sup>b</sup> (ppmv)	Nov. 2020 <sup>b</sup> (ppmv)	May 2021 <sup>b</sup> (ppmv)	Nov. 2021 <sup>b</sup> (ppmv)
MWL-SV01-42.5	0.560	0.400	0.460	0.470	0.410	0.450	0.300	0.420	0.370	0.370	0.470	0.210	0.450	0.380	0.260	0.310
MWL-SV02-41.5	0.086	0.067	0.075	0.068	0.068	0.070	0.071	0.072	0.059	0.059	0.090	0.062	0.081	0.055	0.048	0.061
MWL-SV03-50	0.140	0.120	0.150	0.110	0.170	0.140	0.100	0.140	0.130	0.130	0.210	0.150	0.160	0.150	0.140	0.100
MWL-SV03-100	0.210	0.230	0.240	0.220	0.240	0.240	0.160	0.220	0.210	0.170	0.280	0.210	0.210	0.210	0.210	0.140
MWL-SV03-200	0.300	0.320	0.310	0.290	0.270	0.270	0.210	0.260	0.240	0.210	0.280	0.180	0.230	0.260	0.230	0.170
MWL-SV03-300	0.290	0.320	0.290	0.370	0.310	0.300	0.220	0.280	0.270	0.200	0.310	0.190	0.180	0.250	0.200	0.210
MWL-SV03-400	0.390	0.400	0.420	0.450	0.430	0.440	0.390	0.310	0.370	0.320	0.450	0.230	0.320	0.240	0.320	0.140
MWL-SV04-50	0.072	0.076	0.076	0.074	0.078	0.077	0.052	0.063	0.062	0.060	0.076	0.073	0.020	0.059	0.055	0.053
MWL-SV04-100	0.130	0.120	0.120	0.120	0.130	0.130	0.089	0.110	0.110	0.120	0.110	0.073	0.100	0.120	0.100	0.100
MWL-SV04-200	0.180	0.180	0.170	0.150	0.180	0.150	0.110	0.130	0.120	0.120	0.130	0.094	0.130	0.110	0.110	0.120
MWL-SV04-300	0.110	0.130	0.110	0.120	0.130	0.130	0.095	0.120	0.098	0.110	0.130	0.110	0.110	0.110	0.110	0.110
MWL-SV04-400	0.110	0.140	0.120	0.140	0.150	0.130	0.100	0.110	0.120	0.120	0.130	0.083	0.120	0.150	0.110	0.097
MWL-SV05-50	0.052	0.048	0.055	0.040	0.060	0.045	0.044	0.021	0.045	0.040	0.050	0.047	0.035	0.039	0.042	0.042
MWL-SV05-100	0.092	0.096	0.100	0.077	0.099	0.095	0.089	0.070	0.085	0.075	0.091	0.082	0.079	0.065	0.069	0.070
MWL-SV05-200	0.140	0.170	0.150	0.120	0.170	0.140	0.140	0.100	0.130	0.120	0.150	0.140	0.120	0.140	0.110	0.110
MWL-SV05-300	0.090	0.120	0.097	0.110	0.100	0.110	0.110	0.091	0.098	0.091	0.099	0.099	0.110	0.077	0.081	0.110
MWL-SV05-400	0.100	0.110	0.080	0.120	0.110	0.110	0.100	0.092	0.092	0.081	0.100	0.110	0.098	0.084	0.080	0.089

Notes:

All concentrations are not rounded so they match the reported concentrations in corresponding data tables; in some cases a zero is added to maintain significant digit consistency.

<sup>a</sup>Port depth is the last number in the Well ID and is in feet below ground surface.

<sup>b</sup>If an environmental duplicate sample was collected, then the maximum concentration of the environmental-duplicate sample pair is shown.

ID = Identification.

MWL = Mixed Waste Landfill.

PCE = Tetrachloroethene.

ppmv = Parts per million by volume.

Table 5-5  
Summary of Historical TCE Concentrations  
Mixed Waste Landfill Soil-Vapor Monitoring

Well ID & Sample Port Depth <sup>a</sup>	Sept. 2014 <sup>b</sup> (ppmv)	Oct. 2014 <sup>b</sup> (ppmv)	April 2015 <sup>b</sup> (ppmv)	Oct. 2015 <sup>b</sup> (ppmv)	April 2016 <sup>b</sup> (ppmv)	Oct. 2016 <sup>b</sup> (ppmv)	May 2017 <sup>b</sup> (ppmv)	Oct. 2017 <sup>b</sup> (ppmv)	April 2018 <sup>b</sup> (ppmv)	Oct. 2018 <sup>b</sup> (ppmv)	May 2019 <sup>b</sup> (ppmv)	Oct. 2019 <sup>b</sup> (ppmv)	May 2020 <sup>b</sup> (ppmv)	Nov. 2020 <sup>b</sup> (ppmv)	May 2021 <sup>b</sup> (ppmv)	Nov. 2021 <sup>b</sup> (ppmv)
MWL-SV01-42.5	0.110	0.090	0.099	0.110	0.091	0.100	0.071	0.086	0.081	0.070	0.100	0.045	0.084	0.081	0.057	0.063
MWL-SV02-41.5	0.075	0.058	0.067	0.065	0.063	0.065	0.070	0.067	0.056	0.050	0.073	0.054	0.068	0.055	0.044	0.050
MWL-SV03-50	0.100	0.082	0.097	0.080	0.140	0.110	0.098	0.120	0.110	0.100	0.170	0.120	0.120	0.120	0.100	0.090
MWL-SV03-100	0.190	0.190	0.200	0.200	0.210	0.210	0.130	0.180	0.190	0.150	0.240	0.170	0.180	0.160	0.180	0.130
MWL-SV03-200	0.300	0.300	0.290	0.310	0.250	0.270	0.250	0.230	0.240	0.190	0.260	0.180	0.200	0.220	0.220	0.160
MWL-SV03-300	0.190	0.210	0.170	0.260	0.200	0.220	0.200	0.210	0.190	0.140	0.180	0.130	0.170	0.170	0.140	0.170
MWL-SV03-400	0.290	0.280	0.260	0.350	0.300	0.320	0.250	0.230	0.270	0.230	0.330	0.170	0.220	0.190	0.180	0.120
MWL-SV04-50	0.061	0.059	0.060	0.066	0.070	0.067	0.054	0.058	0.055	0.051	0.062	0.058	0.035	0.048	0.045	0.041
MWL-SV04-100	0.130	0.120	0.120	0.130	0.140	0.150	0.120	0.120	0.110	0.110	0.110	0.080	0.096	0.120	0.100	0.096
MWL-SV04-200	0.210	0.210	0.190	0.200	0.220	0.200	0.180	0.170	0.170	0.140	0.160	0.120	0.160	0.140	0.160	0.140
MWL-SV04-300	0.076	0.091	0.064	0.093	0.081	0.097	0.087	0.094	0.067	0.076	0.091	0.075	0.089	0.063	0.079	0.084
MWL-SV04-400	0.075	0.096	0.060	0.097	0.070	0.091	0.085	0.081	0.087	0.072	0.081	0.055	0.080	0.110	0.080	0.053
MWL-SV05-50	0.067	0.061	0.064	0.052	0.074	0.058	0.049	0.042	0.055	0.051	0.058	0.059	0.047	0.049	0.048	0.047
MWL-SV05-100	0.140	0.130	0.130	0.120	0.130	0.130	0.110	0.100	0.110	0.099	0.120	0.110	0.100	0.084	0.087	0.096
MWL-SV05-200	0.200	0.240	0.210	0.200	0.210	0.200	0.190	0.150	0.190	0.170	0.210	0.210	0.180	0.220	0.160	0.160
MWL-SV05-300	0.100	0.130	0.082	0.120	0.096	0.120	0.120	0.120	0.110	0.120	0.097	0.110	0.130	0.110	0.088	0.130
MWL-SV05-400	0.094	0.100	0.066	0.120	0.089	0.100	0.087	0.097	0.089	0.077	0.089	0.100	0.090	0.083	0.067	0.088

Notes:

All concentrations are not rounded so they match the reported concentrations in corresponding data tables; in some cases a zero is added to maintain significant digit consistency.

<sup>a</sup>Port depth is the last number in the Well ID and is in feet below ground surface.

<sup>b</sup>If an environmental duplicate sample was collected, then the maximum concentration of the environmental-duplicate sample pair is shown.

ID = Identification.

MWL = Mixed Waste Landfill.

ppmv = Parts per million by volume.

TCE = Trichloroethene.

Table 5-6  
Summary of Historical Total VOCs Concentrations  
Mixed Waste Landfill Soil-Vapor Monitoring

Well ID & Sample Port Depth <sup>a</sup>	Sept. 2014 <sup>b</sup> (ppmv)	Oct. 2014 <sup>b</sup> (ppmv)	April 2015 <sup>b</sup> (ppmv)	Oct. 2015 <sup>b</sup> (ppmv)	April 2016 <sup>b</sup> (ppmv)	Oct. 2016 <sup>b</sup> (ppmv)	May 2017 <sup>b</sup> (ppmv)	Oct. 2017 <sup>b</sup> (ppmv)	April 2018 <sup>b</sup> (ppmv)	Oct. 2018 <sup>b</sup> (ppmv)	May 2019 <sup>b</sup> (ppmv)	Oct. 2019 <sup>b</sup> (ppmv)	May 2020 <sup>b</sup> (ppmv)	Nov. 2020 <sup>b</sup> (ppmv)	May 2021 <sup>b</sup> (ppmv)	Nov. 2021 <sup>b</sup> (ppmv)
MWL-SV01-42.5	1.14010	1.00870	1.11670	1.03620	0.93510	0.97570	0.74072	0.89810	0.82938	0.76617	0.98919	0.53118	0.97060	0.82923	0.58583	0.64320
MWL-SV02-41.5	0.71822	0.67880	0.76470	0.69150	0.71030	0.70780	0.62944	0.67594	0.62856	0.58550	0.73830	0.55429	0.67467	0.60661	0.51844	0.49784
MWL-SV03-50	0.36957	0.31750	0.37076	0.30743	0.48016	0.42248	0.34860	0.42918	0.37492	0.37254	0.55177	0.421459	0.44393	0.43056	0.35810	0.31554
MWL-SV03-100	0.61151	0.63820	0.69490	0.74420	0.73270	0.73682	0.53366	0.62881	0.64167	0.51641	0.79405	0.61022	0.61274	0.61284	0.59904	0.43953
MWL-SV03-200	0.91906	0.94754	0.99016	0.93230	0.84151	0.87920	0.78555	0.78590	0.75426	0.63905	0.82572	0.58767	0.69157	0.73170	0.68124	0.49996
MWL-SV03-300	0.64917	0.67835	0.59506	0.83120	0.68678	0.74430	0.61278	0.71640	0.64246	0.51890	0.69218	0.47090	0.56427	0.60664	0.47783	0.54864
MWL-SV03-400	0.87270	0.81410	0.85950	0.95920	0.8798	0.89730	0.69654	0.62930	0.77359	0.67374	0.95564	0.49530	0.65647	0.51541	0.55690	0.30104
MWL-SV04-50	0.25949	0.26359	0.28424	0.28232	0.30064	0.29728	0.232861	0.25573	0.23944	0.22375	0.25427	0.26788	0.20406	0.21711	0.19377	0.19307
MWL-SV04-100	0.45631	0.42879	0.44346	0.46616	0.50930	0.53785	0.40932	0.43340	0.42102	0.40980	0.39089	0.287837	0.38758	0.42548	0.35855	0.36890
MWL-SV04-200	0.68361	0.66935	0.64340	0.63160	0.72689	0.66068	0.56579	0.56287	0.58006	0.52679	0.53017	0.433208	0.57680	0.50409	0.51862	0.49749
MWL-SV04-300	0.26624	0.32355	0.27345	0.34519	0.32831	0.37126	0.32319	0.35562	0.31116	0.30295	0.34700	0.32013	0.34070	0.30656	0.33209	0.32207
MWL-SV04-400	0.25031	0.3246	0.26702	0.35374	0.35148	0.38251	0.31282	0.32932	0.33570	0.31229	0.32006	0.25402	0.33832	0.40556	0.31586	0.25685
MWL-SV05-50	0.36547	0.31833	0.33990	0.30406	0.37770	0.35609	0.29951	0.26189	0.32248	0.28946	0.30571	0.299856	0.27950	0.30139	0.29754	0.28619
MWL-SV05-100	0.56578	0.54556	0.57169	0.53248	0.59430	0.61891	0.54760	0.51172	0.52584	0.47217	0.52797	0.51177	0.52332	0.44824	0.44363	0.47678
MWL-SV05-200	0.70237	0.82115	0.73680	0.65830	0.80567	0.73190	0.69410	0.57349	0.68820	0.60710	0.72360	0.73212	0.65330	0.73969	0.54869	0.57280
MWL-SV05-300	0.35628	0.42371	0.33576	0.44336	0.36421	0.46092	0.47695	0.44050	0.41957	0.40427	0.35226	0.40869	0.46383	0.39804	0.35572	0.46944
MWL-SV05-400	0.54096	0.39521	0.25075	0.45245	0.30765	0.40839	0.29962	0.29543	0.29875	0.30373	0.29021	0.33322	0.36440	0.27466	0.23766	0.32208

Notes:

Some concentrations are rounded and/or a zero is added to maintain significant digit consistency, so they may not exactly match the reported concentrations in corresponding data tables.

<sup>a</sup> Port depth is the last number in the Well ID and is in feet below ground surface.

<sup>b</sup> If an environmental duplicate sample was collected, then the maximum concentration of the environmental-duplicate sample pair is shown.

ID = Identification.

MWL = Mixed Waste Landfill.

ppmv = Parts per million by volume.

VOC = Volatile organic compound.



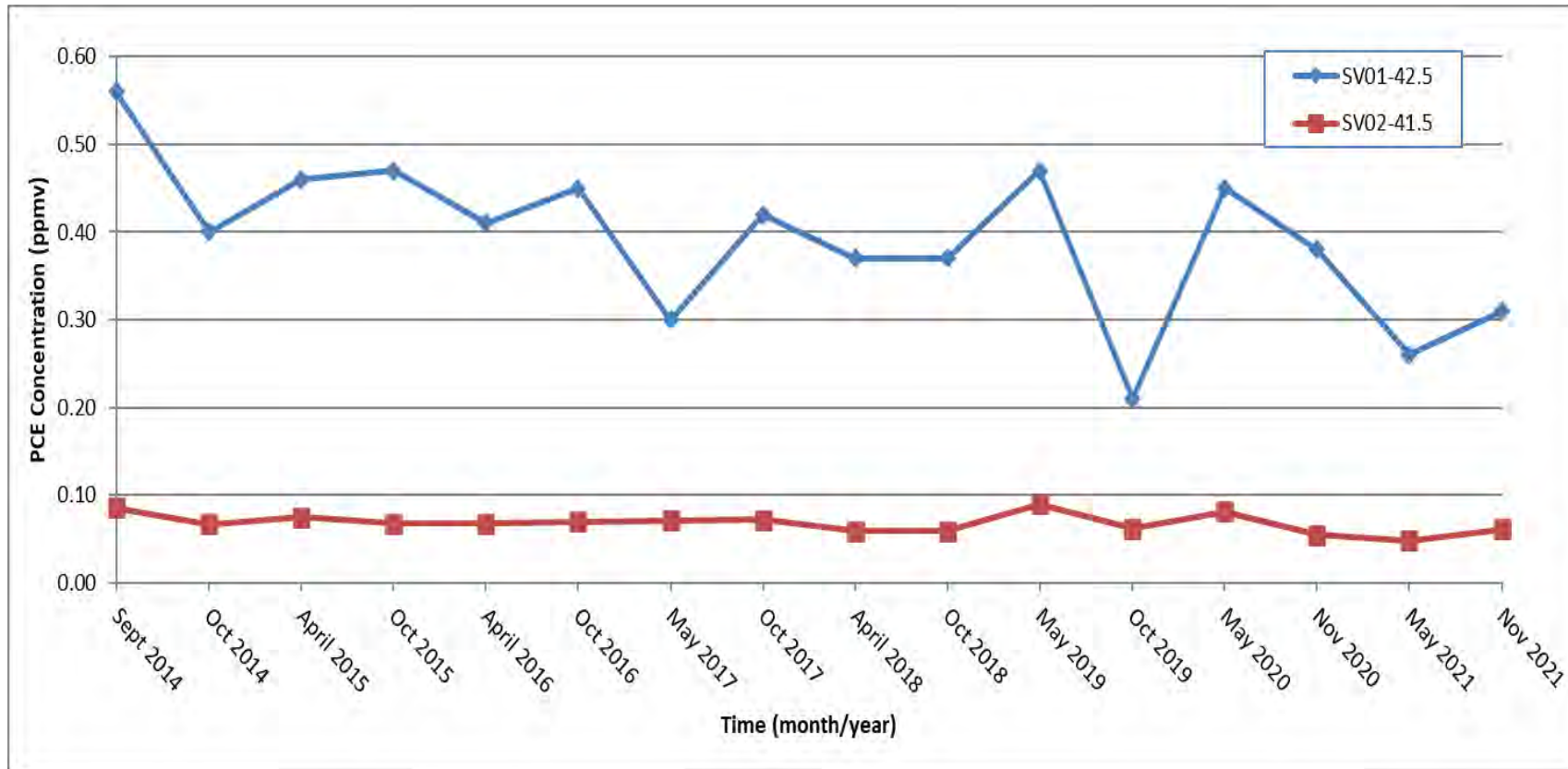


Figure 5-2  
PCE Concentrations vs. Time  
Mixed Waste Landfill Soil-Vapor Monitoring Wells SV01 and SV02 Ports

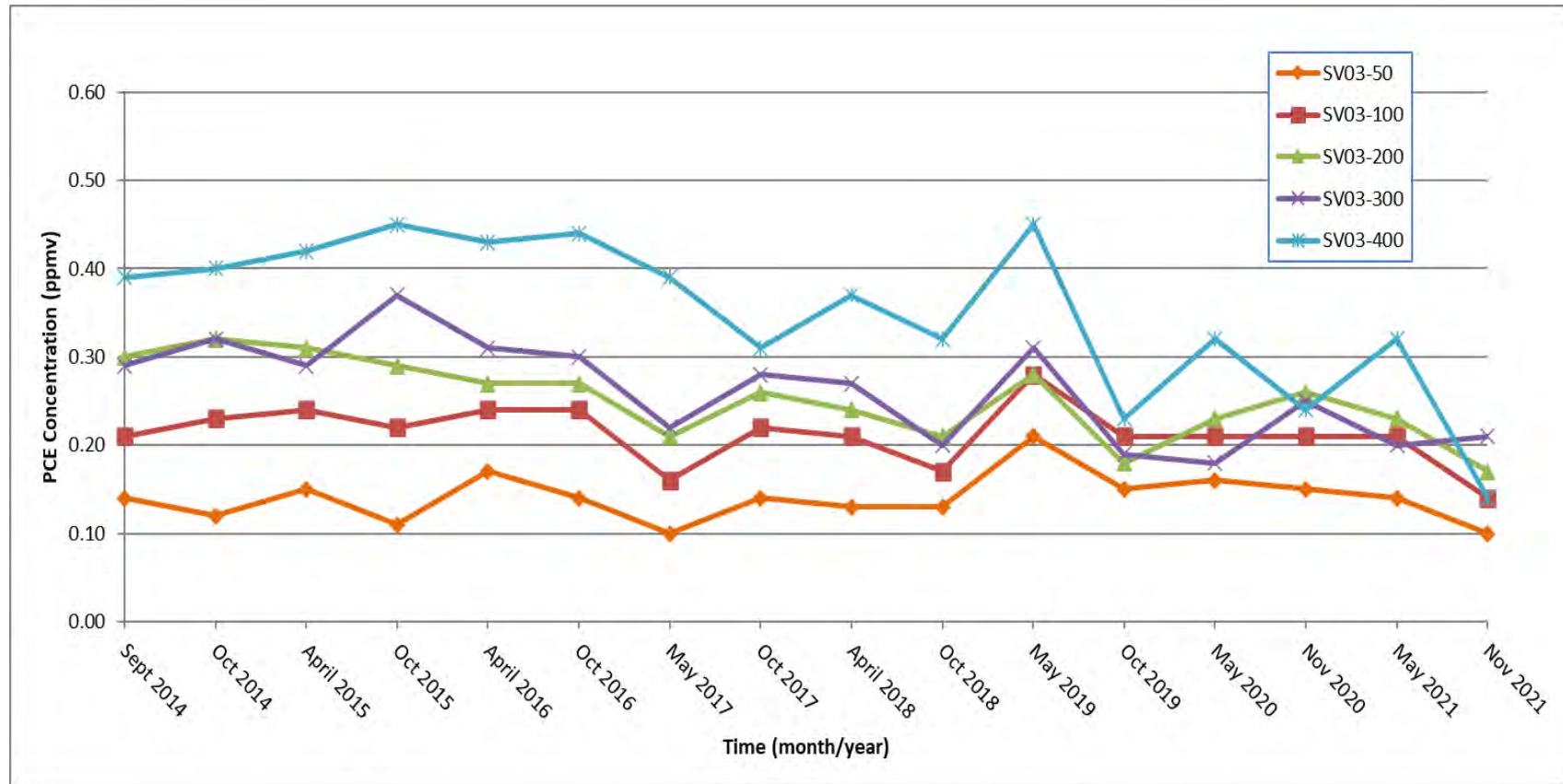


Figure 5-3  
PCE Concentrations vs. Time  
Mixed Waste Landfill Soil-Vapor Monitoring Well SV03 Ports

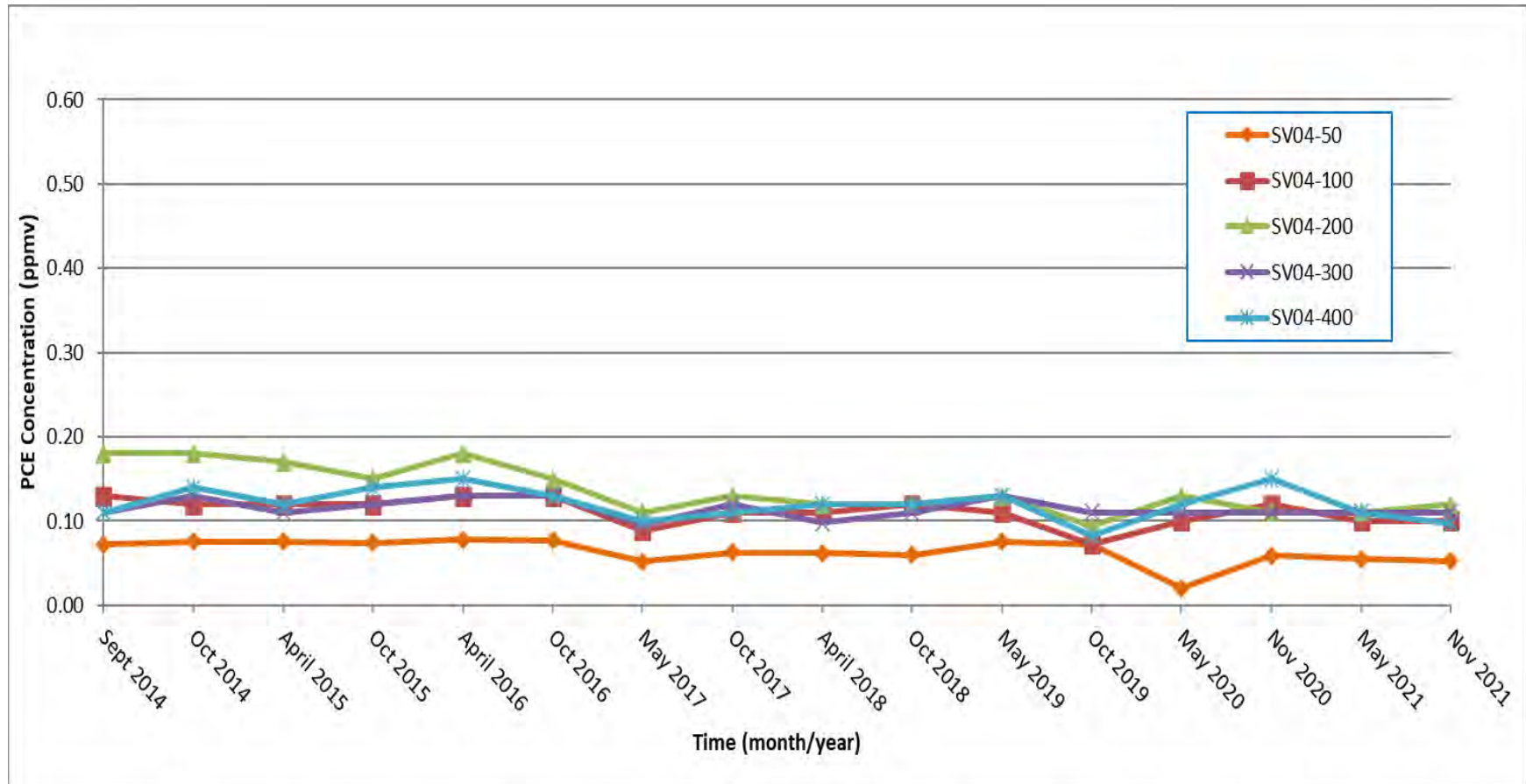


Figure 5-4  
PCE Concentrations vs. Time  
Mixed Waste Landfill Soil-Vapor Monitoring Well SV04 Ports

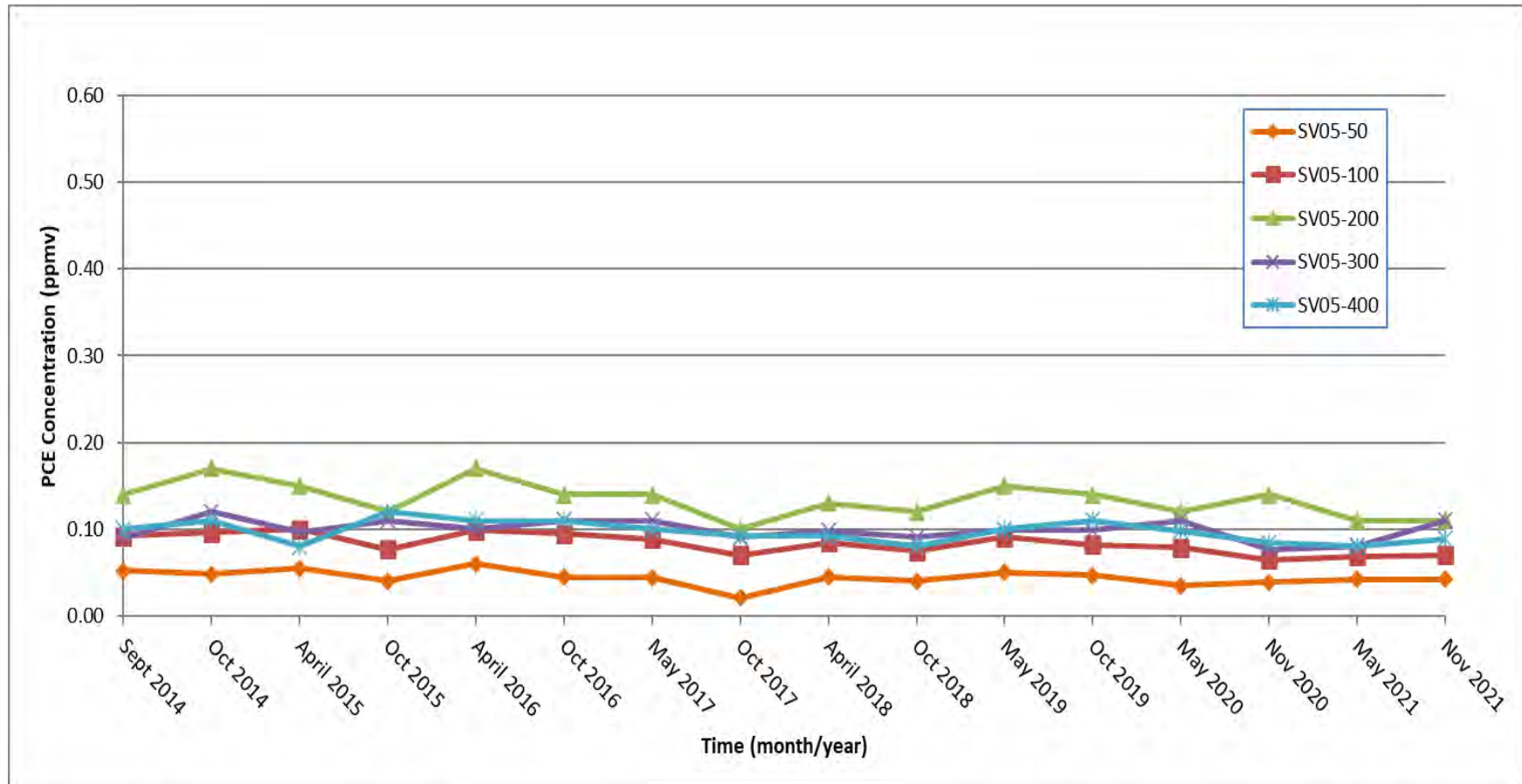


Figure 5-5  
PCE Concentrations vs. Time  
Mixed Waste Landfill Soil-Vapor Monitoring Well SV05 Ports

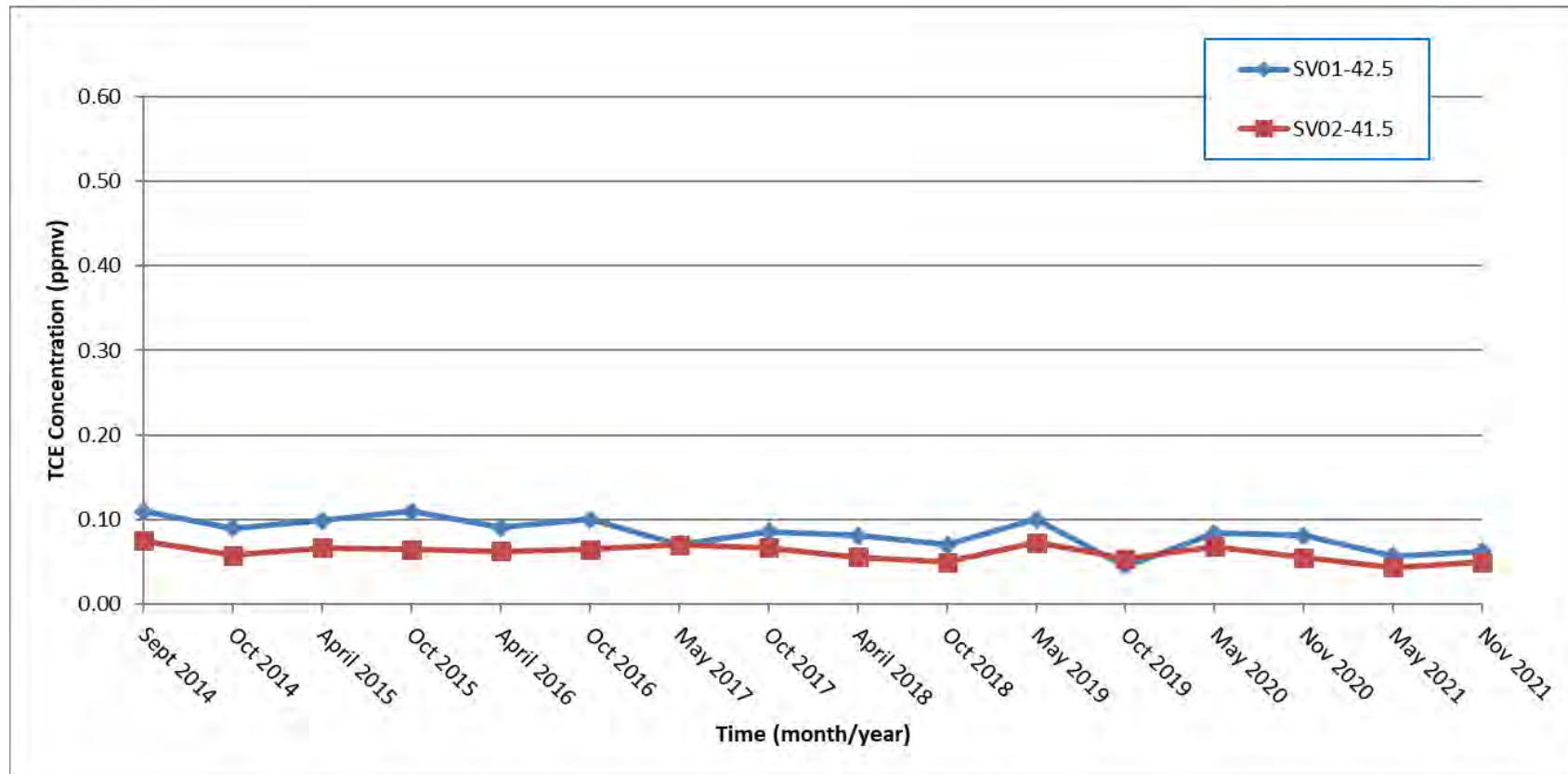


Figure 5-6  
TCE Concentrations vs. Time  
Mixed Waste Landfill Soil-Vapor Monitoring Wells SV01 and SV02 Ports

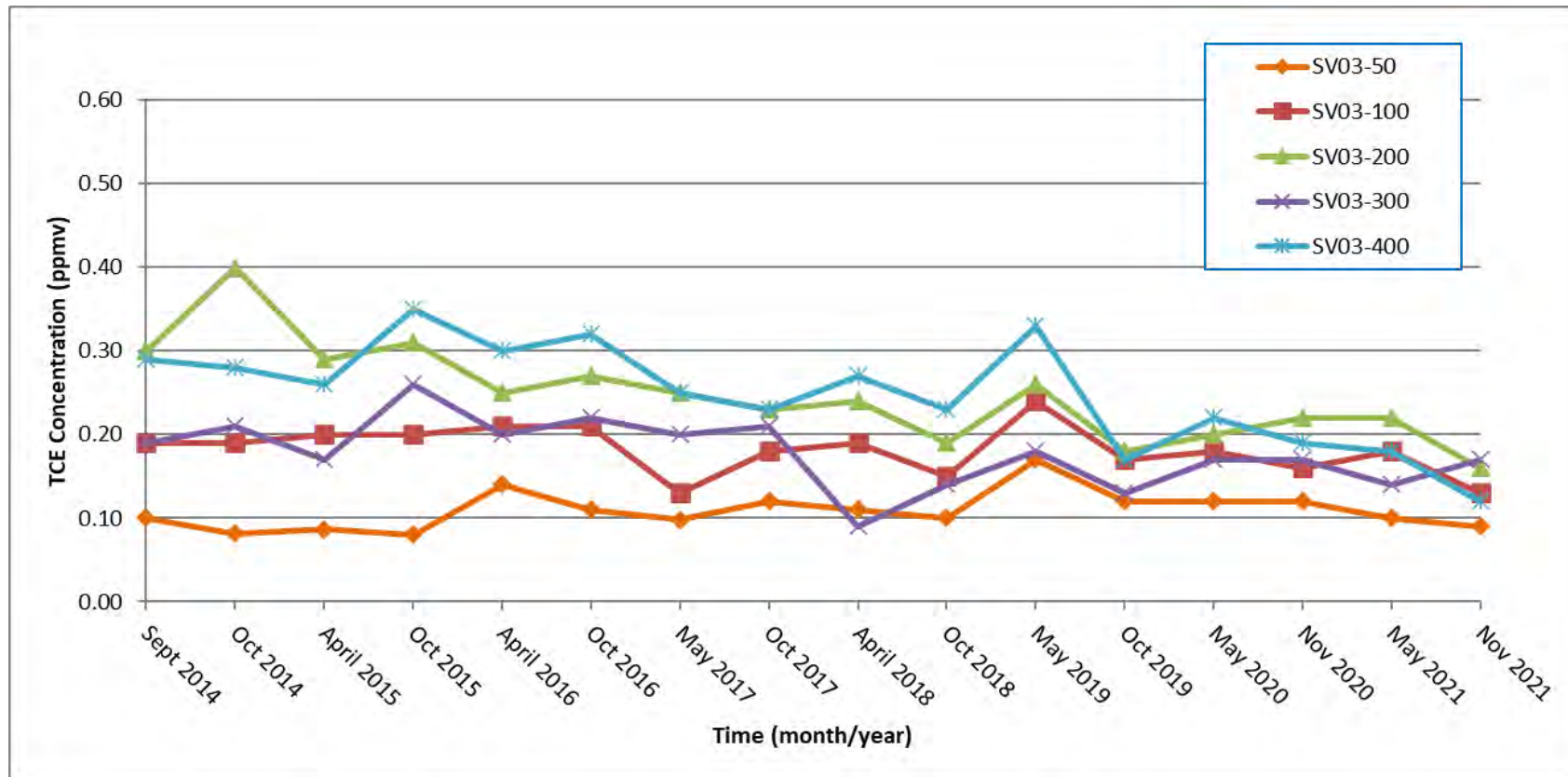


Figure 5-7  
TCE Concentrations vs. Time  
Mixed Waste Landfill Soil-Vapor Monitoring Well SV03 Ports



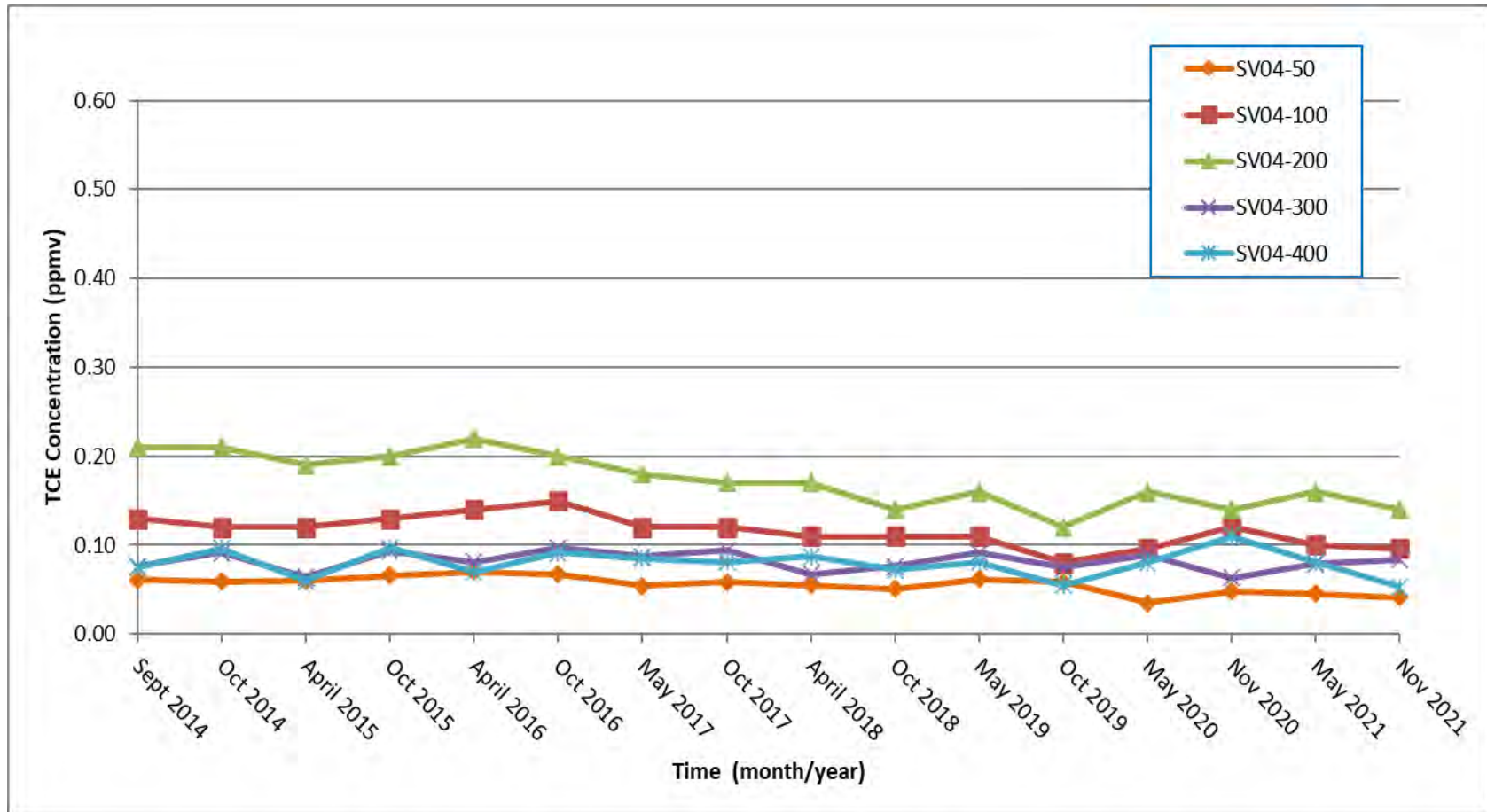


Figure 5-8  
TCE Concentrations vs. Time  
Mixed Waste Landfill Soil-Vapor Monitoring Well SV04 Ports

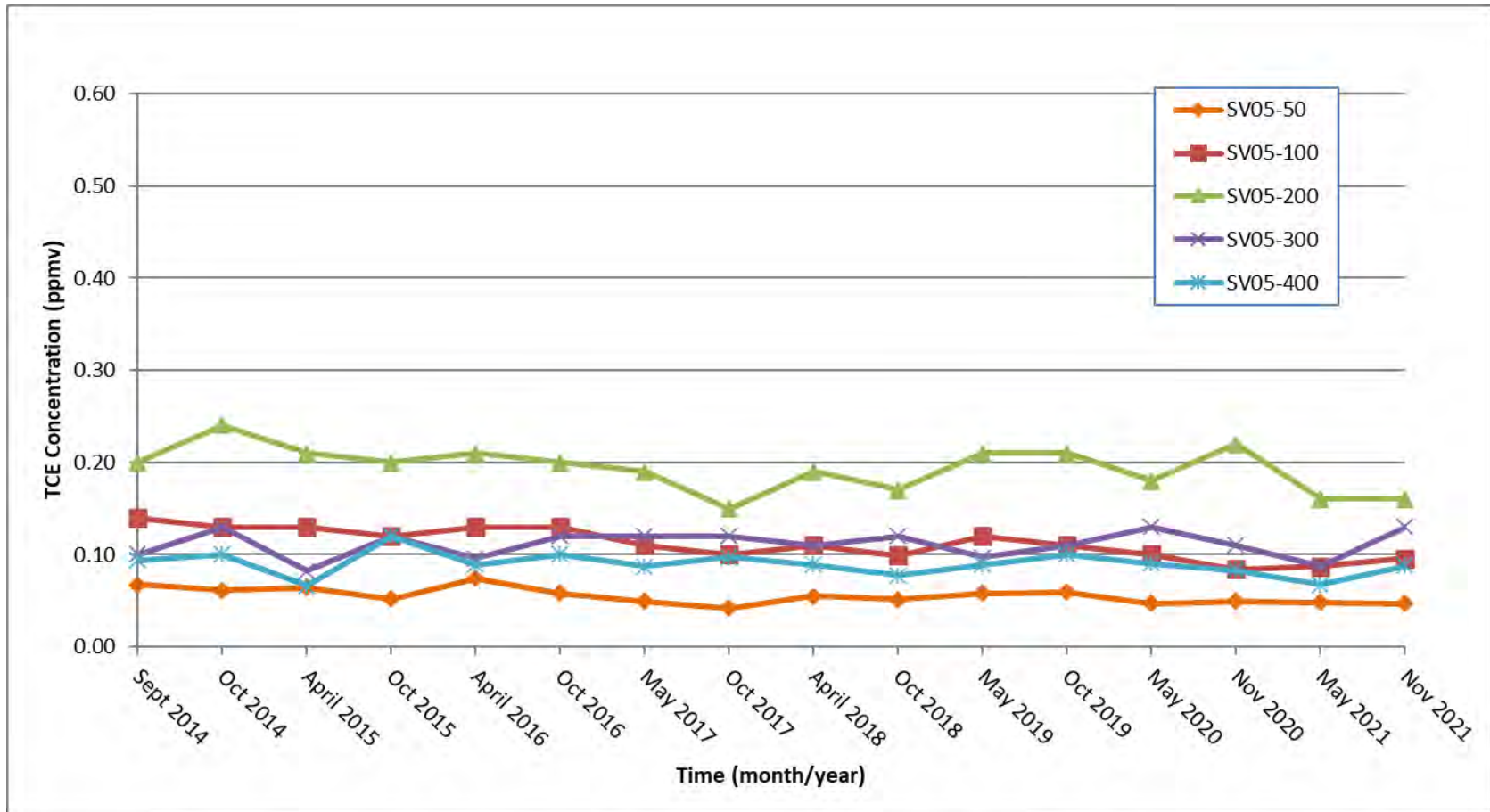


Figure 5-9  
TCE Concentrations vs. Time  
Mixed Waste Landfill Soil-Vapor Monitoring Well SV05 Ports



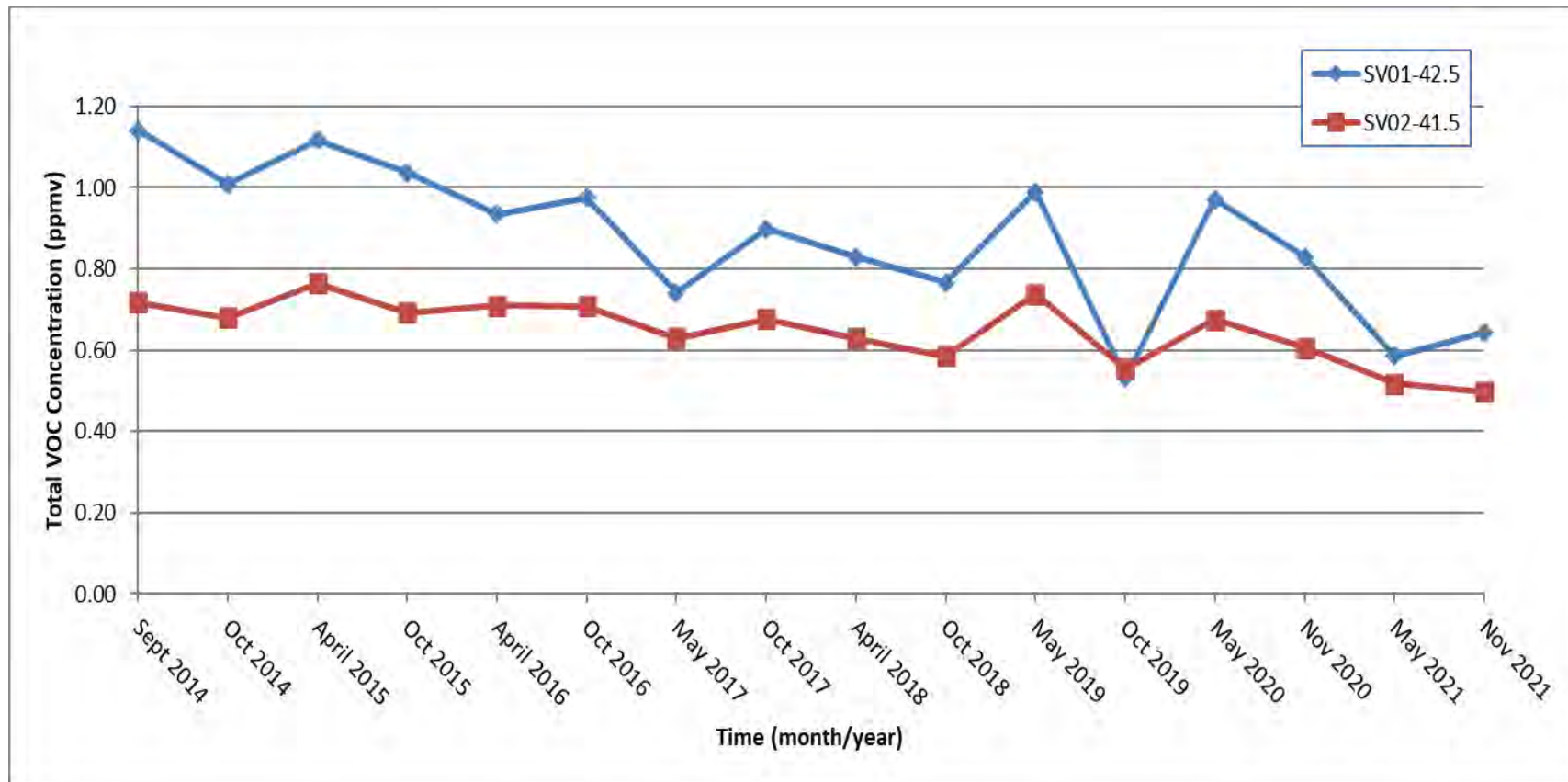


Figure 5-10  
Total VOCs Concentrations vs. Time  
Mixed Waste Landfill Soil-Vapor Monitoring Wells SV01 and SV02 Ports

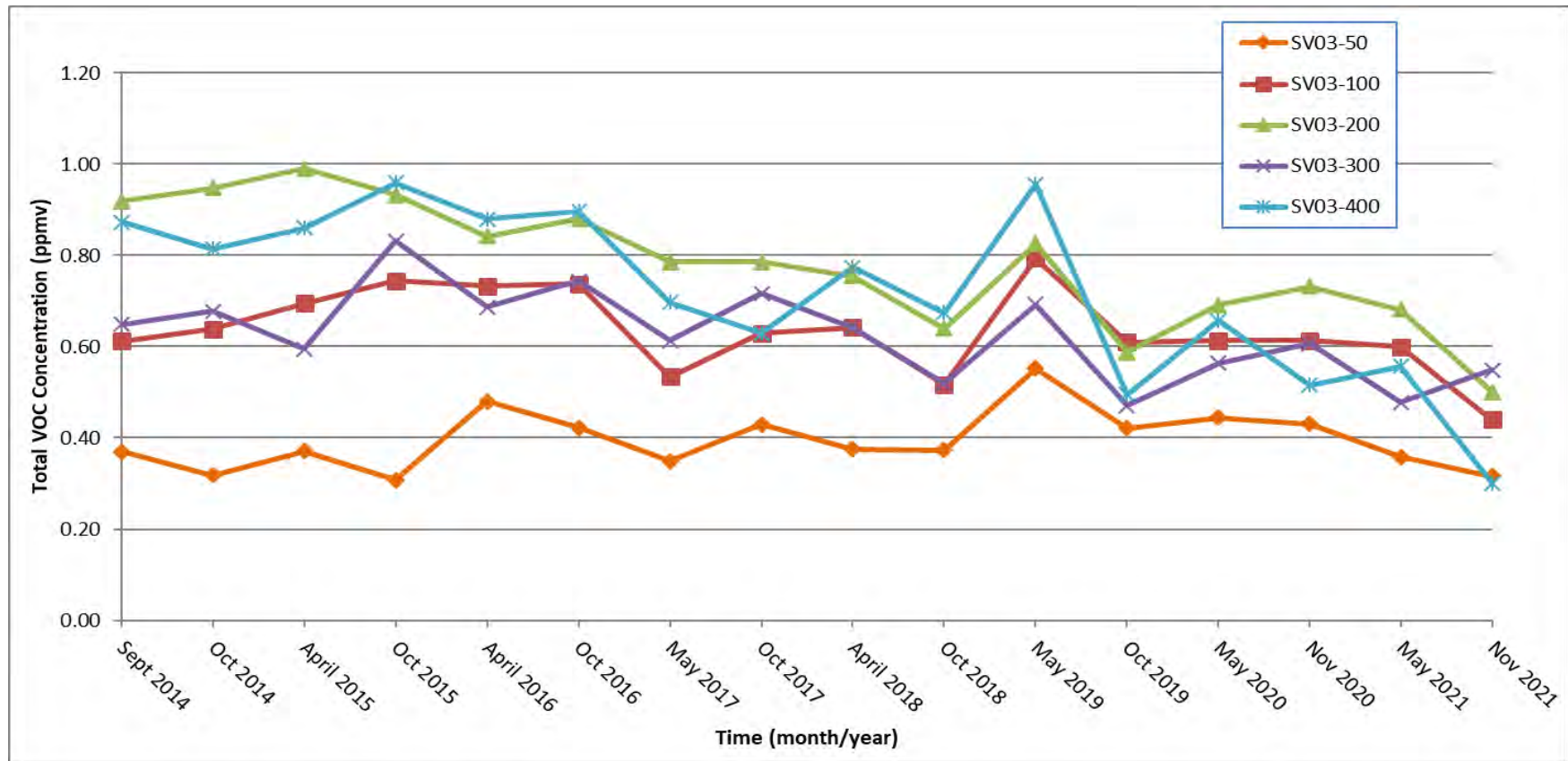


Figure 5-11  
Total VOCs Concentrations vs. Time  
Mixed Waste Landfill Soil-Vapor Monitoring Well SV03 Ports

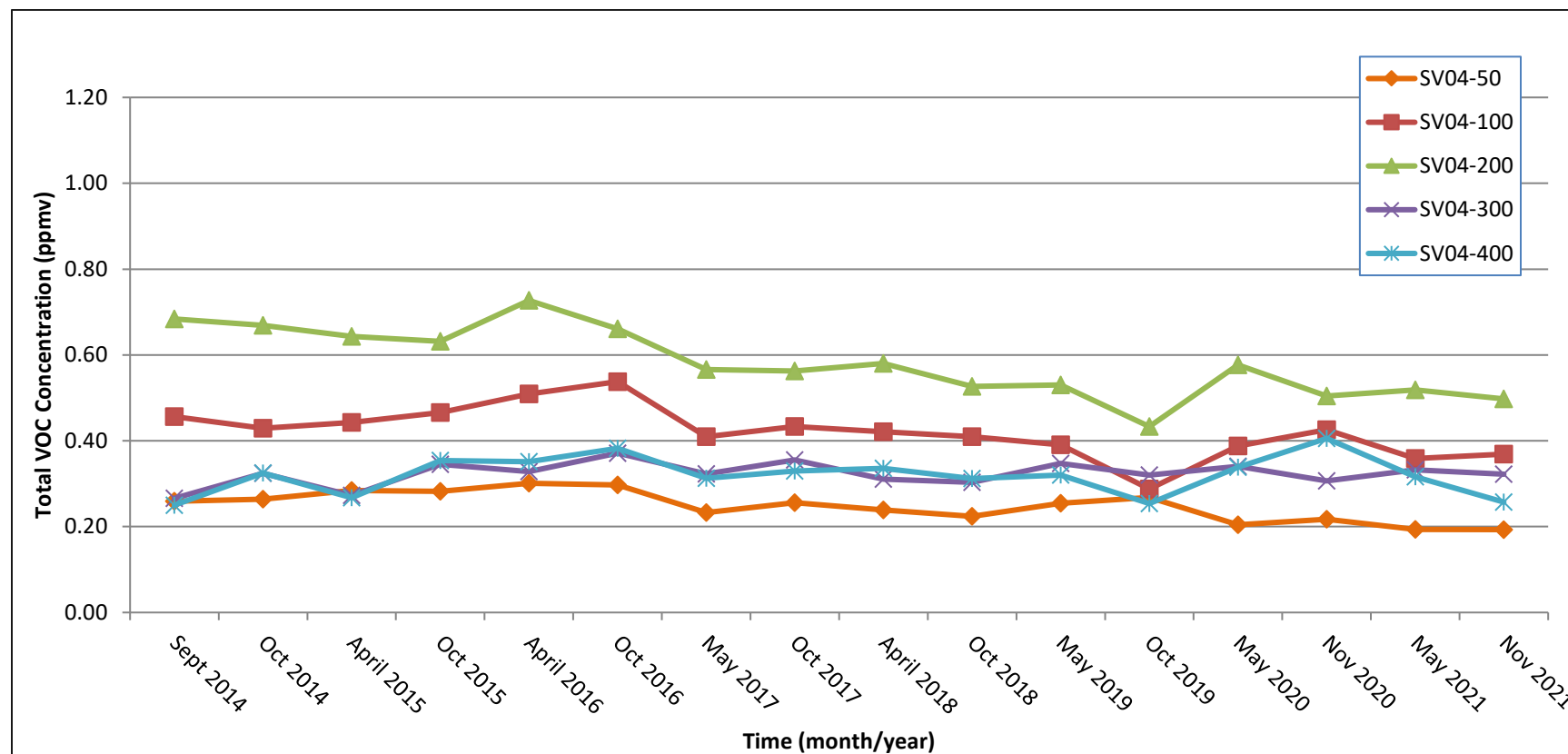


Figure 5-12  
Total VOCs Concentrations vs. Time  
Mixed Waste Landfill Soil-Vapor Monitoring Well SV04 Ports

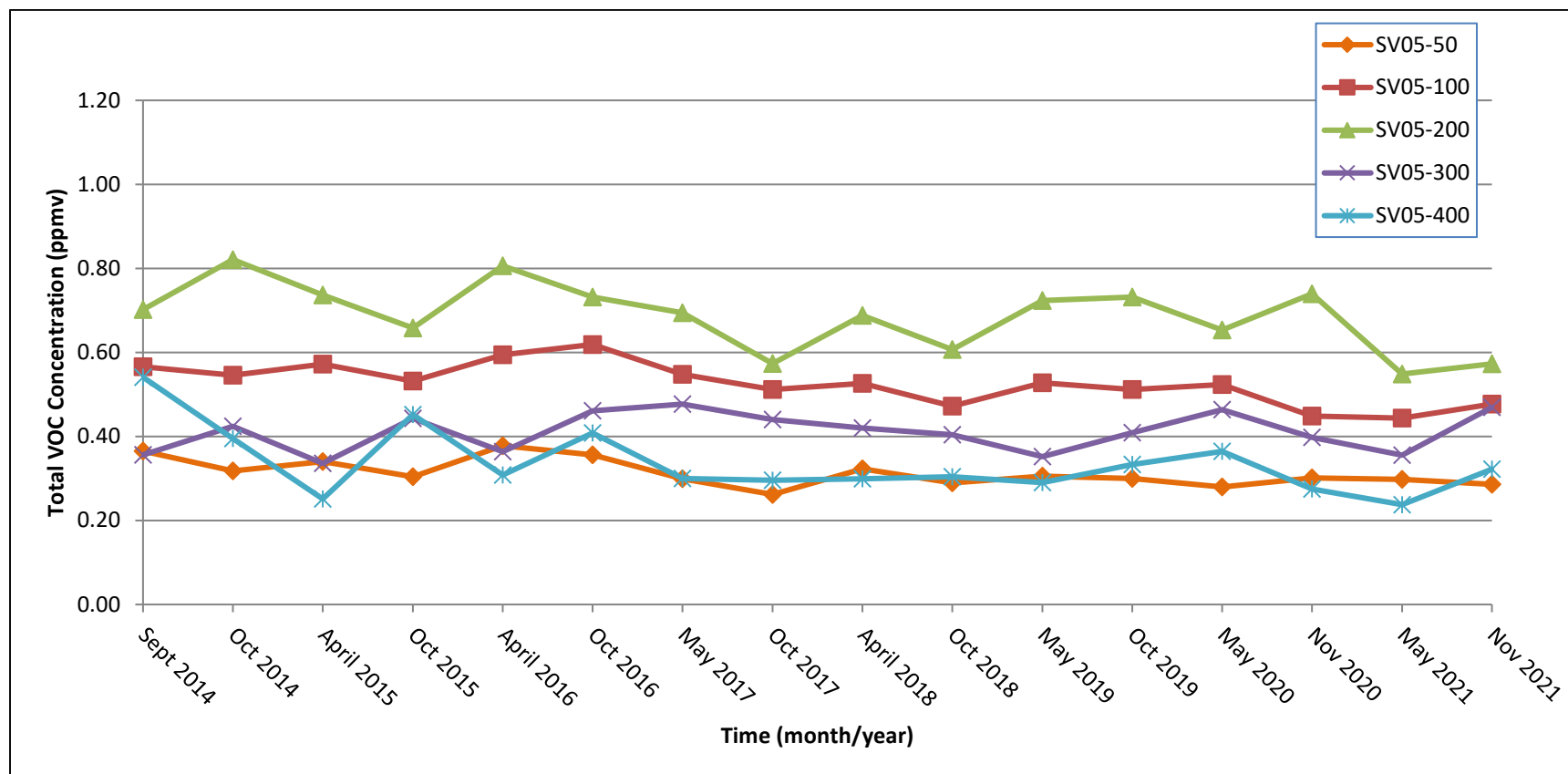


Figure 5-13  
Total VOCs Concentrations vs. Time  
Mixed Waste Landfill Soil-Vapor Monitoring Well SV05 Ports

Table 5-1  
Summary of Detected VOCs – May 2021

Table 5-2  
Summary of Detected VOCs – November 2021

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Table 5-1  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
May 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL-SV01-42.5 06-May-21	Carbon disulfide	0.0012	0.00057	0.010	B, J	0.01U
	Chloroform	0.010	0.00036	0.0042	--	--
	Dichlorodifluoromethane	0.067	0.00073	0.0042	--	--
	1,1-Dichloroethane	0.0015	0.00036	0.0042	J	--
	1,1-Dichloroethene	0.0045	0.00042	0.0042	--	--
	cis-1,2-Dichloroethene	0.00083	0.00052	0.0042	J	--
	Tetrachloroethene	0.26	0.00036	0.0042	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.048	0.00042	0.0042	--	--
	1,1,1-Trichloroethane	0.017	0.0019	0.0042	--	--
	Trichloroethene	0.057	0.00068	0.0021	--	--
	Trichlorofluoromethane	0.12	0.00057	0.0042	--	--
	Total Organics <sup>d</sup>	0.58583	NA	NA	NA	NA
MWL-SV02-41.5 06-May-21	Acetone	0.029	0.022	0.079	J	0.079U
	Benzene	0.00036	0.00031	0.0031	J	0.0031U
	2-Butanone	0.0074	0.0029	0.016	J	0.016U
	Carbon disulfide	0.0018	0.00043	0.0079	B, J	0.0079U
	Chloroform	0.0021	0.00027	0.0031	J	--
	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.00058	0.00047	0.0031	J, *+	--
	Dichlorodifluoromethane	0.082	0.00055	0.0031	--	--
	1,1-Dichloroethane	0.0015	0.00027	0.0031	J	--
	1,1-Dichloroethene	0.0067	0.00031	0.0031	--	--
	cis-1,2-Dichloroethene	0.00056	0.00039	0.0031	J	--
	Tetrachloroethene	0.048	0.00027	0.0031	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.035	0.00031	0.0031	--	--
	1,1,1-Trichloroethane	0.038	0.0015	0.0031	--	--
	Trichloroethene	0.044	0.00051	0.0016	--	--
	Trichlorofluoromethane	0.26	0.00043	0.0031	--	--
	Total Organics <sup>d</sup>	0.51844	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
May 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL-SV03-50 06-May-21	Benzene	0.00026	0.000091	0.00091	J	0.00091U
	Carbon disulfide	0.00024	0.00012	0.0023	B, J	0.0023U
	Carbon tetrachloride	0.00020	0.000080	0.00091	J	--
	Chloroform	0.0013	0.000080	0.00091	--	--
	Dichlorodifluoromethane	0.023	0.00016	0.00091	--	--
	1,1-Dichloroethane	0.0025	0.000080	0.00091	--	--
	1,1-Dichloroethene	0.0092	0.000091	0.00091	--	--
	cis-1,2-Dichloroethene	0.0014	0.00011	0.00091	--	--
	Tetrachloroethene	0.14	0.000080	0.00091	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.058	0.000091	0.00091	--	--
	1,1,1-Trichloroethane	0.0015	0.00042	0.00091	--	--
	Trichloroethene	0.10	0.00015	0.00045	--	--
	Trichlorofluoromethane	0.021	0.00012	0.00091	--	--
	Total Organics <sup>d</sup>	0.35810	NA	NA	NA	NA
MWL-SV03-50 (Duplicate) 06-May-21	Benzene	0.00025	0.000066	0.00066	J	0.00066U
	Carbon disulfide	0.00042	0.000091	0.0017	B, J	0.0017U
	Carbon tetrachloride	0.00022	0.000058	0.00066	J	--
	Chloroform	0.0012	0.000058	0.00066	--	--
	Dichlorodifluoromethane	0.022	0.00012	0.00066	--	--
	1,1-Dichloroethane	0.0024	0.000058	0.00066	--	--
	1,1-Dichloroethene	0.0091	0.000066	0.00066	--	--
	cis-1,2-Dichloroethene	0.0014	0.000083	0.00066	--	--
	Tetrachloroethene	0.11	0.000096	0.0011	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.057	0.000066	0.00066	--	--
	1,1,1-Trichloroethane	0.0014	0.00031	0.00066	--	--
	1,1,2-Trichloroethane	0.000090	0.000058	0.00066	J	--
	Trichloroethene	0.10	0.00011	0.00033	--	--
	Trichlorofluoromethane	0.020	0.000091	0.00066	--	--
	Total Organics <sup>d</sup>	0.32481	NA	NA	NA	NA

Refer to footnotes at end of table.



Table 5-1 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
May 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>c</sup> (ppm v/v)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL-SV03-100 06-May-21	Benzene	0.00023	0.00012	0.0012	J	0.0012U
	Carbon disulfide	0.0034	0.00016	0.0030	B	--
	Carbon tetrachloride	0.00031	0.00010	0.0012	J	--
	Chloroform	0.0020	0.00010	0.0012	--	--
	Dichlorodifluoromethane	0.041	0.00021	0.0012	--	--
	1,1-Dichloroethane	0.0043	0.00010	0.0012	--	--
	1,1-Dichloroethene	0.016	0.00012	0.0012	--	--
	cis-1,2-Dichloroethene	0.0026	0.00015	0.0012	--	--
	Tetrachloroethene	0.21	0.00010	0.0012	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.10	0.00012	0.0012	--	--
	1,1,1-Trichloroethane	0.0023	0.00055	0.0012	--	--
	1,1,2-Trichloroethane	0.00013	0.00010	0.0012	J	--
	Trichloroethene	0.18	0.00019	0.00060	--	--
	Trichlorofluoromethane	0.037	0.00016	0.0012	--	--
	Total Organics <sup>d</sup>	0.59904	NA	NA	NA	NA
MWL-SV03-200 06-May-21	Benzene	0.00026	0.00012	0.0012	J	0.0012U
	Carbon disulfide	0.00041	0.00016	0.0029	B, J	0.0029U
	Carbon tetrachloride	0.00034	0.00010	0.0012	J	--
	Chlorobenzene	0.00012	0.000088	0.0012	B, J	0.0012U
	Chloroform	0.0020	0.00010	0.0012	--	--
	Dichlorodifluoromethane	0.045	0.00020	0.0012	--	--
	1,1-Dichloroethane	0.0052	0.00010	0.0012	--	--
	1,1-Dichloroethene	0.021	0.00012	0.0012	--	--
	cis-1,2-Dichloroethene	0.0032	0.00015	0.0012	--	--
	Tetrachloroethene	0.23	0.00010	0.0012	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.12	0.00012	0.0012	--	--
	1,1,1-Trichloroethane	0.0015	0.00054	0.0012	--	--
	Trichloroethene	0.22	0.00019	0.00058	--	--
	Trichlorofluoromethane	0.033	0.00016	0.0012	--	--
	Total Organics <sup>d</sup>	0.68124	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
May 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>c</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV03-300</b> 06-May-21	Benzene	0.00025	0.00017	0.0017	J	0.0017U
	Carbon disulfide	0.00031	0.00023	0.0042	B, J	0.0042U
	Carbon tetrachloride	0.00023	0.00015	0.0017	J	--
	Chlorobenzene	0.00019	0.00013	0.0017	J	0.0017U
	Chloroform	0.0011	0.00015	0.0017	J	--
	Dichlorodifluoromethane	0.032	0.00029	0.0017	--	--
	1,1-Dichloroethane	0.0020	0.00015	0.0017	--	--
	1,1-Dichloroethene	0.012	0.00017	0.0017	--	--
	cis-1,2-Dichloroethene	0.0015	0.00021	0.0017	J	--
	Tetrachloroethene	0.20	0.00015	0.0017	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.077	0.00017	0.0017	--	--
	Trichloroethene	0.14	0.00027	0.00083	--	--
	Trichlorofluoromethane	0.012	0.00023	0.0017	--	--
	Total Organics <sup>d</sup>	0.47783	NA	NA	NA	NA
<b>MWL-SV03-400</b> 06-May-21  <b>Trigger Levels</b> Tetrachloroethene = 20 ppmv Trichloroethene = 20 ppmv Total Organics = 25 ppmv	Benzene	0.00031	0.00022	0.0022	J	0.0022U
	Carbon disulfide	0.00049	0.00030	0.0055	B, J	0.0055U
	Carbon tetrachloride	0.00021	0.00019	0.0022	J	--
	Chlorobenzene	0.00026	0.00016	0.0022	J	0.0022U
	Chloroform	0.0011	0.00019	0.0022	J	--
	Dichlorodifluoromethane	0.0048	0.00038	0.0022	--	--
	1,1-Dichloroethane	0.0025	0.00019	0.0022	--	--
	1,1-Dichloroethene	0.014	0.00022	0.0022	--	--
	cis-1,2-Dichloroethene	0.0014	0.00027	0.0022	J	--
	Tetrachloroethene	0.32	0.00019	0.0022	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.025	0.00022	0.0022	--	--
	Trichloroethene	0.18	0.00036	0.0011	--	--
	Trichlorofluoromethane	0.0073	0.00030	0.0022	--	--
	Total Organics <sup>d</sup>	0.55631	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
May 2021

Well ID/Sample Port	Analyte	Result <sup>a</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV03-400</b> (Duplicate) 06-May-21  <b>Trigger Levels</b> Tetrachloroethene = 20 ppmv Trichloroethene = 20 ppmv Total Organics = 25 ppmv	Benzene	0.00035	0.00022	0.0022	J	0.0022U
	Carbon disulfide	0.00037	0.00030	0.0055	B, J	0.0055U
	Chloroform	0.0012	0.00019	0.0022	J	--
	Dichlorodifluoromethane	0.0051	0.00038	0.0022	--	--
	1,1-Dichloroethane	0.0026	0.00019	0.0022	--	--
	1,1-Dichloroethene	0.014	0.00022	0.0022	--	--
	cis-1,2-Dichloroethene	0.0015	0.00027	0.0022	J	--
	Tetrachloroethene	0.32	0.00019	0.0022	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.025	0.00022	0.0022	--	--
	Trichloroethene	0.18	0.00036	0.0011	--	--
	Trichlorofluoromethane	0.0075	0.00030	0.0022	--	--
	Total Organics <sup>d</sup>	0.5569	NA	NA	NA	NA
<b>MWL-SV04-50</b> 06-May-21	Acetone	0.0044	0.0041	0.015	J	0.015U
	Benzene	0.00024	0.000058	0.00058	J	--
	2-Butanone	0.00068	0.00053	0.0029	J	0.0029U
	Carbon disulfide	0.00015	0.000080	0.0015	B, J	0.0015U
	Carbon tetrachloride	0.00015	0.000051	0.00058	J	--
	Chloroform	0.0014	0.000051	0.00058	--	--
	Dichlorodifluoromethane	0.015	0.00010	0.00058	--	--
	1,1-Dichloroethane	0.00097	0.000051	0.00058	--	--
	1,1-Dichloroethene	0.0046	0.000058	0.00058	--	--
	cis-1,2-Dichloroethene	0.00041	0.000073	0.00058	J	--
	Tetrachloroethene	0.055	0.000051	0.00058	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.043	0.000058	0.00058	--	--
	1,1,1-Trichloroethane	0.0050	0.00027	0.00058	--	--
	Trichloroethene	0.045	0.000094	0.00029	--	--
	Trichlorofluoromethane	0.023	0.000080	0.00058	--	--
	Total Organics <sup>d</sup>	0.19377	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
May 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>c</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL-SV04-100 06-May-21	Benzene	0.00029	0.000099	0.00099	J	--
	Carbon disulfide	0.00024	0.00014	0.0025	B, J	0.0025U
	Carbon tetrachloride	0.00026	0.000087	0.00099	J	--
	Chlorobenzene	0.00012	0.000075	0.00099	B, J	0.00099U
	Chloroform	0.0017	0.000087	0.00099	--	--
	Dichlorodifluoromethane	0.028	0.00017	0.00099	--	--
	1,1-Dichloroethane	0.0021	0.000087	0.00099	--	--
	1,1-Dichloroethene	0.011	0.000099	0.00099	--	--
	cis-1,2-Dichloroethene	0.0011	0.00012	0.00099	--	--
	Tetrachloroethene	0.10	0.000087	0.00099	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.075	0.000099	0.00099	--	--
	1,1,1-Trichloroethane	0.0041	0.00046	0.00099	--	--
	Trichloroethene	0.10	0.00016	0.00050	--	--
	Trichlorofluoromethane	0.035	0.00014	0.00099	--	--
	Total Organics <sup>d</sup>	0.35855	NA	NA	NA	NA
MWL-SV04-200 06-May-21	Benzene	0.00041	0.00015	0.0015	J	--
	Carbon disulfide	0.00031	0.00021	0.0038	B, J	0.0038U
	Carbon tetrachloride	0.00041	0.00013	0.0015	J	--
	Chloroform	0.0014	0.00013	0.0015	J	--
	Dichlorodifluoromethane	0.047	0.00026	0.0015	--	--
	1,1-Dichloroethane	0.0042	0.00013	0.0015	--	--
	1,1-Dichloroethene	0.023	0.00015	0.0015	--	--
	cis-1,2-Dichloroethene	0.0025	0.00019	0.0015	--	--
	Tetrachloroethene	0.11	0.00013	0.0015	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.13	0.00015	0.0015	--	--
	1,1,1-Trichloroethane	0.0017	0.00069	0.0015	--	--
	Trichloroethene	0.16	0.00024	0.00075	--	--
	Trichlorofluoromethane	0.038	0.00021	0.0015	--	--
	Total Organics <sup>d</sup>	0.51862	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
May 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL-SV04-300 06-May-21	Benzene	0.00040	0.00016	0.0016	J	--
	Carbon disulfide	0.00038	0.00021	0.0039	B, J	0.0039U
	Carbon tetrachloride	0.00027	0.00014	0.0016	J	--
	Chloroform	0.00069	0.00014	0.0016	J	--
	Dichlorodifluoromethane	0.030	0.00027	0.0016	--	--
	1,1-Dichloroethane	0.0011	0.00014	0.0016	J	--
	1,1-Dichloroethene	0.012	0.00016	0.0016	--	--
	cis-1,2-Dichloroethene	0.00073	0.00020	0.0016	J	--
	Tetrachloroethene	0.11	0.00014	0.0016	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.080	0.00016	0.0016	--	--
	1,1,1-Trichloroethane	0.00090	0.00072	0.0016	J	--
	Trichloroethene	0.079	0.00025	0.00078	--	--
	Trichlorofluoromethane	0.017	0.00021	0.0016	--	--
MWL-SV04-400 06-May-21  Trigger Levels Tetrachloroethene = 20 ppmv Trichloroethene = 20 ppmv Total Organics = 25 ppmv	Total Organics <sup>d</sup>	0.33209	NA	NA	NA	NA
	Acetone	0.012	0.0044	0.015	J	0.015U
	Benzene	0.00053	0.000061	0.00061	J	--
	2-Butanone	0.0018	0.00056	0.0031	J	0.0031U
	Carbon disulfide	0.00077	0.000084	0.0015	B, J	0.0015U
	Carbon tetrachloride	0.00018	0.000054	0.00061	J	--
	Chlorobenzene	0.000067	0.000046	0.00061	B, J	0.00061U
	Chloroform	0.00055	0.000054	0.00061	J	--
	Dichlorodifluoromethane	0.025	0.00011	0.00061	--	--
	1,1-Dichloroethane	0.00086	0.000054	0.00061	--	--
	1,1-Dichloroethene	0.0085	0.000061	0.00061	--	--
	cis-1,2-Dichloroethene	0.00061	0.000077	0.00061	--	--
	Tetrachloroethene	0.11	0.00011	0.0012	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.075	0.000061	0.00061	--	--
	1,1,1-Trichloroethane	0.00063	0.00028	0.00061	--	--
	Trichloroethene	0.080	0.000099	0.00031	--	--
	Trichlorofluoromethane	0.014	0.000084	0.00061	--	--
	Total Organics <sup>d</sup>	0.31586	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
May 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV05-50</b> 06-May-21	Acetone	0.0077	0.0046	0.016	J	--
	Benzene	0.00017	0.000064	0.00064	J	--
	2-Butanone	0.00086	0.00059	0.0032	J	--
	Carbon disulfide	0.00025	0.000089	0.0016	B, J	0.0016U
	Carbon tetrachloride	0.00026	0.000056	0.00064	J	--
	Chlorobenzene	0.000063	0.000048	0.00064	J	--
	Chloroform	0.00099	0.000056	0.00064	--	--
	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.00017	0.000097	0.00064	J, *+	--
	Dichlorodifluoromethane	0.042	0.00011	0.00064	--	--
	1,1-Dichloroethane	0.0012	0.000056	0.00064	--	--
	1,1-Dichloroethene	0.0078	0.000064	0.00064	--	--
	cis-1,2-Dichloroethene	0.00053	0.000081	0.00064	J	--
	Tetrachloroethene	0.042	0.000056	0.00064	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.037	0.000064	0.00064	--	--
	1,1,1-Trichloroethane	0.0088	0.00030	0.00064	--	--
	Trichloroethene	0.048	0.00010	0.00032	--	--
	Trichlorofluoromethane	0.10	0.000089	0.00064	--	--
	Total Organics <sup>d</sup>	0.297543	NA	NA	NA	NA
<b>MWL-SV05-100</b> 06-May-21	Benzene	0.00031	0.00015	0.0015	J	--
	Carbon disulfide	0.0043	0.00020	0.0037	B	--
	Carbon tetrachloride	0.00037	0.00013	0.0015	J	--
	Chlorobenzene	0.00015	0.00011	0.0015	J	--
	Chloroform	0.0015	0.00013	0.0015	--	--
	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.00024	0.00022	0.0015	J, *+	--
	Dichlorodifluoromethane	0.065	0.00026	0.0015	--	--
	1,1-Dichloroethane	0.0023	0.00013	0.0015	--	--
	1,1-Dichloroethene	0.016	0.00015	0.0015	--	--
	cis-1,2-Dichloroethene	0.00096	0.00019	0.0015	J	--
	Tetrachloroethene	0.069	0.00013	0.0015	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.068	0.00015	0.0015	--	--
	1,1,1-Trichloroethane	0.0085	0.00068	0.0015	--	--
	Trichloroethene	0.087	0.00024	0.00074	--	--
	Trichlorofluoromethane	0.12	0.00020	0.0015	--	--
	Total Organics <sup>d</sup>	0.44363	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
May 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL-SV05-200 06-May-21	Benzene	0.00038	0.00015	0.0015	J	--
	Carbon disulfide	0.00027	0.00021	0.0038	J	--
	Carbon tetrachloride	0.00067	0.00013	0.0015	J	--
	Chlorobenzene	0.00017	0.00011	0.0015	J	--
	Chloroform	0.0015	0.00013	0.0015	--	--
	Dichlorodifluoromethane	0.058	0.00026	0.0015	--	--
	1,1-Dichloroethane	0.0034	0.00013	0.0015	--	--
	1,1-Dichloroethene	0.026	0.00015	0.0015	--	--
	cis-1,2-Dichloroethene	0.0018	0.00019	0.0015	--	--
	Tetrachloroethene	0.11	0.00013	0.0015	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.11	0.00015	0.0015	--	--
	1,1,1-Trichloroethane	0.0025	0.00069	0.0015	--	--
	Trichloroethene	0.16	0.00024	0.00075	--	--
	Trichlorofluoromethane	0.074	0.00021	0.0015	--	--
	Total Organics <sup>d</sup>	0.54869	NA	NA	NA	NA
MWL-SV05-300 06-May-21	Benzene	0.00032	0.00012	0.0012	J	--
	Carbon disulfide	0.00027	0.00017	0.0031	B, J	0.0031U
	Carbon tetrachloride	0.00061	0.00011	0.0012	J	--
	Chloroform	0.00070	0.00011	0.0012	J	--
	Dichlorodifluoromethane	0.038	0.00022	0.0012	--	--
	1,1-Dichloroethane	0.0014	0.00011	0.0012	--	--
	1,1-Dichloroethene	0.019	0.00012	0.0012	--	--
	cis-1,2-Dichloroethene	0.00077	0.00016	0.0012	J	--
	Tetrachloroethene	0.081	0.00011	0.0012	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.096	0.00012	0.0012	--	--
	1,1,1-Trichloroethane	0.00092	0.00058	0.0012	J	--
	Trichloroethene	0.088	0.00020	0.00062	--	--
	Trichlorofluoromethane	0.029	0.00017	0.0012	--	--
	Total Organics <sup>d</sup>	0.35572	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
May 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV05-400</b> 06-May-21  <b>Trigger Levels</b> Tetrachloroethene = 20 ppmv Trichloroethene = 20 ppmv Total Organics = 25 ppmv	Benzene	0.00034	0.00012	0.0012	J	--
	Carbon disulfide	0.00035	0.00016	0.0030	B, J	0.003U
	Carbon tetrachloride	0.00029	0.00010	0.0012	J	--
	Chlorobenzene	0.00013	0.000089	0.0012	J	--
	Chloroform	0.00057	0.00010	0.0012	J	--
	Dichlorodifluoromethane	0.016	0.00021	0.0012	--	--
	1,1-Dichloroethane	0.0010	0.00010	0.0012	J	--
	1,1-Dichloroethene	0.012	0.00012	0.0012	--	--
	cis-1,2-Dichloroethene	0.00051	0.00015	0.0012	J	--
	Tetrachloroethene	0.080	0.00010	0.0012	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.039	0.00012	0.0012	--	--
	1,1,1-Trichloroethane	0.00082	0.00055	0.0012	J	--
	Trichloroethene	0.067	0.00019	0.00059	--	--
	Trichlorofluoromethane	0.020	0.00016	0.0012	--	--
	Total Organics <sup>d</sup>	0.23766	NA	NA	NA	NA

Refer to footnotes at end of table.



Table 5-1 (Concluded)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
May 2021

Notes:

<sup>a</sup>U.S. Environmental Protection Agency, 1999, "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Compendium Method TO-15, Determination Of Volatile Organic Compounds In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry," Center for Environmental Research Information, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio.

<sup>b</sup>Results, MDL, and RL are reported in parts per million by volume.

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

Laboratory Qualifier

B = Compound was found in the blank sample.

J = Result is greater than the MDL but less than the RL; the concentration is an approximate value.

\*+ = Laboratory control sample and/or laboratory control sample duplicate is outside acceptance limits, high biased.

Validation Qualifier

U = The analyte was reported as a detection by the laboratory but was qualified during data validation as not detected. The associated numerical value is the revised sample quantitation limit (i.e., RL) in units of ppmv, in accordance with the data validation process.

<sup>d</sup>Total Organics or Total VOCs - Sum of validated detected organic analytes (i.e., results for analytes qualified during data validation as not detected are not included in the total).

EPA = U.S. Environmental Protection Agency.

ID = Identification.

MWL = Mixed Waste Landfill.

MDL = Method detection limit. The minimum concentration that can be measured and reported with 99 percent confidence that the analyte is present (i.e., greater than zero).

NA = Not applicable.

ppmv = Parts per million by volume.

RL = Reporting limit. Minimum concentration that can be reported with a statistically established degree of confidence.

VOC = Volatile organic compound.

Table 5-2  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
November 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL-SV01-42.5 05-Nov-21	Bromodichloromethane	0.00057	0.00035	0.0016	J	--
	2-Butanone	0.0024	0.0014	0.0078	J	--
	Carbon disulfide	0.00030	0.00021	0.0039	J	--
	Carbon tetrachloride	0.00024	0.00014	0.0016	J	--
	Chlorobenzene	0.00025	0.00012	0.0016	B, J	0.0016U
	Chloroform	0.012	0.00014	0.0016	--	--
	1,2-Dibromoethane	0.00016	0.00014	0.0016	J	--
	Dichlorodifluoromethane	0.057	0.00027	0.0016	--	--
	1,1-Dichloroethane	0.0014	0.00014	0.0016	J	--
	1,1-Dichloroethene	0.0046	0.00016	0.0016	--	--
	cis-1,2-Dichloroethene	0.0012	0.00020	0.0016	J	--
	Tetrachloroethene	0.31	0.00014	0.0016	--	J
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.049	0.00016	0.0016	--	--
	1,1,1-Trichloroethane	0.021	0.00072	0.0016	--	--
	1,1,2-Trichloroethane	0.00033	0.00014	0.0016	J	--
	Trichloroethene	0.063	0.00025	0.00078	--	--
	Trichlorofluoromethane	0.12	0.00021	0.0016	--	--
	Total Organics <sup>d</sup>	0.64320	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
November 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL-SV02-41.5 05-Nov-21	Acetone	0.0081	0.0022	0.0077	--	--
	Benzene	0.00013	0.000031	0.00031	B, J	0.00031U
	2-Butanone	0.0074	0.00028	0.0015	--	--
	Carbon disulfide	0.00013	0.000042	0.00077	J	--
	Carbon tetrachloride	0.00028	0.000027	0.00031	J	--
	Chloroform	0.0021	0.000027	0.00031	--	--
	1,2-Dibromoethane	0.000039	0.000027	0.00031	J	--
	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.00026	0.000046	0.00031	J	--
	Dichlorodifluoromethane	0.059	0.00054	0.0031	--	--
	1,1-Dichloroethane	0.0014	0.000027	0.00031	--	--
	1,1-Dichloroethene	0.0070	0.000031	0.00031	--	--
	cis-1,2-Dichloroethene	0.00057	0.000038	0.00031	--	--
	2-Hexanone	0.00056	0.000061	0.00077	J	--
	Tetrachloroethene	0.061	0.000027	0.00031	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.035	0.000031	0.00031	--	--
	1,1,1-Trichloroethane	0.045	0.00014	0.00031	--	--
	Trichloroethene	0.050	0.000050	0.00015	--	--
	Trichlorofluoromethane	0.22	0.00042	0.0031	--	--
	Total Organics <sup>d</sup>	0.497839	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
November 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL-SV03-50 05-Nov-21	Acetone	0.0026	0.0023	0.0081	J	0.0081U
	Benzene	0.00019	0.000032	0.00032	B, J	0.00032U
	2-Butanone	0.00042	0.00029	0.0016	J	--
	Carbon disulfide	0.000081	0.000044	0.00081	J	--
	Carbon tetrachloride	0.00024	0.000028	0.00032	J	--
	Chloroform	0.0013	0.000028	0.00032	--	--
	1,2-Dibromoethane	0.000041	0.000028	0.00032	J	--
	Dichlorodifluoromethane	0.020	0.000056	0.00032	--	--
	1,1-Dichloroethane	0.0024	0.000028	0.00032	--	--
	1,1-Dichloroethene	0.0090	0.000032	0.00032	--	--
	cis-1,2-Dichloroethene	0.0016	0.000040	0.00032	--	--
	2-Hexanone	0.00019	0.000064	0.00081	J	--
	Tetrachloroethene	0.10	0.00019	0.0021	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.065	0.000032	0.00032	--	J
	1,1,1-Trichloroethane	0.0019	0.00015	0.00032	--	--
	1,1,2-Trichloroethane	0.000094	0.000028	0.00032	J	--
	Trichloroethene	0.090	0.00035	0.0011	--	--
	Trichlorofluoromethane	0.023	0.000044	0.00032	--	--
	Vinyl acetate	0.00027	0.00011	0.0016	J	--
	Total Organics <sup>d</sup>	0.315536	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
November 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV03-100</b> 05-Nov-21	Acetone	0.0049	0.0043	0.015	J	0.015U
	Benzene	0.00017	0.000061	0.00061	B, J	0.00061U
	2-Butanone	0.00064	0.00055	0.0030	J	--
	Carbon tetrachloride	0.00029	0.000053	0.00061	J	--
	Chlorobenzene	0.00011	0.000046	0.00061	B, J	0.00061U
	Chloroform	0.0019	0.000053	0.00061	--	--
	Dichlorodifluoromethane	0.028	0.00011	0.00061	--	--
	1,1-Dichloroethane	0.0038	0.000053	0.00061	--	--
	1,1-Dichloroethene	0.013	0.000061	0.00061	--	--
	cis-1,2-Dichloroethene	0.0025	0.000076	0.00061	--	--
	Tetrachloroethene	0.14	0.00027	0.0030	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.087	0.000061	0.00061	--	--
	1,1,1-Trichloroethane	0.0023	0.00028	0.00061	--	--
	1,1,2-Trichloroethane	0.00010	0.000053	0.00061	J	--
	Trichloroethene	0.13	0.00049	0.0015	--	--
	Trichlorofluoromethane	0.030	0.000084	0.00061	--	--
	Total Organics <sup>d</sup>	0.43953	NA	NA	NA	NA
<b>MWL-SV03-200</b> 05-Nov-21	Benzene	0.00046	0.00032	0.0032	B, J	0.0032U
	Chlorobenzene	0.00072	0.00024	0.0032	B, J	0.0032U
	Chloroform	0.0019	0.00028	0.0032	J	--
	1,2-Dibromoethane	0.00036	0.00028	0.0032	J	--
	Dichlorodifluoromethane	0.029	0.00055	0.0032	--	--
	1,1-Dichloroethane	0.0047	0.00028	0.0032	--	--
	1,1-Dichloroethene	0.016	0.00032	0.0032	--	--
	cis-1,2-Dichloroethene	0.0034	0.00040	0.0032	--	--
	Tetrachloroethene	0.17	0.00028	0.0032	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.089	0.00032	0.0032	--	--
	1,1,1-Trichloroethane	0.0016	0.0015	0.0032	J	--
	Trichloroethene	0.16	0.00051	0.0016	--	--
	Trichlorofluoromethane	0.024	0.00043	0.0032	--	--
	Total Organics <sup>d</sup>	0.49996	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
November 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV03-300</b> 05-Nov-21	Benzene	0.00030	0.00010	0.0010	B, J	0.001U
	Carbon disulfide	0.00020	0.00014	0.0026	J	--
	Carbon tetrachloride	0.00036	0.000092	0.0010	J	--
	Chlorobenzene	0.00023	0.000079	0.0010	B, J	0.001U
	Chloroform	0.0013	0.000092	0.0010	--	--
	1,2-Dibromoethane	0.000095	0.000092	0.0010	J	--
	Dichlorodifluoromethane	0.030	0.00018	0.0010	--	--
	1,1-Dichloroethane	0.0027	0.000092	0.0010	--	--
	1,1-Dichloroethene	0.016	0.00010	0.0010	--	--
	cis-1,2-Dichloroethene	0.0022	0.00013	0.0010	--	--
	Tetrachloroethene	0.21	0.00027	0.0031	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.10	0.00010	0.0010	--	--
	1,1,1-Trichloroethane	0.00078	0.00048	0.0010	J	--
	Trichloroethene	0.17	0.00017	0.00052	--	--
	Trichlorofluoromethane	0.015	0.00014	0.0010	--	--
	Total Organics <sup>d</sup>	0.548635	NA	NA	NA	NA
<b>MWL-SV03-400</b> 05-Nov-21  <b>Trigger Levels</b> Tetrachloroethene = 20 ppmv Trichloroethene = 20 ppmv Total Organics = 25 ppmv	Acetone	0.0074	0.0054	0.019	J	0.019U
	Benzene	0.00021	0.000076	0.00076	B, J	0.00076U
	2-Butanone	0.00092	0.00069	0.0038	J	--
	Carbon disulfide	0.00018	0.00010	0.0019	J	--
	Carbon tetrachloride	0.00025	0.000066	0.00076	J	--
	Chloroform	0.00092	0.000066	0.00076	--	--
	Dichlorodifluoromethane	0.0041	0.00013	0.00076	--	--
	1,1-Dichloroethane	0.0017	0.000066	0.00076	--	--
	1,1-Dichloroethene	0.0078	0.000076	0.00076	--	--
	cis-1,2-Dichloroethene	0.0013	0.000094	0.00076	--	--
	Tetrachloroethene	0.14	0.000066	0.00076	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.018	0.000076	0.00076	--	--
	1,1,1-Trichloroethane	0.00058	0.00035	0.00076	J	--
	1,1,2-Trichloroethane	0.00090	0.000066	0.00076	J	--
	Trichloroethene	0.12	0.00012	0.00038	--	--
	Trichlorofluoromethane	0.0052	0.00010	0.00076	--	--
	Total Organics <sup>d</sup>	0.301040	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
November 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV04-50</b> 05-Nov-21	Benzene	0.00029	0.000089	0.00089	B, J	0.00089U
	Carbon disulfide	0.00059	0.00012	0.0022	B, J	0.0022U
	Carbon tetrachloride	0.00022	0.000078	0.00089	J	
	Chlorobenzene	0.00015	0.000066	0.00089	B, J	0.00089U
	Chloroform	0.0017	0.000078	0.00089	--	--
	Dichlorodifluoromethane	0.017	0.00016	0.00089	--	--
	1,1-Dichloroethane	0.0011	0.000078	0.00089	--	--
	1,1-Dichloroethene	0.0042	0.000089	0.00089	--	--
	cis-1,2-Dichloroethene	0.00035	0.00011	0.00089	J	--
	Tetrachloroethene	0.053	0.000078	0.00089	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.042	0.000089	0.00089	--	--
	1,1,1-Trichloroethane	0.0065	0.00041	0.00089	--	--
	Trichloroethene	0.041	0.00014	0.00044	--	--
	Trichlorofluoromethane	0.026	0.00012	0.00089	--	--
	Total Organics <sup>d</sup>	0.19307	NA	NA	NA	NA
<b>MWL-SV04-100</b> 05-Nov-21	Carbon disulfide	0.00025	0.00017	0.0031	B, J	0.0031U
	Carbon tetrachloride	0.00030	0.00011	0.0012	J	--
	Chlorobenzene	0.00017	0.000092	0.0012	B, J	0.0012U
	Chloroform	0.0021	0.00011	0.0012	--	--
	Dichlorodifluoromethane	0.032	0.00021	0.0012	--	--
	1,1-Dichloroethane	0.0029	0.00011	0.0012	--	--
	1,1-Dichloroethene	0.012	0.00012	0.0012	--	--
	cis-1,2-Dichloroethene	0.0013	0.00015	0.0012	--	--
	Tetrachloroethene	0.10	0.00011	0.0012	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.076	0.00012	0.0012	--	--
	1,1,1-Trichloroethane	0.0053	0.00057	0.0012	--	--
	Trichloroethene	0.096	0.00020	0.00061	--	--
	Trichlorofluoromethane	0.041	0.00017	0.0012	--	--
	Total Organics <sup>d</sup>	0.36890	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
November 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV04-200</b> 05-Nov-21	Benzene	0.00044	0.00021	0.0021	B, J	0.0021U
	Carbon disulfide	0.00049	0.00029	0.0053	B, J	0.0053U
	Carbon tetrachloride	0.00031	0.00018	0.0021	J	--
	Chloroform	0.0013	0.00018	0.0021	J	--
	Dichlorodifluoromethane	0.041	0.00037	0.0021	--	--
	1,1-Dichloroethane	0.0040	0.00018	0.0021	--	--
	1,1-Dichloroethene	0.020	0.00021	0.0021	--	--
	cis-1,2-Dichloroethene	0.0019	0.00026	0.0021	J	--
	Tetrachloroethene	0.10	0.00018	0.0021	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.10	0.00021	0.0021	--	--
	1,1,1-Trichloroethane	0.0015	0.00097	0.0021	J	--
	Trichloroethene	0.13	0.00034	0.0011	--	--
	Trichlorofluoromethane	0.035	0.00029	0.0021	--	--
	Total Organics <sup>d</sup>	0.43501	NA	NA	NA	NA
<b>MWL-SV04-200 (Duplicate)</b> 05-Nov-21	Benzene	0.00030	0.00013	0.0013	B, J	0.0013U
	Carbon tetrachloride	0.00039	0.00011	0.0013	J	--
	Chloroform	0.0015	0.00011	0.0013	--	--
	Dichlorodifluoromethane	0.046	0.00022	0.0013	--	--
	1,1-Dichloroethane	0.0044	0.00011	0.0013	--	--
	1,1-Dichloroethene	0.022	0.00013	0.0013	--	--
	cis-1,2-Dichloroethene	0.0024	0.00016	0.0013	--	--
	Tetrachloroethene	0.12	0.00011	0.0013	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.12	0.00013	0.0013	--	--
	1,1,1-Trichloroethane	0.0018	0.00058	0.0013	--	--
	Trichloroethene	0.14	0.00021	0.00063	--	--
	Trichlorofluoromethane	0.039	0.00017	0.0013	--	--
	Total Organics <sup>d</sup>	0.49749	NA	NA	NA	NA

Refer to footnotes at end of table.



Table 5-2 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
November 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV04-300</b> 05-Nov-21	Acetone	0.0069	0.0056	0.020	J	0.02U
	Benzene	0.00030	0.000078	0.00078	B, J	0.00078U
	2-Butanone	0.0011	0.00071	0.0039	J	0.0039U
	Carbon disulfide	0.00019	0.00011	0.0020	J	--
	Carbon tetrachloride	0.00035	0.000068	0.00078	J	--
	Chloroform	0.00066	0.000068	0.00078	J	--
	1,2-Dibromoethane	0.00010	0.000068	0.00078	J	--
	Dichlorodifluoromethane	0.022	0.00014	0.00078	--	--
	1,1-Dichloroethane	0.0011	0.000068	0.00078	--	--
	1,1-Dichloroethene	0.012	0.000078	0.00078	--	--
	cis-1,2-Dichloroethene	0.00074	0.000098	0.00078	J	--
	Tetrachloroethene	0.11	0.000068	0.00078	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.075	0.000078	0.00078	--	--
	1,1,1-Trichloroethane	0.00093	0.00036	0.00078	--	--
	Trichloroethene	0.084	0.00013	0.00039	--	--
	Trichlorofluoromethane	0.015	0.00011	0.00078	--	--
	Total Organics <sup>d</sup>	0.32207	NA	NA	NA	NA
<b>MWL-SV04-400</b> 05-Nov-21  <b>Trigger Levels</b> Tetrachloroethene = 20 ppmv Trichloroethene = 20 ppmv Total Organics = 25 ppmv	Acetone	0.0072	0.0047	0.016	J	0.016U
	Benzene	0.00069	0.000066	0.00066	B	--
	2-Butanone	0.00098	0.00060	0.0033	J	0.0033U
	Carbon disulfide	0.0010	0.000090	0.0016	J	--
	Carbon tetrachloride	0.00019	0.000057	0.00066	J	--
	Chlorobenzene	0.00011	0.000049	0.00066	B, J	0.00066U
	Chloroform	0.00050	0.000057	0.00066	J	--
	1,2-Dibromoethane	0.000074	0.000057	0.00066	J	--
	Dichlorodifluoromethane	0.020	0.00011	0.00066	--	--
	1,1-Dichloroethane	0.00062	0.000057	0.00066	J	--
	1,1-Dichloroethene	0.0067	0.000066	0.00066	--	--
	cis-1,2-Dichloroethene	0.00045	0.000082	0.00066	J	--
	Tetrachloroethene	0.094	0.000057	0.00066	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.067	0.000066	0.00066	--	--
	1,1,1-Trichloroethane	0.00055	0.00030	0.00066	J	--
	1,1,2-Trichloroethane	0.000073	0.000057	0.00066	J	--
	Trichloroethene	0.053	0.00011	0.00033	--	--
	Trichlorofluoromethane	0.012	0.000090	0.00066	--	--
	Total Organics <sup>d</sup>	0.256847	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
November 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV04-400</b> (Duplicate) 05-Nov-21  <b>Trigger Levels</b> Tetrachloroethene = 20 ppmv Trichloroethene = 20 ppmv Total Organics = 25 ppmv	Benzene	0.00061	0.000066	0.00066	B, J	0.00066U
	Carbon disulfide	0.00079	0.000091	0.0017	J	--
	Carbon tetrachloride	0.00019	0.000058	0.00066	J	--
	Chlorobenzene	0.00015	0.000050	0.00066	B, J	0.00066U
	Chloroform	0.00041	0.000058	0.00066	J	--
	Dichlorodifluoromethane	0.020	0.00012	0.00066	--	--
	1,1-Dichloroethane	0.00055	0.000058	0.00066	J	--
	1,1-Dichloroethene	0.0059	0.000066	0.00066	--	--
	cis-1,2-Dichloroethene	0.00037	0.000083	0.00066	J	--
	Tetrachloroethene	0.097	0.000058	0.00066	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.066	0.000066	0.00066	--	--
	1,1,1-Trichloroethane	0.00042	0.00031	0.00066	J	--
	Trichloroethene	0.051	0.00011	0.00033	--	--
	Trichlorofluoromethane	0.011	0.000091	0.00066	--	--
	Total Organics <sup>d</sup>	0.25363	NA	NA	NA	NA
<b>MWL-SV05-50</b> 05-Nov-21	Benzene	0.00017	0.000026	0.00026	B, J	0.00026U
	Carbon disulfide	0.000095	0.000035	0.00064	J	--
	Carbon tetrachloride	0.00031	0.000023	0.00026	--	--
	Chlorobenzene	0.000047	0.000019	0.00026	B, J	0.00026U
	Chloroform	0.0010	0.000023	0.00026	--	--
	1,2-Dibromoethane	0.000046	0.000023	0.00026	J	--
	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.000086	0.000039	0.00026	J	--
	Dichlorodifluoromethane	0.034	0.000045	0.00026	--	--
	1,1-Dichloroethane	0.0012	0.000023	0.00026	--	--
	1,1-Dichloroethene	0.0068	0.000026	0.00026	--	--
	cis-1,2-Dichloroethene	0.00053	0.000032	0.00026	--	--
	Tetrachloroethene	0.042	0.000023	0.00026	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.034	0.000026	0.00026	--	--
	1,1,1-Trichloroethane	0.0090	0.00012	0.00026	--	--
	1,1,2-Trichloroethane	0.000026	0.000023	0.00026	J	--
	Trichloroethene	0.047	0.000042	0.00013	--	--
	Trichlorofluoromethane	0.11	0.00018	0.0013	--	--
	m,p-Xylene	0.000094	0.000093	0.00026	J	--
	Total Organics <sup>d</sup>	0.286187	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
November 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL-SV05-100 05-Nov-21	Benzene	0.00024	0.000031	0.00031	B, J	0.00031U
	2-Butanone	0.00030	0.00028	0.0016	J	--
	Carbon disulfide	0.00013	0.000043	0.00078	J	--
	Carbon tetrachloride	0.00057	0.000027	0.00031	--	--
	Chlorobenzene	0.000066	0.000023	0.00031	B, J	0.00031U
	Chloroform	0.0017	0.000027	0.00031	--	--
	1,2-Dibromoethane	0.000031	0.000027	0.00031	J	--
	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.00015	0.000047	0.00031	J	--
	Dichlorodifluoromethane	0.057	0.000055	0.00031	--	--
	1,1-Dichloroethane	0.0026	0.000027	0.00031	--	--
	1,1-Dichloroethene	0.016	0.000031	0.00031	--	--
	cis-1,2-Dichloroethene	0.0013	0.000039	0.00031	--	--
	Tetrachloroethene	0.070	0.00011	0.0012	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.071	0.00012	0.0012	--	--
	1,1,1-Trichloroethane	0.010	0.00014	0.00031	--	--
	Trichloroethene	0.096	0.00020	0.00062	--	--
	Trichlorofluoromethane	0.15	0.00017	0.0012	--	--
	Total Organics <sup>d</sup>	0.476781	NA	NA	NA	NA
MWL-SV05-200 05-Nov-21	Benzene	0.00037	0.000063	0.00063	B, J	0.00063U
	Carbon disulfide	0.00015	0.000087	0.0016	J	--
	Carbon tetrachloride	0.00088	0.000055	0.00063	--	--
	Chloroform	0.0019	0.000055	0.00063	--	--
	1,2-Dibromoethane	0.000065	0.000055	0.00063	J	--
	Dichlorodifluoromethane	0.056	0.00011	0.00063	--	--
	1,1-Dichloroethane	0.0041	0.000055	0.00063	--	--
	1,1-Dichloroethene	0.031	0.000063	0.00063	--	--
	cis-1,2-Dichloroethene	0.0022	0.000079	0.00063	--	--
	Tetrachloroethene	0.11	0.00022	0.0025	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.12	0.00025	0.0025	--	--
	1,1,1-Trichloroethane	0.0035	0.00029	0.00063	--	--
	Trichloroethene	0.16	0.00041	0.0013	--	--
	Trichlorofluoromethane	0.083	0.000087	0.00063	--	--
	Total Organics <sup>d</sup>	0.572795	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
November 2021

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppmv)	RL <sup>b</sup> (ppmv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV05-300</b> 05-Nov-21	Acetone	0.0058	0.0056	0.020	J	
	Benzene	0.00036	0.000078	0.00078	B, J	0.00078U
	2-Butanone	0.00071	0.00071	0.0039	J	--
	Carbon disulfide	0.00016	0.00011	0.0020	J	--
	Carbon tetrachloride	0.00090	0.000068	0.00078	--	--
	Chlorobenzene	0.00013	0.000059	0.00078	B, J	0.00078U
	Chloroform	0.0011	0.000068	0.00078	--	--
	1,2-Dibromoethane	0.000070	0.000068	0.00078	J	--
	Dichlorodifluoromethane	0.037	0.00014	0.00078	--	--
	1,1-Dichloroethane	0.0020	0.000068	0.00078	--	--
	1,1-Dichloroethene	0.024	0.000078	0.00078	--	--
	cis-1,2-Dichloroethene	0.0011	0.000098	0.00078	--	--
	Tetrachloroethene	0.11	0.000068	0.00078	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.12	0.000078	0.00078	--	--
	1,1,1-Trichloroethane	0.0016	0.00036	0.00078	--	--
	Trichloroethene	0.13	0.00013	0.00039	--	--
	Trichlorofluoromethane	0.035	0.00011	0.00078	--	--
	Total Organics <sup>d</sup>	0.469440	NA	NA	NA	NA
<b>MWL-SV05-400</b> 05-Nov-21  <b>Trigger Levels</b> Tetrachloroethene = 20 ppmv Trichloroethene = 20 ppmv Total Organics = 25 ppmv	Acetone	0.0051	0.0036	0.013	J	--
	Benzene	0.00038	0.000051	0.00051	B, J	0.00051U
	2-Butanone	0.00048	0.00046	0.0025	J	--
	Carbon disulfide	0.00015	0.000070	0.0013	J	--
	Carbon tetrachloride	0.00059	0.000044	0.00051	--	--
	Chloroform	0.00067	0.000044	0.00051	--	--
	Dichlorodifluoromethane	0.024	0.000088	0.00051	--	--
	1,1-Dichloroethane	0.0017	0.000044	0.00051	--	--
	1,1-Dichloroethene	0.018	0.000051	0.00051	--	--
	cis-1,2-Dichloroethene	0.00069	0.000063	0.00051	--	--
	Tetrachloroethene	0.089	0.00011	0.0013	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.054	0.000051	0.00051	--	--
	1,1,1-Trichloroethane	0.0017	0.00023	0.00051	--	--
	Trichloroethene	0.088	0.000082	0.00025	--	--
	Trichlorofluoromethane	0.038	0.000070	0.00051	--	--
	Total Organics <sup>d</sup>	0.32208	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Concluded)  
Summary of Detected VOCs (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
November 2021

Notes:

<sup>a</sup>U.S. Environmental Protection Agency, 1999, "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Compendium Method TO-15, Determination Of Volatile Organic Compounds In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry," Center for Environmental Research Information, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio.

<sup>b</sup>Results, MDL, and RL are reported in parts per million by volume.

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

Laboratory Qualifier

B = Compound was found in blank and sample.

J = Result is greater than the MDL but less than the RL; the concentration is an approximate value.

Validation Qualifier

U = The analyte was reported as a detection by the laboratory but was qualified during data validation as not detected. The associated numerical value is the revised sample quantitation limit (i.e., RL) in units of ppmv, in accordance with the data validation process.

J = The associated value is an estimated quantity.

<sup>d</sup>Total Organics or Total VOCs - Sum of validated detected organic analytes (i.e., results for analytes qualified during data validation as not detected not included in the total).

EPA = U.S. Environmental Protection Agency.

ID = Identification.

MWL = Mixed Waste Landfill.

MDL = Method detection limit. The minimum concentration that can be measured and reported with 99 percent confidence that the analyte is present (i.e., greater than zero).

NA = Not applicable.

ppmv = Parts per million by volume.

RL = Reporting limit. Minimum concentration that can be reported with a statistically established degree of confidence.

VOC = Volatile organic compound.

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## **6.0 SOIL-MOISTURE MONITORING RESULTS**

This chapter presents soil-moisture monitoring activities (i.e., data collection and evaluation) in accordance with MWL LTMMMP Section 3.4.2 and Appendix E (SNL/NM March 2012). The monitoring objective is to establish soil-moisture trends in the vadose zone beneath the MWL to evaluate ET Cover performance. The soil-moisture monitoring system functions as an early warning detection system for water percolation and infiltration through the ET Cover and disposal area so that timely action can be taken, if necessary. Results for the depth range of 8.7 to 86.6 ft bgs for each soil-moisture access tube are compared to the trigger level defined in LTMMMP Section 5.2.3.2.

Soil-moisture monitoring field activities and results are described in Sections 6.1 and 6.2, respectively. Data evaluation and comparison of results to the monitoring trigger level are presented in Section 6.3. A summary of soil-moisture monitoring activities and results is provided in Section 11.1.

### **6.1 Soil-Moisture Monitoring Field Activities**

One annual soil-moisture monitoring event was conducted during the April 1, 2021 through March 31, 2022 reporting period fulfilling the LTMMMP annual monitoring requirement. The monitoring event was conducted on April 19, 2021. Figure 6-1 shows the soil-moisture monitoring locations MWL-VZ-1, MWL-VZ-2, and MWL-VZ-3, which are angled boreholes (60 degrees from the horizontal ground surface) that project beneath the MWL. Soil-moisture monitoring field forms and tables that compare soil-moisture content values to baseline values for the three access tubes are provided in Annex D.

Neutron count data collected in the field were correlated to percent soil-moisture content by volume as described in LTMMMP Section 3.4.2 and Appendix E (SNL/NM March 2012). Baseline for soil-moisture content was determined for each access tube prior to the ET Cover subgrade work in September 2006 by averaging data collected during ten monitoring events conducted between May 27, 2004 and August 8, 2006.

#### **6.1.1 Field Quality Control**

The CPN 503DR neutron probe was operated in accordance with the field operating procedure and the manufacturer's operating manual. A standard count was taken on the day of the monitoring event, prior to the moisture logging, to ensure the instrument was functioning properly and to confirm measurement accuracy. The results of the standard counts are provided on the MWL Neutron Logging Data Field Form provided in Annex D.

#### **6.1.2 Waste Management**

No wastes were generated from soil-moisture monitoring activities.

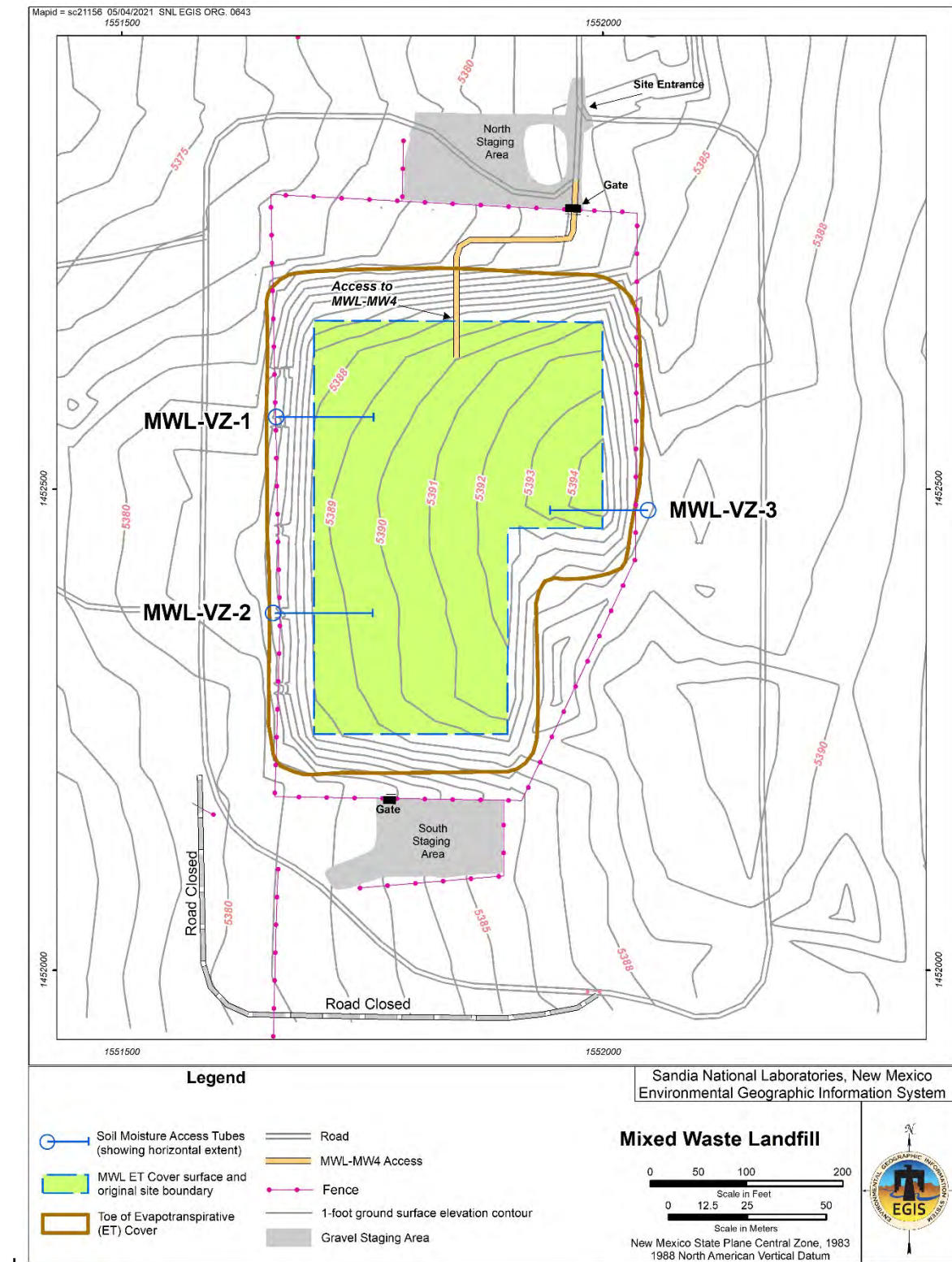


Figure 6-1  
Mixed Waste Landfill Soil-Moisture Monitoring Locations



## 6.2 Monitoring Results

Soil-moisture monitoring data for this reporting period are presented in Figures 6-2, 6-3, and 6-4 for MWL-VZ-1, MWL-VZ-2, and MWL-VZ-3, respectively. The results for the April 19, 2021 annual monitoring event are plotted on these figures along with the baseline soil-moisture content and the trigger level for comparison. The April 2021 results track very closely with the established soil-moisture baseline for the three access tubes and indicate a dry vadose zone.

### 6.2.1 Variances

There were no variances from the LTMMMP soil-moisture monitoring requirements.

## 6.3 Data Evaluation and Monitoring Trigger Level

Soil-moisture data collected during the reporting period did not exceed the trigger level and tracked closely to baseline soil-moisture data, indicating the ET Cover is performing as designed. The trigger level is 23 percent soil moisture by volume and applies to the depth range of 8.7 to 86.6 ft bgs beneath the ET Cover. The April 2021 soil-moisture monitoring results are shown in Figures 6-2, 6-3, and 6-4 along with the baseline soil-moisture data and trigger level for comparison.

During this reporting period, the soil-moisture content measurements for the trigger level depth interval at MWL-VZ-1 ranged from 1.8 to 4.2 percent, compared to 1.7 to 5.6 percent baseline. At MWL-VZ-2 the soil-moisture content ranged from 2.1 to 4.3 percent, compared to 2.1 to 5.5 percent baseline. At MWL-VZ-3 the soil-moisture content ranged from 1.4 to 3.9 percent, compared to 1.8 to 4.5 percent baseline.

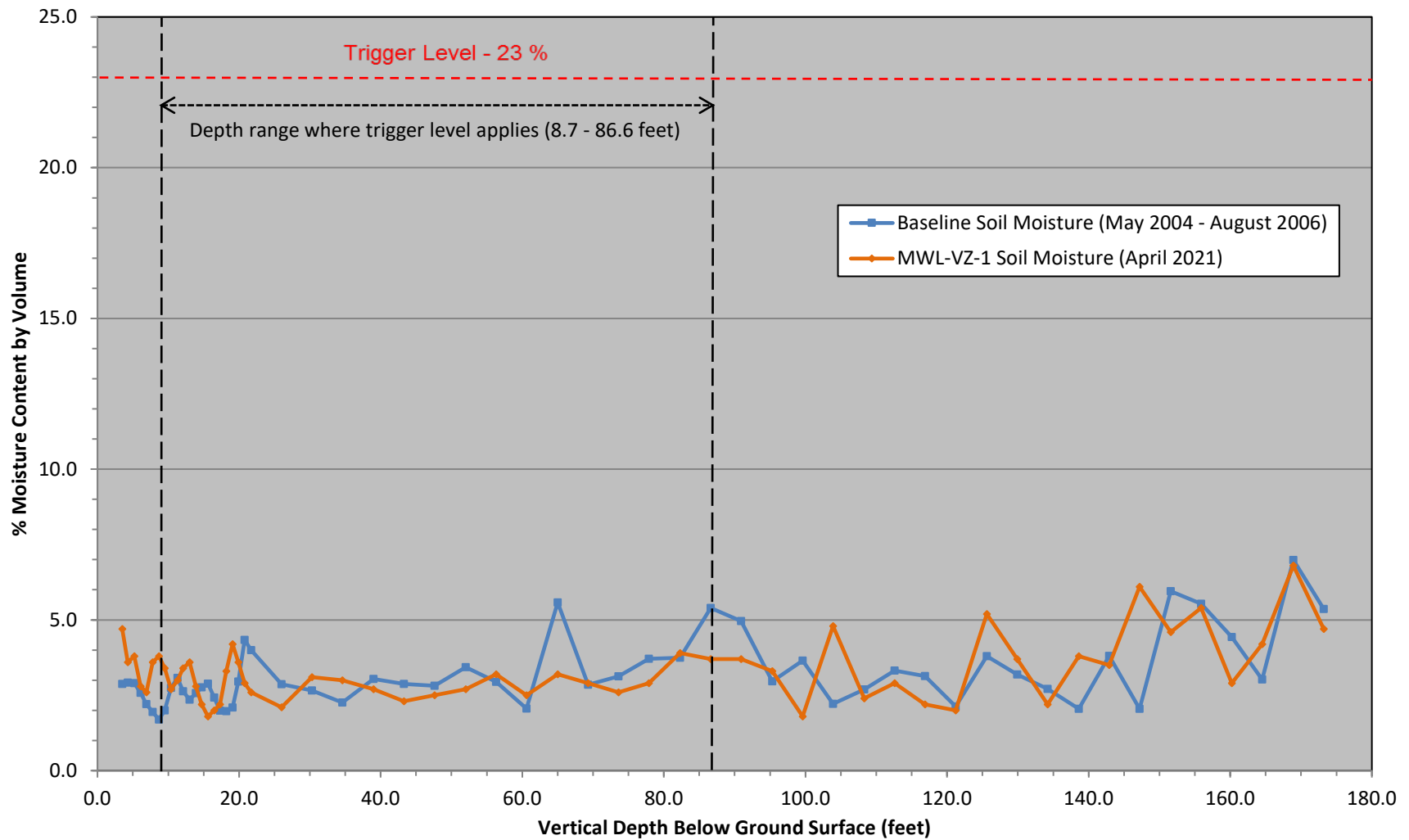


Figure 6-2  
Mixed Waste Landfill MWL-VZ-1 Soil-Moisture Monitoring Results

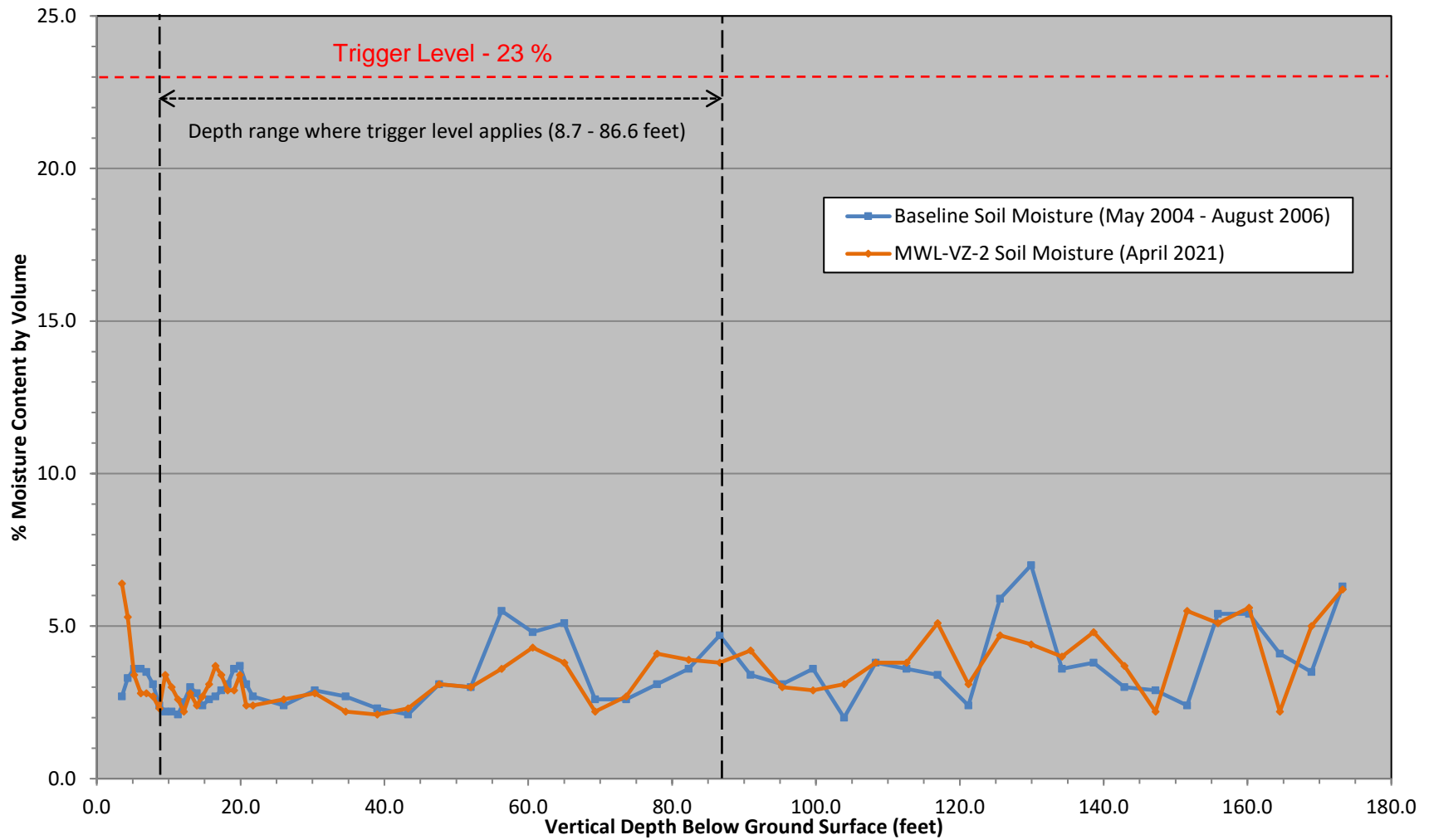


Figure 6-3  
Mixed Waste Landfill MWL-VZ-2 Soil-Moisture Monitoring Results

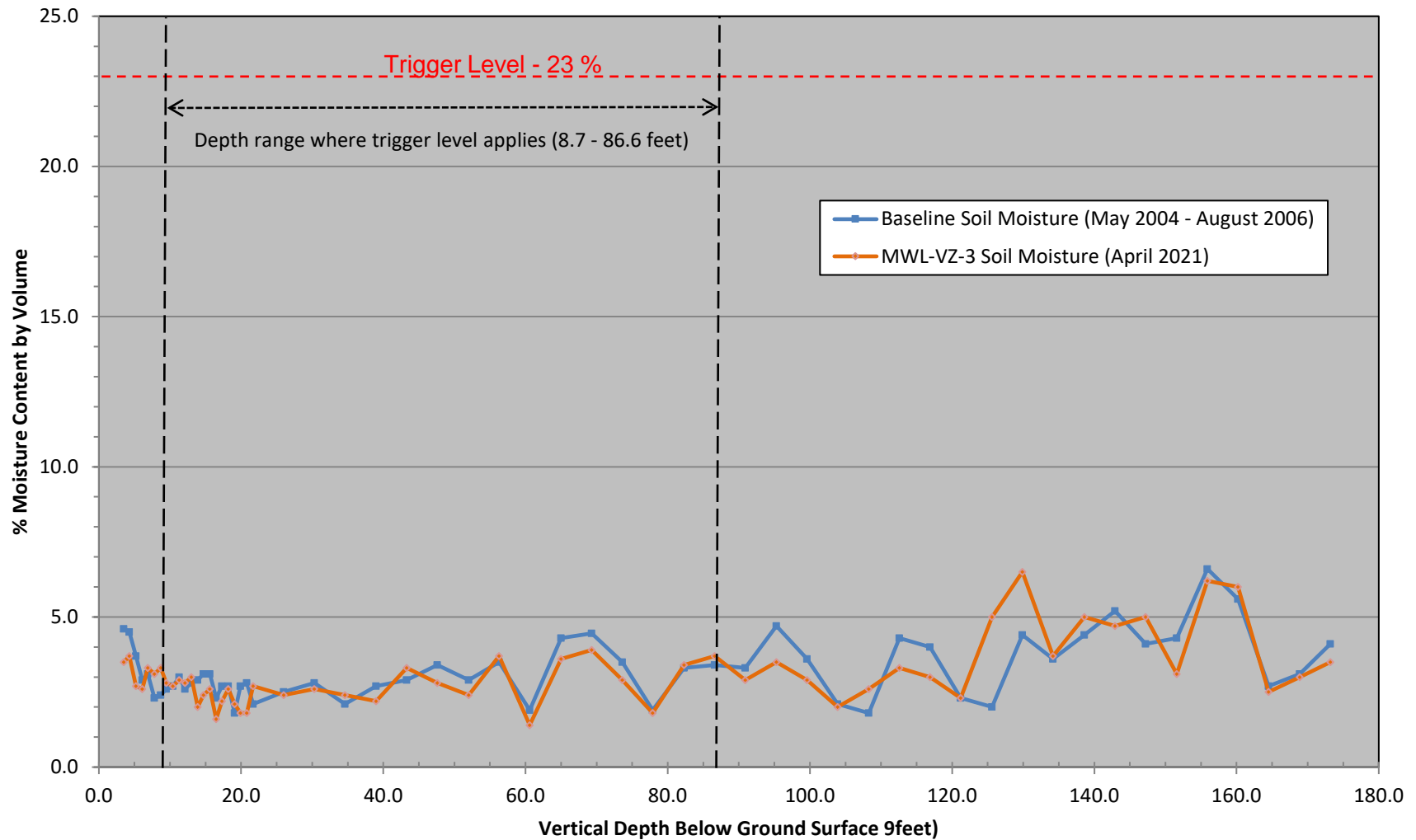


Figure 6-4  
Mixed Waste Landfill MWL-VZ-3 Soil-Moisture Monitoring Results

## **7.0 GROUNDWATER MONITORING RESULTS**

This chapter presents groundwater monitoring activities (i.e., sampling and analysis), analytical results, and data evaluation in accordance with MWL LTMMP Section 3.5 and Appendix F (SNL/NM March 2012). The monitoring objective is to obtain groundwater analytical results representative of the uppermost part of the Regional Aquifer beneath the MWL and compare them to the trigger levels defined in Table 5.2.4-1 of the LTMMP. Groundwater monitoring, combined with soil-vapor monitoring, functions as an early warning detection system for changing conditions so that timely action can be taken, if necessary.

Groundwater sampling field activities are described in Section 7.1, analytical laboratory results are presented and compared to trigger levels in Section 7.2, followed by a discussion of data quality and data evaluation results. Hydrogeologic information on the Regional Aquifer is presented in Section 7.3. A summary of groundwater monitoring activities and results is provided in Section 11.1.

### **7.1 Environmental Sampling Field Activities**

Two groundwater monitoring events were conducted during the April 1, 2021 through March 31, 2022 reporting period, fulfilling the LTMMP semiannual monitoring requirement. Groundwater samples were collected from monitoring wells MWL-BW2, MWL-MW7, MWL-MW8, and MWL-MW9. Well locations are shown in Figure 7-1. The samples were analyzed for VOCs, metals (cadmium, chromium, nickel, and uranium), gamma-emitting radionuclides (americium-241, cesium-137, and cobalt-60), gross alpha and beta activity, tritium, and radon-222. Field forms and documentation that address calibration of equipment, well purging and water quality measurements, and equipment decontamination activities are provided in Annex E.

The first sampling event was conducted between May 10 and 13, 2021. An environmental-duplicate sample pair was collected from MWL-BW2.

The second sampling event was conducted between November 1 and 4, 2021. An environmental-duplicate sample pair was collected from MWL-MW9.

#### **7.1.1 Well Purging**

Purging removes stagnant water from the well so that a representative environmental sample can be obtained. In accordance with LTMMP Appendix F, the minimum purge requirement is one saturated screen volume. Purging continued beyond the minimum purge volume until four stable field measurements for temperature, specific conductivity, potential of hydrogen (i.e., pH), and turbidity were obtained. Field measurements for water quality 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.

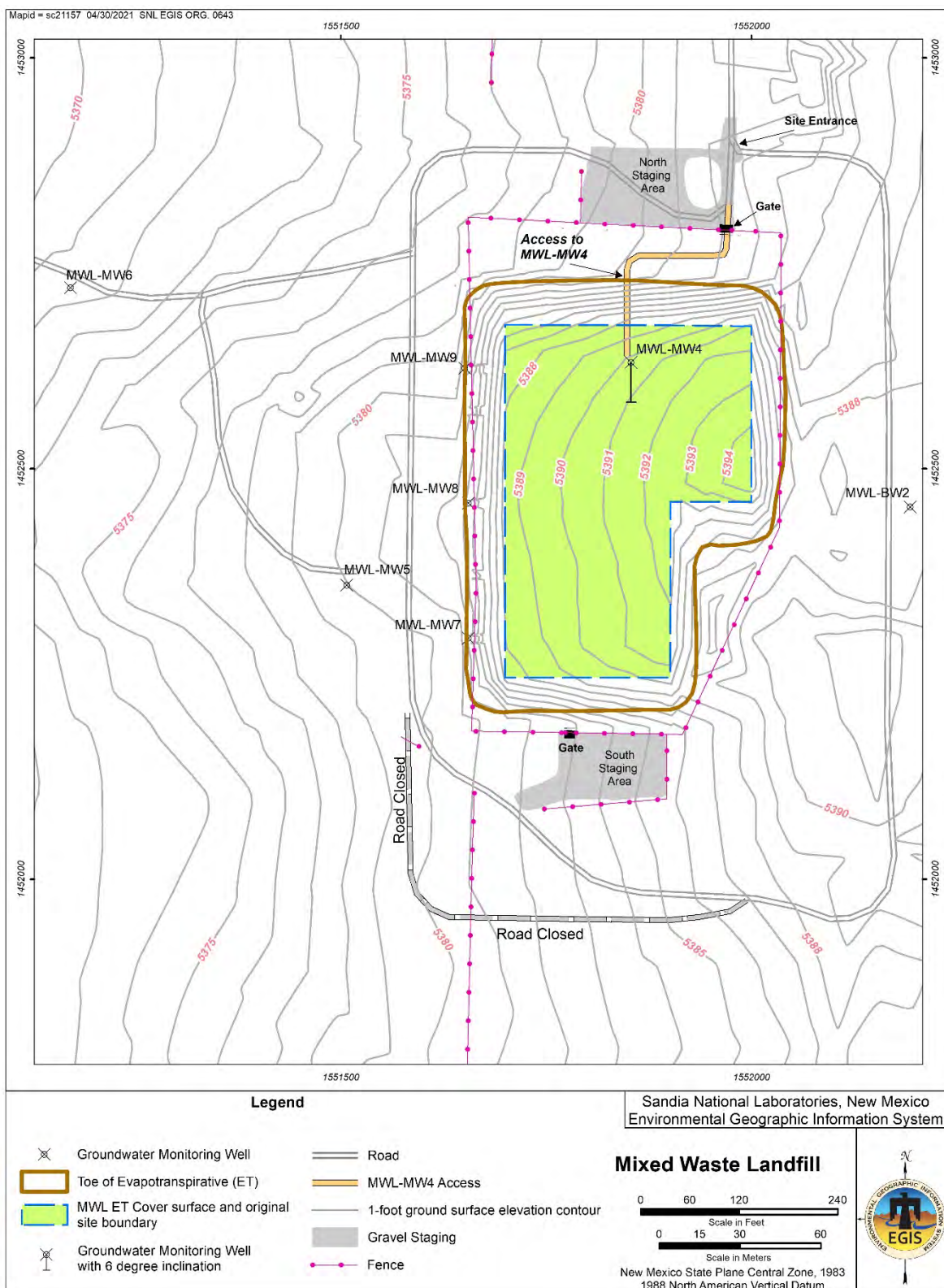


Figure 7-1  
Mixed Waste Landfill Groundwater Monitoring Well Locations

A portable Bennett™ groundwater sampling system was used to collect environmental samples from all wells. Purge requirements were satisfied at all monitoring wells. In accordance with LTMMF Appendix F requirements designed to decrease the purging flow rate as low as possible for wells that potentially purge dry, the portable Bennett™ groundwater sampling system was equipped with a flow meter valve located along the discharge line and with small diameter tubing (1/4-inch inner diameter). The average flow rates ranged from 0.155 gallons per minute (gpm) at MWL-MW9 to 0.292 gpm at MWL-BW2 for the May 2021 sampling event. The average flow rates ranged from 0.152 gpm at MWL-BW2 to 0.196 gpm at MWL-MW7 for the November 2021 sampling event.

### 7.1.2 Field Quality Control

Field QC samples were collected as part of each sampling event and included duplicate, equipment blank, field blank, and trip blank samples. The sampling pump and tubing bundle used to collect environmental samples were decontaminated prior to sampling each monitoring well.

Environmental duplicate samples were collected and analyzed to evaluate the overall precision and reproducibility of the sampling and analytical process. The duplicate samples were collected immediately after the environmental groundwater sample to reduce variability caused by time and/or sampling mechanics. Duplicate samples were analyzed for the same constituents as the groundwater samples.

Equipment blank (also referred to as rinsate blank) samples were collected after equipment decontamination to verify effectiveness of the decontamination process. Equipment blank samples consisted of deionized water that was pumped through the sampling system and analyzed for the same constituents as the environmental groundwater samples.

Field blank samples were collected and analyzed for VOCs to detect potential sample contamination resulting from ambient field conditions. The field blanks were prepared by pouring deionized water into sample containers at the sample point (i.e., inside the sampling truck at each monitoring well) to simulate the transfer of environmental samples from the sampling system to the sample container.

Trip blank samples consist of laboratory reagent-grade water with hydrochloric acid preservative. They are prepared by the analytical laboratory and accompany the sample containers from the laboratory, through sampling activities, and are shipped back to the laboratory with the environmental samples. Trip blank samples were submitted with groundwater samples collected for analysis of VOCs to assess whether contamination of the samples occurred during sampling, transportation, analysis, and/or storage.

The field QC samples were submitted for analysis with the environmental samples. A brief explanation of the field QC sampling protocol for the May and November 2021 sampling events is provided below. Analytical results are presented in Section 7.2.

### First Sampling Event – May 10-13, 2021

One duplicate sample was collected at MWL-BW2. One equipment blank sample was collected prior to sampling monitoring well MWL-BW2. Five field blank samples were collected, one at each monitoring well location, and one was collected from the source water used for the equipment decontamination process. Six trip blank samples were submitted with groundwater samples for VOC analysis.

### Second Sampling Event – November 1-4, 2021

One duplicate sample was collected at MWL-MW9. One equipment blank sample was collected prior to sampling MWL-MW9. Five field blank samples were collected, one at each monitoring well location, and one was collected from the source water used for the equipment decontamination process. Six trip blank samples were submitted with groundwater samples for analysis of VOCs.

## 7.1.3 Waste Management

Purge and decontamination wastewater generated from sampling activities was collected in 55-gallon containers and stored at the Environmental Resources Field Office waste accumulation area. All wastewater was managed as non-hazardous waste based upon historical sample results and process knowledge of monitoring well locations. All wastewater was discharged to the sanitary sewer in accordance with Albuquerque Bernalillo County Water Utility Authority (ABCWUA) requirements after characterization data were compared to discharge limits. Approximately 224 gallons of wastewater were generated during the May 2021 groundwater sampling event and approximately 222 gallons were generated during the November 2021 sampling event.

PPE and other solid waste generated during May and November 2021 soil-vapor and groundwater monitoring activities were managed in accordance with all applicable requirements. Analytical data from the sampling events were used to supplement the waste management process. Based on historical data and sampling results, all solid waste was managed as non-hazardous solid waste.

## 7.2 Laboratory Results

Environmental and field QC samples were submitted to GEL for analyses. Samples were analyzed in accordance with applicable EPA analytical methods. For comparison, trigger levels are included in the analytical results tables in this Annual LTMM Report. Both analytical laboratory and data validation qualifiers are included in the groundwater data tables presented in this section. Analytical laboratory reports, including certificates of analyses, analytical methods, MDLs, practical quantitation limits (PQLs), dates of analyses, results of QC analyses, and data validation reports are filed in the SNL/NM Record Center.



### 7.2.1 Environmental Sample Results

This section summarizes groundwater monitoring results for the reporting period. Groundwater monitoring results were compared to historical MWL groundwater monitoring results and LTMMMP trigger levels. All results were below applicable LTMMMP trigger levels and were comparable to historical MWL groundwater monitoring results. After the general summary provided below, environmental and field QC sample results are presented for the two semiannual monitoring events.

No VOCs were detected in the May or November 2021 sampling events. Methylene chloride was qualified as not detected during data validation in the May 2021 MWL-MW8 and MWL-MW9 environmental samples and in the November 2021 MWL-MW8 environmental sample since methylene chloride was reported in the environmental and associated trip blank samples at concentrations less than the PQL. Table 7-1 summarizes the MDLs for all VOCs. The May and November 2021 cadmium, chromium, nickel, and uranium results are presented in Table 7-2, and the radionuclide, gross alpha, gross beta, tritium, and radon-222 results are provided in Table 7-3. Table 7-4 summarizes field water quality measurements taken prior to environmental groundwater sample collection.

Radionuclide activity in groundwater samples is determined through specific radiological analyses as presented in Table 7-3. In addition, gross alpha and beta activities are measured to screen for indications of other radionuclides (i.e., radiological anomalies). Gross alpha activity values are corrected by subtracting naturally occurring uranium in accordance with 40 CFR 141. Uranium is measured independently and results are presented in Table 7-2.

Trigger levels provide early detection of potentially changing conditions that require additional testing and further investigation (SNL/NM March 2012). Groundwater radiological trigger levels for tritium (4 millirem per year), radon (1,000 pCi/L), gross alpha activity (15 pCi/L), and gross beta activity (4 millirem per year) are shown in Table 7-3. The units for the tritium and gross beta triggers relate to a dose rate and not a specific activity per volume (pCi/L) measurement. For tritium, the approximate equivalent activity is 20,000 pCi/L, assuming an onsite resident using the groundwater underlying the MWL as their primary drinking water source.

Gross alpha and beta results are used as a broad radiological screening tool to look for other potential radionuclides besides tritium, radon, and the radionuclides already addressed by gamma spectroscopy analysis (i.e., the radionuclides of concern). The screening analyses do not provide radionuclide-specific identification necessary to calculate a dose. If the gross alpha trigger is exceeded, additional radiological analysis may be required to identify the specific radionuclide(s) that are contributing to the gross alpha result. Gross beta results are compared to the extensive SNL/NM groundwater monitoring data set to determine if there are indications of radiological anomalies. In other words, the gross beta activity is compared to natural background beta activity. If there are indications of radiological anomalies, additional analysis may be required to identify the specific radionuclide that is causing the anomalous beta activity. Once the specific radionuclide is identified, the corresponding dose to a human receptor can be calculated and compared to the trigger of 4 millirem per year. Additional analysis based on elevated gross alpha or gross beta screening results would only be required if the results are not explained by the other radionuclide-specific results. In summary, the screening and evaluation process ensures that if radiological contamination is present, it will be detected, evaluated, and appropriate follow-up actions will be taken.

Table 7-1  
Summary of Method Detection Limits for VOCs (EPA Method 8260B<sup>a</sup>)  
Mixed Waste Landfill Groundwater Monitoring  
May and November 2021

Analyte	MDL (µg/L)
1,1,1-Trichloroethane	0.300-0.333
1,1,2,2-Tetrachloroethane	0.300-0.333
1,1,2-Trichloroethane	0.300-0.333
1,1-Dichloroethane	0.300-0.333
1,1-Dichloroethene	0.300-0.333
1,2-Dichloroethane	0.300-0.333
1,2-Dichloropropane	0.300-0.333
2-Butanone	1.50-1.67
2-Hexanone	1.50-1.67
4-Methyl-2-pentanone	1.50-1.67
Acetone	1.50-1.67
Benzene	0.300-0.333
Bromodichloromethane	0.300-0.333
Bromoform	0.300-0.333
Bromomethane	0.300-0.333
Carbon disulfide	1.50-1.67
Carbon tetrachloride	0.300-0.333
Chlorobenzene	0.300-0.333
Chloroethane	0.300-0.333
Chloroform	0.300-0.333
Chloromethane	0.300-0.333
Dibromochloromethane	0.300-0.333
Dichlorodifluoromethane	0.300-0.355
Ethylbenzene	0.300-0.333
Methylene chloride	0.500-1.00
Styrene	0.300-0.333
Tetrachloroethene	0.300-0.333
Toluene	0.300-0.333
Trichloroethene	0.300-0.333
Vinyl acetate	1.50-1.67
Vinyl chloride	0.300-0.333
Xylene	0.300-1.00
cis-1,2-Dichloroethene	0.300-0.333
cis-1,3-Dichloropropene	0.300-0.333
trans-1,2-Dichloroethene	0.300-0.333
trans-1,3-Dichloropropene	0.300-0.333

Notes:

<sup>a</sup>U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3<sup>rd</sup> edition, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

EPA = U.S. Environmental Protection Agency.

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

µg/L = Micrograms per liter.

VOC = Volatile organic compound.

Table 7-2  
Summary of Cadmium, Chromium, Nickel, and Uranium Results (EPA Method 6020B<sup>a</sup>)  
Mixed Waste Landfill Groundwater Monitoring  
May and November 2021

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	Trigger Level (mg/L)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
<b>May 2021 Sampling Event</b>							
<b>MWL-BW2</b> 11-May-2021	Cadmium	ND	0.0003	0.001	0.0025	U	--
	Chromium	ND	0.003	0.010	0.043	U	--
	Nickel	ND	0.0006	0.002	0.050	U	--
	Uranium	0.00657	0.000067	0.0002	0.015	--	--
<b>MWL-BW2</b> (Duplicate) 11-May-2021	Cadmium	ND	0.0003	0.001	0.0025	U	--
	Chromium	ND	0.003	0.010	0.043	U	--
	Nickel	ND	0.0006	0.002	0.050	U	--
	Uranium	0.00685	0.000067	0.0002	0.015	--	--
<b>MWL-MW7</b> 10-May-2021	Cadmium	ND	0.0003	0.001	0.0025	U	--
	Chromium	ND	0.003	0.010	0.043	U	--
	Nickel	ND	0.0006	0.002	0.050	U	--
	Uranium	0.00757	0.000067	0.0002	0.015	--	--
<b>MWL-MW8</b> 13-May-2021	Cadmium	ND	0.0003	0.001	0.0025	U	--
	Chromium	ND	0.003	0.010	0.043	U	--
	Nickel	ND	0.0006	0.002	0.050	U	--
	Uranium	0.00771	0.000067	0.0002	0.015	--	--
<b>MWL-MW9</b> 12-May-2021	Cadmium	ND	0.0003	0.001	0.0025	U	--
	Chromium	ND	0.003	0.010	0.043	U	--
	Nickel	ND	0.0006	0.002	0.050	U	--
	Uranium	0.00867	0.000067	0.0002	0.015	--	--

Refer to notes at end of table.

Table 7-2 (Concluded)  
Summary of Cadmium, Chromium, Nickel, and Uranium Results (EPA Method 6020B<sup>a</sup>)  
Mixed Waste Landfill Groundwater Monitoring  
May and November 2021

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	Trigger Level (mg/L)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
<b>November 2021 Sampling Event</b>							
<b>MWL-BW2</b> 01-Nov-2021	Cadmium	ND	0.0003	0.001	0.0025	U	--
	Chromium	ND	0.003	0.010	0.043	U	--
	Nickel	ND	0.0006	0.002	0.050	U	--
	Uranium	0.00673	0.000067	0.0002	0.015	B	--
<b>MWL-MW7</b> 02-Nov-2021	Cadmium	ND	0.0003	0.001	0.0025	U	--
	Chromium	ND	0.003	0.010	0.043	U	--
	Nickel	ND	0.0006	0.002	0.050	U	--
	Uranium	0.00745	0.000067	0.0002	0.015	B	--
<b>MWL-MW8</b> 04-Nov-2021	Cadmium	ND	0.0003	0.001	0.0025	U	--
	Chromium	ND	0.003	0.010	0.043	U	--
	Nickel	ND	0.0006	0.002	0.050	U	--
	Uranium	0.00766	0.000067	0.0002	0.015	B	--
<b>MWL-MW9</b> 03-Nov-2021	Cadmium	ND	0.0003	0.001	0.0025	U	--
	Chromium	ND	0.003	0.010	0.043	U	--
	Nickel	0.000640	0.0006	0.002	0.050	J	--
	Uranium	0.00912	0.000067	0.0002	0.015	B	--
<b>MWL-MW9</b> (Duplicate) 03-Nov-2021	Cadmium	ND	0.0003	0.001	0.0025	U	--
	Chromium	ND	0.003	0.010	0.043	U	--
	Nickel	ND	0.0006	0.002	0.050	U	--
	Uranium	0.00917	0.000067	0.0002	0.015	B	--

Notes:

<sup>a</sup>U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

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

Laboratory Qualifier

B = The analyte was detected in the blank above the effective MDL.

J = Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL

U = Analyte was not detected.

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 = Milligrams per liter.

MWL = Mixed Waste Landfill.

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.

Table 7-3  
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Tritium, and Radon Results  
Mixed Waste Landfill Groundwater Monitoring  
May and November 2021

Well ID	Analyte	Result <sup>a</sup> (pCi/L)	MDA <sup>b</sup> (pCi/L)	Trigger Level	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>	Analytical Method <sup>d</sup>
<b>May 2021 Sampling Event</b>							
<b>MWL-BW2</b> 11-May-2021	Americium-241	11.6 ± 13.9	21.3	NE	U	BD	EPA 901.1
	Cesium-137	1.98 ± 3.09	3.40	NE	U	BD	EPA 901.1
	Cobalt-60	-0.402 ± 1.94	3.56	NE	U	BD	EPA 901.1
	Gross Alpha	5.09	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>e</sup>	6.12 ± 1.10	1.62	4 mrem/yr	--	J	EPA 900.0
	Tritium <sup>f</sup>	27.7 ± 67.9	118	4 mrem/yr	U	BD	EPA 906.0M
	Radon-222	368 ± 96.3	62.0	1,000 pCi/L	--	--	SM7500-Rn B
<b>MWL-BW2</b> (Duplicate) 11-May-2021	Americium-241	-4.09 ± 9.10	15.5	NE	U	BD	EPA 901.1
	Cesium-137	-1.04 ± 1.93	3.07	NE	U	BD	EPA 901.1
	Cobalt-60	1.18 ± 2.17	3.90	NE	U	BD	EPA 901.1
	Gross Alpha	2.36	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>e</sup>	6.09 ± 0.973	1.38	4 mrem/yr	--	J	EPA 900.0
	Tritium <sup>f</sup>	13.8 ± 68.6	122	4 mrem/yr	U	BD	EPA 906.0M
	Radon-222	385 ± 100	62.2	1,000 pCi/L	--	--	SM7500-Rn B
<b>MWL-MW7</b> 10-May-2021	Americium-241	3.74 ± 10.2	17.1	NE	U	BD	EPA 901.1
	Cesium-137	0.720 ± 1.95	3.47	NE	U	BD	EPA 901.1
	Cobalt-60	0.355 ± 1.87	3.52	NE	U	BD	EPA 901.1
	Gross Alpha	4.04	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>e</sup>	5.36 ± 0.912	1.28	4 mrem/yr	--	J	EPA 900.0
	Tritium <sup>f</sup>	-50.6 ± 64.1	123	4 mrem/yr	U	BD	EPA 906.0M
	Radon-222	108 ± 53.8	74.5	1,000 pCi/L	--	J	SM7500-Rn B
<b>MWL-MW8</b> 13-May-2021	Americium-241	1.50 ± 6.00	9.83	NE	U	BD	EPA 901.1
	Cesium-137	-0.0135 ± 1.39	2.49	NE	U	BD	EPA 901.1
	Cobalt-60	-0.217 ± 1.57	2.89	NE	U	BD	EPA 901.1
	Gross Alpha	6.23	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>e</sup>	4.70 ± 0.878	1.25	4 mrem/yr	--	J	EPA 900.0
	Tritium <sup>f</sup>	-17.4 ± 65.1	120	4 mrem/yr	U	BD	EPA 906.0M
	Radon-222	162 ± 46.6	41.5	1,000 pCi/L	--	J	SM7500-Rn B
<b>MWL-MW9</b> 12-May-2021	Americium-241	4.78 ± 9.29	15.2	NE	U	BD	EPA 901.1
	Cesium-137	0.171 ± 2.11	3.32	NE	U	BD	EPA 901.1
	Cobalt-60	0.708 ± 1.68	3.19	NE	U	BD	EPA 901.1
	Gross Alpha	3.55	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>e</sup>	5.85 ± 0.971	1.28	4 mrem/yr	--	J	EPA 900.0
	Tritium <sup>f</sup>	12.7 ± 63.8	113	4 mrem/yr	U	BD	EPA 906.0M
	Radon-222	519 ± 123	49.5	1,000 pCi/L	--	--	SM7500-Rn B
<b>November 2021 Sampling Event</b>							
<b>MWL-BW2</b> 01-Nov-2021	Americium-241	-2.70 ± 9.41	15.1	NE	U	BD	EPA 901.1
	Cesium-137	0.205 ± 1.79	3.09	NE	U	BD	EPA 901.1
	Cobalt-60	0.731 ± 1.89	3.45	NE	U	BD	EPA 901.1
	Gross Alpha	2.32	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>e</sup>	8.79 ± 1.52	2.18	4 mrem/yr	--	--	EPA 900.0
	Tritium <sup>f</sup>	-7.63 ± 88.9	163	4 mrem/yr	U	BD	EPA 906.0M
	Radon-222	347 ± 99.4	79.5	1,000 pCi/L	--	--	SM7500-Rn B
<b>MWL-MW7</b> 02-Nov-2021	Americium-241	2.58 ± 3.72	5.72	NE	U	BD	EPA 901.1
	Cesium-137	3.49 ± 3.69	4.52	NE	U	BD	EPA 901.1
	Cobalt-60	1.83 ± 2.93	5.40	NE	U	BD	EPA 901.1
	Gross Alpha	0.51	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>e</sup>	3.79 ± 1.88	2.54	4 mrem/yr	--	J	EPA 900.0
	Tritium <sup>f</sup>	50.4 ± 90.5	156	4 mrem/yr	U	BD	EPA 906.0M
	Radon-222	174 ± 61.5	67.1	1,000 pCi/L	--	J	SM7500-Rn B

Refer to notes at end of table.

**Table 7-3 (Concluded)**  
**Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Tritium, and Radon Results**  
**Mixed Waste Landfill Groundwater Monitoring**  
**May and November 2021**

Well ID	Analyte	Result <sup>a</sup> (pCi/L)	MDA <sup>b</sup> (pCi/L)	Trigger Level	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>	Analytical Method <sup>d</sup>
<b>November 2021 Sampling Event (continued)</b>							
<b>MWL-MW8</b> 04-Nov-2021	Americium-241	2.12 ± 5.64	9.21	NE	U	BD	EPA 901.1
	Cesium-137	3.04 ± 2.21	3.36	NE	U	BD	EPA 901.1
	Cobalt-60	-2.24 ± 2.13	3.06	NE	U	BD	EPA 901.1
	Gross Alpha	0.77	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>e</sup>	6.33 ± 0.978	1.25	4 mrem/yr	--	--	EPA 900.0
	Tritium <sup>f</sup>	46.7 ± 90.6	157	4 mrem/yr	U	BD	EPA 906.0M
	Radon-222	196 ± 70.0	76.6	1,000 pCi/L	--	J	SM7500-Rn B
<b>MWL-MW9</b> 03-Nov-2021	Americium-241	3.67 ± 5.97	9.27	NE	U	BD	EPA 901.1
	Cesium-137	1.54 ± 1.95	3.00	NE	U	BD	EPA 901.1
	Cobalt-60	0.872 ± 1.77	3.26	NE	U	BD	EPA 901.1
	Gross Alpha	4.59	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>e</sup>	12.7 ± 1.21	1.53	4 mrem/yr	--	--	EPA 900.0
	Tritium <sup>f</sup>	-28.8 ± 85.9	161	4 mrem/yr	U	BD	EPA 906.0M
	Radon-222	470 ± 117	56.1	1,000 pCi/L	--	--	SM7500-Rn B
<b>MWL-MW9</b> (Duplicate) 03-Nov-2021	Americium-241	3.77 ± 6.49	9.66	NE	U	BD	EPA 901.1
	Cesium-137	-0.924 ± 1.84	3.10	NE	U	BD	EPA 901.1
	Cobalt-60	0.874 ± 1.95	3.61	NE	U	BD	EPA 901.1
	Gross Alpha	1.40	NA	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>e</sup>	4.72 ± 0.873	1.24	4 mrem/yr	--	--	EPA 900.0
	Tritium <sup>f</sup>	13.6 ± 90.8	163	4 mrem/yr	U	BD	EPA 906.0M
	Radon-222	396 ± 101	56.3	1,000 pCi/L	--	--	SM7500-Rn B

**Notes:**

<sup>a</sup>Gross alpha activity measurements were corrected by subtracting the total uranium activity from the total gross alpha result (Title 40 Code of Federal Regulations Parts 9, 141, and 142, Table I-4). Negative numbers indicate the sample count or result was less than the instrument background.

<sup>b</sup>MDA is the minimal detectable activity or minimum measured activity in a sample required to ensure 95 percent probability that the measured activity is accurately quantified above the critical level.

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

Laboratory Qualifier

NA = Not applicable because the gross alpha result shown is adjusted for naturally occurring uranium.

U = Analyte was below detection limit.

Validation Qualifier

BD = Result is not statistically different from zero.

J = The associated value is an estimated quantity.

None = No data validation for corrected gross alpha activity.

<sup>d</sup>Analytical Methods EPA 900.0, EPA 901.1, and EPA 906.0M:

- U.S. Environmental Protection Agency, 1980, "Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA-600/4-80-032, Center for Environmental Research Information, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio.

Analytical Method SM7500-Rn B:

- American Public Health Association, American Water Works Association, and Water Environment Federation, 1988, "Standard Methods for the Examination of Water and Wastewater," SM7500-Rn B Method, 22<sup>nd</sup> Edition, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation, Washington, D.C., 1988.

<sup>e</sup>Refer to Section 7.2.1 for an explanation of the gross beta trigger level.

<sup>f</sup>The approximate equivalent activity for the 4 mrem/yr tritium trigger level is 20,000 pCi/L.

EPA = U.S. Environmental Protection Agency.

ID = Identification.

MWL = Mixed Waste Landfill.

mrem/yr = Millirem per year.

NE = Not established.

pCi/L = Picocuries per liter.

SM = Standard method.

Table 7-4  
Summary of Field Water Quality Measurements<sup>a</sup>  
Mixed Waste Landfill Groundwater Monitoring  
May and November 2021

Well ID	Temperature (°C)	SC (µmhos/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (% Sat)	DO (mg/L)
<b>May 2021 Sampling Event</b>							
MWL-BW2	19.89	717.12	132.3	7.33	2.27	42.18	3.19
MWL-MW7	21.30	477.89	129.1	7.53	0.85	87.53	6.36
MWL-MW8	21.00	684.62	131.8	7.46	1.01	47.43	3.51
MWL-MW9	20.52	622.02	108.5	7.30	0.76	16.71	1.25
<b>November 2021 Sampling Event</b>							
MWL-BW2	20.62	702.26	157.5	7.42	1.90	35.22	2.84
MWL-MW7	18.73	568.43	172.2	7.58	0.25	87.99	7.34
MWL-MW8	19.31	577.26	178.3	7.53	0.90	52.80	4.38
MWL-MW9	20.47	593.70	165.9	7.49	3.14	22.03	1.78

Notes:

<sup>a</sup>Field measurements collected prior to sampling.

°C = Degrees Celsius.

% Sat = Percent saturation.

DO = Dissolved oxygen.

ID = Identification.

mg/L = Milligrams per liter.

MWL = Mixed Waste Landfill.

µmhos/cm = Micromhos per centimeter.

mV = Millivolts.

NTU = Nephelometric turbidity units.

ORP = Oxidation-reduction potential.

pH = Potential of hydrogen (negative logarithm of the hydrogen ion concentration).

SC = Specific conductivity.

#### First Sampling Event – May 10-13, 2021

VOCs were not detected in the environmental samples above MDLs. Methylene chloride was qualified as not detected during data validation in the MWL-MW8 and MWL-MW9 environmental samples due to similar, very low concentrations detected in the associated trip blank samples (i.e., reported concentrations were less than the PQL).

Cadmium, chromium, and nickel were not detected above the associated MDLs. Uranium was detected below the LTMMMP trigger level in all groundwater samples. Uranium concentrations ranged from 0.00657 milligrams per liter (mg/L) at MWL-BW2 (environmental sample) to 0.00867 mg/L at MWL-MW9. All metals results are consistent with historical MWL groundwater monitoring results and below LTMMMP trigger levels.

MWL groundwater samples were screened for gamma-emitting radionuclides, gross alpha activity, gross beta activity, tritium, and radon-222. There were no detections of gamma-emitting radionuclides (as determined by gamma spectroscopy) or tritium (as determined by liquid scintillation counting). Gross alpha activity was detected below the LTMMMP trigger level of 15 pCi/L in all samples ranging from 2.36 pCi/L (MWL-BW2 environmental duplicate sample) to 6.23 pCi/L (MWL-MW8). Gross beta activity ranged from 4.70 pCi/L (MWL-MW8) to 6.12 pCi/L (MWL-BW2 environmental sample); results are consistent with background levels. Radon-222

was detected in all samples below the LTMMMP trigger level of 1,000 pCi/L, with activities ranging from 108 pCi/L (MWL-MW7) to 519 pCi/L (MWL-MW9). All radiological results were reviewed by an SNL/NM Health Physics SME to screen for potential indications of radiological contamination; there were no indications of radiological anomalies in the groundwater sample results. Results are consistent with historical results and background activities for MWL groundwater, and below LTMMMP trigger levels.

#### Second Sampling Event – November 1-4, 2021

VOCs were not detected in the environmental samples above MDLs. Methylene chloride was qualified as not detected during data validation in the MWL-MW8 environmental sample due to a similar, very low concentration detected in the associated trip blank sample (i.e., reported concentrations were less than the PQL).

Cadmium and chromium were not detected above the associated MDLs. Nickel was detected in the MWL-MW9 environmental sample at a concentration of 0.000640 mg/L. There were no other detections of nickel. Uranium was detected in all samples at concentrations ranging from 0.00673 mg/L at MWL-BW2 to 0.00917 mg/L at MWL-MW9 (environmental duplicate sample). All metals results are consistent with historical MWL groundwater monitoring results and are below LTMMMP trigger levels.

MWL groundwater samples were screened for gamma-emitting radionuclides, gross alpha activity, gross beta activity, tritium, and radon-222. There were no detections of gamma-emitting radionuclides (as determined by gamma spectroscopy) or tritium (as determined by liquid scintillation counting). Gross alpha activity was detected in all samples ranging from 0.51 pCi/L (MWL-MW7) to 4.59 pCi/L (MWL-MW9 environmental sample). Gross beta activity was detected in all samples ranging from 3.79 pCi/L (MWL-MW7) to 12.7 pCi/L (MWL-MW9 environmental sample). Radon-222 was detected in all samples, with activities ranging from 174 pCi/L at MWL-MW7 to 470 pCi/L at MWL-MW9 (environmental sample). All radiological results were reviewed by an SNL/NM Health Physics SME to screen for potential indications of radiological contamination; there were no indications of radiological anomalies in the groundwater sample results. Results are consistent with historical results and background activities for MWL groundwater, and below LTMMMP trigger levels.

#### Nickel and Uranium Concentration and Gross Alpha Activity Plots

Concentrations or activities over time of nickel, uranium, and gross alpha activity are presented in Figures 7-2 through 7-4, respectively for all groundwater monitoring events conducted since implementation of the LTMMMP in 2014. Trigger levels are shown at the top of these plots and have not been exceeded. For non-detect results the MDL or MDA was used, and for environmental-duplicate sample pairs only the highest result was used. Variation shown in these plots reflects natural background variation in the concentration of these constituents within the Regional Aquifer. The superposition of concentration lines in Figure 7-2 reflects mostly non-detection results for nickel in the groundwater samples from all four compliance monitoring wells.



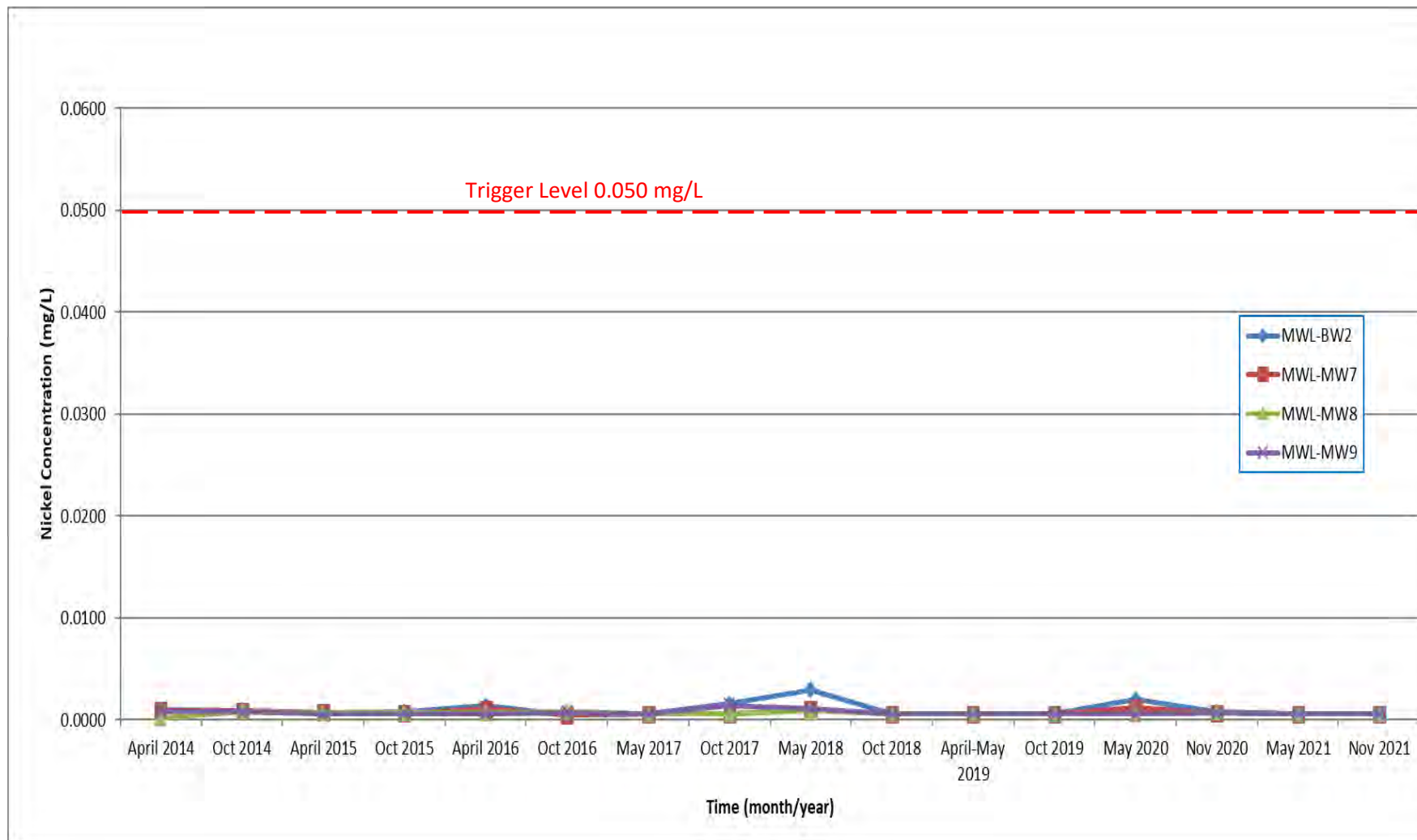


Figure 7-2  
Nickel Concentrations vs. Time  
Mixed Waste Landfill Groundwater Monitoring Wells

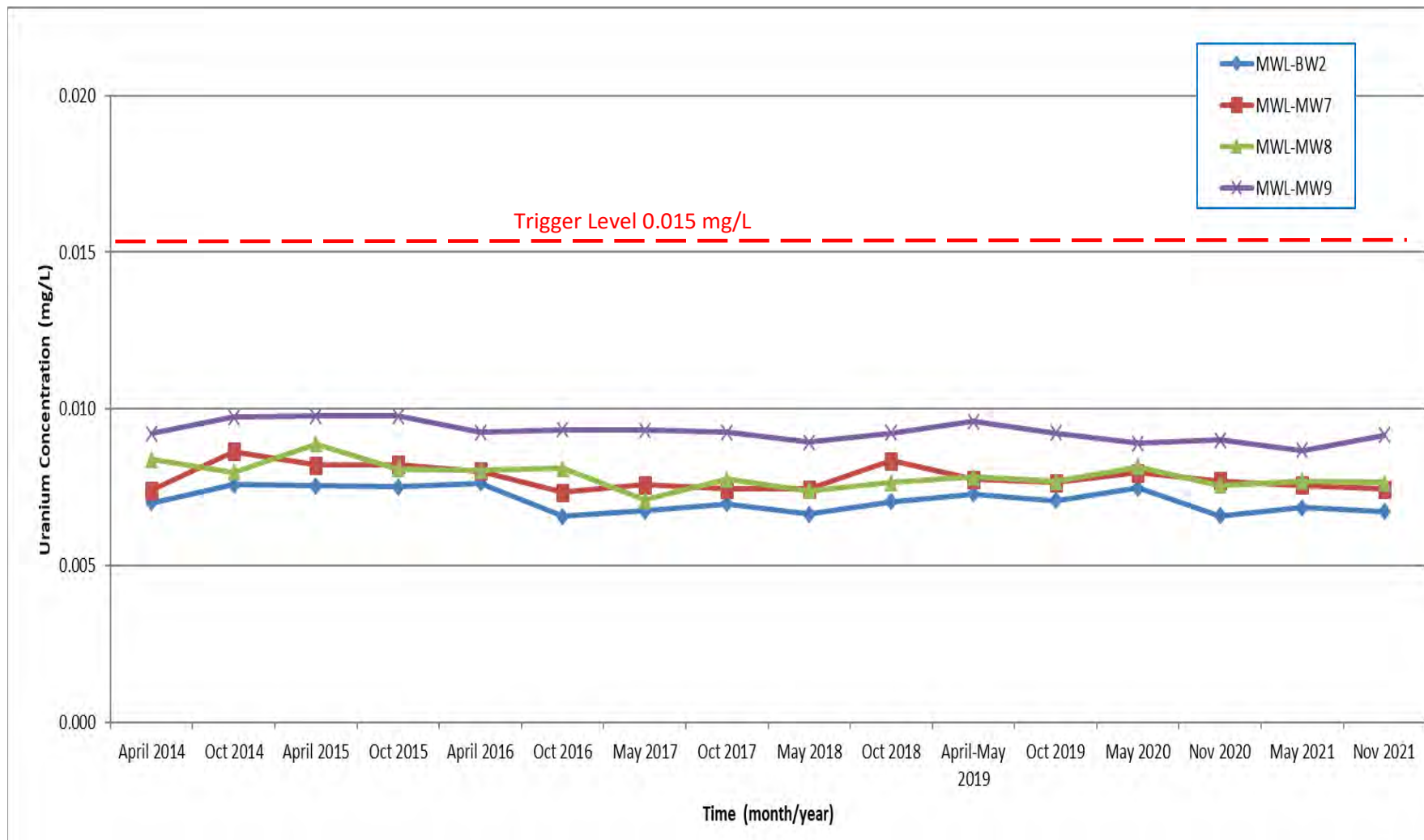


Figure 7-3  
Uranium Concentrations vs. Time  
Mixed Waste Landfill Groundwater Monitoring Wells

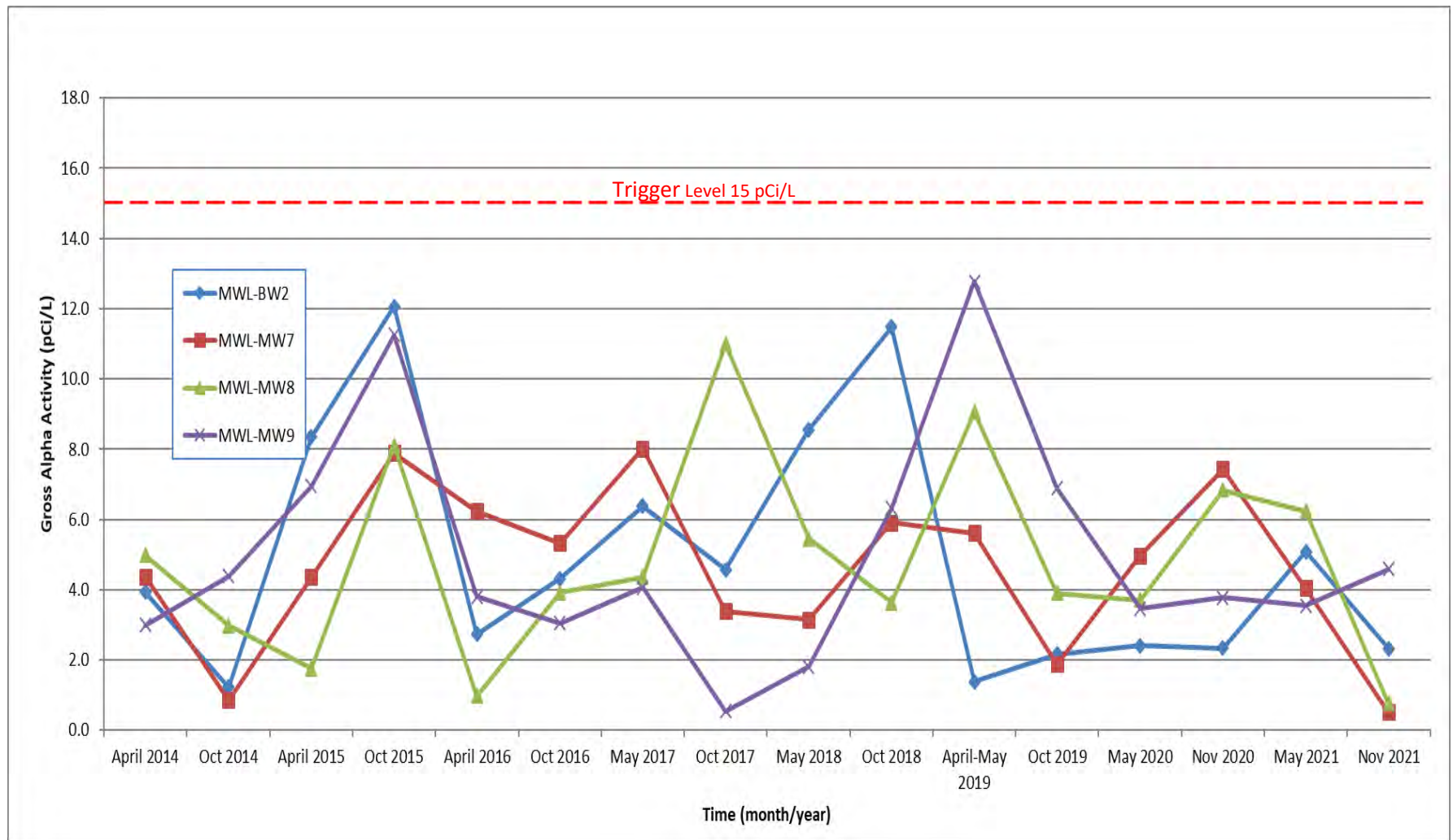


Figure 7-4  
Gross Alpha Activity vs. Time  
Mixed Waste Landfill Groundwater Monitoring Wells

## 7.2.2 Field Quality Control Sample Results

Field QC sample results met the sampling DQOs and validated the field sampling procedures and protocol. The analytical results for each field QC sample type are presented in this section.

Table 7-5 summarizes results of environmental-duplicate sample pair results and the calculated RPD values for the May and November 2021 data sets. RPDs were calculated for constituents that exceeded the MDL in the sample pairs. Only the metal uranium was detected above the associated MDLs in the two sample pairs. Calculated RPDs for uranium show good agreement (i.e., RPD values less than or equal to 35 for metals per LTMMP Appendix F, Section 2.2) for both sampling events, ranging from 1 to 4.

Table 7-5  
Summary of Duplicate Sample Results  
Mixed Waste Landfill Groundwater Monitoring  
May and November 2021

Well ID/Parameter	Environmental Sample (R <sub>1</sub> )	Duplicate Sample (R <sub>2</sub> )	RPD <sup>a</sup> (%)
<b>May 2021 Sampling Event</b>			
<b>MWL-BW2</b>			
Uranium (mg/L)	0.00657	0.00685	4
<b>November 2021 Sampling Event</b>			
<b>MWL-MW9</b>			
Uranium (mg/L)	0.00912	0.00917	1

Notes:

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

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

where: R<sub>1</sub> = Environmental sample result.  
R<sub>2</sub> = Duplicate sample result.

% = Percent.  
ID = Identification.  
mg/L = Milligrams per liter.  
MWL = Mixed Waste Landfill.

A discussion of equipment, field, and trip blank results for the May and November 2021 sampling events is provided below.

### First Sampling Event – May 10-13, 2021

The equipment blank sample for the May 2021 sampling event was analyzed for all constituents. Acetone, 2-butanone, bromodichloromethane, chloroform, and dibromochloromethane were detected above laboratory MDLs. No corrective action was necessary since these compounds were not detected in the MWL-BW2 environmental and environmental duplicate samples.

Validated VOC detections in the five field blank samples at very low concentrations included acetone, bromodichloromethane, chloroform, and dibromochloromethane. No corrective action was necessary since these compounds were not detected in the associated environmental samples.

Methylene chloride was the only VOC detected above the MDL in the six trip blank samples associated with the May 2021 sampling event. It was reported below the PQL in the trip blank samples associated with MWL-MW8 and MWL-MW9 environmental samples. Methylene chloride was qualified as not detected in these environmental samples during data validation since the reported concentrations were similar to the trip blank sample concentrations (i.e., above the MDL but below the PQL). The trip blank sample associated with one field blank sample was analyzed outside the analytical method hold time requirement and the results were qualified as not usable during data validation. No corrective action was required since the results did not impact environmental sample results.

### Second Sampling Event – November 1-4, 2021

The equipment blank sample for the November 2021 sampling event was analyzed for all constituents. Acetone, bromodichloromethane, chloroform, and dibromochloromethane were detected above the MDLs. No corrective action was necessary since these compounds were not detected in the MWL-MW9 environmental and environmental duplicate samples.

Validated VOC detections in the five field blank samples at very low concentrations included bromodichloromethane, bromoform, chloroform, and dibromochloromethane. No corrective action was necessary since these compounds were not detected in the associated environmental samples.

Methylene chloride was the only VOC detected above the MDL in the six trip blank samples associated with the November 2021 sampling event. It was reported below the PQL in the trip blank samples associated with the MWL-MW8 environmental sample and the field blank sample collected from the source water used for the equipment decontamination process. Methylene chloride was qualified as not detected in the environmental and field blank sample during data validation since the reported concentrations were similar to the trip blank sample concentration (i.e., above the MDL but below the PQL).

### 7.2.3 Laboratory Quality Control and Data Quality

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. Reported laboratory QC sample results comply with analytical method and laboratory procedure requirements. Laboratory QC sample results that effected environmental sample results are discussed below.

### First Sampling Event – May 10-13, 2021

All laboratory control sample results met the accuracy (i.e., % recovery) requirement of 50 to 130 for VOCs and 75 to 125 for metals (Section 2.1 of LTMMP Appendix F), except for chloromethane and dichlorodifluoromethane. These compounds recovered outside LTMMP limits but within laboratory and analytical method acceptance limits in laboratory control samples associated with MWL-MW8 and MWL-MW9 environmental samples. Dichlorodifluoromethane recovered outside both LTMMP and analytical method limits in the laboratory control sample associated with the MWL-BW2 environmental samples. In accordance with data validation, no corrective action was required and none of these compounds was detected in the environmental samples.

### Second Sampling Event – November 1-4, 2021

All laboratory control sample results met the accuracy (i.e., % recovery) requirement of 50 to 130 for VOCs and 75 to 125 for metals (Section 2.1 of LTMMP Appendix F), except for vinyl chloride. Vinyl chloride recovered outside LTMMP and analytical method acceptance limits in the laboratory control sample associated with the MWL-MW8 environmental sample. No corrective action was necessary since this compound was not detected in the environmental sample.

All chemical data were reviewed and qualified in accordance with SNL/NM AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data" (SNL/NM June 2020). Based upon the data validation and review criteria, all environmental sample analytical data were determined to be acceptable and met the DQOs. Laboratory QC sample results comply with analytical method and laboratory procedure requirements except as noted above. Corrective action was not required based upon the data validation procedure. Data validation reviews that include AR/COCs and contract verification reviews are provided in Annex E.

## 7.2.4 Variances and Non-Conformances

Variances and non-conformances are defined in the LTMMP Appendix F, Section 6 for groundwater monitoring. There were no variances or non-conformances from LTMMP requirements for groundwater monitoring during the May and November 2021 sampling events.

## 7.3 Hydrogeologic Assessment

A detailed conceptual site model is provided in the MWL Phase 2 RCRA Facility Investigation Report (Peace et al. September 2002) and the Mixed Waste Landfill Groundwater Report, 1990 through 2001 (Goering et al. December 2002). An update to the conceptual site model integrating the findings from the current groundwater monitoring well network installed in 2008 is presented in the Mixed Waste Landfill Annual Groundwater Monitoring Report, Calendar Year 2009 (SNL/NM June 2010).

The upper surface of the Regional Aquifer at the MWL is contained within the interfingering, unconsolidated, fine-grained alluvial-fan deposits of the Santa Fe Group. The more

transmissive, coarser-grained Ancestral Rio Grande sediments underlie the fine-grained alluvial deposits beneath the MWL. The depth to water is approximately 500 ft bgs and groundwater flows generally westward, away from the Manzanita Mountains and towards the Rio Grande. Several production wells operated by KAFB and the ABCWUA have profoundly modified the natural groundwater flow regime near the MWL by creating a trough in the water table in the western and northern portions of KAFB. As a result, water levels at the MWL have historically declined since monitoring began in 1990.

Figure 7-5 shows the change in groundwater elevation at MWL groundwater monitoring wells for the time period 2000 through 2021. Since about 2010, the rate of groundwater elevation decline in all wells has been relatively slow. Some wells have shown very small increases in groundwater elevations. The rate of groundwater elevation decline in the upper screen interval of MWL-MW4 has generally stabilized since April 2010; this well shows more variation due to the strong downward gradient in the Regional Aquifer beneath the MWL and the presence of an inflatable packer between the upper (across the water table) and lower (at least partially within the Ancestral Rio Grande sediments) screen intervals. The overall decline in MWL-BW2, located on the east side of the MWL, reflects a higher rate of decline than observed in the other wells on the western side of the MWL. Monitoring wells on the west side of the MWL (MWL-MW5 through MWL-MW9) have shown a slight increase in the groundwater elevation over the past three years. From October 2020 to October 2021 in the four compliance wells, the groundwater elevation declined in MWL-BW2 (0.25 feet), did not significantly change in MWL-MW7 and MWL-MW8 (0 to 0.01 foot decrease, respectively), and rose in MWL-MW9 (0.12 feet). Changes were similar for the other three monitoring wells; MWL-MW4 showed a slight decline (0.07 feet) whereas MWL-MW5 and MWL-MW6, screened below the top of the water table with part of their screen intervals within the Ancestral Rio Grande, both showed an increase of 0.11 feet. This is likely due to the depth of their screen intervals and decreased pumping of ABCWUA production wells to the north.

Recharge from infiltration of direct precipitation at the MWL is negligible due to high evapotranspiration, low precipitation, the thick sequence of unsaturated Santa Fe Group deposits above the water table, and the presence of the ET Cover. Regional recharge has been affected by extended drought conditions that continued in 2021. Groundwater recharge of the Regional Aquifer occurs primarily by the infiltration of precipitation in the Manzanita Mountains located approximately 5 miles to the east.

Figure 7-6 shows the October 2021 potentiometric surface of the Regional Aquifer beneath the MWL. Based on the potentiometric contours, the hydraulic gradient is to the west-northwest. Measured orthogonally from the potentiometric surface contours, the horizontal gradient for October 2021 ranges from approximately 0.03 to 0.08 feet per foot. Groundwater velocities in the alluvial-fan sediments were calculated using the current potentiometric surface gradient, the average hydraulic conductivity obtained from slug testing of the four compliance monitoring wells, and an effective porosity of 25 percent. The calculated 2021 groundwater velocity remains consistent with previous years, and ranges from 0.02 to 0.06 feet per day; the average is 0.04 feet per day. These very low values and the general position of the groundwater elevation contours have not changed over the past six years and are consistent with previous estimates for horizontal groundwater flow at the water table in the MWL vicinity.

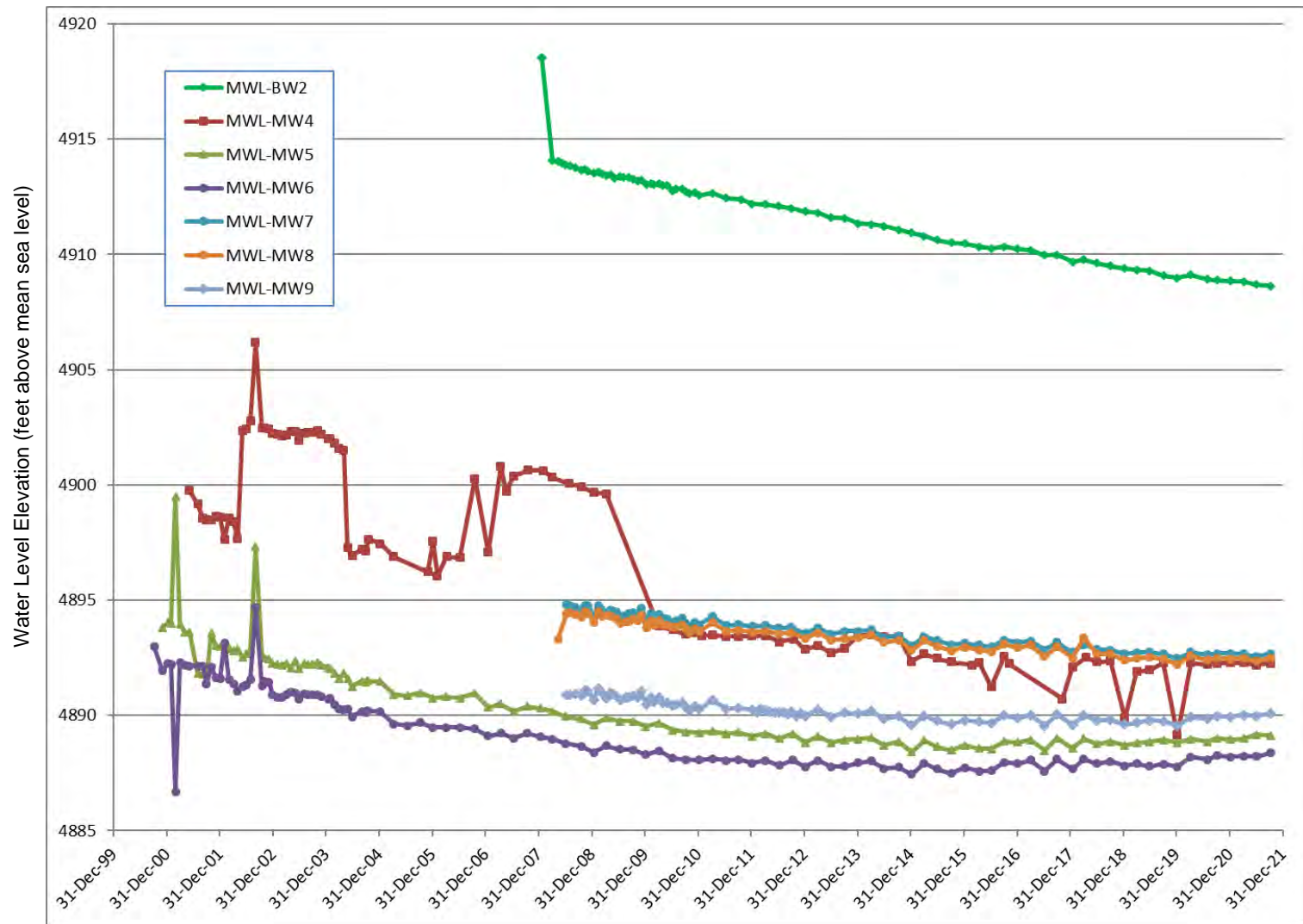


Figure 7-5  
Groundwater Level Elevations at Mixed Waste Landfill Groundwater Monitoring Wells



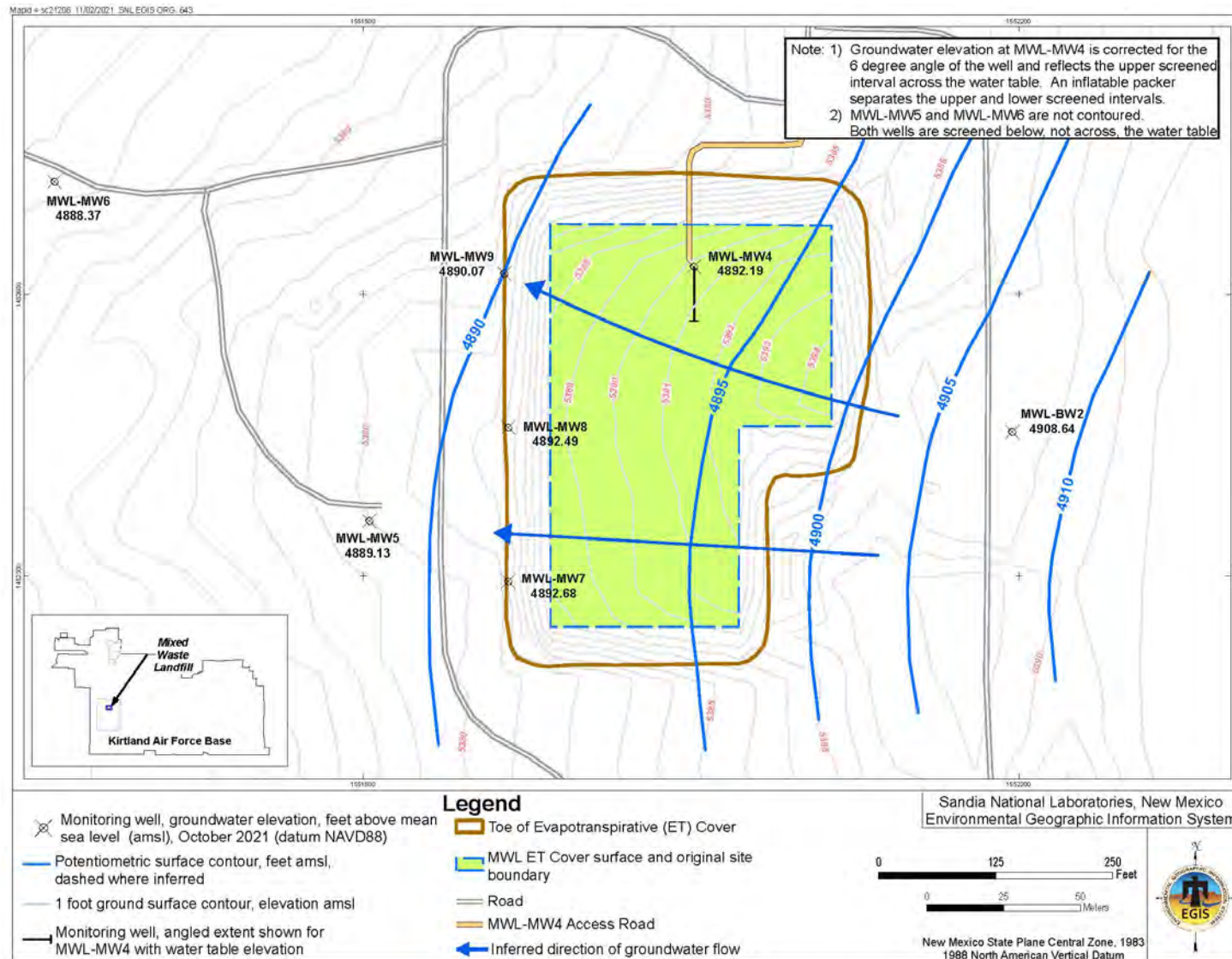


Figure 7-6  
Localized Potentiometric Surface of the Regional Aquifer at the Mixed Waste Landfill, October 2021

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## **8.0 BIOTA MONITORING RESULTS**

This chapter presents biota monitoring activities (i.e., sampling and analysis), analytical results, and data evaluation in accordance with MWL LTMMMP Section 3.6 and Appendix G (SNL/NM March 2012). The monitoring objective is to provide data to evaluate biotic mobilization of contaminants (i.e., metals and radionuclides) from the subsurface to surface. Sampling of surface soil from animal burrows and ant hills, and potentially deep-rooted vegetation, is performed if these features are identified during the annual ET Cover Biology Inspection. Biota monitoring functions as an early warning detection system so that timely action can be taken, if necessary. Results are compared to trigger levels and background levels defined in LTMMMP Section 5.2.2.2.

Biota monitoring field activities are described in Section 8.1, analytical laboratory results and a discussion of data quality are presented in Section 8.2, and data evaluation and a comparison of results to monitoring trigger levels are presented in Section 8.3. A summary of biota monitoring activities and results is provided in Section 11.1.

### **8.1 Biota Monitoring Field Activities**

One biota sampling event was conducted during the April 1, 2021 through March 31, 2022 reporting period fulfilling the LTMMMP annual monitoring requirement. The biota sampling locations were identified during the annual ET Cover Biology Inspection performed on August 16, 2021. The sampling locations are shown in Figure 8-1 and consist of two ant hills (MWL AHSS-01-2021 and MWL AHSS-02-2021). There were no animal burrows or potentially deep-rooted plants identified on the ET Cover during the Biology Inspection. The two ant hill locations selected for surface soil sampling on the ET Cover were active and provided different locations relative to last year's biota sample locations. Surface soil samples were collected at these locations on August 19, 2021 and analyzed for metals and gamma emitting radionuclides by gamma spectroscopy.

#### **8.1.1 Field Quality Control**

In accordance with the Tritium and Biota SAP (LTMMMP Appendix G, Table G-4.2-1), one field QC sample (duplicate sample) was collected at MWL AHSS-02-2021.

#### **8.1.2 Waste Management**

Waste generated during sampling activities included PPE (i.e., gloves) and decontamination wipes. Historical data and analytical results from the sampling event were used to characterize the waste; it was determined to be non-hazardous solid waste and was managed accordingly.

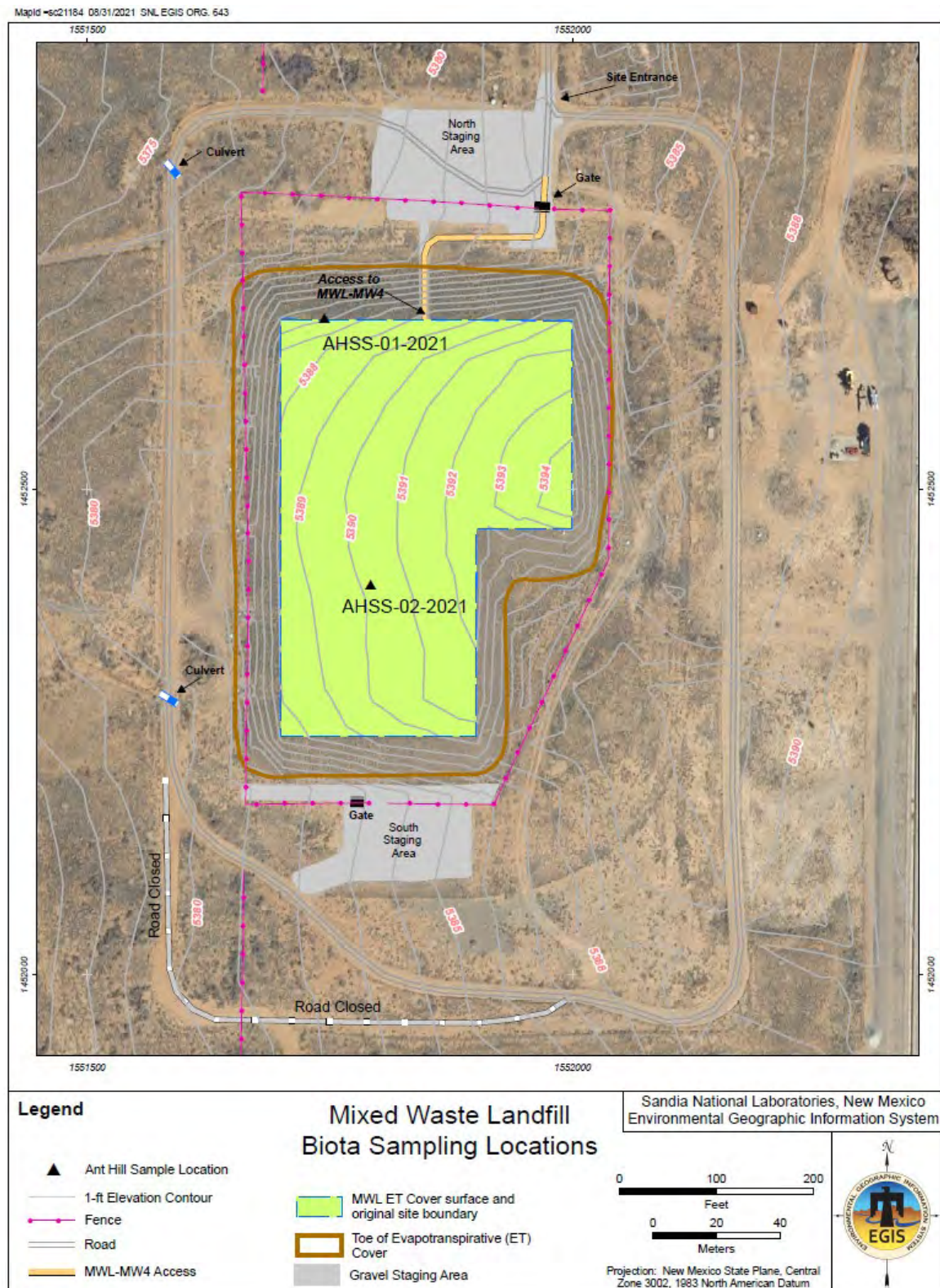


Figure 8-1  
Mixed Waste Landfill Biota Sampling Locations

## 8.2 Laboratory Results

Biota surface soil samples were submitted to GEL for analyses. Samples were analyzed in accordance with applicable EPA analytical methods. Results that are below the MDL (metals) or MDA (gamma spectroscopy) are qualified with a “U” and are designated as not detected. Both laboratory and data validation qualifiers are included in the data tables presented in this section. Analytical laboratory reports, including certificates of analyses, analytical methods, MDAs and MDLs, sample results, dates of analyses, and results of QC analyses, are filed in the SNL/NM Record Center.

### 8.2.1 Environmental Sample Results

Table 8-1 summarizes metals results and Table 8-2 summarizes gamma spectroscopy results for the two ant hill surface soil sample locations. LTMMP trigger levels are included in Table 8-1 and NMED-approved background concentrations and activities (Dinwiddie September 1997) are provided in both Tables 8-1 and 8-2 for comparison.

All metals results were below trigger levels and the respective NMED-approved background concentrations.

All gamma spectroscopy radionuclide activities were low, below the respective NMED-approved background activities. Seven of the 18 results were non-detects. The gamma spectroscopy results were reviewed by an SNL/NM Health Physics SME to screen for potential indications of radiological contamination; there were no indications of radiological anomalies in the biota soil sample results.

### 8.2.2 Field Quality Control Sample Results

Table 8-3 summarizes results of the environmental-duplicate sample pair and the RPD values calculated for the August 2021 biota data set. An RPD was calculated when metals concentrations greater than the RL were reported in both the environmental and duplicate sample, and when radionuclides were reported in both the environmental and duplicate sample at activities greater than the MDA. Calculated RPDs for metals and radiological constituents show good agreement, ranging from 2 to 28. As defined in Section 2.3, Appendix G of the LTMMP, an RPD of less than or equal to 35 is considered acceptable for metals results.



Table 8-1  
Summary of Metals Results (EPA Method 6010D/7471B<sup>a</sup>)  
Mixed Waste Landfill Biota Monitoring  
August 2021

Sample Location	Parameter	Result (mg/kg)	MDL (mg/kg)	Reporting Limit (mg/kg)	NMED Background <sup>b</sup> (mg/kg)	Trigger Level (mg/kg)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL AHSS-01-2021 19-Aug-2021	Arsenic	0.968	0.464	2.78	5.6	17.7	J	--
	Barium	20.6	0.0928	0.464	130	100,000	*	J, RP2
	Beryllium	0.136	0.0928	0.464	0.65	2,260	J	--
	Cadmium	ND	0.0928	0.464	<1	897	U	--
	Chromium	1.46	0.139	0.928	17.3	63.1	*	J, RP2
	Cobalt	0.272	0.139	0.464	5.2	20,500	*, J	J-, B4, B5, RP2
	Copper	1.26	0.278	1.86	15.4	45,400	*, J	J, RP2
	Lead	2.70	0.306	1.86	21.4	800	B	J+, B, B3
	Mercury	ND	0.00698	0.0208	<0.25	73.6	U	--
	Nickel	1.05	0.139	0.464	11.5	22,500	*, B	J, RP2
	Selenium	0.965	0.464	2.78	<1	5,680	BJ	2.78U, B
	Silver	ND	0.0928	0.464	<1	5,680	U	--
	Vanadium	2.61	0.0928	0.464	20.4	5,680	*	J, RP2
	Zinc	6.69	0.371	1.86	62	100,000	*, B	J, RP2
MWL AHSS-02-2021 19-Aug-2021	Arsenic	3.10	0.454	2.72	5.6	17.7	--	--
	Barium	64.8	0.0907	0.454	130	100,000	*	J, RP2
	Beryllium	0.529	0.0907	0.454	0.65	2,260	--	--
	Cadmium	ND	0.0907	0.454	<1	897	U	--
	Chromium	7.88	0.136	0.907	17.3	63.1	*	J, RP2
	Cobalt	2.49	0.136	0.454	5.2	20,500	*	J, RP2
	Copper	7.20	0.272	1.81	15.4	45,400	*	J, RP2
	Lead	5.74	0.299	1.81	21.4	800	B	--
	Mercury	ND	0.00691	0.0206	<0.25	73.6	U	--
	Nickel	5.28	0.136	0.454	11.5	22,500	*, B	J, RP2
	Selenium	ND	0.454	2.72	<1	5,680	U	--
	Silver	ND	0.0907	0.454	<1	5,680	U	--
	Vanadium	17.3	0.0907	0.454	20.4	5,680	*	J, RP2
	Zinc	20.1	0.363	1.81	62	100,000	*, B	J, RP2
MWL AHSS-02-2021 (Duplicate) 19-Aug-2021	Arsenic	3.01	0.484	2.90	5.6	17.7	--	--
	Barium	86.3	0.0967	0.484	130	100,000	*	J, RP2
	Beryllium	0.625	0.0967	0.484	0.65	2,260	--	--
	Cadmium	ND	0.0967	0.484	<1	897	U	--
	Chromium	8.01	0.145	0.967	17.3	63.1	*	J, RP2
	Cobalt	2.91	0.145	0.484	5.2	20,500	*	J, RP2
	Copper	6.44	0.290	1.93	15.4	45,400	*	J, RP2
	Lead	6.99	0.319	1.93	21.4	800	B	--
	Mercury	ND	0.00753	0.0225	<0.25	73.6	U	--
	Nickel	5.98	0.145	0.484	11.5	22,500	*, B	J, RP2
	Selenium	ND	0.484	2.90	<1	5,680	U	--
	Silver	ND	0.0967	0.484	<1	5,680	U	--
	Vanadium	19.4	0.0967	0.484	20.4	5,680	*	J, RP2
	Zinc	23.3	0.387	1.93	62	100,000	*, B	J, RP2

Refer to notes at end of table.

Table 8-1 (Concluded)  
Summary of Metals Results (EPA Method 6010D/7471B<sup>a</sup>)  
Mixed Waste Landfill Biota Monitoring  
August 2021

Notes:

<sup>a</sup>U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3<sup>rd</sup> edition, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

<sup>b</sup>Dinwiddie September 1997, Letter from R.S. Dinwiddie (NMED) to M.J. Zamorski (DOE), "Request for Supplemental Information: Background Concentrations Report, SNL/KAFB," dated September 24, 1997.

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

Laboratory Qualifier

\* = Recovery or percent RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where the concentration falls below the effective practical quantitation limit.

B = The analyte was found in the method blank above the effective MDL.

BJ = The analyte was found in the method blank above the effective MDL and the concentration is an estimated value greater than the MDL but less than the Reporting Limit.

J = Estimated value, the analyte concentration is greater than the MDL but less than the Reporting Limit.

U = Result less than the MDL.

Validation Qualifier

B = Method blank contamination at concentration greater than the MDL.

B3 = Calibration blank contamination at concentration greater than the MDL.

B4 = Negative value for calibration blank – absolute value less than the MDL.

B5 = Negative value for method blank – absolute value less than the MDL.

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.

RP2 = Replicate RPD failed.

U = The analyte was reported as a detection by the laboratory but was qualified during data validation as not detected. The associated numerical value is the revised sample quantitation limit (i.e., Reporting Limit) in units of mg/kg, in accordance with the data validation process.

< = Less than.

DOE = U.S. Department of Energy.

EPA = U.S. Environmental Protection Agency.

MDA = Minimum detectable activity.

MDL = Method detection limit.

mg/kg = Milligrams per kilogram.

MWL = Mixed Waste Landfill.

ND = Not detected above the MDL.

NMED = New Mexico Environment Department.

RPD = Relative percent difference.

SNL/KAFB = Sandia National Laboratories/Kirtland Air Force Base.

Table 8-2  
Summary of Gamma Spectroscopy Results (EPA Method 901.1<sup>a</sup>)  
Mixed Waste Landfill Biota Monitoring  
August 2021

Sample Location	Parameter	Result (pCi/g)	MDA (pCi/g)	NMED Background <sup>b</sup> (pCi/g)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL AHSS-01-2021</b> 19-Aug-2021	Cesium-137	0.0337 ± 0.0255	0.0238	1.5	--	J, FR7
	Cobalt-60	-0.00809 ± 0.0147	0.0242	NA	U	BD, FR3
	Radium-226	0.482 ± 0.0776	0.0439	2.7	--	--
	Thorium-232 <sup>d</sup>	0.767 ± 0.0803	0.0352	1.5	--	--
	Uranium-235	0.0671 ± 0.131	0.126	0.18	U	BD, FR3
	Uranium-238	1.61 ± 1.80	1.17	2.3	X	R, Z2
<b>MWL AHSS-02-2021</b> 19-Aug-2021	Cesium-137	0.0675 ± 0.0317	0.0341	1.5	--	J, FR7
	Cobalt-60	-0.00420 ± 0.0158	0.0293	NA	U	BD, FR3
	Radium-226	0.713 ± 0.114	0.0584	2.7	--	--
	Thorium-232 <sup>d</sup>	0.858 ± 0.0941	0.0449	1.5	--	--
	Uranium-235	0.0464 ± 0.0941	0.173	0.18	U	BD, FR3
	Uranium-238	1.76 ± 1.69	1.29	2.3	--	J, FR7
<b>MWL AHSS-02-2021</b> (Duplicate) 19-Aug-2021	Cesium-137	0.0848 ± 0.0267	0.0236	1.5	--	--
	Cobalt-60	0.0158 ± 0.0170	0.0312	NA	U	BD, FR3
	Radium-226	0.691 ± 0.100	0.0433	2.7	--	--
	Thorium-232 <sup>d</sup>	0.884 ± 0.0930	0.0366	1.5	--	--
	Uranium-235	0.00941 ± 0.142	0.133	0.18	U	BD, FR3
	Uranium-238	0.587 ± 0.979	0.773	2.3	U	BD, FR3

Notes:

Negative numbers indicate the sample count or result was less than the instrument background.

<sup>a</sup>U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3<sup>rd</sup> edition, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

<sup>b</sup>Dinwiddie September 1997, Letter from R.S. Dinwiddie (NMED) to M.J. Zamorski (DOE), "Request for Supplemental Information: Background Concentrations Report, SNL/KAFB," dated September 24, 1997. Cobalt-60 is not naturally occurring; therefore, it does not have a listed background activity.

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

Laboratory Qualifier

U = Analyte is below detection limit.

X = Uncertain identification for gamma spectroscopy.

Validation Qualifier

BD = Result is not statistically different from zero.

FR3 = Result is less than the MDA or less than 2-sigma the total propagated uncertainty.

FR7 = Result is greater than or equal to the MDA and less than 3 times the MDA.

J = The associated value is an estimated quantity.

R = The data are unusable (compound may or may not be present).

Z2 = Minimum peak criteria not met.

<sup>d</sup>Thorium-232 activity is quantified and reported using the daughter isotope Lead-212 results.

DOE = U.S. Department of Energy.

EPA = U.S. Environmental Protection Agency.

MDA = Minimum detectable activity.

MWL = Mixed Waste Landfill.

NA = Not applicable.

NMED = New Mexico Environment Department.

pCi/g = Picocuries per gram.

SNL/KAFB = Sandia National Laboratories/Kirtland Air Force Base.



Table 8-3  
Summary of Duplicate Sample Results  
Mixed Waste Landfill Biota Monitoring  
August 2021

Sample Location	Environmental Sample (R <sub>1</sub> )	Duplicate Sample (R <sub>2</sub> )	RPD <sup>a</sup> (%)
<b>MWL AHSS-02-2021 – Metals (mg/kg)</b>			
Arsenic	3.10	3.01	3
Barium	64.8	86.3	28
Beryllium	0.529	0.625	17
Chromium	7.88	8.01	2
Cobalt	2.49	2.91	16
Copper	7.20	6.44	11
Lead	5.74	6.99	20
Nickel	5.28	5.98	12
Vanadium	17.3	19.4	11
Zinc	20.1	23.3	15
<b>MWL AHSS-02-2021 – Radionuclides (pCi/g)</b>			
Cesium-137	0.0675	0.0848	23
Radium-226	0.713	0.691	5
Thorium-232	0.858	0.884	3

Notes:

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

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

where: R<sub>1</sub> = Environmental sample result.  
R<sub>2</sub> = Duplicate sample result.

% = Percent.

mg/kg = Milligrams per kilogram.

MWL = Mixed Waste Landfill.

pCi/g = Picocuries per gram.

### 8.2.3 Laboratory Quality Control Data Quality

Internal laboratory QC samples were analyzed concurrently with all environmental samples in accordance with laboratory procedures and EPA analytical methods. These included laboratory control samples, method blanks, matrix spike, and replicate samples for the metals analyses. For the radiological analyses, method blanks, laboratory control samples, and replicate samples were analyzed with the environmental 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.

The selenium result at MWL AHSS-01-2021 was qualified as not detected during data validation detection due to contamination in the method blank above the MDL. Various results were qualified during data validation as estimated or “J” values due to laboratory replicate sample results, replicate RPDs that exceeded analytical method limits, and/or laboratory method blank and continuing calibration blank sample results greater than the MDL.

For the gamma spectroscopy results, one uranium-238 value was qualified during data validation as unusable due to the minimum peak requirement not being met (i.e., uncertainty in identifying the radionuclide).

All metals and gamma spectroscopy data were reviewed and qualified in accordance with SNL/NM AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data" (SNL/NM June 2020). Based upon the data validation and review criteria, all environmental sample analytical data were determined to be acceptable and to meet the DQOs. Laboratory QC sample results comply with analytical method and laboratory procedure requirements except as noted above. Corrective action was implemented in accordance with the data validation procedure and included qualification of specific results as documented in Tables 8-1 and 8-2 and the data validation reviews. Data validation reviews that include AR/COC forms and contract verification reviews are provided in Annex B.

#### 8.2.4 Variances

There were no variances from the LTMMMP biota monitoring requirements.

### 8.3 Data Evaluation and Monitoring Trigger Level

Trigger levels for metals in biota surface soil samples are included in Table 8-1. No surface soil metals results exceeded the trigger levels.

There are no trigger levels established for radionuclides. In accordance with LTMMMP Section 5.2.2.2, the gamma spectroscopy results are compared with NMED-approved background activity levels (Dinwiddie September 1997), but the background activities are not considered trigger levels. All radionuclide results for biota surface soil samples were below the NMED-approved background activity levels. No deep-rooted vegetation was identified for sampling.

These results indicate contaminants from the disposal areas are not being mobilized to the surface by plant or animal activity.

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

This chapter presents a summary of inspection, maintenance, and repair activities conducted in accordance with requirements in MWL LTMM Section 4.0 and Appendix I, MWL Long-Term Monitoring Inspection Checklists/Forms (SNL/NM March 2012). Inspection requirements are summarized in Table 2-2 of this Annual LTMM Report. Table 9-1 lists the date each type of inspection was performed during the April 1, 2021 through March 31, 2022 reporting period. Inspection results are presented in the following sections and documented on the inspection forms/checklists listed in Table 9-1 and provided in Annex F. A summary of inspection activities and results is provided in Section 11.2.

### **9.1 Final Cover System**

The final cover system includes the ET Cover vegetation and ET Cover surface (note the term ET Cover includes the side slopes). ET Cover vegetation is inspected annually by an SNL/NM staff biologist, documented on the Biology Inspection Checklist/Form for the MWL Cover, and summarized in Section 9.1.1. The ET Cover surface is inspected quarterly by a field technician, documented on the Cover Inspection Checklist/Form, and summarized in Section 9.1.2. During the quarterly inspections the field technician also inspects the storm-water diversion structures, security fence and access controls, and survey monuments, which are summarized in Sections 9.2 and 9.6.

#### **9.1.1 Biology Inspection**

One ET Cover Biology Inspection was performed by the staff biologist on August 16, 2021 fulfilling the requirement for an annual Biology Inspection during the reporting period growing season (Table 9-1). The ET Cover vegetation continues to meet all LTMM criteria for successful revegetation. The approximate foliar coverage on the ET Cover was 41 percent, with 99 percent of this coverage composed of native vegetation. The foliar coverage is dominated by native grasses, with *Galleta* grass comprising approximately 30 percent of the total foliar coverage. There were no contiguous areas without vegetation exceeding 200 square feet in size and no plants capable of developing deep root systems were identified. No small animal burrows were identified on the ET Cover. Fourteen active ant hills and one inactive ant hill were observed mostly on the side slopes. No action or repairs were required based on the Biology Inspection.

Overall, the ET Cover vegetation and surface is in good condition with even coverage of mature, native perennial grasses. Additional information is provided on the August 16, 2021 Biology Inspection Checklist/Form (Annex F) and in the Biology Report (Annex G). The Biology Report summarizes ET Cover background information, local climate trends, and recommendations for the ET Cover based upon inspections performed during the reporting period. Although only the annual Biology Inspection is required, the staff biologist performed biology verification inspections to support the quarterly ET Cover surface inspections performed by a field technician (Section 9.1.2) as a best practice. These verification inspections are documented in memorandums included in Annex F with the quarterly site/cover inspection forms.

Table 9-1  
Inspection Frequency and Dates Performed  
Mixed Waste Landfill  
April 2021 – March 2022 Reporting Period

Inspection Type	Frequency	Checklist/Form <sup>a</sup>	Date Performed
ET Cover Biology Inspection	Annual <sup>b</sup>	Biology Inspection Checklist/Form	August 16, 2021
ET Cover Surface Inspection	Quarterly	Cover Inspection Checklist/Form	June 1, 2021
			September 23, 2021
			December 8, 2021
			March 1, 2022
Storm-Water Diversion Structure Inspection <sup>c</sup>	Quarterly	Cover Inspection Checklist/Form	June 1, 2021
			September 23, 2021
			December 8, 2021
			March 1, 2022
Soil-Vapor Monitoring Network Inspection	Semiannual <sup>d</sup>	Soil-Vapor Monitoring Network Checklist/Form	May 6, 2021
Soil-Moisture Monitoring Network Inspection	Annual <sup>d</sup>	Soil-Moisture Monitoring Network Checklist/Form	November 5, 2021
Groundwater Monitoring Network Inspection	Semiannual <sup>d</sup>	Groundwater Monitoring Network Checklist/Form	April 19, 2021
			May 10, 2021
Security Fence Inspection <sup>c</sup>	Quarterly	Cover Inspection Checklist/Form	November 1, 2021
			June 1, 2021
			September 23, 2021
			December 8, 2021
			March 1, 2022

Notes:

<sup>a</sup>All reporting period LTMMMP-required inspection forms are provided in Annex F. Best practice monthly supplemental radon monitoring location inspections are provided in Annex A.

<sup>b</sup>Transition from quarterly to annual inspection frequency based upon meeting successful revegetation criteria as determined by the staff biologist during the August 14, 2014 growing season Biology Inspection.

<sup>c</sup>These inspections, conducted at the same time as the ET Cover Surface Inspection, include access controls (gates, locks, signs) and survey monuments, and are documented on the same inspection form.

<sup>d</sup>Monitoring network inspections are performed at the same frequency and at the same time as the associated monitoring.

ET = Evapotranspirative.

LTMMMP = Long-Term Monitoring and Maintenance Plan.

### 9.1.2 ET Cover System/Surface Inspection

Four ET Cover surface inspections were performed by a field technician during the reporting period fulfilling the LTMMMP quarterly inspection requirement (Table 9-1). The quarterly inspections were supported by the staff biologist. There were no inspection items that required maintenance or repairs, although some minor best practice maintenance was performed as discussed in Section 9.7.

## 9.2 Storm-Water Diversion Structure Inspection

Storm-water diversion structure inspections were combined with the quarterly ET Cover System/Surface Inspections during the reporting period, fulfilling the LTMMMP quarterly inspection requirement (Table 9-1). These inspections were documented on the same Cover Inspection Checklist/Form and addressed the storm-water diversion swale on the north, east,

and south sides of the ET Cover (just beyond the toe of the cover side slopes) and the site access road culverts (on the west side of the site), which are shown in Figure 2-3. No inspection items required follow-up actions. Accumulation of dead, windblown tumbleweeds were identified and removed from the road drainage culverts by the field technicians at time of the June 1, 2021 inspection and shortly after the March 1, 2022 inspection on March 10, 2022.

### 9.3 **Soil-Vapor Monitoring Network Inspection**

Two inspections of the soil-vapor monitoring network were performed as part of the semiannual soil-vapor monitoring events conducted during the reporting period, fulfilling the LTMMMP inspection requirement (Table 9-1). No inspection items required follow-up actions.

### 9.4 **Soil-Moisture Monitoring Network Inspection**

One inspection of the soil-moisture monitoring network was performed as part of the annual monitoring event conducted during the reporting period, fulfilling the LTMMMP inspection requirement (Table 9-1). No inspection items required follow-up actions.

### 9.5 **Groundwater Monitoring Well Network Inspection**

Two inspections of the groundwater monitoring well network were performed as part of the semiannual monitoring events conducted during the reporting period, fulfilling the LTMMMP inspection requirement (Table 9-1). No inspection items required follow-up actions.

### 9.6 **Security Fence Inspection**

Perimeter security fence inspections were combined with the four quarterly ET Cover System/Surface Inspections during the reporting period, fulfilling the LTMMMP inspection requirement (Table 9-1). The inspections addressed the security fence, access controls (gates, locks, signs), and survey monuments, and were documented on the same Cover Inspection Checklist/Form. Results of the quarterly inspections are provided below.

#### June 1, 2021 Inspection

Accumulation of dead, windblown tumbleweeds were identified along the perimeter fence. The plant debris was removed by the field technicians at the time of the inspection.

#### September 23, 2021 Inspection

Accumulation of dead, windblown tumbleweeds were identified along the perimeter fence. The plant debris was removed by the field technicians at the time of the inspection. The south gate security lock was replaced on September 26, 2021.

### December 8, 2021 Inspection

Accumulation of dead, windblown tumbleweeds were identified along the perimeter fence. The plant debris was removed by the field technicians at the time of the inspection.

### March 1, 2022 Inspection

Accumulation of dead, windblown tumbleweeds were identified along the perimeter fence. The plant debris was removed on March 10, 2022 by the field technicians.

## **9.7 ET Cover Maintenance and Supplemental Watering**

Efforts completed since ET Cover construction in 2009 to establish self-sustaining, native grasses on the ET Cover have been successful as verified through inspections. Supplemental watering was not conducted during this reporting period and only minimal ET Cover maintenance was needed.

Four minor weed control events were conducted during this reporting period that included live and windblown, dead weed removal as well as selective herbicide sterilant application (May 2021 event) to control weed growth. All removed weed material was loaded in a trailer and disposed at the KAFB Landfill. The objective of this best practice work is to promote the health of the existing native grasses on the ET Cover and perimeter area by reducing competition with weedy species for limited moisture and nutrients and to minimize future maintenance. This ET Cover maintenance work was performed by a contractor under the supervision of SNL/NM personnel.

### March 8-9, 2021

Live and dead weeds were removed from the ET Cover, the perimeter fence and 3-foot area outside the fence, the area between the north toe of the ET Cover and the north fence, the western perimeter area between the fence and access road, the area surrounding all perimeter monitoring well erosion control features, and the perimeter drainage (i.e., swale on the east, north, and south sides of the ET Cover). Debris and weeds were also cleared from all the access road drainage culvert inlets and outlets. A total of approximately 16 cubic yards of weed material was removed.

### May 4 and 6, 2021

Live and dead weeds were removed from the ET Cover, the perimeter fence and 3-foot area outside the fence, the area between the north toe of the ET Cover and the north fence, the western perimeter area between the fence and access road, the area surrounding all perimeter monitoring well erosion control features, and the perimeter drainage (i.e., swale on the east, north, and south sides of the ET Cover). Debris and weeds were also cleared from all the access road drainage culvert inlets and outlets. A total of approximately 8 cubic yards of weed material was removed.

Weed control activities included the application of the herbicide sterilant, Hyvar, to the North and South Staging Areas. Hyvar is approved for use at SNL/NM, does not carry a bee precaution rating according to the University of California Integrated Pest Management, and is applied annually following the manufacturer's instructions.

July 8-9, 2021

Live and dead weeds were removed from the ET Cover, the perimeter fence and 3-foot area outside the fence, the area between the north toe of the ET Cover and the north fence, the western perimeter area between the fence and access road, the area surrounding all perimeter monitoring well erosion control features, and the perimeter drainage (i.e., swale on the east, north, and south sides of the ET Cover). Debris and weeds were also cleared from all the access road drainage culvert inlets and outlets. A total of approximately 8 cubic yards of weed material was removed.

October 28-29, 2021

Live and dead weeds were removed from the ET Cover, the perimeter fence and 3-foot area outside the fence, the area between the north toe of the ET Cover and the north fence, the western perimeter area between the fence and access road, the area surrounding all perimeter monitoring well erosion control features, and the perimeter drainage (i.e., swale on the east, north, and south sides of the ET Cover). Debris and weeds were also cleared from all the access road drainage culvert inlets and outlets. A total of approximately 16 cubic yards of weed material was removed.

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## **10.0 REGULATORY ACTIVITIES**

On January 8, 2014, the NMED approved the MWL LTMM (Blaine January 2014). All MWL regulatory submittals that occurred during this April 1, 2021 through March 31, 2022 reporting period are summarized in Section 10.1, along with submittals since approval of the LTMM. LTMM modification requests made during the reporting period are summarized in Section 10.2.

### **10.1 MWL Regulatory Submittals**

Regulatory submittals during this reporting period include the eighth MWL Annual LTMM Report, April 2020 – March 2021 (SNL/NM June 2021) that was approved by the NMED (Maestas July 2021). There were no submittals of updated reference documents cited in the LTMM SAPs.

All MWL regulatory submittals that occurred after NMED approval of the LTMM are summarized in Table 10-1, including submittals that occurred during this reporting period. A summary of regulatory submittals associated with full implementation of the LTMM is presented in the MWL Annual LTMM Report, April 2014 – March 2015 (SNL/NM June 2015).

### **10.2 MWL LTMM Modifications**

The first LTMM modification request was submitted to the NMED during this reporting period (Hauck December 2021). The Class 1 Permit Modification request included minor changes to monitoring, analytical laboratory quality control, inspection forms, and reference documents that update, improve, and streamline monitoring and inspection activities and remove unnecessary documents from the lists of operating procedures in the various LTMM SAPs. Changes were also made to update descriptions to current conditions (e.g., name change for SNL/NM management and operating contractor). The proposed modifications do not substantially alter the permit conditions and do not reduce the protection of human health and the environment. The permit modification request was approved by the NMED (Shean February 2022) and took effect upon approval.

Table 10-1  
Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan Document Submittal History

Date of Submittal <sup>a</sup>	LTMM Requirement	Description of Submittal
January 15, 2014	Section 3.4.1	Installation Work Plan for Three Soil-Vapor Monitoring Wells at the Mixed Waste Landfill <ul style="list-style-type: none"> <li>Approved in February 2014</li> </ul>
September, 2014	Section 3.4.1	Installation Report for Three Soil-Vapor Monitoring Wells at the Mixed Waste Landfill <ul style="list-style-type: none"> <li>Approved in September 2014</li> </ul>
March 6, 2014	Appendices C through G	Procedures, plans, and documents cited in the LTMM used by SNL/NM personnel for air, surface soil, soil-vapor, soil-moisture, biota, and groundwater monitoring.
June 18, 2014	Section 4.8.1	MWL Annual LTMM Report, January – March 2014 <ul style="list-style-type: none"> <li>Approved in August 2014</li> </ul>
July 9, 2014	Appendices C, D, F, and G	Updates to two documents used by SNL/NM personnel to validate analytical data from contract laboratories and conduct activities related to sampling MWL soil-vapor wells. Updates to the health and safety plan for groundwater monitoring at the MWL.
February 18, 2015	Appendix F	Updates to five reference documents used by SNL/NM personnel to conduct groundwater monitoring activities at the MWL.
June 8, 2015	Section 4.8.1	MWL Annual LTMM Report, April 2014 – March 2015 <ul style="list-style-type: none"> <li>Approved in October 2015</li> </ul>
May 20, 2016	Appendices C, D, E, F, and G	Updates to three documents used by SNL/NM personnel to perform monitoring activities at the MWL.
June 23, 2016	Section 4.8.1	MWL Annual LTMM Report, April 2015 – March 2016 <ul style="list-style-type: none"> <li>Approved in July 2016</li> </ul>
November 9, 2016	Appendices C, D, F, and G	Updates to four documents used by SNL/NM personnel to perform monitoring activities at the MWL.
June 6, 2017	Section 4.8.1	MWL Annual LTMM Report, April 2016 – March 2017 <ul style="list-style-type: none"> <li>Approved in April 2018</li> </ul>
July 6, 2017	Appendices D, F, and G	Updates to one document used by SNL/NM personnel to validate analytical data from contract laboratories.
February 8, 2018	Appendix F	Updates to four documents used by SNL/NM personnel to conduct groundwater monitoring activities at the MWL.
June 7, 2018	Section 4.8.1	MWL Annual LTMM Report, April 2017 – March 2018 <ul style="list-style-type: none"> <li>Approved in July 2018</li> </ul>
December 14, 2018	Section 4.8.2	MWL Five-Year Report (first Five-Year Report) <ul style="list-style-type: none"> <li>Approved in July 2021</li> </ul>
January 15, 2019	Appendices D, F, and G	Update to the SNL/NM Statement of Work for Analytical Laboratories used for monitoring sample analysis.

Refer to notes on next page.

Table 10-1 (Concluded)  
Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan Document Submittal History

Date of Submittal <sup>a</sup>	LTMMMP Requirement	Description of Submittal
June 21, 2019	Section 4.8.1	MWL Annual LTMM Report, April 2018 – March 2019 • Approved in September 2019
May 8, 2019	Appendix D, E, F, and G	Updates to three reference documents used by SNL/NM personnel to conduct soil-moisture monitoring, analytical data verification, and sample management activities at the MWL.
November 8, 2019	Appendix C, D, F, and G	Updates to four reference documents used by SNL/NM personnel to conduct soil-vapor monitoring activities, sample management, and contract laboratory quality control. Updates to the health and safety plan for groundwater monitoring at the MWL.
February 28, 2020	Appendices D, F, and G	Update to the SNL/NM Statement of Work for Analytical Laboratories used for monitoring sample analysis.
May 27, 2020	Section 4.8.1	MWL Annual LTMM Report, April 2019 – March 2020 • Approved in July 2020
June 26, 2020	Appendices D, F, and G	Updates to one document used by SNL/NM personnel to validate analytical data from contract laboratories.
February 9, 2021	Appendix F	Updates to four documents used by SNL/NM personnel to conduct groundwater monitoring activities at the MWL.
<b>April 2021 through March 2022 Reporting Period Submittals</b>		
June 15, 2021	Section 4.8.1	MWL Annual LTMM Report, April 2020 – March 2021 • Approved in July 2021
December 16, 2021	Section 1.4.6	Request for Modification 21-019 to the Resource Conservation and Recovery Act Facility Operating Permit, SNL/NM. • Approved and became effective on February 16, 2022

Notes:

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

DOE = U.S. Department of Energy.

LTMM = Long-Term Monitoring and Maintenance.

LTMMMP = Long-Term Monitoring and Maintenance Plan.

MWL = Mixed Waste Landfill.

SNL/NM = Sandia National Laboratories/New Mexico.

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## 11.0 SUMMARY AND CONCLUSIONS

This chapter presents a summary of MWL LTMMP monitoring, inspection, and maintenance/repair activities performed during the April 1, 2021 through March 31, 2022 reporting period, followed by conclusions based upon these activities and results.

### 11.1 Monitoring Activities

All monitoring activities for the April 1, 2021 through March 31, 2022 reporting period were completed in accordance with LTMMP requirements. The results for each monitoring activity are summarized as follows.

#### Radon Monitoring

The radon air monitoring minimum frequency is annual and was performed over two six-month periods covering CY 2021. The range of radon activity for all monitoring locations was less than 0.2 to 0.8 pCi/L, and the two background location results were 0.2 pCi/L (both results for RN16) and less than 0.2 to less than 0.3 pCi/L (both results were non detections at RN17). No sample locations exceeded the trigger level of 4 pCi/L and all results confirm low levels of radon consistent with natural background levels and historical results. There were no indications of releases of radon gas from the disposal areas.

#### Tritium Surface Soil Monitoring

The tritium surface soil monitoring frequency is annual. Soil samples were collected on August 16, 2021. Reported tritium activities were all non-detections below the MDA, consistent with historical data, and below the trigger level of 20,000 pCi/L. There were no indications of new releases of tritium from the disposal areas.

#### Soil-Vapor Monitoring

The minimum vadose zone soil-vapor monitoring frequency is annual, but it was performed at a semiannual frequency as best practice to keep sample port tubing clear. Soil-vapor samples were collected in May and November 2021. A total of 18 VOCs were detected during the May 2021 sampling event and a total of 23 VOCs were detected during the November 2021 sampling event. Results for PCE, TCE, and Total VOCs from the deepest sampling port of wells MWL-SV03, MWL-SV04, and MWL-SV05 (400 ft bgs) were below the 20 ppmv trigger level for PCE and TCE, and the 25 ppmv trigger level for Total VOCs. The maximum concentrations detected for PCE and TCE at the 400 ft bgs sampling ports for this reporting period were 0.320 ppmv and 0.180 ppmv, respectively. The maximum concentration for Total VOCs at the 400 ft bgs sampling ports was 0.55690 ppmv at. All maximum values were from the May 2021 monitoring event well MWL-SV03. Soil-vapor monitoring results indicate a relatively uniform distribution of low concentration VOCs throughout the 500-foot-thick vadose zone that are not a

threat to groundwater. This distribution is consistent with an old source that has dissipated throughout the vadose zone and indicates the VOC soil-vapor plume is stable and slowly diffusing with no new releases from the disposal area.

### Soil-Moisture Monitoring

The vadose zone soil-moisture monitoring frequency is annual. Soil-moisture measurements were collected on April 19, 2021. The trigger level for soil moisture applies to the shallow depth interval of 8.7 to 86.6 ft bgs at the three monitoring locations. The soil-moisture content by volume for this depth interval at all three locations ranged from 1.4 to 4.3 percent, below the 23 percent soil-moisture content by volume trigger level. Soil-moisture monitoring results are consistent with baseline results established prior to ET Cover construction and indicate the ET Cover is performing as designed.

### Groundwater Monitoring

The groundwater monitoring frequency is semiannual. Groundwater samples were collected in May and November 2021. No constituents were detected in groundwater at concentrations exceeding trigger levels and the results are consistent with background levels and historical MWL groundwater monitoring results. Soil-vapor and groundwater monitoring results indicate the Regional Aquifer beneath the MWL is protected.

### Biota Monitoring

Biota monitoring frequency is annual. Soil samples were collected on August 19, 2021 at two active ant hill locations on the ET Cover. No animal burrows were identified for sampling during the August 16, 2021 Biology Inspection. All metals and radionuclide results were below respective NMED-approved background levels and trigger levels. There were no indications of biotic mobilization of contaminants to the surface.

## **11.2 Inspections/Maintenance/Repairs Activities**

The annual ET Cover Biology Inspection was performed on August 16, 2021 during the reporting period growing season. The ET Cover continues to meet LTMMP successful revegetation criteria. Efforts completed since ET Cover construction in 2009 to establish self-sustaining, native grasses on the ET Cover have been successful. As a result, minimal maintenance and no repairs or supplemental watering were needed. The ET Cover vegetation is in good condition and no issues requiring maintenance or repairs were identified.

The ET Cover System/Surface Inspections were performed quarterly and no issues requiring maintenance or repairs were identified. Inspections of the engineered storm-water drainage swale, perimeter security fence and access controls (i.e., gates, locks, signs), and survey monuments were performed at the same time and frequency. No issues were identified requiring maintenance or repairs beyond that performed during or shortly after the inspections

(i.e., minor maintenance such as clearing dead, windblown tumbleweeds from the security fence and access road culverts and replacing a lock on one of the gates).

Inspections of the soil-vapor monitoring network, soil-moisture monitoring network, groundwater monitoring network, and associated sampling equipment were performed at required frequencies (i.e., concurrent with each monitoring event) and no issues requiring repairs or maintenance were identified. Routine equipment checks and preventive maintenance are performed by monitoring personnel as best practice throughout the monitoring process.

Four minor weed control events were conducted as a best practice for the ET Cover vegetation during the reporting period. These events included removal of live and dead weeds from the ET Cover and perimeter area, and removal of windblown tumbleweeds from the perimeter fence and drainage swale. In addition, an approved herbicide sterilant was applied to the North and South Staging area in early May 2021. These actions were performed as best practice to promote the health of the desired native grass species by reducing competition with weedy species for limited moisture and nutrients.

### **11.3 Regulatory Activities**

Regulatory activities during the April 1, 2021 through March 31, 2022 reporting period included submittal of the eighth MWL Annual LTMM Report, April 2020 – March 2021 (SNL/NM June 2021) that was approved by the NMED (Maestas July 2021). There were no LTMMMP updated reference document submittals. The first LTMMMP modification request (Hauck December 2021) was submitted and approved by the NMED (Shean February 2022) during the reporting period.

### **11.4 Conclusions**

All required LTMMMP monitoring, inspection, and maintenance/repair activities for the April 1, 2021 through March 31, 2022 reporting period were performed and documented in this ninth Annual LTMM Report, which meets the requirements of the LTMMMP, Section 4.8.1 (SNL/NM March 2012).

The monitoring and inspection results indicate the final remedy, which includes the ET Cover, monitoring systems, and related physical controls, is performing as designed. Institutional controls related to the MWL continue to be maintained. No monitoring trigger levels were exceeded and all monitoring results are consistent with historical MWL monitoring data. Based upon monitoring and inspection results, site conditions continue to be protective of human health and the environment.

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**ANNEX A**

**Mixed Waste Landfill  
Radon Monitoring Forms and Reports**

**January-December 2021**

**Data Evaluation Memos**

**Field Forms**

**Contract Verification Forms**

**Radon Detector Inspection Forms**

**Mixed Waste Landfill**

**Radon Monitoring**

**January-June 2021 Monitoring Period**



Operated for the United States Department of Energy  
by National Technology and Engineering Solutions  
of Sandia, LLC.

Albuquerque, New Mexico 87185-0651

*date:* August 30, 2021

*to:* Mike Mitchell (8888), Robert Ziock (8888), and Bonnie Little (8888)

*from:* David Farrar (0618) [drfarra@sandia.gov](mailto:drfarra@sandia.gov)

A handwritten signature in blue ink that reads 'David Farrar'.

*subject:* Review of MWL Radon Air Data – January through June 2021 Semiannual Monitoring Period

The purpose of this memo is to document my review of the radon air monitoring results for the January through June 2021 semiannual monitoring period. My review includes evaluation of the results and supporting documentation relative to the data quality objective (DQO) and monitoring objectives specified in the Mixed Waste Landfill (MWL) Long-Term Monitoring and Maintenance Plan (Appendix C, *Air Sampling and Analysis Plan for the Mixed Waste Landfill*). The DQO for this monitoring is to produce representative, accurate, defensible, and comparable analytical results to support the monitoring objective.

Radon air monitoring measurements during this semiannual period were obtained using Radtrak2<sup>®</sup> detectors. The detectors were deployed at each monitoring location (Figure 1) on January 18, 2021 and were collected on July 19, 2021. The protective casing and mounting hardware were inspected during the collection effort and repairs were made if needed. The detectors remained in the field for approximately six months and were submitted to the analytical laboratory, RADONOVA, for analysis on Analysis Request/Chain of Custody (AR/COC) #621657 along with a trip blank detector (RNTB). RNTB was received at the same time as the other deployed detectors and was stored in a hermetically sealed protective bag at the Environmental Resource Field Office.

The results for this semiannual period indicate very low activities of radon in the air at the MWL, consistent with historical results and background radon activity. Results ranged from <0.2 picocuries per liter ([pCi/L], i.e., non-detect, 5 out of 17 field location results) to 0.5 pCi/L (RN8 and RN14); there were twelve other detections ranging from 0.2 to 0.4 pCi/L. The detectors from the two background locations, RN16 and RN17, had results of 0.2 pCi/L and <0.2 pCi/L (i.e., non-detect), respectively. The trigger level of 4 pCi/L, which applies only to the results from the perimeter locations RN1 through RN10, was not exceeded by any of the individual sample results. A result of 0.3 pCi/L was reported for the trip blank (RNTB) indicating the other detectors may have been potentially exposed to very low activities of radon during shipping and/or at the laboratory.

The result for RN10 had a slightly higher detection limit (0.3 pCi/L) compared to the other non-detects (0.2 pCi/L). This was due to the different backgrounds in the materials from which the detectors were made.

DRF, 0618

Attachments:

Analysis Request/Chain of Custody #621657

Review of MWL Radon-in-Air Data  
1<sup>st</sup> Semiannual CY 2021 (January – June 2021)  
August 30, 2021

RADONOVA Radon Monitoring Report 5757415:1 (analytical laboratory results for Radtrak2<sup>®</sup> detectors)  
Figure 1. Location of the Alpha Track Detectors at the MWL



Review of MWL Radon-in-Air Data  
1<sup>st</sup> Semiannual CY 2021 (January – June 2021)  
August 30, 2021

SMO 2012-ARCO (4-2012)

CONTRACT LABORATORY  
ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Page 1 of 2

Batch No. <u>N/A</u>		SMO Use		AR/COC <b>621657</b>								
Project Name: MWL RADON MONITORING		Date Samples Shipped: <u>7/20/2021</u>	SMO Authorization: <u>[Signature]</u>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius							
Project/Task Manager: Robert Ziock		Carrier/Waybill No. <u>332378</u>	SMO Contact Phone: <u>[Signature]</u>									
Project/Task Number: 195122.10.11.08		Lab Contact: Steve Leslie/331-814-2211	Wendy Palencia/505-844-3132									
Service Order: CF378-21		Lab Destination: RADON	Send Report to SMO: Stephanie Montañio/505-284-2553									
Contract No.: 1776616		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 Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
114110	001	RN1/Radtrak2 428876-7	N/A	7/19/21 07:53	AF	N	0 NA	NONE	C	SA	RADON	
114111	001	RN2/Radtrak2 139301-6	N/A	7/19/21 07:54	AF	N	0 NA	NONE	C	SA	RADON	
114112	001	RN3/Radtrak2 220124-2	N/A	7/19/21 07:25	AF	N	0 NA	NONE	C	SA	RADON	
114113	001	RN4/Radtrak2 620707-0	N/A	7/19/21 07:30	AF	N	0 NA	NONE	C	SA	RADON	
114114	001	RN5/Radtrak2 208263-4	N/A	7/19/21 07:35	AF	N	0 NA	NONE	C	SA	RADON	
114115	001	RN6/Radtrak2 462609-9	N/A	7/19/21 07:40	AF	N	0 NA	NONE	C	SA	RADON	
114116	001	RN7/Radtrak2 599198-9	N/A	7/19/21 07:42	AF	N	0 NA	NONE	C	SA	RADON	
114117	001	RN8/Radtrak2 574197-0	N/A	7/19/21 07:47	AF	N	0 NA	NONE	C	SA	RADON	
114118	001	RN9/Radtrak2 596090-1	N/A	7/19/21 07:50	AF	N	0 NA	NONE	C	SA	RADON	
114119	001	RN10/Radtrak2 398620-5	N/A	7/19/21 07:52	AF	N	0 NA	NONE	C	SA	RADON	
Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD <input checked="" type="checkbox"/> Yes		Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day						
Background: <input type="checkbox"/> Yes		Entered by:		Negotiated TAT <input type="checkbox"/>		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab						
Confirmatory: <input type="checkbox"/> Yes		QC initials:		Return Samples By:		Comments: Detectors were deployed 1/18/2021 to 7/19/2021; 182 days. See attached field form for additional information.						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell								
	Danielle Michel	<u>[Signature]</u>	<u>DM</u>	SNL/08854/505-845-7706/505-219-7143								
	Robert Ziock	<u>[Signature]</u>	<u>RZ</u>	SNL/08888/505-845-0485								
Relinquished by <u>[Signature]</u> Org. <u>SNL</u> Date <u>7/20/21</u> Time <u>0835</u>		Relinquished by <u>[Signature]</u> Org. <u>SNL</u> Date <u>7/23/21</u> Time <u>400pm</u>										
Received by <u>[Signature]</u> Org. <u>SNL</u> Date <u>7/20/21</u> Time <u>0835</u>		Received by <u>[Signature]</u> Org. <u>SNL</u> Date <u>7/23/21</u> Time <u>1pm</u>										
Relinquished by <u>[Signature]</u> Org. <u>SNL</u> Date <u>7/20/21</u> Time <u>1000</u>		Relinquished by <u>[Signature]</u> Org. <u>SNL</u> Date <u>7/23/21</u> Time <u>1pm</u>										
Received by <u>[Signature]</u> Org. <u>SNL</u> Date <u>7/21/21</u> Time <u>3pm</u>		Received by <u>[Signature]</u> Org. <u>SNL</u> Date <u>7/23/21</u> Time <u>1pm</u>										

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

Review of MWL Radon-in-Air Data  
1<sup>st</sup> Semiannual CY 2021 (January – June 2021)  
August 30, 2021

SMO 2012-ARCOC (4-2012)

**CONTRACT LABORATORY  
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)**

AOP 95-16

Page 2 of 2

[illegible]

Review of MWL Radon-in-Air Data  
1<sup>st</sup> Semiannual CY 2021 (January – June 2021)  
August 30, 2021



REPORT NUMBER  
5757415:1

REPORT PAGE  
1 of 3

REPORT DATE  
07/29/2021

PRINT DATE  
07/29/2021

OWN ID  
AR/COC 621657

BY  
NTESS, LLC

REPORT RECEIVER(S)  
NTESS, LLC  
NTESS

NTESS

## RADON MONITORING REPORT

### Description of the measurement

The measurement was performed with a closed alpha-track detector (Radtrak<sup>2</sup>) following the quality guidance in EPA 402-R-95-012.

The detector(s) arrived to Radonova Laboratories AB **07/21/2021**.  
They were measured **07/28/2021**.

*Test data have been given by NTESS*

### Property data and address

MEASURE SITE ADDRESS  
AR/COC 621657

BUILDING ID

### Test results

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
428876-7 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN1		0.3 ± 0.2 pCi/L
139301-6 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN2		0.4 ± 0.2 pCi/L
220124-2 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN3		0.3 ± 0.2 pCi/L
620707-0 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN4		0.2 ± 0.2 pCi/L
208263-4 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN5		0.3 ± 0.2 pCi/L
462609-9 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN6		0.2 ± 0.2 pCi/L
599198-9 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN7		< 0.2 pCi/L
574197-0 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN8		0.5 ± 0.2 pCi/L
596090-1 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN9		< 0.2 pCi/L
398620-5 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN10		< 0.3 pCi/L

### Comment to the results

Trygve Rönqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

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REPORT PAGE  
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NTESS, LLC

REPORT RECEIVER(S)  
NTESS, LLC  
NTESS

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## RADON MONITORING REPORT

### Description of the measurement

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They were measured **07/28/2021**.

*Test data have been given by NTESS*

### Property data and address

MEASURE SITE ADDRESS  
AR/COC 621657

BUILDING ID

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
760717-9 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN11		0.2 ± 0.2 pCi/L
627619-0 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN12		0.3 ± 0.2 pCi/L
736805-3 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN13		< 0.2 pCi/L
913312-5 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN14		0.5 ± 0.2 pCi/L
952730-0 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN15		0.3 ± 0.2 pCi/L
476339-7 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN16		0.2 ± 0.2 pCi/L
516589-9 [Radtrak <sup>2</sup> ]	01/18/2021 – 07/19/2021	RN17		< 0.2 pCi/L
953208-6 [Radtrak <sup>2</sup> ]	01/19/2021 – 07/19/2021	RNTB		0.3 ± 0.2 pCi/L

### Comment to the results

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

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REPORT NUMBER  
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AR/COC 621657

### Measurement method: Closed alpha-track detector

The radon measurement was performed with a closed alpha-track detector following the quality assurance guidance given in EPA 402-R-95-012. The detector container is manufactured from electrically conducting plastic. Through a small slit (filter), radon gas enters the detector. The track-detecting material (film) inside the detector is hit by alpha particles generated by the radon entering the container and the decay products formed from it. On the film, the alpha particles make small tracks which are enlarged through chemical etching and later counted in a microscope in order to determine the radon exposure.

Radonova Laboratories AB (P.O. Box 6522, SE-751 38 Uppsala, Sweden) is accredited (no. 1489) by SWEDAC to conduct radon-gas measurements using the closed alpha-track detector method. The analysis equipment is checked daily and the detectors are calibrated at regular intervals. NRPP Licenses: 107831 AL, 107830 RT

### Measured radon concentrations

For each detector, the measured value of the radon concentration is provided. For each value an uncertainty associated with the measurement to a 95% confidence level is also provided. For example a measurement result of  $4.0 \pm 0.5$  pCi/L means that the radon concentration is most likely contained in the range 3.5 - 4.5 pCi/L. If the start or end date of the measurement has not been provided, the radon concentration cannot be calculated. In such cases, the total exposure in pCi\*days/L will be reported. The reported measured values are related to the detectors as received by Radonova Laboratories AB. Detector deployment is not performed by Radonova Laboratories AB. Measurement information such as monitoring period (dates) and placement location is provided to Radonova Laboratories AB by the end user.

### Codes on non-reportable detectors

DNR Not Reported – Detector Not Returned  
VTW Not Reported – Visibly Tampered With  
FBD Not Reported – Film Broken or Damaged  
LIL Not Reported – Lost in Lab  
DTO Not Reported – Detector Too Old

### Radon measurements in Multifamily Buildings, Schools and Large Buildings

The United States Environmental Protection Agency (EPA) recommends remediation if the results of one long-term test or the average of two short-term tests conducted in an occupied room are 4.0 pCi/L or higher. The average yearly residential indoor radon level in the US is estimated to be around 1.3 pCi/L. Long-term tests are conducted for more than 90 days. Short-term tests are conducted between 2 and 90 days and should be performed under closed building conditions.

If an initial short-term test result is less than 4 pCi/L, a follow-up measurement is probably not needed.

If an initial short-term test result is between 4 pCi/L and 8 pCi/L, a long-term or a short-term follow-up measurement is recommended.

If an initial short-term test result is greater than 8 pCi/L, a short term follow-up measurement is recommended in order to get a fast result.

More information about radon measurements and mitigation can be found in the AARST and EPA publications:

- ANSI/AARST Protocol for Conducting Measurements of Radon and Radon-Decay Products in Schools and Large Buildings.
- ANSI/AARST Protocol for Conducting Radon and Radon Decay Product Measurements in Multifamily Buildings.
- ANSI/AARST Radon Mitigation Standards for Schools and Large Buildings.
- ANSI/AARST Radon Mitigation Standards for Multifamily Buildings.
- EPA Radon Measurements in Schools, EPA 402-R-92-014, July 1993.

For more information about the interpretation of your test results or about other radon related issues we suggest contacting your state radon office.

### Signature on the report

With the signature on the report, the person responsible for the radon analysis at Radonova Laboratories AB hereby certifies that the measurement procedures follows the guidance in accordance with EPA 402-R-95-012 and that the demands from SWEDAC are fulfilled.

Measurement information displayed in italics on report has been provided by the customer.

### Certification no:

107831-AL, 107830-RT, NRSB ARL1904

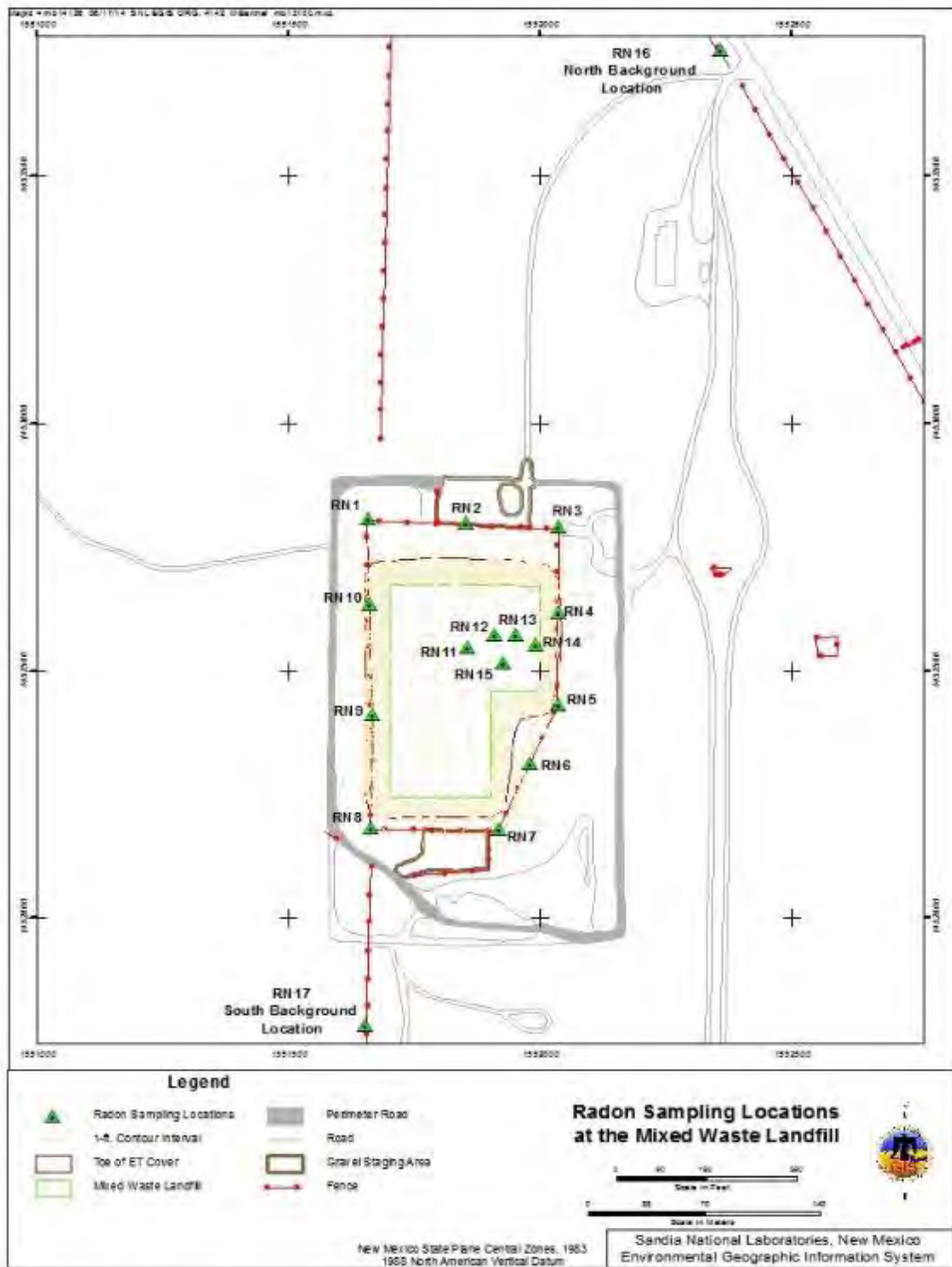
### DISCLAIMER

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331.814.2200, help@radonova.com



**Figure 1. Location of Radon Detectors at the MWL**





# **Mixed Waste Landfill Radon Detector Deployment/Collection Form**

Name: Danielle MichelSignature: *Danielle Michel*

Activity (check all that apply):

☒ Deployment ☒ CollectionName: Robert ZlockSignature: *Robert Zlock*☒ Deployment ☐ CollectionName: Mike MitchellSignature: *Mike Mitchell*☒ Deployment ☐ CollectionARCOC #: 621657Detector Type: Radtrak2No. of Exposure Days: 182

Sampling Location	Sample Number	Detector Serial Number	Deployment Date	Deployment Time	Collection Date	Collection Time	Notes* Y/N Date(s) of Notes
RN1	114110	428876-7	1/18/2021	1012	7/19/2021	0753	N
RN2	114111	139301-6		1020		0754	
RN3	114112	220124-2		0952		0725	
RN4	114113	620707-0		0954		0730	
RN5	114114	208263-4		0955		0735	
RN6	114115	462609-9		0958		0740	
RN7	114116	599198-9		1000		0742	
RN8	114117	574197-0		1010		0747	
RN9	114118	596090-1		1013		0750	
RN10	114119	398620-5		1015		0752	
RN11	114120	760717-9		1024		0813 0753	
RN12	114121	627619-0		1026		0800	
RN13	114122	736805-3		1029		0802	
RN14	114123	913312-5		1030		0805	
RN15	114124	952730-0		1027		0808	
RN16	114125	476339-7		1035		0720	
RN17	114126	516589-9		1004		0745	
RNTB**	114127	953208-6	NA	NA		0820	

\*NOTES are documented on LTS RDN-2012-002 MWL Radon Detector Collection Inspection Form.

\*\*Document deployment date/time even though trip blank is not actually deployed and stays in sealed bag during sample detector deployment. Collection date/time is when sealed bag is opened and trip blank detector is placed in zip top sample bag for analysis.

**Send copy of this form with AR/COC.**

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center

**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.

## Contract Verification Form (CVR)

Project Leader ZIOCK

Project Name MWL RADON

Project/Task No. 195122\_10.11.08

ARCOC No. 621657

Analytical Lab RADONOVA

SDG No. 5757415-1

*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	N/A		
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)	N/A		
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	N/A		
2.7	Dilution factors provided and all dilution levels reported	N/A		
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	X		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	N/A		
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	N/A		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	N/A		
	c) Matrix spike recovery data reported and met	N/A		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	N/A		

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	N/A		
	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	N/A		
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	N/A		
	b) Initial calibration provided	N/A		
	c) Continuing calibration provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Instrument run logs provided	N/A		

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: 08-04-2021 15:36:00

Closed by: Wendy Palencia Date: 08-04-2021 15:36:00

**Mixed Waste Landfill**

**Radon Monitoring**

**July-December 2021 Monitoring Period**



Operated for the United States Department of Energy  
by National Technology and Engineering Solutions  
of Sandia, LLC.

Albuquerque, New Mexico 87185-0651

*date:* February 21, 2022

*to:* Mike Mitchell (8888), Robert Ziock (8888), and Bonnie Little (8888)

*from:* David Farrar (0618) [drfarra@sandia.gov](mailto:drfarra@sandia.gov)

A handwritten signature in blue ink that reads 'David Farrar'.

*subject:* Review of MWL Radon Air Data – July through December 2021 Semiannual Monitoring Period

The purpose of this memo is to document my review of the radon air monitoring results for the July through December 2021 semiannual monitoring period. My review includes evaluation of the results and supporting documentation relative to the data quality objective (DQO) and monitoring objectives specified in the Mixed Waste Landfill (MWL) Long-Term Monitoring and Maintenance Plan (Appendix C, *Air Sampling and Analysis Plan for the Mixed Waste Landfill*). The DQO for this monitoring is to produce representative, accurate, defensible, and comparable analytical results to support the monitoring objective.

Radon air monitoring measurements during this semiannual period were obtained using Radtrak2<sup>®</sup> detectors. The detectors were deployed at each monitoring location (Figure 1) on July 19, 2021 and were collected on January 17, 2022. The protective casing and mounting hardware were inspected during the collection effort and repairs were made if needed. The detectors remained in the field for approximately six months and were submitted to the analytical laboratory, RADONOVA, for analysis on Analysis Request/Chain of Custody (AR/COC) #622183 along with a trip blank detector (RNTB). RNTB was received at the same time as the other deployed detectors and was stored in a hermetically sealed protective bag at the Environmental Resource Field Office.

The results for this semiannual period indicate very low activities of radon in the air at the MWL, consistent with historical results and background radon activity. Results ranged from less than the minimum detectable activity (i.e., non-detect, 6 out of 17 field location results) to 0.8 picocuries per liter (pCi/L) (RN12); note that the minimum detectable activity for this data set ranged from <0.2 to <0.3 pCi/L. There were eleven other detections ranging from 0.2 to 0.4 pCi/L. The detectors from the two background locations, RN16 and RN17, had results of 0.2 pCi/L and <0.3 pCi/L (i.e., non-detect), respectively. The trigger level of 4 pCi/L, which applies only to the results from the perimeter locations RN1 through RN10, was not exceeded by any of the individual sample results. A result of 0.3 pCi/L was reported for the trip blank (RNTB) indicating the other detectors may have been potentially exposed to very low activities of radon during shipping and/or at the laboratory.

DRF, 0618

Attachments:

Analysis Request/Chain of Custody #622183

RADONOVA Radon Monitoring Report 5928149:1 (analytical laboratory results for Radtrak2<sup>®</sup> detectors)

Figure 1. Location of the Alpha Track Detectors at the MWL

SMO 2012-ARCOC (4-2012)

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Page 1 of 2

Batch No. <u>11A</u>		SMO Use		AR/COC <u>622183</u>									
Project Name: <u>MWL RADON MONITORING</u>		Date Samples Shipped: <u>1/19/2022</u>		SMO Authorization: <u>[Signature]</u>									
Project/Task Manager: <u>Robert Zlock</u>		Carrier/Waybill No. <u>333886</u>		SMO Contact Phone: <u>Wendy Palencia/505-844-3132</u>									
Project/Task Number: <u>195122.10.11.08</u>		Lab Contact: <u>Steve Leeller/331-814-2211</u>		Send Report to SMO: <u>Stephanie Montano/505-284-2553</u>									
Service Order: <u>CF378-21</u>		Lab Destination: <u>RADON/OVA</u>		Contract No.: <u>1776616</u>									
Tech Area:		Operational Site:		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius									
Building:		Room:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154									
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
115275	001	RN1/Radtrak2 444108-5	N/A	1/17/22 1412	AF	N	0 NA	NONE	C	SA	RADON		
115276	001	RN2/Radtrak2 572104-8	N/A	1/17/22 1408	AF	N	0 NA	NONE	C	SA	RADON		
115277	001	RN3/Radtrak2 595772-5	N/A	1/17/22 1346	AF	N	0 NA	NONE	C	SA	RADON		
115278	001	RN4/Radtrak2 625063-3	N/A	1/17/22 1348	AF	N	0 NA	NONE	C	SA	RADON		
115279	001	RN5/Radtrak2 261800-7	N/A	1/17/22 1350	AF	N	0 NA	NONE	C	SA	RADON		
115280	001	RN6/Radtrak2 459145-9	N/A	1/17/22 1352	AF	N	0 NA	NONE	C	SA	RADON		
115281	001	RN7/Radtrak2 401146-6	N/A	1/17/22 1354	AF	N	0 NA	NONE	C	SA	RADON		
115282	001	RN8/Radtrak2 715811-6	N/A	1/17/22 1359	AF	N	0 NA	NONE	C	SA	RADON		
115283	001	RN9/Radtrak2 972386-7	N/A	1/17/22 1406	AF	N	0 NA	NONE	C	SA	RADON		
115284	001	RN10/Radtrak2 530792-1	N/A	1/17/22 1405	AF	N	0 NA	NONE	C	SA	RADON		
Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt			
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD <input checked="" type="checkbox"/> Yes		Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day							
Background: <input type="checkbox"/> Yes		Entered by:		Negotiated TAT <input type="checkbox"/>		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab							
Confirmatory: <input type="checkbox"/> Yes		QC Inits:		Return Samples By:		Comments: Detectors were deployed 7/19/2021 to 1/17/2022; 182 days. See attached field form for additional information.							
Sample Team		Name		Signature		Init.		Company/Organization/Phone/Cell		Lab Use			
Members		Danielle Michel		[Signature]		dmm		SNL/08854/505-845-7706/505-219-7143					
		Robert Zlock		[Signature]		rz		SNL/08888/505-845-0485/505-238-3668					
		Michael Mitchell		[Signature]		m3		SNL/08888/505-845-8045/					
		Caitlin LaChance		[Signature]		cl		SNL/00641/505-845-9919					
Relinquished by <u>[Signature]</u>		Org. <u>SNL</u>		Date <u>1-18-2022</u>		Time <u>0957</u>		Relinquished by <u>DE Dodd</u>		Org. <u></u>		Date <u>1/21/22</u>	Time <u>4PM</u>
Received by <u>[Signature]</u>		Org. <u>SNL</u>		Date <u>1/19/22</u>		Time <u>0957</u>		Received by <u>[Signature]</u>		Org. <u></u>		Date <u>1/25/22</u>	Time <u>1 PM</u>
Relinquished by <u>[Signature]</u>		Org. <u>SNL</u>		Date <u>1/19/22</u>		Time <u>0750</u>		Relinquished by <u>[Signature]</u>		Org. <u></u>		Date <u></u>	Time <u></u>
Received by <u>DE Dodd</u>		Org. <u></u>		Date <u>1/21/22</u>		Time <u>1 PM</u>		Received by <u></u>		Org. <u></u>		Date <u></u>	Time <u></u>

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



February 21, 2022

**ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)**

AOP 95-16

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[illegible]



Review of MWL Radon-in-Air Data  
2<sup>nd</sup> Semiannual CY 2021 (July – December 2021)  
February 21, 2022



REPORT NUMBER  
5928149:1

REPORT PAGE  
1 of 3

REPORT DATE  
01/27/2022

PRINT DATE  
01/27/2022

OWN ID  
AR/COC 622183

BY  
NTESS, LLC  
REPORT RECEIVER(S)  
wjpalen@sandia.gov

Mixed Waste Landfill  
NTESS

## RADON MONITORING REPORT

### Description of the measurement

The measurement was performed with a closed alpha-track detector (Radtrak<sup>2</sup>) following the quality guidance in EPA 402-R-95-012.

The detector(s) arrived to Radonova Laboratories AB 01/21/2022.  
They were measured 01/26/2022.

*Test data have been given by Robert Ziock*

### Property data and address

MEASURE SITE ADDRESS  
AR/COC 622183

BUILDING ID

### Test results

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
444108-5 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN1		< 0.3 pCi/L
572104-8 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN2		0.4 ± 0.2 pCi/L
595772-5 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN3		0.3 ± 0.2 pCi/L
625063-3 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN4		< 0.3 pCi/L
261800-7 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN5		0.4 ± 0.2 pCi/L
459145-9 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN6		0.3 ± 0.2 pCi/L
401146-6 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN7		0.4 ± 0.2 pCi/L
715811-6 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN8		0.3 ± 0.2 pCi/L
972386-7 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN9		< 0.2 pCi/L
530792-1 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN10		0.2 ± 0.2 pCi/L

### Comment to the results

Trygve Rönqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

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U\_S\_EN\_001\_REPORT\_v220114v1.ppcd

Review of MWL Radon-in-Air Data  
2<sup>nd</sup> Semiannual CY 2021 (July – December 2021)  
February 21, 2022



Mixed Waste Landfill  
NTESS

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5928149:1  
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REPORT DATE  
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OWN ID  
AR/COC 622183  
BY  
NTESS, LLC  
REPORT RECEIVER(S)  
wjpalen@sandia.gov

## RADON MONITORING REPORT

### Description of the measurement

The measurement was performed with a closed alpha-track detector (Radtrak<sup>2</sup>) following the quality guidance in EPA 402-R-95-012.

The detector(s) arrived to Radonova Laboratories AB 01/21/2022.  
They were measured 01/26/2022.

*Test data have been given by Robert Ziock*

### Property data and address

MEASURE SITE ADDRESS  
AR/COC 622183

BUILDING ID

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
460118-3 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN11		0.3 ± 0.2 pCi/L
943063-8 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN12		0.8 ± 0.2 pCi/L
576548-2 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN13		< 0.2 pCi/L
499500-7 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN14		< 0.2 pCi/L
281888-8 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN15		0.3 ± 0.2 pCi/L
933110-9 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN16		0.2 ± 0.2 pCi/L
802820-1 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RN17		< 0.3 pCi/L
821298-7 [Radtrak <sup>2</sup> ]	07/19/2021 – 01/17/2022	RNTB		0.3 ± 0.2 pCi/L

### Comment to the results

Trygve Rönqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

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REPORT NUMBER	REPORT DATE
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AR/COC 622183	

#### Measurement method: Closed alpha-track detector

The radon measurement was performed with a closed alpha-track detector following the quality assurance guidance given in EPA 402-R-95-012. The detector container is manufactured from electrically conducting plastic. Through a small slit (filter), radon gas enters the detector. The track-detecting material (film) inside the detector is hit by alpha particles generated by the radon entering the container and the decay products formed from it. On the film, the alpha particles make small tracks which are enlarged through chemical etching and later counted in a microscope in order to determine the radon exposure.

Radonova Laboratories AB (P.O. Box 6522, SE-751 38 Uppsala, Sweden) is accredited (no. 1489) by SWEDAC to conduct radon-gas measurements using the closed alpha-track detector method. The analysis equipment is checked daily and the detectors are calibrated at regular intervals. NRPP Licenses: 107831 AL, 107830 RT

#### Measured radon concentrations

For each detector, the measured value of the radon concentration is provided. For each value an uncertainty associated with the measurement to a 95% confidence level is also provided. For example a measurement result of  $4.0 \pm 0.5$  pCi/L means that the radon concentration is most likely contained in the range 3.5 - 4.5 pCi/L. If the start or end date of the measurement has not been provided, the radon concentration cannot be calculated. In such cases, the total exposure in pCi\*days/L will be reported. The reported measured values are related to the detectors as received by Radonova Laboratories AB. Detector deployment is not performed by Radonova Laboratories AB. Measurement information such as monitoring period (dates) and placement location is provided to Radonova Laboratories AB by the end user.

#### Codes on non-reportable detectors

DNR	Not Reported – Detector Not Returned
VTW	Not Reported – Visibly Tampered With
FBD	Not Reported – Film Broken or Damaged
LIL	Not Reported – Lost in Lab
DTO	Not Reported – Detector Too Old

#### Radon measurements in Multifamily Buildings, Schools and Large Buildings

The United States Environmental Protection Agency (EPA) recommends remediation if the results of one long-term test or the average of two short-term tests conducted in an occupied room are 4.0 pCi/L or higher. The average yearly residential indoor radon level in the US is estimated to be around 1.3 pCi/L. Long-term tests are conducted for more than 90 days. Short-term tests are conducted between 2 and 90 days and should be performed under closed building conditions.

If an initial short-term test result is less than 4 pCi/L, a follow-up measurement is probably not needed.

If an initial short-term test result is between 4 pCi/L and 8 pCi/L, a long-term or a short-term follow-up measurement is recommended.

If an initial short-term test result is greater than 8 pCi/L, a short term follow-up measurement is recommended in order to get a fast result.

More information about radon measurements and mitigation can be found in the AARST and EPA publications:

- ANSI/AARST Protocol for Conducting Measurements of Radon and Radon-Decay Products in Schools and Large Buildings.
- ANSI/AARST Protocol for Conducting Radon and Radon Decay Product Measurements in Multifamily Buildings.
- ANSI/AARST Radon Mitigation Standards for Schools and Large Buildings.
- ANSI/AARST Radon Mitigation Standards for Multifamily Buildings.
- EPA Radon Measurements in Schools, EPA 402-R-92-014, July 1993.

For more information about the interpretation of your test results or about other radon related issues we suggest contacting your state radon office.

#### Signature on the report

With the signature on the report, the person responsible for the radon analysis at Radonova Laboratories AB hereby certifies that the measurement procedures follows the guidance in accordance with EPA 402-R-95-012 and that the demands from SWEDAC are fulfilled.

Measurement information displayed in italics on report has been provided by the customer.

#### Certification no:

107831-AL, 107830-RT, NRSB ARL1904, NY ELAP ID: 12042,

#### DISCLAIMER

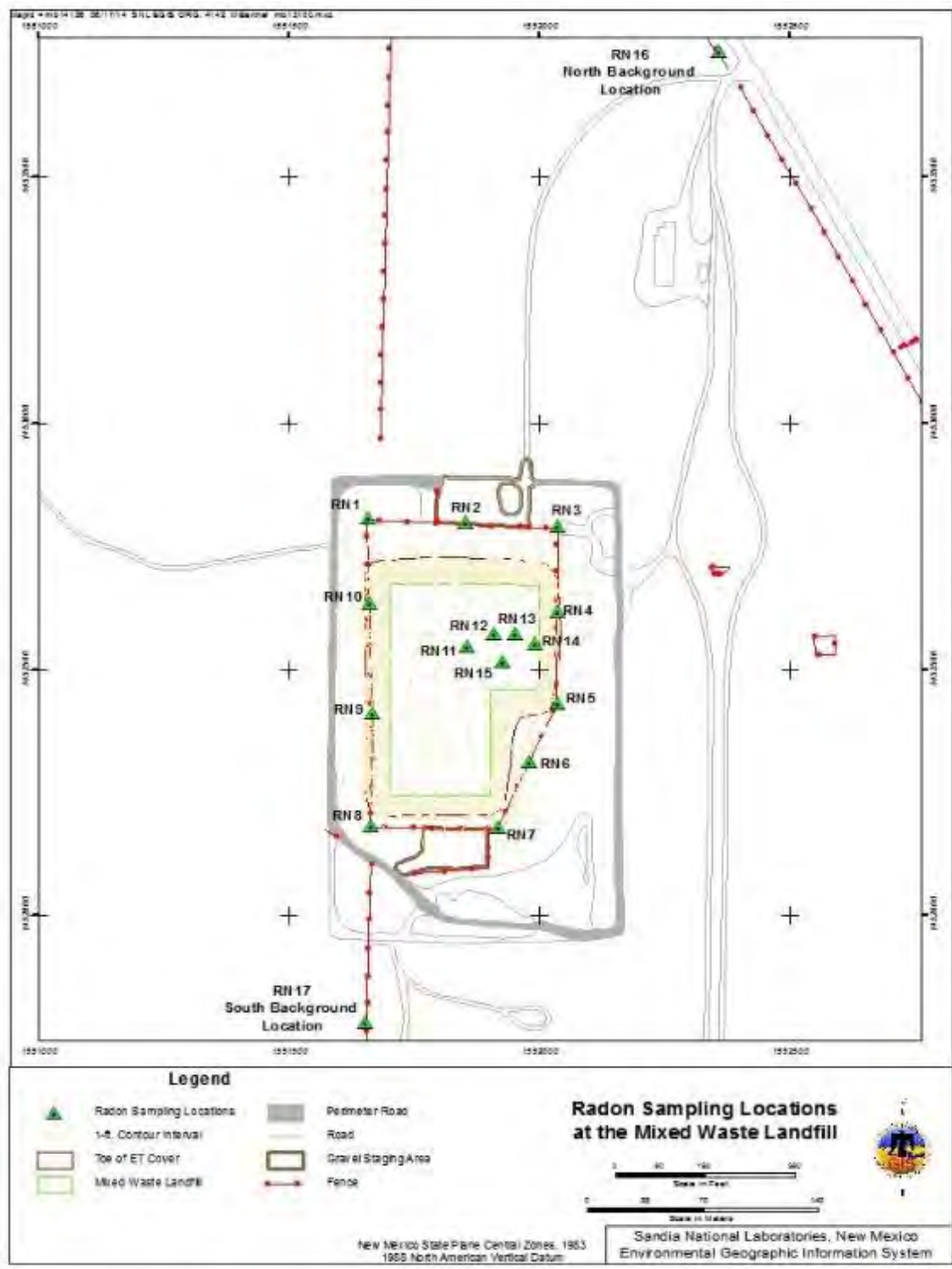
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Figure 1. Location of Radon Detectors at the MWL



**Mixed Waste Landfill  
Radon Detector Deployment/Collection Form**

Name: Danielle MichelSignature: *Danielle Michel*

Activity (check all that apply):

☒ Deployment ☒ CollectionName: Robert ZlockSignature: *Robert Zlock*☐ Deployment ☒ CollectionName: Mike MitchellSignature: *Mike Mitchell*☐ Deployment ☒ CollectionARCO # : 622183Detector Type: Radtrak2No. of Exposure Days: 182

Sampling Location	Sample Number	Detector Serial Number	Deployment Date	Deployment Time	Collection Date	Collection Time	Notes* Y/N Date(s) of Notes
RN1	115275	444108-5	7/19/22	0753	1/17/22	1412	N
RN2	115276	572104-8		0754	1/17/22	1408	N
RN3	115277	595772-5		0725	1/17/22	1346	N
RN4	115278	625063-3		0730	1/17/22	1348	N
RN5	115279	261800-7		0735	1/17/22	1350	N
RN6	115280	459145-9		0740	1/17/22	1352	N
RN7	115281	401146-6		0742	1/17/22	1354	N
RN8	115282	715811-6		0747	1/17/22	1359	N
RN9	115283	972386-7		0750	1/17/22	1406	N
RN10	115284	530792-1		0752	1/17/22	1405	N
RN11	115285	460118-3		0813	1/17/22	1416	N
RN12	115286	943063-8		0800	1/17/22	1419	N
RN13	115287	576548-2		0802	1/17/22	1424	N
RN14	115288	499500-7		0805	1/17/22	1422	N
RN15	115289	281888-8		0808	1/17/22	1427	N
RN16	115290	933110-9		0720	1/17/22	1432	N
RN17	115291	802820-1		0745	1/17/22	1400	N
RNTB**	115292	821298-7	NA		1/17/22	1452	N

\*NOTES are documented on LTS RDN-2012-002 MWL Radon Detector Collection Inspection Form.

\*\*Document deployment date/time even though trip blank is not actually deployed and stays in sealed bag during sample detector deployment. Collection date/time is when sealed bag is opened and trip blank detector is placed in zip top sample bag for analysis.

**Send copy of this form with AR/COC.**

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center

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.

## Contract Verification Form (CVR)

Project Leader ZIOCK

Project Name MWL RADON MONITORING

Project/Task No. 195122\_10.11.08

ARCOC No. 622183

Analytical Lab RADONOVA

SDG No. 5928149-1

*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	N/A		
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)	N/A		
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	N/A		
2.7	Dilution factors provided and all dilution levels reported	N/A		
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	X		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	N/A		
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	N/A		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	N/A		
	c) Matrix spike recovery data reported and met	N/A		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	N/A		

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	N/A		
	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	N/A		
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	N/A		
	b) Initial calibration provided	N/A		
	c) Continuing calibration provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Instrument run logs provided	N/A		



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: 02-02-2022 07:47:00

Closed by: Wendy Palencia Date: 02-02-2022 07:47:00

**Mixed Waste Landfill**  
**Radon Detector Inspection Forms**

**January-December 2021 Monitoring Period**

# **Mixed Waste Landfill Radon Detector Inspection Form**

Date: 1/18/2021Name: Danielle MichelSignature: 

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Are detectors being collected? ☒ Yes ☐ NoDetector Type: Radtrak 2

Radon Monitoring Frequency:

☐ Quarterly☒ Semiannually☐ Annually

Radon Monitoring Location Inspection Parameters (Yes or No)																	
	RN1	RN2	RN3	RN4	RN5	RN6	RN7	RN8	RN9	RN10	RN11	RN12	RN13	RN14	RN15	RN16	RN17
1a. Monitoring location identification labeling.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>1b. Action Required.</b>	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
2a. Radon detector condition (in enclosure or after collection).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>2b. Action Required.</b>	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
3a. Radon detector enclosure securely fastened to post (fence or free standing).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>3b. Action Required.</b>	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4a. Radon detector enclosure and internal attachment components.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>4b. Action Required.</b>	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5a. Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5b. Action Required.</b>	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Location	<b>Action Required</b> (Note any action required and date resolved, otherwise note "None")
RN1	None
RN2	↓
RN3	
RN4	
RN5	
RN6	
RN7	
RN8	
RN9	
RN10	
RN11	
RN12	cobwebs removed from enclosure
RN13	None
RN14	↓
RN15	
RN16	
RN17	

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Date: 2/3/2021  
 Name: Danielle Michel  
 Name: Robert Zwick

Signature: Danielle Michel  
 Signature: Robert Zwick

Are detectors being collected? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Detector Type: <u>Radtrak 2</u>	Radon Monitoring Frequency: <input type="checkbox"/> Quarterly <input checked="" type="checkbox"/> Semiannually <input type="checkbox"/> Annually

Radon Monitoring Location Inspection Parameters (Yes or No)																	
	RN1	RN2	RN3	RN4	RN5	RN6	RN7	RN8	RN9	RN10	RN11	RN12	RN13	RN14	RN15	RN16	RN17
1a. Monitoring location identification labeling.	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
1b. Action Required.	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
2a. Radon detector condition (in enclosure or after collection).	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
2b. Action Required.	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
3a. Radon detector enclosure securely fastened to post (fence or free standing).	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
3b. Action Required.	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
4a. Radon detector enclosure and internal attachment components.	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
4b. Action Required.	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
5a. Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
5b. Action Required.	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Original to: Mixed Waste Landfill Operating Record  
 Copy to: SNL/NM Records Center

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Location	Action Required (Note any action required and date resolved, otherwise note "None")
RN1	None
RN2	
RN3	
RN4	
RN5	
RN6	
RN7	
RN8	
RN9	
RN10	
RN11	
RN12	
RN13	
RN14	
RN15	
RN16	
RN17	



**Mixed Waste Landfill  
Radon Detector Inspection Form**

Date: 3/1/2021Name: Danielle MichelSignature: [Signature]Name: Robert EnochSignature: [Signature]Are detectors being collected? ☐ Yes ☒ NoDetector Type: Radtrak2

Radon Monitoring Frequency:

☐ Quarterly☒ Semiannually☐ Annually

Radon Monitoring Location Inspection Parameters (Yes or No)																	
	RN1	RN2	RN3	RN4	RN5	RN6	RN7	RN8	RN9	RN10	RN11	RN12	RN13	RN14	RN15	RN16	RN17
1a. Monitoring location identification labeling.	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
1b. Action Required.	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
2a. Radon detector condition (in enclosure or after collection).	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
2b. Action Required.	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
3a. Radon detector enclosure securely fastened to post (fence or free standing).	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
3b. Action Required.	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
4a. Radon detector enclosure and internal attachment components.	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
4b. Action Required.	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
5a. Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
5b. Action Required.	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center



**Mixed Waste Landfill  
Radon Detector Inspection Form**

Location	<p style="text-align: center;"><b>Action Required</b> (Note any action required and date resolved, otherwise note "None")</p>
RN1	None
RN2	
RN3	
RN4	
RN5	
RN6	
RN7	
RN8	
RN9	
RN10	
RN11	
RN12	
RN13	
RN14	
RN15	
RN16	
RN17	

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Date: April 1, 2021Name: Robert ZöckSignature: 

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Are detectors being collected? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Detector Type: <u>Redtrak 2</u>	Radon Monitoring Frequency: <input type="checkbox"/> Quarterly <input checked="" type="checkbox"/> Semiannually <input type="checkbox"/> Annually

Radon Monitoring Location Inspection Parameters (Yes or No)																	
	RN1	RN2	RN3	RN4	RN5	RN6	RN7	RN8	RN9	RN10	RN11	RN12	RN13	RN14	RN15	RN16	RN17
1a. Monitoring location identification labeling.	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>1b. Action Required.</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
2a. Radon detector condition (in enclosure or after collection).	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>2b. Action Required.</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
3a. Radon detector enclosure securely fastened to post (fence or free standing).	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>3b. Action Required.</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
4a. Radon detector enclosure and internal attachment components.	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>4b. Action Required.</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
5a. Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>5b. Action Required.</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Original to: Mixed Waste Landfill Operating Record  
Copy to: SNL/NM Records Center

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Location	Action Required (Note any action required and date resolved, otherwise note "None")
RN1	None
RN2	
RN3	
RN4	
RN5	
RN6	
RN7	
RN8	
RN9	
RN10	
RN11	
RN12	
RN13	
RN14	
RN15	
RN16	
RN17	

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Date: 5/3/2021Name: Danielle MichelSignature: Danielle Michel

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Are detectors being collected? ☐ Yes ☒ NoDetector Type: Radtrak 2Radon Monitoring Frequency: ☐ Quarterly ☒ Semiannually ☐ Annually

Radon Monitoring Location Inspection Parameters (Yes or No)																	
	RN1	RN2	RN3	RN4	RN5	RN6	RN7	RN8	RN9	RN10	RN11	RN12	RN13	RN14	RN15	RN16	RN17
1a. Monitoring location identification labeling.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
2a. Radon detector condition (in enclosure or after collection).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
3a. Radon detector enclosure securely fastened to post (fence or free standing).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4a. Radon detector enclosure and internal attachment components.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5a. Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Original to: Mixed Waste Landfill Operating Record  
Copy to: SNL/NM Records Center

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Location	Action Required (Note any action required and date resolved, otherwise note "None")
RN1	None
RN2	
RN3	
RN4	
RN5	
RN6	
RN7	
RN8	
RN9	
RN10	
RN11	
RN12	
RN13	
RN14	
RN15	
RN16	
RN17	



**Mixed Waste Landfill  
Radon Detector Inspection Form**

Date: 6/11/2021Name: Danielle MichelSignature: [Signature]

Name: \_\_\_\_\_


Signature: \_\_\_\_\_

Are detectors being collected? ☐ Yes ☒ NoDetector Type: Radtrak 2Radon Monitoring Frequency: ☐ Quarterly ☒ Semiannually ☐ Annually

Radon Monitoring Location Inspection Parameters (Yes or No)																	
	RN1	RN2	RN3	RN4	RN5	RN6	RN7	RN8	RN9	RN10	RN11	RN12	RN13	RN14	RN15	RN16	RN17
1a. Monitoring location identification labeling.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	X	Y	Y	Y
1b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
2a. Radon detector condition (in enclosure or after collection).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
3a. Radon detector enclosure securely fastened to post (fence or free-standing).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4a. Radon detector enclosure and internal attachment components.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5a. Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Original to: Mixed Waste Landfill Operating Record  
Copy to: SNL/NM Records Center

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Location	Action Required (Note any action required and date resolved, otherwise note "None")
RN1	
RN2	
RN3	
RN4	
RN5	
RN6	
RN7	
RN8	
RN9	
RN10	
RN11	
RN12	
RN13	
RN14	
RN15	
RN16	
RN17	

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Date: 7/19/2021  
 Name: Danielle Nickel Signature: Danielle Nickel  
 Name: \_\_\_\_\_ Signature: \_\_\_\_\_

Are detectors being collected? ☒ Yes ☐ No  
 Detector Type: Radtrak 2 Radon Monitoring Frequency: ☐ Quarterly ☒ Semiannually ☐ Annually

Radon Monitoring Location Inspection Parameters (Yes or No)																	
	RN1	RN2	RN3	RN4	RN5	RN6	RN7	RN8	RN9	RN10	RN11	RN12	RN13	RN14	RN15	RN16	RN17
1a. Monitoring location identification labeling.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
2a. Radon detector condition (in enclosure or after collection).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
3a. Radon detector enclosure securely fastened to post (fence or free standing).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4a. Radon detector enclosure and internal attachment components.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5a. Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Original to: Mixed Waste Landfill Operating Record  
 Copy to: SNL/NM Records Center



**Mixed Waste Landfill  
Radon Detector Inspection Form**

Location	<b>Action Required</b> (Note any action required and date resolved, otherwise note "None")
RN1	None
RN2	
RN3	
RN4	
RN5	
RN6	
RN7	
RN8	
RN9	
RN10	
RN11	
RN12	
RN13	
RN14	
RN15	
RN16	
RN17	

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Date: 8/4/2021Name: Danielle MichelSignature: Danielle Michel

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Are detectors being collected? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Detector Type: <u>Radtrak 2</u>	Radon Monitoring Frequency: <input type="checkbox"/> Quarterly <input checked="" type="checkbox"/> Semiannually <input type="checkbox"/> Annually

Radon Monitoring Location Inspection Parameters (Yes or No)																	
	RN1	RN2	RN3	RN4	RN5	RN6	RN7	RN8	RN9	RN10	RN11	RN12	RN13	RN14	RN15	RN16	RN17
1a. Monitoring location identification labeling.	X	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
2a. Radon detector condition (in enclosure or after collection).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
3a. Radon detector enclosure securely fastened to post (fence or free standing).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4a. Radon detector enclosure and internal attachment components.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5a. Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Original to: Mixed Waste Landfill Operating Record  
Copy to: SNL/NM Records Center

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Location	Action Required (Note any action required and date resolved, otherwise note "None")
RN1	None
RN2	
RN3	
RN4	
RN5	
RN6	
RN7	
RN8	
RN9	
RN10	
RN11	
RN12	
RN13	
RN14	
RN15	
RN16	
RN17	

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Date: 9/3/2021 at 11:57 to 12:25Name: Robert ZiackSignature: *Robert Ziack*

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Are detectors being collected? ☐ Yes ☒ NoDetector Type: Radtrak 2

Radon Monitoring Frequency:

☐ Quarterly☒ Semiannually☐ Annually

Radon Monitoring Location Inspection Parameters (Yes or No)																	
	RN1	RN2	RN3	RN4	RN5	RN6	RN7	RN8	RN9	RN10	RN11	RN12	RN13	RN14	RN15	RN16	RN17
1a. Monitoring location identification labeling.	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>1b. Action Required.</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
2a. Radon detector condition (in enclosure or after collection).	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>2b. Action Required.</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
3a. Radon detector enclosure securely fastened to post (fence or free standing).	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>3b. Action Required.</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
4a. Radon detector enclosure and internal attachment components.	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>4b. Action Required.</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
5a. Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>5b. Action Required.</b>	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Location	<b>Action Required</b> (Note any action required and date resolved, otherwise note "None")
RN1	None
RN2	
RN3	
RN4	
RN5	
RN6	
RN7	
RN8	
RN9	
RN10	
RN11	
RN12	
RN13	
RN14	
RN15	
RN16	
RN17	



# **Mixed Waste Landfill Radon Detector Inspection Form**

Date: 10/4/2021Name: Danielle MichelSignature: [Signature]Name: Robert ZiackSignature: [Signature]Are detectors being collected? ☐ Yes ☒ NoDetector Type: Radtrak 2

Radon Monitoring Frequency:

☐ Quarterly☒ Semiannually☐ Annually

Radon Monitoring Location Inspection Parameters (Yes or No)																	
	RN1	RN2	RN3	RN4	RN5	RN6	RN7	RN8	RN9	RN10	RN11	RN12	RN13	RN14	RN15	RN16	RN17
1a. Monitoring location identification labeling.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	X	Y	Y	Y	Y	Y	Y
1b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
2a. Radon detector condition (in enclosure or after collection).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
3a. Radon detector enclosure securely fastened to post (fence or free standing).	Y	Y	Y	Y	Y	Y	Y	Y	Y	X	Y	Y	Y	Y	Y	Y	Y
3b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4a. Radon detector enclosure and internal attachment components.	Y	X	Y	Y	Y	Y	Y	X	X	Y	Y	Y	X	Y	Y	Y	Y
4b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5a. Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	X	Y	Y	X	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	X	Y	Y
5b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Location	Action Required (Note any action required and date resolved, otherwise note "None")
RN1	None
RN2	
RN3	
RN4	
RN5	
RN6	
RN7	
RN8	
RN9	
RN10	
RN11	
RN12	
RN13	
RN14	
RN15	
RN16	
RN17	

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Date: 11/1/2021Name: Danielle MichelSignature: [Signature]

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Are detectors being collected? ☐ Yes ☒ NoDetector Type: Radtrak 2Radon Monitoring Frequency: ☐ Quarterly ☒ Semiannually ☐ Annually

Radon Monitoring Location Inspection Parameters (Yes or No)																	
	RN1	RN2	RN3	RN4	RN5	RN6	RN7	RN8	RN9	RN10	RN11	RN12	RN13	RN14	RN15	RN16	RN17
1a. Monitoring location identification labeling.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	X	Y	Y	Y	Y	Y	Y
1b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
2a. Radon detector condition (in enclosure or after collection).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
3a. Radon detector enclosure securely fastened to post (fence or free standing).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4a. Radon detector enclosure and internal attachment components.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5a. Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Original to: Mixed Waste Landfill Operating Record  
Copy to: SNL/NM Records Center



**Mixed Waste Landfill  
Radon Detector Inspection Form**

Location	Action Required (Note any action required and date resolved, otherwise note "None")
RN1	None
RN2	
RN3	
RN4	
RN5	
RN6	
RN7	
RN8	
RN9	
RN10	
RN11	
RN12	
RN13	
RN14	
RN15	
RN16	
RN17	

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Date: 12/6/2021Name: Danielle MichelSignature: [Signature]Name: Carlin LachanceSignature: [Signature]Are detectors being collected? ☐ Yes ☒ NoDetector Type: Radtrak 2

Radon Monitoring Frequency:

☐ Quarterly☒ Semiannually☐ Annually

Radon Monitoring Location Inspection Parameters (Yes or No)																	
	RN1	RN2	RN3	RN4	RN5	RN6	RN7	RN8	RN9	RN10	RN11	RN12	RN13	RN14	RN15	RN16	RN17
1a. Monitoring location identification labeling.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
2a. Radon detector condition (in enclosure or after collection).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
3a. Radon detector enclosure securely fastened to post (fence or free standing).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4a. Radon detector enclosure and internal attachment components.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5a. Radon detector enclosure interior clean of debris (dirt, insects, spider webs, etc.).	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5b. Action Required.	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Original to: Mixed Waste Landfill Operating Record  
Copy to: SNL/NM Records Center

**Mixed Waste Landfill  
Radon Detector Inspection Form**

Location	Action Required (Note any action required and date resolved, otherwise note "None")
RN1	None
RN2	
RN3	
RN4	
RN5	
RN6	
RN7	
RN8	
RN9	
RN10	
RN11	
RN12	
RN13	
RN14	
RN15	
RN16	
RN17	

**ANNEX B**

**Mixed Waste Landfill  
Surface Soil Tritium and Biota Monitoring Forms and Reports  
April 2021-March 2022**

**Data Evaluation Memo (tritium monitoring only)**

**Data Validation Reports**

**Contract Verification Forms**

**Mixed Waste Landfill**  
**Surface Soil Tritium Monitoring**  
**August 2021 Sampling Event**



date: September 28, 2021

to: Mike Mitchell (8888), Robert Ziock (8888), and Bonnie Little (8888)

from: David Farrar (0618) [drfarra@sandia.gov](mailto:drfarra@sandia.gov) *David Farrar*

subject: Review of Tritium-in-Soil Results for LTMMP Monitoring at the Mixed Waste Landfill

The purpose of this memo is to document my review of the surface soil tritium monitoring results for the August 16, 2021 sample event. My review includes evaluation of the results and supporting documentation relative to the data quality objective (DQO) and monitoring objectives specified in the Mixed Waste Landfill (MWL) Long-Term Monitoring and Maintenance Plan (Appendix G, *Tritium and Biota Sampling and Analysis Plan for the Mixed Waste Landfill*). All data was reviewed and qualified in accordance with AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data." All data are determined as acceptable and reported quality control measures appear adequate.

Summary of Tritium Results (EPA Method 906.0<sup>a</sup>)  
Mixed Waste Landfill Surface Soil Monitoring  
August 16, 2021

Sample Location	Result (pCi/L)	MDA (pCi/L)	Percent Soil Moisture	Laboratory Qualifier	Validation Qualifier	Trigger Level (pCi/L)
MWL TS-2NW	13.4 ± 76.8	141	5.10	U	BD, FR3	20,000
MWL TS-2SW	7.57 ± 97.8	177	6.34	U	BD, FR3	
MWL TS-2SE	50.6 ± 83.5	144	7.87	U	BD, FR3	
MWL TS-2SE (Duplicate)	89.4 ± 90.1	148	7.81	U	BD, FR3	
MWL TS-2NE	130 ± 112	182	9.28	U	BD, FR3	

Notes:

<sup>a</sup>U.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition.

BD = Result is below the MDA.

EPA = U.S. Environmental Protection Agency.

FR3 = Result is < the MDA / MDL or < the 2-σ TPU (reason code).

MDA = Minimum detectable activity.

MDL = Method detection limit.

MWL = Mixed Waste Landfill.

pCi/L = Picocuries per liter.

TPU = Total Propagated Uncertainty.

U = Analyzed for but undetected.

The August 2021 results were all non-detections below the minimum detectable activity, which is consistent with the July 2020 monitoring results (MWL Annual LTMM Report, June 2021), historical MWL surface soil tritium results, and below the trigger level of 20,000 picocuries per liter.

cc: CFRC

## Memorandum

Date: September 23, 2021

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCO: 622376  
SDG: 553123  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
Analysis: RAD

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 approved procedures using method GL-RAD-A-002 (tritium). Problems were identified with the data package that resulted in the qualification of data.

1. The sample results were either < the associated 2-sigma TPU or < the associated MDA and will be **qualified BD,FR3**.

### Holding Times and Preservation

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

### Quantification

All quantification criteria were met except as noted above in the Summary section.

### Calibration

The case narratives stated that the instruments used were properly calibrated.

### Blanks

No target analytes were detected in the blanks at concentrations  $\geq$  the MDA and 2-sigma TPU.

**Tracer/Carrier Recovery**

Tracer/Carriers were not a method requirement.

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

The MS met QC acceptance criteria.

**Laboratory Replicate**

The replicate error ratio acceptance criteria were met.

**Laboratory Control Sample (LCS)**

The LCS met QC acceptance criteria.

**Detection Limits/Dilutions**

The samples were not diluted. All required detection limits were met.

**Other QC**

A field duplicate was submitted on ARCO 622376. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donovan

**Level:** I

**Date:** 09/24/2021





## Sample Findings Summary



AR/COC: 622376

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
GL-RAD-A-002			
	115665-001/MWL TS-2NW	Tritium (10028-17-8)	BD, FR3
	115666-001/MWL TS-2SW	Tritium (10028-17-8)	BD, FR3
	115667-001/MWL TS-2SE	Tritium (10028-17-8)	BD, FR3
	115668-001/MWL TS-2NE	Tritium (10028-17-8)	BD, FR3
	115669-001/MWL TS-2SE	Tritium (10028-17-8)	BD, FR3

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

## Sandia Data Validation Summary Worksheet

ARCOG#: 622376	Site/Project: MWL LTMMP	Validation Date: 09/23/2021
SDG #: 553123	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Soil	# of Samples: 5	CVR present: Yes
ARCOG(s) present: Yes	Sample Container Integrity: OK	
Analysis Type: <input type="checkbox"/> Organic <input type="checkbox"/> Metals <input type="checkbox"/> Genchem <input checked="" 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<2 X HT	Analysis≥2 X HT
None								

Comments: Collected 08/16/2021

Validated by:

*L Thal*

## Sandia Radiochemistry Worksheet

ARCOC #(s): 622376	SDG #: 553123	Matrix: Soil
Laboratory Sample IDs: 553123 – see below		
Method/Batch#s: ASTM D 2216 Modified (Dry Weight)/GL-RAD-A-002 (Tritium)/2164149/2170052 Samples -001 through -005		

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS/D %R	MS %R	MSD %R	MS/ MSD RER	Lab Rep. RER				
none													

Tracer/Carrier Recovery Outliers								
Sample ID	Tracer/Carrier	%R	Sample ID	Tracer/Carrier	%R	Sample ID	Tracer/Carrier	%R
NA								

Comments: HTs OK. Note: No precision criteria apply to sample results < the MDA including where one result is > the MDA and the other <.

Dry Weight: DUP -001

Tritium: DUP and MS on -004; parent sample/DUP/MS each used 306g of sample



## Contract Verification Form (CVR)

Project Leader MITCHELL

Project Name MWL LTMMMP

Project/Task No. 195122\_10.11.08

ARCOC No. 622376

Analytical Lab GEL

SDG No. 553123

*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	X		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy 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	N/A		
	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	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	N/A		
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	N/A		
	b) Initial calibration provided	N/A		
	c) Continuing calibration provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Instrument run logs provided	N/A		

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	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: 09-22-2021 14:31:00

Closed by: Wendy Palencia Date: 09-22-2021 14:31:00

**Mixed Waste Landfill**

**Biota Monitoring**

**August 2021 Sampling Event**

## Memorandum

Date: September 28, 2021  
To: File  
From: Linda Thal  
Subject: Inorganic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCOC: 622413  
SDG: 553683  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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

Three samples were prepared and analyzed with approved procedures using methods EPA 6010D (ICP-AES) and EPA 7471B (Hg-CVAA). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

### ICP-AES:

1. Co was detected at negative values with absolute values  $>$  the MDL but  $\leq$  the PQL in the MB and a CCB bracketing the samples. The associated result for sample 553683001 was a detect  $<5X$  the absolute values of the blanks and will be **qualified J-,B4,B5**.
2. Pb was detected at  $\leq$  the PQL in the ICB, CCBs and MB. The associated result for sample -001 was a detect  $>$  the PQL but  $< 5X$  all the blank values and will be **qualified J+,B,B3**.
3. Se was detected at  $\leq$  the PQL in the MB. The associated result for sample -001 was a detect  $\leq$  the PQL and will be **qualified 2.78U,B**; non-detect at the PQL.
4. The replicate RPDs were  $>35\%$  for Ba and V and the parent sample results were  $>5X$  the PQL. The associated sample results were detects and will be **qualified J,RP2**.
5. The absolute difference between the parent sample result and the replicate was  $>$  the PQL and either the parent sample results or replicate sample results were  $<5X$  the PQL for Cr, Co, Cu, Ni and Zn. The associated sample results were detects and will be **qualified J,RP2**.

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**

Instrument tuning was not a method requirement.

### **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 except as noted above in the Summary section and as follows.

Co was detected at negative values with an absolute value  $>$  the MDL but  $\leq$  the PQL in the MB and a CCB bracketing the samples. The associated results for samples -003 and -005 were detects  $>5X$  the absolute values of the blank and will not be qualified.

Pb was detected at  $\leq$  the PQL in the ICB, CCBs and MB. The associated results for samples -003 and -005 were detects  $>$  the PQL and  $> 5X$  all the blank values and will not be qualified.

Zn and Ni were detected in the MB at  $\leq$  the PQL. The associated sample results were detects  $>$  the PQL and  $> 5X$  the MB values and will not be qualified.

Se was detected at  $\leq$  the PQL in the MB. The associated results for samples -003 and -005 were non-detect and will not be qualified.

### **ICP -MS Internal Standards**

Internal standards were not a method requirement.

### **Matrix Spike (MS)**

The MS met all QC acceptance criteria.

### **Laboratory Replicate**

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

### **Laboratory Control Sample (LCS)**

The LCS met all QC acceptance criteria.

### Detection Limits/Dilutions

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

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

Results of the ICS A and AB analyses were not evaluated because the sample concentrations for Ca, Mg, Al and Fe were < those in the ICS A and AB solutions.

## ICP Serial Dilution

The serial dilution met all QC acceptance criteria.

### Other QC

A field duplicate pair was submitted with ARCOG 622413. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

---

**Reviewed by:** Mary Donovan      **Level:** I      **Date:** 09/29/2021

## Memorandum

Date: September 28, 2021

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCO: 622413  
SDG: 553683  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
Analysis: RAD

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 approved procedures using method DOE HASL 300, 4.5.2.3/Ga-01-R (gamma spec solid - long list). Problems were identified with the data package that resulted in the qualification of data.

1. The Th-234 and U-238 results for sample 553683002 and the Ra-224 result for sample -004 were rejected by the laboratory due to the peaks not meeting identification criteria and will be **qualified R,Z2**.
2. The sample results that were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3**.
3. The sample results that were  $\geq$  the MDA but < 3X the MDA will be **qualified J,FR7**.

### Holding Times and Preservation

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

### Quantification

All quantification criteria were met except as noted above in the Summary section.

### Calibration

The case narratives stated that the instruments used were properly calibrated.

#### **Blanks**

No target analytes were detected in the blank at concentrations > the MDA and 2-sigma TPU.

#### **Tracer/Carrier Recovery**

Tracer/Carriers were not a method requirement.

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

An MS/MSD was not a method requirement.

#### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

#### **Laboratory Control Sample (LCS)**

The LCS met all QC acceptance criteria.

#### **Detection Limits/Dilutions**

The samples were not diluted. All required detection limits were met.

#### **Other QC**

A field duplicate pair was submitted on ARCOG 622413. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donovan

**Level:** I

**Date:** 09/29/2021

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## Sample Findings Summary



AR/COC: 622413

Page 1 of 4

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE HASL 300, 4.5.2.3/Ga-			
	115747-002/MWL AHSS-01-2021	Americium-241 (14596-10-2)	BD, FR3
	115747-002/MWL AHSS-01-2021	Beryllium-7 (13966-02-4)	J, FR7
	115747-002/MWL AHSS-01-2021	Bismuth-212 (14913-49-6)	J, FR7
	115747-002/MWL AHSS-01-2021	Cesium-137 (10045-97-3)	J, FR7
	115747-002/MWL AHSS-01-2021	Cobalt-60 (10198-40-0)	BD, FR3
	115747-002/MWL AHSS-01-2021	Neptunium-237 (13994-20-2)	BD, FR3
	115747-002/MWL AHSS-01-2021	Radium-223 (15623-45-7)	BD, FR3
	115747-002/MWL AHSS-01-2021	Radium-224 (13233-32-4)	J, FR7
	115747-002/MWL AHSS-01-2021	Sodium-22 (13966-32-0)	BD, FR3
	115747-002/MWL AHSS-01-2021	Thorium-227 (15623-47-9)	BD, FR3
	115747-002/MWL AHSS-01-2021	Thorium-231 (14932-40-2)	BD, FR3
	115747-002/MWL AHSS-01-2021	Thorium-234 (15065-10-8)	R, Z2
	115747-002/MWL AHSS-01-2021	Uranium-235 (15117-96-1)	BD, FR3
	115747-002/MWL AHSS-01-2021	Uranium-238 (7440-61-1)	R, Z2
	115748-002/MWL AHSS-02-2021	Americium-241 (14596-10-2)	BD, FR3



Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	115748-002/MWL AHSS-02-2021	Beryllium-7 (13966-02-4)	J, FR7
	115748-002/MWL AHSS-02-2021	Cesium-137 (10045-97-3)	J, FR7
	115748-002/MWL AHSS-02-2021	Cobalt-60 (10198-40-0)	BD, FR3
	115748-002/MWL AHSS-02-2021	Neptunium-237 (13994-20-2)	BD, FR3
	115748-002/MWL AHSS-02-2021	Radium-223 (15623-45-7)	BD, FR3
	115748-002/MWL AHSS-02-2021	Radium-224 (13233-32-4)	R, Z2
	115748-002/MWL AHSS-02-2021	Sodium-22 (13966-32-0)	BD, FR3
	115748-002/MWL AHSS-02-2021	Thorium-227 (15623-47-9)	BD, FR3
	115748-002/MWL AHSS-02-2021	Thorium-231 (14932-40-2)	BD, FR3
	115748-002/MWL AHSS-02-2021	Thorium-234 (15065-10-8)	J, FR7
	115748-002/MWL AHSS-02-2021	Uranium-235 (15117-96-1)	BD, FR3
	115748-002/MWL AHSS-02-2021	Uranium-238 (7440-61-1)	J, FR7
	115749-002/MWL AHSS-02-2021	Americium-241 (14596-10-2)	BD, FR3
	115749-002/MWL AHSS-02-2021	Beryllium-7 (13966-02-4)	J, FR7
	115749-002/MWL AHSS-02-2021	Cobalt-60 (10198-40-0)	BD, FR3
	115749-002/MWL AHSS-02-2021	Neptunium-237 (13994-20-2)	BD, FR3
	115749-002/MWL AHSS-02-2021	Radium-223 (15623-45-7)	BD, FR3
	115749-002/MWL AHSS-02-2021	Radium-224 (13233-32-4)	J, FR7

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	115749-002/MWL AHSS-02-2021	Sodium-22 (13966-32-0)	BD, FR3
	115749-002/MWL AHSS-02-2021	Thorium-227 (15623-47-9)	BD, FR3
	115749-002/MWL AHSS-02-2021	Thorium-231 (14932-40-2)	BD, FR3
	115749-002/MWL AHSS-02-2021	Thorium-234 (15065-10-8)	BD, FR3
	115749-002/MWL AHSS-02-2021	Uranium-235 (15117-96-1)	BD, FR3
	115749-002/MWL AHSS-02-2021	Uranium-238 (7440-61-1)	BD, FR3
<b>SW846 3050B/6010D</b>			
	115747-001/MWL AHSS-01-2021	Barium (7440-39-3)	J, RP2
	115747-001/MWL AHSS-01-2021	Chromium (7440-47-3)	J, RP2
	115747-001/MWL AHSS-01-2021	Cobalt (7440-48-4)	J-, B4,B5,RP2
	115747-001/MWL AHSS-01-2021	Copper (7440-50-8)	J, RP2
	115747-001/MWL AHSS-01-2021	Lead (7439-92-1)	J+, B,B3
	115747-001/MWL AHSS-01-2021	Nickel (7440-02-0)	J, RP2
	115747-001/MWL AHSS-01-2021	Selenium (7782-49-2)	2.78U, B
	115747-001/MWL AHSS-01-2021	Vanadium (7440-62-2)	J, RP2
	115747-001/MWL AHSS-01-2021	Zinc (7440-66-6)	J, RP2
	115748-001/MWL AHSS-02-2021	Barium (7440-39-3)	J, RP2
	115748-001/MWL AHSS-02-2021	Chromium (7440-47-3)	J, RP2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	115748-001/MWL AHSS-02-2021	Cobalt (7440-48-4)	J, RP2
	115748-001/MWL AHSS-02-2021	Copper (7440-50-8)	J, RP2
	115748-001/MWL AHSS-02-2021	Nickel (7440-02-0)	J, RP2
	115748-001/MWL AHSS-02-2021	Vanadium (7440-62-2)	J, RP2
	115748-001/MWL AHSS-02-2021	Zinc (7440-66-6)	J, RP2
	115749-001/MWL AHSS-02-2021	Barium (7440-39-3)	J, RP2
	115749-001/MWL AHSS-02-2021	Chromium (7440-47-3)	J, RP2
	115749-001/MWL AHSS-02-2021	Cobalt (7440-48-4)	J, RP2
	115749-001/MWL AHSS-02-2021	Copper (7440-50-8)	J, RP2
	115749-001/MWL AHSS-02-2021	Nickel (7440-02-0)	J, RP2
	115749-001/MWL AHSS-02-2021	Vanadium (7440-62-2)	J, RP2
	115749-001/MWL AHSS-02-2021	Zinc (7440-66-6)	J, RP2

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

## Sandia Data Validation Summary Worksheet

ARCOC#: 622413	Site/Project: MWL LTMMMP	Validation Date: 09/28/2021
SDG #: 553683	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Soil	# of Samples: 6	CVR present: Yes
ARCOC(s) present: Yes	Sample Container Integrity: OK	
Analysis Type: <input type="checkbox"/> Organic <input checked="" type="checkbox"/> Metals <input type="checkbox"/> Genchem <input checked="" 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 08/19/2021
<u>Validated by:</u> <i>L Thal</i>

## Sandia Inorganic Metals Worksheet

ARCOC #(s): 622413	SDG #(s): 553683	Matrix: Soil
Laboratory Sample IDs: 553683001, -003, -005		
Method/Batch #s: <b>3050B/6010D</b> : 2170404/2170405 <b>7471B</b> : 2173710/2173711		

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

Analyte (outliers)	Calibration						MB mg/kg *ug/L	5X Blank mg/kg *ug/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 <sup>2</sup>	ICV	CCV	ICB ug/L	CCB ug/L											
Co	✓	✓	✓	✓	✓	-1.57J	-1.80*	9.0*	✓	✓	**0.72	✓	NA	NA	✓		
Pb	✓	✓	✓	✓	5.92J	8.63J	0.603J	3.02 43.2*	✓	✓	✓	✓	NA	NA	✓		
Ni	✓	✓	✓	✓	✓	✓	0.187J	0.935	✓	✓	**1.4	✓	NA	NA	✓		
Se	✓	✓	✓		✓	✓	0.635J	3.18	✓	✓	✓	✓	NA	NA	✓		
Zn	✓	✓	✓	✓	✓	✓	0.395J	1.98	✓	✓	**3.14	✓	NA	NA	✓		
Ba	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	51.9	✓	NA	NA	✓		
Cr	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**1.34	✓	NA	NA	✓		
Cu	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**5.8	✓	NA	NA	✓		
V	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	90.7	✓	NA	NA	✓		

IS Outliers 60-125%				IS Outliers 80-120%			
Sample ID	%Recovery	Sample ID	%Recovery	CCV/CCB ID	%Recovery	%Recovery	%Recovery
NA				NA			

Comments: HTs OK. Matrix QC on -001. \*ICB, CCB and negative MB detects compared to sample raw data.

Ca, Mg, Al and Fe < ICS

\*\* Parent and/or replicate result < 5X the RL, difference between parent and replicate >PQL, data qualified.

# Sandia Radiochemistry Worksheet

ARCOC #(s): 622413	SDG #: 553683	Matrix: Soil
Laboratory Sample IDs: 553683 – see below		
Method/Batch #s: DOE HASL 300, 4.5.2.3/Ga-01-R (gammasec)/2166592/2166599 Samples -002, -004, -006		
Method/Batch #s:		
Method/Batch #s:		

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS %R	MS %R	MSD %R	MS/ MSD RER	Lab Rep. RER	MS/MSD RPD			
none													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	
NA													

Comments: HTs OK. Note: No precision criteria applies to sample results < the MDA including where one result is > the MDA and the other <.

GS: DUP on -002

The following results were rejected by the lab due to the peak not meeting identification criteria: -002 Th-234 and U-238; -004 Ra-224


553 683

Page 1 of 2

Batch No. *NA*

### SMO Use

AR/COC 622413

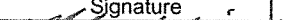



SMO Authorization:	
SMO Contact Phone:	Wendy Palencia/505-844-3132
Send Report to SMO:	Stephanie Montaño/505-284-2553

☐ Waste Characterization  
☐ RMA  
☐ Released by COC No.

☒ 4° Celsius

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

Tech Area:		Operational Site:
Building:	Room:	

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			Lab Use
	Robert Ziolk			SNL/08888/505-845-0485/505-238-3668		Return Samples By:			
	Caitlin LaChance			SNL/00641/505-845-9919/505-220-0075		Comments: Include RCRA Metals and Be, Co, Cu, Ni, V, Zn. Use Pb-212 to determine Th-232.			

Relinquished by <i>[Signature]</i>	Org. <i>8808</i>	Date <i>8-19-21</i>	Time <i>10:45</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>0018</i>	Date <i>8/19/21</i>	Time <i>10:45</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org. <i>00618</i>	Date <i>8/29/21</i>	Time <i>1000</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org.	Date <i>8-25-21</i>	Time <i>745</i>	Received by	Org.	Date	Time

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

## Contract Verification Form (CVR)

Project Leader MITCHELL

Project Name MWL LTMMMP

Project/Task No. 195122\_10.11.08

ARCOC No. 622413

Analytical Lab GEL

SDG No. 553683

*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	X		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy 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	N/A		
	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	RPD between sample 115747-001 and replicate outside acceptance range for barium, chromium, cobalt, copper, nickel, vanadium and zinc (QC1204902841)

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	Lead, nickel, selenium and zinc detected in method blank (QC1204902839)
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	N/A		
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	N/A		
	b) Initial calibration provided	N/A		
	c) Continuing calibration provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Instrument run logs provided	N/A		

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: 09-28-2021 08:43:00

Closed by: Wendy Palencia Date: 09-28-2021 08:43:00

**ANNEX C**

**Mixed Waste Landfill  
Soil-Vapor Monitoring Forms and Reports**

**April 2021-March 2022**

**Field Forms**

**Sample Summary Sheet**

**Data Validation Reports**

**Contract Verification Forms**

**Certificates of Analysis**

**Field Sampling Forms**

**Mixed Waste Landfill**

**Long-Term Monitoring and Maintenance**

**Soil-Vapor Monitoring**

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

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

**Field Sampling Forms**  
**May 2021 Soil-Vapor Monitoring**





## Soil Vapor Sampling Log Form

Location	Date	Time	Canister #	PID (ppm)	Flow Rate (cc/min)	Initial Canister Vacuum (PSI)	Ending Canister Vacuum (PSI)	Comments
MWL-FB3	5/6/21	0955	34000212	NA	NA	-25	-6	upn
MWL-SV03-50	5/6/21	1000		0.0	8	NA	NA	
		↓	↓	↓	↓	↓	↓	
		1001						
		↓	↓	↓	↓	↓	↓	
		1003	34000493	NA	NA	-25	-6	SA
		↓	↓	↓	↓	↓	↓	
		1003	10635	NA	NA	-25	-6	DU
MWL-SV03-100	5/6/21	1006		0.0	10	NA	NA	
		↓	↓	↓	↓	↓	↓	
		1007						
		↓	↓	↓	↓	↓	↓	
		1008	34000888	NA	NA	-25	-6	
MWL-SV03-200	5/6/21	1013		0.0	12	NA	NA	
		↓	↓	↓	↓	↓	↓	
		1014						
		↓	↓	↓	↓	↓	↓	
		1016	09623	NA	NA	-26	-6	
MWL-SV03-300	5/6/21	1020		0.0	12	NA	NA	
		↓	↓	↓	↓	↓	↓	
		1022						
		↓	↓	↓	↓	↓	↓	
		1025	7959	NA	NA	-26	-6	
MWL-SV03-400	5/6/21	1033		0.0	15	NA	NA	
		↓	↓	↓	↓	↓	↓	
		1035						
		↓	↓	↓	↓	↓	↓	
		1109	11300	NA	NA	-26	-6	SA
		↓	↓	↓	↓	↓	↓	
		1109	34002118	NA	NA	-26	-6	DU

## Field Notes:

Continuous PID Readings During Purge.

Background PID Readings:

SV03- 0.0

(All ports  
 obtained split sample + Du@ 200ft

## Soil Vapor Sampling Log Form

Location	Date	Time	Canister #	PID (ppm)	Flow Rate (scf/min)	Initial Canister Vacuum (PSI)	Ending Canister Vacuum (PSI)	Comments
MWL-FB4	5/6/21	0841	11060	NA	NA	-24	-4	WPN
MWL-SV04-50	5/6/21	0848	↓	0.0	8	NA	NA	
		↓	↓	↓	↓	↓	↓	
		0849	↓	↓	↓	↓	↓	
		0856	11151	NA	NA	-25	-6	
MWL-SV04-100	5/6/21	0909	↓	0.0	8	NA	NA	
		↓	↓	↓	↓	↓	↓	
		0910	↓	↓	↓	↓	↓	
		0912	10716	NA	NA	-25	-6	
MWL-SV04-200	5/6/21	0915	↓	0.0	12	NA	NA	
		↓	↓	↓	↓	↓	↓	
		0916	↓	↓	↓	↓	↓	
		0921	11994	NA	NA	-25	-6	
MWL-SV04-300	5/6/21	0930	↓	0.0	8	NA	NA	
		↓	↓	↓	↓	↓	↓	
		0932	↓	↓	↓	↓	↓	
		0934	11159	NA	NA	-25	-6	
MWL-SV04-400	5/6/21	0937	↓	0.0	15	NA	NA	
		↓	↓	↓	↓	↓	↓	
		0939	↓	↓	↓	↓	↓	
		0940	12089	NA	NA	-26	-6	
<b>Field Notes:</b> Continuous PID Readings During Purge. Background PID Readings: SV04- 0.0 Soft port Sampling slow 2000 port Sampling slow (all ports) OBTAINED Split Sample all ports								

## Soil Vapor Sampling Log Form

Location	Date	Time	Canister #	PID (ppm)	Flow Rate (scfh)	Initial Canister Vacuum (PSI)	Ending Canister Vacuum (PSI)	Comments
MWL-FB5	5/6/21	1134	34000364	NA	NA	-25	-6	upn
MWL-SV05-50	5/6/21	1136	↓	0.0	8	NA	NA	
	↓	↓	↓	↓	↓	↓	↓	
	↓	1137	↓	↓	↓	↓	↓	
	↓	1208	34000346	NA	NA	-26	-6	
MWL-SV05-100	5/6/21	1141	↓	0.0	8	NA	NA	
	↓	↓	↓	↓	↓	↓	↓	
	↓	1142	↓	↓	↓	↓	↓	
	↓	1209	09530	NA	NA	-26	-6	
MWL-SV05-200	5/6/21	1146	↓	0.0	10	NA	NA	
	↓	↓	↓	↓	↓	↓	↓	
	↓	1148	↓	↓	↓	↓	↓	
	↓	1149	12103	NA	NA	-26	-6	
MWL-SV05-300	5/6/21	1156	↓	0.0	10	NA	NA	
	↓	↓	↓	↓	↓	↓	↓	
	↓	1158	↓	↓	↓	↓	↓	
	↓	1159	8195	NA	NA	-26	-6	
MWL-SV05-400	5/6/21	1202	↓	0.0	10	NA	NA	
	↓	↓	↓	↓	↓	↓	↓	
	↓	1204	↓	↓	↓	↓	↓	
	↓	1206	7841	NA	NA	-26	-6	

## Field Notes:

Continuous PID Readings During Purge.

Background PID Readings:

SV05- 0.0

(all parts)  
 OBNMED Split Sampling + Du @ 400ft

**Summary Sheet For**  
**May 2021 Soil-Vapor Samples**

**Sample Summary for Mixed Waste Landfill Soil-Vapor Monitoring**  
**May 2021**

Well ID	Sample Date	Sample ID / Port	SUMMA Number	ARCOC	Sample Number	Sample Type	Associated Field Blank (ARCOC #/Sample #)	Comments
<b>Mixed Waste Landfill Soil Vapor Monitoring: Project Task Number 195122.10.11.08 / Service Order Number CF 01-21</b>								
MWL-SV01	6-May-21	MWL-SV01-42.5	34001308	622030	114903	Environmental	622030 / 004902	
		MWL-FB1	34000184		114902	Field QC	n/a	Ultra Pure N2
MWL-SV02	6-May-21	MWL-SV02-41.5	10375	622031	114905	Environmental	622031 / 114904	
		MWL-FB2	10883		114904	Field QC	n/a	Ultra Pure N2
MWL-SV03	6-May-21	MWL-SV03-50	34000493	622032	114907	Environmental	622032 / 114906	
		MWL-SV03-50	10635		114908	Duplicate		
		MWL-SV03-100	34000888		114909	Environmental		
		MWL-SV03-200	09623		114910	Environmental		
		MWL-SV03-300	7959		114911	Environmental		
		MWL-SV03-400	11300		114912	Environmental		
		MWL-SV03-400	34002118		114913	Duplicate		
		MWL-FB3	34000212		114906	Field QC	n/a	Ultra Pure N2
MWL-SV04	6-May-21	MWL-SV04-50	11151	622033	114915	Environmental	622033 / 114914	
		MWL-SV04-100	10716		114916	Environmental		
		MWL-SV04-200	11994		114917	Environmental		
		MWL-SV04-300	11159		114918	Environmental		
		MWL-SV04-400	12089		114919	Environmental		
		MWL-FB4	11060		114914	Field QC	n/a	Ultra Pure N2
MWL-SV05	6-May-21	MWL-SV05-50	34000346	622034	114921	Environmental	622034 / 114920	
		MWL-SV05-100	09530		114922	Environmental		
		MWL-SV05-200	12103		114923	Environmental		
		MWL-SV05-300	8195		114924	Environmental		
		MWL-SV05-400	7841		114925	Environmental		
		MWL-FB5	34000504		114920	Field QC	n/a	Ultra Pure N2

**Data Validation For Environmental Samples**

**Mixed Waste Landfill**

**Soil-Vapor Monitoring**

**May 2021**

**AR/COC Numbers 622030, 622031, 622032, 622033, 622034**

## Memorandum

Date: June 18, 2021

To: File

From: Mary Donovan

Subject: GC/MS Organic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCOC: 622030, 622031, 622032, 622033 and 622034  
SDG: 140-23051  
Laboratory: Eurofins TestAmerica, Knoxville  
Project/Task: 195122.10.11.08  
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 06.

### Summary

Twenty-four 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. Carbon disulfide and chlorobenzene were detected at  $\leq$  the PQL in the MB associated with samples 140-23051-2, -6 through -9 and -19. All associated sample results for carbon disulfide and the chlorobenzene result for samples -7 and -19 were detects  $\leq$  the PQL and will be **qualified U,B**; non-detect at their respective PQLs.
2. Carbon disulfide and chlorobenzene were detected at  $\leq$  the PQL in the MB associated with samples -4, -10, -12 through -15. All associated sample results *except* the result for carbon disulfide for sample -14 and the chlorobenzene results for samples -4, -12, -13 and -14 were detects  $\leq$  the PQL and will be **qualified U,B**; non-detect at their respective PQLs.
3. Carbon disulfide was detected at  $\leq$  the PQL in the MB associated with samples -16 through -18, -20, -21, -23 and -24. All associated sample results *except* for the result for carbon disulfide in sample -21 were detects  $\leq$  the PQL and will be **qualified U,B**; non-detect at their respective PQLs.
4. Carbon disulfide was detected at  $\leq$  the PQL in FB1, sample -1 associated with sample -2. The associated sample result was a detect  $\leq$  the PQL and will be qualified **0.01U,B2**; non-detect at the PQL.



5. Acetone, benzene, 2-butanone and carbon disulfide were detected at  $\leq$  the PQL in FB2, sample -3, associated with sample -4. The associated sample results were detects  $\leq$  the PQL and will be **qualified U,B2**; non-detect at their respective PQLs.
6. Acetone, 2-butanone, carbon disulfide and chlorobenzene were detected at  $\leq$  the PQL in FB4, sample -5, associated with samples -6 through -10. The associated acetone and 2-butanone results for samples -6 and -10, all associated carbon disulfide sample results and the associated chlorobenzene results for samples -7 and -10 were detects  $\leq$  the PQL and will be **qualified U,B2**; non-detect at their respective PQLs.
7. Acetone, benzene, carbon disulfide and chlorobenzene were detected at  $\leq$  the PQL in FB3, sample -11, associated with samples -12 through -18. All associated sample results for benzene, all associated sample results for carbon disulfide *except* the result for sample -14 and the associated chlorobenzene results for samples -15 through -17 were detects  $\leq$  the PQL and will be **qualified U,B2**; non-detect at their respective PQLs.
8. No duplicate precision was available for samples -1, -3, -5 and -11. The associated sample results that were detects will be **qualified J,RP1**. The 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 follows.

For the CCV associated with samples -1, -3, -5 and -11, the %Ds were  $>30\%$  and positive for 1,2-dichloro-1,1,2,2-tetrafluoroethane and hexachlorobutadiene. The associated sample results were non-detect and will not be qualified.

For the CCV associated with samples -2, -6 through -9 and -19, the %Ds were  $>30\%$  and positive for bromomethane; 1,2-dichloro-1,1,2,2-tetrafluoroethane and hexachlorobutadiene. The associated sample results were non-detect and will not be qualified.

For the CCV associated with samples -2, -6 through -9 and -19, the %Ds were  $>30\%$  but  $\leq 45\%$  with negative bias for 4-methyl-2-pentanone and vinyl acetate. The associated sample results were non-detect and since no other calibration infraction occurred will not be qualified.

For the CCV associated with samples -4, -10, -12 through -15, the %Ds were  $>30\%$  and positive for 1,2-dichloro-1,1,2,2-tetrafluoroethane and hexachlorobutadiene. The associated sample results were non-detect and will not be qualified.

For the CCV associated with samples -4, -10, -12 through -15, the %Ds were >30% but ≤45% with negative bias for 4-methyl-2-pentanone and vinyl acetate. The associated sample results were non-detect and since no other calibration infraction occurred will not be qualified.

For the CCV associated with samples -16 through -18, -20, -21, -23 and -24, the %Ds were >30% and positive for bromomethane; 1,2-dichloro-1,1,2,2-tetrafluoroethane and hexachlorobutadiene. The associated sample results were non-detect and will not be qualified.

For the CCV associated with samples -16 through -18, -20, -21, -23 and -24, the %D was >30% but ≤45% with negative bias for 4-methyl-2-pentanone. The associated sample results were non-detect and since no other calibration infraction occurred will not be qualified.

For the CCV associated with sample -22, the %Ds were >30% and positive for bromoform; bromomethane; 1,2-dichloro-1,1,2,2-tetrafluoroethane; hexachlorobutadiene and vinyl chloride. The associated sample results were non-detect and will not be qualified.

For the CCV associated with sample -22, the %D was >30% but ≤45% with negative bias for 4-methyl-2-pentanone and vinyl acetate. The associated sample results were non-detect and since no other calibration infraction occurred will not be qualified.

### **Blanks**

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

Chlorobenzene was detected at ≤ the PQL in the MB associated with samples -2, -6 through -9 and -19. The associated results for samples -2, -6, -8 and -9 were non-detect and will not be qualified.

Carbon disulfide and chlorobenzene were detected at ≤ the PQL in the MB associated with samples -4, -10, -12 through -15. The carbon disulfide result for sample -14 was a detect > the PQL and >5X the MB value and will not be qualified. The associated chlorobenzene results for samples -4, -12 through -14 were non-detect and will not be qualified.

Carbon disulfide was detected at ≤ the PQL in the MB associated with samples -16 through -18, -20, -21, -23 and -24. The carbon disulfide result for sample -21 was a detect > the PQL and >5X the MB value and will not be qualified.

Tetrachloroethene was detected at ≤ the PQL in FB1, sample -1, associated with sample -2. The associated sample result for tetrachloroethene was a detect > the PQL and >5X the FB value and will not be qualified.

Tetrachloroethene was detected at ≤ the PQL in FB2, sample -3, associated with sample -4. The associated sample result was a detect > the PQL and >5X the FB value and will not be qualified.

Acetone, 2-butanone and chlorobenzene were detected at ≤ the PQL in FB4, sample -5, associated with samples -6 through -10. The chlorobenzene result for sample -6, the acetone and 2-butanone results for sample -7 and the acetone, 2-butanone and chlorobenzene results for samples -8 and -9 were non-detect and will not be qualified.

Acetone, carbon disulfide and chlorobenzene were detected at ≤ the PQL in FB3, sample -11, associated with samples -12 through -18. All associated sample results for acetone and the chlorobenzene results for

samples -12 through -14 and -18 were non-detect and will not be qualified. The carbon disulfide result for sample -14 was a detect > the PQL and >5X the FB value and will not be qualified.

Carbon disulfide, chlorobenzene and trichlorofluoromethane were detected at  $\leq$  the PQL and methylene chloride was detected at > the PQL in FB5, sample -19, associated with samples -20 through -24. It should be noted that the FB results for carbon disulfide and chlorobenzene were qualified non-detect due to MB contamination and will not be applied to the associated field sample results. The associated sample results for methylene chloride were non-detect and will not be qualified. The associated sample results for trichlorofluoromethane were detects > the PQL and >5X the FB value 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 for all batches met QC acceptance criteria except as noted above in the Summary section and as follows. For the LCS associated with samples -1, -3, -5 and -11, the %Rs were > 130% for 1,2-dichloro-1,1,2,2-tetrafluoroethane and hexachlorobutadiene. Up to two LCS recovery infractions are allowed since 50 LCS analytes were reported. Therefore, the associated sample results will not be qualified.

For the LCS associated with samples -2, -6 through -9 and -19, the %Rs were > 130% for 1,2-dichloro-1,1,2,2-tetrafluoroethane; bromomethane and hexachlorobutadiene. The associated sample results were non-detect and will not be qualified.

For the LCS associated with samples -4, -10, -12 through -15, the %Rs were > 130% for 1,2-dichloro-1,1,2,2-tetrafluoroethane and hexachlorobutadiene. The associated sample results were non-detect and will not be qualified.

For the LCS associated with samples -16 through -18, -20, -21, -23 and -24, the %Rs were > 130% for 1,2-dichloro-1,1,2,2-tetrafluoroethane; bromomethane and hexachlorobutadiene. The associated sample results were non-detect and will not be qualified.

For the LCS associated with sample -22, the %Rs were > 130% for 1,2-dichloro-1,1,2,2-tetrafluoroethane; bromoform; bromomethane; hexachlorobutadiene and vinyl chloride. The associated sample results were non-detect and will not be qualified.

### **Laboratory Replicate**

Laboratory replicates met QC acceptance criteria except as noted above in the Summary section and as follows. The parent and replicate sample results for carbon disulfide and cis-1,2-dichloroethene in sample -9 were flagged by the lab for exceeding the RPD limit of 25%. Both results were <5X the PQL and the

difference between the sample and replicate results was < the PQL; therefore, no sample data will be qualified.

### **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 (1.64X); -2 (1.56X); -3 (1.57X); -4 (1.57X); -5 (1.49X); -6 (1.45X); -7 (1.49X); -8 (1.5X); -9 (1.56X); -10 (1.53X); -11 (1.62X); -12 (1.59X); -13 (1.65X); -14 (1.49X); -15 (1.46X); -16 (1.46X); -17 (1.64X); -18 (1.64X); -19 (1.53X); -20 (1.45X); -21 (1.48X); -22 (1.5X); -23 (1.56X) and -24 (1.48X).

### **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 ARCOC and were associated with the samples on the same ARCOC. Two field duplicate pairs were submitted with ARCOCs 622032. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 06/25/2021



## Sample Findings Summary



AR/COC: 622030, 622031, 622032, 622033, 622034

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
TO15_LL_PF			
	114902-001 / MWL-FB1	1,1,1-TRICHLOROETHANE (71-55-6)	UJ, RP1
	114902-001 / MWL-FB1	1,1,2,2-TETRACHLOROETHANE (79-34-5)	UJ, RP1
	114902-001 / MWL-FB1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (76-13-1)	UJ, RP1
	114902-001 / MWL-FB1	1,1,2-TRICHLOROETHANE (79-00-5)	UJ, RP1
	114902-001 / MWL-FB1	1,1-DICHLOROETHANE (75-34-3)	UJ, RP1
	114902-001 / MWL-FB1	1,1-DICHLOROETHENE (75-35-4)	UJ, RP1
	114902-001 / MWL-FB1	1,2,4-TRICHLOROBENZENE (120-82-1)	UJ, RP1
	114902-001 / MWL-FB1	1,2,4-TRIMETHYLBENZENE (95-63-6)	UJ, RP1
	114902-001 / MWL-FB1	1,2-DIBROMOETHANE (EDB) (106-93-4)	UJ, RP1
	114902-001 / MWL-FB1	1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (76-14-2)	UJ, RP1
	114902-001 / MWL-FB1	1,2-DICHLOROBENZENE (95-50-1)	UJ, RP1
	114902-001 / MWL-FB1	1,2-DICHLOROETHANE (107-06-2)	UJ, RP1
	114902-001 / MWL-FB1	1,2-DICHLOROPROPANE (78-87-5)	UJ, RP1
	114902-001 / MWL-FB1	1,3,5-TRIMETHYLBENZENE (108-67-8)	UJ, RP1
	114902-001 / MWL-FB1	1,3-DICHLOROBENZENE (541-73-1)	UJ, RP1
	114902-001 / MWL-FB1	1,4-DICHLOROBENZENE (106-46-7)	UJ, RP1
	114902-001 / MWL-FB1	2-BUTANONE (MEK) (78-93-3)	UJ, RP1
	114902-001 / MWL-FB1	2-HEXANONE (591-78-6)	UJ, RP1
	114902-001 / MWL-FB1	4-ETHYLTOLUENE (622-96-8)	UJ, RP1
	114902-001 / MWL-FB1	4-METHYL-2-PENTANONE (MIBK) (108-10-1)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	114902-001 / MWL-FB1	ACETONE (67-64-1)	UJ, RP1
	114902-001 / MWL-FB1	BENZENE (71-43-2)	UJ, RP1
	114902-001 / MWL-FB1	BENZYL CHLORIDE (100-44-7)	UJ, RP1
	114902-001 / MWL-FB1	BROMODICHLOROMETHANE (75-27-4)	UJ, RP1
	114902-001 / MWL-FB1	BROMOFORM (75-25-2)	UJ, RP1
	114902-001 / MWL-FB1	BROMOMETHANE (74-83-9)	UJ, RP1
	114902-001 / MWL-FB1	CARBON DISULFIDE (75-15-0)	J, RP1
	114902-001 / MWL-FB1	CARBON TETRACHLORIDE (56-23-5)	UJ, RP1
	114902-001 / MWL-FB1	CHLOROBENZENE (108-90-7)	UJ, RP1
	114902-001 / MWL-FB1	CHLOROETHANE (75-00-3)	UJ, RP1
	114902-001 / MWL-FB1	CHLOROFORM (67-66-3)	UJ, RP1
	114902-001 / MWL-FB1	CHLOROMETHANE (74-87-3)	UJ, RP1
	114902-001 / MWL-FB1	CIS-1,2-DICHLOROETHENE (156-59-2)	UJ, RP1
	114902-001 / MWL-FB1	CIS-1,3-DICHLOROPROPENE (10061-01-5)	UJ, RP1
	114902-001 / MWL-FB1	DIBROMOCHLOROMETHANE (124-48-1)	UJ, RP1
	114902-001 / MWL-FB1	DICHLORODIFLUOROMETHANE (75-71-8)	UJ, RP1
	114902-001 / MWL-FB1	ETHYLBENZENE (100-41-4)	UJ, RP1
	114902-001 / MWL-FB1	HEXACHLOROBUTADIENE (87-68-3)	UJ, RP1
	114902-001 / MWL-FB1	M,P-XYLENE (179601-23-1)	UJ, RP1
	114902-001 / MWL-FB1	METHYLENE CHLORIDE (75-09-2)	UJ, RP1
	114902-001 / MWL-FB1	O-XYLENE (95-47-6)	UJ, RP1
	114902-001 / MWL-FB1	STYRENE (100-42-5)	UJ, RP1
	114902-001 / MWL-FB1	TETRACHLOROETHENE (127-18-4)	J, RP1
	114902-001 / MWL-FB1	TOLUENE (108-88-3)	UJ, RP1
	114902-001 / MWL-FB1	TRANS-1,2-DICHLOROETHENE (156-60-5)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	114902-001 / MWL-FB1	TRANS-1,3-DICHLOROPROPENE (10061-02-6)	UJ, RP1
	114902-001 / MWL-FB1	TRICHLOROETHENE (79-01-6)	UJ, RP1
	114902-001 / MWL-FB1	TRICHLOROFLUOROMETHANE (75-69-4)	UJ, RP1
	114902-001 / MWL-FB1	VINYL ACETATE (108-05-4)	UJ, RP1
	114902-001 / MWL-FB1	VINYL CHLORIDE (75-01-4)	UJ, RP1
	114903-001 / MWL-SV01-42.5	CARBON DISULFIDE (75-15-0)	0.01U, B,B2
	114904-001 / MWL-FB2	1,1,1-TRICHLOROETHANE (71-55-6)	UJ, RP1
	114904-001 / MWL-FB2	1,1,2,2-TETRACHLOROETHANE (79-34-5)	UJ, RP1
	114904-001 / MWL-FB2	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (76-13-1)	UJ, RP1
	114904-001 / MWL-FB2	1,1,2-TRICHLOROETHANE (79-00-5)	UJ, RP1
	114904-001 / MWL-FB2	1,1-DICHLOROETHANE (75-34-3)	UJ, RP1
	114904-001 / MWL-FB2	1,1-DICHLOROETHENE (75-35-4)	UJ, RP1
	114904-001 / MWL-FB2	1,2,4-TRICHLOROBENZENE (120-82-1)	UJ, RP1
	114904-001 / MWL-FB2	1,2,4-TRIMETHYLBENZENE (95-63-6)	UJ, RP1
	114904-001 / MWL-FB2	1,2-DIBROMOETHANE (EDB) (106-93-4)	UJ, RP1
	114904-001 / MWL-FB2	1,2-DICHLORO-1,1,2,2-TETRAFLUROETHANE (76-14-2)	UJ, RP1
	114904-001 / MWL-FB2	1,2-DICHLOROBENZENE (95-50-1)	UJ, RP1
	114904-001 / MWL-FB2	1,2-DICHLOROETHANE (107-06-2)	UJ, RP1
	114904-001 / MWL-FB2	1,2-DICHLOROPROPANE (78-87-5)	UJ, RP1
	114904-001 / MWL-FB2	1,3,5-TRIMETHYLBENZENE (108-67-8)	UJ, RP1
	114904-001 / MWL-FB2	1,3-DICHLOROBENZENE (541-73-1)	UJ, RP1
	114904-001 / MWL-FB2	1,4-DICHLOROBENZENE (106-46-7)	UJ, RP1
	114904-001 / MWL-FB2	2-BUTANONE (MEK) (78-93-3)	J, RP1
	114904-001 / MWL-FB2	2-HEXANONE (591-78-6)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	114904-001 / MWL-FB2	4-ETHYLTOLUENE (622-96-8)	UJ, RP1
	114904-001 / MWL-FB2	4-METHYL-2-PENTANONE (MIBK) (108-10-1)	UJ, RP1
	114904-001 / MWL-FB2	ACETONE (67-64-1)	J, RP1
	114904-001 / MWL-FB2	BENZENE (71-43-2)	J, RP1
	114904-001 / MWL-FB2	BENZYL CHLORIDE (100-44-7)	UJ, RP1
	114904-001 / MWL-FB2	BROMODICHLOROMETHANE (75-27-4)	UJ, RP1
	114904-001 / MWL-FB2	BROMOFORM (75-25-2)	UJ, RP1
	114904-001 / MWL-FB2	BROMOMETHANE (74-83-9)	UJ, RP1
	114904-001 / MWL-FB2	CARBON DISULFIDE (75-15-0)	J, RP1
	114904-001 / MWL-FB2	CARBON TETRACHLORIDE (56-23-5)	UJ, RP1
	114904-001 / MWL-FB2	CHLOROBENZENE (108-90-7)	UJ, RP1
	114904-001 / MWL-FB2	CHLOROETHANE (75-00-3)	UJ, RP1
	114904-001 / MWL-FB2	CHLOROFORM (67-66-3)	UJ, RP1
	114904-001 / MWL-FB2	CHLOROMETHANE (74-87-3)	UJ, RP1
	114904-001 / MWL-FB2	CIS-1,2-DICHLOROETHENE (156-59-2)	UJ, RP1
	114904-001 / MWL-FB2	CIS-1,3-DICHLOROPROPENE (10061-01-5)	UJ, RP1
	114904-001 / MWL-FB2	DIBROMOCHLOROMETHANE (124-48-1)	UJ, RP1
	114904-001 / MWL-FB2	DICHLORODIFLUOROMETHANE (75-71-8)	UJ, RP1
	114904-001 / MWL-FB2	ETHYLBENZENE (100-41-4)	UJ, RP1
	114904-001 / MWL-FB2	HEXACHLOROBUTADIENE (87-68-3)	UJ, RP1
	114904-001 / MWL-FB2	M,P-XYLENE (179601-23-1)	UJ, RP1
	114904-001 / MWL-FB2	METHYLENE CHLORIDE (75-09-2)	UJ, RP1
	114904-001 / MWL-FB2	O-XYLENE (95-47-6)	UJ, RP1
	114904-001 / MWL-FB2	STYRENE (100-42-5)	UJ, RP1
	114904-001 / MWL-FB2	TETRACHLOROETHENE (127-18-4)	J, RP1



Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	114904-001 / MWL-FB2	TOLUENE (108-88-3)	UJ, RP1
	114904-001 / MWL-FB2	TRANS-1,2-DICHLOROETHENE (156-60-5)	UJ, RP1
	114904-001 / MWL-FB2	TRANS-1,3-DICHLOROPROPENE (10061-02-6)	UJ, RP1
	114904-001 / MWL-FB2	TRICHLOROETHENE (79-01-6)	UJ, RP1
	114904-001 / MWL-FB2	TRICHLOROFLUOROMETHANE (75-69-4)	UJ, RP1
	114904-001 / MWL-FB2	VINYL ACETATE (108-05-4)	UJ, RP1
	114904-001 / MWL-FB2	VINYL CHLORIDE (75-01-4)	UJ, RP1
	114905-001 / MWL-SV02-41.5	2-BUTANONE (MEK) (78-93-3)	0.016U, B2
	114905-001 / MWL-SV02-41.5	ACETONE (67-64-1)	0.079U, B2
	114905-001 / MWL-SV02-41.5	BENZENE (71-43-2)	0.0031U, B2
	114905-001 / MWL-SV02-41.5	CARBON DISULFIDE (75-15-0)	0.0079U, B,B2
	114906-001 / MWL-FB3	1,1,1-TRICHLOROETHANE (71-55-6)	UJ, RP1
	114906-001 / MWL-FB3	1,1,2,2-TETRACHLOROETHANE (79-34-5)	UJ, RP1
	114906-001 / MWL-FB3	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (76-13-1)	UJ, RP1
	114906-001 / MWL-FB3	1,1,2-TRICHLOROETHANE (79-00-5)	UJ, RP1
	114906-001 / MWL-FB3	1,1-DICHLOROETHANE (75-34-3)	UJ, RP1
	114906-001 / MWL-FB3	1,1-DICHLOROETHENE (75-35-4)	UJ, RP1
	114906-001 / MWL-FB3	1,2,4-TRICHLOROBENZENE (120-82-1)	UJ, RP1
	114906-001 / MWL-FB3	1,2,4-TRIMETHYLBENZENE (95-63-6)	UJ, RP1
	114906-001 / MWL-FB3	1,2-DIBROMOETHANE (EDB) (106-93-4)	UJ, RP1
	114906-001 / MWL-FB3	1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (76-14-2)	UJ, RP1
	114906-001 / MWL-FB3	1,2-DICHLOROBENZENE (95-50-1)	UJ, RP1
	114906-001 / MWL-FB3	1,2-DICHLOROETHANE (107-06-2)	UJ, RP1
	114906-001 / MWL-FB3	1,2-DICHLOROPROPANE (78-87-5)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	114906-001 / MWL-FB3	1,3,5-TRIMETHYLBENZENE (108-67-8)	UJ, RP1
	114906-001 / MWL-FB3	1,3-DICHLOROBENZENE (541-73-1)	UJ, RP1
	114906-001 / MWL-FB3	1,4-DICHLOROBENZENE (106-46-7)	UJ, RP1
	114906-001 / MWL-FB3	2-BUTANONE (MEK) (78-93-3)	UJ, RP1
	114906-001 / MWL-FB3	2-HEXANONE (591-78-6)	UJ, RP1
	114906-001 / MWL-FB3	4-ETHYLTOLUENE (622-96-8)	UJ, RP1
	114906-001 / MWL-FB3	4-METHYL-2-PENTANONE (MIBK) (108-10-1)	UJ, RP1
	114906-001 / MWL-FB3	ACETONE (67-64-1)	J, RP1
	114906-001 / MWL-FB3	BENZENE (71-43-2)	J, RP1
	114906-001 / MWL-FB3	BENZYL CHLORIDE (100-44-7)	UJ, RP1
	114906-001 / MWL-FB3	BROMODICHLOROMETHANE (75-27-4)	UJ, RP1
	114906-001 / MWL-FB3	BROMOFORM (75-25-2)	UJ, RP1
	114906-001 / MWL-FB3	BROMOMETHANE (74-83-9)	UJ, RP1
	114906-001 / MWL-FB3	CARBON DISULFIDE (75-15-0)	J, RP1
	114906-001 / MWL-FB3	CARBON TETRACHLORIDE (56-23-5)	UJ, RP1
	114906-001 / MWL-FB3	CHLOROBENZENE (108-90-7)	J, RP1
	114906-001 / MWL-FB3	CHLOROETHANE (75-00-3)	UJ, RP1
	114906-001 / MWL-FB3	CHLOROFORM (67-66-3)	UJ, RP1
	114906-001 / MWL-FB3	CHLOROMETHANE (74-87-3)	UJ, RP1
	114906-001 / MWL-FB3	CIS-1,2-DICHLOROETHENE (156-59-2)	UJ, RP1
	114906-001 / MWL-FB3	CIS-1,3-DICHLOROPROPENE (10061-01-5)	UJ, RP1
	114906-001 / MWL-FB3	DIBROMOCHLOROMETHANE (124-48-1)	UJ, RP1
	114906-001 / MWL-FB3	DICHLORODIFLUOROMETHANE (75-71-8)	UJ, RP1
	114906-001 / MWL-FB3	ETHYLBENZENE (100-41-4)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	114906-001 / MWL-FB3	HEXACHLOROBUTADIENE (87-68-3)	UJ, RP1
	114906-001 / MWL-FB3	M,P-XYLENE (179601-23-1)	UJ, RP1
	114906-001 / MWL-FB3	METHYLENE CHLORIDE (75-09-2)	UJ, RP1
	114906-001 / MWL-FB3	O-XYLENE (95-47-6)	UJ, RP1
	114906-001 / MWL-FB3	STYRENE (100-42-5)	UJ, RP1
	114906-001 / MWL-FB3	TETRACHLOROETHENE (127-18-4)	UJ, RP1
	114906-001 / MWL-FB3	TOLUENE (108-88-3)	UJ, RP1
	114906-001 / MWL-FB3	TRANS-1,2-DICHLOROETHENE (156-60-5)	UJ, RP1
	114906-001 / MWL-FB3	TRANS-1,3-DICHLOROPROPENE (10061-02-6)	UJ, RP1
	114906-001 / MWL-FB3	TRICHLOROETHENE (79-01-6)	UJ, RP1
	114906-001 / MWL-FB3	TRICHLOROFLUOROMETHANE (75-69-4)	UJ, RP1
	114906-001 / MWL-FB3	VINYL ACETATE (108-05-4)	UJ, RP1
	114906-001 / MWL-FB3	VINYL CHLORIDE (75-01-4)	UJ, RP1
	114907-001 / MWL-SV03-50	BENZENE (71-43-2)	0.00091U, B2
	114907-001 / MWL-SV03-50	CARBON DISULFIDE (75-15-0)	0.0023U, B,B2
	114908-001 / MWL-SV03-50	BENZENE (71-43-2)	0.00066U, B2
	114908-001 / MWL-SV03-50	CARBON DISULFIDE (75-15-0)	0.0017U, B,B2
	114909-001 / MWL-SV03-100	BENZENE (71-43-2)	0.0012U, B2
	114910-001 / MWL-SV03-200	BENZENE (71-43-2)	0.0012U, B2
	114910-001 / MWL-SV03-200	CARBON DISULFIDE (75-15-0)	0.0029U, B,B2
	114910-001 / MWL-SV03-200	CHLOROBENZENE (108-90-7)	0.0012U, B,B2
	114911-001 / MWL-SV03-300	BENZENE (71-43-2)	0.0017U, B2
	114911-001 / MWL-SV03-300	CARBON DISULFIDE (75-15-0)	0.0042U, B,B2
	114911-001 / MWL-SV03-300	CHLOROBENZENE (108-90-7)	0.0017U, B2
	114912-001 / MWL-SV03-400	BENZENE (71-43-2)	0.0022U, B2
	114912-001 / MWL-SV03-400	CARBON DISULFIDE (75-15-0)	0.0055U, B,B2
	114912-001 / MWL-SV03-400	CHLOROBENZENE (108-90-7)	0.0022U, B2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	114913-001 / MWL-SV03-400	BENZENE (71-43-2)	0.0022U, B2
	114913-001 / MWL-SV03-400	CARBON DISULFIDE (75-15-0)	0.0055U, B,B2
	114914-001 / MWL-FB4	1,1,1-TRICHLOROETHANE (71-55-6)	UJ, RP1
	114914-001 / MWL-FB4	1,1,2,2-TETRACHLOROETHANE (79-34-5)	UJ, RP1
	114914-001 / MWL-FB4	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (76-13-1)	UJ, RP1
	114914-001 / MWL-FB4	1,1,2-TRICHLOROETHANE (79-00-5)	UJ, RP1
	114914-001 / MWL-FB4	1,1-DICHLOROETHANE (75-34-3)	UJ, RP1
	114914-001 / MWL-FB4	1,1-DICHLOROETHENE (75-35-4)	UJ, RP1
	114914-001 / MWL-FB4	1,2,4-TRICHLOROBENZENE (120-82-1)	UJ, RP1
	114914-001 / MWL-FB4	1,2,4-TRIMETHYLBENZENE (95-63-6)	UJ, RP1
	114914-001 / MWL-FB4	1,2-DIBROMOETHANE (EDB) (106-93-4)	UJ, RP1
	114914-001 / MWL-FB4	1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (76-14-2)	UJ, RP1
	114914-001 / MWL-FB4	1,2-DICHLOROBENZENE (95-50-1)	UJ, RP1
	114914-001 / MWL-FB4	1,2-DICHLOROETHANE (107-06-2)	UJ, RP1
	114914-001 / MWL-FB4	1,2-DICHLOROPROPANE (78-87-5)	UJ, RP1
	114914-001 / MWL-FB4	1,3,5-TRIMETHYLBENZENE (108-67-8)	UJ, RP1
	114914-001 / MWL-FB4	1,3-DICHLOROBENZENE (541-73-1)	UJ, RP1
	114914-001 / MWL-FB4	1,4-DICHLOROBENZENE (106-46-7)	UJ, RP1
	114914-001 / MWL-FB4	2-BUTANONE (MEK) (78-93-3)	J, RP1
	114914-001 / MWL-FB4	2-HEXANONE (591-78-6)	UJ, RP1
	114914-001 / MWL-FB4	4-ETHYLTOLUENE (622-96-8)	UJ, RP1
	114914-001 / MWL-FB4	4-METHYL-2-PENTANONE (MIBK) (108-10-1)	UJ, RP1
	114914-001 / MWL-FB4	ACETONE (67-64-1)	J, RP1
	114914-001 / MWL-FB4	BENZENE (71-43-2)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	114914-001 / MWL-FB4	BENZYL CHLORIDE (100-44-7)	UJ, RP1
	114914-001 / MWL-FB4	BROMODICHLOROMETHANE (75-27-4)	UJ, RP1
	114914-001 / MWL-FB4	BROMOFORM (75-25-2)	UJ, RP1
	114914-001 / MWL-FB4	BROMOMETHANE (74-83-9)	UJ, RP1
	114914-001 / MWL-FB4	CARBON DISULFIDE (75-15-0)	J, RP1
	114914-001 / MWL-FB4	CARBON TETRACHLORIDE (56-23-5)	UJ, RP1
	114914-001 / MWL-FB4	CHLOROBENZENE (108-90-7)	J, RP1
	114914-001 / MWL-FB4	CHLOROETHANE (75-00-3)	UJ, RP1
	114914-001 / MWL-FB4	CHLOROFORM (67-66-3)	UJ, RP1
	114914-001 / MWL-FB4	CHLOROMETHANE (74-87-3)	UJ, RP1
	114914-001 / MWL-FB4	CIS-1,2-DICHLOROETHENE (156-59-2)	UJ, RP1
	114914-001 / MWL-FB4	CIS-1,3-DICHLOROPROPENE (10061-01-5)	UJ, RP1
	114914-001 / MWL-FB4	DIBROMOCHLOROMETHANE (124-48-1)	UJ, RP1
	114914-001 / MWL-FB4	DICHLORODIFLUOROMETHANE (75-71-8)	UJ, RP1
	114914-001 / MWL-FB4	ETHYLBENZENE (100-41-4)	UJ, RP1
	114914-001 / MWL-FB4	HEXACHLOROBUTADIENE (87-68-3)	UJ, RP1
	114914-001 / MWL-FB4	M,P-XYLENE (179601-23-1)	UJ, RP1
	114914-001 / MWL-FB4	METHYLENE CHLORIDE (75-09-2)	UJ, RP1
	114914-001 / MWL-FB4	O-XYLENE (95-47-6)	UJ, RP1
	114914-001 / MWL-FB4	STYRENE (100-42-5)	UJ, RP1
	114914-001 / MWL-FB4	TETRACHLOROETHENE (127-18-4)	UJ, RP1
	114914-001 / MWL-FB4	TOLUENE (108-88-3)	UJ, RP1
	114914-001 / MWL-FB4	TRANS-1,2-DICHLOROETHENE (156-60-5)	UJ, RP1
	114914-001 / MWL-FB4	TRANS-1,3-DICHLOROPROPENE (10061-02-6)	UJ, RP1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	114914-001 / MWL-FB4	TRICHLOROETHENE (79-01-6)	UJ, RP1
	114914-001 / MWL-FB4	TRICHLOROFLUOROMETHANE (75-69-4)	UJ, RP1
	114914-001 / MWL-FB4	VINYL ACETATE (108-05-4)	UJ, RP1
	114914-001 / MWL-FB4	VINYL CHLORIDE (75-01-4)	UJ, RP1
	114915-001 / MWL-SV04-50	2-BUTANONE (MEK) (78-93-3)	0.0029U, B2
	114915-001 / MWL-SV04-50	ACETONE (67-64-1)	0.015U, B2
	114915-001 / MWL-SV04-50	CARBON DISULFIDE (75-15-0)	0.0015U, B,B2
	114916-001 / MWL-SV04-100	CARBON DISULFIDE (75-15-0)	0.0025U, B,B2
	114916-001 / MWL-SV04-100	CHLOROBENZENE (108-90-7)	0.00099U, B,B2
	114917-001 / MWL-SV04-200	CARBON DISULFIDE (75-15-0)	0.0038U, B,B2
	114918-001 / MWL-SV04-300	CARBON DISULFIDE (75-15-0)	0.0039U, B,B2
	114919-001 / MWL-SV04-400	2-BUTANONE (MEK) (78-93-3)	0.0031U, B2
	114919-001 / MWL-SV04-400	ACETONE (67-64-1)	0.015U, B2
	114919-001 / MWL-SV04-400	CARBON DISULFIDE (75-15-0)	0.0015U, B,B2
	114919-001 / MWL-SV04-400	CHLOROBENZENE (108-90-7)	0.00061U, B,B2
	114920-001 / MWL-FB5	CARBON DISULFIDE (75-15-0)	0.002U, B
	114920-001 / MWL-FB5	CHLOROBENZENE (108-90-7)	0.00008U, B
	114921-001 / MWL-SV05-50	CARBON DISULFIDE (75-15-0)	0.0016U, B
	114924-001 / MWL-SV05-300	CARBON DISULFIDE (75-15-0)	0.0031U, B
	114925-001 / MWL-SV05-400	CARBON DISULFIDE (75-15-0)	0.003U, B

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

## Sandia Data Validation Summary Worksheet

ARCOG#: 622030, 622031, 622032, 622033 and 622034	Site/Project: MWL LTMMP	Validation Date: 06/18/2021
SDG #: 140-23051	Laboratory: Eurofins TestAmerica, Knoxville	Validator: Mary Donovan
Matrix: Air	# of Samples: 24	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: 05/06/2021

No custody seals.

Validated by:

*Mary A. Donovan*





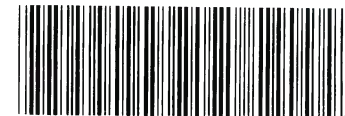
Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	Lab. REP RPD	FB5 -19	5X (10X)			
	Int.	RF/ Slope	RSD/ r <sup>2</sup>	(ICV)/CC V %D									
Batch 49841 (samples -2, -6 through -9, -9DU, -19)													
1,2-Dichloro-1,1,2,2-tetrafluoroethane	NA	✓	✓	+55	✓	NA	155	✓	✓	NA			
Bromomethane	NA	✓	✓	+43	✓	NA	143	✓	✓	NA			
Vinyl acetate	NA	✓	✓	-35	✓	NA	✓	✓	✓	NA			
4-Methyl-2-pentanone	NA	✓	✓	-36	✓	NA	✓	✓	✓	NA			
Hexachlorobutadiene	NA	✓	✓	+38	✓	NA	138	✓	✓	NA			
Carbon disulfide	NA	✓	✓	✓	0.0000146J	0.00007	✓	✓	0.000023J	0.00012			
Chlorobenzene	NA	✓	✓	✓	.00000899J	0.00004	✓	✓	0.0000077J	0.000039			
Methylene chloride	NA	✓	✓	✓	✓	NA	✓	✓	0.00059	(0.0059)			
Trichlorofluoromethane	NA	✓	✓	✓	✓	NA	✓	✓	0.000021J	0.00011			
Batch 49913 (samples -4, -10, -12 through -15, -15DU)													
1,2-Dichloro-1,1,2,2-tetrafluoroethane	NA	✓	✓	+62	✓	NA	162	✓					
Vinyl acetate	NA	✓	✓	-34	✓	NA	✓	✓					
4-Methyl-2-pentanone	NA	✓	✓	-34	✓	NA	✓	✓					
Hexachlorobutadiene	NA	✓	✓	+39	✓	NA	139	✓					
Carbon disulfide	NA	✓	✓	✓	.0000128J	.000064	✓	✓					
Chlorobenzene	NA	✓	✓	✓	.0000086J	.000043	✓	✓					
Batch 49973 (samples -10DL, -13DL -16 through -18, -20, -21, -23, -23DU, -24)													
1,2-Dichloro-1,1,2,2-tetrafluoroethane	NA	✓	✓	+70	✓	NA	170	✓					
Bromomethane	NA	✓	✓	+36	✓	NA	136	✓					
4-Methyl-2-pentanone	NA	✓	✓	-32	✓	NA	✓	✓					
Hexachlorobutadiene	NA	✓	✓	+48	✓	NA	148	✓					
Carbon disulfide	NA	✓	✓	✓	0.0000144J	.000072	✓	✓					
Batch 50024 (samples -22, -22DU)													
1,2-Dichloro-1,1,2,2-tetrafluoroethane	NA	✓	✓	+81	✓	NA	181	✓					
Bromoform	NA	✓	✓	+35	✓	NA	134	✓					
Bromomethane	NA	✓	✓	+61	✓	NA	161	✓					
4-Methyl-2-pentanone	NA	✓	✓	-38	✓	NA	✓	✓					
Hexachlorobutadiene	NA	✓	✓	+67	✓	NA	167	✓					
Vinyl acetate	NA	✓	✓	-36	✓	NA	✓	✓					
Vinyl chloride	NA	✓	✓	+34	✓	NA	134	✓					

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											
	CBM		DFBZ		ChI-d5						
Sample ID	Area	RT	Area	RT	Area	RT					
None											

Comments: HTs OK. LCS limits MWL 50-130%  
 ICAL MS 02/22/2021; All Avg,

Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by Eurofins TestAmerica Knoxville.  
 Canisters <RL for all target compounds.

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY



140-23051 Chain of Custody

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Internal Lab

Batch No. *N/A*

SMO Use

AR/COC **622030**

Project Name: MWL LTMMMP	Date Samples Shipped: <i>5/7/21</i>	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> <b>4° Celsius</b>
Project/Task Manager: Timmie Jackson	Carrier/Waybill No. <i>324897</i>	SMO Contact Phone: <i>[Signature]</i>	
Project/Task Number: 195122.10.11.08	Lab Contact: Jamie McKinney/865-291-3006	Wendy Palencia/505-844-3132	
Service Order: CF01-21	Lab Destination: TAKX	Send Report to SMO: Stephanie Montaño/505-284-2553	
Contract No.: 1636780			

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					
114902	001	MWL-FB1 34000184	NA	5/6/21 12:22	UPN	S	6 L	None	G	FB	VOC (TO-15)	
114903	001	MWL-SV01-42.5 34001308	42.5	5/6/21 12:47	SG	S	6 L	None	G	SA	VOC (TO-15)	

*Received @ ambient, 5 boxes  
Fedex G, No Custody seal  
Trk # 4412 3457 3367  
KW 5/11/21  
28cans, No flavor, 1 gauge*

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	Name	Signature	Init.	
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/08888/505-284-3307/505-239-7367
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/08888/505-844-4013/505-250-7090
	Zachary Tenorio	<i>[Signature]</i>	<i>ZT</i>	SNL/08888/505-845-8636/505-259-5765
Denisha Sanchez	<i>[Signature]</i>	<i>DS</i>		SNL/08888/505-845-7829/505-208-1375
Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			Return Samples By:	
Comments: Elevation and ambient pressure information provided on attached forms.				

Relinquished by <i>[Signature]</i>	Org. <i>8888</i>	Date <i>5/6/21</i>	Time <i>1455</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>0618</i>	Date <i>5/6/21</i>	Time <i>1455</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org. <i>0618</i>	Date <i>5/7/21</i>	Time <i>0830</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>ETA</i>	Date <i>5/11/21</i>	Time <i>1145</i>	Received by	Org.	Date	Time

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

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06/15/2021

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. <u>N/A</u>		SMO Use		AR/COC <b>622031</b>								
Project Name: MWL LTMMF		Date Samples Shipped: <u>5/7/21</u>		SMO Authorization: <u>[Signature]</u>								
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <u>329897</u>		SMO Contact Phone: <u>505-844-3132</u>								
Project/Task Number: 195122.10.11.08		Lab Contact: Jamie McKinney/865-291-3006		Send Report to SMO: <u>Stephanie Montaño/505-284-2553</u>								
Service Order: CF01-21		Lab Destination: TAKX		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius								
Contract No.: 1636780		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154										
Tech Area:		Operational Site:										
Building:		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
114904	001	MWL-FB2 10883	NA	5/6/21 12:20	UPN	S	6 L	None	G	FB	VOC (TO-15)	
114905	001	MWL-SV02-41.5 10375	41.5	5/6/21 12:38	SG	S	6 L	None	G	SA	VOC (TO-15)	
<p>Received @ ambient, 5 boxes          Fedex G, No Custody seal          Trk# 442, 3457 3367          KW 5/11/21          2 edw, 1 gage</p>												
Last Chain: <input type="checkbox"/> Yes			Sample Tracking			SMO Use			Special Instructions/QC Requirements:			Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes			Date Entered:			EDD <input checked="" type="checkbox"/> Yes			Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day			
Background: <input type="checkbox"/> Yes			Entered by:			Negotiated TAT <input type="checkbox"/>			Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			
Confirmatory: <input type="checkbox"/> Yes			QC initials:			Return Samples By:			Comments: Elevation and ambient pressure information provided on attached forms.			
Sample Team Members	Name		Signature		Init.	Company/Organization/Phone/Cell		Lab Use Relinquished by _____ Org. _____ Date _____ Time _____ Received by _____ Org. _____ Date _____ Time _____ Relinquished by _____ Org. _____ Date _____ Time _____ Received by _____ Org. _____ Date _____ Time _____				
	William Gibson		<u>[Signature]</u>		<u>WG</u>	SNL/08888/505-284-3307/505-239-7367						
	Robert Lynch		<u>[Signature]</u>		<u>RL</u>	SNL/08888/505-844-4013/505-250-7090						
	Zachary Tenorio		<u>[Signature]</u>		<u>ZT</u>	SNL/08888/505-845-8636/505-259-5765						
	Denisha Sanchez		<u>[Signature]</u>		<u>DS</u>	SNL/08888/505-845-7829/505-208-1375						

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

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06/15/2021



# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

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Batch No. <i>NA</i>		SMO Use		AR/COC <b>622032</b>								
Project Name: MWL LTMMMP		Date Samples Shipped: <i>5/7/2021</i>		SMO Authorization: <i>[Signature]</i>								
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>329897</i>		SMO Contact Phone: <i>[Signature]</i>								
Project/Task Number: 195122.10.11.08		Lab Contact: Jamie McKinney/865-291-3006		Wendy Palencia/505-844-3132								
Service Order: CF01-21		Lab Destination: TAKX		Send Report to SMO:								
		Contract No.: 1636780		Stephanie Montaño/505-284-2553								
Tech Area:				<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> <b>4° Celsius</b>								
Building:		Room:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154								
		Operational Site:										
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
114906	001	MWL-FB3 34000212	NA	5/6/21 09:55	UPN	S	6 L	None	G	FB	VOC (TO-15)	
114907	001	MWL-SV03-50 34000493	50	5/6/21 10:03	SG	S	6 L	None	G	SA	VOC (TO-15)	
114908	001	MWL-SV03-50 10635	50	5/6/21 10:03	SG	S	6 L	None	G	DU	VOC (TO-15)	
114909	001	MWL-SV03-100 34000888	100	5/6/21 10:08	SG	S	6 L	None	G	SA	VOC (TO-15)	
114910	001	MWL-SV03-200 09623	200	5/6/21 10:16	SG	S	6 L	None	G	SA	VOC (TO-15)	
114911	001	MWL-SV03-300 7959	300	5/6/21 10:25	SG	S	6 L	None	G	SA	VOC (TO-15)	
114912	001	MWL-SV03-400 11300	400	5/6/21 11:09	SG	S	6 L	None	G	SA	VOC (TO-15)	
114913	001	MWL-SV03-400 34002118	400	5/6/21 11:09	SG	S	6 L	None	G	DU	VOC (TO-15)	
Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD <input checked="" type="checkbox"/> Yes		Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day						
Background: <input type="checkbox"/> Yes		Entered by:		Negotiated TAT <input type="checkbox"/>		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab						
Confirmatory: <input type="checkbox"/> Yes		QC initials:		Return Samples By:		Comments: Elevation and ambient pressure information provided on attached forms.						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell								
	William Gibson	<i>[Signature]</i>	WJ	SNL/08888/505-284-3307/505-239-7367								
	Robert Lynch	<i>[Signature]</i>	RL	SNL/08888/505-844-4013/505-250-7090								
	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								
Relinquished by <i>[Signature]</i>		Org. <i>8888</i>	Date <i>5/6/21</i>	Time <i>1455</i>	Relinquished by		Org.	Date	Time			
Received by <i>[Signature]</i>		Org. <i>0618</i>	Date <i>5/6/21</i>	Time <i>1455</i>	Received by		Org.	Date	Time			
Relinquished by <i>[Signature]</i>		Org. <i>0618</i>	Date <i>5/7/21</i>	Time <i>0830</i>	Relinquished by		Org.	Date	Time			
Received by <i>[Signature]</i>		Org. <i>ETA</i>	Date <i>5/11/21</i>	Time <i>1145</i>	Received by		Org.	Date	Time			

Prior confirmation with SMO required for 7 and 15 day TAT

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

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Batch No. *N/A*

SMO Use

AR/COG **622033**

Project Name: MWL LTMMP		Date Samples Shipped: <i>5/7/21</i>		SMO Authorization: <i>[Signature]</i>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> <b>4° Celsius</b>	
Project/Task Manager: Timmie Jackson		Carrier/Waybill No: <i>329897</i>		SMO Contact Phone: Wendy Palencia/505-844-3132			
Project/Task Number: 195122.10.11.08		Lab Contact: Jamie McKinney/865-291-3006		Send Report to SMO: Stephanie Montaño/505-284-2553			
Service Order: CF01-21		Lab Destination: TAKX					
Contract No.: 1636780							
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		Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
114914	001	MWL-FB4 11060	NA	5/6/21 08:41	UPN	S	6 L	None	G	FB	VOC (TO-15)	
114915	001	MWL-SV04-50 11151	50	5/6/21 08:56	SG	S	6 L	None	G	SA	VOC (TO-15)	
114916	001	MWL-SV04-100 10716	100	5/6/21 09:12	SG	S	6 L	None	G	SA	VOC (TO-15)	
114917	001	MWL-SV04-200 11994	200	5/6/21 09:21	SG	S	6 L	None	G	SA	VOC (TO-15)	
114918	001	MWL-SV04-300 11159	300	5/6/21 09:34	SG	S	6 L	None	G	SA	VOC (TO-15)	
114919	001	MWL-SV04-400 12089	400	5/6/21 09:40	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 initials:		Negotiated TAT		<input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal		Lab Use
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/08888/505-284-3307/505-239-7367		<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:		
	Zachary Tenorio	<i>[Signature]</i>	<i>ZT</i>	SNL/08888/505-845-8636/505-259-5765		Comments: Elevation and ambient pressure information provided on attached forms.		
	Denisha Sanchez	<i>[Signature]</i>	<i>DS</i>	SNL/08888/505-845-7829/505-208-1375				

Relinquished by <i>[Signature]</i>	Org. <i>8888</i>	Date <i>5/6/21</i>	Time <i>1455</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>0818</i>	Date <i>5/6/21</i>	Time <i>1455</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org. <i>0818</i>	Date <i>5/7/21</i>	Time <i>0830</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>ETA</i>	Date <i>5/11/21</i>	Time <i>1145</i>	Received by	Org.	Date	Time

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

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# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

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Batch No. <u>N/A</u>		SMO Use		AR/COC <b>622034</b>								
Project Name: MWL LTMMP		Date Samples Shipped: <u>5/7/21</u>		SMO Authorization: <u>[Signature]</u>								
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <u>329897</u>		SMO Contact Phone: <u>Wendy Palencia/505-844-3132</u>								
Project/Task Number: 195122.10.11.08		Lab Contact: Jamie McKinney/865-291-3006		Send Report to SMO:								
Service Order: CF01-21		Lab Destination: TAKX		Stephanie Montaño/505-284-2553								
Contract No.: 1636780												
Tech Area:												
Building:		Operational Site:										
Room:												
Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154												
		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> <b>4° Celsius</b>										
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
114920	001	MWL-FB5 34000504	NA	5/6/21 11:34	UPN	S	6 L	None	G	FB	VOC (TO-15)	
114921	001	MWL-SV05-50 34000346	50	5/6/21 12:08	SG	S	6 L	None	G	SA	VOC (TO-15)	
114922	001	MWL-SV05-100 09530	100	5/6/21 12:09	SG	S	6 L	None	G	SA	VOC (TO-15)	
114923	001	MWL-SV05-200 12103	200	5/6/21 11:49	SG	S	6 L	None	G	SA	VOC (TO-15)	
114924	001	MWL-SV05-300 8195	300	5/6/21 11:59	SG	S	6 L	None	G	SA	VOC (TO-15)	
114925	001	MWL-SV05-400 7841	400	5/6/21 12:06	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 initials:				Negotiated TAT <input type="checkbox"/>						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal		Return Samples By:		Lab Use		
	William Gibson	<u>[Signature]</u>	<u>WG</u>	SNL/08888/505-284-3307/505-239-7367		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab						
	Robert Lynch	<u>[Signature]</u>	<u>RL</u>	SNL/08888/505-844-4013/505-250-7090								
	Zachary Tenorio	<u>[Signature]</u>	<u>ZT</u>	SNL/08888/505-845-8636/505-259-5765								
	Denisha Sanchez	<u>[Signature]</u>	<u>DS</u>	SNL/08888/505-845-7829/505-208-1375								
Relinquished by <u>[Signature]</u>		Org. <u>8888</u>	Date <u>5/6/21</u>	Time <u>1455</u>	Relinquished by		Org.	Date	Time			
Received by <u>[Signature]</u>		Org. <u>0618</u>	Date <u>5/6/21</u>	Time <u>1455</u>	Received by		Org.	Date	Time			
Relinquished by <u>[Signature]</u>		Org. <u>0618</u>	Date <u>5/7/21</u>	Time <u>0830</u>	Relinquished by		Org.	Date	Time			
Received by <u>[Signature]</u>		Org. <u>ETA</u>	Date <u>5/1/21</u>	Time <u>1145</u>	Received by		Org.	Date	Time			

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

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**Contract Verification Review Forms**  
**Mixed Waste Landfill Soil-Vapor Monitoring**  
**May 2021**

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.

<b>AR/COC Number</b>	<b>Sample Type</b>
622030	Environmental & Quality Control
622031	Environmental & Quality Control
622032	Environmental & Quality Control
622033	Environmental & Quality Control
622034	Environmental & Quality Control



## Contract Verification Form (CVR)

Project Leader JACKSON

Project Name MWL LTMMMP

Project/Task No. 195122\_10.11.08

ARCOC No. 622030, 622031, 622032, 622033 &amp; 622034

Analytical Lab TAKX

SDG No. 140-23051-1

*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	Several analytes failed recovery limits for LCS (batch 140-49778, 140-49841, 140-49913, 140-49973 and 140-50024)
	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	X		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		Carbon disulfide and chlorobenzene detected in method blank (batch 140-49841 and 140-49913). Carbon disulfide detected in method blank (140-49973).
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Carbon disulfide and tetrachloroethene detected in MWL-FB1. Acetone, benzene, 2-butanone, carbon disulfide and tetrachloroethene detected in MWL-FB2. Acetone, benzene, carbon disulfide and chlorobenzene detected in MWL-FB3. Acetone, 2-butanone, carbon disulfide and chlorobenzene detected in MWL-FB4. Carbon disulfide, chlorobenzene, methylene chloride and trichlorofluoromethane detected in MWL-FB5.
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		Several CCV analytes outside acceptance limits for batch 140-49778, 140-49841, 140-49913 batch 140-50024
	d) Internal standard performance data provided	X		

Line No.	Item	Yes	No	Comments
	e) Instrument run logs provided	X		
4.2	GC/HPLC (8330, 8082, 9070A, and 8010) a) Initial calibration provided	N/A		
	b) Continuing calibration provided	N/A		
	c) Instrument run logs provided	N/A		
4.3	HRGC/HRMS (1668 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		

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

## 5.0 Data Anomaly Report

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

## 6.0 Problem Resolution

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

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions
114918-001	TO-15	2 sets of results reported on COA

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: 06-11-2021

Reviewed by: Wendy Palencia Date: 06-11-2021 09:39:00

Were resolutions adequate and data package complete? ☒ Yes ☐ No

Closed by: Wendy Palencia Date: 06-17-2021 07:15:00

## **Certificates of Analysis**

### **Mixed Waste Landfill**

### **May 2021 Soil-Vapor Samples**

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114902-001 / MWL-FB1

Lab Sample ID: 140-23051-1

Date Collected: 05/06/21 12:22

Matrix: Air

Date Received: 05/11/21 11:45

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		0.0021	0.00058	ppm v/v			05/14/21 22:01	1.64
Benzene	ND		0.000082	0.0000082	ppm v/v			05/14/21 22:01	1.64
Benzyl chloride	ND		0.00016	0.000039	ppm v/v			05/14/21 22:01	1.64
Bromodichloromethane	ND		0.000082	0.000018	ppm v/v			05/14/21 22:01	1.64
Bromoform	ND		0.000082	0.0000092	ppm v/v			05/14/21 22:01	1.64
Bromomethane	ND		0.000082	0.000023	ppm v/v			05/14/21 22:01	1.64
2-Butanone (MEK)	ND		0.00041	0.000075	ppm v/v			05/14/21 22:01	1.64
Carbon disulfide	0.000035	J	0.00021	0.000011	ppm v/v			05/14/21 22:01	1.64
Carbon tetrachloride	ND		0.000082	0.0000072	ppm v/v			05/14/21 22:01	1.64
Chlorobenzene	ND		0.000082	0.0000062	ppm v/v			05/14/21 22:01	1.64
Chloroethane	ND		0.000082	0.000030	ppm v/v			05/14/21 22:01	1.64
Chloroform	ND		0.000082	0.0000072	ppm v/v			05/14/21 22:01	1.64
Chloromethane	ND		0.00021	0.000068	ppm v/v			05/14/21 22:01	1.64
Dibromochloromethane	ND		0.000082	0.0000072	ppm v/v			05/14/21 22:01	1.64
1,2-Dibromoethane (EDB)	ND		0.000082	0.0000072	ppm v/v			05/14/21 22:01	1.64
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.000082	0.000012	ppm v/v			05/14/21 22:01	1.64
1,2-Dichlorobenzene	ND		0.000082	0.000032	ppm v/v			05/14/21 22:01	1.64
1,3-Dichlorobenzene	ND		0.000082	0.000016	ppm v/v			05/14/21 22:01	1.64
1,4-Dichlorobenzene	ND		0.000082	0.000016	ppm v/v			05/14/21 22:01	1.64
Dichlorodifluoromethane	ND		0.000082	0.000014	ppm v/v			05/14/21 22:01	1.64
1,1-Dichloroethane	ND		0.000082	0.0000072	ppm v/v			05/14/21 22:01	1.64
1,2-Dichloroethane	ND		0.000082	0.000010	ppm v/v			05/14/21 22:01	1.64
1,1-Dichloroethene	ND		0.000082	0.0000082	ppm v/v			05/14/21 22:01	1.64
cis-1,2-Dichloroethene	ND		0.000082	0.000010	ppm v/v			05/14/21 22:01	1.64
trans-1,2-Dichloroethene	ND		0.000082	0.0000072	ppm v/v			05/14/21 22:01	1.64
1,2-Dichloropropane	ND		0.000082	0.000010	ppm v/v			05/14/21 22:01	1.64
cis-1,3-Dichloropropene	ND		0.000082	0.000016	ppm v/v			05/14/21 22:01	1.64
trans-1,3-Dichloropropene	ND		0.000082	0.0000092	ppm v/v			05/14/21 22:01	1.64
Ethylbenzene	ND		0.000082	0.000013	ppm v/v			05/14/21 22:01	1.64
4-Ethyltoluene	ND		0.00016	0.000022	ppm v/v			05/14/21 22:01	1.64
Hexachlorobutadiene	ND		0.00041	0.000033	ppm v/v			05/14/21 22:01	1.64
2-Hexanone	ND		0.00021	0.000016	ppm v/v			05/14/21 22:01	1.64
4-Methyl-2-pentanone (MIBK)	ND		0.00021	0.000055	ppm v/v			05/14/21 22:01	1.64
Methylene Chloride	ND		0.00041	0.000040	ppm v/v			05/14/21 22:01	1.64
Styrene	ND		0.000082	0.000025	ppm v/v			05/14/21 22:01	1.64
1,1,2,2-Tetrachloroethane	ND		0.000082	0.000014	ppm v/v			05/14/21 22:01	1.64
Tetrachloroethene	0.000021	J	0.000082	0.0000072	ppm v/v			05/14/21 22:01	1.64
Toluene	ND		0.00012	0.000080	ppm v/v			05/14/21 22:01	1.64
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.000082	0.0000082	ppm v/v			05/14/21 22:01	1.64
1,2,4-Trichlorobenzene	ND		0.00041	0.000066	ppm v/v			05/14/21 22:01	1.64
1,1,1-Trichloroethane	ND		0.000082	0.000038	ppm v/v			05/14/21 22:01	1.64
1,1,2-Trichloroethane	ND		0.000082	0.0000072	ppm v/v			05/14/21 22:01	1.64
Trichloroethene	ND		0.000041	0.000013	ppm v/v			05/14/21 22:01	1.64
Trichlorofluoromethane	ND		0.000082	0.000011	ppm v/v			05/14/21 22:01	1.64
1,2,4-Trimethylbenzene	ND		0.000082	0.000021	ppm v/v			05/14/21 22:01	1.64
1,3,5-Trimethylbenzene	ND		0.000082	0.000023	ppm v/v			05/14/21 22:01	1.64
Vinyl acetate	ND		0.00041	0.000029	ppm v/v			05/14/21 22:01	1.64
Vinyl chloride	ND		0.000041	0.000027	ppm v/v			05/14/21 22:01	1.64

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

**Client Sample ID: 114902-001 / MWL-FB1**

**Lab Sample ID: 140-23051-1**

**Date Collected: 05/06/21 12:22**

**Matrix: Air**

**Date Received: 05/11/21 11:45**

**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		0.000082	0.000030	ppm v/v			05/14/21 22:01	1.64
o-Xylene	ND		0.000082	0.000015	ppm v/v			05/14/21 22:01	1.64
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		60 - 140					05/14/21 22:01	1.64

**Client Sample ID: 114903-001 / MWL-SV01-42.5**

**Lab Sample ID: 140-23051-2**

**Date Collected: 05/06/21 12:47**

**Matrix: Air**

**Date Received: 05/11/21 11:45**

**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		0.10	0.030	ppm v/v			05/18/21 16:20	1.56
Benzene	ND		0.0042	0.00042	ppm v/v			05/18/21 16:20	1.56
Benzyl chloride	ND		0.0083	0.0020	ppm v/v			05/18/21 16:20	1.56
Bromodichloromethane	ND		0.0042	0.00094	ppm v/v			05/18/21 16:20	1.56
Bromoform	ND		0.0042	0.00047	ppm v/v			05/18/21 16:20	1.56
Bromomethane	ND	*+	0.0042	0.0011	ppm v/v			05/18/21 16:20	1.56
2-Butanone (MEK)	ND		0.021	0.0038	ppm v/v			05/18/21 16:20	1.56
Carbon disulfide	0.0012	J B	0.010	0.00057	ppm v/v			05/18/21 16:20	1.56
Carbon tetrachloride	ND		0.0042	0.00036	ppm v/v			05/18/21 16:20	1.56
Chlorobenzene	ND		0.0042	0.00031	ppm v/v			05/18/21 16:20	1.56
Chloroethane	ND		0.0042	0.0015	ppm v/v			05/18/21 16:20	1.56
Chloroform	0.010		0.0042	0.00036	ppm v/v			05/18/21 16:20	1.56
Chloromethane	ND		0.010	0.0034	ppm v/v			05/18/21 16:20	1.56
Dibromochloromethane	ND		0.0042	0.00036	ppm v/v			05/18/21 16:20	1.56
1,2-Dibromoethane (EDB)	ND		0.0042	0.00036	ppm v/v			05/18/21 16:20	1.56
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.0042	0.00062	ppm v/v			05/18/21 16:20	1.56
1,2-Dichlorobenzene	ND		0.0042	0.0016	ppm v/v			05/18/21 16:20	1.56
1,3-Dichlorobenzene	ND		0.0042	0.00083	ppm v/v			05/18/21 16:20	1.56
1,4-Dichlorobenzene	ND		0.0042	0.00083	ppm v/v			05/18/21 16:20	1.56
Dichlorodifluoromethane	0.067		0.0042	0.00073	ppm v/v			05/18/21 16:20	1.56
1,1-Dichloroethane	0.0015	J	0.0042	0.00036	ppm v/v			05/18/21 16:20	1.56
1,2-Dichloroethane	ND		0.0042	0.00052	ppm v/v			05/18/21 16:20	1.56
1,1-Dichloroethene	0.0045		0.0042	0.00042	ppm v/v			05/18/21 16:20	1.56
cis-1,2-Dichloroethene	0.00083	J	0.0042	0.00052	ppm v/v			05/18/21 16:20	1.56
trans-1,2-Dichloroethene	ND		0.0042	0.00036	ppm v/v			05/18/21 16:20	1.56
1,2-Dichloropropane	ND		0.0042	0.00052	ppm v/v			05/18/21 16:20	1.56
cis-1,3-Dichloropropene	ND		0.0042	0.00083	ppm v/v			05/18/21 16:20	1.56
trans-1,3-Dichloropropene	ND		0.0042	0.00047	ppm v/v			05/18/21 16:20	1.56
Ethylbenzene	ND		0.0042	0.00068	ppm v/v			05/18/21 16:20	1.56
4-Ethyltoluene	ND		0.0083	0.0011	ppm v/v			05/18/21 16:20	1.56
Hexachlorobutadiene	ND		0.021	0.0017	ppm v/v			05/18/21 16:20	1.56
2-Hexanone	ND		0.010	0.00083	ppm v/v			05/18/21 16:20	1.56
4-Methyl-2-pentanone (MIBK)	ND		0.010	0.0028	ppm v/v			05/18/21 16:20	1.56
Methylene Chloride	ND		0.021	0.020	ppm v/v			05/18/21 16:20	1.56
Styrene	ND		0.0042	0.0012	ppm v/v			05/18/21 16:20	1.56
1,1,2,2-Tetrachloroethane	ND		0.0042	0.00073	ppm v/v			05/18/21 16:20	1.56

Eurofins TestAmerica, Knoxville



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114903-001 / MWL-SV01-42.5

Lab Sample ID: 140-23051-2

Date Collected: 05/06/21 12:47

Matrix: Air

Date Received: 05/11/21 11:45

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	0.26		0.0042	0.00036	ppm v/v			05/18/21 16:20	1.56
Toluene	ND		0.0062	0.0041	ppm v/v			05/18/21 16:20	1.56
1,1,2-Trichloro-1,2,2-trifluoroethane	0.048		0.0042	0.00042	ppm v/v			05/18/21 16:20	1.56
1,2,4-Trichlorobenzene	ND		0.021	0.0033	ppm v/v			05/18/21 16:20	1.56
1,1,1-Trichloroethane	0.017		0.0042	0.0019	ppm v/v			05/18/21 16:20	1.56
1,1,2-Trichloroethane	ND		0.0042	0.00036	ppm v/v			05/18/21 16:20	1.56
Trichloroethene	0.057		0.0021	0.00068	ppm v/v			05/18/21 16:20	1.56
Trichlorofluoromethane	0.12		0.0042	0.00057	ppm v/v			05/18/21 16:20	1.56
1,2,4-Trimethylbenzene	ND		0.0042	0.0010	ppm v/v			05/18/21 16:20	1.56
1,3,5-Trimethylbenzene	ND		0.0042	0.0011	ppm v/v			05/18/21 16:20	1.56
Vinyl acetate	ND		0.021	0.0015	ppm v/v			05/18/21 16:20	1.56
Vinyl chloride	ND		0.0021	0.0014	ppm v/v			05/18/21 16:20	1.56
m,p-Xylene	ND		0.0042	0.0015	ppm v/v			05/18/21 16:20	1.56
o-Xylene	ND		0.0042	0.00078	ppm v/v			05/18/21 16:20	1.56
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		60 - 140					05/18/21 16:20	1.56

Client Sample ID: 114904-001 / MWL-FB2

Lab Sample ID: 140-23051-3

Date Collected: 05/06/21 12:20

Matrix: Air

Date Received: 05/11/21 11:45

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	0.0011	J	0.0020	0.00057	ppm v/v			05/14/21 22:55	1.57
Benzene	0.000087	J	0.000080	0.0000080	ppm v/v			05/14/21 22:55	1.57
Benzyl chloride	ND		0.00016	0.000038	ppm v/v			05/14/21 22:55	1.57
Bromodichloromethane	ND		0.000080	0.000018	ppm v/v			05/14/21 22:55	1.57
Bromoform	ND		0.000080	0.0000090	ppm v/v			05/14/21 22:55	1.57
Bromomethane	ND		0.000080	0.000022	ppm v/v			05/14/21 22:55	1.57
2-Butanone (MEK)	0.00016	J	0.00040	0.000073	ppm v/v			05/14/21 22:55	1.57
Carbon disulfide	0.000017	J	0.00020	0.000011	ppm v/v			05/14/21 22:55	1.57
Carbon tetrachloride	ND		0.000080	0.0000070	ppm v/v			05/14/21 22:55	1.57
Chlorobenzene	ND		0.000080	0.0000060	ppm v/v			05/14/21 22:55	1.57
Chloroethane	ND		0.000080	0.000029	ppm v/v			05/14/21 22:55	1.57
Chloroform	ND		0.000080	0.0000070	ppm v/v			05/14/21 22:55	1.57
Chloromethane	ND		0.00020	0.000066	ppm v/v			05/14/21 22:55	1.57
Dibromochloromethane	ND		0.000080	0.0000070	ppm v/v			05/14/21 22:55	1.57
1,2-Dibromoethane (EDB)	ND		0.000080	0.0000070	ppm v/v			05/14/21 22:55	1.57
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.000080	0.000012	ppm v/v			05/14/21 22:55	1.57
1,2-Dichlorobenzene	ND		0.000080	0.000031	ppm v/v			05/14/21 22:55	1.57
1,3-Dichlorobenzene	ND		0.000080	0.000016	ppm v/v			05/14/21 22:55	1.57
1,4-Dichlorobenzene	ND		0.000080	0.000016	ppm v/v			05/14/21 22:55	1.57
Dichlorodifluoromethane	ND		0.000080	0.000014	ppm v/v			05/14/21 22:55	1.57
1,1-Dichloroethane	ND		0.000080	0.0000070	ppm v/v			05/14/21 22:55	1.57
1,2-Dichloroethane	ND		0.000080	0.000010	ppm v/v			05/14/21 22:55	1.57
1,1-Dichloroethene	ND		0.000080	0.0000080	ppm v/v			05/14/21 22:55	1.57

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

**Client Sample ID: 114904-001 / MWL-FB2**

**Lab Sample ID: 140-23051-3**

**Date Collected: 05/06/21 12:20**

**Matrix: Air**

**Date Received: 05/11/21 11:45**

**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		0.000080	0.000010	ppm v/v			05/14/21 22:55	1.57
trans-1,2-Dichloroethene	ND		0.000080	0.0000070	ppm v/v			05/14/21 22:55	1.57
1,2-Dichloropropane	ND		0.000080	0.000010	ppm v/v			05/14/21 22:55	1.57
cis-1,3-Dichloropropene	ND		0.000080	0.000016	ppm v/v			05/14/21 22:55	1.57
trans-1,3-Dichloropropene	ND		0.000080	0.0000090	ppm v/v			05/14/21 22:55	1.57
Ethylbenzene	ND		0.000080	0.000013	ppm v/v			05/14/21 22:55	1.57
4-Ethyltoluene	ND		0.00016	0.000021	ppm v/v			05/14/21 22:55	1.57
Hexachlorobutadiene	ND		0.00040	0.000032	ppm v/v			05/14/21 22:55	1.57
2-Hexanone	ND		0.00020	0.000016	ppm v/v			05/14/21 22:55	1.57
4-Methyl-2-pentanone (MIBK)	ND		0.00020	0.000054	ppm v/v			05/14/21 22:55	1.57
Methylene Chloride	ND		0.00040	0.00039	ppm v/v			05/14/21 22:55	1.57
Styrene	ND		0.000080	0.000024	ppm v/v			05/14/21 22:55	1.57
1,1,2,2-Tetrachloroethane	ND		0.000080	0.000014	ppm v/v			05/14/21 22:55	1.57
<b>Tetrachloroethene</b>	<b>0.0000075</b>	<b>J</b>	0.000080	0.0000070	ppm v/v			05/14/21 22:55	1.57
Toluene	ND		0.00012	0.000078	ppm v/v			05/14/21 22:55	1.57
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.000080	0.0000080	ppm v/v			05/14/21 22:55	1.57
1,2,4-Trichlorobenzene	ND		0.00040	0.000064	ppm v/v			05/14/21 22:55	1.57
1,1,1-Trichloroethane	ND		0.000080	0.000037	ppm v/v			05/14/21 22:55	1.57
1,1,2-Trichloroethane	ND		0.000080	0.0000070	ppm v/v			05/14/21 22:55	1.57
Trichloroethene	ND		0.000040	0.000013	ppm v/v			05/14/21 22:55	1.57
Trichlorofluoromethane	ND		0.000080	0.000011	ppm v/v			05/14/21 22:55	1.57
1,2,4-Trimethylbenzene	ND		0.000080	0.000020	ppm v/v			05/14/21 22:55	1.57
1,3,5-Trimethylbenzene	ND		0.000080	0.000022	ppm v/v			05/14/21 22:55	1.57
Vinyl acetate	ND		0.00040	0.000028	ppm v/v			05/14/21 22:55	1.57
Vinyl chloride	ND		0.000040	0.000026	ppm v/v			05/14/21 22:55	1.57
m,p-Xylene	ND		0.000080	0.000029	ppm v/v			05/14/21 22:55	1.57
o-Xylene	ND		0.000080	0.000015	ppm v/v			05/14/21 22:55	1.57
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	89		60 - 140					05/14/21 22:55	1.57

**Client Sample ID: 114905-001 / MWL-SV02-41.5**

**Lab Sample ID: 140-23051-4**

**Date Collected: 05/06/21 12:38**

**Matrix: Air**

**Date Received: 05/11/21 11:45**

**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
<b>Acetone</b>	<b>0.029</b>	<b>J</b>	0.079	0.022	ppm v/v			05/20/21 00:34	1.57
<b>Benzene</b>	<b>0.00036</b>	<b>J</b>	0.0031	0.00031	ppm v/v			05/20/21 00:34	1.57
Benzyl chloride	ND		0.0063	0.0015	ppm v/v			05/20/21 00:34	1.57
Bromodichloromethane	ND		0.0031	0.00071	ppm v/v			05/20/21 00:34	1.57
Bromoform	ND		0.0031	0.00035	ppm v/v			05/20/21 00:34	1.57
Bromomethane	ND		0.0031	0.00086	ppm v/v			05/20/21 00:34	1.57
<b>2-Butanone (MEK)</b>	<b>0.0074</b>	<b>J</b>	0.016	0.0029	ppm v/v			05/20/21 00:34	1.57
<b>Carbon disulfide</b>	<b>0.0018</b>	<b>J B</b>	0.0079	0.00043	ppm v/v			05/20/21 00:34	1.57
Carbon tetrachloride	ND		0.0031	0.00027	ppm v/v			05/20/21 00:34	1.57
Chlorobenzene	ND		0.0031	0.00024	ppm v/v			05/20/21 00:34	1.57
Chloroethane	ND		0.0031	0.0011	ppm v/v			05/20/21 00:34	1.57

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114905-001 / MWL-SV02-41.5

Lab Sample ID: 140-23051-4

Date Collected: 05/06/21 12:38

Matrix: Air

Date Received: 05/11/21 11:45

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
<b>Chloroform</b>	<b>0.0021</b>	<b>J</b>	0.0031	0.00027	ppm v/v			05/20/21 00:34	1.57
Chloromethane	ND		0.0079	0.0026	ppm v/v			05/20/21 00:34	1.57
Dibromochloromethane	ND		0.0031	0.00027	ppm v/v			05/20/21 00:34	1.57
1,2-Dibromoethane (EDB)	ND		0.0031	0.00027	ppm v/v			05/20/21 00:34	1.57
<b>1,2-Dichloro-1,1,2,2-tetrafluoroethane</b>	<b>0.00058</b>	<b>J *+</b>	0.0031	0.00047	ppm v/v			05/20/21 00:34	1.57
1,2-Dichlorobenzene	ND		0.0031	0.0012	ppm v/v			05/20/21 00:34	1.57
1,3-Dichlorobenzene	ND		0.0031	0.00063	ppm v/v			05/20/21 00:34	1.57
1,4-Dichlorobenzene	ND		0.0031	0.00063	ppm v/v			05/20/21 00:34	1.57
<b>Dichlorodifluoromethane</b>	<b>0.082</b>		0.0031	0.00055	ppm v/v			05/20/21 00:34	1.57
<b>1,1-Dichloroethane</b>	<b>0.0015</b>	<b>J</b>	0.0031	0.00027	ppm v/v			05/20/21 00:34	1.57
1,2-Dichloroethane	ND		0.0031	0.00039	ppm v/v			05/20/21 00:34	1.57
<b>1,1-Dichloroethene</b>	<b>0.0067</b>		0.0031	0.00031	ppm v/v			05/20/21 00:34	1.57
<b>cis-1,2-Dichloroethene</b>	<b>0.00056</b>	<b>J</b>	0.0031	0.00039	ppm v/v			05/20/21 00:34	1.57
trans-1,2-Dichloroethene	ND		0.0031	0.00027	ppm v/v			05/20/21 00:34	1.57
1,2-Dichloropropane	ND		0.0031	0.00039	ppm v/v			05/20/21 00:34	1.57
cis-1,3-Dichloropropene	ND		0.0031	0.00063	ppm v/v			05/20/21 00:34	1.57
trans-1,3-Dichloropropene	ND		0.0031	0.00035	ppm v/v			05/20/21 00:34	1.57
Ethylbenzene	ND		0.0031	0.00051	ppm v/v			05/20/21 00:34	1.57
4-Ethyltoluene	ND		0.0063	0.00082	ppm v/v			05/20/21 00:34	1.57
Hexachlorobutadiene	ND		0.016	0.0013	ppm v/v			05/20/21 00:34	1.57
2-Hexanone	ND		0.0079	0.00063	ppm v/v			05/20/21 00:34	1.57
4-Methyl-2-pentanone (MIBK)	ND		0.0079	0.0021	ppm v/v			05/20/21 00:34	1.57
Methylene Chloride	ND		0.016	0.015	ppm v/v			05/20/21 00:34	1.57
Styrene	ND		0.0031	0.00094	ppm v/v			05/20/21 00:34	1.57
1,1,2,2-Tetrachloroethane	ND		0.0031	0.00055	ppm v/v			05/20/21 00:34	1.57
<b>Tetrachloroethene</b>	<b>0.048</b>		0.0031	0.00027	ppm v/v			05/20/21 00:34	1.57
Toluene	ND		0.0047	0.0031	ppm v/v			05/20/21 00:34	1.57
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.035</b>		0.0031	0.00031	ppm v/v			05/20/21 00:34	1.57
1,2,4-Trichlorobenzene	ND		0.016	0.0025	ppm v/v			05/20/21 00:34	1.57
<b>1,1,1-Trichloroethane</b>	<b>0.038</b>		0.0031	0.0015	ppm v/v			05/20/21 00:34	1.57
1,1,2-Trichloroethane	ND		0.0031	0.00027	ppm v/v			05/20/21 00:34	1.57
<b>Trichloroethene</b>	<b>0.044</b>		0.0016	0.00051	ppm v/v			05/20/21 00:34	1.57
<b>Trichlorofluoromethane</b>	<b>0.26</b>		0.0031	0.00043	ppm v/v			05/20/21 00:34	1.57
1,2,4-Trimethylbenzene	ND		0.0031	0.00079	ppm v/v			05/20/21 00:34	1.57
1,3,5-Trimethylbenzene	ND		0.0031	0.00086	ppm v/v			05/20/21 00:34	1.57
Vinyl acetate	ND		0.016	0.0011	ppm v/v			05/20/21 00:34	1.57
Vinyl chloride	ND		0.0016	0.0010	ppm v/v			05/20/21 00:34	1.57
m,p-Xylene	ND		0.0031	0.0011	ppm v/v			05/20/21 00:34	1.57
o-Xylene	ND		0.0031	0.00059	ppm v/v			05/20/21 00:34	1.57

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		60 - 140		05/20/21 00:34	1.57

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

**Client Sample ID: 114914-001 / MWL-FB4**

**Lab Sample ID: 140-23051-5**

**Date Collected: 05/06/21 08:41**

**Matrix: Air**

**Date Received: 05/11/21 11:45**

**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	0.0018	J	0.0020	0.00057	ppm v/v			05/14/21 23:47	1.49
Benzene	ND		0.000080	0.0000080	ppm v/v			05/14/21 23:47	1.49
Benzyl chloride	ND		0.00016	0.000038	ppm v/v			05/14/21 23:47	1.49
Bromodichloromethane	ND		0.000080	0.000018	ppm v/v			05/14/21 23:47	1.49
Bromoform	ND		0.000080	0.0000090	ppm v/v			05/14/21 23:47	1.49
Bromomethane	ND		0.000080	0.000022	ppm v/v			05/14/21 23:47	1.49
2-Butanone (MEK)	0.00019	J	0.00040	0.000073	ppm v/v			05/14/21 23:47	1.49
Carbon disulfide	0.000018	J	0.00020	0.000011	ppm v/v			05/14/21 23:47	1.49
Carbon tetrachloride	ND		0.000080	0.0000070	ppm v/v			05/14/21 23:47	1.49
Chlorobenzene	0.000010	J	0.000080	0.0000060	ppm v/v			05/14/21 23:47	1.49
Chloroethane	ND		0.000080	0.000029	ppm v/v			05/14/21 23:47	1.49
Chloroform	ND		0.000080	0.0000070	ppm v/v			05/14/21 23:47	1.49
Chloromethane	ND		0.00020	0.000066	ppm v/v			05/14/21 23:47	1.49
Dibromochloromethane	ND		0.000080	0.0000070	ppm v/v			05/14/21 23:47	1.49
1,2-Dibromoethane (EDB)	ND		0.000080	0.0000070	ppm v/v			05/14/21 23:47	1.49
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.000080	0.000012	ppm v/v			05/14/21 23:47	1.49
1,2-Dichlorobenzene	ND		0.000080	0.000031	ppm v/v			05/14/21 23:47	1.49
1,3-Dichlorobenzene	ND		0.000080	0.000016	ppm v/v			05/14/21 23:47	1.49
1,4-Dichlorobenzene	ND		0.000080	0.000016	ppm v/v			05/14/21 23:47	1.49
Dichlorodifluoromethane	ND		0.000080	0.000014	ppm v/v			05/14/21 23:47	1.49
1,1-Dichloroethane	ND		0.000080	0.0000070	ppm v/v			05/14/21 23:47	1.49
1,2-Dichloroethane	ND		0.000080	0.000010	ppm v/v			05/14/21 23:47	1.49
1,1-Dichloroethene	ND		0.000080	0.0000080	ppm v/v			05/14/21 23:47	1.49
cis-1,2-Dichloroethene	ND		0.000080	0.000010	ppm v/v			05/14/21 23:47	1.49
trans-1,2-Dichloroethene	ND		0.000080	0.0000070	ppm v/v			05/14/21 23:47	1.49
1,2-Dichloropropane	ND		0.000080	0.000010	ppm v/v			05/14/21 23:47	1.49
cis-1,3-Dichloropropene	ND		0.000080	0.000016	ppm v/v			05/14/21 23:47	1.49
trans-1,3-Dichloropropene	ND		0.000080	0.0000090	ppm v/v			05/14/21 23:47	1.49
Ethylbenzene	ND		0.000080	0.000013	ppm v/v			05/14/21 23:47	1.49
4-Ethyltoluene	ND		0.00016	0.000021	ppm v/v			05/14/21 23:47	1.49
Hexachlorobutadiene	ND		0.00040	0.000032	ppm v/v			05/14/21 23:47	1.49
2-Hexanone	ND		0.00020	0.000016	ppm v/v			05/14/21 23:47	1.49
4-Methyl-2-pentanone (MIBK)	ND		0.00020	0.000054	ppm v/v			05/14/21 23:47	1.49
Methylene Chloride	ND		0.00040	0.00039	ppm v/v			05/14/21 23:47	1.49
Styrene	ND		0.000080	0.000024	ppm v/v			05/14/21 23:47	1.49
1,1,2,2-Tetrachloroethane	ND		0.000080	0.000014	ppm v/v			05/14/21 23:47	1.49
Tetrachloroethene	ND		0.000080	0.0000070	ppm v/v			05/14/21 23:47	1.49
Toluene	ND		0.00012	0.000078	ppm v/v			05/14/21 23:47	1.49
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.000080	0.0000080	ppm v/v			05/14/21 23:47	1.49
1,2,4-Trichlorobenzene	ND		0.00040	0.000064	ppm v/v			05/14/21 23:47	1.49
1,1,1-Trichloroethane	ND		0.000080	0.000037	ppm v/v			05/14/21 23:47	1.49
1,1,2-Trichloroethane	ND		0.000080	0.0000070	ppm v/v			05/14/21 23:47	1.49
Trichloroethene	ND		0.000040	0.000013	ppm v/v			05/14/21 23:47	1.49
Trichlorofluoromethane	ND		0.000080	0.000011	ppm v/v			05/14/21 23:47	1.49
1,2,4-Trimethylbenzene	ND		0.000080	0.000020	ppm v/v			05/14/21 23:47	1.49
1,3,5-Trimethylbenzene	ND		0.000080	0.000022	ppm v/v			05/14/21 23:47	1.49
Vinyl acetate	ND		0.00040	0.000028	ppm v/v			05/14/21 23:47	1.49
Vinyl chloride	ND		0.000040	0.000026	ppm v/v			05/14/21 23:47	1.49

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

**Client Sample ID: 114914-001 / MWL-FB4**

**Lab Sample ID: 140-23051-5**

**Date Collected: 05/06/21 08:41**

**Matrix: Air**

**Date Received: 05/11/21 11:45**

**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		0.000080	0.000029	ppm v/v			05/14/21 23:47	1.49
o-Xylene	ND		0.000080	0.000015	ppm v/v			05/14/21 23:47	1.49
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		60 - 140					05/14/21 23:47	1.49

**Client Sample ID: 114915-001 / MWL-SV04-50**

**Lab Sample ID: 140-23051-6**

**Date Collected: 05/06/21 08:56**

**Matrix: Air**

**Date Received: 05/11/21 11:45**

**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	0.0044	J	0.015	0.0041	ppm v/v			05/18/21 17:53	1.45
Benzene	0.00024	J	0.00058	0.000058	ppm v/v			05/18/21 17:53	1.45
Benzyl chloride	ND		0.0012	0.00028	ppm v/v			05/18/21 17:53	1.45
Bromodichloromethane	ND		0.00058	0.00013	ppm v/v			05/18/21 17:53	1.45
Bromoform	ND		0.00058	0.000065	ppm v/v			05/18/21 17:53	1.45
Bromomethane	ND	*+	0.00058	0.00016	ppm v/v			05/18/21 17:53	1.45
2-Butanone (MEK)	0.00068	J	0.0029	0.00053	ppm v/v			05/18/21 17:53	1.45
Carbon disulfide	0.00015	J B	0.0015	0.000080	ppm v/v			05/18/21 17:53	1.45
Carbon tetrachloride	0.00015	J	0.00058	0.000051	ppm v/v			05/18/21 17:53	1.45
Chlorobenzene	ND		0.00058	0.000044	ppm v/v			05/18/21 17:53	1.45
Chloroethane	ND		0.00058	0.00021	ppm v/v			05/18/21 17:53	1.45
Chloroform	0.0014		0.00058	0.000051	ppm v/v			05/18/21 17:53	1.45
Chloromethane	ND		0.0015	0.00048	ppm v/v			05/18/21 17:53	1.45
Dibromochloromethane	ND		0.00058	0.000051	ppm v/v			05/18/21 17:53	1.45
1,2-Dibromoethane (EDB)	ND		0.00058	0.000051	ppm v/v			05/18/21 17:53	1.45
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.00058	0.000087	ppm v/v			05/18/21 17:53	1.45
1,2-Dichlorobenzene	ND		0.00058	0.00022	ppm v/v			05/18/21 17:53	1.45
1,3-Dichlorobenzene	ND		0.00058	0.00012	ppm v/v			05/18/21 17:53	1.45
1,4-Dichlorobenzene	ND		0.00058	0.00012	ppm v/v			05/18/21 17:53	1.45
Dichlorodifluoromethane	0.015		0.00058	0.00010	ppm v/v			05/18/21 17:53	1.45
1,1-Dichloroethane	0.00097		0.00058	0.000051	ppm v/v			05/18/21 17:53	1.45
1,2-Dichloroethane	ND		0.00058	0.000073	ppm v/v			05/18/21 17:53	1.45
1,1-Dichloroethene	0.0046		0.00058	0.000058	ppm v/v			05/18/21 17:53	1.45
cis-1,2-Dichloroethene	0.00041	J	0.00058	0.000073	ppm v/v			05/18/21 17:53	1.45
trans-1,2-Dichloroethene	ND		0.00058	0.000051	ppm v/v			05/18/21 17:53	1.45
1,2-Dichloropropane	ND		0.00058	0.000073	ppm v/v			05/18/21 17:53	1.45
cis-1,3-Dichloropropene	ND		0.00058	0.00012	ppm v/v			05/18/21 17:53	1.45
trans-1,3-Dichloropropene	ND		0.00058	0.000065	ppm v/v			05/18/21 17:53	1.45
Ethylbenzene	ND		0.00058	0.000094	ppm v/v			05/18/21 17:53	1.45
4-Ethyltoluene	ND		0.0012	0.00015	ppm v/v			05/18/21 17:53	1.45
Hexachlorobutadiene	ND		0.0029	0.00023	ppm v/v			05/18/21 17:53	1.45
2-Hexanone	ND		0.0015	0.00012	ppm v/v			05/18/21 17:53	1.45
4-Methyl-2-pentanone (MIBK)	ND		0.0015	0.00039	ppm v/v			05/18/21 17:53	1.45
Methylene Chloride	ND		0.0029	0.0028	ppm v/v			05/18/21 17:53	1.45
Styrene	ND		0.00058	0.00017	ppm v/v			05/18/21 17:53	1.45
1,1,2,2-Tetrachloroethane	ND		0.00058	0.00010	ppm v/v			05/18/21 17:53	1.45

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114915-001 / MWL-SV04-50

Lab Sample ID: 140-23051-6

Date Collected: 05/06/21 08:56

Matrix: Air

Date Received: 05/11/21 11:45

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	0.055		0.00058	0.000051	ppm v/v			05/18/21 17:53	1.45
Toluene	ND		0.00087	0.00057	ppm v/v			05/18/21 17:53	1.45
1,1,2-Trichloro-1,2,2-trifluoroethane	0.043		0.00058	0.000058	ppm v/v			05/18/21 17:53	1.45
1,2,4-Trichlorobenzene	ND		0.0029	0.00046	ppm v/v			05/18/21 17:53	1.45
1,1,1-Trichloroethane	0.0050		0.00058	0.00027	ppm v/v			05/18/21 17:53	1.45
1,1,2-Trichloroethane	ND		0.00058	0.000051	ppm v/v			05/18/21 17:53	1.45
Trichloroethene	0.045		0.00029	0.000094	ppm v/v			05/18/21 17:53	1.45
Trichlorofluoromethane	0.023		0.00058	0.000080	ppm v/v			05/18/21 17:53	1.45
1,2,4-Trimethylbenzene	ND		0.00058	0.00015	ppm v/v			05/18/21 17:53	1.45
1,3,5-Trimethylbenzene	ND		0.00058	0.00016	ppm v/v			05/18/21 17:53	1.45
Vinyl acetate	ND		0.0029	0.00020	ppm v/v			05/18/21 17:53	1.45
Vinyl chloride	ND		0.00029	0.00019	ppm v/v			05/18/21 17:53	1.45
m,p-Xylene	ND		0.00058	0.00021	ppm v/v			05/18/21 17:53	1.45
o-Xylene	ND		0.00058	0.00011	ppm v/v			05/18/21 17:53	1.45
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		60 - 140					05/18/21 17:53	1.45

Client Sample ID: 114916-001 / MWL-SV04-100

Lab Sample ID: 140-23051-7

Date Collected: 05/06/21 09:12

Matrix: Air

Date Received: 05/11/21 11:45

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		0.025	0.0071	ppm v/v			05/18/21 18:41	1.49
Benzene	0.00029	J	0.00099	0.000099	ppm v/v			05/18/21 18:41	1.49
Benzyl chloride	ND		0.0020	0.00047	ppm v/v			05/18/21 18:41	1.49
Bromodichloromethane	ND		0.00099	0.00022	ppm v/v			05/18/21 18:41	1.49
Bromoform	ND		0.00099	0.00011	ppm v/v			05/18/21 18:41	1.49
Bromomethane	ND	*+	0.00099	0.00027	ppm v/v			05/18/21 18:41	1.49
2-Butanone (MEK)	ND		0.0050	0.00091	ppm v/v			05/18/21 18:41	1.49
Carbon disulfide	0.00024	J B	0.0025	0.00014	ppm v/v			05/18/21 18:41	1.49
Carbon tetrachloride	0.00026	J	0.00099	0.000087	ppm v/v			05/18/21 18:41	1.49
Chlorobenzene	0.00012	J B	0.00099	0.000075	ppm v/v			05/18/21 18:41	1.49
Chloroethane	ND		0.00099	0.00036	ppm v/v			05/18/21 18:41	1.49
Chloroform	0.0017		0.00099	0.000087	ppm v/v			05/18/21 18:41	1.49
Chloromethane	ND		0.0025	0.00082	ppm v/v			05/18/21 18:41	1.49
Dibromochloromethane	ND		0.00099	0.000087	ppm v/v			05/18/21 18:41	1.49
1,2-Dibromoethane (EDB)	ND		0.00099	0.000087	ppm v/v			05/18/21 18:41	1.49
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.00099	0.00015	ppm v/v			05/18/21 18:41	1.49
1,2-Dichlorobenzene	ND		0.00099	0.00038	ppm v/v			05/18/21 18:41	1.49
1,3-Dichlorobenzene	ND		0.00099	0.00020	ppm v/v			05/18/21 18:41	1.49
1,4-Dichlorobenzene	ND		0.00099	0.00020	ppm v/v			05/18/21 18:41	1.49
Dichlorodifluoromethane	0.028		0.00099	0.00017	ppm v/v			05/18/21 18:41	1.49
1,1-Dichloroethane	0.0021		0.00099	0.000087	ppm v/v			05/18/21 18:41	1.49
1,2-Dichloroethane	ND		0.00099	0.00012	ppm v/v			05/18/21 18:41	1.49
1,1-Dichloroethene	0.011		0.00099	0.000099	ppm v/v			05/18/21 18:41	1.49

Eurofins TestAmerica, Knoxville



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMP

Job ID: 140-23051-1

Client Sample ID: 114916-001 / MWL-SV04-100

Lab Sample ID: 140-23051-7

Date Collected: 05/06/21 09:12

Matrix: Air

Date Received: 05/11/21 11:45

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	0.0011		0.00099	0.00012	ppm v/v			05/18/21 18:41	1.49
trans-1,2-Dichloroethene	ND		0.00099	0.000087	ppm v/v			05/18/21 18:41	1.49
1,2-Dichloropropane	ND		0.00099	0.00012	ppm v/v			05/18/21 18:41	1.49
cis-1,3-Dichloropropene	ND		0.00099	0.00020	ppm v/v			05/18/21 18:41	1.49
trans-1,3-Dichloropropene	ND		0.00099	0.00011	ppm v/v			05/18/21 18:41	1.49
Ethylbenzene	ND		0.00099	0.00016	ppm v/v			05/18/21 18:41	1.49
4-Ethyltoluene	ND		0.0020	0.00026	ppm v/v			05/18/21 18:41	1.49
Hexachlorobutadiene	ND		0.0050	0.00040	ppm v/v			05/18/21 18:41	1.49
2-Hexanone	ND		0.0025	0.00020	ppm v/v			05/18/21 18:41	1.49
4-Methyl-2-pentanone (MIBK)	ND		0.0025	0.00067	ppm v/v			05/18/21 18:41	1.49
Methylene Chloride	ND		0.0050	0.0048	ppm v/v			05/18/21 18:41	1.49
Styrene	ND		0.00099	0.00030	ppm v/v			05/18/21 18:41	1.49
1,1,2,2-Tetrachloroethane	ND		0.00099	0.00017	ppm v/v			05/18/21 18:41	1.49
Tetrachloroethene	0.10		0.00099	0.000087	ppm v/v			05/18/21 18:41	1.49
Toluene	ND		0.0015	0.00097	ppm v/v			05/18/21 18:41	1.49
1,1,2-Trichloro-1,2,2-trifluoroethane	0.075		0.00099	0.000099	ppm v/v			05/18/21 18:41	1.49
1,2,4-Trichlorobenzene	ND		0.0050	0.00079	ppm v/v			05/18/21 18:41	1.49
1,1,1-Trichloroethane	0.0041		0.00099	0.00046	ppm v/v			05/18/21 18:41	1.49
1,1,2-Trichloroethane	ND		0.00099	0.000087	ppm v/v			05/18/21 18:41	1.49
Trichloroethene	0.10		0.00050	0.00016	ppm v/v			05/18/21 18:41	1.49
Trichlorofluoromethane	0.035		0.00099	0.00014	ppm v/v			05/18/21 18:41	1.49
1,2,4-Trimethylbenzene	ND		0.00099	0.00025	ppm v/v			05/18/21 18:41	1.49
1,3,5-Trimethylbenzene	ND		0.00099	0.00027	ppm v/v			05/18/21 18:41	1.49
Vinyl acetate	ND		0.0050	0.00035	ppm v/v			05/18/21 18:41	1.49
Vinyl chloride	ND		0.00050	0.00032	ppm v/v			05/18/21 18:41	1.49
m,p-Xylene	ND		0.00099	0.00036	ppm v/v			05/18/21 18:41	1.49
o-Xylene	ND		0.00099	0.00019	ppm v/v			05/18/21 18:41	1.49
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		60 - 140					05/18/21 18:41	1.49

Client Sample ID: 114917-001 / MWL-SV04-200

Lab Sample ID: 140-23051-8

Date Collected: 05/06/21 09:21

Matrix: Air

Date Received: 05/11/21 11:45

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		0.038	0.011	ppm v/v			05/18/21 19:30	1.5
Benzene	0.00041	J	0.0015	0.00015	ppm v/v			05/18/21 19:30	1.5
Benzyl chloride	ND		0.0030	0.00071	ppm v/v			05/18/21 19:30	1.5
Bromodichloromethane	ND		0.0015	0.00034	ppm v/v			05/18/21 19:30	1.5
Bromoform	ND		0.0015	0.00017	ppm v/v			05/18/21 19:30	1.5
Bromomethane	ND	*+	0.0015	0.00041	ppm v/v			05/18/21 19:30	1.5
2-Butanone (MEK)	ND		0.0075	0.0014	ppm v/v			05/18/21 19:30	1.5
Carbon disulfide	0.00031	J B	0.0038	0.00021	ppm v/v			05/18/21 19:30	1.5
Carbon tetrachloride	0.00041	J	0.0015	0.00013	ppm v/v			05/18/21 19:30	1.5
Chlorobenzene	ND		0.0015	0.00011	ppm v/v			05/18/21 19:30	1.5

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114917-001 / MWL-SV04-200

Lab Sample ID: 140-23051-8

Date Collected: 05/06/21 09:21

Matrix: Air

Date Received: 05/11/21 11:45

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		0.0015	0.00054	ppm v/v			05/18/21 19:30	1.5
<b>Chloroform</b>	<b>0.0014</b>	<b>J</b>	0.0015	0.00013	ppm v/v			05/18/21 19:30	1.5
Chloromethane	ND		0.0038	0.0012	ppm v/v			05/18/21 19:30	1.5
Dibromochloromethane	ND		0.0015	0.00013	ppm v/v			05/18/21 19:30	1.5
1,2-Dibromoethane (EDB)	ND		0.0015	0.00013	ppm v/v			05/18/21 19:30	1.5
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.0015	0.00023	ppm v/v			05/18/21 19:30	1.5
1,2-Dichlorobenzene	ND		0.0015	0.00058	ppm v/v			05/18/21 19:30	1.5
1,3-Dichlorobenzene	ND		0.0015	0.00030	ppm v/v			05/18/21 19:30	1.5
1,4-Dichlorobenzene	ND		0.0015	0.00030	ppm v/v			05/18/21 19:30	1.5
<b>Dichlorodifluoromethane</b>	<b>0.047</b>		0.0015	0.00026	ppm v/v			05/18/21 19:30	1.5
<b>1,1-Dichloroethane</b>	<b>0.0042</b>		0.0015	0.00013	ppm v/v			05/18/21 19:30	1.5
1,2-Dichloroethane	ND		0.0015	0.00019	ppm v/v			05/18/21 19:30	1.5
<b>1,1-Dichloroethene</b>	<b>0.023</b>		0.0015	0.00015	ppm v/v			05/18/21 19:30	1.5
<b>cis-1,2-Dichloroethene</b>	<b>0.0025</b>		0.0015	0.00019	ppm v/v			05/18/21 19:30	1.5
trans-1,2-Dichloroethene	ND		0.0015	0.00013	ppm v/v			05/18/21 19:30	1.5
1,2-Dichloropropane	ND		0.0015	0.00019	ppm v/v			05/18/21 19:30	1.5
cis-1,3-Dichloropropene	ND		0.0015	0.00030	ppm v/v			05/18/21 19:30	1.5
trans-1,3-Dichloropropene	ND		0.0015	0.00017	ppm v/v			05/18/21 19:30	1.5
Ethylbenzene	ND		0.0015	0.00024	ppm v/v			05/18/21 19:30	1.5
4-Ethyltoluene	ND		0.0030	0.00039	ppm v/v			05/18/21 19:30	1.5
Hexachlorobutadiene	ND		0.0075	0.00060	ppm v/v			05/18/21 19:30	1.5
2-Hexanone	ND		0.0038	0.00030	ppm v/v			05/18/21 19:30	1.5
4-Methyl-2-pentanone (MIBK)	ND		0.0038	0.0010	ppm v/v			05/18/21 19:30	1.5
Methylene Chloride	ND		0.0075	0.0073	ppm v/v			05/18/21 19:30	1.5
Styrene	ND		0.0015	0.00045	ppm v/v			05/18/21 19:30	1.5
1,1,2,2-Tetrachloroethane	ND		0.0015	0.00026	ppm v/v			05/18/21 19:30	1.5
<b>Tetrachloroethene</b>	<b>0.11</b>		0.0015	0.00013	ppm v/v			05/18/21 19:30	1.5
Toluene	ND		0.0023	0.0015	ppm v/v			05/18/21 19:30	1.5
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.13</b>		0.0015	0.00015	ppm v/v			05/18/21 19:30	1.5
1,2,4-Trichlorobenzene	ND		0.0075	0.0012	ppm v/v			05/18/21 19:30	1.5
<b>1,1,1-Trichloroethane</b>	<b>0.0017</b>		0.0015	0.00069	ppm v/v			05/18/21 19:30	1.5
1,1,2-Trichloroethane	ND		0.0015	0.00013	ppm v/v			05/18/21 19:30	1.5
<b>Trichloroethene</b>	<b>0.16</b>		0.00075	0.00024	ppm v/v			05/18/21 19:30	1.5
<b>Trichlorofluoromethane</b>	<b>0.038</b>		0.0015	0.00021	ppm v/v			05/18/21 19:30	1.5
1,2,4-Trimethylbenzene	ND		0.0015	0.00038	ppm v/v			05/18/21 19:30	1.5
1,3,5-Trimethylbenzene	ND		0.0015	0.00041	ppm v/v			05/18/21 19:30	1.5
Vinyl acetate	ND		0.0075	0.00053	ppm v/v			05/18/21 19:30	1.5
Vinyl chloride	ND		0.00075	0.00049	ppm v/v			05/18/21 19:30	1.5
m,p-Xylene	ND		0.0015	0.00054	ppm v/v			05/18/21 19:30	1.5
o-Xylene	ND		0.0015	0.00028	ppm v/v			05/18/21 19:30	1.5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		60 - 140		05/18/21 19:30	1.5



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMP

Job ID: 140-23051-1

Client Sample ID: 114918-001 / MWL-SV04-300

Lab Sample ID: 140-23051-9

Date Collected: 05/06/21 09:34

Matrix: Air

Date Received: 05/11/21 11:45

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		0.039	0.011	ppm v/v			05/19/21 07:42	1.56
<b>Benzene</b>	<b>0.00040</b>	<b>J</b>	0.0016	0.00016	ppm v/v			05/19/21 07:42	1.56
Benzyl chloride	ND		0.0031	0.00074	ppm v/v			05/19/21 07:42	1.56
Bromodichloromethane	ND		0.0016	0.00035	ppm v/v			05/19/21 07:42	1.56
Bromoform	ND		0.0016	0.00018	ppm v/v			05/19/21 07:42	1.56
Bromomethane	ND	*+	0.0016	0.00043	ppm v/v			05/19/21 07:42	1.56
2-Butanone (MEK)	ND		0.0078	0.0014	ppm v/v			05/19/21 07:42	1.56
<b>Carbon disulfide</b>	<b>0.00038</b>	<b>J B</b>	0.0039	0.00021	ppm v/v			05/19/21 07:42	1.56
<b>Carbon tetrachloride</b>	<b>0.00027</b>	<b>J</b>	0.0016	0.00014	ppm v/v			05/19/21 07:42	1.56
Chlorobenzene	ND		0.0016	0.00012	ppm v/v			05/19/21 07:42	1.56
Chloroethane	ND		0.0016	0.00057	ppm v/v			05/19/21 07:42	1.56
<b>Chloroform</b>	<b>0.00069</b>	<b>J</b>	0.0016	0.00014	ppm v/v			05/19/21 07:42	1.56
Chloromethane	ND		0.0039	0.0013	ppm v/v			05/19/21 07:42	1.56
Dibromochloromethane	ND		0.0016	0.00014	ppm v/v			05/19/21 07:42	1.56
1,2-Dibromoethane (EDB)	ND		0.0016	0.00014	ppm v/v			05/19/21 07:42	1.56
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.0016	0.00023	ppm v/v			05/19/21 07:42	1.56
1,2-Dichlorobenzene	ND		0.0016	0.00060	ppm v/v			05/19/21 07:42	1.56
1,3-Dichlorobenzene	ND		0.0016	0.00031	ppm v/v			05/19/21 07:42	1.56
1,4-Dichlorobenzene	ND		0.0016	0.00031	ppm v/v			05/19/21 07:42	1.56
<b>Dichlorodifluoromethane</b>	<b>0.030</b>		0.0016	0.00027	ppm v/v			05/19/21 07:42	1.56
<b>1,1-Dichloroethane</b>	<b>0.0011</b>	<b>J</b>	0.0016	0.00014	ppm v/v			05/19/21 07:42	1.56
1,2-Dichloroethane	ND		0.0016	0.00020	ppm v/v			05/19/21 07:42	1.56
<b>1,1-Dichloroethene</b>	<b>0.012</b>		0.0016	0.00016	ppm v/v			05/19/21 07:42	1.56
<b>cis-1,2-Dichloroethene</b>	<b>0.00073</b>	<b>J</b>	0.0016	0.00020	ppm v/v			05/19/21 07:42	1.56
trans-1,2-Dichloroethene	ND		0.0016	0.00014	ppm v/v			05/19/21 07:42	1.56
1,2-Dichloropropane	ND		0.0016	0.00020	ppm v/v			05/19/21 07:42	1.56
cis-1,3-Dichloropropene	ND		0.0016	0.00031	ppm v/v			05/19/21 07:42	1.56
trans-1,3-Dichloropropene	ND		0.0016	0.00018	ppm v/v			05/19/21 07:42	1.56
Ethylbenzene	ND		0.0016	0.00025	ppm v/v			05/19/21 07:42	1.56
4-Ethyltoluene	ND		0.0031	0.00041	ppm v/v			05/19/21 07:42	1.56
Hexachlorobutadiene	ND		0.0078	0.00062	ppm v/v			05/19/21 07:42	1.56
2-Hexanone	ND		0.0039	0.00031	ppm v/v			05/19/21 07:42	1.56
4-Methyl-2-pentanone (MIBK)	ND		0.0039	0.0011	ppm v/v			05/19/21 07:42	1.56
Methylene Chloride	ND		0.0078	0.0076	ppm v/v			05/19/21 07:42	1.56
Styrene	ND		0.0016	0.00047	ppm v/v			05/19/21 07:42	1.56
1,1,2,2-Tetrachloroethane	ND		0.0016	0.00027	ppm v/v			05/19/21 07:42	1.56
<b>Tetrachloroethene</b>	<b>0.11</b>		0.0016	0.00014	ppm v/v			05/19/21 07:42	1.56
Toluene	ND		0.0023	0.0015	ppm v/v			05/19/21 07:42	1.56
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.080</b>		0.0016	0.00016	ppm v/v			05/19/21 07:42	1.56
1,2,4-Trichlorobenzene	ND		0.0078	0.0012	ppm v/v			05/19/21 07:42	1.56
<b>1,1,1-Trichloroethane</b>	<b>0.00090</b>	<b>J</b>	0.0016	0.00072	ppm v/v			05/19/21 07:42	1.56
1,1,2-Trichloroethane	ND		0.0016	0.00014	ppm v/v			05/19/21 07:42	1.56
<b>Trichloroethene</b>	<b>0.079</b>		0.00078	0.00025	ppm v/v			05/19/21 07:42	1.56
<b>Trichlorofluoromethane</b>	<b>0.017</b>		0.0016	0.00021	ppm v/v			05/19/21 07:42	1.56
1,2,4-Trimethylbenzene	ND		0.0016	0.00039	ppm v/v			05/19/21 07:42	1.56
1,3,5-Trimethylbenzene	ND		0.0016	0.00043	ppm v/v			05/19/21 07:42	1.56
Vinyl acetate	ND		0.0078	0.00055	ppm v/v			05/19/21 07:42	1.56
Vinyl chloride	ND		0.00078	0.00051	ppm v/v			05/19/21 07:42	1.56

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMP

Job ID: 140-23051-1

**Client Sample ID: 114918-001 / MWL-SV04-300**

**Lab Sample ID: 140-23051-9**

**Date Collected: 05/06/21 09:34**

**Matrix: Air**

**Date Received: 05/11/21 11:45**

**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		0.0016	0.00057	ppm v/v			05/19/21 07:42	1.56
o-Xylene	ND		0.0016	0.00029	ppm v/v			05/19/21 07:42	1.56
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		60 - 140					05/19/21 07:42	1.56

**Client Sample ID: 114919-001 / MWL-SV04-400**

**Lab Sample ID: 140-23051-10**

**Date Collected: 05/06/21 09:40**

**Matrix: Air**

**Date Received: 05/11/21 11:45**

**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	0.012	J	0.015	0.0044	ppm v/v			05/20/21 01:20	1.53
Benzene	0.00053	J	0.00061	0.000061	ppm v/v			05/20/21 01:20	1.53
Benzyl chloride	ND		0.0012	0.00029	ppm v/v			05/20/21 01:20	1.53
Bromodichloromethane	ND		0.00061	0.00014	ppm v/v			05/20/21 01:20	1.53
Bromoform	ND		0.00061	0.000069	ppm v/v			05/20/21 01:20	1.53
Bromomethane	ND		0.00061	0.00017	ppm v/v			05/20/21 01:20	1.53
2-Butanone (MEK)	0.0018	J	0.0031	0.00056	ppm v/v			05/20/21 01:20	1.53
Carbon disulfide	0.00077	J B	0.0015	0.000084	ppm v/v			05/20/21 01:20	1.53
Carbon tetrachloride	0.00018	J	0.00061	0.000054	ppm v/v			05/20/21 01:20	1.53
Chlorobenzene	0.000067	J B	0.00061	0.000046	ppm v/v			05/20/21 01:20	1.53
Chloroethane	ND		0.00061	0.00022	ppm v/v			05/20/21 01:20	1.53
Chloroform	0.00055	J	0.00061	0.000054	ppm v/v			05/20/21 01:20	1.53
Chloromethane	ND		0.0015	0.00050	ppm v/v			05/20/21 01:20	1.53
Dibromochloromethane	ND		0.00061	0.000054	ppm v/v			05/20/21 01:20	1.53
1,2-Dibromoethane (EDB)	ND		0.00061	0.000054	ppm v/v			05/20/21 01:20	1.53
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.00061	0.000092	ppm v/v			05/20/21 01:20	1.53
1,2-Dichlorobenzene	ND		0.00061	0.00024	ppm v/v			05/20/21 01:20	1.53
1,3-Dichlorobenzene	ND		0.00061	0.00012	ppm v/v			05/20/21 01:20	1.53
1,4-Dichlorobenzene	ND		0.00061	0.00012	ppm v/v			05/20/21 01:20	1.53
Dichlorodifluoromethane	0.025		0.00061	0.00011	ppm v/v			05/20/21 01:20	1.53
1,1-Dichloroethane	0.00086		0.00061	0.000054	ppm v/v			05/20/21 01:20	1.53
1,2-Dichloroethane	ND		0.00061	0.000077	ppm v/v			05/20/21 01:20	1.53
1,1-Dichloroethene	0.0085		0.00061	0.000061	ppm v/v			05/20/21 01:20	1.53
cis-1,2-Dichloroethene	0.00061		0.00061	0.000077	ppm v/v			05/20/21 01:20	1.53
trans-1,2-Dichloroethene	ND		0.00061	0.000054	ppm v/v			05/20/21 01:20	1.53
1,2-Dichloropropane	ND		0.00061	0.000077	ppm v/v			05/20/21 01:20	1.53
cis-1,3-Dichloropropene	ND		0.00061	0.00012	ppm v/v			05/20/21 01:20	1.53
trans-1,3-Dichloropropene	ND		0.00061	0.000069	ppm v/v			05/20/21 01:20	1.53
Ethylbenzene	ND		0.00061	0.000099	ppm v/v			05/20/21 01:20	1.53
4-Ethyltoluene	ND		0.0012	0.00016	ppm v/v			05/20/21 01:20	1.53
Hexachlorobutadiene	ND		0.0031	0.00024	ppm v/v			05/20/21 01:20	1.53
2-Hexanone	ND		0.0015	0.00012	ppm v/v			05/20/21 01:20	1.53
4-Methyl-2-pentanone (MIBK)	ND		0.0015	0.00041	ppm v/v			05/20/21 01:20	1.53
Methylene Chloride	ND		0.0031	0.0030	ppm v/v			05/20/21 01:20	1.53
Styrene	ND		0.00061	0.00018	ppm v/v			05/20/21 01:20	1.53
1,1,2,2-Tetrachloroethane	ND		0.00061	0.00011	ppm v/v			05/20/21 01:20	1.53

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114919-001 / MWL-SV04-400

Lab Sample ID: 140-23051-10

Date Collected: 05/06/21 09:40

Matrix: Air

Date Received: 05/11/21 11:45

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		0.00092	0.00060	ppm v/v			05/20/21 01:20	1.53
1,1,2-Trichloro-1,2,2-trifluoroethane	0.075		0.00061	0.000061	ppm v/v			05/20/21 01:20	1.53
1,2,4-Trichlorobenzene	ND		0.0031	0.00049	ppm v/v			05/20/21 01:20	1.53
1,1,1-Trichloroethane	0.00063		0.00061	0.00028	ppm v/v			05/20/21 01:20	1.53
1,1,2-Trichloroethane	ND		0.00061	0.000054	ppm v/v			05/20/21 01:20	1.53
Trichloroethene	0.080		0.00031	0.000099	ppm v/v			05/20/21 01:20	1.53
Trichlorofluoromethane	0.014		0.00061	0.000084	ppm v/v			05/20/21 01:20	1.53
1,2,4-Trimethylbenzene	ND		0.00061	0.00015	ppm v/v			05/20/21 01:20	1.53
1,3,5-Trimethylbenzene	ND		0.00061	0.00017	ppm v/v			05/20/21 01:20	1.53
Vinyl acetate	ND		0.0031	0.00021	ppm v/v			05/20/21 01:20	1.53
Vinyl chloride	ND		0.00031	0.00020	ppm v/v			05/20/21 01:20	1.53
m,p-Xylene	ND		0.00061	0.00022	ppm v/v			05/20/21 01:20	1.53
o-Xylene	ND		0.00061	0.00011	ppm v/v			05/20/21 01:20	1.53
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		60 - 140					05/20/21 01:20	1.53

## 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
Tetrachloroethene	0.11		0.0012	0.00011	ppm v/v			05/20/21 20:10	1.53
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		60 - 140					05/20/21 20:10	1.53

Client Sample ID: 114906-001 / MWL-FB3

Lab Sample ID: 140-23051-11

Date Collected: 05/06/21 09:55

Matrix: Air

Date Received: 05/11/21 11:45

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	0.00058	J	0.0020	0.00058	ppm v/v			05/15/21 00:40	1.62
Benzene	0.0000099	J	0.000081	0.0000081	ppm v/v			05/15/21 00:40	1.62
Benzyl chloride	ND		0.00016	0.000038	ppm v/v			05/15/21 00:40	1.62
Bromodichloromethane	ND		0.000081	0.000018	ppm v/v			05/15/21 00:40	1.62
Bromoform	ND		0.000081	0.0000091	ppm v/v			05/15/21 00:40	1.62
Bromomethane	ND		0.000081	0.000022	ppm v/v			05/15/21 00:40	1.62
2-Butanone (MEK)	ND		0.00041	0.000074	ppm v/v			05/15/21 00:40	1.62
Carbon disulfide	0.000018	J	0.00020	0.000011	ppm v/v			05/15/21 00:40	1.62
Carbon tetrachloride	ND		0.000081	0.0000071	ppm v/v			05/15/21 00:40	1.62
Chlorobenzene	0.0000087	J	0.000081	0.0000061	ppm v/v			05/15/21 00:40	1.62
Chloroethane	ND		0.000081	0.000029	ppm v/v			05/15/21 00:40	1.62
Chloroform	ND		0.000081	0.0000071	ppm v/v			05/15/21 00:40	1.62
Chloromethane	ND		0.00020	0.000067	ppm v/v			05/15/21 00:40	1.62
Dibromochloromethane	ND		0.000081	0.0000071	ppm v/v			05/15/21 00:40	1.62
1,2-Dibromoethane (EDB)	ND		0.000081	0.0000071	ppm v/v			05/15/21 00:40	1.62
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.000081	0.000012	ppm v/v			05/15/21 00:40	1.62
1,2-Dichlorobenzene	ND		0.000081	0.000031	ppm v/v			05/15/21 00:40	1.62
1,3-Dichlorobenzene	ND		0.000081	0.000016	ppm v/v			05/15/21 00:40	1.62

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114906-001 / MWL-FB3

Lab Sample ID: 140-23051-11

Date Collected: 05/06/21 09:55

Matrix: Air

Date Received: 05/11/21 11:45

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
1,4-Dichlorobenzene	ND		0.000081	0.000016	ppm v/v			05/15/21 00:40	1.62
Dichlorodifluoromethane	ND		0.000081	0.000014	ppm v/v			05/15/21 00:40	1.62
1,1-Dichloroethane	ND		0.000081	0.0000071	ppm v/v			05/15/21 00:40	1.62
1,2-Dichloroethane	ND		0.000081	0.000010	ppm v/v			05/15/21 00:40	1.62
1,1-Dichloroethene	ND		0.000081	0.0000081	ppm v/v			05/15/21 00:40	1.62
cis-1,2-Dichloroethene	ND		0.000081	0.000010	ppm v/v			05/15/21 00:40	1.62
trans-1,2-Dichloroethene	ND		0.000081	0.0000071	ppm v/v			05/15/21 00:40	1.62
1,2-Dichloropropane	ND		0.000081	0.000010	ppm v/v			05/15/21 00:40	1.62
cis-1,3-Dichloropropene	ND		0.000081	0.000016	ppm v/v			05/15/21 00:40	1.62
trans-1,3-Dichloropropene	ND		0.000081	0.0000091	ppm v/v			05/15/21 00:40	1.62
Ethylbenzene	ND		0.000081	0.000013	ppm v/v			05/15/21 00:40	1.62
4-Ethyltoluene	ND		0.00016	0.000021	ppm v/v			05/15/21 00:40	1.62
Hexachlorobutadiene	ND		0.00041	0.000032	ppm v/v			05/15/21 00:40	1.62
2-Hexanone	ND		0.00020	0.000016	ppm v/v			05/15/21 00:40	1.62
4-Methyl-2-pentanone (MIBK)	ND		0.00020	0.000055	ppm v/v			05/15/21 00:40	1.62
Methylene Chloride	ND		0.00041	0.00039	ppm v/v			05/15/21 00:40	1.62
Styrene	ND		0.000081	0.000024	ppm v/v			05/15/21 00:40	1.62
1,1,2,2-Tetrachloroethane	ND		0.000081	0.000014	ppm v/v			05/15/21 00:40	1.62
Tetrachloroethene	ND		0.000081	0.0000071	ppm v/v			05/15/21 00:40	1.62
Toluene	ND		0.00012	0.000079	ppm v/v			05/15/21 00:40	1.62
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.000081	0.0000081	ppm v/v			05/15/21 00:40	1.62
1,2,4-Trichlorobenzene	ND		0.00041	0.000065	ppm v/v			05/15/21 00:40	1.62
1,1,1-Trichloroethane	ND		0.000081	0.000037	ppm v/v			05/15/21 00:40	1.62
1,1,2-Trichloroethane	ND		0.000081	0.0000071	ppm v/v			05/15/21 00:40	1.62
Trichloroethene	ND		0.000041	0.000013	ppm v/v			05/15/21 00:40	1.62
Trichlorofluoromethane	ND		0.000081	0.000011	ppm v/v			05/15/21 00:40	1.62
1,2,4-Trimethylbenzene	ND		0.000081	0.000020	ppm v/v			05/15/21 00:40	1.62
1,3,5-Trimethylbenzene	ND		0.000081	0.000022	ppm v/v			05/15/21 00:40	1.62
Vinyl acetate	ND		0.00041	0.000028	ppm v/v			05/15/21 00:40	1.62
Vinyl chloride	ND		0.000041	0.000026	ppm v/v			05/15/21 00:40	1.62
m,p-Xylene	ND		0.000081	0.000029	ppm v/v			05/15/21 00:40	1.62
o-Xylene	ND		0.000081	0.000015	ppm v/v			05/15/21 00:40	1.62

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		60 - 140		05/15/21 00:40	1.62

Client Sample ID: 114907-001 / MWL-SV03-50

Lab Sample ID: 140-23051-12

Date Collected: 05/06/21 10:03

Matrix: Air

Date Received: 05/11/21 11:45

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		0.023	0.0065	ppm v/v			05/20/21 02:08	1.59
Benzene	0.00026	J	0.00091	0.000091	ppm v/v			05/20/21 02:08	1.59
Benzyl chloride	ND		0.0018	0.00043	ppm v/v			05/20/21 02:08	1.59
Bromodichloromethane	ND		0.00091	0.00020	ppm v/v			05/20/21 02:08	1.59
Bromoform	ND		0.00091	0.00010	ppm v/v			05/20/21 02:08	1.59
Bromomethane	ND		0.00091	0.00025	ppm v/v			05/20/21 02:08	1.59

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114907-001 / MWL-SV03-50

Lab Sample ID: 140-23051-12

Date Collected: 05/06/21 10:03

Matrix: Air

Date Received: 05/11/21 11:45

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
2-Butanone (MEK)	ND		0.0045	0.00083	ppm v/v			05/20/21 02:08	1.59
Carbon disulfide	0.00024	J B	0.0023	0.00012	ppm v/v			05/20/21 02:08	1.59
Carbon tetrachloride	0.00020	J	0.00091	0.000080	ppm v/v			05/20/21 02:08	1.59
Chlorobenzene	ND		0.00091	0.000068	ppm v/v			05/20/21 02:08	1.59
Chloroethane	ND		0.00091	0.00033	ppm v/v			05/20/21 02:08	1.59
Chloroform	0.0013		0.00091	0.000080	ppm v/v			05/20/21 02:08	1.59
Chloromethane	ND		0.0023	0.00075	ppm v/v			05/20/21 02:08	1.59
Dibromochloromethane	ND		0.00091	0.000080	ppm v/v			05/20/21 02:08	1.59
1,2-Dibromoethane (EDB)	ND		0.00091	0.000080	ppm v/v			05/20/21 02:08	1.59
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.00091	0.00014	ppm v/v			05/20/21 02:08	1.59
1,2-Dichlorobenzene	ND		0.00091	0.00035	ppm v/v			05/20/21 02:08	1.59
1,3-Dichlorobenzene	ND		0.00091	0.00018	ppm v/v			05/20/21 02:08	1.59
1,4-Dichlorobenzene	ND		0.00091	0.00018	ppm v/v			05/20/21 02:08	1.59
Dichlorodifluoromethane	0.023		0.00091	0.00016	ppm v/v			05/20/21 02:08	1.59
1,1-Dichloroethane	0.0025		0.00091	0.000080	ppm v/v			05/20/21 02:08	1.59
1,2-Dichloroethane	ND		0.00091	0.00011	ppm v/v			05/20/21 02:08	1.59
1,1-Dichloroethene	0.0092		0.00091	0.000091	ppm v/v			05/20/21 02:08	1.59
cis-1,2-Dichloroethene	0.0014		0.00091	0.00011	ppm v/v			05/20/21 02:08	1.59
trans-1,2-Dichloroethene	ND		0.00091	0.000080	ppm v/v			05/20/21 02:08	1.59
1,2-Dichloropropane	ND		0.00091	0.00011	ppm v/v			05/20/21 02:08	1.59
cis-1,3-Dichloropropene	ND		0.00091	0.00018	ppm v/v			05/20/21 02:08	1.59
trans-1,3-Dichloropropene	ND		0.00091	0.00010	ppm v/v			05/20/21 02:08	1.59
Ethylbenzene	ND		0.00091	0.00015	ppm v/v			05/20/21 02:08	1.59
4-Ethyltoluene	ND		0.0018	0.00024	ppm v/v			05/20/21 02:08	1.59
Hexachlorobutadiene	ND		0.0045	0.00036	ppm v/v			05/20/21 02:08	1.59
2-Hexanone	ND		0.0023	0.00018	ppm v/v			05/20/21 02:08	1.59
4-Methyl-2-pentanone (MIBK)	ND		0.0023	0.00061	ppm v/v			05/20/21 02:08	1.59
Methylene Chloride	ND		0.0045	0.0044	ppm v/v			05/20/21 02:08	1.59
Styrene	ND		0.00091	0.00027	ppm v/v			05/20/21 02:08	1.59
1,1,2,2-Tetrachloroethane	ND		0.00091	0.00016	ppm v/v			05/20/21 02:08	1.59
Tetrachloroethene	0.14		0.00091	0.000080	ppm v/v			05/20/21 02:08	1.59
Toluene	ND		0.0014	0.00089	ppm v/v			05/20/21 02:08	1.59
1,1,2-Trichloro-1,2,2-trifluoroethane	0.058		0.00091	0.000091	ppm v/v			05/20/21 02:08	1.59
1,2,4-Trichlorobenzene	ND		0.0045	0.00073	ppm v/v			05/20/21 02:08	1.59
1,1,1-Trichloroethane	0.0015		0.00091	0.00042	ppm v/v			05/20/21 02:08	1.59
1,1,2-Trichloroethane	ND		0.00091	0.000080	ppm v/v			05/20/21 02:08	1.59
Trichloroethene	0.10		0.00045	0.00015	ppm v/v			05/20/21 02:08	1.59
Trichlorofluoromethane	0.021		0.00091	0.00012	ppm v/v			05/20/21 02:08	1.59
1,2,4-Trimethylbenzene	ND		0.00091	0.00023	ppm v/v			05/20/21 02:08	1.59
1,3,5-Trimethylbenzene	ND		0.00091	0.00025	ppm v/v			05/20/21 02:08	1.59
Vinyl acetate	ND		0.0045	0.00032	ppm v/v			05/20/21 02:08	1.59
Vinyl chloride	ND		0.00045	0.00030	ppm v/v			05/20/21 02:08	1.59
m,p-Xylene	ND		0.00091	0.00033	ppm v/v			05/20/21 02:08	1.59
o-Xylene	ND		0.00091	0.00017	ppm v/v			05/20/21 02:08	1.59

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		60 - 140		05/20/21 02:08	1.59

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114908-001 / MWL-SV03-50

Lab Sample ID: 140-23051-13

Date Collected: 05/06/21 10:03

Matrix: Air

Date Received: 05/11/21 11:45

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		0.017	0.0047	ppm v/v			05/20/21 02:56	1.65
<b>Benzene</b>	<b>0.00025</b>	<b>J</b>	0.00066	0.000066	ppm v/v			05/20/21 02:56	1.65
Benzyl chloride	ND		0.0013	0.00031	ppm v/v			05/20/21 02:56	1.65
Bromodichloromethane	ND		0.00066	0.00015	ppm v/v			05/20/21 02:56	1.65
Bromoform	ND		0.00066	0.000074	ppm v/v			05/20/21 02:56	1.65
Bromomethane	ND		0.00066	0.00018	ppm v/v			05/20/21 02:56	1.65
2-Butanone (MEK)	ND		0.0033	0.00060	ppm v/v			05/20/21 02:56	1.65
<b>Carbon disulfide</b>	<b>0.00042</b>	<b>J B</b>	0.0017	0.000091	ppm v/v			05/20/21 02:56	1.65
<b>Carbon tetrachloride</b>	<b>0.00022</b>	<b>J</b>	0.00066	0.000058	ppm v/v			05/20/21 02:56	1.65
Chlorobenzene	ND		0.00066	0.000050	ppm v/v			05/20/21 02:56	1.65
Chloroethane	ND		0.00066	0.00024	ppm v/v			05/20/21 02:56	1.65
<b>Chloroform</b>	<b>0.0012</b>		0.00066	0.000058	ppm v/v			05/20/21 02:56	1.65
Chloromethane	ND		0.0017	0.00054	ppm v/v			05/20/21 02:56	1.65
Dibromochloromethane	ND		0.00066	0.000058	ppm v/v			05/20/21 02:56	1.65
1,2-Dibromoethane (EDB)	ND		0.00066	0.000058	ppm v/v			05/20/21 02:56	1.65
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.00066	0.000099	ppm v/v			05/20/21 02:56	1.65
1,2-Dichlorobenzene	ND		0.00066	0.00026	ppm v/v			05/20/21 02:56	1.65
1,3-Dichlorobenzene	ND		0.00066	0.00013	ppm v/v			05/20/21 02:56	1.65
1,4-Dichlorobenzene	ND		0.00066	0.00013	ppm v/v			05/20/21 02:56	1.65
<b>Dichlorodifluoromethane</b>	<b>0.022</b>		0.00066	0.00012	ppm v/v			05/20/21 02:56	1.65
<b>1,1-Dichloroethane</b>	<b>0.0024</b>		0.00066	0.000058	ppm v/v			05/20/21 02:56	1.65
1,2-Dichloroethane	ND		0.00066	0.000083	ppm v/v			05/20/21 02:56	1.65
<b>1,1-Dichloroethene</b>	<b>0.0091</b>		0.00066	0.000066	ppm v/v			05/20/21 02:56	1.65
<b>cis-1,2-Dichloroethene</b>	<b>0.0014</b>		0.00066	0.000083	ppm v/v			05/20/21 02:56	1.65
trans-1,2-Dichloroethene	ND		0.00066	0.000058	ppm v/v			05/20/21 02:56	1.65
1,2-Dichloropropane	ND		0.00066	0.000083	ppm v/v			05/20/21 02:56	1.65
cis-1,3-Dichloropropene	ND		0.00066	0.00013	ppm v/v			05/20/21 02:56	1.65
trans-1,3-Dichloropropene	ND		0.00066	0.000074	ppm v/v			05/20/21 02:56	1.65
Ethylbenzene	ND		0.00066	0.00011	ppm v/v			05/20/21 02:56	1.65
4-Ethyltoluene	ND		0.0013	0.00017	ppm v/v			05/20/21 02:56	1.65
Hexachlorobutadiene	ND		0.0033	0.00026	ppm v/v			05/20/21 02:56	1.65
2-Hexanone	ND		0.0017	0.00013	ppm v/v			05/20/21 02:56	1.65
4-Methyl-2-pentanone (MIBK)	ND		0.0017	0.00045	ppm v/v			05/20/21 02:56	1.65
Methylene Chloride	ND		0.0033	0.0032	ppm v/v			05/20/21 02:56	1.65
Styrene	ND		0.00066	0.00020	ppm v/v			05/20/21 02:56	1.65
1,1,2,2-Tetrachloroethane	ND		0.00066	0.00012	ppm v/v			05/20/21 02:56	1.65
Toluene	ND		0.00099	0.00064	ppm v/v			05/20/21 02:56	1.65
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.057</b>		0.00066	0.000066	ppm v/v			05/20/21 02:56	1.65
1,2,4-Trichlorobenzene	ND		0.0033	0.00053	ppm v/v			05/20/21 02:56	1.65
<b>1,1,1-Trichloroethane</b>	<b>0.0014</b>		0.00066	0.00031	ppm v/v			05/20/21 02:56	1.65
<b>1,1,2-Trichloroethane</b>	<b>0.000090</b>	<b>J</b>	0.00066	0.000058	ppm v/v			05/20/21 02:56	1.65
<b>Trichloroethene</b>	<b>0.10</b>		0.00033	0.00011	ppm v/v			05/20/21 02:56	1.65
<b>Trichlorofluoromethane</b>	<b>0.020</b>		0.00066	0.000091	ppm v/v			05/20/21 02:56	1.65
1,2,4-Trimethylbenzene	ND		0.00066	0.00017	ppm v/v			05/20/21 02:56	1.65
1,3,5-Trimethylbenzene	ND		0.00066	0.00018	ppm v/v			05/20/21 02:56	1.65
Vinyl acetate	ND		0.0033	0.00023	ppm v/v			05/20/21 02:56	1.65
Vinyl chloride	ND		0.00033	0.00021	ppm v/v			05/20/21 02:56	1.65
m,p-Xylene	ND		0.00066	0.00024	ppm v/v			05/20/21 02:56	1.65

Eurofins TestAmerica, Knoxville



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

**Client Sample ID: 114908-001 / MWL-SV03-50**

**Lab Sample ID: 140-23051-13**

Date Collected: 05/06/21 10:03

Matrix: Air

Date Received: 05/11/21 11:45

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
o-Xylene	ND		0.00066	0.00012	ppm v/v			05/20/21 02:56	1.65
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		60 - 140					05/20/21 02:56	1.65

## 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
Tetrachloroethene	0.11		0.0011	0.000096	ppm v/v			05/21/21 07:33	1.65
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		60 - 140					05/21/21 07:33	1.65

**Client Sample ID: 114909-001 / MWL-SV03-100**

**Lab Sample ID: 140-23051-14**

Date Collected: 05/06/21 10:08

Matrix: Air

Date Received: 05/11/21 11:45

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		0.030	0.0085	ppm v/v			05/20/21 03:43	1.49
Benzene	0.00023	J	0.0012	0.00012	ppm v/v			05/20/21 03:43	1.49
Benzyl chloride	ND		0.0024	0.00057	ppm v/v			05/20/21 03:43	1.49
Bromodichloromethane	ND		0.0012	0.00027	ppm v/v			05/20/21 03:43	1.49
Bromoform	ND		0.0012	0.00013	ppm v/v			05/20/21 03:43	1.49
Bromomethane	ND		0.0012	0.00033	ppm v/v			05/20/21 03:43	1.49
2-Butanone (MEK)	ND		0.0060	0.0011	ppm v/v			05/20/21 03:43	1.49
Carbon disulfide	0.0034	B	0.0030	0.00016	ppm v/v			05/20/21 03:43	1.49
Carbon tetrachloride	0.00031	J	0.0012	0.00010	ppm v/v			05/20/21 03:43	1.49
Chlorobenzene	ND		0.0012	0.000089	ppm v/v			05/20/21 03:43	1.49
Chloroethane	ND		0.0012	0.00043	ppm v/v			05/20/21 03:43	1.49
Chloroform	0.0020		0.0012	0.00010	ppm v/v			05/20/21 03:43	1.49
Chloromethane	ND		0.0030	0.00098	ppm v/v			05/20/21 03:43	1.49
Dibromochloromethane	ND		0.0012	0.00010	ppm v/v			05/20/21 03:43	1.49
1,2-Dibromoethane (EDB)	ND		0.0012	0.00010	ppm v/v			05/20/21 03:43	1.49
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.0012	0.00018	ppm v/v			05/20/21 03:43	1.49
1,2-Dichlorobenzene	ND		0.0012	0.00046	ppm v/v			05/20/21 03:43	1.49
1,3-Dichlorobenzene	ND		0.0012	0.00024	ppm v/v			05/20/21 03:43	1.49
1,4-Dichlorobenzene	ND		0.0012	0.00024	ppm v/v			05/20/21 03:43	1.49
Dichlorodifluoromethane	0.041		0.0012	0.00021	ppm v/v			05/20/21 03:43	1.49
1,1-Dichloroethane	0.0043		0.0012	0.00010	ppm v/v			05/20/21 03:43	1.49
1,2-Dichloroethane	ND		0.0012	0.00015	ppm v/v			05/20/21 03:43	1.49
1,1-Dichloroethene	0.016		0.0012	0.00012	ppm v/v			05/20/21 03:43	1.49
cis-1,2-Dichloroethene	0.0026		0.0012	0.00015	ppm v/v			05/20/21 03:43	1.49
trans-1,2-Dichloroethene	ND		0.0012	0.00010	ppm v/v			05/20/21 03:43	1.49
1,2-Dichloropropane	ND		0.0012	0.00015	ppm v/v			05/20/21 03:43	1.49
cis-1,3-Dichloropropene	ND		0.0012	0.00024	ppm v/v			05/20/21 03:43	1.49
trans-1,3-Dichloropropene	ND		0.0012	0.00013	ppm v/v			05/20/21 03:43	1.49
Ethylbenzene	ND		0.0012	0.00019	ppm v/v			05/20/21 03:43	1.49
4-Ethyltoluene	ND		0.0024	0.00031	ppm v/v			05/20/21 03:43	1.49
Hexachlorobutadiene	ND		0.0060	0.00048	ppm v/v			05/20/21 03:43	1.49

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114909-001 / MWL-SV03-100

Lab Sample ID: 140-23051-14

Date Collected: 05/06/21 10:08

Matrix: Air

Date Received: 05/11/21 11:45

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
2-Hexanone	ND		0.0030	0.00024	ppm v/v			05/20/21 03:43	1.49
4-Methyl-2-pentanone (MIBK)	ND		0.0030	0.00080	ppm v/v			05/20/21 03:43	1.49
Methylene Chloride	ND		0.0060	0.0058	ppm v/v			05/20/21 03:43	1.49
Styrene	ND		0.0012	0.00036	ppm v/v			05/20/21 03:43	1.49
1,1,2,2-Tetrachloroethane	ND		0.0012	0.00021	ppm v/v			05/20/21 03:43	1.49
<b>Tetrachloroethene</b>	<b>0.21</b>		0.0012	0.00010	ppm v/v			05/20/21 03:43	1.49
Toluene	ND		0.0018	0.0012	ppm v/v			05/20/21 03:43	1.49
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.10</b>		0.0012	0.00012	ppm v/v			05/20/21 03:43	1.49
1,2,4-Trichlorobenzene	ND		0.0060	0.00095	ppm v/v			05/20/21 03:43	1.49
<b>1,1,1-Trichloroethane</b>	<b>0.0023</b>		0.0012	0.00055	ppm v/v			05/20/21 03:43	1.49
<b>1,1,2-Trichloroethane</b>	<b>0.00013</b>	J	0.0012	0.00010	ppm v/v			05/20/21 03:43	1.49
<b>Trichloroethene</b>	<b>0.18</b>		0.00060	0.00019	ppm v/v			05/20/21 03:43	1.49
<b>Trichlorofluoromethane</b>	<b>0.037</b>		0.0012	0.00016	ppm v/v			05/20/21 03:43	1.49
1,2,4-Trimethylbenzene	ND		0.0012	0.00030	ppm v/v			05/20/21 03:43	1.49
1,3,5-Trimethylbenzene	ND		0.0012	0.00033	ppm v/v			05/20/21 03:43	1.49
Vinyl acetate	ND		0.0060	0.00042	ppm v/v			05/20/21 03:43	1.49
Vinyl chloride	ND		0.00060	0.00039	ppm v/v			05/20/21 03:43	1.49
m,p-Xylene	ND		0.0012	0.00043	ppm v/v			05/20/21 03:43	1.49
o-Xylene	ND		0.0012	0.00022	ppm v/v			05/20/21 03:43	1.49
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		60 - 140					05/20/21 03:43	1.49

Client Sample ID: 114910-001 / MWL-SV03-200

Lab Sample ID: 140-23051-15

Date Collected: 05/06/21 10:16

Matrix: Air

Date Received: 05/11/21 11:45

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		0.029	0.0083	ppm v/v			05/20/21 05:13	1.46
<b>Benzene</b>	<b>0.00026</b>	J	0.0012	0.00012	ppm v/v			05/20/21 05:13	1.46
Benzyl chloride	ND		0.0023	0.00055	ppm v/v			05/20/21 05:13	1.46
Bromodichloromethane	ND		0.0012	0.00026	ppm v/v			05/20/21 05:13	1.46
Bromoform	ND		0.0012	0.00013	ppm v/v			05/20/21 05:13	1.46
Bromomethane	ND		0.0012	0.00032	ppm v/v			05/20/21 05:13	1.46
2-Butanone (MEK)	ND		0.0058	0.0011	ppm v/v			05/20/21 05:13	1.46
<b>Carbon disulfide</b>	<b>0.00041</b>	J B	0.0029	0.00016	ppm v/v			05/20/21 05:13	1.46
<b>Carbon tetrachloride</b>	<b>0.00034</b>	J	0.0012	0.00010	ppm v/v			05/20/21 05:13	1.46
<b>Chlorobenzene</b>	<b>0.00012</b>	J B	0.0012	0.000088	ppm v/v			05/20/21 05:13	1.46
Chloroethane	ND		0.0012	0.00042	ppm v/v			05/20/21 05:13	1.46
<b>Chloroform</b>	<b>0.0020</b>		0.0012	0.00010	ppm v/v			05/20/21 05:13	1.46
Chloromethane	ND		0.0029	0.00096	ppm v/v			05/20/21 05:13	1.46
Dibromochloromethane	ND		0.0012	0.00010	ppm v/v			05/20/21 05:13	1.46
1,2-Dibromoethane (EDB)	ND		0.0012	0.00010	ppm v/v			05/20/21 05:13	1.46
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.0012	0.00018	ppm v/v			05/20/21 05:13	1.46
1,2-Dichlorobenzene	ND		0.0012	0.00045	ppm v/v			05/20/21 05:13	1.46
1,3-Dichlorobenzene	ND		0.0012	0.00023	ppm v/v			05/20/21 05:13	1.46

Eurofins TestAmerica, Knoxville



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114910-001 / MWL-SV03-200

Lab Sample ID: 140-23051-15

Date Collected: 05/06/21 10:16

Matrix: Air

Date Received: 05/11/21 11:45

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
1,4-Dichlorobenzene	ND		0.0012	0.00023	ppm v/v			05/20/21 05:13	1.46
Dichlorodifluoromethane	0.045		0.0012	0.00020	ppm v/v			05/20/21 05:13	1.46
1,1-Dichloroethane	0.0052		0.0012	0.00010	ppm v/v			05/20/21 05:13	1.46
1,2-Dichloroethane	ND		0.0012	0.00015	ppm v/v			05/20/21 05:13	1.46
1,1-Dichloroethene	0.021		0.0012	0.00012	ppm v/v			05/20/21 05:13	1.46
cis-1,2-Dichloroethene	0.0032		0.0012	0.00015	ppm v/v			05/20/21 05:13	1.46
trans-1,2-Dichloroethene	ND		0.0012	0.00010	ppm v/v			05/20/21 05:13	1.46
1,2-Dichloropropane	ND		0.0012	0.00015	ppm v/v			05/20/21 05:13	1.46
cis-1,3-Dichloropropene	ND		0.0012	0.00023	ppm v/v			05/20/21 05:13	1.46
trans-1,3-Dichloropropene	ND		0.0012	0.00013	ppm v/v			05/20/21 05:13	1.46
Ethylbenzene	ND		0.0012	0.00019	ppm v/v			05/20/21 05:13	1.46
4-Ethyltoluene	ND		0.0023	0.00031	ppm v/v			05/20/21 05:13	1.46
Hexachlorobutadiene	ND		0.0058	0.00047	ppm v/v			05/20/21 05:13	1.46
2-Hexanone	ND		0.0029	0.00023	ppm v/v			05/20/21 05:13	1.46
4-Methyl-2-pentanone (MIBK)	ND		0.0029	0.00079	ppm v/v			05/20/21 05:13	1.46
Methylene Chloride	ND		0.0058	0.0057	ppm v/v			05/20/21 05:13	1.46
Styrene	ND		0.0012	0.00035	ppm v/v			05/20/21 05:13	1.46
1,1,2,2-Tetrachloroethane	ND		0.0012	0.00020	ppm v/v			05/20/21 05:13	1.46
Tetrachloroethene	0.23		0.0012	0.00010	ppm v/v			05/20/21 05:13	1.46
Toluene	ND		0.0018	0.0011	ppm v/v			05/20/21 05:13	1.46
1,1,2-Trichloro-1,2,2-trifluoroethane	0.12		0.0012	0.00012	ppm v/v			05/20/21 05:13	1.46
1,2,4-Trichlorobenzene	ND		0.0058	0.00093	ppm v/v			05/20/21 05:13	1.46
1,1,1-Trichloroethane	0.0015		0.0012	0.00054	ppm v/v			05/20/21 05:13	1.46
1,1,2-Trichloroethane	ND		0.0012	0.00010	ppm v/v			05/20/21 05:13	1.46
Trichloroethene	0.22		0.00058	0.00019	ppm v/v			05/20/21 05:13	1.46
Trichlorofluoromethane	0.033		0.0012	0.00016	ppm v/v			05/20/21 05:13	1.46
1,2,4-Trimethylbenzene	ND		0.0012	0.00029	ppm v/v			05/20/21 05:13	1.46
1,3,5-Trimethylbenzene	ND		0.0012	0.00032	ppm v/v			05/20/21 05:13	1.46
Vinyl acetate	ND		0.0058	0.00041	ppm v/v			05/20/21 05:13	1.46
Vinyl chloride	ND		0.00058	0.00038	ppm v/v			05/20/21 05:13	1.46
m,p-Xylene	ND		0.0012	0.00042	ppm v/v			05/20/21 05:13	1.46
o-Xylene	ND		0.0012	0.00022	ppm v/v			05/20/21 05:13	1.46
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	90		60 - 140					05/20/21 05:13	1.46

Client Sample ID: 114911-001 / MWL-SV03-300

Lab Sample ID: 140-23051-16

Date Collected: 05/06/21 10:25

Matrix: Air

Date Received: 05/11/21 11:45

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		0.042	0.012	ppm v/v			05/20/21 21:47	1.46
Benzene	0.00025	J	0.0017	0.00017	ppm v/v			05/20/21 21:47	1.46
Benzyl chloride	ND		0.0033	0.00079	ppm v/v			05/20/21 21:47	1.46
Bromodichloromethane	ND		0.0017	0.00038	ppm v/v			05/20/21 21:47	1.46
Bromoform	ND		0.0017	0.00019	ppm v/v			05/20/21 21:47	1.46

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114911-001 / MWL-SV03-300

Lab Sample ID: 140-23051-16

Date Collected: 05/06/21 10:25

Matrix: Air

Date Received: 05/11/21 11:45

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
Bromomethane	ND	*+	0.0017	0.00046	ppm v/v			05/20/21 21:47	1.46
2-Butanone (MEK)	ND		0.0083	0.0015	ppm v/v			05/20/21 21:47	1.46
Carbon disulfide	0.00031	J B	0.0042	0.00023	ppm v/v			05/20/21 21:47	1.46
Carbon tetrachloride	0.00023	J	0.0017	0.00015	ppm v/v			05/20/21 21:47	1.46
Chlorobenzene	0.00019	J	0.0017	0.00013	ppm v/v			05/20/21 21:47	1.46
Chloroethane	ND		0.0017	0.00060	ppm v/v			05/20/21 21:47	1.46
Chloroform	0.0011	J	0.0017	0.00015	ppm v/v			05/20/21 21:47	1.46
Chloromethane	ND		0.0042	0.0014	ppm v/v			05/20/21 21:47	1.46
Dibromochloromethane	ND		0.0017	0.00015	ppm v/v			05/20/21 21:47	1.46
1,2-Dibromoethane (EDB)	ND		0.0017	0.00015	ppm v/v			05/20/21 21:47	1.46
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.0017	0.00025	ppm v/v			05/20/21 21:47	1.46
1,2-Dichlorobenzene	ND		0.0017	0.00065	ppm v/v			05/20/21 21:47	1.46
1,3-Dichlorobenzene	ND		0.0017	0.00033	ppm v/v			05/20/21 21:47	1.46
1,4-Dichlorobenzene	ND		0.0017	0.00033	ppm v/v			05/20/21 21:47	1.46
Dichlorodifluoromethane	0.032		0.0017	0.00029	ppm v/v			05/20/21 21:47	1.46
1,1-Dichloroethane	0.0020		0.0017	0.00015	ppm v/v			05/20/21 21:47	1.46
1,2-Dichloroethane	ND		0.0017	0.00021	ppm v/v			05/20/21 21:47	1.46
1,1-Dichloroethene	0.012		0.0017	0.00017	ppm v/v			05/20/21 21:47	1.46
cis-1,2-Dichloroethene	0.0015	J	0.0017	0.00021	ppm v/v			05/20/21 21:47	1.46
trans-1,2-Dichloroethene	ND		0.0017	0.00015	ppm v/v			05/20/21 21:47	1.46
1,2-Dichloropropane	ND		0.0017	0.00021	ppm v/v			05/20/21 21:47	1.46
cis-1,3-Dichloropropene	ND		0.0017	0.00033	ppm v/v			05/20/21 21:47	1.46
trans-1,3-Dichloropropene	ND		0.0017	0.00019	ppm v/v			05/20/21 21:47	1.46
Ethylbenzene	ND		0.0017	0.00027	ppm v/v			05/20/21 21:47	1.46
4-Ethyltoluene	ND		0.0033	0.00044	ppm v/v			05/20/21 21:47	1.46
Hexachlorobutadiene	ND	*+	0.0083	0.00067	ppm v/v			05/20/21 21:47	1.46
2-Hexanone	ND		0.0042	0.00033	ppm v/v			05/20/21 21:47	1.46
4-Methyl-2-pentanone (MIBK)	ND		0.0042	0.0011	ppm v/v			05/20/21 21:47	1.46
Methylene Chloride	ND		0.0083	0.0081	ppm v/v			05/20/21 21:47	1.46
Styrene	ND		0.0017	0.00050	ppm v/v			05/20/21 21:47	1.46
1,1,2,2-Tetrachloroethane	ND		0.0017	0.00029	ppm v/v			05/20/21 21:47	1.46
Tetrachloroethene	0.20		0.0017	0.00015	ppm v/v			05/20/21 21:47	1.46
Toluene	ND		0.0025	0.0016	ppm v/v			05/20/21 21:47	1.46
1,1,2-Trichloro-1,2,2-trifluoroethane	0.077		0.0017	0.00017	ppm v/v			05/20/21 21:47	1.46
1,2,4-Trichlorobenzene	ND		0.0083	0.0013	ppm v/v			05/20/21 21:47	1.46
1,1,1-Trichloroethane	ND		0.0017	0.00077	ppm v/v			05/20/21 21:47	1.46
1,1,2-Trichloroethane	ND		0.0017	0.00015	ppm v/v			05/20/21 21:47	1.46
Trichloroethene	0.14		0.00083	0.00027	ppm v/v			05/20/21 21:47	1.46
Trichlorofluoromethane	0.012		0.0017	0.00023	ppm v/v			05/20/21 21:47	1.46
1,2,4-Trimethylbenzene	ND		0.0017	0.00042	ppm v/v			05/20/21 21:47	1.46
1,3,5-Trimethylbenzene	ND		0.0017	0.00046	ppm v/v			05/20/21 21:47	1.46
Vinyl acetate	ND		0.0083	0.00058	ppm v/v			05/20/21 21:47	1.46
Vinyl chloride	ND		0.00083	0.00054	ppm v/v			05/20/21 21:47	1.46
m,p-Xylene	ND		0.0017	0.00060	ppm v/v			05/20/21 21:47	1.46
o-Xylene	ND		0.0017	0.00031	ppm v/v			05/20/21 21:47	1.46

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		60 - 140		05/20/21 21:47	1.46

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114912-001 / MWL-SV03-400

Lab Sample ID: 140-23051-17

Date Collected: 05/06/21 11:09

Matrix: Air

Date Received: 05/11/21 11:45

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		0.055	0.016	ppm v/v			05/20/21 22:37	1.64
<b>Benzene</b>	<b>0.00031</b>	<b>J</b>	0.0022	0.00022	ppm v/v			05/20/21 22:37	1.64
Benzyl chloride	ND		0.0044	0.0010	ppm v/v			05/20/21 22:37	1.64
Bromodichloromethane	ND		0.0022	0.00049	ppm v/v			05/20/21 22:37	1.64
Bromoform	ND		0.0022	0.00025	ppm v/v			05/20/21 22:37	1.64
Bromomethane	ND	*+	0.0022	0.00060	ppm v/v			05/20/21 22:37	1.64
2-Butanone (MEK)	ND		0.011	0.0020	ppm v/v			05/20/21 22:37	1.64
<b>Carbon disulfide</b>	<b>0.00049</b>	<b>J B</b>	0.0055	0.00030	ppm v/v			05/20/21 22:37	1.64
<b>Carbon tetrachloride</b>	<b>0.00021</b>	<b>J</b>	0.0022	0.00019	ppm v/v			05/20/21 22:37	1.64
<b>Chlorobenzene</b>	<b>0.00026</b>	<b>J</b>	0.0022	0.00016	ppm v/v			05/20/21 22:37	1.64
Chloroethane	ND		0.0022	0.00079	ppm v/v			05/20/21 22:37	1.64
<b>Chloroform</b>	<b>0.0011</b>	<b>J</b>	0.0022	0.00019	ppm v/v			05/20/21 22:37	1.64
Chloromethane	ND		0.0055	0.0018	ppm v/v			05/20/21 22:37	1.64
Dibromochloromethane	ND		0.0022	0.00019	ppm v/v			05/20/21 22:37	1.64
1,2-Dibromoethane (EDB)	ND		0.0022	0.00019	ppm v/v			05/20/21 22:37	1.64
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.0022	0.00033	ppm v/v			05/20/21 22:37	1.64
1,2-Dichlorobenzene	ND		0.0022	0.00085	ppm v/v			05/20/21 22:37	1.64
1,3-Dichlorobenzene	ND		0.0022	0.00044	ppm v/v			05/20/21 22:37	1.64
1,4-Dichlorobenzene	ND		0.0022	0.00044	ppm v/v			05/20/21 22:37	1.64
<b>Dichlorodifluoromethane</b>	<b>0.0048</b>		0.0022	0.00038	ppm v/v			05/20/21 22:37	1.64
<b>1,1-Dichloroethane</b>	<b>0.0025</b>		0.0022	0.00019	ppm v/v			05/20/21 22:37	1.64
1,2-Dichloroethane	ND		0.0022	0.00027	ppm v/v			05/20/21 22:37	1.64
<b>1,1-Dichloroethene</b>	<b>0.014</b>		0.0022	0.00022	ppm v/v			05/20/21 22:37	1.64
<b>cis-1,2-Dichloroethene</b>	<b>0.0014</b>	<b>J</b>	0.0022	0.00027	ppm v/v			05/20/21 22:37	1.64
trans-1,2-Dichloroethene	ND		0.0022	0.00019	ppm v/v			05/20/21 22:37	1.64
1,2-Dichloropropane	ND		0.0022	0.00027	ppm v/v			05/20/21 22:37	1.64
cis-1,3-Dichloropropene	ND		0.0022	0.00044	ppm v/v			05/20/21 22:37	1.64
trans-1,3-Dichloropropene	ND		0.0022	0.00025	ppm v/v			05/20/21 22:37	1.64
Ethylbenzene	ND		0.0022	0.00036	ppm v/v			05/20/21 22:37	1.64
4-Ethyltoluene	ND		0.0044	0.00057	ppm v/v			05/20/21 22:37	1.64
Hexachlorobutadiene	ND	*+	0.011	0.00087	ppm v/v			05/20/21 22:37	1.64
2-Hexanone	ND		0.0055	0.00044	ppm v/v			05/20/21 22:37	1.64
4-Methyl-2-pentanone (MIBK)	ND		0.0055	0.0015	ppm v/v			05/20/21 22:37	1.64
Methylene Chloride	ND		0.011	0.011	ppm v/v			05/20/21 22:37	1.64
Styrene	ND		0.0022	0.00066	ppm v/v			05/20/21 22:37	1.64
1,1,2,2-Tetrachloroethane	ND		0.0022	0.00038	ppm v/v			05/20/21 22:37	1.64
<b>Tetrachloroethene</b>	<b>0.32</b>		0.0022	0.00019	ppm v/v			05/20/21 22:37	1.64
Toluene	ND		0.0033	0.0021	ppm v/v			05/20/21 22:37	1.64
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.025</b>		0.0022	0.00022	ppm v/v			05/20/21 22:37	1.64
1,2,4-Trichlorobenzene	ND		0.011	0.0017	ppm v/v			05/20/21 22:37	1.64
1,1,1-Trichloroethane	ND		0.0022	0.0010	ppm v/v			05/20/21 22:37	1.64
1,1,2-Trichloroethane	ND		0.0022	0.00019	ppm v/v			05/20/21 22:37	1.64
<b>Trichloroethene</b>	<b>0.18</b>		0.0011	0.00036	ppm v/v			05/20/21 22:37	1.64
<b>Trichlorofluoromethane</b>	<b>0.0073</b>		0.0022	0.00030	ppm v/v			05/20/21 22:37	1.64
1,2,4-Trimethylbenzene	ND		0.0022	0.00055	ppm v/v			05/20/21 22:37	1.64
1,3,5-Trimethylbenzene	ND		0.0022	0.00060	ppm v/v			05/20/21 22:37	1.64
Vinyl acetate	ND		0.011	0.00077	ppm v/v			05/20/21 22:37	1.64
Vinyl chloride	ND		0.0011	0.00071	ppm v/v			05/20/21 22:37	1.64

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

**Client Sample ID: 114912-001 / MWL-SV03-400**

**Lab Sample ID: 140-23051-17**

**Date Collected: 05/06/21 11:09**

**Matrix: Air**

**Date Received: 05/11/21 11:45**

**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		0.0022	0.00079	ppm v/v			05/20/21 22:37	1.64
o-Xylene	ND		0.0022	0.00041	ppm v/v			05/20/21 22:37	1.64
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		60 - 140					05/20/21 22:37	1.64

**Client Sample ID: 114913-001 / MWL-SV03-400**

**Lab Sample ID: 140-23051-18**

**Date Collected: 05/06/21 11:09**

**Matrix: Air**

**Date Received: 05/11/21 11:45**

**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		0.055	0.016	ppm v/v			05/21/21 08:19	1.64
<b>Benzene</b>	<b>0.00035</b>	<b>J</b>	0.0022	0.00022	ppm v/v			05/21/21 08:19	1.64
Benzyl chloride	ND		0.0044	0.0010	ppm v/v			05/21/21 08:19	1.64
Bromodichloromethane	ND		0.0022	0.00049	ppm v/v			05/21/21 08:19	1.64
Bromoform	ND		0.0022	0.00025	ppm v/v			05/21/21 08:19	1.64
Bromomethane	ND	*+	0.0022	0.00060	ppm v/v			05/21/21 08:19	1.64
2-Butanone (MEK)	ND		0.011	0.0020	ppm v/v			05/21/21 08:19	1.64
<b>Carbon disulfide</b>	<b>0.00037</b>	<b>J B</b>	0.0055	0.00030	ppm v/v			05/21/21 08:19	1.64
Carbon tetrachloride	ND		0.0022	0.00019	ppm v/v			05/21/21 08:19	1.64
Chlorobenzene	ND		0.0022	0.00016	ppm v/v			05/21/21 08:19	1.64
Chloroethane	ND		0.0022	0.00079	ppm v/v			05/21/21 08:19	1.64
<b>Chloroform</b>	<b>0.0012</b>	<b>J</b>	0.0022	0.00019	ppm v/v			05/21/21 08:19	1.64
Chloromethane	ND		0.0055	0.0018	ppm v/v			05/21/21 08:19	1.64
Dibromochloromethane	ND		0.0022	0.00019	ppm v/v			05/21/21 08:19	1.64
1,2-Dibromoethane (EDB)	ND		0.0022	0.00019	ppm v/v			05/21/21 08:19	1.64
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.0022	0.00033	ppm v/v			05/21/21 08:19	1.64
1,2-Dichlorobenzene	ND		0.0022	0.00085	ppm v/v			05/21/21 08:19	1.64
1,3-Dichlorobenzene	ND		0.0022	0.00044	ppm v/v			05/21/21 08:19	1.64
1,4-Dichlorobenzene	ND		0.0022	0.00044	ppm v/v			05/21/21 08:19	1.64
<b>Dichlorodifluoromethane</b>	<b>0.0051</b>		0.0022	0.00038	ppm v/v			05/21/21 08:19	1.64
<b>1,1-Dichloroethane</b>	<b>0.0026</b>		0.0022	0.00019	ppm v/v			05/21/21 08:19	1.64
1,2-Dichloroethane	ND		0.0022	0.00027	ppm v/v			05/21/21 08:19	1.64
<b>1,1-Dichloroethene</b>	<b>0.014</b>		0.0022	0.00022	ppm v/v			05/21/21 08:19	1.64
<b>cis-1,2-Dichloroethene</b>	<b>0.0015</b>	<b>J</b>	0.0022	0.00027	ppm v/v			05/21/21 08:19	1.64
trans-1,2-Dichloroethene	ND		0.0022	0.00019	ppm v/v			05/21/21 08:19	1.64
1,2-Dichloropropane	ND		0.0022	0.00027	ppm v/v			05/21/21 08:19	1.64
cis-1,3-Dichloropropene	ND		0.0022	0.00044	ppm v/v			05/21/21 08:19	1.64
trans-1,3-Dichloropropene	ND		0.0022	0.00025	ppm v/v			05/21/21 08:19	1.64
Ethylbenzene	ND		0.0022	0.00036	ppm v/v			05/21/21 08:19	1.64
4-Ethyltoluene	ND		0.0044	0.00057	ppm v/v			05/21/21 08:19	1.64
Hexachlorobutadiene	ND	*+	0.011	0.00087	ppm v/v			05/21/21 08:19	1.64
2-Hexanone	ND		0.0055	0.00044	ppm v/v			05/21/21 08:19	1.64
4-Methyl-2-pentanone (MIBK)	ND		0.0055	0.0015	ppm v/v			05/21/21 08:19	1.64
Methylene Chloride	ND		0.011	0.011	ppm v/v			05/21/21 08:19	1.64
Styrene	ND		0.0022	0.00066	ppm v/v			05/21/21 08:19	1.64
1,1,2,2-Tetrachloroethane	ND		0.0022	0.00038	ppm v/v			05/21/21 08:19	1.64

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114913-001 / MWL-SV03-400

Lab Sample ID: 140-23051-18

Date Collected: 05/06/21 11:09

Matrix: Air

Date Received: 05/11/21 11:45

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	0.32		0.0022	0.00019	ppm v/v			05/21/21 08:19	1.64
Toluene	ND		0.0033	0.0021	ppm v/v			05/21/21 08:19	1.64
1,1,2-Trichloro-1,2,2-trifluoroethane	0.025		0.0022	0.00022	ppm v/v			05/21/21 08:19	1.64
1,2,4-Trichlorobenzene	ND		0.011	0.0017	ppm v/v			05/21/21 08:19	1.64
1,1,1-Trichloroethane	ND		0.0022	0.0010	ppm v/v			05/21/21 08:19	1.64
1,1,2-Trichloroethane	ND		0.0022	0.00019	ppm v/v			05/21/21 08:19	1.64
Trichloroethene	0.18		0.0011	0.00036	ppm v/v			05/21/21 08:19	1.64
Trichlorofluoromethane	0.0075		0.0022	0.00030	ppm v/v			05/21/21 08:19	1.64
1,2,4-Trimethylbenzene	ND		0.0022	0.00055	ppm v/v			05/21/21 08:19	1.64
1,3,5-Trimethylbenzene	ND		0.0022	0.00060	ppm v/v			05/21/21 08:19	1.64
Vinyl acetate	ND		0.011	0.00077	ppm v/v			05/21/21 08:19	1.64
Vinyl chloride	ND		0.0011	0.00071	ppm v/v			05/21/21 08:19	1.64
m,p-Xylene	ND		0.0022	0.00079	ppm v/v			05/21/21 08:19	1.64
o-Xylene	ND		0.0022	0.00041	ppm v/v			05/21/21 08:19	1.64
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		60 - 140					05/21/21 08:19	1.64

Client Sample ID: 114920-001 / MWL-FB5

Lab Sample ID: 140-23051-19

Date Collected: 05/06/21 11:34

Matrix: Air

Date Received: 05/11/21 11:45

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		0.0020	0.00057	ppm v/v			05/18/21 15:33	1.53
Benzene	ND		0.000080	0.0000080	ppm v/v			05/18/21 15:33	1.53
Benzyl chloride	ND		0.00016	0.000038	ppm v/v			05/18/21 15:33	1.53
Bromodichloromethane	ND		0.000080	0.000018	ppm v/v			05/18/21 15:33	1.53
Bromoform	ND		0.000080	0.0000090	ppm v/v			05/18/21 15:33	1.53
Bromomethane	ND	*+	0.000080	0.000022	ppm v/v			05/18/21 15:33	1.53
2-Butanone (MEK)	ND		0.00040	0.000073	ppm v/v			05/18/21 15:33	1.53
Carbon disulfide	0.000023	J B	0.00020	0.000011	ppm v/v			05/18/21 15:33	1.53
Carbon tetrachloride	ND		0.000080	0.0000070	ppm v/v			05/18/21 15:33	1.53
Chlorobenzene	0.0000077	J B	0.000080	0.0000060	ppm v/v			05/18/21 15:33	1.53
Chloroethane	ND		0.000080	0.000029	ppm v/v			05/18/21 15:33	1.53
Chloroform	ND		0.000080	0.0000070	ppm v/v			05/18/21 15:33	1.53
Chloromethane	ND		0.00020	0.000066	ppm v/v			05/18/21 15:33	1.53
Dibromochloromethane	ND		0.000080	0.0000070	ppm v/v			05/18/21 15:33	1.53
1,2-Dibromoethane (EDB)	ND		0.000080	0.0000070	ppm v/v			05/18/21 15:33	1.53
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.000080	0.000012	ppm v/v			05/18/21 15:33	1.53
1,2-Dichlorobenzene	ND		0.000080	0.000031	ppm v/v			05/18/21 15:33	1.53
1,3-Dichlorobenzene	ND		0.000080	0.000016	ppm v/v			05/18/21 15:33	1.53
1,4-Dichlorobenzene	ND		0.000080	0.000016	ppm v/v			05/18/21 15:33	1.53
Dichlorodifluoromethane	ND		0.000080	0.000014	ppm v/v			05/18/21 15:33	1.53
1,1-Dichloroethane	ND		0.000080	0.0000070	ppm v/v			05/18/21 15:33	1.53
1,2-Dichloroethane	ND		0.000080	0.000010	ppm v/v			05/18/21 15:33	1.53
1,1-Dichloroethene	ND		0.000080	0.0000080	ppm v/v			05/18/21 15:33	1.53

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114920-001 / MWL-FB5

Lab Sample ID: 140-23051-19

Date Collected: 05/06/21 11:34

Matrix: Air

Date Received: 05/11/21 11:45

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		0.000080	0.000010	ppm v/v			05/18/21 15:33	1.53
trans-1,2-Dichloroethene	ND		0.000080	0.0000070	ppm v/v			05/18/21 15:33	1.53
1,2-Dichloropropane	ND		0.000080	0.000010	ppm v/v			05/18/21 15:33	1.53
cis-1,3-Dichloropropene	ND		0.000080	0.000016	ppm v/v			05/18/21 15:33	1.53
trans-1,3-Dichloropropene	ND		0.000080	0.0000090	ppm v/v			05/18/21 15:33	1.53
Ethylbenzene	ND		0.000080	0.000013	ppm v/v			05/18/21 15:33	1.53
4-Ethyltoluene	ND		0.00016	0.000021	ppm v/v			05/18/21 15:33	1.53
Hexachlorobutadiene	ND		0.00040	0.000032	ppm v/v			05/18/21 15:33	1.53
2-Hexanone	ND		0.00020	0.000016	ppm v/v			05/18/21 15:33	1.53
4-Methyl-2-pentanone (MIBK)	ND		0.00020	0.000054	ppm v/v			05/18/21 15:33	1.53
Methylene Chloride	0.00059		0.00040	0.00039	ppm v/v			05/18/21 15:33	1.53
Styrene	ND		0.000080	0.000024	ppm v/v			05/18/21 15:33	1.53
1,1,2,2-Tetrachloroethane	ND		0.000080	0.000014	ppm v/v			05/18/21 15:33	1.53
Tetrachloroethene	ND		0.000080	0.0000070	ppm v/v			05/18/21 15:33	1.53
Toluene	ND		0.00012	0.000078	ppm v/v			05/18/21 15:33	1.53
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.000080	0.0000080	ppm v/v			05/18/21 15:33	1.53
1,2,4-Trichlorobenzene	ND		0.00040	0.000064	ppm v/v			05/18/21 15:33	1.53
1,1,1-Trichloroethane	ND		0.000080	0.000037	ppm v/v			05/18/21 15:33	1.53
1,1,2-Trichloroethane	ND		0.000080	0.0000070	ppm v/v			05/18/21 15:33	1.53
Trichloroethene	ND		0.000040	0.000013	ppm v/v			05/18/21 15:33	1.53
Trichlorofluoromethane	0.000021	J	0.000080	0.000011	ppm v/v			05/18/21 15:33	1.53
1,2,4-Trimethylbenzene	ND		0.000080	0.000020	ppm v/v			05/18/21 15:33	1.53
1,3,5-Trimethylbenzene	ND		0.000080	0.000022	ppm v/v			05/18/21 15:33	1.53
Vinyl acetate	ND		0.00040	0.000028	ppm v/v			05/18/21 15:33	1.53
Vinyl chloride	ND		0.000040	0.000026	ppm v/v			05/18/21 15:33	1.53
m,p-Xylene	ND		0.000080	0.000029	ppm v/v			05/18/21 15:33	1.53
o-Xylene	ND		0.000080	0.000015	ppm v/v			05/18/21 15:33	1.53
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		60 - 140					05/18/21 15:33	1.53

Client Sample ID: 114921-001 / MWL-SV05-50

Lab Sample ID: 140-23051-20

Date Collected: 05/06/21 12:08

Matrix: Air

Date Received: 05/11/21 11:45

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	0.0077	J	0.016	0.0046	ppm v/v			05/21/21 00:09	1.45
Benzene	0.00017	J	0.00064	0.000064	ppm v/v			05/21/21 00:09	1.45
Benzyl chloride	ND		0.0013	0.00031	ppm v/v			05/21/21 00:09	1.45
Bromodichloromethane	ND		0.00064	0.00015	ppm v/v			05/21/21 00:09	1.45
Bromoform	ND		0.00064	0.000073	ppm v/v			05/21/21 00:09	1.45
Bromomethane	ND	*+	0.00064	0.00018	ppm v/v			05/21/21 00:09	1.45
2-Butanone (MEK)	0.00086	J	0.0032	0.00059	ppm v/v			05/21/21 00:09	1.45
Carbon disulfide	0.00025	J B	0.0016	0.000089	ppm v/v			05/21/21 00:09	1.45
Carbon tetrachloride	0.00026	J	0.00064	0.000056	ppm v/v			05/21/21 00:09	1.45
Chlorobenzene	0.000063	J	0.00064	0.000048	ppm v/v			05/21/21 00:09	1.45
Chloroethane	ND		0.00064	0.00023	ppm v/v			05/21/21 00:09	1.45

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114921-001 / MWL-SV05-50

Lab Sample ID: 140-23051-20

Date Collected: 05/06/21 12:08

Matrix: Air

Date Received: 05/11/21 11:45

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
<b>Chloroform</b>	<b>0.00099</b>		0.00064	0.000056	ppm v/v			05/21/21 00:09	1.45
Chloromethane	ND		0.0016	0.00053	ppm v/v			05/21/21 00:09	1.45
Dibromochloromethane	ND		0.00064	0.000056	ppm v/v			05/21/21 00:09	1.45
1,2-Dibromoethane (EDB)	ND		0.00064	0.000056	ppm v/v			05/21/21 00:09	1.45
<b>1,2-Dichloro-1,1,2,2-tetrafluoroethane</b>	<b>0.00017</b>	<b>J *+</b>	0.00064	0.000097	ppm v/v			05/21/21 00:09	1.45
1,2-Dichlorobenzene	ND		0.00064	0.00025	ppm v/v			05/21/21 00:09	1.45
1,3-Dichlorobenzene	ND		0.00064	0.00013	ppm v/v			05/21/21 00:09	1.45
1,4-Dichlorobenzene	ND		0.00064	0.00013	ppm v/v			05/21/21 00:09	1.45
<b>Dichlorodifluoromethane</b>	<b>0.042</b>		0.00064	0.00011	ppm v/v			05/21/21 00:09	1.45
<b>1,1-Dichloroethane</b>	<b>0.0012</b>		0.00064	0.000056	ppm v/v			05/21/21 00:09	1.45
1,2-Dichloroethane	ND		0.00064	0.000081	ppm v/v			05/21/21 00:09	1.45
<b>1,1-Dichloroethene</b>	<b>0.0078</b>		0.00064	0.000064	ppm v/v			05/21/21 00:09	1.45
<b>cis-1,2-Dichloroethene</b>	<b>0.00053</b>	<b>J</b>	0.00064	0.000081	ppm v/v			05/21/21 00:09	1.45
trans-1,2-Dichloroethene	ND		0.00064	0.000056	ppm v/v			05/21/21 00:09	1.45
1,2-Dichloropropane	ND		0.00064	0.000081	ppm v/v			05/21/21 00:09	1.45
cis-1,3-Dichloropropene	ND		0.00064	0.00013	ppm v/v			05/21/21 00:09	1.45
trans-1,3-Dichloropropene	ND		0.00064	0.000073	ppm v/v			05/21/21 00:09	1.45
Ethylbenzene	ND		0.00064	0.00010	ppm v/v			05/21/21 00:09	1.45
4-Ethyltoluene	ND		0.0013	0.00017	ppm v/v			05/21/21 00:09	1.45
Hexachlorobutadiene	ND	*+	0.0032	0.00026	ppm v/v			05/21/21 00:09	1.45
2-Hexanone	ND		0.0016	0.00013	ppm v/v			05/21/21 00:09	1.45
4-Methyl-2-pentanone (MIBK)	ND		0.0016	0.00044	ppm v/v			05/21/21 00:09	1.45
Methylene Chloride	ND		0.0032	0.0031	ppm v/v			05/21/21 00:09	1.45
Styrene	ND		0.00064	0.00019	ppm v/v			05/21/21 00:09	1.45
1,1,2,2-Tetrachloroethane	ND		0.00064	0.00011	ppm v/v			05/21/21 00:09	1.45
<b>Tetrachloroethene</b>	<b>0.042</b>		0.00064	0.000056	ppm v/v			05/21/21 00:09	1.45
Toluene	ND		0.00097	0.00063	ppm v/v			05/21/21 00:09	1.45
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.037</b>		0.00064	0.000064	ppm v/v			05/21/21 00:09	1.45
1,2,4-Trichlorobenzene	ND		0.0032	0.00052	ppm v/v			05/21/21 00:09	1.45
<b>1,1,1-Trichloroethane</b>	<b>0.0088</b>		0.00064	0.00030	ppm v/v			05/21/21 00:09	1.45
1,1,2-Trichloroethane	ND		0.00064	0.000056	ppm v/v			05/21/21 00:09	1.45
<b>Trichloroethene</b>	<b>0.048</b>		0.00032	0.00010	ppm v/v			05/21/21 00:09	1.45
<b>Trichlorofluoromethane</b>	<b>0.10</b>		0.00064	0.000089	ppm v/v			05/21/21 00:09	1.45
1,2,4-Trimethylbenzene	ND		0.00064	0.00016	ppm v/v			05/21/21 00:09	1.45
1,3,5-Trimethylbenzene	ND		0.00064	0.00018	ppm v/v			05/21/21 00:09	1.45
Vinyl acetate	ND		0.0032	0.00023	ppm v/v			05/21/21 00:09	1.45
Vinyl chloride	ND		0.00032	0.00021	ppm v/v			05/21/21 00:09	1.45
m,p-Xylene	ND		0.00064	0.00023	ppm v/v			05/21/21 00:09	1.45
o-Xylene	ND		0.00064	0.00012	ppm v/v			05/21/21 00:09	1.45

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		60 - 140		05/21/21 00:09	1.45

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114922-001 / MWL-SV05-100

Lab Sample ID: 140-23051-21

Date Collected: 05/06/21 12:09

Matrix: Air

Date Received: 05/11/21 11:45

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		0.037	0.011	ppm v/v			05/21/21 00:53	1.48
<b>Benzene</b>	<b>0.00031</b>	<b>J</b>	0.0015	0.00015	ppm v/v			05/21/21 00:53	1.48
Benzyl chloride	ND		0.0030	0.00070	ppm v/v			05/21/21 00:53	1.48
Bromodichloromethane	ND		0.0015	0.00033	ppm v/v			05/21/21 00:53	1.48
Bromoform	ND		0.0015	0.00017	ppm v/v			05/21/21 00:53	1.48
Bromomethane	ND	*+	0.0015	0.00041	ppm v/v			05/21/21 00:53	1.48
2-Butanone (MEK)	ND		0.0074	0.0014	ppm v/v			05/21/21 00:53	1.48
<b>Carbon disulfide</b>	<b>0.0043</b>	<b>B</b>	0.0037	0.00020	ppm v/v			05/21/21 00:53	1.48
<b>Carbon tetrachloride</b>	<b>0.00037</b>	<b>J</b>	0.0015	0.00013	ppm v/v			05/21/21 00:53	1.48
<b>Chlorobenzene</b>	<b>0.00015</b>	<b>J</b>	0.0015	0.00011	ppm v/v			05/21/21 00:53	1.48
Chloroethane	ND		0.0015	0.00054	ppm v/v			05/21/21 00:53	1.48
<b>Chloroform</b>	<b>0.0015</b>		0.0015	0.00013	ppm v/v			05/21/21 00:53	1.48
Chloromethane	ND		0.0037	0.0012	ppm v/v			05/21/21 00:53	1.48
Dibromochloromethane	ND		0.0015	0.00013	ppm v/v			05/21/21 00:53	1.48
1,2-Dibromoethane (EDB)	ND		0.0015	0.00013	ppm v/v			05/21/21 00:53	1.48
<b>1,2-Dichloro-1,1,2,2-tetrafluoroethane</b>	<b>0.00024</b>	<b>J *+</b>	0.0015	0.00022	ppm v/v			05/21/21 00:53	1.48
1,2-Dichlorobenzene	ND		0.0015	0.00057	ppm v/v			05/21/21 00:53	1.48
1,3-Dichlorobenzene	ND		0.0015	0.00030	ppm v/v			05/21/21 00:53	1.48
1,4-Dichlorobenzene	ND		0.0015	0.00030	ppm v/v			05/21/21 00:53	1.48
<b>Dichlorodifluoromethane</b>	<b>0.065</b>		0.0015	0.00026	ppm v/v			05/21/21 00:53	1.48
<b>1,1-Dichloroethane</b>	<b>0.0023</b>		0.0015	0.00013	ppm v/v			05/21/21 00:53	1.48
1,2-Dichloroethane	ND		0.0015	0.00019	ppm v/v			05/21/21 00:53	1.48
<b>1,1-Dichloroethene</b>	<b>0.016</b>		0.0015	0.00015	ppm v/v			05/21/21 00:53	1.48
<b>cis-1,2-Dichloroethene</b>	<b>0.00096</b>	<b>J</b>	0.0015	0.00019	ppm v/v			05/21/21 00:53	1.48
trans-1,2-Dichloroethene	ND		0.0015	0.00013	ppm v/v			05/21/21 00:53	1.48
1,2-Dichloropropane	ND		0.0015	0.00019	ppm v/v			05/21/21 00:53	1.48
cis-1,3-Dichloropropene	ND		0.0015	0.00030	ppm v/v			05/21/21 00:53	1.48
trans-1,3-Dichloropropene	ND		0.0015	0.00017	ppm v/v			05/21/21 00:53	1.48
Ethylbenzene	ND		0.0015	0.00024	ppm v/v			05/21/21 00:53	1.48
4-Ethyltoluene	ND		0.0030	0.00039	ppm v/v			05/21/21 00:53	1.48
Hexachlorobutadiene	ND	*+	0.0074	0.00059	ppm v/v			05/21/21 00:53	1.48
2-Hexanone	ND		0.0037	0.00030	ppm v/v			05/21/21 00:53	1.48
4-Methyl-2-pentanone (MIBK)	ND		0.0037	0.0010	ppm v/v			05/21/21 00:53	1.48
Methylene Chloride	ND		0.0074	0.0072	ppm v/v			05/21/21 00:53	1.48
Styrene	ND		0.0015	0.00044	ppm v/v			05/21/21 00:53	1.48
1,1,2,2-Tetrachloroethane	ND		0.0015	0.00026	ppm v/v			05/21/21 00:53	1.48
<b>Tetrachloroethene</b>	<b>0.069</b>		0.0015	0.00013	ppm v/v			05/21/21 00:53	1.48
Toluene	ND		0.0022	0.0014	ppm v/v			05/21/21 00:53	1.48
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.068</b>		0.0015	0.00015	ppm v/v			05/21/21 00:53	1.48
1,2,4-Trichlorobenzene	ND		0.0074	0.0012	ppm v/v			05/21/21 00:53	1.48
<b>1,1,1-Trichloroethane</b>	<b>0.0085</b>		0.0015	0.00068	ppm v/v			05/21/21 00:53	1.48
1,1,2-Trichloroethane	ND		0.0015	0.00013	ppm v/v			05/21/21 00:53	1.48
<b>Trichloroethene</b>	<b>0.087</b>		0.00074	0.00024	ppm v/v			05/21/21 00:53	1.48
<b>Trichlorofluoromethane</b>	<b>0.12</b>		0.0015	0.00020	ppm v/v			05/21/21 00:53	1.48
1,2,4-Trimethylbenzene	ND		0.0015	0.00037	ppm v/v			05/21/21 00:53	1.48
1,3,5-Trimethylbenzene	ND		0.0015	0.00041	ppm v/v			05/21/21 00:53	1.48
Vinyl acetate	ND		0.0074	0.00052	ppm v/v			05/21/21 00:53	1.48

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114922-001 / MWL-SV05-100

Lab Sample ID: 140-23051-21

Date Collected: 05/06/21 12:09

Matrix: Air

Date Received: 05/11/21 11:45

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
Vinyl chloride	ND		0.00074	0.00048	ppm v/v			05/21/21 00:53	1.48
m,p-Xylene	ND		0.0015	0.00054	ppm v/v			05/21/21 00:53	1.48
o-Xylene	ND		0.0015	0.00028	ppm v/v			05/21/21 00:53	1.48
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		60 - 140					05/21/21 00:53	1.48

Client Sample ID: 114923-001 / MWL-SV05-200

Lab Sample ID: 140-23051-22

Date Collected: 05/06/21 11:49

Matrix: Air

Date Received: 05/11/21 11:45

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		0.038	0.011	ppm v/v			05/22/21 14:27	1.5
Benzene	0.00038	J	0.0015	0.00015	ppm v/v			05/22/21 14:27	1.5
Benzyl chloride	ND		0.0030	0.00071	ppm v/v			05/22/21 14:27	1.5
Bromodichloromethane	ND		0.0015	0.00034	ppm v/v			05/22/21 14:27	1.5
Bromoform	ND		0.0015	0.00017	ppm v/v			05/22/21 14:27	1.5
Bromomethane	ND	*+	0.0015	0.00041	ppm v/v			05/22/21 14:27	1.5
2-Butanone (MEK)	ND		0.0075	0.0014	ppm v/v			05/22/21 14:27	1.5
Carbon disulfide	0.00027	J	0.0038	0.00021	ppm v/v			05/22/21 14:27	1.5
Carbon tetrachloride	0.00067	J	0.0015	0.00013	ppm v/v			05/22/21 14:27	1.5
Chlorobenzene	0.00017	J	0.0015	0.00011	ppm v/v			05/22/21 14:27	1.5
Chloroethane	ND		0.0015	0.00054	ppm v/v			05/22/21 14:27	1.5
Chloroform	0.0015		0.0015	0.00013	ppm v/v			05/22/21 14:27	1.5
Chloromethane	ND		0.0038	0.0012	ppm v/v			05/22/21 14:27	1.5
Dibromochloromethane	ND		0.0015	0.00013	ppm v/v			05/22/21 14:27	1.5
1,2-Dibromoethane (EDB)	ND		0.0015	0.00013	ppm v/v			05/22/21 14:27	1.5
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.0015	0.00023	ppm v/v			05/22/21 14:27	1.5
1,2-Dichlorobenzene	ND		0.0015	0.00058	ppm v/v			05/22/21 14:27	1.5
1,3-Dichlorobenzene	ND		0.0015	0.00030	ppm v/v			05/22/21 14:27	1.5
1,4-Dichlorobenzene	ND		0.0015	0.00030	ppm v/v			05/22/21 14:27	1.5
Dichlorodifluoromethane	0.058		0.0015	0.00026	ppm v/v			05/22/21 14:27	1.5
1,1-Dichloroethane	0.0034		0.0015	0.00013	ppm v/v			05/22/21 14:27	1.5
1,2-Dichloroethane	ND		0.0015	0.00019	ppm v/v			05/22/21 14:27	1.5
1,1-Dichloroethene	0.026		0.0015	0.00015	ppm v/v			05/22/21 14:27	1.5
cis-1,2-Dichloroethene	0.0018		0.0015	0.00019	ppm v/v			05/22/21 14:27	1.5
trans-1,2-Dichloroethene	ND		0.0015	0.00013	ppm v/v			05/22/21 14:27	1.5
1,2-Dichloropropane	ND		0.0015	0.00019	ppm v/v			05/22/21 14:27	1.5
cis-1,3-Dichloropropene	ND		0.0015	0.00030	ppm v/v			05/22/21 14:27	1.5
trans-1,3-Dichloropropene	ND		0.0015	0.00017	ppm v/v			05/22/21 14:27	1.5
Ethylbenzene	ND		0.0015	0.00024	ppm v/v			05/22/21 14:27	1.5
4-Ethyltoluene	ND		0.0030	0.00039	ppm v/v			05/22/21 14:27	1.5
Hexachlorobutadiene	ND	*+	0.0075	0.00060	ppm v/v			05/22/21 14:27	1.5
2-Hexanone	ND		0.0038	0.00030	ppm v/v			05/22/21 14:27	1.5
4-Methyl-2-pentanone (MIBK)	ND		0.0038	0.0010	ppm v/v			05/22/21 14:27	1.5
Methylene Chloride	ND		0.0075	0.0073	ppm v/v			05/22/21 14:27	1.5
Styrene	ND		0.0015	0.00045	ppm v/v			05/22/21 14:27	1.5

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMP

Job ID: 140-23051-1

Client Sample ID: 114923-001 / MWL-SV05-200

Lab Sample ID: 140-23051-22

Date Collected: 05/06/21 11:49

Matrix: Air

Date Received: 05/11/21 11:45

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
1,1,2,2-Tetrachloroethane	ND		0.0015	0.00026	ppm v/v			05/22/21 14:27	1.5
<b>Tetrachloroethene</b>	<b>0.11</b>		0.0015	0.00013	ppm v/v			05/22/21 14:27	1.5
Toluene	ND		0.0023	0.0015	ppm v/v			05/22/21 14:27	1.5
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.11</b>		0.0015	0.00015	ppm v/v			05/22/21 14:27	1.5
1,2,4-Trichlorobenzene	ND		0.0075	0.0012	ppm v/v			05/22/21 14:27	1.5
<b>1,1,1-Trichloroethane</b>	<b>0.0025</b>		0.0015	0.00069	ppm v/v			05/22/21 14:27	1.5
1,1,2-Trichloroethane	ND		0.0015	0.00013	ppm v/v			05/22/21 14:27	1.5
<b>Trichloroethene</b>	<b>0.16</b>		0.00075	0.00024	ppm v/v			05/22/21 14:27	1.5
<b>Trichlorofluoromethane</b>	<b>0.074</b>		0.0015	0.00021	ppm v/v			05/22/21 14:27	1.5
1,2,4-Trimethylbenzene	ND		0.0015	0.00038	ppm v/v			05/22/21 14:27	1.5
1,3,5-Trimethylbenzene	ND		0.0015	0.00041	ppm v/v			05/22/21 14:27	1.5
Vinyl acetate	ND		0.0075	0.00053	ppm v/v			05/22/21 14:27	1.5
Vinyl chloride	ND	*+	0.00075	0.00049	ppm v/v			05/22/21 14:27	1.5
m,p-Xylene	ND		0.0015	0.00054	ppm v/v			05/22/21 14:27	1.5
o-Xylene	ND		0.0015	0.00028	ppm v/v			05/22/21 14:27	1.5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		60 - 140					05/22/21 14:27	1.5

Client Sample ID: 114924-001 / MWL-SV05-300

Lab Sample ID: 140-23051-23

Date Collected: 05/06/21 11:59

Matrix: Air

Date Received: 05/11/21 11:45

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		0.031	0.0089	ppm v/v			05/21/21 02:24	1.56
<b>Benzene</b>	<b>0.00032</b>	<b>J</b>	0.0012	0.00012	ppm v/v			05/21/21 02:24	1.56
Benzyl chloride	ND		0.0025	0.00059	ppm v/v			05/21/21 02:24	1.56
Bromodichloromethane	ND		0.0012	0.00028	ppm v/v			05/21/21 02:24	1.56
Bromoform	ND		0.0012	0.00014	ppm v/v			05/21/21 02:24	1.56
Bromomethane	ND	*+	0.0012	0.00034	ppm v/v			05/21/21 02:24	1.56
2-Butanone (MEK)	ND		0.0062	0.0011	ppm v/v			05/21/21 02:24	1.56
<b>Carbon disulfide</b>	<b>0.00027</b>	<b>J B</b>	0.0031	0.00017	ppm v/v			05/21/21 02:24	1.56
<b>Carbon tetrachloride</b>	<b>0.00061</b>	<b>J</b>	0.0012	0.00011	ppm v/v			05/21/21 02:24	1.56
Chlorobenzene	ND		0.0012	0.000094	ppm v/v			05/21/21 02:24	1.56
Chloroethane	ND		0.0012	0.00045	ppm v/v			05/21/21 02:24	1.56
<b>Chloroform</b>	<b>0.00070</b>	<b>J</b>	0.0012	0.00011	ppm v/v			05/21/21 02:24	1.56
Chloromethane	ND		0.0031	0.0010	ppm v/v			05/21/21 02:24	1.56
Dibromochloromethane	ND		0.0012	0.00011	ppm v/v			05/21/21 02:24	1.56
1,2-Dibromoethane (EDB)	ND		0.0012	0.00011	ppm v/v			05/21/21 02:24	1.56
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.0012	0.00019	ppm v/v			05/21/21 02:24	1.56
1,2-Dichlorobenzene	ND		0.0012	0.00048	ppm v/v			05/21/21 02:24	1.56
1,3-Dichlorobenzene	ND		0.0012	0.00025	ppm v/v			05/21/21 02:24	1.56
1,4-Dichlorobenzene	ND		0.0012	0.00025	ppm v/v			05/21/21 02:24	1.56
<b>Dichlorodifluoromethane</b>	<b>0.038</b>		0.0012	0.00022	ppm v/v			05/21/21 02:24	1.56
<b>1,1-Dichloroethane</b>	<b>0.0014</b>		0.0012	0.00011	ppm v/v			05/21/21 02:24	1.56
1,2-Dichloroethane	ND		0.0012	0.00016	ppm v/v			05/21/21 02:24	1.56

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114924-001 / MWL-SV05-300

Lab Sample ID: 140-23051-23

Date Collected: 05/06/21 11:59

Matrix: Air

Date Received: 05/11/21 11:45

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-Dichloroethene	0.019		0.0012	0.00012	ppm v/v			05/21/21 02:24	1.56
cis-1,2-Dichloroethene	0.00077	J	0.0012	0.00016	ppm v/v			05/21/21 02:24	1.56
trans-1,2-Dichloroethene	ND		0.0012	0.00011	ppm v/v			05/21/21 02:24	1.56
1,2-Dichloropropane	ND		0.0012	0.00016	ppm v/v			05/21/21 02:24	1.56
cis-1,3-Dichloropropene	ND		0.0012	0.00025	ppm v/v			05/21/21 02:24	1.56
trans-1,3-Dichloropropene	ND		0.0012	0.00014	ppm v/v			05/21/21 02:24	1.56
Ethylbenzene	ND		0.0012	0.00020	ppm v/v			05/21/21 02:24	1.56
4-Ethyltoluene	ND		0.0025	0.00033	ppm v/v			05/21/21 02:24	1.56
Hexachlorobutadiene	ND	*+	0.0062	0.00050	ppm v/v			05/21/21 02:24	1.56
2-Hexanone	ND		0.0031	0.00025	ppm v/v			05/21/21 02:24	1.56
4-Methyl-2-pentanone (MIBK)	ND		0.0031	0.00084	ppm v/v			05/21/21 02:24	1.56
Methylene Chloride	ND		0.0062	0.0061	ppm v/v			05/21/21 02:24	1.56
Styrene	ND		0.0012	0.00037	ppm v/v			05/21/21 02:24	1.56
1,1,2,2-Tetrachloroethane	ND		0.0012	0.00022	ppm v/v			05/21/21 02:24	1.56
Tetrachloroethene	0.081		0.0012	0.00011	ppm v/v			05/21/21 02:24	1.56
Toluene	ND		0.0019	0.0012	ppm v/v			05/21/21 02:24	1.56
1,1,2-Trichloro-1,2,2-trifluoroethane	0.096		0.0012	0.00012	ppm v/v			05/21/21 02:24	1.56
1,2,4-Trichlorobenzene	ND		0.0062	0.0010	ppm v/v			05/21/21 02:24	1.56
1,1,1-Trichloroethane	0.00092	J	0.0012	0.00058	ppm v/v			05/21/21 02:24	1.56
1,1,2-Trichloroethane	ND		0.0012	0.00011	ppm v/v			05/21/21 02:24	1.56
Trichloroethene	0.088		0.00062	0.00020	ppm v/v			05/21/21 02:24	1.56
Trichlorofluoromethane	0.029		0.0012	0.00017	ppm v/v			05/21/21 02:24	1.56
1,2,4-Trimethylbenzene	ND		0.0012	0.00031	ppm v/v			05/21/21 02:24	1.56
1,3,5-Trimethylbenzene	ND		0.0012	0.00034	ppm v/v			05/21/21 02:24	1.56
Vinyl acetate	ND		0.0062	0.00044	ppm v/v			05/21/21 02:24	1.56
Vinyl chloride	ND		0.00062	0.00041	ppm v/v			05/21/21 02:24	1.56
m,p-Xylene	ND		0.0012	0.00045	ppm v/v			05/21/21 02:24	1.56
o-Xylene	ND		0.0012	0.00023	ppm v/v			05/21/21 02:24	1.56
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	90		60 - 140					05/21/21 02:24	1.56

Client Sample ID: 114925-001 / MWL-SV05-400

Lab Sample ID: 140-23051-24

Date Collected: 05/06/21 12:06

Matrix: Air

Date Received: 05/11/21 11:45

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		0.030	0.0084	ppm v/v			05/21/21 03:56	1.48
Benzene	0.00034	J	0.0012	0.00012	ppm v/v			05/21/21 03:56	1.48
Benzyl chloride	ND		0.0024	0.00056	ppm v/v			05/21/21 03:56	1.48
Bromodichloromethane	ND		0.0012	0.00027	ppm v/v			05/21/21 03:56	1.48
Bromoform	ND		0.0012	0.00013	ppm v/v			05/21/21 03:56	1.48
Bromomethane	ND	*+	0.0012	0.00033	ppm v/v			05/21/21 03:56	1.48
2-Butanone (MEK)	ND		0.0059	0.0011	ppm v/v			05/21/21 03:56	1.48
Carbon disulfide	0.00035	J B	0.0030	0.00016	ppm v/v			05/21/21 03:56	1.48
Carbon tetrachloride	0.00029	J	0.0012	0.00010	ppm v/v			05/21/21 03:56	1.48

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-23051-1

Client Sample ID: 114925-001 / MWL-SV05-400

Lab Sample ID: 140-23051-24

Date Collected: 05/06/21 12:06

Matrix: Air

Date Received: 05/11/21 11:45

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
Chlorobenzene	0.00013	J	0.0012	0.000089	ppm v/v			05/21/21 03:56	1.48
Chloroethane	ND		0.0012	0.00043	ppm v/v			05/21/21 03:56	1.48
Chloroform	0.00057	J	0.0012	0.00010	ppm v/v			05/21/21 03:56	1.48
Chloromethane	ND		0.0030	0.00098	ppm v/v			05/21/21 03:56	1.48
Dibromochloromethane	ND		0.0012	0.00010	ppm v/v			05/21/21 03:56	1.48
1,2-Dibromoethane (EDB)	ND		0.0012	0.00010	ppm v/v			05/21/21 03:56	1.48
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*+	0.0012	0.00018	ppm v/v			05/21/21 03:56	1.48
1,2-Dichlorobenzene	ND		0.0012	0.00046	ppm v/v			05/21/21 03:56	1.48
1,3-Dichlorobenzene	ND		0.0012	0.00024	ppm v/v			05/21/21 03:56	1.48
1,4-Dichlorobenzene	ND		0.0012	0.00024	ppm v/v			05/21/21 03:56	1.48
Dichlorodifluoromethane	0.016		0.0012	0.00021	ppm v/v			05/21/21 03:56	1.48
1,1-Dichloroethane	0.0010	J	0.0012	0.00010	ppm v/v			05/21/21 03:56	1.48
1,2-Dichloroethane	ND		0.0012	0.00015	ppm v/v			05/21/21 03:56	1.48
1,1-Dichloroethene	0.012		0.0012	0.00012	ppm v/v			05/21/21 03:56	1.48
cis-1,2-Dichloroethene	0.00051	J	0.0012	0.00015	ppm v/v			05/21/21 03:56	1.48
trans-1,2-Dichloroethene	ND		0.0012	0.00010	ppm v/v			05/21/21 03:56	1.48
1,2-Dichloropropane	ND		0.0012	0.00015	ppm v/v			05/21/21 03:56	1.48
cis-1,3-Dichloropropene	ND		0.0012	0.00024	ppm v/v			05/21/21 03:56	1.48
trans-1,3-Dichloropropene	ND		0.0012	0.00013	ppm v/v			05/21/21 03:56	1.48
Ethylbenzene	ND		0.0012	0.00019	ppm v/v			05/21/21 03:56	1.48
4-Ethyltoluene	ND		0.0024	0.00031	ppm v/v			05/21/21 03:56	1.48
Hexachlorobutadiene	ND	*+	0.0059	0.00047	ppm v/v			05/21/21 03:56	1.48
2-Hexanone	ND		0.0030	0.00024	ppm v/v			05/21/21 03:56	1.48
4-Methyl-2-pentanone (MIBK)	ND		0.0030	0.00080	ppm v/v			05/21/21 03:56	1.48
Methylene Chloride	ND		0.0059	0.0058	ppm v/v			05/21/21 03:56	1.48
Styrene	ND		0.0012	0.00036	ppm v/v			05/21/21 03:56	1.48
1,1,2,2-Tetrachloroethane	ND		0.0012	0.00021	ppm v/v			05/21/21 03:56	1.48
Tetrachloroethene	0.080		0.0012	0.00010	ppm v/v			05/21/21 03:56	1.48
Toluene	ND		0.0018	0.0012	ppm v/v			05/21/21 03:56	1.48
1,1,2-Trichloro-1,2,2-trifluoroethane	0.039		0.0012	0.00012	ppm v/v			05/21/21 03:56	1.48
1,2,4-Trichlorobenzene	ND		0.0059	0.00095	ppm v/v			05/21/21 03:56	1.48
1,1,1-Trichloroethane	0.00082	J	0.0012	0.00055	ppm v/v			05/21/21 03:56	1.48
1,1,2-Trichloroethane	ND		0.0012	0.00010	ppm v/v			05/21/21 03:56	1.48
Trichloroethene	0.067		0.00059	0.00019	ppm v/v			05/21/21 03:56	1.48
Trichlorofluoromethane	0.020		0.0012	0.00016	ppm v/v			05/21/21 03:56	1.48
1,2,4-Trimethylbenzene	ND		0.0012	0.00030	ppm v/v			05/21/21 03:56	1.48
1,3,5-Trimethylbenzene	ND		0.0012	0.00033	ppm v/v			05/21/21 03:56	1.48
Vinyl acetate	ND		0.0059	0.00041	ppm v/v			05/21/21 03:56	1.48
Vinyl chloride	ND		0.00059	0.00038	ppm v/v			05/21/21 03:56	1.48
m,p-Xylene	ND		0.0012	0.00043	ppm v/v			05/21/21 03:56	1.48
o-Xylene	ND		0.0012	0.00022	ppm v/v			05/21/21 03:56	1.48
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	88		60 - 140					05/21/21 03:56	1.48

## **Field Sampling Forms**

**November 2021 Soil-Vapor Monitoring**



## Soil Vapor Sampling Log Form

Location	Date	Time	Canister #	PID (ppm)	Flow Rate (cu FT/Hr)	Initial Canister Vacuum (PSI)	Ending Canister Vacuum (PSI)	Comments
MWL-SV-FB3	11/5/21	0834	10823	NA	NA	-24	-6	UPN
MWL-SV03-50	11/5/21	0839		0.0	10	NA	NA	
		↓	↓	↓	↓	↓	↓	
		0840						
		↓	↓	↓	↓	↓	↓	
		0841	34000185	NA	NA	-24	-6	
MWL-SV03-100	11/5/21	0843		0.0	10	NA	NA	
		↓	↓	↓	↓	↓	↓	
		0844						
		↓	↓	↓	↓	↓	↓	
		0845	12021	NA	NA	-24	-6	
MWL-SV03-200	11/5/21	0846		0.0	10	NA	NA	
		↓	↓	↓	↓	↓	↓	
		0848						
		↓	↓	↓	↓	↓	↓	
		0849	10512	NA	NA	-24	-6	
MWL-SV03-300	11/5/21	0850		0.1	10	NA	NA	
		↓	↓	↓	↓	↓	↓	
		0852						
		↓	↓	↓	↓	↓	↓	
		0855	34000700	NA	NA	-24	-6	
MWL-SV03-400	11/5/21	0903		0.1	10	NA	NA	
		↓	↓	↓	↓	↓	↓	
		0905						
		↓	↓	↓	↓	↓	↓	
		0915	11532	NA	NA	-24	-6	

Field Notes: PID 11.7 Lamp - SN: 914942

Continuous PID Readings During Purge.

Background PID Readings:

SV03- 0.0

Port's 4 + 5 Long Sampling Collection Times.

NMED OB Split Sampling Port 4&amp;5.

MWL Elevation ~5300 feet above mean sea level.



## Soil Vapor Sampling Log Form

Location	Date	Time	Canister #	PID (ppm)	Flow Rate (cu FT/hr)	Initial Canister Vacuum (PSI)	Ending Canister Vacuum (PSI)	Comments
MWL-SV-FB4	11/5/21	0934	11301	NA	NA	-26	-6	upn
MWL-SV04-50	11/5/21	1000	↓	1.0	10	NA	NA	
		↓	↓	↓	↓	↓	↓	
		1001	↓	↓	↓	↓	↓	
		1008	11566	NA	NA	-25	-6	
MWL-SV04-100	11/5/21	1009	↓	1.1	15	NA	NA	
		↓	↓	↓	↓	↓	↓	
		1010	↓	↓	↓	↓	↓	
		1011	34000259	NA	NA	-25	-6	
MWL-SV04-200	11/5/21	1011	↓	1.2	15	NA	NA	
		↓	↓	↓	↓	↓	↓	
		1012	↓	↓	↓	↓	↓	
		1020	34000206	NA	NA	-25	-6	SA
		1020	12101	NA	NA	-25	-6	DU
MWL-SV04-300	11/5/21	1021	↓	1.3	15	NA	NA	
		↓	↓	↓	↓	↓	↓	
		1022	↓	↓	↓	↓	↓	
		1023	11612	NA	NA	-25	-6	
MWL-SV04-400	11/5/21	1026	↓	1.4	15	NA	NA	
		↓	↓	↓	↓	↓	↓	
		1028	↓	↓	↓	↓	↓	
		1030	11231	NA	NA	-25	-6	SA
		1030	34002083	NA	NA	-25	-6	DU

Field Notes: PID- 11.7 Lamp - SN: 914942

Continuous PID Readings During Purge.

Background PID Readings:

SV04- 1.0

Port 1, 3

Long Sample collection time.

NMED OB Split Sampling Ports 4&amp;5

MWL Elevation ~5300 feet above mean sea level.

Smoke &amp; Hazy in the air. PID reading high



## Soil Vapor Sampling Log Form

Location	Date	Time	Canister #	PID (ppm)	Flow Rate (scf/hr)	Initial Canister Vacuum (PSI)	Ending Canister Vacuum (PSI)	Comments
MWL-SV-FB5	11/5/21	1049	12145	NA	NA	-24	-6	UPN
MWL-SV05-50	11/5/21	1054	↓	1.5	15	NA	NA	
	↓	↓	↓	↓	↓	↓	↓	
	↓	1055	↓	↓	↓	↓	↓	
	↓	1056	10411	NA	NA	-24	-6	
MWL-SV05-100	11/5/21	1056	↓	1.6	15	NA	NA	
	↓	↓	↓	↓	↓	↓	↓	
	↓	1057	↓	↓	↓	↓	↓	
	↓	1058	10472	NA	NA	-24	-6	
MWL-SV05-200	11/5/21	1058	↓	1.6	15	NA	NA	
	↓	↓	↓	↓	↓	↓	↓	
	↓	1059	↓	↓	↓	↓	↓	
	↓	1100	11028	NA	NA	-24	-6	
MWL-SV05-300	11/5/21	1101	↓	1.7	15	NA	NA	
	↓	↓	↓	↓	↓	↓	↓	
	↓	1102	↓	↓	↓	↓	↓	
	↓	1103	11998	NA	NA	-25	-6	
MWL-SV05-400	11/5/21	1106	↓	1.8	15	NA	NA	
	↓	↓	↓	↓	↓	↓	↓	
	↓	1108	↓	↓	↓	↓	↓	
	↓	1108	12022	NA	NA	-25	-6	

Field Notes: PID 11.7 Lamp - SN: 914942

Continuous PID Readings During Purge.

Background PID Readings:

SV05- 1.5

NMED OB Split Sampling Ports 4 & 5 w/DU

MWL Elevation ~5300 feet above mean sea level.

Smoke & Hazy in the air PID Reading high.

**Summary Sheet For**  
**November 2021 Soil-Vapor Samples**

**Sample Summary for Mixed Waste Landfill Soil-Vapor Monitoring**  
**November 2021**

Well ID	Sample Date	Sample ID / Port	SUMMA Number	ARCOC	Sample Number	Sample Type	Associated Field Blank (ARCOC #/Sample #)	Comments
<b>Mixed Waste Landfill Soil Vapor Monitoring: Project Task Number 195122.10.11.08 / Service Order Number CF 01-21</b>								
MWL-SV01	5-Nov-21	MWL-SV-01-42.5	09539	622647	116193	Environmental	622647 / 116192	
		MWL-SV-FB 1	34000613		116192	Field QC	n/a	Ultra Pure N2
MWL-SV02	5-Nov-21	MWL-SV02-41.5	11982	622648	116195	Environmental	622648 / 116194	
		MWL-SV-FB 2	34000021		116194	Field QC	n/a	Ultra Pure N2
MWL-SV03	5-Nov-21	MWL-SV03-50	34000185	622649	116197	Environmental	622649 / 116196	
		MWL-SV03-100	12021		116198	Environmental		
		MWL-SV03-200	10512		116199	Environmental		
		MWL-SV03-300	34000700		116200	Environmental		
		MWL-SV03-400	11532		116201	Environmental		
		MWL-SV-FB 3	10823		116196	Field QC	n/a	Ultra Pure N2
MWL-SV04	5-Nov-21	MWL-SV04-50	11566	622645	116203	Environmental	622645 / 116202	
		MWL-SV04-100	34000259		116204	Environmental		
		MWL-SV04-200	34000206		116205	Environmental		
		MWL-SV04-200	12101		116206	Duplicate		
		MWL-SV04-300	11612		116207	Environmental		
		MWL-SV04-400	11231		116208	Environmental		
		MWL-SV04-400	34002083		116209	Duplicate		
		MWL-SV-FB 4	11301		116202	Field QC	n/a	Ultra Pure N2
MWL-SV05	5-Nov-21	MWL-SV05-50	10411	622646	116211	Environmental	622646 / 116210	
		MWL-SV05-100	10472		116212	Environmental		
		MWL-SV05-200	11028		116213	Environmental		
		MWL-SV05-300	11998		116214	Environmental		
		MWL-SV05-400	12022		116215	Environmental		
		MWL-SV-FB 5	12145		116210	Field QC	n/a	Ultra Pure N2

**Data Validation Reports For Environmental Samples**

**Mixed Waste Landfill**

**Soil-Vapor Monitoring**

**November 2021**

**AR/COC Numbers 622645, 622646, 622647, 622648, 622649**

## Memorandum

Date: December 3, 2021

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCOC: 622645, 622646, 622647, 622648 and 622649  
SDG: 140-25404  
Laboratory: Eurofins TestAmerica, Knoxville  
Project/Task: 195122.10.11.08  
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 06.

### Summary

Twenty-four 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. Chlorobenzene, benzene, carbon disulfide and 1,2-dibromoethane were detected at  $\leq$  the PQL in the MB associated with samples 140-25404-1 through -5, -9, -15, -17 and -19. The chlorobenzene results for samples -2, -3, -9, -15, -17 and -19; the benzene results for samples -1, -2, -4, -5, -9, -15, -17 and -19; the carbon disulfide results for -1, -2, -3, -4, -9, -15, -17 and -19 and the 1,2-dibromoethane results for samples -9 and -15 were detects  $\leq$  the PQL and will be **qualified U,B**; non-detect at their associated PQLs.
2. Chlorobenzene and benzene were detected at  $\leq$  the PQL in the MB associated with samples -6 through -8, -10 through -14, -16, -18 and -20 through -24. The chlorobenzene results for samples -7, -8, -10, -11, -13, -16, -21, -22 and -23 and the benzene results for samples -6, -8, -10, -11, -12, -13, -14, -18, -20, -21, -22, -23 and -24 were detects  $\leq$  the PQL and will be **qualified U,B**; non-detect at their associated PQLs.
3. Acetone was detected at  $\leq$  the PQL in FB 3, sample -19 associated with samples -20 through -24. The acetone results for samples -20, -21 and -24 were detects  $\leq$  the PQL and will be **qualified U,B2**; non-detect at their associated PQLs.

4. Acetone and 2-butanone were detected at  $\leq$  the PQL in FB 4, sample -1 associated with samples -2 through -8. The acetone and 2-butanone results for samples -6 and -7 were detects  $\leq$  the PQL and will be **qualified U,B2**; non-detect at their associated PQL.
5. The tetrachloroethene result for sample -16 and the 1,1,2-trichloro-1,2,2-trifluoroethane result for sample -20 were flagged in the raw data as being  $>$  the instrument calibration range. The associated results were not re-analyzed at a dilution and, therefore, will be **qualified J,FR1**.

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 follows.

For the initial calibration associated with samples -1 through -5, -9, -15, -17 and -19, the intercept was  $>$  the MDL and positive for 1,3,5-trimethylbenzene. The associated sample results were non-detect and will not be qualified.

For the initial calibration associated with samples -6 through -8, -10 through -14, -16, -18 and -20 through -24, the intercept was  $>$  the MDL and positive for bromoform. The associated sample results 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.

Chlorobenzene, benzene, carbon disulfide, 1,3,5-trimethylbenzene and 1,2-dibromoethane were detected at  $\leq$  the PQL in the MB associated with samples -1 through -5, -9, -15, -17 and -19. All associated sample results, *except* the chlorobenzene results for samples -2, -3, -9, -15, -17 and -19; the benzene results for samples -1, -2, -4, -5, -9, -15, -17 and -19; the carbon disulfide results for -1, -2, -3, -4, -9, -15, -17 and -19 and the 1,2-dibromoethane results for samples -9 and -15 were non-detect and will not be qualified.

Chlorobenzene, benzene and 1,3-dichlorobenzene were detected at  $\leq$  the PQL in the MB associated with samples -6 through -8, -10 through -14, -16, -18 and -20 through -24. All associated sample results, *except* the chlorobenzene results for samples -7, -8, -10, -11, -13, -16, -21, -22 and -23 and the benzene results for samples -6, -8, -10, -11, -12, -13, -14, -18, -20, -21, -22, -23 and -24 were either non-detect or detects  $>$  the PQL and  $>5X$  the MB values and will not be qualified.

Acetone, carbon disulfide; benzene; chlorobenzene and 1,2-dibromomethane were detected at  $\leq$  the PQL in FB 1, sample -15 associated with sample -16. The carbon disulfide; benzene; chlorobenzene and 1,2-dibromomethane results for FB 1 were qualified non-detect due to MB contamination and will not be applied

to the associated field sample result. The acetone result for sample -16 was non-detect and will not be qualified.

Acetone, carbon disulfide; benzene and chlorobenzene were detected at  $\leq$  the PQL in FB 2, sample -17 associated with sample -18. The carbon disulfide; benzene and chlorobenzene results for FB 2 were qualified non-detect due to MB contamination and will not be applied to the associated field sample result. The acetone result for sample -18 was a detect  $>$  the PQL and  $>10X$  the FB value and will not be qualified.

Acetone, carbon disulfide; benzene, chloromethane and chlorobenzene detected at  $\leq$  the PQL in FB 3, sample -19 associated with samples -20 through -24. The carbon disulfide; benzene and chlorobenzene results for FB 3 were qualified non-detect due to MB contamination and will not be applied to the associated field sample results. All remaining associated sample results, *except* the acetone results for samples -20, -21 and -24, were either non-detect or detects  $>$  the PQL and  $>5X/10X$  the FB values and will not be qualified.

Acetone, benzene, 2-butanone, carbon disulfide, tetrachloroethene and 1,1,2-trichlorethane were detected at  $\leq$  the PQL in FB 4, sample -1 associated with samples -2 through -8. The carbon disulfide and benzene results for FB 4 were qualified non-detect due to MB contamination and will not be applied to the associated field sample results. All remaining associated sample results, *except* the acetone and 2-butanone results for samples -6 and -7, were either non-detect or detects  $>$  the PQL and  $>5X/10X$  the FB values and will not be qualified.

Carbon disulfide; benzene; chlorobenzene and 1,2-dibromomethane were detected at  $\leq$  the PQL in FB 5, sample -9 associated with samples -10 through 14. All detected results for FB 5 were qualified non-detect due to MB contamination and will not be applied to the associated field sample results.

### **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/LCSD for all batches met QC acceptance criteria for accuracy and precision.

### **Laboratory Replicate**

The laboratory replicates met QC acceptance criteria.

### **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 (1.54X); -2 (1.55X); -3 (1.53X); -4 (1.58X); -5 (1.58X); -6 (1.56X); -7 (1.64X); -8 (1.65X); -9 (1.62X); -10 (1.61X); -11 (1.56X); -12 (1.58X); -13 (1.56X); -14 (1.58X); -15 (1.53X); -16 (1.56); -17 (1.58X); -18 (1.53X); -19 (1.71X); -20 (1.61X); -21 (1.52X); -22 (1.58X); -23 (1.57X) and -24 (1.51X).

Samples -10 thru -12; -14, -18, -20, -21 and -23 were also further diluted and re-analyzed for one or more of the following compounds due to sample results > instrument calibration range for the initial analysis. Trichlorofluoromethane; 1,1,2-trichloro-1,2,2-trifluoroethane; trichloroethene; tetrachloroethene and/or dichlorodifluoromethane.

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.

Five FBs were submitted, one for each ARCO.

Two field duplicate pairs were submitted with ARCO 622645. 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:** 12/06/2021



## Sample Findings Summary



AR/COC: 622645, 622646, 622647, 622648, 622649

Page 1 of 3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
TO15_LL_PF			
	116192-001/MWL-SV-FB 1	1,2-DIBROMOETHANE (EDB) (106-93-4)	0.00008U, B
	116192-001/MWL-SV-FB 1	BENZENE (71-43-2)	0.00008U, B
	116192-001/MWL-SV-FB 1	CARBON DISULFIDE (75-15-0)	0.0002U, B
	116192-001/MWL-SV-FB 1	CHLOROBENZENE (108-90-7)	0.00008U, B
	116193-001/MWL-SV-01-42.5	CHLOROBENZENE (108-90-7)	0.0016U, B
	116193-001/MWL-SV-01-42.5	TETRACHLOROETHENE (127-18-4)	J, FR1
	116194-001/MWL-SV-FB 2	BENZENE (71-43-2)	0.00008U, B
	116194-001/MWL-SV-FB 2	CARBON DISULFIDE (75-15-0)	0.0002U, B
	116194-001/MWL-SV-FB 2	CHLOROBENZENE (108-90-7)	0.00008U, B
	116195-001/MWL-SV02-41.5	BENZENE (71-43-2)	0.00031U, B
	116196-001/MWL-SV-FB 3	BENZENE (71-43-2)	0.000086U, B
	116196-001/MWL-SV-FB 3	CARBON DISULFIDE (75-15-0)	0.00021U, B
	116196-001/MWL-SV-FB 3	CHLOROBENZENE (108-90-7)	0.000086U, B
	116197-001/MWL-SV03-50	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (76-13-1)	J, FR1
	116197-001/MWL-SV03-50	ACETONE (67-64-1)	0.0081U, B2
	116197-001/MWL-SV03-50	BENZENE (71-43-2)	0.00032U, B
	116198-001/MWL-SV03-100	ACETONE (67-64-1)	0.015U, B2
	116198-001/MWL-SV03-100	BENZENE (71-43-2)	0.00061U, B
	116198-001/MWL-SV03-100	CHLOROBENZENE (108-90-7)	0.00061U, B
	116199-001/MWL-SV03-200	BENZENE (71-43-2)	0.0032U, B
	116199-001/MWL-SV03-200	CHLOROBENZENE (108-90-7)	0.0032U, B
	116200-001/MWL-SV03-300	BENZENE (71-43-2)	0.001U, B
	116200-001/MWL-SV03-300	CHLOROBENZENE (108-90-7)	0.001U, B

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	116201-001/MWL-SV03-400	ACETONE (67-64-1)	0.019U, B2
	116201-001/MWL-SV03-400	BENZENE (71-43-2)	0.00076U, B
	116202-001/MWL-SV-FB 4	BENZENE (71-43-2)	0.00008U, B
	116202-001/MWL-SV-FB 4	CARBON DISULFIDE (75-15-0)	0.0002U, B
	116203-001/MWL-SV04-50	BENZENE (71-43-2)	0.00089U, B
	116203-001/MWL-SV04-50	CARBON DISULFIDE (75-15-0)	0.0022U, B
	116203-001/MWL-SV04-50	CHLOROBENZENE (108-90-7)	0.00089U, B
	116204-001/MWL-SV04-100	CARBON DISULFIDE (75-15-0)	0.0031U, B
	116204-001/MWL-SV04-100	CHLOROBENZENE (108-90-7)	0.0012U, B
	116205-001/MWL-SV04-200	BENZENE (71-43-2)	0.0021U, B
	116205-001/MWL-SV04-200	CARBON DISULFIDE (75-15-0)	0.0053U, B
	116206-001/MWL-SV04-200	BENZENE (71-43-2)	0.0013U, B
	116207-001/MWL-SV04-300	2-BUTANONE (MEK) (78-93-3)	0.0039U, B2
	116207-001/MWL-SV04-300	ACETONE (67-64-1)	0.02U, B2
	116207-001/MWL-SV04-300	BENZENE (71-43-2)	0.00078U, B
	116208-001/MWL-SV04-400	2-BUTANONE (MEK) (78-93-3)	0.0033U, B2
	116208-001/MWL-SV04-400	ACETONE (67-64-1)	0.016U, B2
	116208-001/MWL-SV04-400	CHLOROBENZENE (108-90-7)	0.00066U, B
	116209-001/MWL-SV04-400	BENZENE (71-43-2)	0.00066U, B
	116209-001/MWL-SV04-400	CHLOROBENZENE (108-90-7)	0.00066U, B
	116210-001/MWL-SV-FB 5	1,2-DIBROMOETHANE (EDB) (106-93-4)	0.000081U, B
	116210-001/MWL-SV-FB 5	BENZENE (71-43-2)	0.000081U, B
	116210-001/MWL-SV-FB 5	CARBON DISULFIDE (75-15-0)	0.0002U, B
	116210-001/MWL-SV-FB 5	CHLOROBENZENE (108-90-7)	0.000081U, B
	116211-001/MWL-SV05-50	BENZENE (71-43-2)	0.00026U, B
	116211-001/MWL-SV05-50	CHLOROBENZENE (108-90-7)	0.00026U, B
	116212-001/MWL-SV05-100	BENZENE (71-43-2)	0.00031U, B
	116212-001/MWL-SV05-100	CHLOROBENZENE (108-90-7)	0.00031U, B

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	116213-001/MWL-SV05-200	BENZENE (71-43-2)	0.00063U, B
	116214-001/MWL-SV05-300	BENZENE (71-43-2)	0.00078U, B
	116214-001/MWL-SV05-300	CHLOROBENZENE (108-90-7)	0.00078U, B
	116215-001/MWL-SV05-400	BENZENE (71-43-2)	0.00051U, B

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

## Sandia Data Validation Summary Worksheet

ARCOG#: 622645, 622646, 622647, 622648 and 622649	Site/Project: MWL LTMMP	Validation Date: 12/03/2021
SDG #: 140-25404	Laboratory: Eurofins TestAmerica, Knoxville	Validator: Linda Thal
Matrix: Air	# of Samples: 24	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								

<u>Comments:</u> Collected 11/05/2021
<u>Validated by:</u>

## Sandia Organic Worksheet (GC/MS VOC)

ARCOC #(s): 622645, 622646, 622647, 622648 and 622649	SDG: 140-25404	Matrix: Air
Laboratory Sample IDs: 140-25404 -1 through -24		
Method/Batch #s: <b>TO-15/55945</b> (samples -1 thru -5; -9, -15, -17, -19); 56035(sample -6 thru -8; -10 thru -14; -16, -18, -20 thru -24); 56038 (DLs samples -10 thru -12; -14, -18, -20, -21, -23)	Tuning (pass/fail): pass	TICs Required? (yes/no): no

Analyte (outliers)	Calibration				MB ppm v/v	5X (10X) MB	LCS/ LCSD %R	Lab. REP RPD	FB 1 -15	FB 2 -17	FB 3 -19	FB 4 -1	FB 5 -9
	Int.	RF/ Slope	RSD/ r <sup>2</sup>	(ICV)/ CCV %D									
<b>55945 -1 through -5, -9, -15, -17, -19 (MS)</b>													
Acetone	NA	✓	✓	✓	✓	NA	✓	✓	0.00071 J	0.00074 J	0.0011 J	0.0016 J	✓
Benzene	NA	✓	✓	✓	0.00000 941J	0.0000 47	✓	✓	0.00002 JB	0.000016 JB	0.000014 JB	0.000014 JB	0.000014 JB
2-Butanone	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	0.00017 J	✓
Carbon disulfide	NA	✓	✓	✓	0.0000 110J	0.0000 55	✓	✓	0.000044 JB	0.000044 JB	0.000049 JB	0.000066 JB	0.000091 JB
Tetrachloroethene	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	0.0000082 J	✓
1,1,2-Trichloroethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	0.0000078 J	✓
Chlorobenzene	NA	✓	✓	✓	0.0000 131J	0.0000 66	✓	✓	0.000016 JB	0.000014 JB	0.000015 JB	✓	0.000015 JB
1,2-Dibromoethane	NA	✓	✓	✓	0.0000 110J	0.0000 55	✓	✓	0.000008 7JB	✓	✓	✓	0.0000074 JB
Chloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	0.0001J	✓	✓
1,3,5-Trimethylbenzene	+0.046	✓	✓	✓	0.0000 484J	0.000 242	✓	✓	✓	✓	✓	✓	✓
<b>56035 -6 thru -8; -10 thru -14; -16, -18, -20 thru -24 (MR)</b>													
Benzene	NA	✓	✓	✓	0.00000 828J	0.0000 41	✓	✓					
Chlorobenzene	NA	✓	✓	✓	0.0000 130J	0.0000 65	✓	✓					
1,3-Dichlorobenzene	NA	✓	✓	✓	0.0000 164J	0.0000 82	✓	✓					
Bromoform	+0.041	✓	✓	✓	✓	NA	✓	✓					
<b>56038 DLs samples -10 thru -12; -14, -18, -20, -21, -23 (MR)</b>													
<b>Surrogate Recovery Outliers</b>													
<b>Sample ID</b>	<b>BFB %R</b>												
None													

IS Outliers											
	CBM		DFBZ		Chl-d5						
Sample ID	Area	RT	Area	RT	Area	RT					
None											

Comments: HTs OK. 24-hour tune check. ICAL/ICV/CCV 30%. LCS limits - lab limits . RPD 25%

MB detects compared to on-column results. FB detects compared to final results.

55945: MB, LCS/LCSD and -5DUP ICAL MS 10/25/2021 Linear: 1,3,5-Trimethylbenzene Quadratic forced: 1,2,4-Trichlorobenzene.

56035: MB, LCS/LCSD and -24DUP ICAL MR 10/07/2021 Linear: Bromoform; Benzyl chloride Quadratic forced: Carbon tetrachloride.

56038: MB, LCS/LCSD and -23DUP ICAL MR 10/07/2021 Linear: Bromoform; Benzyl chloride Quadratic forced: Carbon tetrachloride.

Samples -10 thru -12; -14, -18, -20, -21, -23 diluted for one or more of the following compounds: Trichlorofluoromethane; 112TCTFE; TCE; PCE; Dichlorodifluoromethane.

-016 result for PCE "E" qualified and not rerun in dilution. -20 result for 112TCTFE "E" qualified and not rerun in dilution. (Both results only slightly above highest ICAL standard.)

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



140-25404 Chain of Custody

Internal Lab

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NO CUSTODY SEALS  
RECEIVED AMBIGNT  
SNO 11-15-21  
SDXES FGD X# 44423459 6200 m G  
28 CANS / 0 FLOWS / 1 GAUGE

Batch No. N/A

SMO Use

AR/COC **622645**

Project Name: MWL LTMMF		Date Samples Shipped: <u>11/8/2021</u>		SMO Authorization: <u>[Signature]</u>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> <b>4° Celsius</b>	
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <u>330923</u>		SMO Contact Phone: <u>[Signature]</u>			
Project/Task Number: 195122.10.11.08		Lab Contact: Jamie McKinney/865-291-3006		Wendy Palencia/505-844-3132			
Service Order: CF01-22		Lab Destination: TAKX		Send Report to SMO:		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					
116202	001	MWL-SV-FB 4 11301	NA	11/5/21 09:34	UPN	S	6 L	None	G	FB	VOC (TO-15)	
116203	001	MWL-SV04-50 11566	50	11/5/21 10:08	SG	S	6 L	None	G	SA	VOC (TO-15)	
116204	001	MWL-SV04-100 34000259	100	11/5/21 10:11	SG	S	6 L	None	G	SA	VOC (TO-15)	
116205	001	MWL-SV04-200 34000206	200	11/5/21 10:20	SG	S	6 L	None	G	SA	VOC (TO-15)	
116206	001	MWL-SV04-200 12101	200	11/5/21 10:20	SG	S	6 L	None	G	DU	VOC (TO-15)	
116207	001	MWL-SV04-300 11612	300	11/5/21 10:23	SG	S	6 L	None	G	SA	VOC (TO-15)	
116208	001	MWL-SV04-400 11231	400	11/5/21 10:30	SG	S	6 L	None	G	SA	VOC (TO-15)	
116209	001	MWL-SV04-400 34002083	400	11/5/21 10:30	SG	S	6 L	None	G	DU	VOC (TO-15)	

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD		<input checked="" type="checkbox"/> Yes		
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		Init.		Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		
William Gibson		[Signature]		SNL/08888/505-284-3307/505-239-7367		Return Samples By:		
Robert Lynch		[Signature]		SNL/08888/505-844-4013/505-250-7090		Comments: Elevation and ambient pressure information provided on attached forms.		
Zachary Tenorio		[Signature]		SNL/08888/505-845-8636/505-259-5765				
Denisha Sanchez		[Signature]		SNL/08888/505-845-7829/505-208-1375				

Relinquished by <u>[Signature]</u>	Org. <u>08888</u>	Date <u>11/8/21</u>	Time <u>10:10</u>	Relinquished by	Org.	Date	Time
Received by <u>[Signature]</u>	Org. <u>0618</u>	Date <u>11/8/21</u>	Time <u>10:10</u>	Received by	Org.	Date	Time
Relinquished by <u>[Signature]</u>	Org. <u>0618</u>	Date <u>11/8/21</u>	Time <u>10:55</u>	Relinquished by	Org.	Date	Time
Received by <u>[Signature]</u>	Org. <u>STA-KIT</u>	Date <u>11/5/21</u>	Time <u>10:00</u>	Received by	Org.	Date	Time

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

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11/23/2021



Internal Lab

Batch No. NA

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AR/COC	622646
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Project Name: MWL LTMMMP		Date Samples Shipped: 11/8/2021		SMO Authorization: [Signature]		AR/COG 622646									
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. 330923		SMO Contact Phone: Wendy Palencia/505-844-3132		<input type="checkbox"/> Waste Characterization									
Project/Task Number: 195122.10.11.08		Lab Contact: Jamie McKinney/865-291-3006		Send Report to SMO: Stephanie Montaño/505-284-2553		<input type="checkbox"/> RMA									
Service Order: CF01-22		Lab Destination: TAKX				<input type="checkbox"/> Released by COC No.									
Contract No.: 1636780						<input checked="" type="checkbox"/> 4° Celsius									
Tech Area:		Operational Site:		Bill to: Sandia National Laboratories (Accounts Payable)		P.O. Box 5800, MS-0154									
Building:		Room:		Albuquerque, NM 87185-0154											
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			
116210	001	MWL-SV-FB 5 12145	NA	11/5/21 10:49	UPN	S	6 L	None	G	FB	VOC (TO-15)				
116211	001	MWL-SV05-50 10411	50	11/5/21 10:56	SG	S	6 L	None	G	SA	VOC (TO-15)				
116212	001	MWL-SV05-100 10472	100	11/5/21 10:58	SG	S	6 L	None	G	SA	VOC (TO-15)				
116213	001	MWL-SV05-200 11028	200	11/5/21 11:00	SG	S	6 L	None	G	SA	VOC (TO-15)				
116214	001	MWL-SV05-300 11998	300	11/5/21 11:03	SG	S	6 L	None	G	SA	VOC (TO-15)				
116215	001	MWL-SV05-400 12022	400	11/5/21 11:08	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		Lab Use					
Background:		<input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day							
Confirmatory:		<input type="checkbox"/> Yes		QC inits.:				Negotiated TAT <input type="checkbox"/>							
Sample Team Members		Name		Signature		Init.		Company/Organization/Phone/Cell					Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		
		William Gibson		[Signature]		WYG		SNL/08888/505-284-3307/505-239-7367		Return Samples By:					
		Robert Lynch		[Signature]		RL		SNL/08888/505-844-4013/505-250-7090		Comments: Elevation and ambient pressure information provided on attached forms.					
		Zachary Tenorio		[Signature]		ZT		SNL/08888/505-845-8636/505-259-5765							
		Denisha Sanchez		[Signature]		DS		SNL/08888/505-845-7829/505-208-1375							
Relinquished by [Signature]		Org. 08888		Date 11/8/21		Time 1010		Relinquished by		Org.		Date		Time	
Received by [Signature]		Org. 0618		Date 11/8/21		Time 1010		Received by		Org.		Date		Time	
Relinquished by [Signature]		Org. 00618		Date 11/8/21		Time 1055		Relinquished by		Org.		Date		Time	
Received by [Signature]		Org. 08888		Date 11/8/21		Time 10:00		Received by		Org.		Date		Time	
Prior confirmation with SMO required for 7 and 15 day TAT															

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11/23/2021

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *N/A*

Page 1 of 1

SMO Use

AR/COC **622647**

Project Name: MWL LTMMP		Date Samples Shipped: <i>11/8/2021</i>		SMO Authorization: <i>[Signature]</i>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> <b>4° Celsius</b>
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>330923</i>		SMO Contact Phone: <i>[Signature]</i>		
Project/Task Number: 195122.10.11.08		Lab Contact: Jamie McKinney/865-291-3006		Wendy Palencia/505-844-3132		
Service Order: CF01-22		Lab Destination: TAKX		Send Report to SMO: Stephanie Montaño/505-284-2553		
Contract No.: 1636780						

Tech Area:		Operational Site:	
Building:	Room:		

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					
116192	001	MWL-SV-FB 1 34000613	NA	11/5/21 11:22	UPN	S	6 L	None	G	FB	VOC (TO-15)	
116193	001	MWL-SV-01-42.5 09539	42.5	11/5/21 11:37	SG	S	6 L	None	G	SA	VOC (TO-15)	

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

Relinquished by <i>[Signature]</i>	Org. <i>08888</i> Date <i>11/8/21</i> Time <i>1010</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>0018</i> Date <i>11/8/21</i> Time <i>1010</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org. <i>00618</i> Date <i>11/8/21</i> Time <i>1035</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>00618</i> Date <i>11/8/21</i> Time <i>1010</i>	Received by	Org.	Date	Time

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

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11/23/2021

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. *N/A*

Page 1 of 1

SMO Use

AR/COC **622648**

Project Name: MWL LTMP		Date Samples Shipped: <i>11/8/2021</i>		SMO Authorization: <i>[Signature]</i>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> <b>4° Celsius</b>	
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>350923</i>		SMO Contact Phone: <i>[Signature]</i>			
Project/Task Number: 195122.10.11.08		Lab Contact: Jamie McKinney/865-291-3006		Wendy Palencia/505-844-3132			
Service Order: CF01-22		Lab Destination: TAKX		Send Report to SMO:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	
		Contract No.: 1636780		Stephanie Montaño/505-284-2553			
Tech Area:		Operational Site:					
Building:		Room:					

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
116194	001	MWL-SV-FB 2 34000021	NA	11/5/21 11:17	UPN	S	6 L	None	G	FB	VOC (TO-15)	
116195	001	MWL-SV02-41.5 11982	41.5	11/5/21 11:44	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          Lab Use															
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 <table border="1"> <tr> <th>Name</th> <th>Signature</th> <th>Init.</th> <th>Company/Organization/Phone/Cell</th> </tr> <tr> <td>William Gibson</td> <td><i>[Signature]</i></td> <td>WG</td> <td>SNL/08888/505-284-3307/505-239-7367</td> </tr> <tr> <td>Robert Lynch</td> <td><i>[Signature]</i></td> <td>RL</td> <td>SNL/08888/505-844-4013/505-250-7090</td> </tr> <tr> <td>Zachary Tenorio</td> <td><i>[Signature]</i></td> <td>ZT</td> <td>SNL/08888/505-845-8636/505-259-5765</td> </tr> <tr> <td>Denisha Sanchez</td> <td><i>[Signature]</i></td> <td>DS</td> <td>SNL/08888/505-845-7829/505-208-1375</td> </tr> </table>		Name	Signature	Init.	Company/Organization/Phone/Cell	William Gibson	<i>[Signature]</i>		WG	SNL/08888/505-284-3307/505-239-7367	Robert Lynch	<i>[Signature]</i>	RL	SNL/08888/505-844-4013/505-250-7090	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	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab Return Samples By: Comments: Elevation and ambient pressure information provided on attached forms.
Name	Signature	Init.	Company/Organization/Phone/Cell																				
William Gibson	<i>[Signature]</i>	WG	SNL/08888/505-284-3307/505-239-7367																				
Robert Lynch	<i>[Signature]</i>	RL	SNL/08888/505-844-4013/505-250-7090																				
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																				

Relinquished by <i>[Signature]</i>	Org. <i>08888</i>	Date <i>11/8/21</i>	Time <i>1010</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>0818</i>	Date <i>11/8/21</i>	Time <i>1010</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org. <i>00618</i>	Date <i>11/8/21</i>	Time <i>1055</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>57447</i>	Date <i>11-15-21</i>	Time <i>10:00</i>	Received by	Org.	Date	Time

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

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**Contract Verification Review Forms**  
**Mixed Waste Landfill Soil-Vapor Monitoring**  
**November 2021**

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.

<b>AR/COC Number</b>	<b>Sample Type</b>
622645	Environmental & Quality Control
622646	Environmental & Quality Control
622647	Environmental & Quality Control
622648	Environmental & Quality Control
622649	Environmental & Quality Control

## Contract Verification Form (CVR)

Project Leader JACKSON

Project Name MWL LTMMMP

Project/Task No. 195122\_10.11.08

ARCOG No. 622645, 622646, 622647, 622648 &amp; 622649

Analytical Lab TAKX

SDG No. 140-25404-1

*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		
	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		Sample replicates analyzed with each batch

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	X		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		Benzene, carbon disulfide, chlorobenzene, EDB and 1,3,5-trimethylbenzene detected in method blank (batch 55945). Benzene, chlorobenzene and 1,3-dichlorobenzene detected in method blank (batch 56035).
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Acetone, benzene, 2-butanone, carbon disulfide, tetrachloroethene and 1,1,2-trichloroethane detected in MWL-SV-FB 4. Benzene, carbon disulfide, chlorobenzene and EDB detected in MWL-SV-FB 5. Acetone, benzene, carbon disulfide, chlorobenzene and EDB detected in MWL-SV-FB 1. Acetone, benzene, carbon disulfide and chlorobenzene detected in MWL-SV-FB 2. Acetone, benzene, carbon disulfide, chlorobenzene and chloromethane detected in MWL-SV-FB 3.
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		



Line No.	Item	Yes	No	Comments
	e) Instrument run logs provided	X		
4.2	GC/HPLC (8330, 8082, 9070A, and 8010) a) Initial calibration provided	N/A		
	b) Continuing calibration provided	N/A		
	c) Instrument run logs provided	N/A		
4.3	HRGC/HRMS (1668 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		

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

## 5.0 Data Anomaly Report

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

## 6.0 Problem Resolution

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

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

Were deficiencies unresolved? ☐ Yes ☒ No

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

Reviewed by: Wendy Palencia Date: 12-02-2021 07:00:00

Closed by: Wendy Palencia Date: 12-02-2021 07:00:00

**Certificates of Analysis**

**Mixed Waste Landfill**

**November 2021 Soil-Vapor Samples**

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116202-001/MWL-SV-FB 4

Lab Sample ID: 140-25404-1

Date Collected: 11/05/21 09:34

Matrix: Air

Date Received: 11/15/21 10:00

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	0.0016	J	0.0020	0.00057	ppm v/v			11/17/21 14:57	1.54
Benzene	0.000014	J B	0.000080	0.0000080	ppm v/v			11/17/21 14:57	1.54
Benzyl chloride	ND		0.00016	0.000038	ppm v/v			11/17/21 14:57	1.54
Bromodichloromethane	ND		0.000080	0.000018	ppm v/v			11/17/21 14:57	1.54
Bromoform	ND		0.000080	0.0000090	ppm v/v			11/17/21 14:57	1.54
Bromomethane	ND		0.000080	0.000022	ppm v/v			11/17/21 14:57	1.54
2-Butanone (MEK)	0.00017	J	0.00040	0.000073	ppm v/v			11/17/21 14:57	1.54
Carbon disulfide	0.000066	J B	0.00020	0.000011	ppm v/v			11/17/21 14:57	1.54
Carbon tetrachloride	ND		0.000080	0.0000070	ppm v/v			11/17/21 14:57	1.54
Chlorobenzene	ND		0.000080	0.0000060	ppm v/v			11/17/21 14:57	1.54
Chloroethane	ND		0.000080	0.000029	ppm v/v			11/17/21 14:57	1.54
Chloroform	ND		0.000080	0.0000070	ppm v/v			11/17/21 14:57	1.54
Chloromethane	ND		0.00020	0.000066	ppm v/v			11/17/21 14:57	1.54
Dibromochloromethane	ND		0.000080	0.0000070	ppm v/v			11/17/21 14:57	1.54
1,2-Dibromoethane (EDB)	ND		0.000080	0.0000070	ppm v/v			11/17/21 14:57	1.54
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.000080	0.000012	ppm v/v			11/17/21 14:57	1.54
1,2-Dichlorobenzene	ND		0.000080	0.000031	ppm v/v			11/17/21 14:57	1.54
1,3-Dichlorobenzene	ND		0.000080	0.000016	ppm v/v			11/17/21 14:57	1.54
1,4-Dichlorobenzene	ND		0.000080	0.000016	ppm v/v			11/17/21 14:57	1.54
Dichlorodifluoromethane	ND		0.000080	0.000014	ppm v/v			11/17/21 14:57	1.54
1,1-Dichloroethane	ND		0.000080	0.0000070	ppm v/v			11/17/21 14:57	1.54
1,2-Dichloroethane	ND		0.000080	0.000010	ppm v/v			11/17/21 14:57	1.54
1,1-Dichloroethene	ND		0.000080	0.0000080	ppm v/v			11/17/21 14:57	1.54
cis-1,2-Dichloroethene	ND		0.000080	0.000010	ppm v/v			11/17/21 14:57	1.54
trans-1,2-Dichloroethene	ND		0.000080	0.0000070	ppm v/v			11/17/21 14:57	1.54
1,2-Dichloropropane	ND		0.000080	0.000010	ppm v/v			11/17/21 14:57	1.54
cis-1,3-Dichloropropene	ND		0.000080	0.000016	ppm v/v			11/17/21 14:57	1.54
trans-1,3-Dichloropropene	ND		0.000080	0.0000090	ppm v/v			11/17/21 14:57	1.54
Ethylbenzene	ND		0.000080	0.000013	ppm v/v			11/17/21 14:57	1.54
4-Ethyltoluene	ND		0.00016	0.000021	ppm v/v			11/17/21 14:57	1.54
Hexachlorobutadiene	ND		0.00040	0.000032	ppm v/v			11/17/21 14:57	1.54
2-Hexanone	ND		0.00020	0.000016	ppm v/v			11/17/21 14:57	1.54
4-Methyl-2-pentanone (MIBK)	ND		0.00020	0.000054	ppm v/v			11/17/21 14:57	1.54
Methylene Chloride	ND		0.00040	0.00039	ppm v/v			11/17/21 14:57	1.54
Styrene	ND		0.000080	0.000024	ppm v/v			11/17/21 14:57	1.54
1,1,2,2-Tetrachloroethane	ND		0.000080	0.000014	ppm v/v			11/17/21 14:57	1.54
Tetrachloroethene	0.000082	J	0.000080	0.0000070	ppm v/v			11/17/21 14:57	1.54
Toluene	ND		0.00012	0.000078	ppm v/v			11/17/21 14:57	1.54
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.000080	0.0000080	ppm v/v			11/17/21 14:57	1.54
1,2,4-Trichlorobenzene	ND		0.00040	0.000064	ppm v/v			11/17/21 14:57	1.54
1,1,1-Trichloroethane	ND		0.000080	0.000037	ppm v/v			11/17/21 14:57	1.54
1,1,2-Trichloroethane	0.000078	J	0.000080	0.0000070	ppm v/v			11/17/21 14:57	1.54
Trichloroethene	ND		0.000040	0.000013	ppm v/v			11/17/21 14:57	1.54
Trichlorofluoromethane	ND		0.000080	0.000011	ppm v/v			11/17/21 14:57	1.54
1,2,4-Trimethylbenzene	ND		0.000080	0.000020	ppm v/v			11/17/21 14:57	1.54
1,3,5-Trimethylbenzene	ND		0.000080	0.000022	ppm v/v			11/17/21 14:57	1.54
Vinyl acetate	ND		0.00040	0.000028	ppm v/v			11/17/21 14:57	1.54
Vinyl chloride	ND		0.000040	0.000026	ppm v/v			11/17/21 14:57	1.54

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

**Client Sample ID: 116202-001/MWL-SV-FB 4**

**Lab Sample ID: 140-25404-1**

**Date Collected: 11/05/21 09:34**

**Matrix: Air**

**Date Received: 11/15/21 10:00**

**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		0.000080	0.000029	ppm v/v			11/17/21 14:57	1.54
o-Xylene	ND		0.000080	0.000015	ppm v/v			11/17/21 14:57	1.54
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		60 - 140					11/17/21 14:57	1.54

**Client Sample ID: 116203-001/MWL-SV04-50**

**Lab Sample ID: 140-25404-2**

**Date Collected: 11/05/21 10:08**

**Matrix: Air**

**Date Received: 11/15/21 10:00**

**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		0.022	0.0063	ppm v/v			11/17/21 19:15	1.55
<b>Benzene</b>	<b>0.00029</b>	<b>J B</b>	0.00089	0.000089	ppm v/v			11/17/21 19:15	1.55
Benzyl chloride	ND		0.0018	0.00042	ppm v/v			11/17/21 19:15	1.55
Bromodichloromethane	ND		0.00089	0.00020	ppm v/v			11/17/21 19:15	1.55
Bromoform	ND		0.00089	0.00010	ppm v/v			11/17/21 19:15	1.55
Bromomethane	ND		0.00089	0.00024	ppm v/v			11/17/21 19:15	1.55
2-Butanone (MEK)	ND		0.0044	0.00081	ppm v/v			11/17/21 19:15	1.55
<b>Carbon disulfide</b>	<b>0.00059</b>	<b>J B</b>	0.0022	0.00012	ppm v/v			11/17/21 19:15	1.55
<b>Carbon tetrachloride</b>	<b>0.00022</b>	<b>J</b>	0.00089	0.000078	ppm v/v			11/17/21 19:15	1.55
<b>Chlorobenzene</b>	<b>0.00015</b>	<b>J B</b>	0.00089	0.000066	ppm v/v			11/17/21 19:15	1.55
Chloroethane	ND		0.00089	0.00032	ppm v/v			11/17/21 19:15	1.55
<b>Chloroform</b>	<b>0.0017</b>		0.00089	0.000078	ppm v/v			11/17/21 19:15	1.55
Chloromethane	ND		0.0022	0.00073	ppm v/v			11/17/21 19:15	1.55
Dibromochloromethane	ND		0.00089	0.000078	ppm v/v			11/17/21 19:15	1.55
1,2-Dibromoethane (EDB)	ND		0.00089	0.000078	ppm v/v			11/17/21 19:15	1.55
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.00089	0.00013	ppm v/v			11/17/21 19:15	1.55
1,2-Dichlorobenzene	ND		0.00089	0.00034	ppm v/v			11/17/21 19:15	1.55
1,3-Dichlorobenzene	ND		0.00089	0.00018	ppm v/v			11/17/21 19:15	1.55
1,4-Dichlorobenzene	ND		0.00089	0.00018	ppm v/v			11/17/21 19:15	1.55
<b>Dichlorodifluoromethane</b>	<b>0.017</b>		0.00089	0.00016	ppm v/v			11/17/21 19:15	1.55
<b>1,1-Dichloroethane</b>	<b>0.0011</b>		0.00089	0.000078	ppm v/v			11/17/21 19:15	1.55
1,2-Dichloroethane	ND		0.00089	0.00011	ppm v/v			11/17/21 19:15	1.55
<b>1,1-Dichloroethene</b>	<b>0.0042</b>		0.00089	0.000089	ppm v/v			11/17/21 19:15	1.55
<b>cis-1,2-Dichloroethene</b>	<b>0.00035</b>	<b>J</b>	0.00089	0.00011	ppm v/v			11/17/21 19:15	1.55
trans-1,2-Dichloroethene	ND		0.00089	0.000078	ppm v/v			11/17/21 19:15	1.55
1,2-Dichloropropane	ND		0.00089	0.00011	ppm v/v			11/17/21 19:15	1.55
cis-1,3-Dichloropropene	ND		0.00089	0.00018	ppm v/v			11/17/21 19:15	1.55
trans-1,3-Dichloropropene	ND		0.00089	0.00010	ppm v/v			11/17/21 19:15	1.55
Ethylbenzene	ND		0.00089	0.00014	ppm v/v			11/17/21 19:15	1.55
4-Ethyltoluene	ND		0.0018	0.00023	ppm v/v			11/17/21 19:15	1.55
Hexachlorobutadiene	ND		0.0044	0.00035	ppm v/v			11/17/21 19:15	1.55
2-Hexanone	ND		0.0022	0.00018	ppm v/v			11/17/21 19:15	1.55
4-Methyl-2-pentanone (MIBK)	ND		0.0022	0.00060	ppm v/v			11/17/21 19:15	1.55
Methylene Chloride	ND		0.0044	0.0043	ppm v/v			11/17/21 19:15	1.55
Styrene	ND		0.00089	0.00027	ppm v/v			11/17/21 19:15	1.55
1,1,2,2-Tetrachloroethane	ND		0.00089	0.00016	ppm v/v			11/17/21 19:15	1.55

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMP

Job ID: 140-25404-1

Client Sample ID: 116203-001/MWL-SV04-50

Lab Sample ID: 140-25404-2

Date Collected: 11/05/21 10:08

Matrix: Air

Date Received: 11/15/21 10:00

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	0.053		0.00089	0.000078	ppm v/v			11/17/21 19:15	1.55
Toluene	ND		0.0013	0.00086	ppm v/v			11/17/21 19:15	1.55
1,1,2-Trichloro-1,2,2-trifluoroethane	0.042		0.00089	0.000089	ppm v/v			11/17/21 19:15	1.55
1,2,4-Trichlorobenzene	ND		0.0044	0.00071	ppm v/v			11/17/21 19:15	1.55
1,1,1-Trichloroethane	0.0065		0.00089	0.00041	ppm v/v			11/17/21 19:15	1.55
1,1,2-Trichloroethane	ND		0.00089	0.000078	ppm v/v			11/17/21 19:15	1.55
Trichloroethene	0.041		0.00044	0.00014	ppm v/v			11/17/21 19:15	1.55
Trichlorofluoromethane	0.026		0.00089	0.00012	ppm v/v			11/17/21 19:15	1.55
1,2,4-Trimethylbenzene	ND		0.00089	0.00022	ppm v/v			11/17/21 19:15	1.55
1,3,5-Trimethylbenzene	ND		0.00089	0.00024	ppm v/v			11/17/21 19:15	1.55
Vinyl acetate	ND		0.0044	0.00031	ppm v/v			11/17/21 19:15	1.55
Vinyl chloride	ND		0.00044	0.00029	ppm v/v			11/17/21 19:15	1.55
m,p-Xylene	ND		0.00089	0.00032	ppm v/v			11/17/21 19:15	1.55
o-Xylene	ND		0.00089	0.00017	ppm v/v			11/17/21 19:15	1.55
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		60 - 140					11/17/21 19:15	1.55

Client Sample ID: 116204-001/MWL-SV04-100

Lab Sample ID: 140-25404-3

Date Collected: 11/05/21 10:11

Matrix: Air

Date Received: 11/15/21 10:00

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		0.031	0.0087	ppm v/v			11/17/21 19:59	1.53
Benzene	ND		0.0012	0.00012	ppm v/v			11/17/21 19:59	1.53
Benzyl chloride	ND		0.0024	0.00058	ppm v/v			11/17/21 19:59	1.53
Bromodichloromethane	ND		0.0012	0.00028	ppm v/v			11/17/21 19:59	1.53
Bromoform	ND		0.0012	0.00014	ppm v/v			11/17/21 19:59	1.53
Bromomethane	ND		0.0012	0.00034	ppm v/v			11/17/21 19:59	1.53
2-Butanone (MEK)	ND		0.0061	0.0011	ppm v/v			11/17/21 19:59	1.53
Carbon disulfide	0.00025	J B	0.0031	0.00017	ppm v/v			11/17/21 19:59	1.53
Carbon tetrachloride	0.00030	J	0.0012	0.00011	ppm v/v			11/17/21 19:59	1.53
Chlorobenzene	0.00017	J B	0.0012	0.000092	ppm v/v			11/17/21 19:59	1.53
Chloroethane	ND		0.0012	0.00044	ppm v/v			11/17/21 19:59	1.53
Chloroform	0.0021		0.0012	0.00011	ppm v/v			11/17/21 19:59	1.53
Chloromethane	ND		0.0031	0.0010	ppm v/v			11/17/21 19:59	1.53
Dibromochloromethane	ND		0.0012	0.00011	ppm v/v			11/17/21 19:59	1.53
1,2-Dibromoethane (EDB)	ND		0.0012	0.00011	ppm v/v			11/17/21 19:59	1.53
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.0012	0.00018	ppm v/v			11/17/21 19:59	1.53
1,2-Dichlorobenzene	ND		0.0012	0.00047	ppm v/v			11/17/21 19:59	1.53
1,3-Dichlorobenzene	ND		0.0012	0.00024	ppm v/v			11/17/21 19:59	1.53
1,4-Dichlorobenzene	ND		0.0012	0.00024	ppm v/v			11/17/21 19:59	1.53
Dichlorodifluoromethane	0.032		0.0012	0.00021	ppm v/v			11/17/21 19:59	1.53
1,1-Dichloroethane	0.0029		0.0012	0.00011	ppm v/v			11/17/21 19:59	1.53
1,2-Dichloroethane	ND		0.0012	0.00015	ppm v/v			11/17/21 19:59	1.53
1,1-Dichloroethene	0.012		0.0012	0.00012	ppm v/v			11/17/21 19:59	1.53

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

**Client Sample ID: 116204-001/MWL-SV04-100**

**Lab Sample ID: 140-25404-3**

Date Collected: 11/05/21 10:11

Matrix: Air

Date Received: 11/15/21 10:00

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	0.0013		0.0012	0.00015	ppm v/v			11/17/21 19:59	1.53
trans-1,2-Dichloroethene	ND		0.0012	0.00011	ppm v/v			11/17/21 19:59	1.53
1,2-Dichloropropane	ND		0.0012	0.00015	ppm v/v			11/17/21 19:59	1.53
cis-1,3-Dichloropropene	ND		0.0012	0.00024	ppm v/v			11/17/21 19:59	1.53
trans-1,3-Dichloropropene	ND		0.0012	0.00014	ppm v/v			11/17/21 19:59	1.53
Ethylbenzene	ND		0.0012	0.00020	ppm v/v			11/17/21 19:59	1.53
4-Ethyltoluene	ND		0.0024	0.00032	ppm v/v			11/17/21 19:59	1.53
Hexachlorobutadiene	ND		0.0061	0.00049	ppm v/v			11/17/21 19:59	1.53
2-Hexanone	ND		0.0031	0.00024	ppm v/v			11/17/21 19:59	1.53
4-Methyl-2-pentanone (MIBK)	ND		0.0031	0.00083	ppm v/v			11/17/21 19:59	1.53
Methylene Chloride	ND		0.0061	0.0060	ppm v/v			11/17/21 19:59	1.53
Styrene	ND		0.0012	0.00037	ppm v/v			11/17/21 19:59	1.53
1,1,2,2-Tetrachloroethane	ND		0.0012	0.00021	ppm v/v			11/17/21 19:59	1.53
Tetrachloroethene	0.10		0.0012	0.00011	ppm v/v			11/17/21 19:59	1.53
Toluene	ND		0.0018	0.0012	ppm v/v			11/17/21 19:59	1.53
1,1,2-Trichloro-1,2,2-trifluoroethane	0.076		0.0012	0.00012	ppm v/v			11/17/21 19:59	1.53
1,2,4-Trichlorobenzene	ND		0.0061	0.00098	ppm v/v			11/17/21 19:59	1.53
1,1,1-Trichloroethane	0.0053		0.0012	0.00057	ppm v/v			11/17/21 19:59	1.53
1,1,2-Trichloroethane	ND		0.0012	0.00011	ppm v/v			11/17/21 19:59	1.53
Trichloroethene	0.096		0.00061	0.00020	ppm v/v			11/17/21 19:59	1.53
Trichlorofluoromethane	0.041		0.0012	0.00017	ppm v/v			11/17/21 19:59	1.53
1,2,4-Trimethylbenzene	ND		0.0012	0.00031	ppm v/v			11/17/21 19:59	1.53
1,3,5-Trimethylbenzene	ND		0.0012	0.00034	ppm v/v			11/17/21 19:59	1.53
Vinyl acetate	ND		0.0061	0.00043	ppm v/v			11/17/21 19:59	1.53
Vinyl chloride	ND		0.00061	0.00040	ppm v/v			11/17/21 19:59	1.53
m,p-Xylene	ND		0.0012	0.00044	ppm v/v			11/17/21 19:59	1.53
o-Xylene	ND		0.0012	0.00023	ppm v/v			11/17/21 19:59	1.53
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		60 - 140					11/17/21 19:59	1.53

**Client Sample ID: 116205-001/MWL-SV04-200**

**Lab Sample ID: 140-25404-4**

Date Collected: 11/05/21 10:20

Matrix: Air

Date Received: 11/15/21 10:00

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		0.053	0.015	ppm v/v			11/17/21 20:45	1.58
Benzene	0.00044	J B	0.0021	0.00021	ppm v/v			11/17/21 20:45	1.58
Benzyl chloride	ND		0.0042	0.0010	ppm v/v			11/17/21 20:45	1.58
Bromodichloromethane	ND		0.0021	0.00047	ppm v/v			11/17/21 20:45	1.58
Bromoform	ND		0.0021	0.00024	ppm v/v			11/17/21 20:45	1.58
Bromomethane	ND		0.0021	0.00058	ppm v/v			11/17/21 20:45	1.58
2-Butanone (MEK)	ND		0.011	0.0019	ppm v/v			11/17/21 20:45	1.58
Carbon disulfide	0.00049	J B	0.0053	0.00029	ppm v/v			11/17/21 20:45	1.58
Carbon tetrachloride	0.00031	J	0.0021	0.00018	ppm v/v			11/17/21 20:45	1.58
Chlorobenzene	ND		0.0021	0.00016	ppm v/v			11/17/21 20:45	1.58

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116205-001/MWL-SV04-200

Lab Sample ID: 140-25404-4

Date Collected: 11/05/21 10:20

Matrix: Air

Date Received: 11/15/21 10:00

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		0.0021	0.00076	ppm v/v			11/17/21 20:45	1.58
<b>Chloroform</b>	<b>0.0013</b>	<b>J</b>	0.0021	0.00018	ppm v/v			11/17/21 20:45	1.58
Chloromethane	ND		0.0053	0.0017	ppm v/v			11/17/21 20:45	1.58
Dibromochloromethane	ND		0.0021	0.00018	ppm v/v			11/17/21 20:45	1.58
1,2-Dibromoethane (EDB)	ND		0.0021	0.00018	ppm v/v			11/17/21 20:45	1.58
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.0021	0.00032	ppm v/v			11/17/21 20:45	1.58
1,2-Dichlorobenzene	ND		0.0021	0.00082	ppm v/v			11/17/21 20:45	1.58
1,3-Dichlorobenzene	ND		0.0021	0.00042	ppm v/v			11/17/21 20:45	1.58
1,4-Dichlorobenzene	ND		0.0021	0.00042	ppm v/v			11/17/21 20:45	1.58
<b>Dichlorodifluoromethane</b>	<b>0.041</b>		0.0021	0.00037	ppm v/v			11/17/21 20:45	1.58
<b>1,1-Dichloroethane</b>	<b>0.0040</b>		0.0021	0.00018	ppm v/v			11/17/21 20:45	1.58
1,2-Dichloroethane	ND		0.0021	0.00026	ppm v/v			11/17/21 20:45	1.58
<b>1,1-Dichloroethene</b>	<b>0.020</b>		0.0021	0.00021	ppm v/v			11/17/21 20:45	1.58
<b>cis-1,2-Dichloroethene</b>	<b>0.0019</b>	<b>J</b>	0.0021	0.00026	ppm v/v			11/17/21 20:45	1.58
trans-1,2-Dichloroethene	ND		0.0021	0.00018	ppm v/v			11/17/21 20:45	1.58
1,2-Dichloropropane	ND		0.0021	0.00026	ppm v/v			11/17/21 20:45	1.58
cis-1,3-Dichloropropene	ND		0.0021	0.00042	ppm v/v			11/17/21 20:45	1.58
trans-1,3-Dichloropropene	ND		0.0021	0.00024	ppm v/v			11/17/21 20:45	1.58
Ethylbenzene	ND		0.0021	0.00034	ppm v/v			11/17/21 20:45	1.58
4-Ethyltoluene	ND		0.0042	0.00055	ppm v/v			11/17/21 20:45	1.58
Hexachlorobutadiene	ND		0.011	0.00084	ppm v/v			11/17/21 20:45	1.58
2-Hexanone	ND		0.0053	0.00042	ppm v/v			11/17/21 20:45	1.58
4-Methyl-2-pentanone (MIBK)	ND		0.0053	0.0014	ppm v/v			11/17/21 20:45	1.58
Methylene Chloride	ND		0.011	0.010	ppm v/v			11/17/21 20:45	1.58
Styrene	ND		0.0021	0.00063	ppm v/v			11/17/21 20:45	1.58
1,1,2,2-Tetrachloroethane	ND		0.0021	0.00037	ppm v/v			11/17/21 20:45	1.58
<b>Tetrachloroethene</b>	<b>0.10</b>		0.0021	0.00018	ppm v/v			11/17/21 20:45	1.58
Toluene	ND		0.0032	0.0021	ppm v/v			11/17/21 20:45	1.58
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.10</b>		0.0021	0.00021	ppm v/v			11/17/21 20:45	1.58
1,2,4-Trichlorobenzene	ND		0.011	0.0017	ppm v/v			11/17/21 20:45	1.58
<b>1,1,1-Trichloroethane</b>	<b>0.0015</b>	<b>J</b>	0.0021	0.00097	ppm v/v			11/17/21 20:45	1.58
1,1,2-Trichloroethane	ND		0.0021	0.00018	ppm v/v			11/17/21 20:45	1.58
<b>Trichloroethene</b>	<b>0.13</b>		0.0011	0.00034	ppm v/v			11/17/21 20:45	1.58
<b>Trichlorofluoromethane</b>	<b>0.035</b>		0.0021	0.00029	ppm v/v			11/17/21 20:45	1.58
1,2,4-Trimethylbenzene	ND		0.0021	0.00053	ppm v/v			11/17/21 20:45	1.58
1,3,5-Trimethylbenzene	ND		0.0021	0.00058	ppm v/v			11/17/21 20:45	1.58
Vinyl acetate	ND		0.011	0.00074	ppm v/v			11/17/21 20:45	1.58
Vinyl chloride	ND		0.0011	0.00068	ppm v/v			11/17/21 20:45	1.58
m,p-Xylene	ND		0.0021	0.00076	ppm v/v			11/17/21 20:45	1.58
o-Xylene	ND		0.0021	0.00040	ppm v/v			11/17/21 20:45	1.58

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		60 - 140		11/17/21 20:45	1.58



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116206-001/MWL-SV04-200

Lab Sample ID: 140-25404-5

Date Collected: 11/05/21 10:20

Matrix: Air

Date Received: 11/15/21 10:00

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		0.032	0.0090	ppm v/v			11/17/21 21:30	1.58
<b>Benzene</b>	<b>0.00030</b>	<b>J B</b>	0.0013	0.00013	ppm v/v			11/17/21 21:30	1.58
Benzyl chloride	ND		0.0025	0.00060	ppm v/v			11/17/21 21:30	1.58
Bromodichloromethane	ND		0.0013	0.00028	ppm v/v			11/17/21 21:30	1.58
Bromoform	ND		0.0013	0.00014	ppm v/v			11/17/21 21:30	1.58
Bromomethane	ND		0.0013	0.00035	ppm v/v			11/17/21 21:30	1.58
2-Butanone (MEK)	ND		0.0063	0.0012	ppm v/v			11/17/21 21:30	1.58
Carbon disulfide	ND		0.0032	0.00017	ppm v/v			11/17/21 21:30	1.58
<b>Carbon tetrachloride</b>	<b>0.00039</b>	<b>J</b>	0.0013	0.00011	ppm v/v			11/17/21 21:30	1.58
Chlorobenzene	ND		0.0013	0.000095	ppm v/v			11/17/21 21:30	1.58
Chloroethane	ND		0.0013	0.00046	ppm v/v			11/17/21 21:30	1.58
<b>Chloroform</b>	<b>0.0015</b>		0.0013	0.00011	ppm v/v			11/17/21 21:30	1.58
Chloromethane	ND		0.0032	0.0010	ppm v/v			11/17/21 21:30	1.58
Dibromochloromethane	ND		0.0013	0.00011	ppm v/v			11/17/21 21:30	1.58
1,2-Dibromoethane (EDB)	ND		0.0013	0.00011	ppm v/v			11/17/21 21:30	1.58
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.0013	0.00019	ppm v/v			11/17/21 21:30	1.58
1,2-Dichlorobenzene	ND		0.0013	0.00049	ppm v/v			11/17/21 21:30	1.58
1,3-Dichlorobenzene	ND		0.0013	0.00025	ppm v/v			11/17/21 21:30	1.58
1,4-Dichlorobenzene	ND		0.0013	0.00025	ppm v/v			11/17/21 21:30	1.58
<b>Dichlorodifluoromethane</b>	<b>0.046</b>		0.0013	0.00022	ppm v/v			11/17/21 21:30	1.58
<b>1,1-Dichloroethane</b>	<b>0.0044</b>		0.0013	0.00011	ppm v/v			11/17/21 21:30	1.58
1,2-Dichloroethane	ND		0.0013	0.00016	ppm v/v			11/17/21 21:30	1.58
<b>1,1-Dichloroethene</b>	<b>0.022</b>		0.0013	0.00013	ppm v/v			11/17/21 21:30	1.58
<b>cis-1,2-Dichloroethene</b>	<b>0.0024</b>		0.0013	0.00016	ppm v/v			11/17/21 21:30	1.58
trans-1,2-Dichloroethene	ND		0.0013	0.00011	ppm v/v			11/17/21 21:30	1.58
1,2-Dichloropropane	ND		0.0013	0.00016	ppm v/v			11/17/21 21:30	1.58
cis-1,3-Dichloropropene	ND		0.0013	0.00025	ppm v/v			11/17/21 21:30	1.58
trans-1,3-Dichloropropene	ND		0.0013	0.00014	ppm v/v			11/17/21 21:30	1.58
Ethylbenzene	ND		0.0013	0.00021	ppm v/v			11/17/21 21:30	1.58
4-Ethyltoluene	ND		0.0025	0.00033	ppm v/v			11/17/21 21:30	1.58
Hexachlorobutadiene	ND		0.0063	0.00051	ppm v/v			11/17/21 21:30	1.58
2-Hexanone	ND		0.0032	0.00025	ppm v/v			11/17/21 21:30	1.58
4-Methyl-2-pentanone (MIBK)	ND		0.0032	0.00085	ppm v/v			11/17/21 21:30	1.58
Methylene Chloride	ND		0.0063	0.0062	ppm v/v			11/17/21 21:30	1.58
Styrene	ND		0.0013	0.00038	ppm v/v			11/17/21 21:30	1.58
1,1,2,2-Tetrachloroethane	ND		0.0013	0.00022	ppm v/v			11/17/21 21:30	1.58
<b>Tetrachloroethene</b>	<b>0.12</b>		0.0013	0.00011	ppm v/v			11/17/21 21:30	1.58
Toluene	ND		0.0019	0.0012	ppm v/v			11/17/21 21:30	1.58
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.12</b>		0.0013	0.00013	ppm v/v			11/17/21 21:30	1.58
1,2,4-Trichlorobenzene	ND		0.0063	0.0010	ppm v/v			11/17/21 21:30	1.58
<b>1,1,1-Trichloroethane</b>	<b>0.0018</b>		0.0013	0.00058	ppm v/v			11/17/21 21:30	1.58
1,1,2-Trichloroethane	ND		0.0013	0.00011	ppm v/v			11/17/21 21:30	1.58
<b>Trichloroethene</b>	<b>0.14</b>		0.00063	0.00021	ppm v/v			11/17/21 21:30	1.58
<b>Trichlorofluoromethane</b>	<b>0.039</b>		0.0013	0.00017	ppm v/v			11/17/21 21:30	1.58
1,2,4-Trimethylbenzene	ND		0.0013	0.00032	ppm v/v			11/17/21 21:30	1.58
1,3,5-Trimethylbenzene	ND		0.0013	0.00035	ppm v/v			11/17/21 21:30	1.58
Vinyl acetate	ND		0.0063	0.00044	ppm v/v			11/17/21 21:30	1.58
Vinyl chloride	ND		0.00063	0.00041	ppm v/v			11/17/21 21:30	1.58

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMP

Job ID: 140-25404-1

**Client Sample ID: 116206-001/MWL-SV04-200**

**Lab Sample ID: 140-25404-5**

**Date Collected: 11/05/21 10:20**

**Matrix: Air**

**Date Received: 11/15/21 10:00**

**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		0.0013	0.00046	ppm v/v			11/17/21 21:30	1.58
o-Xylene	ND		0.0013	0.00024	ppm v/v			11/17/21 21:30	1.58
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		60 - 140					11/17/21 21:30	1.58

**Client Sample ID: 116207-001/MWL-SV04-300**

**Lab Sample ID: 140-25404-6**

**Date Collected: 11/05/21 10:23**

**Matrix: Air**

**Date Received: 11/15/21 10:00**

**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	0.0069	J	0.020	0.0056	ppm v/v			11/18/21 14:56	1.56
Benzene	0.00030	J B	0.00078	0.000078	ppm v/v			11/18/21 14:56	1.56
Benzyl chloride	ND		0.0016	0.00037	ppm v/v			11/18/21 14:56	1.56
Bromodichloromethane	ND		0.00078	0.00018	ppm v/v			11/18/21 14:56	1.56
Bromoform	ND		0.00078	0.000088	ppm v/v			11/18/21 14:56	1.56
Bromomethane	ND		0.00078	0.00021	ppm v/v			11/18/21 14:56	1.56
2-Butanone (MEK)	0.0011	J	0.0039	0.00071	ppm v/v			11/18/21 14:56	1.56
Carbon disulfide	0.00019	J	0.0020	0.00011	ppm v/v			11/18/21 14:56	1.56
Carbon tetrachloride	0.00035	J	0.00078	0.000068	ppm v/v			11/18/21 14:56	1.56
Chlorobenzene	ND		0.00078	0.000059	ppm v/v			11/18/21 14:56	1.56
Chloroethane	ND		0.00078	0.00028	ppm v/v			11/18/21 14:56	1.56
Chloroform	0.00066	J	0.00078	0.000068	ppm v/v			11/18/21 14:56	1.56
Chloromethane	ND		0.0020	0.00064	ppm v/v			11/18/21 14:56	1.56
Dibromochloromethane	ND		0.00078	0.000068	ppm v/v			11/18/21 14:56	1.56
1,2-Dibromoethane (EDB)	0.00010	J	0.00078	0.000068	ppm v/v			11/18/21 14:56	1.56
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.00078	0.00012	ppm v/v			11/18/21 14:56	1.56
1,2-Dichlorobenzene	ND		0.00078	0.00030	ppm v/v			11/18/21 14:56	1.56
1,3-Dichlorobenzene	ND		0.00078	0.00016	ppm v/v			11/18/21 14:56	1.56
1,4-Dichlorobenzene	ND		0.00078	0.00016	ppm v/v			11/18/21 14:56	1.56
Dichlorodifluoromethane	0.022		0.00078	0.00014	ppm v/v			11/18/21 14:56	1.56
1,1-Dichloroethane	0.0011		0.00078	0.000068	ppm v/v			11/18/21 14:56	1.56
1,2-Dichloroethane	ND		0.00078	0.000098	ppm v/v			11/18/21 14:56	1.56
1,1-Dichloroethene	0.012		0.00078	0.000078	ppm v/v			11/18/21 14:56	1.56
cis-1,2-Dichloroethene	0.00074	J	0.00078	0.000098	ppm v/v			11/18/21 14:56	1.56
trans-1,2-Dichloroethene	ND		0.00078	0.000068	ppm v/v			11/18/21 14:56	1.56
1,2-Dichloropropane	ND		0.00078	0.000098	ppm v/v			11/18/21 14:56	1.56
cis-1,3-Dichloropropene	ND		0.00078	0.00016	ppm v/v			11/18/21 14:56	1.56
trans-1,3-Dichloropropene	ND		0.00078	0.000088	ppm v/v			11/18/21 14:56	1.56
Ethylbenzene	ND		0.00078	0.00013	ppm v/v			11/18/21 14:56	1.56
4-Ethyltoluene	ND		0.0016	0.00020	ppm v/v			11/18/21 14:56	1.56
Hexachlorobutadiene	ND		0.0039	0.00031	ppm v/v			11/18/21 14:56	1.56
2-Hexanone	ND		0.0020	0.00016	ppm v/v			11/18/21 14:56	1.56
4-Methyl-2-pentanone (MIBK)	ND		0.0020	0.00053	ppm v/v			11/18/21 14:56	1.56
Methylene Chloride	ND		0.0039	0.0038	ppm v/v			11/18/21 14:56	1.56
Styrene	ND		0.00078	0.00023	ppm v/v			11/18/21 14:56	1.56
1,1,2,2-Tetrachloroethane	ND		0.00078	0.00014	ppm v/v			11/18/21 14:56	1.56

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMP

Job ID: 140-25404-1

Client Sample ID: 116207-001/MWL-SV04-300

Lab Sample ID: 140-25404-6

Date Collected: 11/05/21 10:23

Matrix: Air

Date Received: 11/15/21 10:00

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	0.11		0.00078	0.000068	ppm v/v			11/18/21 14:56	1.56
Toluene	ND		0.0012	0.00076	ppm v/v			11/18/21 14:56	1.56
1,1,2-Trichloro-1,2,2-trifluoroethane	0.075		0.00078	0.000078	ppm v/v			11/18/21 14:56	1.56
1,2,4-Trichlorobenzene	ND		0.0039	0.00062	ppm v/v			11/18/21 14:56	1.56
1,1,1-Trichloroethane	0.00093		0.00078	0.00036	ppm v/v			11/18/21 14:56	1.56
1,1,2-Trichloroethane	ND		0.00078	0.000068	ppm v/v			11/18/21 14:56	1.56
Trichloroethene	0.084		0.00039	0.00013	ppm v/v			11/18/21 14:56	1.56
Trichlorofluoromethane	0.015		0.00078	0.00011	ppm v/v			11/18/21 14:56	1.56
1,2,4-Trimethylbenzene	ND		0.00078	0.00020	ppm v/v			11/18/21 14:56	1.56
1,3,5-Trimethylbenzene	ND		0.00078	0.00021	ppm v/v			11/18/21 14:56	1.56
Vinyl acetate	ND		0.0039	0.00027	ppm v/v			11/18/21 14:56	1.56
Vinyl chloride	ND		0.00039	0.00025	ppm v/v			11/18/21 14:56	1.56
m,p-Xylene	ND		0.00078	0.00028	ppm v/v			11/18/21 14:56	1.56
o-Xylene	ND		0.00078	0.00015	ppm v/v			11/18/21 14:56	1.56
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		60 - 140					11/18/21 14:56	1.56

Client Sample ID: 116208-001/MWL-SV04-400

Lab Sample ID: 140-25404-7

Date Collected: 11/05/21 10:30

Matrix: Air

Date Received: 11/15/21 10:00

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	0.0072	J	0.016	0.0047	ppm v/v			11/18/21 15:38	1.64
Benzene	0.00069	B	0.00066	0.000066	ppm v/v			11/18/21 15:38	1.64
Benzyl chloride	ND		0.0013	0.00031	ppm v/v			11/18/21 15:38	1.64
Bromodichloromethane	ND		0.00066	0.00015	ppm v/v			11/18/21 15:38	1.64
Bromoform	ND		0.00066	0.000074	ppm v/v			11/18/21 15:38	1.64
Bromomethane	ND		0.00066	0.00018	ppm v/v			11/18/21 15:38	1.64
2-Butanone (MEK)	0.00098	J	0.0033	0.00060	ppm v/v			11/18/21 15:38	1.64
Carbon disulfide	0.0010	J	0.0016	0.000090	ppm v/v			11/18/21 15:38	1.64
Carbon tetrachloride	0.00019	J	0.00066	0.000057	ppm v/v			11/18/21 15:38	1.64
Chlorobenzene	0.00011	J B	0.00066	0.000049	ppm v/v			11/18/21 15:38	1.64
Chloroethane	ND		0.00066	0.00024	ppm v/v			11/18/21 15:38	1.64
Chloroform	0.00050	J	0.00066	0.000057	ppm v/v			11/18/21 15:38	1.64
Chloromethane	ND		0.0016	0.00054	ppm v/v			11/18/21 15:38	1.64
Dibromochloromethane	ND		0.00066	0.000057	ppm v/v			11/18/21 15:38	1.64
1,2-Dibromoethane (EDB)	0.000074	J	0.00066	0.000057	ppm v/v			11/18/21 15:38	1.64
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.00066	0.000098	ppm v/v			11/18/21 15:38	1.64
1,2-Dichlorobenzene	ND		0.00066	0.00025	ppm v/v			11/18/21 15:38	1.64
1,3-Dichlorobenzene	ND		0.00066	0.00013	ppm v/v			11/18/21 15:38	1.64
1,4-Dichlorobenzene	ND		0.00066	0.00013	ppm v/v			11/18/21 15:38	1.64
Dichlorodifluoromethane	0.020		0.00066	0.00011	ppm v/v			11/18/21 15:38	1.64
1,1-Dichloroethane	0.00062	J	0.00066	0.000057	ppm v/v			11/18/21 15:38	1.64
1,2-Dichloroethane	ND		0.00066	0.000082	ppm v/v			11/18/21 15:38	1.64
1,1-Dichloroethene	0.0067		0.00066	0.000066	ppm v/v			11/18/21 15:38	1.64

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116208-001/MWL-SV04-400

Lab Sample ID: 140-25404-7

Date Collected: 11/05/21 10:30

Matrix: Air

Date Received: 11/15/21 10:00

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	0.00045	J	0.00066	0.000082	ppm v/v			11/18/21 15:38	1.64
trans-1,2-Dichloroethene	ND		0.00066	0.000057	ppm v/v			11/18/21 15:38	1.64
1,2-Dichloropropane	ND		0.00066	0.000082	ppm v/v			11/18/21 15:38	1.64
cis-1,3-Dichloropropene	ND		0.00066	0.00013	ppm v/v			11/18/21 15:38	1.64
trans-1,3-Dichloropropene	ND		0.00066	0.000074	ppm v/v			11/18/21 15:38	1.64
Ethylbenzene	ND		0.00066	0.00011	ppm v/v			11/18/21 15:38	1.64
4-Ethyltoluene	ND		0.0013	0.00017	ppm v/v			11/18/21 15:38	1.64
Hexachlorobutadiene	ND		0.0033	0.00026	ppm v/v			11/18/21 15:38	1.64
2-Hexanone	ND		0.0016	0.00013	ppm v/v			11/18/21 15:38	1.64
4-Methyl-2-pentanone (MIBK)	ND		0.0016	0.00044	ppm v/v			11/18/21 15:38	1.64
Methylene Chloride	ND		0.0033	0.0032	ppm v/v			11/18/21 15:38	1.64
Styrene	ND		0.00066	0.00020	ppm v/v			11/18/21 15:38	1.64
1,1,2,2-Tetrachloroethane	ND		0.00066	0.00011	ppm v/v			11/18/21 15:38	1.64
Tetrachloroethene	0.094		0.00066	0.000057	ppm v/v			11/18/21 15:38	1.64
Toluene	ND		0.00098	0.00064	ppm v/v			11/18/21 15:38	1.64
1,1,2-Trichloro-1,2,2-trifluoroethane	0.067		0.00066	0.000066	ppm v/v			11/18/21 15:38	1.64
1,2,4-Trichlorobenzene	ND		0.0033	0.00052	ppm v/v			11/18/21 15:38	1.64
1,1,1-Trichloroethane	0.00055	J	0.00066	0.00030	ppm v/v			11/18/21 15:38	1.64
1,1,2-Trichloroethane	0.000073	J	0.00066	0.000057	ppm v/v			11/18/21 15:38	1.64
Trichloroethene	0.053		0.00033	0.00011	ppm v/v			11/18/21 15:38	1.64
Trichlorofluoromethane	0.012		0.00066	0.000090	ppm v/v			11/18/21 15:38	1.64
1,2,4-Trimethylbenzene	ND		0.00066	0.00016	ppm v/v			11/18/21 15:38	1.64
1,3,5-Trimethylbenzene	ND		0.00066	0.00018	ppm v/v			11/18/21 15:38	1.64
Vinyl acetate	ND		0.0033	0.00023	ppm v/v			11/18/21 15:38	1.64
Vinyl chloride	ND		0.00033	0.00021	ppm v/v			11/18/21 15:38	1.64
m,p-Xylene	ND		0.00066	0.00024	ppm v/v			11/18/21 15:38	1.64
o-Xylene	ND		0.00066	0.00012	ppm v/v			11/18/21 15:38	1.64
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	87		60 - 140					11/18/21 15:38	1.64

Client Sample ID: 116209-001/MWL-SV04-400

Lab Sample ID: 140-25404-8

Date Collected: 11/05/21 10:30

Matrix: Air

Date Received: 11/15/21 10:00

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		0.017	0.0047	ppm v/v			11/18/21 16:21	1.65
Benzene	0.00061	J B	0.00066	0.000066	ppm v/v			11/18/21 16:21	1.65
Benzyl chloride	ND		0.0013	0.00031	ppm v/v			11/18/21 16:21	1.65
Bromodichloromethane	ND		0.00066	0.00015	ppm v/v			11/18/21 16:21	1.65
Bromoform	ND		0.00066	0.000074	ppm v/v			11/18/21 16:21	1.65
Bromomethane	ND		0.00066	0.00018	ppm v/v			11/18/21 16:21	1.65
2-Butanone (MEK)	ND		0.0033	0.00060	ppm v/v			11/18/21 16:21	1.65
Carbon disulfide	0.00079	J	0.0017	0.000091	ppm v/v			11/18/21 16:21	1.65
Carbon tetrachloride	0.00019	J	0.00066	0.000058	ppm v/v			11/18/21 16:21	1.65
Chlorobenzene	0.00015	J B	0.00066	0.000050	ppm v/v			11/18/21 16:21	1.65

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116209-001/MWL-SV04-400

Lab Sample ID: 140-25404-8

Date Collected: 11/05/21 10:30

Matrix: Air

Date Received: 11/15/21 10:00

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		0.00066	0.00024	ppm v/v			11/18/21 16:21	1.65
<b>Chloroform</b>	<b>0.00041</b>	<b>J</b>	0.00066	0.000058	ppm v/v			11/18/21 16:21	1.65
Chloromethane	ND		0.0017	0.00054	ppm v/v			11/18/21 16:21	1.65
Dibromochloromethane	ND		0.00066	0.000058	ppm v/v			11/18/21 16:21	1.65
1,2-Dibromoethane (EDB)	ND		0.00066	0.000058	ppm v/v			11/18/21 16:21	1.65
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.00066	0.000099	ppm v/v			11/18/21 16:21	1.65
1,2-Dichlorobenzene	ND		0.00066	0.00026	ppm v/v			11/18/21 16:21	1.65
1,3-Dichlorobenzene	ND		0.00066	0.00013	ppm v/v			11/18/21 16:21	1.65
1,4-Dichlorobenzene	ND		0.00066	0.00013	ppm v/v			11/18/21 16:21	1.65
<b>Dichlorodifluoromethane</b>	<b>0.020</b>		0.00066	0.00012	ppm v/v			11/18/21 16:21	1.65
<b>1,1-Dichloroethane</b>	<b>0.00055</b>	<b>J</b>	0.00066	0.000058	ppm v/v			11/18/21 16:21	1.65
1,2-Dichloroethane	ND		0.00066	0.000083	ppm v/v			11/18/21 16:21	1.65
<b>1,1-Dichloroethene</b>	<b>0.0059</b>		0.00066	0.000066	ppm v/v			11/18/21 16:21	1.65
<b>cis-1,2-Dichloroethene</b>	<b>0.00037</b>	<b>J</b>	0.00066	0.000083	ppm v/v			11/18/21 16:21	1.65
trans-1,2-Dichloroethene	ND		0.00066	0.000058	ppm v/v			11/18/21 16:21	1.65
1,2-Dichloropropane	ND		0.00066	0.000083	ppm v/v			11/18/21 16:21	1.65
cis-1,3-Dichloropropene	ND		0.00066	0.00013	ppm v/v			11/18/21 16:21	1.65
trans-1,3-Dichloropropene	ND		0.00066	0.000074	ppm v/v			11/18/21 16:21	1.65
Ethylbenzene	ND		0.00066	0.00011	ppm v/v			11/18/21 16:21	1.65
4-Ethyltoluene	ND		0.0013	0.00017	ppm v/v			11/18/21 16:21	1.65
Hexachlorobutadiene	ND		0.0033	0.00026	ppm v/v			11/18/21 16:21	1.65
2-Hexanone	ND		0.0017	0.00013	ppm v/v			11/18/21 16:21	1.65
4-Methyl-2-pentanone (MIBK)	ND		0.0017	0.00045	ppm v/v			11/18/21 16:21	1.65
Methylene Chloride	ND		0.0033	0.0032	ppm v/v			11/18/21 16:21	1.65
Styrene	ND		0.00066	0.00020	ppm v/v			11/18/21 16:21	1.65
1,1,2,2-Tetrachloroethane	ND		0.00066	0.00012	ppm v/v			11/18/21 16:21	1.65
<b>Tetrachloroethene</b>	<b>0.097</b>		0.00066	0.000058	ppm v/v			11/18/21 16:21	1.65
Toluene	ND		0.00099	0.00064	ppm v/v			11/18/21 16:21	1.65
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.066</b>		0.00066	0.000066	ppm v/v			11/18/21 16:21	1.65
1,2,4-Trichlorobenzene	ND		0.0033	0.00053	ppm v/v			11/18/21 16:21	1.65
<b>1,1,1-Trichloroethane</b>	<b>0.00042</b>	<b>J</b>	0.00066	0.00031	ppm v/v			11/18/21 16:21	1.65
1,1,2-Trichloroethane	ND		0.00066	0.000058	ppm v/v			11/18/21 16:21	1.65
<b>Trichloroethene</b>	<b>0.051</b>		0.00033	0.00011	ppm v/v			11/18/21 16:21	1.65
<b>Trichlorofluoromethane</b>	<b>0.011</b>		0.00066	0.000091	ppm v/v			11/18/21 16:21	1.65
1,2,4-Trimethylbenzene	ND		0.00066	0.00017	ppm v/v			11/18/21 16:21	1.65
1,3,5-Trimethylbenzene	ND		0.00066	0.00018	ppm v/v			11/18/21 16:21	1.65
Vinyl acetate	ND		0.0033	0.00023	ppm v/v			11/18/21 16:21	1.65
Vinyl chloride	ND		0.00033	0.00021	ppm v/v			11/18/21 16:21	1.65
m,p-Xylene	ND		0.00066	0.00024	ppm v/v			11/18/21 16:21	1.65
o-Xylene	ND		0.00066	0.00012	ppm v/v			11/18/21 16:21	1.65

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		60 - 140		11/18/21 16:21	1.65

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

**Client Sample ID: 116210-001/MWL-SV-FB 5**

**Lab Sample ID: 140-25404-9**

**Date Collected: 11/05/21 10:49**

**Matrix: Air**

**Date Received: 11/15/21 10:00**

**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		0.0020	0.00058	ppm v/v			11/17/21 15:50	1.62
<b>Benzene</b>	<b>0.000014</b>	<b>J B</b>	0.000081	0.0000081	ppm v/v			11/17/21 15:50	1.62
Benzyl chloride	ND		0.00016	0.000038	ppm v/v			11/17/21 15:50	1.62
Bromodichloromethane	ND		0.000081	0.000018	ppm v/v			11/17/21 15:50	1.62
Bromoform	ND		0.000081	0.0000091	ppm v/v			11/17/21 15:50	1.62
Bromomethane	ND		0.000081	0.000022	ppm v/v			11/17/21 15:50	1.62
2-Butanone (MEK)	ND		0.00041	0.000074	ppm v/v			11/17/21 15:50	1.62
<b>Carbon disulfide</b>	<b>0.000091</b>	<b>J B</b>	0.00020	0.000011	ppm v/v			11/17/21 15:50	1.62
Carbon tetrachloride	ND		0.000081	0.0000071	ppm v/v			11/17/21 15:50	1.62
<b>Chlorobenzene</b>	<b>0.000015</b>	<b>J B</b>	0.000081	0.0000061	ppm v/v			11/17/21 15:50	1.62
Chloroethane	ND		0.000081	0.000029	ppm v/v			11/17/21 15:50	1.62
Chloroform	ND		0.000081	0.0000071	ppm v/v			11/17/21 15:50	1.62
Chloromethane	ND		0.00020	0.000067	ppm v/v			11/17/21 15:50	1.62
Dibromochloromethane	ND		0.000081	0.0000071	ppm v/v			11/17/21 15:50	1.62
<b>1,2-Dibromoethane (EDB)</b>	<b>0.0000074</b>	<b>J B</b>	0.000081	0.0000071	ppm v/v			11/17/21 15:50	1.62
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.000081	0.000012	ppm v/v			11/17/21 15:50	1.62
1,2-Dichlorobenzene	ND		0.000081	0.000031	ppm v/v			11/17/21 15:50	1.62
1,3-Dichlorobenzene	ND		0.000081	0.000016	ppm v/v			11/17/21 15:50	1.62
1,4-Dichlorobenzene	ND		0.000081	0.000016	ppm v/v			11/17/21 15:50	1.62
Dichlorodifluoromethane	ND		0.000081	0.000014	ppm v/v			11/17/21 15:50	1.62
1,1-Dichloroethane	ND		0.000081	0.0000071	ppm v/v			11/17/21 15:50	1.62
1,2-Dichloroethane	ND		0.000081	0.000010	ppm v/v			11/17/21 15:50	1.62
1,1-Dichloroethene	ND		0.000081	0.0000081	ppm v/v			11/17/21 15:50	1.62
cis-1,2-Dichloroethene	ND		0.000081	0.000010	ppm v/v			11/17/21 15:50	1.62
trans-1,2-Dichloroethene	ND		0.000081	0.0000071	ppm v/v			11/17/21 15:50	1.62
1,2-Dichloropropane	ND		0.000081	0.000010	ppm v/v			11/17/21 15:50	1.62
cis-1,3-Dichloropropene	ND		0.000081	0.000016	ppm v/v			11/17/21 15:50	1.62
trans-1,3-Dichloropropene	ND		0.000081	0.0000091	ppm v/v			11/17/21 15:50	1.62
Ethylbenzene	ND		0.000081	0.000013	ppm v/v			11/17/21 15:50	1.62
4-Ethyltoluene	ND		0.00016	0.000021	ppm v/v			11/17/21 15:50	1.62
Hexachlorobutadiene	ND		0.00041	0.000032	ppm v/v			11/17/21 15:50	1.62
2-Hexanone	ND		0.00020	0.000016	ppm v/v			11/17/21 15:50	1.62
4-Methyl-2-pentanone (MIBK)	ND		0.00020	0.000055	ppm v/v			11/17/21 15:50	1.62
Methylene Chloride	ND		0.00041	0.00039	ppm v/v			11/17/21 15:50	1.62
Styrene	ND		0.000081	0.000024	ppm v/v			11/17/21 15:50	1.62
1,1,2,2-Tetrachloroethane	ND		0.000081	0.000014	ppm v/v			11/17/21 15:50	1.62
Tetrachloroethene	ND		0.000081	0.0000071	ppm v/v			11/17/21 15:50	1.62
Toluene	ND		0.00012	0.000079	ppm v/v			11/17/21 15:50	1.62
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.000081	0.0000081	ppm v/v			11/17/21 15:50	1.62
1,2,4-Trichlorobenzene	ND		0.00041	0.000065	ppm v/v			11/17/21 15:50	1.62
1,1,1-Trichloroethane	ND		0.000081	0.000037	ppm v/v			11/17/21 15:50	1.62
1,1,2-Trichloroethane	ND		0.000081	0.0000071	ppm v/v			11/17/21 15:50	1.62
Trichloroethene	ND		0.000041	0.000013	ppm v/v			11/17/21 15:50	1.62
Trichlorofluoromethane	ND		0.000081	0.000011	ppm v/v			11/17/21 15:50	1.62
1,2,4-Trimethylbenzene	ND		0.000081	0.000020	ppm v/v			11/17/21 15:50	1.62
1,3,5-Trimethylbenzene	ND		0.000081	0.000022	ppm v/v			11/17/21 15:50	1.62
Vinyl acetate	ND		0.00041	0.000028	ppm v/v			11/17/21 15:50	1.62
Vinyl chloride	ND		0.000041	0.000026	ppm v/v			11/17/21 15:50	1.62



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

**Client Sample ID: 116210-001/MWL-SV-FB 5**

**Lab Sample ID: 140-25404-9**

**Date Collected: 11/05/21 10:49**

**Matrix: Air**

**Date Received: 11/15/21 10:00**

**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		0.000081	0.000029	ppm v/v			11/17/21 15:50	1.62
o-Xylene	ND		0.000081	0.000015	ppm v/v			11/17/21 15:50	1.62
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		60 - 140					11/17/21 15:50	1.62

**Client Sample ID: 116211-001/MWL-SV05-50**

**Lab Sample ID: 140-25404-10**

**Date Collected: 11/05/21 10:56**

**Matrix: Air**

**Date Received: 11/15/21 10:00**

**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		0.0064	0.0018	ppm v/v			11/18/21 17:06	1.61
<b>Benzene</b>	<b>0.00017</b>	<b>J B</b>	0.00026	0.000026	ppm v/v			11/18/21 17:06	1.61
Benzyl chloride	ND		0.00052	0.00012	ppm v/v			11/18/21 17:06	1.61
Bromodichloromethane	ND		0.00026	0.000058	ppm v/v			11/18/21 17:06	1.61
Bromoform	ND		0.00026	0.000029	ppm v/v			11/18/21 17:06	1.61
Bromomethane	ND		0.00026	0.000071	ppm v/v			11/18/21 17:06	1.61
2-Butanone (MEK)	ND		0.0013	0.00024	ppm v/v			11/18/21 17:06	1.61
<b>Carbon disulfide</b>	<b>0.000095</b>	<b>J</b>	0.00064	0.000035	ppm v/v			11/18/21 17:06	1.61
<b>Carbon tetrachloride</b>	<b>0.00031</b>		0.00026	0.000023	ppm v/v			11/18/21 17:06	1.61
<b>Chlorobenzene</b>	<b>0.000047</b>	<b>J B</b>	0.00026	0.000019	ppm v/v			11/18/21 17:06	1.61
Chloroethane	ND		0.00026	0.000093	ppm v/v			11/18/21 17:06	1.61
<b>Chloroform</b>	<b>0.0010</b>		0.00026	0.000023	ppm v/v			11/18/21 17:06	1.61
Chloromethane	ND		0.00064	0.00021	ppm v/v			11/18/21 17:06	1.61
Dibromochloromethane	ND		0.00026	0.000023	ppm v/v			11/18/21 17:06	1.61
<b>1,2-Dibromoethane (EDB)</b>	<b>0.000046</b>	<b>J</b>	0.00026	0.000023	ppm v/v			11/18/21 17:06	1.61
<b>1,2-Dichloro-1,1,2,2-tetrafluoroethane</b>	<b>0.000086</b>	<b>J</b>	0.00026	0.000039	ppm v/v			11/18/21 17:06	1.61
1,2-Dichlorobenzene	ND		0.00026	0.00010	ppm v/v			11/18/21 17:06	1.61
1,3-Dichlorobenzene	ND		0.00026	0.000052	ppm v/v			11/18/21 17:06	1.61
1,4-Dichlorobenzene	ND		0.00026	0.000052	ppm v/v			11/18/21 17:06	1.61
<b>Dichlorodifluoromethane</b>	<b>0.034</b>		0.00026	0.000045	ppm v/v			11/18/21 17:06	1.61
<b>1,1-Dichloroethane</b>	<b>0.0012</b>		0.00026	0.000023	ppm v/v			11/18/21 17:06	1.61
1,2-Dichloroethane	ND		0.00026	0.000032	ppm v/v			11/18/21 17:06	1.61
<b>1,1-Dichloroethene</b>	<b>0.0068</b>		0.00026	0.000026	ppm v/v			11/18/21 17:06	1.61
<b>cis-1,2-Dichloroethene</b>	<b>0.00053</b>		0.00026	0.000032	ppm v/v			11/18/21 17:06	1.61
trans-1,2-Dichloroethene	ND		0.00026	0.000023	ppm v/v			11/18/21 17:06	1.61
1,2-Dichloropropane	ND		0.00026	0.000032	ppm v/v			11/18/21 17:06	1.61
cis-1,3-Dichloropropene	ND		0.00026	0.000052	ppm v/v			11/18/21 17:06	1.61
trans-1,3-Dichloropropene	ND		0.00026	0.000029	ppm v/v			11/18/21 17:06	1.61
Ethylbenzene	ND		0.00026	0.000042	ppm v/v			11/18/21 17:06	1.61
4-Ethyltoluene	ND		0.00052	0.000068	ppm v/v			11/18/21 17:06	1.61
Hexachlorobutadiene	ND		0.0013	0.00010	ppm v/v			11/18/21 17:06	1.61
2-Hexanone	ND		0.00064	0.000052	ppm v/v			11/18/21 17:06	1.61
4-Methyl-2-pentanone (MIBK)	ND		0.00064	0.00017	ppm v/v			11/18/21 17:06	1.61
Methylene Chloride	ND		0.0013	0.0013	ppm v/v			11/18/21 17:06	1.61
Styrene	ND		0.00026	0.000077	ppm v/v			11/18/21 17:06	1.61

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116211-001/MWL-SV05-50

Lab Sample ID: 140-25404-10

Date Collected: 11/05/21 10:56

Matrix: Air

Date Received: 11/15/21 10:00

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
1,1,2,2-Tetrachloroethane	ND		0.00026	0.000045	ppm v/v			11/18/21 17:06	1.61
<b>Tetrachloroethene</b>	<b>0.042</b>		0.00026	0.000023	ppm v/v			11/18/21 17:06	1.61
Toluene	ND		0.00039	0.000025	ppm v/v			11/18/21 17:06	1.61
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.034</b>		0.00026	0.000026	ppm v/v			11/18/21 17:06	1.61
1,2,4-Trichlorobenzene	ND		0.0013	0.00021	ppm v/v			11/18/21 17:06	1.61
<b>1,1,1-Trichloroethane</b>	<b>0.0090</b>		0.00026	0.00012	ppm v/v			11/18/21 17:06	1.61
<b>1,1,2-Trichloroethane</b>	<b>0.000026</b>	<b>J</b>	0.00026	0.000023	ppm v/v			11/18/21 17:06	1.61
<b>Trichloroethene</b>	<b>0.047</b>		0.00013	0.000042	ppm v/v			11/18/21 17:06	1.61
1,2,4-Trimethylbenzene	ND		0.00026	0.000064	ppm v/v			11/18/21 17:06	1.61
1,3,5-Trimethylbenzene	ND		0.00026	0.000071	ppm v/v			11/18/21 17:06	1.61
Vinyl acetate	ND		0.0013	0.000090	ppm v/v			11/18/21 17:06	1.61
Vinyl chloride	ND		0.00013	0.000084	ppm v/v			11/18/21 17:06	1.61
<b>m,p-Xylene</b>	<b>0.000094</b>	<b>J</b>	0.00026	0.000093	ppm v/v			11/18/21 17:06	1.61
o-Xylene	ND		0.00026	0.000048	ppm v/v			11/18/21 17:06	1.61
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		60 - 140					11/18/21 17:06	1.61

## 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
<b>Trichlorofluoromethane</b>	<b>0.11</b>		0.0013	0.00018	ppm v/v			11/19/21 12:05	1.61
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		60 - 140					11/19/21 12:05	1.61

Client Sample ID: 116212-001/MWL-SV05-100

Lab Sample ID: 140-25404-11

Date Collected: 11/05/21 10:58

Matrix: Air

Date Received: 11/15/21 10:00

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		0.0078	0.0022	ppm v/v			11/18/21 17:50	1.56
<b>Benzene</b>	<b>0.00024</b>	<b>J B</b>	0.00031	0.000031	ppm v/v			11/18/21 17:50	1.56
Benzyl chloride	ND		0.00062	0.00015	ppm v/v			11/18/21 17:50	1.56
Bromodichloromethane	ND		0.00031	0.000070	ppm v/v			11/18/21 17:50	1.56
Bromoform	ND		0.00031	0.000035	ppm v/v			11/18/21 17:50	1.56
Bromomethane	ND		0.00031	0.000086	ppm v/v			11/18/21 17:50	1.56
<b>2-Butanone (MEK)</b>	<b>0.00030</b>	<b>J</b>	0.0016	0.00028	ppm v/v			11/18/21 17:50	1.56
<b>Carbon disulfide</b>	<b>0.00013</b>	<b>J</b>	0.00078	0.000043	ppm v/v			11/18/21 17:50	1.56
<b>Carbon tetrachloride</b>	<b>0.00057</b>		0.00031	0.000027	ppm v/v			11/18/21 17:50	1.56
<b>Chlorobenzene</b>	<b>0.000066</b>	<b>J B</b>	0.00031	0.000023	ppm v/v			11/18/21 17:50	1.56
Chloroethane	ND		0.00031	0.00011	ppm v/v			11/18/21 17:50	1.56
<b>Chloroform</b>	<b>0.0017</b>		0.00031	0.000027	ppm v/v			11/18/21 17:50	1.56
Chloromethane	ND		0.00078	0.00026	ppm v/v			11/18/21 17:50	1.56
Dibromochloromethane	ND		0.00031	0.000027	ppm v/v			11/18/21 17:50	1.56
<b>1,2-Dibromoethane (EDB)</b>	<b>0.000031</b>	<b>J</b>	0.00031	0.000027	ppm v/v			11/18/21 17:50	1.56
<b>1,2-Dichloro-1,1,2,2-tetrafluoroethane</b>	<b>0.00015</b>	<b>J</b>	0.00031	0.000047	ppm v/v			11/18/21 17:50	1.56

Eurofins TestAmerica, Knoxville



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116212-001/MWL-SV05-100

Lab Sample ID: 140-25404-11

Date Collected: 11/05/21 10:58

Matrix: Air

Date Received: 11/15/21 10:00

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		0.00031	0.00012	ppm v/v			11/18/21 17:50	1.56
1,3-Dichlorobenzene	ND		0.00031	0.000062	ppm v/v			11/18/21 17:50	1.56
1,4-Dichlorobenzene	ND		0.00031	0.000062	ppm v/v			11/18/21 17:50	1.56
Dichlorodifluoromethane	0.057		0.00031	0.000055	ppm v/v			11/18/21 17:50	1.56
1,1-Dichloroethane	0.0026		0.00031	0.000027	ppm v/v			11/18/21 17:50	1.56
1,2-Dichloroethane	ND		0.00031	0.000039	ppm v/v			11/18/21 17:50	1.56
1,1-Dichloroethene	0.016		0.00031	0.000031	ppm v/v			11/18/21 17:50	1.56
cis-1,2-Dichloroethene	0.0013		0.00031	0.000039	ppm v/v			11/18/21 17:50	1.56
trans-1,2-Dichloroethene	ND		0.00031	0.000027	ppm v/v			11/18/21 17:50	1.56
1,2-Dichloropropane	ND		0.00031	0.000039	ppm v/v			11/18/21 17:50	1.56
cis-1,3-Dichloropropene	ND		0.00031	0.000062	ppm v/v			11/18/21 17:50	1.56
trans-1,3-Dichloropropene	ND		0.00031	0.000035	ppm v/v			11/18/21 17:50	1.56
Ethylbenzene	ND		0.00031	0.000051	ppm v/v			11/18/21 17:50	1.56
4-Ethyltoluene	ND		0.00062	0.000082	ppm v/v			11/18/21 17:50	1.56
Hexachlorobutadiene	ND		0.0016	0.00012	ppm v/v			11/18/21 17:50	1.56
2-Hexanone	ND		0.00078	0.000062	ppm v/v			11/18/21 17:50	1.56
4-Methyl-2-pentanone (MIBK)	ND		0.00078	0.00021	ppm v/v			11/18/21 17:50	1.56
Methylene Chloride	ND		0.0016	0.0015	ppm v/v			11/18/21 17:50	1.56
Styrene	ND		0.00031	0.000094	ppm v/v			11/18/21 17:50	1.56
1,1,2,2-Tetrachloroethane	ND		0.00031	0.000055	ppm v/v			11/18/21 17:50	1.56
Toluene	ND		0.00047	0.00030	ppm v/v			11/18/21 17:50	1.56
1,2,4-Trichlorobenzene	ND		0.0016	0.00025	ppm v/v			11/18/21 17:50	1.56
1,1,1-Trichloroethane	0.010		0.00031	0.00014	ppm v/v			11/18/21 17:50	1.56
1,1,2-Trichloroethane	ND		0.00031	0.000027	ppm v/v			11/18/21 17:50	1.56
1,2,4-Trimethylbenzene	ND		0.00031	0.000078	ppm v/v			11/18/21 17:50	1.56
1,3,5-Trimethylbenzene	ND		0.00031	0.000086	ppm v/v			11/18/21 17:50	1.56
Vinyl acetate	ND		0.0016	0.00011	ppm v/v			11/18/21 17:50	1.56
Vinyl chloride	ND		0.00016	0.00010	ppm v/v			11/18/21 17:50	1.56
m,p-Xylene	ND		0.00031	0.00011	ppm v/v			11/18/21 17:50	1.56
o-Xylene	ND		0.00031	0.000059	ppm v/v			11/18/21 17:50	1.56

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		60 - 140		11/18/21 17:50	1.56

## 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
Tetrachloroethene	0.070		0.0012	0.00011	ppm v/v			11/19/21 12:47	1.56
1,1,2-Trichloro-1,2,2-trifluoroethane	0.071		0.0012	0.00012	ppm v/v			11/19/21 12:47	1.56
Trichloroethene	0.096		0.00062	0.00020	ppm v/v			11/19/21 12:47	1.56
Trichlorofluoromethane	0.15		0.0012	0.00017	ppm v/v			11/19/21 12:47	1.56

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	85		60 - 140		11/19/21 12:47	1.56

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116213-001/MWL-SV05-200

Lab Sample ID: 140-25404-12

Date Collected: 11/05/21 11:00

Matrix: Air

Date Received: 11/15/21 10:00

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		0.016	0.0045	ppm v/v			11/18/21 18:33	1.58
<b>Benzene</b>	<b>0.00037</b>	<b>J B</b>	0.00063	0.000063	ppm v/v			11/18/21 18:33	1.58
Benzyl chloride	ND		0.0013	0.00030	ppm v/v			11/18/21 18:33	1.58
Bromodichloromethane	ND		0.00063	0.00014	ppm v/v			11/18/21 18:33	1.58
Bromoform	ND		0.00063	0.000071	ppm v/v			11/18/21 18:33	1.58
Bromomethane	ND		0.00063	0.00017	ppm v/v			11/18/21 18:33	1.58
2-Butanone (MEK)	ND		0.0032	0.00058	ppm v/v			11/18/21 18:33	1.58
<b>Carbon disulfide</b>	<b>0.00015</b>	<b>J</b>	0.0016	0.000087	ppm v/v			11/18/21 18:33	1.58
<b>Carbon tetrachloride</b>	<b>0.00088</b>		0.00063	0.000055	ppm v/v			11/18/21 18:33	1.58
Chlorobenzene	ND		0.00063	0.000047	ppm v/v			11/18/21 18:33	1.58
Chloroethane	ND		0.00063	0.00023	ppm v/v			11/18/21 18:33	1.58
<b>Chloroform</b>	<b>0.0019</b>		0.00063	0.000055	ppm v/v			11/18/21 18:33	1.58
Chloromethane	ND		0.0016	0.00052	ppm v/v			11/18/21 18:33	1.58
Dibromochloromethane	ND		0.00063	0.000055	ppm v/v			11/18/21 18:33	1.58
<b>1,2-Dibromoethane (EDB)</b>	<b>0.000065</b>	<b>J</b>	0.00063	0.000055	ppm v/v			11/18/21 18:33	1.58
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.00063	0.000095	ppm v/v			11/18/21 18:33	1.58
1,2-Dichlorobenzene	ND		0.00063	0.00024	ppm v/v			11/18/21 18:33	1.58
1,3-Dichlorobenzene	ND		0.00063	0.00013	ppm v/v			11/18/21 18:33	1.58
1,4-Dichlorobenzene	ND		0.00063	0.00013	ppm v/v			11/18/21 18:33	1.58
<b>Dichlorodifluoromethane</b>	<b>0.056</b>		0.00063	0.00011	ppm v/v			11/18/21 18:33	1.58
<b>1,1-Dichloroethane</b>	<b>0.0041</b>		0.00063	0.000055	ppm v/v			11/18/21 18:33	1.58
1,2-Dichloroethane	ND		0.00063	0.000079	ppm v/v			11/18/21 18:33	1.58
<b>1,1-Dichloroethene</b>	<b>0.031</b>		0.00063	0.000063	ppm v/v			11/18/21 18:33	1.58
<b>cis-1,2-Dichloroethene</b>	<b>0.0022</b>		0.00063	0.000079	ppm v/v			11/18/21 18:33	1.58
trans-1,2-Dichloroethene	ND		0.00063	0.000055	ppm v/v			11/18/21 18:33	1.58
1,2-Dichloropropane	ND		0.00063	0.000079	ppm v/v			11/18/21 18:33	1.58
cis-1,3-Dichloropropene	ND		0.00063	0.00013	ppm v/v			11/18/21 18:33	1.58
trans-1,3-Dichloropropene	ND		0.00063	0.000071	ppm v/v			11/18/21 18:33	1.58
Ethylbenzene	ND		0.00063	0.00010	ppm v/v			11/18/21 18:33	1.58
4-Ethyltoluene	ND		0.0013	0.00017	ppm v/v			11/18/21 18:33	1.58
Hexachlorobutadiene	ND		0.0032	0.00025	ppm v/v			11/18/21 18:33	1.58
2-Hexanone	ND		0.0016	0.00013	ppm v/v			11/18/21 18:33	1.58
4-Methyl-2-pentanone (MIBK)	ND		0.0016	0.00043	ppm v/v			11/18/21 18:33	1.58
Methylene Chloride	ND		0.0032	0.0031	ppm v/v			11/18/21 18:33	1.58
Styrene	ND		0.00063	0.00019	ppm v/v			11/18/21 18:33	1.58
1,1,2,2-Tetrachloroethane	ND		0.00063	0.00011	ppm v/v			11/18/21 18:33	1.58
Toluene	ND		0.00095	0.00062	ppm v/v			11/18/21 18:33	1.58
1,2,4-Trichlorobenzene	ND		0.0032	0.00051	ppm v/v			11/18/21 18:33	1.58
<b>1,1,1-Trichloroethane</b>	<b>0.0035</b>		0.00063	0.00029	ppm v/v			11/18/21 18:33	1.58
1,1,2-Trichloroethane	ND		0.00063	0.000055	ppm v/v			11/18/21 18:33	1.58
<b>Trichlorofluoromethane</b>	<b>0.083</b>		0.00063	0.000087	ppm v/v			11/18/21 18:33	1.58
1,2,4-Trimethylbenzene	ND		0.00063	0.00016	ppm v/v			11/18/21 18:33	1.58
1,3,5-Trimethylbenzene	ND		0.00063	0.00017	ppm v/v			11/18/21 18:33	1.58
Vinyl acetate	ND		0.0032	0.00022	ppm v/v			11/18/21 18:33	1.58
Vinyl chloride	ND		0.00032	0.00021	ppm v/v			11/18/21 18:33	1.58
m,p-Xylene	ND		0.00063	0.00023	ppm v/v			11/18/21 18:33	1.58
o-Xylene	ND		0.00063	0.00012	ppm v/v			11/18/21 18:33	1.58

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

**Client Sample ID: 116213-001/MWL-SV05-200**

**Lab Sample ID: 140-25404-12**

Date Collected: 11/05/21 11:00

Matrix: Air

Date Received: 11/15/21 10:00

Sample Container: Summa Canister 6L

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		60 - 140		11/18/21 18:33	1.58

## 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
Tetrachloroethene	0.11		0.0025	0.00022	ppm v/v			11/19/21 13:31	1.58
1,1,2-Trichloro-1,2,2-trifluoroethane	0.12		0.0025	0.00025	ppm v/v			11/19/21 13:31	1.58
Trichloroethene	0.16		0.0013	0.00041	ppm v/v			11/19/21 13:31	1.58
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	82		60 - 140					11/19/21 13:31	1.58

**Client Sample ID: 116214-001/MWL-SV05-300**

**Lab Sample ID: 140-25404-13**

Date Collected: 11/05/21 11:03

Matrix: Air

Date Received: 11/15/21 10:00

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	0.0058	J	0.020	0.0056	ppm v/v			11/18/21 19:16	1.56
Benzene	0.00036	J B	0.00078	0.000078	ppm v/v			11/18/21 19:16	1.56
Benzyl chloride	ND		0.0016	0.00037	ppm v/v			11/18/21 19:16	1.56
Bromodichloromethane	ND		0.00078	0.00018	ppm v/v			11/18/21 19:16	1.56
Bromoform	ND		0.00078	0.000088	ppm v/v			11/18/21 19:16	1.56
Bromomethane	ND		0.00078	0.00021	ppm v/v			11/18/21 19:16	1.56
2-Butanone (MEK)	0.00071	J	0.0039	0.00071	ppm v/v			11/18/21 19:16	1.56
Carbon disulfide	0.00016	J	0.0020	0.00011	ppm v/v			11/18/21 19:16	1.56
Carbon tetrachloride	0.00090		0.00078	0.000068	ppm v/v			11/18/21 19:16	1.56
Chlorobenzene	0.00013	J B	0.00078	0.000059	ppm v/v			11/18/21 19:16	1.56
Chloroethane	ND		0.00078	0.00028	ppm v/v			11/18/21 19:16	1.56
Chloroform	0.0011		0.00078	0.000068	ppm v/v			11/18/21 19:16	1.56
Chloromethane	ND		0.0020	0.00064	ppm v/v			11/18/21 19:16	1.56
Dibromochloromethane	ND		0.00078	0.000068	ppm v/v			11/18/21 19:16	1.56
1,2-Dibromoethane (EDB)	0.000070	J	0.00078	0.000068	ppm v/v			11/18/21 19:16	1.56
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.00078	0.00012	ppm v/v			11/18/21 19:16	1.56
1,2-Dichlorobenzene	ND		0.00078	0.00030	ppm v/v			11/18/21 19:16	1.56
1,3-Dichlorobenzene	ND		0.00078	0.00016	ppm v/v			11/18/21 19:16	1.56
1,4-Dichlorobenzene	ND		0.00078	0.00016	ppm v/v			11/18/21 19:16	1.56
Dichlorodifluoromethane	0.037		0.00078	0.00014	ppm v/v			11/18/21 19:16	1.56
1,1-Dichloroethane	0.0020		0.00078	0.000068	ppm v/v			11/18/21 19:16	1.56
1,2-Dichloroethane	ND		0.00078	0.000098	ppm v/v			11/18/21 19:16	1.56
1,1-Dichloroethene	0.024		0.00078	0.000078	ppm v/v			11/18/21 19:16	1.56
cis-1,2-Dichloroethene	0.0011		0.00078	0.000098	ppm v/v			11/18/21 19:16	1.56
trans-1,2-Dichloroethene	ND		0.00078	0.000068	ppm v/v			11/18/21 19:16	1.56
1,2-Dichloropropane	ND		0.00078	0.000098	ppm v/v			11/18/21 19:16	1.56
cis-1,3-Dichloropropene	ND		0.00078	0.00016	ppm v/v			11/18/21 19:16	1.56
trans-1,3-Dichloropropene	ND		0.00078	0.000088	ppm v/v			11/18/21 19:16	1.56
Ethylbenzene	ND		0.00078	0.00013	ppm v/v			11/18/21 19:16	1.56
4-Ethyltoluene	ND		0.0016	0.00020	ppm v/v			11/18/21 19:16	1.56
Hexachlorobutadiene	ND		0.0039	0.00031	ppm v/v			11/18/21 19:16	1.56

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116214-001/MWL-SV05-300

Lab Sample ID: 140-25404-13

Date Collected: 11/05/21 11:03

Matrix: Air

Date Received: 11/15/21 10:00

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
2-Hexanone	ND		0.0020	0.00016	ppm v/v			11/18/21 19:16	1.56
4-Methyl-2-pentanone (MIBK)	ND		0.0020	0.00053	ppm v/v			11/18/21 19:16	1.56
Methylene Chloride	ND		0.0039	0.0038	ppm v/v			11/18/21 19:16	1.56
Styrene	ND		0.00078	0.00023	ppm v/v			11/18/21 19:16	1.56
1,1,2,2-Tetrachloroethane	ND		0.00078	0.00014	ppm v/v			11/18/21 19:16	1.56
<b>Tetrachloroethene</b>	<b>0.11</b>		0.00078	0.000068	ppm v/v			11/18/21 19:16	1.56
Toluene	ND		0.0012	0.00076	ppm v/v			11/18/21 19:16	1.56
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.12</b>		0.00078	0.000078	ppm v/v			11/18/21 19:16	1.56
1,2,4-Trichlorobenzene	ND		0.0039	0.00062	ppm v/v			11/18/21 19:16	1.56
<b>1,1,1-Trichloroethane</b>	<b>0.0016</b>		0.00078	0.00036	ppm v/v			11/18/21 19:16	1.56
1,1,2-Trichloroethane	ND		0.00078	0.000068	ppm v/v			11/18/21 19:16	1.56
<b>Trichloroethene</b>	<b>0.13</b>		0.00039	0.00013	ppm v/v			11/18/21 19:16	1.56
<b>Trichlorofluoromethane</b>	<b>0.035</b>		0.00078	0.00011	ppm v/v			11/18/21 19:16	1.56
1,2,4-Trimethylbenzene	ND		0.00078	0.00020	ppm v/v			11/18/21 19:16	1.56
1,3,5-Trimethylbenzene	ND		0.00078	0.00021	ppm v/v			11/18/21 19:16	1.56
Vinyl acetate	ND		0.0039	0.00027	ppm v/v			11/18/21 19:16	1.56
Vinyl chloride	ND		0.00039	0.00025	ppm v/v			11/18/21 19:16	1.56
m,p-Xylene	ND		0.00078	0.00028	ppm v/v			11/18/21 19:16	1.56
o-Xylene	ND		0.00078	0.00015	ppm v/v			11/18/21 19:16	1.56
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		60 - 140					11/18/21 19:16	1.56

Client Sample ID: 116215-001/MWL-SV05-400

Lab Sample ID: 140-25404-14

Date Collected: 11/05/21 11:08

Matrix: Air

Date Received: 11/15/21 10:00

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
<b>Acetone</b>	<b>0.0051</b>	<b>J</b>	0.013	0.0036	ppm v/v			11/18/21 20:00	1.58
<b>Benzene</b>	<b>0.00038</b>	<b>J B</b>	0.00051	0.000051	ppm v/v			11/18/21 20:00	1.58
Benzyl chloride	ND		0.0010	0.00024	ppm v/v			11/18/21 20:00	1.58
Bromodichloromethane	ND		0.00051	0.00011	ppm v/v			11/18/21 20:00	1.58
Bromoform	ND		0.00051	0.000057	ppm v/v			11/18/21 20:00	1.58
Bromomethane	ND		0.00051	0.00014	ppm v/v			11/18/21 20:00	1.58
<b>2-Butanone (MEK)</b>	<b>0.00048</b>	<b>J</b>	0.0025	0.00046	ppm v/v			11/18/21 20:00	1.58
<b>Carbon disulfide</b>	<b>0.00015</b>	<b>J</b>	0.0013	0.000070	ppm v/v			11/18/21 20:00	1.58
<b>Carbon tetrachloride</b>	<b>0.00059</b>		0.00051	0.000044	ppm v/v			11/18/21 20:00	1.58
Chlorobenzene	ND		0.00051	0.000038	ppm v/v			11/18/21 20:00	1.58
Chloroethane	ND		0.00051	0.00018	ppm v/v			11/18/21 20:00	1.58
<b>Chloroform</b>	<b>0.00067</b>		0.00051	0.000044	ppm v/v			11/18/21 20:00	1.58
Chloromethane	ND		0.0013	0.00042	ppm v/v			11/18/21 20:00	1.58
Dibromochloromethane	ND		0.00051	0.000044	ppm v/v			11/18/21 20:00	1.58
1,2-Dibromoethane (EDB)	ND		0.00051	0.000044	ppm v/v			11/18/21 20:00	1.58
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.00051	0.000076	ppm v/v			11/18/21 20:00	1.58
1,2-Dichlorobenzene	ND		0.00051	0.00020	ppm v/v			11/18/21 20:00	1.58
1,3-Dichlorobenzene	ND		0.00051	0.00010	ppm v/v			11/18/21 20:00	1.58

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116215-001/MWL-SV05-400

Lab Sample ID: 140-25404-14

Date Collected: 11/05/21 11:08

Matrix: Air

Date Received: 11/15/21 10:00

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
1,4-Dichlorobenzene	ND		0.00051	0.00010	ppm v/v			11/18/21 20:00	1.58
Dichlorodifluoromethane	0.024		0.00051	0.000088	ppm v/v			11/18/21 20:00	1.58
1,1-Dichloroethane	0.0017		0.00051	0.000044	ppm v/v			11/18/21 20:00	1.58
1,2-Dichloroethane	ND		0.00051	0.000063	ppm v/v			11/18/21 20:00	1.58
1,1-Dichloroethene	0.018		0.00051	0.000051	ppm v/v			11/18/21 20:00	1.58
cis-1,2-Dichloroethene	0.00069		0.00051	0.000063	ppm v/v			11/18/21 20:00	1.58
trans-1,2-Dichloroethene	ND		0.00051	0.000044	ppm v/v			11/18/21 20:00	1.58
1,2-Dichloropropane	ND		0.00051	0.000063	ppm v/v			11/18/21 20:00	1.58
cis-1,3-Dichloropropene	ND		0.00051	0.00010	ppm v/v			11/18/21 20:00	1.58
trans-1,3-Dichloropropene	ND		0.00051	0.000057	ppm v/v			11/18/21 20:00	1.58
Ethylbenzene	ND		0.00051	0.000082	ppm v/v			11/18/21 20:00	1.58
4-Ethyltoluene	ND		0.0010	0.00013	ppm v/v			11/18/21 20:00	1.58
Hexachlorobutadiene	ND		0.0025	0.00020	ppm v/v			11/18/21 20:00	1.58
2-Hexanone	ND		0.0013	0.00010	ppm v/v			11/18/21 20:00	1.58
4-Methyl-2-pentanone (MIBK)	ND		0.0013	0.00034	ppm v/v			11/18/21 20:00	1.58
Methylene Chloride	ND		0.0025	0.0025	ppm v/v			11/18/21 20:00	1.58
Styrene	ND		0.00051	0.00015	ppm v/v			11/18/21 20:00	1.58
1,1,2,2-Tetrachloroethane	ND		0.00051	0.000088	ppm v/v			11/18/21 20:00	1.58
Toluene	ND		0.00076	0.00049	ppm v/v			11/18/21 20:00	1.58
1,1,2-Trichloro-1,2,2-trifluoroethane	0.054		0.00051	0.000051	ppm v/v			11/18/21 20:00	1.58
1,2,4-Trichlorobenzene	ND		0.0025	0.00040	ppm v/v			11/18/21 20:00	1.58
1,1,1-Trichloroethane	0.0017		0.00051	0.00023	ppm v/v			11/18/21 20:00	1.58
1,1,2-Trichloroethane	ND		0.00051	0.000044	ppm v/v			11/18/21 20:00	1.58
Trichloroethene	0.088		0.00025	0.000082	ppm v/v			11/18/21 20:00	1.58
Trichlorofluoromethane	0.038		0.00051	0.000070	ppm v/v			11/18/21 20:00	1.58
1,2,4-Trimethylbenzene	ND		0.00051	0.00013	ppm v/v			11/18/21 20:00	1.58
1,3,5-Trimethylbenzene	ND		0.00051	0.00014	ppm v/v			11/18/21 20:00	1.58
Vinyl acetate	ND		0.0025	0.00018	ppm v/v			11/18/21 20:00	1.58
Vinyl chloride	ND		0.00025	0.00016	ppm v/v			11/18/21 20:00	1.58
m,p-Xylene	ND		0.00051	0.00018	ppm v/v			11/18/21 20:00	1.58
o-Xylene	ND		0.00051	0.000095	ppm v/v			11/18/21 20:00	1.58

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		60 - 140		11/18/21 20:00	1.58

## 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
Tetrachloroethene	0.089		0.0013	0.00011	ppm v/v			11/19/21 14:13	1.58

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		60 - 140		11/19/21 14:13	1.58

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116192-001/MWL-SV-FB 1

Lab Sample ID: 140-25404-15

Date Collected: 11/05/21 11:22

Matrix: Air

Date Received: 11/15/21 10:00

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	0.00071	J	0.0020	0.00057	ppm v/v			11/17/21 16:43	1.53
Benzene	0.000020	J B	0.000080	0.0000080	ppm v/v			11/17/21 16:43	1.53
Benzyl chloride	ND		0.00016	0.000038	ppm v/v			11/17/21 16:43	1.53
Bromodichloromethane	ND		0.000080	0.000018	ppm v/v			11/17/21 16:43	1.53
Bromoform	ND		0.000080	0.0000090	ppm v/v			11/17/21 16:43	1.53
Bromomethane	ND		0.000080	0.000022	ppm v/v			11/17/21 16:43	1.53
2-Butanone (MEK)	ND		0.00040	0.000073	ppm v/v			11/17/21 16:43	1.53
Carbon disulfide	0.000044	J B	0.00020	0.000011	ppm v/v			11/17/21 16:43	1.53
Carbon tetrachloride	ND		0.000080	0.0000070	ppm v/v			11/17/21 16:43	1.53
Chlorobenzene	0.000016	J B	0.000080	0.0000060	ppm v/v			11/17/21 16:43	1.53
Chloroethane	ND		0.000080	0.000029	ppm v/v			11/17/21 16:43	1.53
Chloroform	ND		0.000080	0.0000070	ppm v/v			11/17/21 16:43	1.53
Chloromethane	ND		0.00020	0.000066	ppm v/v			11/17/21 16:43	1.53
Dibromochloromethane	ND		0.000080	0.0000070	ppm v/v			11/17/21 16:43	1.53
1,2-Dibromoethane (EDB)	0.0000087	J B	0.000080	0.0000070	ppm v/v			11/17/21 16:43	1.53
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.000080	0.000012	ppm v/v			11/17/21 16:43	1.53
1,2-Dichlorobenzene	ND		0.000080	0.000031	ppm v/v			11/17/21 16:43	1.53
1,3-Dichlorobenzene	ND		0.000080	0.000016	ppm v/v			11/17/21 16:43	1.53
1,4-Dichlorobenzene	ND		0.000080	0.000016	ppm v/v			11/17/21 16:43	1.53
Dichlorodifluoromethane	ND		0.000080	0.000014	ppm v/v			11/17/21 16:43	1.53
1,1-Dichloroethane	ND		0.000080	0.0000070	ppm v/v			11/17/21 16:43	1.53
1,2-Dichloroethane	ND		0.000080	0.000010	ppm v/v			11/17/21 16:43	1.53
1,1-Dichloroethene	ND		0.000080	0.0000080	ppm v/v			11/17/21 16:43	1.53
cis-1,2-Dichloroethene	ND		0.000080	0.000010	ppm v/v			11/17/21 16:43	1.53
trans-1,2-Dichloroethene	ND		0.000080	0.0000070	ppm v/v			11/17/21 16:43	1.53
1,2-Dichloropropane	ND		0.000080	0.000010	ppm v/v			11/17/21 16:43	1.53
cis-1,3-Dichloropropene	ND		0.000080	0.000016	ppm v/v			11/17/21 16:43	1.53
trans-1,3-Dichloropropene	ND		0.000080	0.0000090	ppm v/v			11/17/21 16:43	1.53
Ethylbenzene	ND		0.000080	0.000013	ppm v/v			11/17/21 16:43	1.53
4-Ethyltoluene	ND		0.00016	0.000021	ppm v/v			11/17/21 16:43	1.53
Hexachlorobutadiene	ND		0.00040	0.000032	ppm v/v			11/17/21 16:43	1.53
2-Hexanone	ND		0.00020	0.000016	ppm v/v			11/17/21 16:43	1.53
4-Methyl-2-pentanone (MIBK)	ND		0.00020	0.000054	ppm v/v			11/17/21 16:43	1.53
Methylene Chloride	ND		0.00040	0.000039	ppm v/v			11/17/21 16:43	1.53
Styrene	ND		0.000080	0.000024	ppm v/v			11/17/21 16:43	1.53
1,1,2,2-Tetrachloroethane	ND		0.000080	0.000014	ppm v/v			11/17/21 16:43	1.53
Tetrachloroethene	ND		0.000080	0.0000070	ppm v/v			11/17/21 16:43	1.53
Toluene	ND		0.00012	0.000078	ppm v/v			11/17/21 16:43	1.53
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.000080	0.0000080	ppm v/v			11/17/21 16:43	1.53
1,2,4-Trichlorobenzene	ND		0.00040	0.000064	ppm v/v			11/17/21 16:43	1.53
1,1,1-Trichloroethane	ND		0.000080	0.000037	ppm v/v			11/17/21 16:43	1.53
1,1,2-Trichloroethane	ND		0.000080	0.0000070	ppm v/v			11/17/21 16:43	1.53
Trichloroethene	ND		0.000040	0.000013	ppm v/v			11/17/21 16:43	1.53
Trichlorofluoromethane	ND		0.000080	0.000011	ppm v/v			11/17/21 16:43	1.53
1,2,4-Trimethylbenzene	ND		0.000080	0.000020	ppm v/v			11/17/21 16:43	1.53
1,3,5-Trimethylbenzene	ND		0.000080	0.000022	ppm v/v			11/17/21 16:43	1.53
Vinyl acetate	ND		0.00040	0.000028	ppm v/v			11/17/21 16:43	1.53
Vinyl chloride	ND		0.000040	0.000026	ppm v/v			11/17/21 16:43	1.53



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

**Client Sample ID: 116192-001/MWL-SV-FB 1**

**Lab Sample ID: 140-25404-15**

**Date Collected: 11/05/21 11:22**

**Matrix: Air**

**Date Received: 11/15/21 10:00**

**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		0.000080	0.000029	ppm v/v			11/17/21 16:43	1.53
o-Xylene	ND		0.000080	0.000015	ppm v/v			11/17/21 16:43	1.53
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		60 - 140					11/17/21 16:43	1.53

**Client Sample ID: 116193-001/MWL-SV-01-42.5**

**Lab Sample ID: 140-25404-16**

**Date Collected: 11/05/21 11:37**

**Matrix: Air**

**Date Received: 11/15/21 10:00**

**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		0.039	0.011	ppm v/v			11/18/21 20:42	1.56
Benzene	ND		0.0016	0.00016	ppm v/v			11/18/21 20:42	1.56
Benzyl chloride	ND		0.0031	0.00074	ppm v/v			11/18/21 20:42	1.56
Bromodichloromethane	0.00057	J	0.0016	0.00035	ppm v/v			11/18/21 20:42	1.56
Bromoform	ND		0.0016	0.00018	ppm v/v			11/18/21 20:42	1.56
Bromomethane	ND		0.0016	0.00043	ppm v/v			11/18/21 20:42	1.56
2-Butanone (MEK)	0.0024	J	0.0078	0.0014	ppm v/v			11/18/21 20:42	1.56
Carbon disulfide	0.00030	J	0.0039	0.00021	ppm v/v			11/18/21 20:42	1.56
Carbon tetrachloride	0.00024	J	0.0016	0.00014	ppm v/v			11/18/21 20:42	1.56
Chlorobenzene	0.00025	J B	0.0016	0.00012	ppm v/v			11/18/21 20:42	1.56
Chloroethane	ND		0.0016	0.00057	ppm v/v			11/18/21 20:42	1.56
Chloroform	0.012		0.0016	0.00014	ppm v/v			11/18/21 20:42	1.56
Chloromethane	ND		0.0039	0.0013	ppm v/v			11/18/21 20:42	1.56
Dibromochloromethane	ND		0.0016	0.00014	ppm v/v			11/18/21 20:42	1.56
1,2-Dibromoethane (EDB)	0.00016	J	0.0016	0.00014	ppm v/v			11/18/21 20:42	1.56
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.0016	0.00023	ppm v/v			11/18/21 20:42	1.56
1,2-Dichlorobenzene	ND		0.0016	0.00060	ppm v/v			11/18/21 20:42	1.56
1,3-Dichlorobenzene	ND		0.0016	0.00031	ppm v/v			11/18/21 20:42	1.56
1,4-Dichlorobenzene	ND		0.0016	0.00031	ppm v/v			11/18/21 20:42	1.56
Dichlorodifluoromethane	0.057		0.0016	0.00027	ppm v/v			11/18/21 20:42	1.56
1,1-Dichloroethane	0.0014	J	0.0016	0.00014	ppm v/v			11/18/21 20:42	1.56
1,2-Dichloroethane	ND		0.0016	0.00020	ppm v/v			11/18/21 20:42	1.56
1,1-Dichloroethene	0.0046		0.0016	0.00016	ppm v/v			11/18/21 20:42	1.56
cis-1,2-Dichloroethene	0.0012	J	0.0016	0.00020	ppm v/v			11/18/21 20:42	1.56
trans-1,2-Dichloroethene	ND		0.0016	0.00014	ppm v/v			11/18/21 20:42	1.56
1,2-Dichloropropane	ND		0.0016	0.00020	ppm v/v			11/18/21 20:42	1.56
cis-1,3-Dichloropropene	ND		0.0016	0.00031	ppm v/v			11/18/21 20:42	1.56
trans-1,3-Dichloropropene	ND		0.0016	0.00018	ppm v/v			11/18/21 20:42	1.56
Ethylbenzene	ND		0.0016	0.00025	ppm v/v			11/18/21 20:42	1.56
4-Ethyltoluene	ND		0.0031	0.00041	ppm v/v			11/18/21 20:42	1.56
Hexachlorobutadiene	ND		0.0078	0.00062	ppm v/v			11/18/21 20:42	1.56
2-Hexanone	ND		0.0039	0.00031	ppm v/v			11/18/21 20:42	1.56
4-Methyl-2-pentanone (MIBK)	ND		0.0039	0.0011	ppm v/v			11/18/21 20:42	1.56
Methylene Chloride	ND		0.0078	0.0076	ppm v/v			11/18/21 20:42	1.56
Styrene	ND		0.0016	0.00047	ppm v/v			11/18/21 20:42	1.56
1,1,2,2-Tetrachloroethane	ND		0.0016	0.00027	ppm v/v			11/18/21 20:42	1.56

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMP

Job ID: 140-25404-1

Client Sample ID: 116193-001/MWL-SV-01-42.5

Lab Sample ID: 140-25404-16

Date Collected: 11/05/21 11:37

Matrix: Air

Date Received: 11/15/21 10:00

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	0.31		0.0016	0.00014	ppm v/v			11/18/21 20:42	1.56
Toluene	ND		0.0023	0.0015	ppm v/v			11/18/21 20:42	1.56
1,1,2-Trichloro-1,2,2-trifluoroethane	0.049		0.0016	0.00016	ppm v/v			11/18/21 20:42	1.56
1,2,4-Trichlorobenzene	ND		0.0078	0.0012	ppm v/v			11/18/21 20:42	1.56
1,1,1-Trichloroethane	0.021		0.0016	0.00072	ppm v/v			11/18/21 20:42	1.56
1,1,2-Trichloroethane	0.00033	J	0.0016	0.00014	ppm v/v			11/18/21 20:42	1.56
Trichloroethene	0.063		0.00078	0.00025	ppm v/v			11/18/21 20:42	1.56
Trichlorofluoromethane	0.12		0.0016	0.00021	ppm v/v			11/18/21 20:42	1.56
1,2,4-Trimethylbenzene	ND		0.0016	0.00039	ppm v/v			11/18/21 20:42	1.56
1,3,5-Trimethylbenzene	ND		0.0016	0.00043	ppm v/v			11/18/21 20:42	1.56
Vinyl acetate	ND		0.0078	0.00055	ppm v/v			11/18/21 20:42	1.56
Vinyl chloride	ND		0.00078	0.00051	ppm v/v			11/18/21 20:42	1.56
m,p-Xylene	ND		0.0016	0.00057	ppm v/v			11/18/21 20:42	1.56
o-Xylene	ND		0.0016	0.00029	ppm v/v			11/18/21 20:42	1.56
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	85		60 - 140					11/18/21 20:42	1.56

Client Sample ID: 116194-001/MWL-SV-FB 2

Lab Sample ID: 140-25404-17

Date Collected: 11/05/21 11:17

Matrix: Air

Date Received: 11/15/21 10:00

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	0.00074	J	0.0020	0.00057	ppm v/v			11/17/21 17:36	1.58
Benzene	0.000016	J B	0.000080	0.0000080	ppm v/v			11/17/21 17:36	1.58
Benzyl chloride	ND		0.00016	0.000038	ppm v/v			11/17/21 17:36	1.58
Bromodichloromethane	ND		0.000080	0.000018	ppm v/v			11/17/21 17:36	1.58
Bromoform	ND		0.000080	0.0000090	ppm v/v			11/17/21 17:36	1.58
Bromomethane	ND		0.000080	0.000022	ppm v/v			11/17/21 17:36	1.58
2-Butanone (MEK)	ND		0.00040	0.000073	ppm v/v			11/17/21 17:36	1.58
Carbon disulfide	0.000044	J B	0.00020	0.000011	ppm v/v			11/17/21 17:36	1.58
Carbon tetrachloride	ND		0.000080	0.0000070	ppm v/v			11/17/21 17:36	1.58
Chlorobenzene	0.000014	J B	0.000080	0.0000060	ppm v/v			11/17/21 17:36	1.58
Chloroethane	ND		0.000080	0.000029	ppm v/v			11/17/21 17:36	1.58
Chloroform	ND		0.000080	0.0000070	ppm v/v			11/17/21 17:36	1.58
Chloromethane	ND		0.00020	0.000066	ppm v/v			11/17/21 17:36	1.58
Dibromochloromethane	ND		0.000080	0.0000070	ppm v/v			11/17/21 17:36	1.58
1,2-Dibromoethane (EDB)	ND		0.000080	0.0000070	ppm v/v			11/17/21 17:36	1.58
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.000080	0.000012	ppm v/v			11/17/21 17:36	1.58
1,2-Dichlorobenzene	ND		0.000080	0.000031	ppm v/v			11/17/21 17:36	1.58
1,3-Dichlorobenzene	ND		0.000080	0.000016	ppm v/v			11/17/21 17:36	1.58
1,4-Dichlorobenzene	ND		0.000080	0.000016	ppm v/v			11/17/21 17:36	1.58
Dichlorodifluoromethane	ND		0.000080	0.000014	ppm v/v			11/17/21 17:36	1.58
1,1-Dichloroethane	ND		0.000080	0.0000070	ppm v/v			11/17/21 17:36	1.58
1,2-Dichloroethane	ND		0.000080	0.000010	ppm v/v			11/17/21 17:36	1.58
1,1-Dichloroethene	ND		0.000080	0.0000080	ppm v/v			11/17/21 17:36	1.58

Eurofins TestAmerica, Knoxville



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

**Client Sample ID: 116194-001/MWL-SV-FB 2**

**Lab Sample ID: 140-25404-17**

**Date Collected: 11/05/21 11:17**

**Matrix: Air**

**Date Received: 11/15/21 10:00**

**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		0.000080	0.000010	ppm v/v			11/17/21 17:36	1.58
trans-1,2-Dichloroethene	ND		0.000080	0.0000070	ppm v/v			11/17/21 17:36	1.58
1,2-Dichloropropane	ND		0.000080	0.000010	ppm v/v			11/17/21 17:36	1.58
cis-1,3-Dichloropropene	ND		0.000080	0.000016	ppm v/v			11/17/21 17:36	1.58
trans-1,3-Dichloropropene	ND		0.000080	0.0000090	ppm v/v			11/17/21 17:36	1.58
Ethylbenzene	ND		0.000080	0.000013	ppm v/v			11/17/21 17:36	1.58
4-Ethyltoluene	ND		0.00016	0.000021	ppm v/v			11/17/21 17:36	1.58
Hexachlorobutadiene	ND		0.00040	0.000032	ppm v/v			11/17/21 17:36	1.58
2-Hexanone	ND		0.00020	0.000016	ppm v/v			11/17/21 17:36	1.58
4-Methyl-2-pentanone (MIBK)	ND		0.00020	0.000054	ppm v/v			11/17/21 17:36	1.58
Methylene Chloride	ND		0.00040	0.00039	ppm v/v			11/17/21 17:36	1.58
Styrene	ND		0.000080	0.000024	ppm v/v			11/17/21 17:36	1.58
1,1,2,2-Tetrachloroethane	ND		0.000080	0.000014	ppm v/v			11/17/21 17:36	1.58
Tetrachloroethene	ND		0.000080	0.0000070	ppm v/v			11/17/21 17:36	1.58
Toluene	ND		0.00012	0.000078	ppm v/v			11/17/21 17:36	1.58
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.000080	0.0000080	ppm v/v			11/17/21 17:36	1.58
1,2,4-Trichlorobenzene	ND		0.00040	0.000064	ppm v/v			11/17/21 17:36	1.58
1,1,1-Trichloroethane	ND		0.000080	0.000037	ppm v/v			11/17/21 17:36	1.58
1,1,2-Trichloroethane	ND		0.000080	0.0000070	ppm v/v			11/17/21 17:36	1.58
Trichloroethene	ND		0.000040	0.000013	ppm v/v			11/17/21 17:36	1.58
Trichlorofluoromethane	ND		0.000080	0.000011	ppm v/v			11/17/21 17:36	1.58
1,2,4-Trimethylbenzene	ND		0.000080	0.000020	ppm v/v			11/17/21 17:36	1.58
1,3,5-Trimethylbenzene	ND		0.000080	0.000022	ppm v/v			11/17/21 17:36	1.58
Vinyl acetate	ND		0.00040	0.000028	ppm v/v			11/17/21 17:36	1.58
Vinyl chloride	ND		0.000040	0.000026	ppm v/v			11/17/21 17:36	1.58
m,p-Xylene	ND		0.000080	0.000029	ppm v/v			11/17/21 17:36	1.58
o-Xylene	ND		0.000080	0.000015	ppm v/v			11/17/21 17:36	1.58
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
4-Bromofluorobenzene (Surr)	96		60 - 140					11/17/21 17:36	1.58

**Client Sample ID: 116195-001/MWL-SV02-41.5**

**Lab Sample ID: 140-25404-18**

**Date Collected: 11/05/21 11:44**

**Matrix: Air**

**Date Received: 11/15/21 10:00**

**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	0.0081		0.0077	0.0022	ppm v/v			11/18/21 21:25	1.53
Benzene	0.00013	J B	0.00031	0.000031	ppm v/v			11/18/21 21:25	1.53
Benzyl chloride	ND		0.00061	0.00015	ppm v/v			11/18/21 21:25	1.53
Bromodichloromethane	ND		0.00031	0.000069	ppm v/v			11/18/21 21:25	1.53
Bromoform	ND		0.00031	0.000034	ppm v/v			11/18/21 21:25	1.53
Bromomethane	ND		0.00031	0.000084	ppm v/v			11/18/21 21:25	1.53
2-Butanone (MEK)	0.0074		0.0015	0.00028	ppm v/v			11/18/21 21:25	1.53
Carbon disulfide	0.00013	J	0.00077	0.000042	ppm v/v			11/18/21 21:25	1.53
Carbon tetrachloride	0.00028	J	0.00031	0.000027	ppm v/v			11/18/21 21:25	1.53
Chlorobenzene	ND		0.00031	0.000023	ppm v/v			11/18/21 21:25	1.53
Chloroethane	ND		0.00031	0.00011	ppm v/v			11/18/21 21:25	1.53

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116195-001/MWL-SV02-41.5

Lab Sample ID: 140-25404-18

Date Collected: 11/05/21 11:44

Matrix: Air

Date Received: 11/15/21 10:00

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	0.0021		0.00031	0.000027	ppm v/v			11/18/21 21:25	1.53
Chloromethane	ND		0.00077	0.00025	ppm v/v			11/18/21 21:25	1.53
Dibromochloromethane	ND		0.00031	0.000027	ppm v/v			11/18/21 21:25	1.53
1,2-Dibromoethane (EDB)	0.000039	J	0.00031	0.000027	ppm v/v			11/18/21 21:25	1.53
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.00026	J	0.00031	0.000046	ppm v/v			11/18/21 21:25	1.53
1,2-Dichlorobenzene	ND		0.00031	0.00012	ppm v/v			11/18/21 21:25	1.53
1,3-Dichlorobenzene	ND		0.00031	0.000061	ppm v/v			11/18/21 21:25	1.53
1,4-Dichlorobenzene	ND		0.00031	0.000061	ppm v/v			11/18/21 21:25	1.53
1,1-Dichloroethane	0.0014		0.00031	0.000027	ppm v/v			11/18/21 21:25	1.53
1,2-Dichloroethane	ND		0.00031	0.000038	ppm v/v			11/18/21 21:25	1.53
1,1-Dichloroethene	0.0070		0.00031	0.000031	ppm v/v			11/18/21 21:25	1.53
cis-1,2-Dichloroethene	0.00057		0.00031	0.000038	ppm v/v			11/18/21 21:25	1.53
trans-1,2-Dichloroethene	ND		0.00031	0.000027	ppm v/v			11/18/21 21:25	1.53
1,2-Dichloropropane	ND		0.00031	0.000038	ppm v/v			11/18/21 21:25	1.53
cis-1,3-Dichloropropene	ND		0.00031	0.000061	ppm v/v			11/18/21 21:25	1.53
trans-1,3-Dichloropropene	ND		0.00031	0.000034	ppm v/v			11/18/21 21:25	1.53
Ethylbenzene	ND		0.00031	0.000050	ppm v/v			11/18/21 21:25	1.53
4-Ethyltoluene	ND		0.00061	0.000080	ppm v/v			11/18/21 21:25	1.53
Hexachlorobutadiene	ND		0.0015	0.00012	ppm v/v			11/18/21 21:25	1.53
2-Hexanone	0.00056	J	0.00077	0.000061	ppm v/v			11/18/21 21:25	1.53
4-Methyl-2-pentanone (MIBK)	ND		0.00077	0.00021	ppm v/v			11/18/21 21:25	1.53
Methylene Chloride	ND		0.0015	0.0015	ppm v/v			11/18/21 21:25	1.53
Styrene	ND		0.00031	0.000092	ppm v/v			11/18/21 21:25	1.53
1,1,2,2-Tetrachloroethane	ND		0.00031	0.000054	ppm v/v			11/18/21 21:25	1.53
Tetrachloroethene	0.061		0.00031	0.000027	ppm v/v			11/18/21 21:25	1.53
Toluene	ND		0.00046	0.00030	ppm v/v			11/18/21 21:25	1.53
1,1,2-Trichloro-1,2,2-trifluoroethane	0.035		0.00031	0.000031	ppm v/v			11/18/21 21:25	1.53
1,2,4-Trichlorobenzene	ND		0.0015	0.00024	ppm v/v			11/18/21 21:25	1.53
1,1,1-Trichloroethane	0.045		0.00031	0.00014	ppm v/v			11/18/21 21:25	1.53
1,1,2-Trichloroethane	ND		0.00031	0.000027	ppm v/v			11/18/21 21:25	1.53
Trichloroethene	0.050		0.00015	0.000050	ppm v/v			11/18/21 21:25	1.53
1,2,4-Trimethylbenzene	ND		0.00031	0.000077	ppm v/v			11/18/21 21:25	1.53
1,3,5-Trimethylbenzene	ND		0.00031	0.000084	ppm v/v			11/18/21 21:25	1.53
Vinyl acetate	ND		0.0015	0.00011	ppm v/v			11/18/21 21:25	1.53
Vinyl chloride	ND		0.00015	0.000099	ppm v/v			11/18/21 21:25	1.53
m,p-Xylene	ND		0.00031	0.00011	ppm v/v			11/18/21 21:25	1.53
o-Xylene	ND		0.00031	0.000057	ppm v/v			11/18/21 21:25	1.53

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	86		60 - 140		11/18/21 21:25	1.53

## 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
Dichlorodifluoromethane	0.059		0.0031	0.00054	ppm v/v			11/19/21 14:56	1.53
Trichlorofluoromethane	0.22		0.0031	0.00042	ppm v/v			11/19/21 14:56	1.53

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	84		60 - 140		11/19/21 14:56	1.53

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116196-001/MWL-SV-FB 3

Lab Sample ID: 140-25404-19

Date Collected: 11/05/21 08:34

Matrix: Air

Date Received: 11/15/21 10:00

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	0.0011	J	0.0021	0.00061	ppm v/v			11/17/21 18:29	1.71
Benzene	0.000014	J B	0.000086	0.0000086	ppm v/v			11/17/21 18:29	1.71
Benzyl chloride	ND		0.00017	0.000041	ppm v/v			11/17/21 18:29	1.71
Bromodichloromethane	ND		0.000086	0.000019	ppm v/v			11/17/21 18:29	1.71
Bromoform	ND		0.000086	0.0000096	ppm v/v			11/17/21 18:29	1.71
Bromomethane	ND		0.000086	0.000024	ppm v/v			11/17/21 18:29	1.71
2-Butanone (MEK)	ND		0.00043	0.000078	ppm v/v			11/17/21 18:29	1.71
Carbon disulfide	0.000049	J B	0.00021	0.000012	ppm v/v			11/17/21 18:29	1.71
Carbon tetrachloride	ND		0.000086	0.0000075	ppm v/v			11/17/21 18:29	1.71
Chlorobenzene	0.000015	J B	0.000086	0.0000064	ppm v/v			11/17/21 18:29	1.71
Chloroethane	ND		0.000086	0.000031	ppm v/v			11/17/21 18:29	1.71
Chloroform	ND		0.000086	0.0000075	ppm v/v			11/17/21 18:29	1.71
Chloromethane	0.00010	J	0.00021	0.000071	ppm v/v			11/17/21 18:29	1.71
Dibromochloromethane	ND		0.000086	0.0000075	ppm v/v			11/17/21 18:29	1.71
1,2-Dibromoethane (EDB)	ND		0.000086	0.0000075	ppm v/v			11/17/21 18:29	1.71
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.000086	0.000013	ppm v/v			11/17/21 18:29	1.71
1,2-Dichlorobenzene	ND		0.000086	0.000033	ppm v/v			11/17/21 18:29	1.71
1,3-Dichlorobenzene	ND		0.000086	0.000017	ppm v/v			11/17/21 18:29	1.71
1,4-Dichlorobenzene	ND		0.000086	0.000017	ppm v/v			11/17/21 18:29	1.71
Dichlorodifluoromethane	ND		0.000086	0.000015	ppm v/v			11/17/21 18:29	1.71
1,1-Dichloroethane	ND		0.000086	0.0000075	ppm v/v			11/17/21 18:29	1.71
1,2-Dichloroethane	ND		0.000086	0.000011	ppm v/v			11/17/21 18:29	1.71
1,1-Dichloroethene	ND		0.000086	0.0000086	ppm v/v			11/17/21 18:29	1.71
cis-1,2-Dichloroethene	ND		0.000086	0.000011	ppm v/v			11/17/21 18:29	1.71
trans-1,2-Dichloroethene	ND		0.000086	0.0000075	ppm v/v			11/17/21 18:29	1.71
1,2-Dichloropropane	ND		0.000086	0.000011	ppm v/v			11/17/21 18:29	1.71
cis-1,3-Dichloropropene	ND		0.000086	0.000017	ppm v/v			11/17/21 18:29	1.71
trans-1,3-Dichloropropene	ND		0.000086	0.0000096	ppm v/v			11/17/21 18:29	1.71
Ethylbenzene	ND		0.000086	0.000014	ppm v/v			11/17/21 18:29	1.71
4-Ethyltoluene	ND		0.00017	0.000022	ppm v/v			11/17/21 18:29	1.71
Hexachlorobutadiene	ND		0.00043	0.000034	ppm v/v			11/17/21 18:29	1.71
2-Hexanone	ND		0.00021	0.000017	ppm v/v			11/17/21 18:29	1.71
4-Methyl-2-pentanone (MIBK)	ND		0.00021	0.000058	ppm v/v			11/17/21 18:29	1.71
Methylene Chloride	ND		0.00043	0.00042	ppm v/v			11/17/21 18:29	1.71
Styrene	ND		0.000086	0.000026	ppm v/v			11/17/21 18:29	1.71
1,1,2,2-Tetrachloroethane	ND		0.000086	0.000015	ppm v/v			11/17/21 18:29	1.71
Tetrachloroethene	ND		0.000086	0.0000075	ppm v/v			11/17/21 18:29	1.71
Toluene	ND		0.00013	0.000083	ppm v/v			11/17/21 18:29	1.71
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.000086	0.0000086	ppm v/v			11/17/21 18:29	1.71
1,2,4-Trichlorobenzene	ND		0.00043	0.000068	ppm v/v			11/17/21 18:29	1.71
1,1,1-Trichloroethane	ND		0.000086	0.000040	ppm v/v			11/17/21 18:29	1.71
1,1,2-Trichloroethane	ND		0.000086	0.0000075	ppm v/v			11/17/21 18:29	1.71
Trichloroethene	ND		0.000043	0.000014	ppm v/v			11/17/21 18:29	1.71
Trichlorofluoromethane	ND		0.000086	0.000012	ppm v/v			11/17/21 18:29	1.71
1,2,4-Trimethylbenzene	ND		0.000086	0.000021	ppm v/v			11/17/21 18:29	1.71
1,3,5-Trimethylbenzene	ND		0.000086	0.000024	ppm v/v			11/17/21 18:29	1.71
Vinyl acetate	ND		0.00043	0.000030	ppm v/v			11/17/21 18:29	1.71
Vinyl chloride	ND		0.000043	0.000028	ppm v/v			11/17/21 18:29	1.71

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMP

Job ID: 140-25404-1

**Client Sample ID: 116196-001/MWL-SV-FB 3**

**Lab Sample ID: 140-25404-19**

**Date Collected: 11/05/21 08:34**

**Matrix: Air**

**Date Received: 11/15/21 10:00**

**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		0.000086	0.000031	ppm v/v			11/17/21 18:29	1.71
o-Xylene	ND		0.000086	0.000016	ppm v/v			11/17/21 18:29	1.71
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		60 - 140					11/17/21 18:29	1.71

**Client Sample ID: 116197-001/MWL-SV03-50**

**Lab Sample ID: 140-25404-20**

**Date Collected: 11/05/21 08:41**

**Matrix: Air**

**Date Received: 11/15/21 10:00**

**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	0.0026	J	0.0081	0.0023	ppm v/v			11/18/21 22:09	1.61
Benzene	0.00019	J B	0.00032	0.000032	ppm v/v			11/18/21 22:09	1.61
Benzyl chloride	ND		0.00064	0.00015	ppm v/v			11/18/21 22:09	1.61
Bromodichloromethane	ND		0.00032	0.000072	ppm v/v			11/18/21 22:09	1.61
Bromoform	ND		0.00032	0.000036	ppm v/v			11/18/21 22:09	1.61
Bromomethane	ND		0.00032	0.000089	ppm v/v			11/18/21 22:09	1.61
2-Butanone (MEK)	0.00042	J	0.0016	0.00029	ppm v/v			11/18/21 22:09	1.61
Carbon disulfide	0.000081	J	0.00081	0.000044	ppm v/v			11/18/21 22:09	1.61
Carbon tetrachloride	0.00024	J	0.00032	0.000028	ppm v/v			11/18/21 22:09	1.61
Chlorobenzene	ND		0.00032	0.000024	ppm v/v			11/18/21 22:09	1.61
Chloroethane	ND		0.00032	0.00012	ppm v/v			11/18/21 22:09	1.61
Chloroform	0.0013		0.00032	0.000028	ppm v/v			11/18/21 22:09	1.61
Chloromethane	ND		0.00081	0.00027	ppm v/v			11/18/21 22:09	1.61
Dibromochloromethane	ND		0.00032	0.000028	ppm v/v			11/18/21 22:09	1.61
1,2-Dibromoethane (EDB)	0.000041	J	0.00032	0.000028	ppm v/v			11/18/21 22:09	1.61
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.00032	0.000048	ppm v/v			11/18/21 22:09	1.61
1,2-Dichlorobenzene	ND		0.00032	0.00012	ppm v/v			11/18/21 22:09	1.61
1,3-Dichlorobenzene	ND		0.00032	0.000064	ppm v/v			11/18/21 22:09	1.61
1,4-Dichlorobenzene	ND		0.00032	0.000064	ppm v/v			11/18/21 22:09	1.61
Dichlorodifluoromethane	0.020		0.00032	0.000056	ppm v/v			11/18/21 22:09	1.61
1,1-Dichloroethane	0.0024		0.00032	0.000028	ppm v/v			11/18/21 22:09	1.61
1,2-Dichloroethane	ND		0.00032	0.000040	ppm v/v			11/18/21 22:09	1.61
1,1-Dichloroethene	0.0090		0.00032	0.000032	ppm v/v			11/18/21 22:09	1.61
cis-1,2-Dichloroethene	0.0016		0.00032	0.000040	ppm v/v			11/18/21 22:09	1.61
trans-1,2-Dichloroethene	ND		0.00032	0.000028	ppm v/v			11/18/21 22:09	1.61
1,2-Dichloropropane	ND		0.00032	0.000040	ppm v/v			11/18/21 22:09	1.61
cis-1,3-Dichloropropene	ND		0.00032	0.000064	ppm v/v			11/18/21 22:09	1.61
trans-1,3-Dichloropropene	ND		0.00032	0.000036	ppm v/v			11/18/21 22:09	1.61
Ethylbenzene	ND		0.00032	0.000052	ppm v/v			11/18/21 22:09	1.61
4-Ethyltoluene	ND		0.00064	0.000085	ppm v/v			11/18/21 22:09	1.61
Hexachlorobutadiene	ND		0.0016	0.00013	ppm v/v			11/18/21 22:09	1.61
2-Hexanone	0.00019	J	0.00081	0.000064	ppm v/v			11/18/21 22:09	1.61
4-Methyl-2-pentanone (MIBK)	ND		0.00081	0.00022	ppm v/v			11/18/21 22:09	1.61
Methylene Chloride	ND		0.0016	0.0016	ppm v/v			11/18/21 22:09	1.61
Styrene	ND		0.00032	0.000097	ppm v/v			11/18/21 22:09	1.61
1,1,2,2-Tetrachloroethane	ND		0.00032	0.000056	ppm v/v			11/18/21 22:09	1.61

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116197-001/MWL-SV03-50

Lab Sample ID: 140-25404-20

Date Collected: 11/05/21 08:41

Matrix: Air

Date Received: 11/15/21 10:00

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		0.00048	0.00031	ppm v/v			11/18/21 22:09	1.61
1,1,2-Trichloro-1,2,2-trifluoroethane	0.065		0.00032	0.000032	ppm v/v			11/18/21 22:09	1.61
1,2,4-Trichlorobenzene	ND		0.0016	0.00026	ppm v/v			11/18/21 22:09	1.61
1,1,1-Trichloroethane	0.0019		0.00032	0.00015	ppm v/v			11/18/21 22:09	1.61
1,1,2-Trichloroethane	0.000094	J	0.00032	0.000028	ppm v/v			11/18/21 22:09	1.61
Trichlorofluoromethane	0.023		0.00032	0.000044	ppm v/v			11/18/21 22:09	1.61
1,2,4-Trimethylbenzene	ND		0.00032	0.000081	ppm v/v			11/18/21 22:09	1.61
1,3,5-Trimethylbenzene	ND		0.00032	0.000089	ppm v/v			11/18/21 22:09	1.61
Vinyl acetate	0.00027	J	0.0016	0.00011	ppm v/v			11/18/21 22:09	1.61
Vinyl chloride	ND		0.00016	0.00010	ppm v/v			11/18/21 22:09	1.61
m,p-Xylene	ND		0.00032	0.00012	ppm v/v			11/18/21 22:09	1.61
o-Xylene	ND		0.00032	0.000060	ppm v/v			11/18/21 22:09	1.61

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		60 - 140		11/18/21 22:09	1.61

## 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
Tetrachloroethene	0.10		0.0021	0.00019	ppm v/v			11/19/21 15:39	1.61
Trichloroethene	0.090		0.0011	0.00035	ppm v/v			11/19/21 15:39	1.61

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	86		60 - 140		11/19/21 15:39	1.61

Client Sample ID: 116198-001/MWL-SV03-100

Lab Sample ID: 140-25404-21

Date Collected: 11/05/21 08:45

Matrix: Air

Date Received: 11/15/21 10:00

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	0.0049	J	0.015	0.0043	ppm v/v			11/18/21 22:52	1.52
Benzene	0.00017	J B	0.00061	0.000061	ppm v/v			11/18/21 22:52	1.52
Benzyl chloride	ND		0.0012	0.00029	ppm v/v			11/18/21 22:52	1.52
Bromodichloromethane	ND		0.00061	0.00014	ppm v/v			11/18/21 22:52	1.52
Bromoform	ND		0.00061	0.000068	ppm v/v			11/18/21 22:52	1.52
Bromomethane	ND		0.00061	0.00017	ppm v/v			11/18/21 22:52	1.52
2-Butanone (MEK)	0.00064	J	0.0030	0.00055	ppm v/v			11/18/21 22:52	1.52
Carbon disulfide	ND		0.0015	0.000084	ppm v/v			11/18/21 22:52	1.52
Carbon tetrachloride	0.00029	J	0.00061	0.000053	ppm v/v			11/18/21 22:52	1.52
Chlorobenzene	0.00011	J B	0.00061	0.000046	ppm v/v			11/18/21 22:52	1.52
Chloroethane	ND		0.00061	0.00022	ppm v/v			11/18/21 22:52	1.52
Chloroform	0.0019		0.00061	0.000053	ppm v/v			11/18/21 22:52	1.52
Chloromethane	ND		0.0015	0.00050	ppm v/v			11/18/21 22:52	1.52
Dibromochloromethane	ND		0.00061	0.000053	ppm v/v			11/18/21 22:52	1.52
1,2-Dibromoethane (EDB)	ND		0.00061	0.000053	ppm v/v			11/18/21 22:52	1.52
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.00061	0.000091	ppm v/v			11/18/21 22:52	1.52
1,2-Dichlorobenzene	ND		0.00061	0.00024	ppm v/v			11/18/21 22:52	1.52
1,3-Dichlorobenzene	ND		0.00061	0.00012	ppm v/v			11/18/21 22:52	1.52

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116198-001/MWL-SV03-100

Lab Sample ID: 140-25404-21

Date Collected: 11/05/21 08:45

Matrix: Air

Date Received: 11/15/21 10:00

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
1,4-Dichlorobenzene	ND		0.00061	0.00012	ppm v/v			11/18/21 22:52	1.52
Dichlorodifluoromethane	0.028		0.00061	0.00011	ppm v/v			11/18/21 22:52	1.52
1,1-Dichloroethane	0.0038		0.00061	0.000053	ppm v/v			11/18/21 22:52	1.52
1,2-Dichloroethane	ND		0.00061	0.000076	ppm v/v			11/18/21 22:52	1.52
1,1-Dichloroethene	0.013		0.00061	0.000061	ppm v/v			11/18/21 22:52	1.52
cis-1,2-Dichloroethene	0.0025		0.00061	0.000076	ppm v/v			11/18/21 22:52	1.52
trans-1,2-Dichloroethene	ND		0.00061	0.000053	ppm v/v			11/18/21 22:52	1.52
1,2-Dichloropropane	ND		0.00061	0.000076	ppm v/v			11/18/21 22:52	1.52
cis-1,3-Dichloropropene	ND		0.00061	0.00012	ppm v/v			11/18/21 22:52	1.52
trans-1,3-Dichloropropene	ND		0.00061	0.000068	ppm v/v			11/18/21 22:52	1.52
Ethylbenzene	ND		0.00061	0.000099	ppm v/v			11/18/21 22:52	1.52
4-Ethyltoluene	ND		0.0012	0.00016	ppm v/v			11/18/21 22:52	1.52
Hexachlorobutadiene	ND		0.0030	0.00024	ppm v/v			11/18/21 22:52	1.52
2-Hexanone	ND		0.0015	0.00012	ppm v/v			11/18/21 22:52	1.52
4-Methyl-2-pentanone (MIBK)	ND		0.0015	0.00041	ppm v/v			11/18/21 22:52	1.52
Methylene Chloride	ND		0.0030	0.0030	ppm v/v			11/18/21 22:52	1.52
Styrene	ND		0.00061	0.00018	ppm v/v			11/18/21 22:52	1.52
1,1,2,2-Tetrachloroethane	ND		0.00061	0.00011	ppm v/v			11/18/21 22:52	1.52
Toluene	ND		0.00091	0.00059	ppm v/v			11/18/21 22:52	1.52
1,1,2-Trichloro-1,2,2-trifluoroethane	0.087		0.00061	0.000061	ppm v/v			11/18/21 22:52	1.52
1,2,4-Trichlorobenzene	ND		0.0030	0.00049	ppm v/v			11/18/21 22:52	1.52
1,1,1-Trichloroethane	0.0023		0.00061	0.00028	ppm v/v			11/18/21 22:52	1.52
1,1,2-Trichloroethane	0.00010 J		0.00061	0.000053	ppm v/v			11/18/21 22:52	1.52
Trichlorofluoromethane	0.030		0.00061	0.000084	ppm v/v			11/18/21 22:52	1.52
1,2,4-Trimethylbenzene	ND		0.00061	0.00015	ppm v/v			11/18/21 22:52	1.52
1,3,5-Trimethylbenzene	ND		0.00061	0.00017	ppm v/v			11/18/21 22:52	1.52
Vinyl acetate	ND		0.0030	0.00021	ppm v/v			11/18/21 22:52	1.52
Vinyl chloride	ND		0.00030	0.00020	ppm v/v			11/18/21 22:52	1.52
m,p-Xylene	ND		0.00061	0.00022	ppm v/v			11/18/21 22:52	1.52
o-Xylene	ND		0.00061	0.00011	ppm v/v			11/18/21 22:52	1.52

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	86		60 - 140		11/18/21 22:52	1.52

## 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
Tetrachloroethene	0.14		0.0030	0.00027	ppm v/v			11/19/21 16:22	1.52
Trichloroethene	0.13		0.0015	0.00049	ppm v/v			11/19/21 16:22	1.52

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	84		60 - 140		11/19/21 16:22	1.52



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116199-001/MWL-SV03-200

Lab Sample ID: 140-25404-22

Date Collected: 11/05/21 08:49

Matrix: Air

Date Received: 11/15/21 10:00

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		0.079	0.023	ppm v/v			11/18/21 23:35	1.58
<b>Benzene</b>	<b>0.00046</b>	<b>J B</b>	0.0032	0.00032	ppm v/v			11/18/21 23:35	1.58
Benzyl chloride	ND		0.0063	0.0015	ppm v/v			11/18/21 23:35	1.58
Bromodichloromethane	ND		0.0032	0.00071	ppm v/v			11/18/21 23:35	1.58
Bromoform	ND		0.0032	0.00036	ppm v/v			11/18/21 23:35	1.58
Bromomethane	ND		0.0032	0.00087	ppm v/v			11/18/21 23:35	1.58
2-Butanone (MEK)	ND		0.016	0.0029	ppm v/v			11/18/21 23:35	1.58
Carbon disulfide	ND		0.0079	0.00043	ppm v/v			11/18/21 23:35	1.58
Carbon tetrachloride	ND		0.0032	0.00028	ppm v/v			11/18/21 23:35	1.58
<b>Chlorobenzene</b>	<b>0.00072</b>	<b>J B</b>	0.0032	0.00024	ppm v/v			11/18/21 23:35	1.58
Chloroethane	ND		0.0032	0.0011	ppm v/v			11/18/21 23:35	1.58
<b>Chloroform</b>	<b>0.0019</b>	<b>J</b>	0.0032	0.00028	ppm v/v			11/18/21 23:35	1.58
Chloromethane	ND		0.0079	0.0026	ppm v/v			11/18/21 23:35	1.58
Dibromochloromethane	ND		0.0032	0.00028	ppm v/v			11/18/21 23:35	1.58
<b>1,2-Dibromoethane (EDB)</b>	<b>0.00036</b>	<b>J</b>	0.0032	0.00028	ppm v/v			11/18/21 23:35	1.58
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.0032	0.00047	ppm v/v			11/18/21 23:35	1.58
1,2-Dichlorobenzene	ND		0.0032	0.0012	ppm v/v			11/18/21 23:35	1.58
1,3-Dichlorobenzene	ND		0.0032	0.00063	ppm v/v			11/18/21 23:35	1.58
1,4-Dichlorobenzene	ND		0.0032	0.00063	ppm v/v			11/18/21 23:35	1.58
<b>Dichlorodifluoromethane</b>	<b>0.029</b>		0.0032	0.00055	ppm v/v			11/18/21 23:35	1.58
<b>1,1-Dichloroethane</b>	<b>0.0047</b>		0.0032	0.00028	ppm v/v			11/18/21 23:35	1.58
1,2-Dichloroethane	ND		0.0032	0.00040	ppm v/v			11/18/21 23:35	1.58
<b>1,1-Dichloroethene</b>	<b>0.016</b>		0.0032	0.00032	ppm v/v			11/18/21 23:35	1.58
<b>cis-1,2-Dichloroethene</b>	<b>0.0034</b>		0.0032	0.00040	ppm v/v			11/18/21 23:35	1.58
trans-1,2-Dichloroethene	ND		0.0032	0.00028	ppm v/v			11/18/21 23:35	1.58
1,2-Dichloropropane	ND		0.0032	0.00040	ppm v/v			11/18/21 23:35	1.58
cis-1,3-Dichloropropene	ND		0.0032	0.00063	ppm v/v			11/18/21 23:35	1.58
trans-1,3-Dichloropropene	ND		0.0032	0.00036	ppm v/v			11/18/21 23:35	1.58
Ethylbenzene	ND		0.0032	0.00051	ppm v/v			11/18/21 23:35	1.58
4-Ethyltoluene	ND		0.0063	0.00083	ppm v/v			11/18/21 23:35	1.58
Hexachlorobutadiene	ND		0.016	0.0013	ppm v/v			11/18/21 23:35	1.58
2-Hexanone	ND		0.0079	0.00063	ppm v/v			11/18/21 23:35	1.58
4-Methyl-2-pentanone (MIBK)	ND		0.0079	0.0021	ppm v/v			11/18/21 23:35	1.58
Methylene Chloride	ND		0.016	0.015	ppm v/v			11/18/21 23:35	1.58
Styrene	ND		0.0032	0.00095	ppm v/v			11/18/21 23:35	1.58
1,1,2,2-Tetrachloroethane	ND		0.0032	0.00055	ppm v/v			11/18/21 23:35	1.58
<b>Tetrachloroethene</b>	<b>0.17</b>		0.0032	0.00028	ppm v/v			11/18/21 23:35	1.58
Toluene	ND		0.0047	0.0031	ppm v/v			11/18/21 23:35	1.58
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>0.089</b>		0.0032	0.00032	ppm v/v			11/18/21 23:35	1.58
1,2,4-Trichlorobenzene	ND		0.016	0.0025	ppm v/v			11/18/21 23:35	1.58
<b>1,1,1-Trichloroethane</b>	<b>0.0016</b>	<b>J</b>	0.0032	0.0015	ppm v/v			11/18/21 23:35	1.58
1,1,2-Trichloroethane	ND		0.0032	0.00028	ppm v/v			11/18/21 23:35	1.58
<b>Trichloroethene</b>	<b>0.16</b>		0.0016	0.00051	ppm v/v			11/18/21 23:35	1.58
<b>Trichlorofluoromethane</b>	<b>0.024</b>		0.0032	0.00043	ppm v/v			11/18/21 23:35	1.58
1,2,4-Trimethylbenzene	ND		0.0032	0.00079	ppm v/v			11/18/21 23:35	1.58
1,3,5-Trimethylbenzene	ND		0.0032	0.00087	ppm v/v			11/18/21 23:35	1.58
Vinyl acetate	ND		0.016	0.0011	ppm v/v			11/18/21 23:35	1.58
Vinyl chloride	ND		0.0016	0.0010	ppm v/v			11/18/21 23:35	1.58

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMP

Job ID: 140-25404-1

Client Sample ID: 116199-001/MWL-SV03-200

Lab Sample ID: 140-25404-22

Date Collected: 11/05/21 08:49

Matrix: Air

Date Received: 11/15/21 10:00

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		0.0032	0.0011	ppm v/v			11/18/21 23:35	1.58
o-Xylene	ND		0.0032	0.00059	ppm v/v			11/18/21 23:35	1.58
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	85		60 - 140					11/18/21 23:35	1.58

Client Sample ID: 116200-001/MWL-SV03-300

Lab Sample ID: 140-25404-23

Date Collected: 11/05/21 08:55

Matrix: Air

Date Received: 11/15/21 10:00

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		0.026	0.0075	ppm v/v			11/19/21 00:17	1.57
Benzene	0.00030	J B	0.0010	0.00010	ppm v/v			11/19/21 00:17	1.57
Benzyl chloride	ND		0.0021	0.00050	ppm v/v			11/19/21 00:17	1.57
Bromodichloromethane	ND		0.0010	0.00024	ppm v/v			11/19/21 00:17	1.57
Bromoform	ND		0.0010	0.00012	ppm v/v			11/19/21 00:17	1.57
Bromomethane	ND		0.0010	0.00029	ppm v/v			11/19/21 00:17	1.57
2-Butanone (MEK)	ND		0.0052	0.00096	ppm v/v			11/19/21 00:17	1.57
Carbon disulfide	0.00020	J	0.0026	0.00014	ppm v/v			11/19/21 00:17	1.57
Carbon tetrachloride	0.00036	J	0.0010	0.000092	ppm v/v			11/19/21 00:17	1.57
Chlorobenzene	0.00023	J B	0.0010	0.000079	ppm v/v			11/19/21 00:17	1.57
Chloroethane	ND		0.0010	0.00038	ppm v/v			11/19/21 00:17	1.57
Chloroform	0.0013		0.0010	0.000092	ppm v/v			11/19/21 00:17	1.57
Chloromethane	ND		0.0026	0.00086	ppm v/v			11/19/21 00:17	1.57
Dibromochloromethane	ND		0.0010	0.000092	ppm v/v			11/19/21 00:17	1.57
1,2-Dibromoethane (EDB)	0.000095	J	0.0010	0.000092	ppm v/v			11/19/21 00:17	1.57
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.0010	0.00016	ppm v/v			11/19/21 00:17	1.57
1,2-Dichlorobenzene	ND		0.0010	0.00041	ppm v/v			11/19/21 00:17	1.57
1,3-Dichlorobenzene	ND		0.0010	0.00021	ppm v/v			11/19/21 00:17	1.57
1,4-Dichlorobenzene	ND		0.0010	0.00021	ppm v/v			11/19/21 00:17	1.57
Dichlorodifluoromethane	0.030		0.0010	0.00018	ppm v/v			11/19/21 00:17	1.57
1,1-Dichloroethane	0.0027		0.0010	0.000092	ppm v/v			11/19/21 00:17	1.57
1,2-Dichloroethane	ND		0.0010	0.00013	ppm v/v			11/19/21 00:17	1.57
1,1-Dichloroethene	0.016		0.0010	0.00010	ppm v/v			11/19/21 00:17	1.57
cis-1,2-Dichloroethene	0.0022		0.0010	0.00013	ppm v/v			11/19/21 00:17	1.57
trans-1,2-Dichloroethene	ND		0.0010	0.000092	ppm v/v			11/19/21 00:17	1.57
1,2-Dichloropropane	ND		0.0010	0.00013	ppm v/v			11/19/21 00:17	1.57
cis-1,3-Dichloropropene	ND		0.0010	0.00021	ppm v/v			11/19/21 00:17	1.57
trans-1,3-Dichloropropene	ND		0.0010	0.00012	ppm v/v			11/19/21 00:17	1.57
Ethylbenzene	ND		0.0010	0.00017	ppm v/v			11/19/21 00:17	1.57
4-Ethyltoluene	ND		0.0021	0.00027	ppm v/v			11/19/21 00:17	1.57
Hexachlorobutadiene	ND		0.0052	0.00042	ppm v/v			11/19/21 00:17	1.57
2-Hexanone	ND		0.0026	0.00021	ppm v/v			11/19/21 00:17	1.57
4-Methyl-2-pentanone (MIBK)	ND		0.0026	0.00071	ppm v/v			11/19/21 00:17	1.57
Methylene Chloride	ND		0.0052	0.0051	ppm v/v			11/19/21 00:17	1.57
Styrene	ND		0.0010	0.00031	ppm v/v			11/19/21 00:17	1.57
1,1,2,2-Tetrachloroethane	ND		0.0010	0.00018	ppm v/v			11/19/21 00:17	1.57

Eurofins TestAmerica, Knoxville



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMP

Job ID: 140-25404-1

Client Sample ID: 116200-001/MWL-SV03-300

Lab Sample ID: 140-25404-23

Date Collected: 11/05/21 08:55

Matrix: Air

Date Received: 11/15/21 10:00

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		0.0016	0.0010	ppm v/v			11/19/21 00:17	1.57
1,1,2-Trichloro-1,2,2-trifluoroethane	0.10		0.0010	0.00010	ppm v/v			11/19/21 00:17	1.57
1,2,4-Trichlorobenzene	ND		0.0052	0.00084	ppm v/v			11/19/21 00:17	1.57
1,1,1-Trichloroethane	0.00078	J	0.0010	0.00048	ppm v/v			11/19/21 00:17	1.57
1,1,2-Trichloroethane	ND		0.0010	0.000092	ppm v/v			11/19/21 00:17	1.57
Trichloroethene	0.17		0.00052	0.00017	ppm v/v			11/19/21 00:17	1.57
Trichlorofluoromethane	0.015		0.0010	0.00014	ppm v/v			11/19/21 00:17	1.57
1,2,4-Trimethylbenzene	ND		0.0010	0.00026	ppm v/v			11/19/21 00:17	1.57
1,3,5-Trimethylbenzene	ND		0.0010	0.00029	ppm v/v			11/19/21 00:17	1.57
Vinyl acetate	ND		0.0052	0.00037	ppm v/v			11/19/21 00:17	1.57
Vinyl chloride	ND		0.00052	0.00034	ppm v/v			11/19/21 00:17	1.57
m,p-Xylene	ND		0.0010	0.00038	ppm v/v			11/19/21 00:17	1.57
o-Xylene	ND		0.0010	0.00020	ppm v/v			11/19/21 00:17	1.57
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		60 - 140					11/19/21 00:17	1.57

## 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
Tetrachloroethene	0.21		0.0031	0.00027	ppm v/v			11/19/21 17:06	1.57
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	83		60 - 140					11/19/21 17:06	1.57

Client Sample ID: 116201-001/MWL-SV03-400

Lab Sample ID: 140-25404-24

Date Collected: 11/05/21 09:15

Matrix: Air

Date Received: 11/15/21 10:00

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	0.0074	J	0.019	0.0054	ppm v/v			11/19/21 00:59	1.51
Benzene	0.00021	J B	0.00076	0.000076	ppm v/v			11/19/21 00:59	1.51
Benzyl chloride	ND		0.0015	0.00036	ppm v/v			11/19/21 00:59	1.51
Bromodichloromethane	ND		0.00076	0.00017	ppm v/v			11/19/21 00:59	1.51
Bromoform	ND		0.00076	0.000085	ppm v/v			11/19/21 00:59	1.51
Bromomethane	ND		0.00076	0.00021	ppm v/v			11/19/21 00:59	1.51
2-Butanone (MEK)	0.00092	J	0.0038	0.00069	ppm v/v			11/19/21 00:59	1.51
Carbon disulfide	0.00018	J	0.0019	0.00010	ppm v/v			11/19/21 00:59	1.51
Carbon tetrachloride	0.00025	J	0.00076	0.000066	ppm v/v			11/19/21 00:59	1.51
Chlorobenzene	ND		0.00076	0.000057	ppm v/v			11/19/21 00:59	1.51
Chloroethane	ND		0.00076	0.00027	ppm v/v			11/19/21 00:59	1.51
Chloroform	0.00092		0.00076	0.000066	ppm v/v			11/19/21 00:59	1.51
Chloromethane	ND		0.0019	0.00062	ppm v/v			11/19/21 00:59	1.51
Dibromochloromethane	ND		0.00076	0.000066	ppm v/v			11/19/21 00:59	1.51
1,2-Dibromoethane (EDB)	ND		0.00076	0.000066	ppm v/v			11/19/21 00:59	1.51
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.00076	0.00011	ppm v/v			11/19/21 00:59	1.51
1,2-Dichlorobenzene	ND		0.00076	0.00029	ppm v/v			11/19/21 00:59	1.51
1,3-Dichlorobenzene	ND		0.00076	0.00015	ppm v/v			11/19/21 00:59	1.51

Eurofins TestAmerica, Knoxville

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL LTMMMP

Job ID: 140-25404-1

Client Sample ID: 116201-001/MWL-SV03-400

Lab Sample ID: 140-25404-24

Date Collected: 11/05/21 09:15

Matrix: Air

Date Received: 11/15/21 10:00

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
1,4-Dichlorobenzene	ND		0.00076	0.00015	ppm v/v			11/19/21 00:59	1.51
Dichlorodifluoromethane	0.0041		0.00076	0.00013	ppm v/v			11/19/21 00:59	1.51
1,1-Dichloroethane	0.0017		0.00076	0.000066	ppm v/v			11/19/21 00:59	1.51
1,2-Dichloroethane	ND		0.00076	0.000094	ppm v/v			11/19/21 00:59	1.51
1,1-Dichloroethene	0.0078		0.00076	0.000076	ppm v/v			11/19/21 00:59	1.51
cis-1,2-Dichloroethene	0.0013		0.00076	0.000094	ppm v/v			11/19/21 00:59	1.51
trans-1,2-Dichloroethene	ND		0.00076	0.000066	ppm v/v			11/19/21 00:59	1.51
1,2-Dichloropropane	ND		0.00076	0.000094	ppm v/v			11/19/21 00:59	1.51
cis-1,3-Dichloropropene	ND		0.00076	0.00015	ppm v/v			11/19/21 00:59	1.51
trans-1,3-Dichloropropene	ND		0.00076	0.000085	ppm v/v			11/19/21 00:59	1.51
Ethylbenzene	ND		0.00076	0.00012	ppm v/v			11/19/21 00:59	1.51
4-Ethyltoluene	ND		0.0015	0.00020	ppm v/v			11/19/21 00:59	1.51
Hexachlorobutadiene	ND		0.0038	0.00030	ppm v/v			11/19/21 00:59	1.51
2-Hexanone	ND		0.0019	0.00015	ppm v/v			11/19/21 00:59	1.51
4-Methyl-2-pentanone (MIBK)	ND		0.0019	0.00051	ppm v/v			11/19/21 00:59	1.51
Methylene Chloride	ND		0.0038	0.0037	ppm v/v			11/19/21 00:59	1.51
Styrene	ND		0.00076	0.00023	ppm v/v			11/19/21 00:59	1.51
1,1,2,2-Tetrachloroethane	ND		0.00076	0.00013	ppm v/v			11/19/21 00:59	1.51
Tetrachloroethene	0.14		0.00076	0.000066	ppm v/v			11/19/21 00:59	1.51
Toluene	ND		0.0011	0.00074	ppm v/v			11/19/21 00:59	1.51
1,1,2-Trichloro-1,2,2-trifluoroethane	0.018		0.00076	0.000076	ppm v/v			11/19/21 00:59	1.51
1,2,4-Trichlorobenzene	ND		0.0038	0.00060	ppm v/v			11/19/21 00:59	1.51
1,1,1-Trichloroethane	0.00058	J	0.00076	0.00035	ppm v/v			11/19/21 00:59	1.51
1,1,2-Trichloroethane	0.000090	J	0.00076	0.000066	ppm v/v			11/19/21 00:59	1.51
Trichloroethene	0.12		0.00038	0.00012	ppm v/v			11/19/21 00:59	1.51
Trichlorofluoromethane	0.0052		0.00076	0.00010	ppm v/v			11/19/21 00:59	1.51
1,2,4-Trimethylbenzene	ND		0.00076	0.00019	ppm v/v			11/19/21 00:59	1.51
1,3,5-Trimethylbenzene	ND		0.00076	0.00021	ppm v/v			11/19/21 00:59	1.51
Vinyl acetate	ND		0.0038	0.00026	ppm v/v			11/19/21 00:59	1.51
Vinyl chloride	ND		0.00038	0.00025	ppm v/v			11/19/21 00:59	1.51
m,p-Xylene	ND		0.00076	0.00027	ppm v/v			11/19/21 00:59	1.51
o-Xylene	ND		0.00076	0.00014	ppm v/v			11/19/21 00:59	1.51

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		60 - 140		11/19/21 00:59	1.51

**ANNEX D**

**Mixed Waste Landfill  
Soil-Moisture Monitoring Forms**

**April 2021-March 2022**

**Field Forms and Tables**

**Mixed Waste Landfill**

**Soil-Moisture Monitoring**

**Soil-Moisture Monitoring Field Forms**

## Mixed Waste Landfill Neutron Logging Data Field Form

Name: <u>Robert Ziock</u>	Standard Count: <u>6629</u>	Chi: <u>1.02</u>			
Name: <u>Daniel K Michel</u>	Previous Count: <u>6629</u>	Count Time: 30 seconds			
Notes:					
Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Winch Counter Reading (ft)	VZ-3 Counts (E Side) Date/Time	VZ-2 Counts (SW Corner) Date/Time	VZ-1 Counts (NW Corner) Date/Time
<u>Ground Surface</u> <u>4-27-21</u>			<u>4-19-21/10:40</u>	<u>4-19-21/11:47</u>	<u>4-19-21/14:20</u>
0.0	0	0	1170	2280	2557
0.9	1	9999	2349	2921	2560
1.7	2	9998	2657	3232	2448
2.6	3	9997	2152	3211	2450
3.5	4	9996	2088	3170	2509
4.3	5	9995	2167	2737	2106
5.2	6	9994	1794	2060	2183
6.1	7	9993	1736	1823	1815
6.9	8	9992	2001	1831	1736
7.8	9	9991	1945	1798	2116
8.7	10	9990	2023	1633	2190
9.5	11	9989	1812	2037	2030
10.4	12	9988	1770	1893	1796
11.3	13	9987	1841	1758	1897
12.1	14	9986	1808	1602	2057
13.0	15	9985	1884	1828	2123
13.9	16	9984	1513	1688	1806
14.7	17	9983	1666	1708	1592
15.6	18	9982	1726	1923	1464
16.5	19	9981	1362	2139	1519
17.3	20	9980	1604	2059	1578
18.2	21	9979	1762	1848	2008
19.1	22	9978	1552	1866	2327
19.9	23	9977	1433	2042	2130
20.8	24	9976	1461	1661	1845
21.7	25	9975	1792	1668	1743



## Mixed Waste Landfill Neutron Logging Data Field Form

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Winch Counter Reading (ft)	VZ-3 Counts (E Side)	VZ-2 Counts (SW Corner)	VZ-1 Counts (NW Corner)
Ground Surface Ag 4-27-21 26.0	30	9970	1670	1236	2554 1575
30.3	35	9965	1733	1814	1940
34.6	40	9960	1665	1581	1877
39.0	45	9955	1601	1572	1775
43.3	50	9950	2013	1623	1616
47.6	55	9945	1819	1914	1711
52.0	60	9940	1685	1909	1766
56.3	65	9935	2143	2135	1962
60.6	70	9930	1311	2378	1701
65.0	75	9925	2101	2179	1981
69.3	80	9920	2246	1594	1854
73.6	85	9915	1866	1774	1761
77.9	90	9910	1433	2315	1870
82.3	95	9905	2028	2217	2218
86.6	100	9900	2148	2185	2136
90.9	105	9895	1850	2352	2158
95.3	110	9890	2068	1887	1988
99.6	115	9885	1852	1850	1449
103.9	120	9880	1510	1935	2547
108.3	125	9875	1763	2198	1668
112.6	130	9870	2002	2187	1847
116.9	135	9865	1875	2672	1596
121.2	140	9860	1626	1916	1513
125.6	145	9855	2628	2537	2717
129.9	150	9850	2206	2421	2142
134.2	155	9845	2158	2269	1609
138.6	160	9840	2627	2553	2196
142.9	165	9835	2527	2166	2087
147.2	170	9830	2635	1598	3041
151.6	175	9825	1915	2810	2487
155.9	180	9820	3070	2675	2790
160.2	185	9815	3004	2870	1869
164.5	190	9810	1672	1589	2329
168.9	195	9805	1885	2654	3315
173.2	200	9800	2072	2097	2538

## **Mixed Waste Landfill**

### **Soil-Moisture Monitoring**

#### **Soil-Moisture Monitoring Results Tables**

Table D-1  
VZ-1 Soil-Moisture Monitoring Results  
April 2021

Vertical Depth Below Ground Surface (ft)	Linear Depth Along Casing (ft)	Collection Period April 2021	Baseline Average (2004-2006)	Difference between Baseline Average & April 2021	Soil-Moisture Trigger Level (% content by volume)
		Soil-Moisture (% content by volume)			
3.5	4	4.7	2.9	1.8	NA
4.3	5	3.6	2.9	0.7	NA
5.2	6	3.8	2.9	0.9	NA
6.1	7	2.8	2.6	0.2	NA
6.9	8	2.6	2.2	0.4	NA
7.8	9	3.6	1.9	1.7	NA
8.7	10	3.8	1.7	2.1	23
9.5	11	3.4	2.0	1.4	23
10.4	12	2.7	2.7	0.0	23
11.3	13	3.0	3.1	-0.1	23
12.1	14	3.4	2.6	0.8	23
13.0	15	3.6	2.4	1.2	23
13.9	16	2.8	2.6	0.2	23
14.7	17	2.2	2.8	-0.6	23
15.6	18	1.8	2.9	-1.1	23
16.5	19	2.0	2.4	-0.4	23
17.3	20	2.2	2.0	0.2	23
18.2	21	3.3	2.0	1.3	23
19.1	22	4.2	2.1	2.1	23
19.9	23	3.6	3.0	0.6	23
20.8	24	2.9	4.3	-1.4	23
21.7	25	2.6	4.0	-1.4	23
26.0	30	2.1	2.9	-0.8	23
30.3	35	3.1	2.7	0.4	23
34.6	40	3.0	2.3	0.7	23
39.0	45	2.7	3.0	-0.3	23
43.3	50	2.3	2.9	-0.6	23
47.6	55	2.5	2.8	-0.3	23
52.0	60	2.7	3.4	-0.7	23
56.3	65	3.2	2.9	0.3	23



Table D-1 (Concluded)  
VZ-1 Soil-Moisture Monitoring Results  
April 2021

Vertical Depth Below Ground Surface (ft)	Linear Depth Along Casing (ft)	Collection Period April 2021	Baseline Average (2004-2006)	Difference between Baseline Average & April 2021	Soil-Moisture Trigger Level (% content by volume)
		Soil-Moisture (% content by volume)			
60.6	70	2.5	2.1	0.4	23
65.0	75	3.2	5.6	-2.4	23
69.3	80	2.9	2.8	0.1	23
73.6	85	2.6	3.1	-0.5	23
77.9	90	2.9	3.7	-0.8	23
82.3	95	3.9	3.7	0.2	23
86.6	100	3.7	5.4	-1.7	23
90.9	105	3.7	5.0	-1.3	NA
95.3	110	3.3	3.0	0.3	NA
99.6	115	1.8	3.6	-1.8	NA
103.9	120	4.8	2.2	2.6	NA
108.3	125	2.4	2.7	-0.3	NA
112.6	130	2.9	3.3	-0.4	NA
116.9	135	2.2	3.1	-0.9	NA
121.2	140	2.0	2.1	-0.1	NA
125.6	145	5.2	3.8	1.4	NA
129.9	150	3.7	3.2	0.5	NA
134.2	155	2.2	2.7	-0.5	NA
138.6	160	3.8	2.1	1.7	NA
142.9	165	3.5	3.8	-0.3	NA
147.2	170	6.1	2.0	4.1	NA
151.6	175	4.6	6.0	-1.4	NA
155.9	180	5.4	5.5	-0.1	NA
160.2	185	2.9	4.4	-1.5	NA
164.5	190	4.2	3.0	1.2	NA
168.9	195	6.8	7.0	-0.2	NA
173.2	200	4.7	5.4	-0.7	NA
	Average	3.3	3.2		

Note: Shaded area represents depths where 23% soil moisture trigger applies.

NA = Not applicable.

Table D-2  
VZ-2 Soil-Moisture Monitoring Results  
April 2021

Vertical Depth Below Ground Surface (ft)	Linear Depth Along Casing (ft)	Collection Period April 2021	Baseline Average (2004-2006)	Difference between Baseline Average & April 2021	Soil-Moisture Trigger Level (% content by volume)
		Soil-Moisture (% content by volume)			
3.5	4	6.4	2.7	3.7	NA
4.3	5	5.3	3.3	2.0	NA
5.2	6	3.4	3.6	-0.2	NA
6.1	7	2.8	3.6	-0.8	NA
6.9	8	2.8	3.5	-0.7	NA
7.8	9	2.7	3.1	-0.4	NA
8.7	10	2.3	2.4	-0.1	23
9.5	11	3.4	2.2	1.2	23
10.4	12	3.0	2.2	0.8	23
11.3	13	2.6	2.1	0.5	23
12.1	14	2.2	2.5	-0.3	23
13.0	15	2.8	3.0	-0.2	23
13.9	16	2.4	2.8	-0.4	23
14.7	17	2.7	2.4	0.3	23
15.6	18	3.1	2.6	0.5	23
16.5	19	3.7	2.7	1.0	23
17.3	20	3.4	2.9	0.5	23
18.2	21	2.9	3.1	-0.2	23
19.1	22	2.9	3.6	-0.7	23
19.9	23	3.4	3.7	-0.3	23
20.8	24	2.4	3.1	-0.7	23
21.7	25	2.4	2.7	-0.3	23
26.0	30	2.6	2.4	0.2	23
30.3	35	2.8	2.9	-0.1	23
34.6	40	2.2	2.7	-0.5	23
39.0	45	2.1	2.3	-0.2	23
43.3	50	2.3	2.1	0.2	23
47.6	55	3.1	3.1	0.0	23
52.0	60	3.0	3.0	0.0	23
56.3	65	3.6	5.5	-1.9	23

Table D-2 (Concluded)  
VZ-2 Soil-Moisture Monitoring Results  
April 2021

Vertical Depth Below Ground Surface (ft)	Linear Depth Along Casing (ft)	Collection Period April 2021	Baseline Average (2004-2006)	Difference between Baseline Average & April 2021	Soil-Moisture Trigger Level (% content by volume)
		Soil-Moisture (% content by volume)			
60.6	70	4.3	4.8	-0.5	23
65.0	75	3.8	5.1	-1.3	23
69.3	80	2.2	2.6	-0.4	23
73.6	85	2.7	2.6	0.1	23
77.9	90	4.1	3.1	1.0	23
82.3	95	3.9	3.6	0.3	23
86.6	100	3.8	4.7	-0.9	23
90.9	105	4.2	3.4	0.8	NA
95.3	110	3.0	3.1	-0.1	NA
99.6	115	2.9	3.6	-0.7	NA
103.9	120	3.1	2.0	1.1	NA
108.3	125	3.8	3.8	0.0	NA
112.6	130	3.8	3.6	0.2	NA
116.9	135	5.1	3.4	1.7	NA
121.2	140	3.1	2.4	0.7	NA
125.6	145	4.7	5.9	-1.2	NA
129.9	150	4.4	7.0	-2.6	NA
134.2	155	4.0	3.6	0.4	NA
138.6	160	4.8	3.8	1.0	NA
142.9	165	3.7	3.0	0.7	NA
147.2	170	2.2	2.9	-0.7	NA
151.6	175	5.5	2.4	3.1	NA
155.9	180	5.1	5.4	-0.3	NA
160.2	185	5.6	5.4	0.2	NA
164.5	190	2.2	4.1	-1.9	NA
168.9	195	5.0	3.5	1.5	NA
173.2	200	6.2	6.3	-0.1	NA
	Average	3.5	3.4		

Note: Shaded area represents depths where 23% soil moisture trigger applies.

NA = Not applicable.

Table D-3  
VZ-3 Soil-Moisture Monitoring Results  
April 2021

Vertical Depth Below Ground Surface (ft)	Linear Depth Along Casing (ft)	Collection Period April 2021	Baseline Average (2004-2006)	Difference between Baseline Average & April 2021	Soil-Moisture Trigger Level (% content by volume)
		Soil-Moisture (% content by volume)			
3.5	4	3.5	4.6	-1.1	NA
4.3	5	3.7	4.5	-0.8	NA
5.2	6	2.7	3.7	-1.0	NA
6.1	7	2.6	2.9	-0.3	NA
6.9	8	3.3	3.1	0.2	NA
7.8	9	3.1	2.3	0.8	NA
8.7	10	3.3	2.4	0.9	23
9.5	11	2.8	2.6	0.2	23
10.4	12	2.7	2.7	0.0	23
11.3	13	2.9	3.0	-0.1	23
12.1	14	2.8	2.6	0.2	23
13.0	15	3.0	2.8	0.2	23
13.9	16	2.0	2.9	-0.9	23
14.7	17	2.4	3.1	-0.7	23
15.6	18	2.6	3.1	-0.5	23
16.5	19	1.6	2.3	-0.7	23
17.3	20	2.2	2.7	-0.5	23
18.2	21	2.6	2.7	-0.1	23
19.1	22	2.1	1.8	0.3	23
19.9	23	1.8	2.7	-0.9	23
20.8	24	1.8	2.8	-1.0	23
21.7	25	2.7	2.1	0.6	23
26.0	30	2.4	2.5	-0.1	23
30.3	35	2.6	2.8	-0.2	23
34.6	40	2.4	2.1	0.3	23
39.0	45	2.2	2.7	-0.5	23
43.3	50	3.3	2.9	0.4	23
47.6	55	2.8	3.4	-0.6	23
52.0	60	2.4	2.9	-0.5	23
56.3	65	3.7	3.5	0.2	23

Table D-3 (Concluded)  
VZ-3 Soil-Moisture Monitoring Results  
April 2021

Vertical Depth Below Ground Surface (ft)	Linear Depth Along Casing (ft)	Collection Period April 2021	Baseline Average (2004-2006)	Difference between Baseline Average & April 2021	Soil-Moisture Trigger Level (% content by volume)
		Soil-Moisture (% content by volume)			
60.6	70	1.4	1.9	-0.5	23
65.0	75	3.6	4.3	-0.7	23
69.3	80	3.9	4.5	-0.6	23
73.6	85	2.9	3.5	-0.6	23
77.9	90	1.8	1.9	-0.1	23
82.3	95	3.4	3.3	0.1	23
86.6	100	3.7	3.4	0.3	23
90.9	105	2.9	3.3	-0.4	NA
95.3	110	3.5	4.7	-1.2	NA
99.6	115	2.9	3.6	-0.7	NA
103.9	120	2.0	2.1	-0.1	NA
108.3	125	2.6	1.8	0.8	NA
112.6	130	3.3	4.3	-1.0	NA
116.9	135	3.0	4.0	-1.0	NA
121.2	140	2.3	2.3	0.0	NA
125.6	145	5.0	2.0	3.0	NA
129.9	150	6.5	4.4	2.1	NA
134.2	155	3.7	3.6	0.1	NA
138.6	160	5.0	4.4	0.6	NA
142.9	165	4.7	5.2	-0.5	NA
147.2	170	5.0	4.1	0.9	NA
151.6	175	3.1	4.3	-1.2	NA
155.9	180	6.2	6.6	-0.4	NA
160.2	185	6.0	5.6	0.4	NA
164.5	190	2.5	2.7	-0.2	NA
168.9	195	3.0	3.1	-0.1	NA
173.2	200	3.5	4.1	-0.6	NA
	Average	3.1	3.2		

Note: Shaded area represents depths where 23% soil moisture trigger applies.

NA = Not applicable.

**ANNEX E**

**Mixed Waste Landfill  
Groundwater Monitoring Forms and Reports**

**April 2021-March 2022**

**Field Forms**

**Sample Summary Sheet**

**Data Validation Reports**

**Contract Verification Forms**

**Field Sampling Forms**  
**Mixed Waste Landfill**  
**Long-Term Monitoring and Maintenance**  
**Groundwater Monitoring**

<b>Form Title</b>	<b>Corresponding Procedure</b>
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**

**May 2021 Groundwater Monitoring**



## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

SNL/NM Project Name: MWL		
Well ID: MWL-BW2	Date: 05/11/21	Date:
Pump Method: Portable	Pump Depth: 496'	

## PURGE MEASUREMENTS

[illegible]**Comments:**

~ 1.5 gals purged from tubing @ 0839

Lot # fb = 042721

## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

SNL/NM Project Name: MWL		
Well ID: MWL-MW7	Date: 05/10/21	Date:
Pump Method: Portable	Pump Depth: 496'	

## PURGE MEASUREMENTS

[illegible]**Comments:**

~ 1.5 gals purged from tubing @ 0844





## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

SNL/NM Project Name: MWL		
Well ID: MWL-MW9	Date: 05/12/21	Date:
Pump Method: Portable	Pump Depth: 497'	

## PURGE MEASUREMENTS

[illegible]

Comments:

Comments: Additional purge required due to turbidity  
~ 1.5 gals purged from tubing @ 0839

QC x FB Lot No. 042721

## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: <b>MWL</b>						
Calibrations done by: <b>R Lynch</b>				Date: <b>05/10/21</b>		
Make & Model: <b>In-Situ Aqua Troll 600</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>536303</b>						
Other (SN): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>NA</b>				pH sloped to (std): <b>NA</b>		
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time (24 hr):	<b>0630</b>	<b>4.03</b>	<b>21.59</b>	<b>7.04</b>	<b>21.64</b>	<b>10.05</b>
2. Time (24 hr):	<b>1255</b>	<b>4.03</b>	<b>23.60</b>	<b>7.03</b>	<b>23.44</b>	<b>10.04</b>
3. Time (24 hr):						
4. Time (24 hr):						
Standard Lot No.:	<b>OGK004</b>		<b>OGL004</b>		<b>OGK650</b>	
Expiration Date.:	<b>NOV/22</b>		<b>DEC/22</b>		<b>SEP/22</b>	
<b>SC Calibration/Check</b>			<b>ORP Calibration/Check</b>			
Reference Value: <b>1413 uS/cm @ 25 C</b>			Reference Value: <b>220 mV</b>			
	Value	Temp		Value	Temp	
1. Time (24 hr):	<b>0635</b>	<b>1299.5</b>	<b>20.88</b>	1. Time (24 hr):	<b>0636</b>	<b>221.3</b>
2. Time (24 hr):	<b>1258</b>	<b>1342.0</b>	<b>20.11</b>	2. Time (24 hr):	<b>1254</b>	<b>221.1</b>
3. Time (24 hr):				3. Time (24 hr):		
4. Time (24 hr):				4. Time (24 hr):		
Standard Lot No.:	<b>OGK781</b>		Expiration Date.:	<b>NOV/21</b>		Standard Lot No.:
						<b>0GL1015</b>
						Expiration Date.:
						<b>SEP/21</b>
<b>DO Calibration/Check</b>						
Calibration Value:	81% air saturation @ 5200 ft.			Atmospheric Pressure in Hg		
1. Time (24 hr):	<b>0631</b>	<b>98.67</b>		<b>24.69</b>		
2. Time (24 hr):	<b>1253</b>	<b>90.84</b>		<b>25.33</b>		
3. Time (24 hr):						
4. Time (24 hr):						

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

SNL/NM Project Name: <b>MWL</b>				
Calibration done by: <b>R Lynch</b>			Date: <b>05/10/21</b>	
<b>TURBIDIMETER</b>				
Make & Model: <b>HACH 2100Q</b>			Serial No. S/N <b>19050C076301</b>	
Reference Value	<b>10</b>	<b>20</b>	<b>100</b>	<b>800</b>
Standard Lot No.	<b>A0288</b>	<b>A0295</b>	<b>A0276</b>	<b>A0279</b>
1. Time (24 hr): <b>0630</b>	<b>10.1</b>	<b>19.9</b>	<b>98.9</b>	<b>801</b>
2. Time (24 hr): <b>1252</b>	<b>10.0</b>	<b>20.1</b>	<b>99.6</b>	<b>802</b>
3. Time (24 hr):				
4. Time (24 hr):				
Comments:				

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## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: <b>MWL</b>						
Calibrations done by: <b>R Lynch</b>				Date: <b>05/11/21</b>		
Make & Model: <b>In-Situ Aqua Troll 600</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>536303</b>						
Other (SN): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>NA</b>			pH sloped to (std): <b>NA</b>			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time (24 hr):	<b>0632</b>	<b>4.03</b>	<b>21.09</b>	<b>7.01</b>	<b>21.58</b>	<b>10.03</b>
2. Time (24 hr):	<b>1232</b>	<b>4.03</b>	<b>22.53</b>	<b>7.03</b>	<b>23.00</b>	<b>10.04</b>
3. Time (24 hr):						
4. Time (24 hr):						
Standard Lot No.:	<b>OGK004</b>		<b>OGL004</b>		<b>OGK650</b>	
Expiration Date.:	<b>NOV/22</b>		<b>DEC/22</b>		<b>SEP/22</b>	
<b>SC Calibration/Check</b>			<b>ORP Calibration/Check</b>			
Reference Value: <b>1413 uS/cm @ 25 C</b>			Reference Value: <b>220 mV</b>			
	Value	Temp		Value	Temp	
1. Time (24 hr):	<b>0636</b>	<b>1323.3</b>	<b>21.80</b>	1. Time (24 hr):	<b>0637</b>	<b>221.9</b>
2. Time (24 hr):	<b>1237</b>	<b>1339.8</b>	<b>22.34</b>	2. Time (24 hr):	<b>1235</b>	<b>221.7</b>
3. Time (24 hr):				3. Time (24 hr):		
4. Time (24 hr):				4. Time (24 hr):		
Standard Lot No.:	<b>OGK781</b>		Expiration Date.:		<b>NOV/21</b>	
			Standard Lot No.:		<b>OGL1015</b>	
			Expiration Date.:		<b>SEP/21</b>	
<b>DO Calibration/Check</b>						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time (24 hr):	<b>0631</b>	<b>91.69</b>	<b>24.97</b>			
2. Time (24 hr):	<b>1231</b>	<b>95.80</b>	<b>24.66</b>			
3. Time (24 hr):						
4. Time (24 hr):						

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

SNL/NM Project Name: <b>MWL</b>				
Calibration done by: <b>R Lynch</b>			Date: <b>05/11/21</b>	
<b>TURBIDIMETER</b>				
Make & Model: <b>HACH 2100Q</b>			Serial No. S/N <b>19050C076301</b>	
Reference Value	10	20	100	800
Standard Lot No.	A0288	A0295	A0276	A0279
1. Time (24 hr): <b>0630</b>	<b>9.99</b>	<b>20.1</b>	<b>99.7</b>	<b>801</b>
2. Time (24 hr): <b>1230</b>	<b>10.1</b>	<b>20.2</b>	<b>101</b>	<b>800</b>
3. Time (24 hr):				
4. Time (24 hr):				
Comments: <b>Recalcd 45/cm due to low readings</b>				

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

SNL/NM Project Name: <b>MWL</b>						
Calibrations done by: <b>R Lynch</b>				Date: <b>05/12/21</b>		
Make & Model: <b>In-Situ Aqua Troll 600</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>536303</b>						
Other (SN): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>NA</b>			pH sloped to (std): <b>NA</b>			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time (24 hr):	<b>0636</b>	<b>4.00</b>	<b>22.17</b>	<b>6.98</b>	<b>21.83</b>	<b>10.03</b>
2. Time (24 hr):	<b>1315</b>	<b>3.99</b>	<b>23.01</b>	<b>6.99</b>	<b>22.48</b>	<b>9.97</b>
3. Time (24 hr):						
4. Time (24 hr):						
Standard Lot No.:	<b>0GK004</b>		<b>0GL004</b>		<b>0GK650</b>	
Expiration Date.:	<b>NOV/22</b>		<b>DEC/22</b>		<b>SEP/22</b>	
<b>SC Calibration/Check</b>			<b>ORP Calibration/Check</b>			
Reference Value: <b>1413 uS/cm @ 25 C</b>			Reference Value: <b>220 mV</b>			
	Value	Temp		Value	Temp	
1. Time (24 hr):	<b>0639</b>	<b>1362.4</b>	<b>22.06</b>	1. Time (24 hr):	<b>0641</b>	<b>222.4</b>
2. Time (24 hr):	<b>1319</b>	<b>1366.1</b>	<b>22.92</b>	2. Time (24 hr):	<b>1320</b>	<b>221.7</b>
3. Time (24 hr):				3. Time (24 hr):		
4. Time (24 hr):				4. Time (24 hr):		
Standard Lot No.:	<b>0GK781</b>		Expiration Date.:	<b>NOV/21</b>		Standard Lot No.:
						<b>0GL1015</b>
						Expiration Date.:
						<b>SEP/21</b>
<b>DO Calibration/Check</b>						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time (24 hr):	<b>0635</b>	<b>92.07</b>	<b>25.04</b>			
2. Time (24 hr):	<b>1314</b>	<b>93.53</b>	<b>25.16</b>			
3. Time (24 hr):						
4. Time (24 hr):						

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

SNL/NM Project Name: <b>MWL</b>				
Calibration done by: <b>R Lynch</b>			Date: <b>05/12/21</b>	
<b>TURBIDIMETER</b>				
Make & Model: <b>HACH 2100Q</b>			Serial No. S/N <b>19050C076301</b>	
Reference Value	10	20	100	800
Standard Lot No.	A0288	A0295	A0276	A0279
1. Time (24 hr): 0635	9.99	19.8	101	803
2. Time (24 hr): 1313	10.1	20.3	99.9	801
3. Time (24 hr):				
4. Time (24 hr):				
Comments:				

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## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG



Page 1 of 2

SNL/NM Project Name: <b>MWL</b>						
Calibrations done by: <b>R Lynch</b>				Date: <b>05/13/21</b>		
Make & Model: <b>In-Situ Aqua Troll 600</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>538303</b>						
Other (SN): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>NA</b>			pH sloped to (std): <b>NA</b>			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time (24 hr):	<b>0637</b>	<b>3.99</b>	<b>21.83</b>	<b>7.00</b>	<b>21.94</b>	<b>9.99</b>
2. Time (24 hr):	<b>1235</b>	<b>4.02</b>	<b>23.28</b>	<b>7.01</b>	<b>23.19</b>	<b>9.98</b>
3. Time (24 hr):						
4. Time (24 hr):						
Standard Lot No.:	<b>OGK004</b>		<b>0GL004</b>		<b>OGK650</b>	
Expiration Date.:	<b>NOV/22</b>		<b>DEC/22</b>		<b>SEP/22</b>	
<b>SC Calibration/Check</b>			<b>ORP Calibration/Check</b>			
Reference Value: <b>1413 uS/cm @ 25 C</b>			Reference Value: <b>220 mV</b>			
	Value	Temp		Value	Temp	
1. Time (24 hr):	<b>0634</b>	<b>1324.4</b>	<b>21.98</b>	1. Time (24 hr):	<b>0635</b>	<b>221.9</b>
2. Time (24 hr):	<b>1241</b>	<b>1362.3</b>	<b>23.11</b>	2. Time (24 hr):	<b>1240</b>	<b>222.0</b>
3. Time (24 hr):				3. Time (24 hr):		
4. Time (24 hr):				4. Time (24 hr):		
Standard Lot No.:	<b>OGK781</b>		Expiration Date.:		<b>NOV/21</b>	
			Standard Lot No.:		<b>0GL1015</b>	
			Expiration Date.:		<b>SEP/21</b>	
<b>DO Calibration/Check</b>						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time (24 hr):	<b>0633</b>	<b>98.88</b>	<b>25.02</b>			
2. Time (24 hr):	<b>1234</b>	<b>92.91</b>	<b>25.30</b>			
3. Time (24 hr):						
4. Time (24 hr):						

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



SNL/NM Project Name: MWL				
Calibration done by: R Lynch			Date: 05/13/21	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 19050C076301	
Reference Value	10	20	100	800
Standard Lot No.	A0288	A0295	A0276	A0279
1. Time (24 hr): 0632	9.96	20.1	99.7	797
2. Time (24 hr): 1234	10.1	19.8	103	795
3. Time (24 hr):				
4. Time (24 hr):				
Comments: recalibrated cond probe due to low readings				

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

SNL/NM Project Name: <u>MWL</u>	Monitoring Well ID #: <u>Pre Decon</u>	Date: <u>5/7/2021</u> Date: _____
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03.		
Pump and Tubing Bundle ID #: <u>1807B-950</u>	Water Level Indicator ID #: <u>362721</u>	
<b>Personnel Performing Decontamination:</b> <div style="display: flex; justify-content: space-between;"> <div> Zach Tenorio  Print Name: _____  Denisha Sanchez  Print Name: _____ </div> <div>   Initial: _____    Initial: _____ </div> </div>		
<b>Condition of Equipment</b>		
Pump: <u>Excellent</u>	Tubing Bundle: <u>Excellent</u>	Water Level Indicator: <u>Excellent</u>
<b>List of Decontamination Materials</b>		
<b>Deionized Water</b> Source: <u>Culligan</u> Lot Number: <u>04/27/2021</u> _____ _____	<b>HNO<sub>3</sub></b> Grade: <u>NA</u> UN #: <u>NA</u> Manufacturer: <u>NA</u> Lot Number: <u>NA</u>	<b>Detergent</b> Manufacturer: <u>Liquinox</u> Lot Number: <u>L1F9</u> Expiration Date: <u>06/21</u>



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

<b>SNL/NM</b> <b>Project Name:</b> MWL	<b>Monitoring Well ID #:</b> MWL-BW2	<b>Date:</b> 5/11/2021 <b>Date:</b> _____
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03.		
<b>Pump and Tubing Bundle ID #:</b> 1807B-950	<b>Water Level Indicator ID #:</b> 362721	
<b>Personnel Performing Decontamination:</b>		
<b>William Gibson</b> <b>Print Name:</b> _____	 <b>Initial:</b> _____	
<b>Zach Tenorio</b> <b>Print Name:</b> _____	 <b>Initial:</b> _____	
<b>Condition of Equipment</b>		
<b>Pump:</b> Excellent	<b>Tubing Bundle:</b> Excellent	<b>Water Level Indicator:</b> Excellent
<b>List of Decontamination Materials</b>		
<b>Deionized Water</b> <b>Source:</b> Culligan <b>Lot Number:</b> 04/27/21-05/05/21	<b>HNO<sub>3</sub></b> <b>Grade:</b> NA <b>UN #:</b> NA <b>Manufacturer:</b> NA <b>Lot Number:</b> NA	<b>Detergent</b> <b>Manufacturer:</b> liquinox <b>Lot Number:</b> L1F9 <b>Expiration Date:</b> 06/21



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

<b>SNL/NM</b> <b>Project Name:</b> MWL	<b>Monitoring Well ID #:</b> MWL-MW7	<b>Date:</b> 5/10/2021 <b>Date:</b> _____
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03.		
<b>Pump and Tubing Bundle ID #:</b> 1807B-950	<b>Water Level Indicator ID #:</b> 362721	
<b>Personnel Performing Decontamination:</b>		
Denisha Sanchez Print Name: _____	 Initial: _____  Initial: _____	
Robert Lynch Print Name: _____		
<b>Condition of Equipment</b>		
<b>Pump:</b> Excellent	<b>Tubing Bundle:</b> Excellent	<b>Water Level Indicator:</b> Excellent
<b>List of Decontamination Materials</b>		
<b>Deionized Water</b> <b>Source:</b> Culligan <b>Lot Number:</b> 05/05/21 _____ _____	<b>HNO<sub>3</sub></b> <b>Grade:</b> NA <b>UN #:</b> NA <b>Manufacturer:</b> NA <b>Lot Number:</b> NA	<b>Detergent</b> <b>Manufacturer:</b> liquinox <b>Lot Number:</b> L1F9 <b>Expiration Date:</b> 06/21

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

<b>SNL/NM</b> <b>Project Name:</b> MWL	<b>Monitoring Well ID #:</b> MWL-MW8	<b>Date:</b> 5/13/2021 <b>Date:</b> _____
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03.		
<b>Pump and Tubing Bundle ID #:</b> 1807B-950	<b>Water Level Indicator ID #:</b> 362721	
<b>Personnel Performing Decontamination:</b>		
Robert Lynch Print Name: _____	Initial: 	
Denisha Sanchez Print Name: _____	Initial: 	
<b>Condition of Equipment</b>		
<b>Pump:</b> Excellent	<b>Tubing Bundle:</b> Excellent	<b>Water Level Indicator:</b> Excellent
<b>List of Decontamination Materials</b>		
<b>Deionized Water</b> <b>Source:</b> Culligan <b>Lot Number:</b> 04/27/21-05/05/21	<b>HNO<sub>3</sub></b> <b>Grade:</b> NA <b>UN #:</b> NA <b>Manufacturer:</b> NA <b>Lot Number:</b> NA	<b>Detergent</b> <b>Manufacturer:</b> liquinox <b>Lot Number:</b> L1F9 <b>Expiration Date:</b> 06/21

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

<b>SNL/NM</b> <b>Project Name:</b> MWL	<b>Monitoring Well ID #:</b> MWL-MW9	<b>Date:</b> 5/12/2021 <b>Date:</b> _____
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03.		
<b>Pump and Tubing Bundle ID #:</b> 1807B-950	<b>Water Level Indicator ID #:</b> 362721	
<b>Personnel Performing Decontamination:</b>		
Denisha Sanchez Print Name: _____	 Initial: _____	
William Gibson Print Name: _____	 Initial: _____	
<b>Condition of Equipment</b>		
<b>Pump:</b> Excellent	<b>Tubing Bundle:</b> Excellent	<b>Water Level Indicator:</b> Excellent
<b>List of Decontamination Materials</b>		
<b>Deionized Water</b> <b>Source:</b> Culligan <b>Lot Number:</b> 04/27/21, 05/05/21 _____ _____	<b>HNO<sub>3</sub></b> <b>Grade:</b> NA <b>UN #:</b> NA <b>Manufacturer:</b> NA <b>Lot Number:</b> NA	<b>Detergent</b> <b>Manufacturer:</b> liquinox <b>Lot Number:</b> L1F9 <b>Expiration Date:</b> 06/21

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**Summary Sheet For**  
**May 2021 Groundwater Samples**

**Sample Summary for Mixed Waste Landfill Groundwater Monitoring  
May 2021**

<b>Well ID</b>	<b>Sample Date</b>	<b>ARCOC</b>	<b>Sample Number</b>	<b>Sample Type</b>	<b>Associated Equipment Blank (ARCOC #/Sample #)</b>	<b>Associated Trip Blank (ARCOC #/ Sample #)</b>	<b>Associated Field Blank (ARCOC #/ Sample #)</b>	<b>Comments</b>
<b>GEL Analytical Data: Project Task # 195122.10.11.08, Service Order # CF01-21</b>								
MWL-BW2	11-May-21	622035	114927	Environmental	622039 / 114939	622035 / 114929	622035 / 114926	
MWL-BW2	11-May-21	622035	114928	Duplicate	622039 / 114939	622035 / 114929	622035 / 114926	
MWL-MW7	10-May-21	622036	114931	Environmental	n/a	622036 / 114932	622036 / 114930	
MWL-MW8	13-May-21	622037	114934	Environmental	n/a	622037 / 114935	622037 / 114933	
MWL-MW9	12-May-21	622038	114937	Environmental	n/a	622038 / 114938	622038 / 114936	
MWL-EB1	10-May-21	622039	114939	Equipment Blank	n/a	622039 / 114940	n/a	Equipment blank sample prior to MWL-BW2.
MWL-FB1	11-May-21	622035	114926	Field Blank	n/a	622035 / 114929	n/a	at MWL-BW2
MWL-FB2	10-May-21	622036	114930	Field Blank	n/a	622036 / 114932	n/a	at MWL-MW7
MWL-FB3	13-May-21	622037	114933	Field Blank	n/a	622037 / 114935	n/a	at MWL-MW8
MWL-FB4	12-May-21	622038	114936	Field Blank	n/a	622038 / 114938	n/a	at MWL-MW9
DIW/QC	12-May-21	622040	114941	Field Blank	n/a	622040 / 114942	n/a	DI source water for equipment decontamination

**Data Validation Reports For Environmental Samples**

**Groundwater Monitoring**

**May 2021**

**AR/COC Number 622035**

## Memorandum

Date: June 23, 2021

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCOC: 622035  
SDG: 544248  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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. Problems were identified with the data package that resulted in the qualification of data.

1. The CCV %D was  $>40\%$  but  $\leq 60\%$  with negative bias for dichlorodifluoromethane. The associated sample results were non-detect and will be **qualified UJ,C3**.
2. The MS and/or MSD %Rs were  $<$  the lower acceptance limit but  $\geq 20\%$  for dichlorodifluoromethane and chloroethane. The associated sample results were non-detect and will be **qualified UJ,MS3**.

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

### Holding Times 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 except as noted above in the Summary section and as follows.

The CCV %Ds were  $>20\%$  but  $\leq 40\%$  with negative bias for chloroethane and chloromethane. The associated sample results were non-detect and since no other calibration infractions occurred for these compounds, will not be qualified.

### **Blanks**

No target analytes were detected in any of the blanks except as follows.

Acetone was detected at  $\leq$  the PQL and chloroform, dibromochloromethane and bromodichloromethane were detected at  $>$  the PQL in FB1, sample 544248001 associated with samples -002 and -008. The associated sample results were non-detect and will not be qualified.

Acetone and 2-butanone were detected at  $\leq$  the PQL and chloroform, dibromochloromethane and bromodichloromethane were detected at  $>$  the PQL in EB1, sample 544086009 submitted on ARCO 622039 in another SDG and associated with samples -002 and -008 in this SDG. 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 except as noted above in the Summary section.

### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met with the following exception.

The LCS %R was  $<$  the lower acceptance limit but  $>20\%$  for dichlorodifluoromethane. According to the data validation procedure, one LCS recovery may be outside acceptance criteria with no qualification required since 36 target analytes were reported. Therefore, no data were qualified.

### **Detection Limits/Dilutions**

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

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

TIC reports were not required.

### **Other QC**

A TB was submitted on the ARCOC. FB1 was submitted on ARCOC 622035 and was associated with the samples on the same ARCOC. EB1 was submitted on ARCOC 622039 in another SDG and was associated with the samples on ARCOC 622035 in this SDG. A field duplicate pair was submitted with ARCOC 622035. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

Mass spectra acceptability were verified during data validation and met QC acceptance criteria.

No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donovan

**Level:** I

**Date:** 06/23/2021

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## Memorandum

Date: June 23, 2021  
To: File  
From: Linda Thal  
Subject: Inorganic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCO: 622035  
SDG: 544248  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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 except as follows.

U was detected at  $\leq$  the PQL in a CCB bracketing the samples. The associated sample results were detected  $>$  the PQL and  $>5X$  the CCB value and will not be qualified.

### **ICP -MS Internal Standards**

The ICP-MS internal standards met QC acceptance criteria.

### **Matrix Spike (MS)**

The MS met all QC acceptance criteria.

### **Laboratory Replicate**

The replicate met all QC acceptance criteria.

### **Laboratory Control Sample (LCS)**

The LCS met all QC acceptance criteria.

### **Detection Limits/Dilutions**

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

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

Results of the ICS A and AB analyses were not evaluated because the sample concentrations for Ca, Mg, Al and Fe were  $<$  those in the ICS A and AB solutions.

### **ICP Serial Dilution**

The serial dilution met all QC acceptance criteria.

### **Other QC**

EB1 was submitted on ARCOG 622039 in another SDG and was associated with the samples on ARCOG 622035 in this SDG. A field duplicate pair was submitted with ARCOG 622035. 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:** 06/23/2021

## Memorandum

Date: June 23, 2021

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCO: 622035  
SDG: 544248  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
Analysis: RAD

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 methods EPA 901.1 (gamma spec - short list), EPA 900.0/ SW846 9310 (gross alpha/beta), SM 7500 Rn B (Rn-222) and EPA 906.0 modified (tritium). Problems were identified with the data package that resulted in the qualification of data.

#### Gamma spec and tritium:

1. The sample results that were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3**.

#### Gross alpha/beta:

1. The samples were analyzed undiluted; however, the MS/MSD analyses were performed on an SNL sample from another SDG diluted >5X and considered a dissimilar matrix. The associated sample results were > the MDA and will be **qualified J,MS1**.

### Holding Times and Preservation

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

### Quantification

All quantification criteria were met except as noted above in the Summary section.

### Calibration

The case narratives stated that the instruments used were properly calibrated.

### **Blanks**

No target analytes were detected in the blanks at concentrations  $\geq$  the MDA and 2-sigma TPU.

### **Tracer/Carrier Recovery**

Tracer/Carriers were not a method requirement.

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

The MS and/or MSD met QC acceptance criteria except as noted above in the Summary section.

It should be noted that the MS analysis for tritium was performed on an SNL sample of similar matrix from another SDG. No data will be qualified.

### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

It should be noted that the replicate analyses for all target analytes were performed on SNL samples of similar matrix from another SDG. No data will be qualified.

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

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

### **Detection Limits/Dilutions**

The samples were not diluted. All required detection limits were met.

### **Other QC**

EB1 was submitted on ARCOG 622039 in another SDG and was associated with the samples on ARCOG 622035 in this SDG. A field duplicate pair was submitted with ARCOG 622035. 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:** 06/23/2021



## Sample Findings Summary



AR/COC: 622035

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
<b>EPA 900.0/SW846 9310</b>			
	114927-004/MWL-BW2	ALPHA (12587-46-1)	J, MS1
	114927-004/MWL-BW2	BETA (12587-47-2)	J, MS1
	114928-004/MWL-BW2	ALPHA (12587-46-1)	J, MS1
	114928-004/MWL-BW2	BETA (12587-47-2)	J, MS1
<b>EPA 901.1</b>			
	114927-003/MWL-BW2	Americium-241 (14596-10-2)	BD, FR3
	114927-003/MWL-BW2	Cesium-137 (10045-97-3)	BD, FR3
	114927-003/MWL-BW2	Cobalt-60 (10198-40-0)	BD, FR3
	114927-003/MWL-BW2	Potassium-40 (13966-00-2)	BD, FR3
	114928-003/MWL-BW2	Americium-241 (14596-10-2)	BD, FR3
	114928-003/MWL-BW2	Cesium-137 (10045-97-3)	BD, FR3
	114928-003/MWL-BW2	Cobalt-60 (10198-40-0)	BD, FR3
	114928-003/MWL-BW2	Potassium-40 (13966-00-2)	BD, FR3
<b>EPA 906.0 Modified</b>			
	114927-005/MWL-BW2	Tritium (10028-17-8)	BD, FR3
	114928-005/MWL-BW2	Tritium (10028-17-8)	BD, FR3
<b>SW846 8260B DOE-AL</b>			
	114926-001/MWL-FB1	Chloroethane (75-00-3)	UJ, MS3
	114926-001/MWL-FB1	Dichlorodifluoromethane (75-71-8)	UJ, C3,MS3
	114927-001/MWL-BW2	Chloroethane (75-00-3)	UJ, MS3
	114927-001/MWL-BW2	Dichlorodifluoromethane (75-71-8)	UJ, C3,MS3
	114928-001/MWL-BW2	Chloroethane (75-00-3)	UJ, MS3
	114928-001/MWL-BW2	Dichlorodifluoromethane (75-71-8)	UJ, C3,MS3
	114929-001/MWL-TB1	Chloroethane (75-00-3)	UJ, MS3
	114929-001/MWL-TB1	Dichlorodifluoromethane (75-71-8)	UJ, C3,MS3

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
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All other analyses met QC acceptance criteria; no further data should be qualified.

## Sandia Data Validation Summary Worksheet

ARCOG#: 622035	Site/Project: MWL LTMMP	Validation Date: 06/22/2021
SDG #: 544248	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 14	CVR present: Yes
ARCOG(s) present: Yes	Sample Container Integrity: OK	
Analysis Type: <input checked="" type="checkbox"/> Organic <input checked="" type="checkbox"/> Metals <input type="checkbox"/> Genchem <input checked="" 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<2 X HT	Analysis≥2 X HT
None								

Comments: Collected 05/11/2021

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

EB1 was submitted on ARCOG 622039 in another SDG and was associated with the samples on ARCOG 622035 in this SDG.

Validated by:



## Sandia Organic Worksheet (GC/MS VOC)

ARCOG #(s): 622035	SDG: 544248	Matrix: Aqueous
Laboratory Sample IDs: 544248001, -002, -008, -014		
Method/Batch #s: <b>8260B</b> 2130835	Tuning (pass/fail): pass	TICs Required? (yes/no): no

[illegible]

### Surrogate Recovery Outliers

<b>Sample ID</b>	<b>1,2-DCA-d4 %R</b>	<b>Toluene-d8 %R</b>	<b>BFB %R</b>		<b>Sample ID</b>	<b>1,2-DCA-d4 %R</b>	<b>Toluene-d8 %R</b>	<b>BFB %R</b>	
None									

## IS Outliers

[illegible]

Comments: HTs OK.

MS/MSD on -002

VOA6.I 04/09/21 Linear: Methylene chloride (= to MDL not >, no data qualified)



## Sandia Inorganic Metals Worksheet

ARCOG #(s): 622035	SDG #(s): 544248	Matrix: Aqueous
Laboratory Sample IDs: 544248003, -009		
Method/Batch #: <b>3005A/6020B</b> : 2127107/2127108		

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 544086 -010	
	Int. ug/L	R <sup>2</sup>	ICV	CCV	ICB ug/L	CCB ug/L											
U	NA	✓	✓	✓	✓	0.068J	✓	0.00034	✓	✓	✓	✓	NA	NA	✓	✓	

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 -003.  
Al, Ca, Fe Mg all <ICSA in samples -003 and -009

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS/D %R	MS %R	MSD %R	MS/ MSD RER	Lab Rep. RER	EB1			
none													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	
NA													

Tritium: DUP and MS on SNL sample 544086006

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

544248

Internal Lab

Page 1 of 2

Batch No. <u>N/A</u>		SMO Use		AR/COC <b>622035</b>								
Project Name: MWL LTMMMP		Date Samples Shipped: <u>5/11/2021</u>		SMO Authorization: <u>[Signature]</u>								
Project/Task Manager: Timmie Jackson		Carrier/Waybill No: <u>329898</u>		SMO Contact Phone: <u>Wendy Palencia/505-844-3132</u>								
Project/Task Number: 195122.10.11.08		Lab Contact: Zac Worsham/843-300-4224		Send Report to SMO: <u>Stephanie Montaño/505-284-2553</u>								
Service Order: CF01-21		Lab Destination: GEL		Contract No.: 1983530								
Tech Area:				<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius								
Building:		Room:		Operational Site:								
Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154												
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
114926	001	MWL-FB1	NA	5/11/21 10:00	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMMP (SW846-8260B)	001
114927	001	MWL-BW2	496	5/11/21 10:26	GW	G	3x40 ml	HCl	G	SA	VOC-LTMMMP (SW846-8260B)	002
114927	002	MWL-BW2	496	5/11/21 10:28	GW	P	500 ml	HNO3	G	SA	METALS, LTMMMP - Cd, Cr, Ni, U	003
114927	003	MWL-BW2	496	5/11/21 10:30	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	004
114927	004	MWL-BW2	496	5/11/21 10:32	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900)	005
114927	005	MWL-BW2	496	5/11/21 10:34	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	006
114927	006	MWL-BW2	496	5/11/21 10:36	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	007
114928	001	MWL-BW2	496	5/11/21 10:27	GW	G	3x40 ml	HCl	G	DU	VOC-LTMMMP (SW846-8260B)	008
114928	002	MWL-BW2	496	5/11/21 10:29	GW	P	500 ml	HNO3	G	DU	METALS, LTMMMP - Cd, Cr, Ni, U	009
114928	003	MWL-BW2	496	5/11/21 10:31	GW	P	1 L	HNO3	G	DU	GAMMA SPEC, SHORT LIST (EPA 901)	010
Last Chain: <input type="checkbox"/> Yes			Sample Tracking			SMO Use			Special Instructions/QC Requirements:			Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes			Date Entered:						EDD <input checked="" type="checkbox"/> Yes			
Background: <input type="checkbox"/> Yes			Entered by:						Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day			
Confirmatory: <input type="checkbox"/> Yes			QC inits.:						Negotiated TAT <input type="checkbox"/>			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			Return Samples By:			Lab Use
	William Gibson	<u>[Signature]</u>	<u>WG</u>	SNL/08888/505-284-3307/505-239-7367								
	Robert Lynch	<u>[Signature]</u>	<u>RL</u>	SNL/08888/505-844-4013/505-250-7090								
	Zachary Tenorio	<u>[Signature]</u>	<u>ZT</u>	SNL/08888/505-845-8636/505-259-5765								
	Denisha Sanchez	<u>[Signature]</u>	<u>DS</u>	SNL/08888/505-845-7829/505-208-1375								
Relinquished by <u>Denisha Sanchez</u>		Org. <u>08888</u>	Date <u>5-11-21</u>	Time <u>1105</u>	Relinquished by		Org.	Date	Time			
Received by <u>[Signature]</u>		Org. <u>0618</u>	Date <u>5-11-21</u>	Time <u>1105</u>	Received by		Org.	Date	Time			
Relinquished by <u>[Signature]</u>		Org. <u>0618</u>	Date <u>5-11-21</u>	Time <u>1105</u>	Relinquished by		Org.	Date	Time			
Received by <u>[Signature]</u>		Org. <u>0618</u>	Date <u>5-12-21</u>	Time <u>1015</u>	Received by		Org.	Date	Time			

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

## Page 2 of 2

**622035**

Recipient Initials

**AR/COC Numbers 622036, 622039**

## Memorandum

Date: June 22, 2021

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCO: 622036 and 622039  
SDG: 544086  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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. Problems were identified with the data package that resulted in the qualification of data.

1. The initial calibration intercept was negative and  $>$  the MDL but  $\leq 3X$  the MDL for methylene chloride. The associated sample results were non-detect and will be **qualified UJ,I5**.
2. The initial calibration %RSD was  $>15\%$  but  $\leq 40\%$  and the ICV %D was  $>20\%$  but  $\leq 40\%$  with negative bias for acetone. The associated results for samples 544086001 and -009 were detects and will be **qualified J-,I3,C3**. The remaining associated sample results were non-detect and will be **qualified UJ,I3,C3**.
3. The ICV %D was  $>20\%$  but  $\leq 40\%$  with negative bias for 2-butanone. The associated result for sample -009 was a detect and will be **qualified J-,C3**.

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 except as noted above in the Summary section and as follows.

The ICV %Ds were >20% but ≤40% with negative bias for 2-butanone and 1,1,2,2-tetrachloroethane. All associated sample results, *except* the 2-butanone result for sample -009, were non-detect and since no other calibration infractions occurred for these compounds, will not be qualified.

### **Blanks**

No target analytes were detected in any of the blanks except as follows.

Acetone was detected at ≤ the PQL and chloroform, dibromochloromethane and bromodichloromethane were detected at > the PQL in FB2, sample -001 associated with sample -002. The associated sample results were non-detect and will not be qualified.

Acetone and 2-butanone were detected at ≤ the PQL and chloroform, dibromochloromethane and bromodichloromethane were detected at > the PQL in EB1, sample -009 associated with the samples submitted on ARCO 622035 in another SDG. No data from this SDG 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.

### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

### **Detection Limits/Dilutions**

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

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

TIC reports were not required.

### **Other QC**

A TB was submitted on each ARCOC. FB2 was submitted on ARCOC 622036 and was associated with the sample on the same ARCOC. EB1 was submitted on ARCOC 622039 in this SDG and was associated with the samples on ARCOC 622035 submitted in another SDG.

Mass spectra acceptability were verified during data validation and met QC acceptance criteria.

No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donovan

**Level:** I

**Date:** 06/25/2021

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## Memorandum

Date: June 22, 2021  
To: File  
From: Linda Thal  
Subject: Inorganic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCO: 622036 and 622039  
SDG: 544086  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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.

### **Laboratory Replicate**

The replicate met all QC acceptance criteria.

### **Laboratory Control Sample (LCS)**

The LCS met all QC acceptance criteria.

### **Detection Limits/Dilutions**

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

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

Results of the ICS A and AB analyses were not evaluated because the sample concentrations for Ca, Mg, Al and Fe were < those in the ICS A and AB solutions.

### **ICP Serial Dilution**

The serial dilution met all QC acceptance criteria.

### **Other QC**

EB1 was submitted on ARCOG 622039 and was associated with samples on ARCOG 622035 submitted in another SDG.

No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donovan

**Level:** I

**Date:** 06/25/2021

---

## Memorandum

Date: June 22, 2021

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCO: 622036 and 622039  
SDG: 544086  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
Analysis: RAD

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 methods EPA 901.1 (gamma spec - short list), EPA 900.0/ SW846 9310 (gross alpha/beta), SM 7500 Rn B (Rn-222) and EPA 906.0 modified (tritium). Problems were identified with the data package that resulted in the qualification of data.

#### All analyses:

1. The sample results that were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3**.

#### Rn-222:

1. The sample results that were  $\geq$  the MDA but <3X the MDA will be **qualified J,FR7**.

#### Gross alpha/beta:

1. The sample was analyzed undiluted; however, the MS/MSD analyses were diluted >5X and considered a dissimilar matrix. The associated results for sample 544086005 were > the MDA and will be **qualified J,MS1**.

### Holding Times and Preservation

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

### Quantification

All quantification criteria were met except as noted above in the Summary section.

#### **Calibration**

The case narratives stated that the instruments used were properly calibrated.

#### **Blanks**

No target analytes were detected in the blanks at concentrations  $\geq$  the MDA and 2-sigma TPU.

#### **Tracer/Carrier Recovery**

Tracer/Carriers were not a method requirement.

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

The MS and/or MSD met QC acceptance criteria except as noted above in the Summary section.

It should be noted that sample -012, an EB, will not be qualified for the diluted MS/MSD since the LCS associated with this sample may be assessed for accuracy.

#### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

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

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

#### **Detection Limits/Dilutions**

The samples were not diluted. All required detection limits were met.

#### **Other QC**

EB1 was submitted on ARCOG 622039 and was associated with the samples on ARCOG 622035 submitted in another SDG.

No other specific issues that affect data quality were identified.

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**Reviewed by:** Mary Donovan **Level:** I **Date:** 06/25/2021



## Sample Findings Summary



AR/COC: 622036, 622039

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
<b>EPA 900.0/SW846 9310</b>			
	114931-004/MWL-MW7	ALPHA (12587-46-1)	J, MS1
	114931-004/MWL-MW7	BETA (12587-47-2)	J, MS1
	114939-004/MWL-EB1	ALPHA (12587-46-1)	BD, FR3
	114939-004/MWL-EB1	BETA (12587-47-2)	BD, FR3
<b>EPA 901.1</b>			
	114931-003/MWL-MW7	Americium-241 (14596-10-2)	BD, FR3
	114931-003/MWL-MW7	Cesium-137 (10045-97-3)	BD, FR3
	114931-003/MWL-MW7	Cobalt-60 (10198-40-0)	BD, FR3
	114931-003/MWL-MW7	Potassium-40 (13966-00-2)	BD, FR3
	114939-003/MWL-EB1	Americium-241 (14596-10-2)	BD, FR3
	114939-003/MWL-EB1	Cesium-137 (10045-97-3)	BD, FR3
	114939-003/MWL-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	114939-003/MWL-EB1	Potassium-40 (13966-00-2)	BD, FR3
<b>EPA 906.0 Modified</b>			
	114931-005/MWL-MW7	Tritium (10028-17-8)	BD, FR3
	114939-005/MWL-EB1	Tritium (10028-17-8)	BD, FR3
<b>SM 7500 Rn B</b>			
	114931-006/MWL-MW7	Radon-222 (14859-67-7)	J, FR7
	114939-006/MWL-EB1	Radon-222 (14859-67-7)	BD, FR3
<b>SW846 8260B DOE-AL</b>			
	114930-001/MWL-FB2	Acetone (67-64-1)	J-, I3,C3
	114930-001/MWL-FB2	Methylene chloride (75-09-2)	UJ, I5
	114931-001/MWL-MW7	Acetone (67-64-1)	UJ, I3,C3
	114931-001/MWL-MW7	Methylene chloride (75-09-2)	UJ, I5
	114932-001/MWL- TB2	Acetone (67-64-1)	UJ, I3,C3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	114932-001/MWL- TB2	Methylene chloride (75-09-2)	UJ, I5
	114939-001/MWL-EB1	2-Butanone (78-93-3)	J-, C3
	114939-001/MWL-EB1	Acetone (67-64-1)	J-, I3,C3
	114939-001/MWL-EB1	Methylene chloride (75-09-2)	UJ, I5
	114940-001/MWL- TB5	Acetone (67-64-1)	UJ, I3,C3
	114940-001/MWL- TB5	Methylene chloride (75-09-2)	UJ, I5

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

## Sandia Data Validation Summary Worksheet

ARCOG#: 622036 and 622039	Site/Project: MWL LTMMP	Validation Date: 06/22/2021
SDG #: 544086	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 15	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 checked="" 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<2 X HT	Analysis≥2 X HT
None								

Comments: Collected 05/10/2021

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

EB1 was submitted on ARCOG 622039 in this SDG and was associated with the samples on ARCOG 622035 submitted in another SDG.

One vial for TB2 was received with headspace.

Validated by:



Comments: HTs OK. MS/MSD on -002 VOA9.I 04/09/21 Linear: Methylene chloride
---



## Sandia Inorganic Metals Worksheet

ARCOG #(s): 622036 and 622039	SDG #(s): 544086	Matrix: Aqueous
Laboratory Sample IDs: 544086003, -010		
Method/Batch #: <b>3005A/6020B</b> :2126589/2126590		

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 -010	
	Int. ug/L	R <sup>2</sup>	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 on -003.  
Al, Ca, Fe Mg all <ICSA in samples -003 and -010

[illegible]

Tritium: DUP and MS on -006

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

544086

Page 1 of 1

Internal Lab

Batch No. <i>MA</i>		SMO Use		AR/COC <b>622036</b>								
Project Name: <i>MWL LTMMP</i>		Date Samples Shipped: <i>5/10/2021</i>		SMO Authorization: <i>[Signature]</i>								
Project/Task Manager: <i>Timmie Jackson</i>		Carrier/Waybill No. <i>329837</i>		SMO Contact Phone: <i>[Signature]</i>								
Project/Task Number: <i>195122.10.11.08</i>		Lab Contact: <i>Zac Worsham/843-300-4224</i>		Wendy Palencia/505-844-3132								
Service Order: <i>CF01-21</i>		Lab Destination: <i>GEL</i>		Send Report to SMO: <i>Stephanie Montaño/505-284-2553</i>								
Contract No.: <i>1983530</i>												
Tech Area:				<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> <b>4° Celsius</b>								
Building:		Room:		Operational Site:								
				Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154								
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
114930	001	MWL-FB2	NA	5/10/21 09:11	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMP (SW846-8260B)	001
114931	001	MWL-MW7	496	5/10/21 09:44	GW	G	3x40 ml	HCl	G	SA	VOC-LTMMP (SW846-8260B)	002
114931	002	MWL-MW7	496	5/10/21 09:45	GW	P	500 ml	HNO3	G	SA	METALS, LTMMP - Cd, Cr, Ni, U	003
114931	003	MWL-MW7	496	5/10/21 09:46	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	004
114931	004	MWL-MW7	496	5/10/21 09:47	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900)	005
114931	005	MWL-MW7	496	5/10/21 09:48	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	006
114931	006	MWL-MW7	496	5/10/21 09:49	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	007
114932	001	MWL-TB2	NA	5/10/21 09:11	DIW	G	3x40 ml	HCl	G	TB	VOC-LTMMP (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		Sample Disposal		Return Samples By:		Lab Use		
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/08888/505-284-3307/505-239-7367		<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								
	Zachary Tenorio	<i>[Signature]</i>	<i>ZT</i>	SNL/08888/505-845-8636/505-259-5765								
	Denisha Sanchez	<i>[Signature]</i>	<i>DS</i>	SNL/08888/505-845-7829/505-208-1375								
Relinquished by <i>[Signature]</i>		Org. <i>8888</i>	Date <i>5/10/21</i>	Time <i>1115</i>	Relinquished by		Org.	Date	Time			
Received by <i>[Signature]</i>		Org. <i>0618</i>	Date <i>5/10/21</i>	Time <i>1115</i>	Received by		Org.	Date	Time			
Relinquished by <i>[Signature]</i>		Org. <i>0618</i>	Date <i>5/10/21</i>	Time <i>1220</i>	Relinquished by		Org.	Date	Time			
Received by <i>[Signature]</i>		Org. <i>602</i>	Date <i>5/11/21</i>	Time <i>1000</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

544086

Page 1 of 1

Internal Lab

Batch No. *N/A*

SMO Use

AR/COC 622039

Project Name: MWL LTMMMP  
 Project/Task Manager: Timmie Jackson  
 Project/Task Number: 195122.10.11.08  
 Service Order: CF01-21

Date Samples Shipped: *5/10/2021*  
 Carrier/Waybill No: *329837*  
 Lab Contact: Zac Worsham/843-300-4224  
 Lab Destination: GEL  
 Contract No.: 1983530

SMO Authorization: *[Signature]*  
 SMO Contact Phone: Wendy Palencia/505-844-3132  
 Send Report to SMO: Stephanie Montaño/505-284-2553

☐ Waste Characterization  
☐ RMA  
☐ Released by COC No.  
☒ 4° Celsius

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 Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
114939	001	MWL-EB1	NA	5/10/21 10:54	DIW	G	3x40 ml	HCl	G	EB	VOC-LTMMMP (SW846-8260B)	009
114939	002	MWL-EB1	NA	5/10/21 10:55	DIW	P	500 ml	HNO3	G	EB	METALS, LTMMMP - Cd, Cr, Ni, U	010
114939	003	MWL-EB1	NA	5/10/21 10:56	DIW	P	1 L	HNO3	G	EB	GAMMA SPEC, SHORT LIST (EPA 901)	011
114939	004	MWL-EB1	NA	5/10/21 10:57	DIW	P	1 L	HNO3	G	EB	GROSS-ALPHA/BETA (EPA 900)	012
114939	005	MWL-EB1	NA	5/10/21 10:58	DIW	AG	250 ml	NONE	G	EB	TRITIUM (EPA 906)	013
114939	006	MWL-EB1	NA	5/10/21 10:59	DIW	G	2x40 ml	NONE	G	EB	RADON (SM7500 Rn B)	014
114940	001	MWL-TB5	NA	5/10/21 10:54	DIW	G	3x40 ml	HCl	G	TB	VOC-LTMMMP (SW846-8260B)	015

Last Chain: ☐ YesValidation Req'd: ☒ YesBackground: ☐ YesConfirmatory: ☐ Yes

Sample Tracking

SMO Use

Date Entered:

Entered by:

QC inits:

Special Instructions/QC Requirements:

EDD ☒ YesTurnaround Time ☐ 7-Day\* ☐ 15-Day\* ☒ 30-DayNegotiated TAT ☐Sample Disposal ☐ Return to Client ☒ Disposal by Lab

Return Samples By:

Comments: Trip Blanks received from Lab with head space.

Conditions on Receipt

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/08888/505-284-3307/505-239-7367
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/08888/505-844-4013/505-250-7090
	Zachary Tenorio	<i>[Signature]</i>	<i>ZT</i>	SNL/08888/505-845-8636/505-259-5765
	Denisha Sanchez	<i>[Signature]</i>	<i>DS</i>	SNL/08888/505-845-7829/505-208-1375

Relinquished by *[Signature]* Org. *8888* Date *5/10/21* Time *1115*  
 Received by *[Signature]* Org. *0618* Date *5/10/21* Time *1115*  
 Relinquished by *[Signature]* Org. *0618* Date *5/10/21* Time *1220*  
 Received by *[Signature]* Org. *GEL* Date *5/11/21* Time *10:00*

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

Relinquished by \_\_\_\_\_ Org. \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
 Received by \_\_\_\_\_ Org. \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
 Relinquished by \_\_\_\_\_ Org. \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
 Received by \_\_\_\_\_ Org. \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

Lab Use

**AR/COC Numbers 622037, 622040**

## Memorandum

Date: June 21, 2021

To: File

From: Mary Donovan

Subject: GC/MS Organic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCOC: 622037 and 622040  
SDG: 544544  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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. Problems were identified with the data package that resulted in the qualification of data.

1. Sample 544544011 was analyzed beyond the method-specified holding time. The associated result for methylene chloride was a detect and will be **qualified J-,H1**. All remaining associated sample results were non-detect and will be **qualified R,H1** due to analysis beyond the holding time.
2. The ICAL intercepts were negative with absolute values > the MDL but  $\leq 3X$  the MDL for methylene chloride and dichlorodifluoromethane. The associated sample results for methylene chloride were detects < 3X the value of the intercept and will be **qualified J-,I5**. The associated sample results for dichlorodifluoromethane were non-detect and will be **qualified UJ,I5**.
3. The ICV %D was >20% and positive for methylene chloride. The associated sample results were detects and will be **qualified J+,C2**.
4. Methylene chloride was detected at  $\leq$  the PQL in both TBs. All associated sample results were detects  $\leq$  the PQL and will be **qualified 10.0U,B1**, non-detect at the PQL.

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 except as noted above in the Summary section.

### **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 ICAL intercepts were positive and > the MDL for dibromochloromethane and bromoform. The dibromochloromethane results for samples -001 and -009 were detects >3X the value of the intercept and will not be qualified. All remaining associated sample results were non-detect and will not be qualified.

The ICV and/or CCV %Ds were >20% with positive bias for dichlorodifluoromethane and carbon tetrachloride. The associated sample results were non-detect and will not be qualified.

### **Blanks**

No target analytes were detected in any of the blanks except as noted above in the Summary section and as follows. Acetone and methylene chloride were detected at  $\leq$  the PQL and bromodichloromethane, chloroform and dibromochloromethane were detected at > the PQL in FB 3, sample -001 associated with sample -002. The associated FB result for methylene chloride was qualified non-detect due to TB contamination and was not applied to the associated field sample. The remaining associated sample results were non-detect and will not be qualified.

Acetone and methylene chloride were detected at  $\leq$  the PQL and bromodichloromethane, chloroform and dibromochloromethane were detected at > the PQL in the DIW/QC sample, sample -009. The associated DIW/QC sample result for methylene chloride was qualified non-detect due to TB contamination. 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**

One TB was submitted with each ARCOC. FB3 was submitted on ARCOC 622037 and was associated with the sample on the same ARCOC. The DIW/QC sample was submitted on ARCOC 622040 and was the DI source water for equipment decontamination.

Mass spectra acceptability were verified during data validation and met QC acceptance criteria.

No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 06/22/2021



## Memorandum

Date: June 17, 2021  
To: File  
From: Mary Donovan  
Subject: Inorganic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCO: 622037 and 622040  
SDG: 544544  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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 not evaluated because the sample concentrations for Ca, Mg, Al and Fe were < those in the ICS A and AB solutions.

### **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**

The DIW/QC sample was submitted on ARCOG 622040 and was the DI source water for equipment decontamination.

No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 06/22/2021

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## Memorandum

Date: June 17, 2021

To: File

From: Mary Donovan

Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCOC: 622037  
SDG: 544544  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
Analysis: RAD

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 methods EPA 901.1 (gamma spec - short list), EPA 900.0/ SW846 9310 (gross alpha/beta), SM 7500 Rn B (Rn-222) and EPA 906.0 modified (tritium). Problems were identified with the data package that resulted in the qualification of data.

#### Gamma spec and tritium:

1. The sample results that were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3**.

#### Gamma spec:

1. The K-40 result for sample 544544004 was rejected by the laboratory due to the peak not meeting identification criteria and will be **qualified R,Z2**.

#### Gross alpha/beta:

1. The sample was analyzed undiluted; however, the MS/MSD analyses were performed on an SNL sample from another SDG diluted >5X and considered a dissimilar matrix. The associated sample results were > the MDA and will be **qualified J,MS1**.

### Holding Times and Preservation

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

### Quantification

All quantification criteria were met except as noted above in the Summary section.

#### **Calibration**

The case narratives stated that the instruments used were properly calibrated.

#### **Blanks**

No target analytes were detected in the blanks at concentrations  $\geq$  the MDA and 2-sigma TPU.

#### **Tracer/Carrier Recovery**

Tracer/Carriers were not a method requirement.

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

The MS and/or MSD met QC acceptance criteria except as noted above in the Summary section.

It should be noted that the MS analysis for tritium was performed on an SNL sample of similar matrix from another SDG. No data will be qualified.

#### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

It should be noted that the replicate analyses for all analytes were performed on SNL samples of similar matrix from other SDGs. No data will be qualified.

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

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

#### **Detection Limits/Dilutions**

The sample was not diluted. All required detection limits were met.

#### **Other QC**

No other specific issues that affect data quality were identified.

---

**Reviewed by:** Linda Thal **Level:** I **Date:** 06/22/2021

## Sandia Data Validation Summary Worksheet

ARCOG#: 622037 and 622040	Site/Project: MWL LTMMP	Validation Date: 06/17/2021
SDG #: 544544	Laboratory: GEL Laboratories, LLC	Validator: Mary Donovan
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 checked="" 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
114942-001 MWL-TB6	544544011	VOC	HCl	05/12/21 09:05	NA	05/27/21 00:38	yes	no

Comments: Collected: 05/12 and 05/13/2021

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

DIW/QC was submitted on ARCOG 622040 and was the DI source water for equipment decontamination.

Validated by:

*Mary A. Donovan*

[illegible]

Revised 7/2015

## Sandia Inorganic Metals Worksheet

ARCO #s: 622037 and 622040	SDG #(s): 544544	Matrix: Aqueous
Laboratory Sample IDs: 544544003, -010		
Method/Batch #s: <b>3005A/6020B</b> :2130381/2130382		

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 -010	
	Int. ug/L	R <sup>2</sup>	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 544486003.  
Al, Ca, Fe Mg all <ICSA in samples -003 and -010

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS/D %R	MS %R	MSD %R	MS/ MSD RER	Lab Rep. RER				
none													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	
NA													

Tritium: DUP and MS on SNL sample 544086006



CONTRACT LABORATORY  
ANALYSIS REQUEST AND CHAIN OF CUSTODY

544544

Internal Lab

Batch No. *N/A*

SMO Use

AR/COC

622037

Page 1 of 1

Project Name: MWL LTMMMP  
Project/Task Manager: Timmie Jackson  
Project/Task Number: 195122.10.11.08  
Service Order: CF01-21

Date Samples Shipped: *5/13/2021*  
Carrier/Waybill No: *330197*  
Lab Contact: Zac Worsham/843-300-4224  
Lab Destination: GEL  
Contract No.: 1983530

SMO Authorization: *[Signature]*  
SMO Contact Phone: Wendy Palencia/505-844-3132  
Send Report to SMO: Stephanie Montaño/505-284-2553

☐ Waste Characterization  
☐ RMA  
☐ Released by COC No. ☒ 4° Celsius

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

Tech Area:		Stephanie Winkler/365-264-2555										Pin 10 - Sandia National Laboratories (Accounts Payable),			
Building:		Room:		Operational Site:										P.O. Box 5800, MS-0154	
														Albuquerque, NM 87185-0154	
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID			
						Type	Volume								
114933	001	MWL-FB3	NA	5/13/21 09:28	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMMP (SW846-8260B)	001			
114934	001	MWL-MW8	497	5/13/21 09:35	GW	G	3x40 ml	HCl	G	SA	VOC-LTMMMP (SW846-8260B)	002			
114934	002	MWL-MW8	497	5/13/21 09:36	GW	P	500 ml	HNO3	G	SA	METALS, LTMMMP - Cd, Cr, Ni, U	003			
114934	003	MWL-MW8	497	5/13/21 09:37	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	004			
114934	004	MWL-MW8	497	5/13/21 09:38	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900)	005			
114934	005	MWL-MW8	497	5/13/21 09:39	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	006			
114934	006	MWL-MW8	497	5/13/21 09:40	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	007			
114935	001	MWL-TB3	NA	5/13/21 09:28	DIW	G	3x40 ml	HCl	G	TB	VOC-LTMMMP (SW846-8260B)	008			

\* Last Chain: ☒ Yes  
Validation Req'd: ☒ Yes  
Background: ☐ Yes  
Confirmatory: ☐ Yes

Sample Tracking  
Date Entered:  
Entered by:  
QC Inits.:

SMO Use  
Special Instructions/QC Requirements:  
EDD ☒ Yes  
Turnaround Time ☐ 7-Day\* ☐ 15-Day\* ☒ 30-Day  
Negotiated TAT ☐  
Sample Disposal ☐ Return to Client ☒ Disposal by Lab  
Return Samples By:  
Comments: Trip Blanks received from Lab with head space.

Conditions on Receipt

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/08888/505-284-3307/505-239-7367
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/08888/505-844-4013/505-250-7090
	Zachary Tenorio	<i>[Signature]</i>	<i>ZT</i>	SNL/08888/505-845-8636/505-259-5765
	Denisha Sanchez	<i>[Signature]</i>	<i>DS</i>	SNL/08888/505-845-7829/505-208-1375

Relinquished by: <i>[Signature]</i>	Org. <i>8888</i>	Date <i>5-13-21</i>	Time <i>1015</i>	Relinquished by:	Org.	Date	Time
Received by: <i>[Signature]</i>	Org. <i>0618</i>	Date <i>5-13-21</i>	Time <i>1015</i>	Received by:	Org.	Date	Time
Relinquished by: <i>[Signature]</i>	Org. <i>0618</i>	Date <i>5-13-21</i>	Time <i>1115</i>	Relinquished by:	Org.	Date	Time
Received by: <i>[Signature]</i>	Org.	Date <i>5-14-21</i>	Time <i>800</i>	Received by:	Org.	Date	Time

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

## AOP 95-16

544 544

Batch No. *NA*

AR/COC	622040
--------	--------

[illegible]

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

**AR/COC Number 622038**

## Memorandum

Date: June 23, 2021

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCOC: 622038  
SDG: 544486  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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. 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 MDL but  $\leq 3X$  the MDL for methylene chloride. The associated sample results were detects  $< 3X$  the absolute value of the intercept and will be **qualified J-,I5**.
2. The initial calibration intercept was negative with an absolute value  $>$  the MDL but  $\leq 3X$  the MDL for dichlorodifluoromethane. The associated sample results were non-detect and will be **qualified UJ,I5**.
3. The ICV %D was  $> 20\%$  and positive for methylene chloride. The associated sample results were detects and will be **qualified J+,C2**.
4. Methylene chloride was detected at  $\leq$  the PQL in TB4, sample 544486008, associated with samples -001 and -002. The associated sample results were detects  $\leq$  the PQL and will be **qualified 10U,B1**.

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 except as noted above in the Summary section and as follows.

The initial calibration intercepts were positive and  $>$  the MDL for dibromochloromethane and bromoform. The dibromochloromethane result for sample -001 was a detect  $>3X$  the value of the intercept and will not be qualified. All remaining associated sample results were non-detect and will not be qualified.

The ICV and/or CCV %Ds were  $>20\%$  and positive for dichlorodifluoromethane and carbon tetrachloride. The associated sample results were non-detect and will not be qualified.

### **Blanks**

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

Acetone and methylene chloride were detected at  $\leq$  the PQL and chloroform, dibromochloromethane and bromodichloromethane were detected at  $>$  the PQL in FB4, sample -001 associated with sample -002. The associated methylene chloride results in the FB and field sample were qualified non-detect due to TB contamination. The remaining 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 analyses were performed on an SNL sample of similar matrix from another SDG. No data will be qualified.

### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

### **Detection Limits/Dilutions**

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

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

TIC reports were not required.

### **Other QC**

A TB was submitted on the ARCOC. FB4 was submitted on ARCOC 622038 and was associated with the sample on the same ARCOC.

Mass spectra acceptability were verified during data validation and met QC acceptance criteria.

No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donovan **Level:** I **Date:** 06/23/2021

## Memorandum

Date: June 23, 2021  
To: File  
From: Linda Thal  
Subject: Inorganic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCO: 622038  
SDG: 544486  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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.

**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 not evaluated because the sample concentrations for Ca, Mg, Al and Fe were < those in the ICS A and AB solutions.

**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:** 06/23/2021



## Memorandum

Date: June 23, 2021

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCO: 622038  
SDG: 544486  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
Analysis: RAD

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 methods EPA 901.1 (gamma spec - short list), EPA 900.0/ SW846 9310 (gross alpha/beta), SM 7500 Rn B (Rn-222) and EPA 906.0 modified (tritium). Problems were identified with the data package that resulted in the qualification of data.

#### Gamma spec and tritium:

1. The sample results that were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3**.

#### Gross alpha/beta:

1. The sample was analyzed undiluted; however, the MS/MSD analyses were performed on an SNL sample from another SDG diluted >5X and considered a dissimilar matrix. The associated sample results were > the MDA and will be **qualified J,MS1**.

### Holding Times and Preservation

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

### Quantification

All quantification criteria were met except as noted above in the Summary section.

### Calibration

The case narratives stated that the instruments used were properly calibrated.

### **Blanks**

No target analytes were detected in the blanks at concentrations  $\geq$  the MDA and 2-sigma TPU.

### **Tracer/Carrier Recovery**

Tracer/Carriers were not a method requirement.

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

The MS and/or MSD met QC acceptance criteria except as noted above in the Summary section.

It should be noted that the MS analysis for tritium was performed on an SNL sample of similar matrix from another SDG. No data will be qualified.

### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

It should be noted that the replicate analyses for all target analytes *except* Rn-222 were performed on SNL samples of similar matrix from another SDG. No data will be qualified.

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

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

### **Detection Limits/Dilutions**

The sample was not diluted. All required detection limits were met.

### **Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donovan **Level:** I **Date:** 06/23/2021



## Sample Findings Summary



AR/COC: 622038

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	114937-004/MWL-MW9	ALPHA (12587-46-1)	J, MS1
	114937-004/MWL-MW9	BETA (12587-47-2)	J, MS1
EPA 901.1			
	114937-003/MWL-MW9	Americium-241 (14596-10-2)	BD, FR3
	114937-003/MWL-MW9	Cesium-137 (10045-97-3)	BD, FR3
	114937-003/MWL-MW9	Cobalt-60 (10198-40-0)	BD, FR3
	114937-003/MWL-MW9	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	114937-005/MWL-MW9	Tritium (10028-17-8)	BD, FR3
SW846 8260B DOE-AL			
	114936-001/MWL-FB4	Dichlorodifluoromethane (75-71-8)	UJ, I5
	114936-001/MWL-FB4	Methylene chloride (75-09-2)	10UJ, B1,I5,C2
	114937-001/MWL-MW9	Dichlorodifluoromethane (75-71-8)	UJ, I5
	114937-001/MWL-MW9	Methylene chloride (75-09-2)	10UJ, B1,I5,C2
	114938-001/MWL-TB4	Dichlorodifluoromethane (75-71-8)	UJ, I5
	114938-001/MWL-TB4	Methylene chloride (75-09-2)	J, I5,C2

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

## Sandia Data Validation Summary Worksheet

ARCOG#: 622038	Site/Project: MWL LTMMP	Validation Date: 06/23/2021
SDG #: 544486	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 checked="" 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<2 X HT	Analysis≥2 X HT
None								

Comments: Collected 05/12/2021

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

Validated by:

*L Thal*

[illegible][illegible][illegible]

<p><u>Comments:</u> HTs OK. MS/MSD on SNL sample 545362002<sup>1</sup> VOAA.I 05/19/21 Linear: Dichlorodifluoromethane; Methylene chloride; Dibromochloromethane; Bromoform</p>
---

## Sandia Inorganic Metals Worksheet

ARCO #s: 622038	SDG #(s): 544486	Matrix: Aqueous
Laboratory Sample IDs: 544486003		
Method/Batch #s: <b>3005A/6020B</b> : 2130381/2130382		

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 <sup>2</sup>	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 -003.  
Al, Ca, Fe Mg all <ICSA in sample -003

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS/D %R	MS %R	MSD %R	MS/ MSD RER	Lab Rep. RER				
none													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	
NA													

Tritium: DUP and MS on SNL sample 544086006

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

544486

Page 1 of 1

Internal Lab

Batch No.		SMO Use		<b>AR/COC</b>		<b>622038</b>									
Project Name: MWL LTMMMP		Date Samples Shipped:		SMO Authorization:		<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									
Project/Task Manager: Timmie Jackson		Carrier/Waybill No.		SMO Contact Phone:											
Project/Task Number: 195122.10.11.08		Lab Contact: Zac Worsham/843-300-4224		Wendy Palencia/505-844-3132											
Service Order: CF01-21		Lab Destination: GEL		Send Report to SMO:											
		Contract No.: 1983530		Stephanie Montaña/505-284-2553											
Tech Area:															
Building:		Room:		Operational Site:											
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID			
114936	001	MWL-FB4 ✓	NA	5/12/21 09:04 ✓	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMMP (SW846-8260B) ✓	001			
114937	001	MWL-MW9	497	5/12/21 09:54 ✓	GW	G	3x40 ml	HCl	G	SA	VOC-LTMMMP (SW846-8260B)	002			
114937	002	MWL-MW9	497	5/12/21 09:56 ✓	GW	P	500 ml	HNO3	G	SA	METALS, LTMMMP - Cd, Cr, Ni, U ✓	003			
114937	003	MWL-MW9	497	5/12/21 09:57 ✓	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901) ✓	004			
114937	004	MWL-MW9	497	5/12/21 09:58 ✓	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900) ✓	005			
114937	005	MWL-MW9	497	5/12/21 09:59 ✓	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906) ✓	006			
114937	006	MWL-MW9	497	5/12/21 09:55 ✓	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B) ✓	007			
114938	001	MWL-TB4 ✓	NA	5/12/21 09:04 ✓	DIW	G	3x40 ml	HCl	G	TB	VOC-LTMMMP (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		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			Lab Use			
	William Gibson				WJG		SNL/08888/505-284-3307/505-239-7367		Return Samples By:						
	Robert Lynch				RL		SNL/08888/505-844-4013/505-250-7090		Comments: Trip Blanks received from Lab with head space.						
	Denisha Sanchez				DS		SNL/08888/505-845-7829/505-208-1375								
	Zachary Tenorio				ZT		SNL/08888/505-845-8636/505-259-5765								
Relinquished by		Org. 08888		Date 5-12-21		Time 1135		Relinquished by		Org.		Date		Time	
Received by Danny Ferrero		Org. 0618		Date 5/12/2021		Time 1035		Received by		Org.		Date		Time	
Relinquished by Danny Ferrero		Org. 0618		Date 5/12/2021		Time 1135		Relinquished by		Org.		Date		Time	
Received by		Org.		Date 5/13/21		Time 750		Received by		Org.		Date		Time	

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



## **Contract Verification Review Forms**

### **Mixed Waste Landfill**

#### **Groundwater Monitoring May 2021**

<b>AR/COC Number</b>	<b>Sample Type</b>
622035	Environmental & Quality Control
622036	Environmental & Quality Control
622037	Environmental & Quality Control
622038	Environmental & Quality Control
622039	Quality Control
622040	Quality Control

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.

## Contract Verification Form (CVR)

Project Leader JACKSON

Project Name MWL LTMMMP

Project/Task No. 195122\_10.11.08

ARCOC No. 622035

Analytical Lab GEL

SDG No. 544248

*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	X		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples		X	Dichlorodifluoromethane failed recovery limits for LCS (QC1204827555)
	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	Dichlorodifluoromethane failed recovery limits for PS/PSD (QC1204827557/558). Chloroethane failed recovery limits for PS (QC1204827557).
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	X		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Acetone, bromodichloromethane, chloroform and dibromochloromethane detected in MWL-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	X		
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: 06-16-2021 14:23:00

Closed by: Wendy Palencia Date: 06-16-2021 14:23:00

## Contract Verification Form (CVR)

Project Leader JACKSON

Project Name MWL LTMMMP

Project/Task No. 195122\_10.11.08

ARCOC No. 622036 &amp; 622039

Analytical Lab GEL

SDG No. 544086

*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	X		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy 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	X		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Bromodichloromethane, chloroform and dibromochloromethane detected in MWL-FB2. Acetone, 2-butanone, bromodichloromethane, chloroform and dibromochloromethane detected in MWL-EB1.
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	X		
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: 06-16-2021 15:53:00

Closed by: Wendy Palencia Date: 06-16-2021 15:53:00

## Contract Verification Form (CVR)

Project Leader JACKSON

Project Name MWL LTMMMP

Project/Task No. 195122\_10.11.08

ARCOC No. 622037 &amp; 622040

Analytical Lab GEL

SDG No. 544544

*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	X		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met		X	VOC sample 114942-001 analyzed past holding time
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	X		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Acetone, bromodichloromethane, chloroform, dibromochloromethane and methylene chloride detected in MWL-FB3 and DIW/QC. Methylene chloride detected in MWL-TB3 and MWL-TB6.
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	X		
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: 06-16-2021 13:17:00

Closed by: Wendy Palencia Date: 06-16-2021 13:17:00



## Contract Verification Form (CVR)

Project Leader JACKSON

Project Name MWL LTMMMP

Project/Task No. 195122\_10.11.08

ARCOC No. 622038

Analytical Lab GEL

SDG No. 544486

*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	X		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy 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	X		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Acetone, bromodichloromethane, chloroform, dibromochloromethane and methylene chloride detected in MWL-FB4. Methylene chloride detected in MWL-TB4.
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	X		
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: 06-16-2021 11:42:00

Closed by: Wendy Palencia Date: 06-16-2021 11:42:00

## **Field Sampling Forms**

**November 2021 Groundwater Monitoring**

**FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION**

SNL/NM Project Name: MWL		
Well ID: MWL-BW2	Date: 11/01/21	Date:
Pump Method: Portable	Pump Depth: 496'	

**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)
481.83	0843	Start	-----	-----	-----	-----	-----	-----	-----
484.19	0911	5	18.25	673.80	196.8	7.32	0.33	19.43	1.64
485.12	0932	10	19.05	672.65	168.3	7.37	1.88	20.62	1.72
486.44	0952	15	20.10	699.56	153.9	7.36	1.42	18.43	1.50
487.29	1004	18	20.28	705.87	147.0	7.36	1.44	21.92	1.78
487.79	1012	20	20.25	704.20	147.1	7.37	1.62	24.23	1.97
488.35	1019	22	20.13	700.13	148.3	7.38	2.09	27.74	2.27
488.84	1027	24	20.17	701.45	150.5	7.38	2.21	33.71	2.76
489.34	1036	26	20.13	698.65	153.5	7.39	2.02	38.70	3.15
489.51	1040	27	20.18	698.30	154.4	7.40	1.86	39.00	3.17
489.62	1045	28	20.20	697.18	155.6	7.41	1.92	37.86	3.06
489.71	1050	29	20.23	695.65	156.9	7.41	1.88	36.58	2.97
489.84	1055	30	20.62	702.26	157.5	7.42	1.90	35.22	2.84
	1056	Sampling →							

Comments:

~ 2 gals purged from tubing @ 0852

## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

SNL/NM Project Name: MWL		
Well ID: MWL-MW7	Date: 11/02/21	Date:
Pump Method: Portable	Pump Depth: 496'	

## PURGE MEASUREMENTS

[illegible]

Comments:

~ 2 gals purged from tubing @ 0849



SNL/NM Project Name: MWL		
Well ID: MWL-MW8	Date: 11/04/21	Date:
Pump Method: Portable	Pump Depth: 497'	

[illegible]

~ 2 gals purged from tubing @ 0851

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## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

SNL/NM Project Name: MWL		
Well ID: MWL-MW9	Date: 11/03/21	Date:
Pump Method: Portable	Pump Depth: 497'	

## PURGE MEASUREMENTS

[illegible]

Comments:

~ 2 gals purged from tubing @ 0848

## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: <b>MWL</b>						
Calibrations done by: <b>R Lynch</b>				Date: <b>11/01/21</b>		
Make & Model: <b>In-Situ Aqua Troll 600</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>571114</b>						
Other (SN): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>7.00</b>			pH sloped to (std): <b>10.00</b>			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time (24 hr):	<b>0636</b>	<b>4.00</b>	<b>21.78</b>	<b>7.02</b>	<b>22.25</b>	<b>10.04</b>
2. Time (24 hr):	<b>1308</b>	<b>4.00</b>	<b>22.99</b>	<b>7.01</b>	<b>23.07</b>	<b>10.02</b>
3. Time (24 hr):						
4. Time (24 hr):						
Standard Lot No.:	<b>1GC758</b>		<b>1GD1201</b>		<b>1GE278</b>	
Expiration Date.:	<b>MAR/23</b>		<b>APR/23</b>		<b>MAY/23</b>	
<b>SC Calibration/Check</b>			<b>ORP Calibration/Check</b>			
Reference Value: <b>1413 uS/cm @ 25 C</b>			Reference Value: <b>220 mV</b>			
	Value	Temp		Value	Temp	
1. Time (24 hr):	<b>0637</b>	<b>1314.3</b>	<b>21.47</b>	1. Time (24 hr):	<b>0625</b>	<b>220.0</b>
2. Time (24 hr):	<b>1306</b>	<b>1342.4</b>	<b>22.01</b>	2. Time (24 hr):	<b>1305</b>	<b>223.4</b>
3. Time (24 hr):				3. Time (24 hr):		
4. Time (24 hr):				4. Time (24 hr):		
Standard Lot No.:	<b>1GE263</b>		Expiration Date.:	<b>MAY/22</b>		Standard Lot No.:
				<b>JAN/22</b>		
<b>DO Calibration/Check</b>						
Calibration Value:	81% air saturation @ 5200 ft.			Atmospheric Pressure in Hg		
1. Time (24 hr):	<b>0624</b>	<b>100.28</b>		<b>27.02</b>		
2. Time (24 hr):	<b>1304</b>	<b>101.34</b>		<b>26.91</b>		
3. Time (24 hr):						
4. Time (24 hr):						

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

SNL/NM Project Name: MWL				
Calibration done by: R Lynch			Date: 11/01/21	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 21090D000519	
Reference Value	10	20	100	800
Standard Lot No.	A1215R	A1215R	A1205	A1243
1. Time (24 hr): 0626	9.98	21.1	111	876
2. Time (24 hr): 1303	9.99	20.5	109	893
3. Time (24 hr):				
4. Time (24 hr):				
Comments:				

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## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: <b>MWL</b>						
Calibrations done by: <b>R Lynch</b>				Date: <b>11/02/21</b>		
Make & Model: <b>In-Situ Aqua Troll 600</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>571114</b>						
Other (SN): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>NA</b>			pH sloped to (std): <b>NA</b>			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time (24 hr):	<b>0624</b>	<b>4.00</b>	<b>22.68</b>	<b>7.01</b>	<b>21.72</b>	<b>10.02</b>
2. Time (24 hr):	<b>1254</b>	<b>3.99</b>	<b>22.20</b>	<b>7.02</b>	<b>22.25</b>	<b>10.03</b>
3. Time (24 hr):						
4. Time (24 hr):						
Standard Lot No.:	<b>1GC758</b>		<b>1GD1201</b>		<b>1GE278</b>	
Expiration Date.:	<b>MAR/23</b>		<b>APR/23</b>		<b>MAY/23</b>	
<b>SC Calibration/Check</b>			<b>ORP Calibration/Check</b>			
Reference Value: <b>1413 uS/cm @ 25 C</b>			Reference Value: <b>220 mV</b>			
	Value	Temp		Value	Temp	
1. Time (24 hr):	<b>0622</b>	<b>1321.3</b>	<b>21.56</b>	1. Time (24 hr):	<b>0621</b>	<b>223.8</b>
2. Time (24 hr):	<b>1252</b>	<b>1334.2</b>	<b>22.18</b>	2. Time (24 hr):	<b>1251</b>	<b>225.4</b>
3. Time (24 hr):				3. Time (24 hr):		
4. Time (24 hr):				4. Time (24 hr):		
Standard Lot No.:	<b>1GE263</b>		Expiration Date.:	<b>MAY/22</b>		Standard Lot No.:
				<b>1GD902</b>		Expiration Date.:
				<b>JAN/22</b>		
<b>DO Calibration/Check</b>						
Calibration Value:	81% air saturation @ 5200 ft.			Atmospheric Pressure in Hg		
1. Time (24 hr):	<b>0620</b>	<b>100.53</b>		<b>26.87</b>		
2. Time (24 hr):	<b>1250</b>	<b>99.83</b>		<b>27.14</b>		
3. Time (24 hr):						
4. Time (24 hr):						

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

SNL/NM Project Name: MWL				
Calibration done by: R Lynch			Date: 11/02/21	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 21090D000519	
Reference Value	10	20	100	800
Standard Lot No.	A1215R	A1215R	A1205	A1243
1. Time (24 hr): 0620	9.95	19.7	101	834
2. Time (24 hr): 1249	9.98	19.9	102	829
3. Time (24 hr):				
4. Time (24 hr):				
Comments:				

## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: <b>MWL</b>						
Calibrations done by: <b>R Lynch</b>				Date: <b>11/03/21</b>		
Make & Model: <b>In-Situ Aqua Troll 600</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>571114</b>						
Other (SN): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>NA</b>				pH sloped to (std): <b>NA</b>		
Reference value:		4.00		7.00		10.00
	Value	Temp	Value	Temp	Value	Temp
1. Time (24 hr):	<b>0629</b>	<b>3.98</b>	<b>21.25</b>	<b>7.01</b>	<b>21.30</b>	<b>10.01</b>
2. Time (24 hr):	<b>1324</b>	<b>3.99</b>	<b>22.09</b>	<b>7.00</b>	<b>22.12</b>	<b>10.03</b>
3. Time (24 hr):						
4. Time (24 hr):						
Standard Lot No.:		<b>1GC758</b>		<b>1GD1201</b>		<b>1GE278</b>
Expiration Date.:		<b>MAR/23</b>		<b>APR/23</b>		<b>MAY/23</b>
<b>SC Calibration/Check</b>				<b>ORP Calibration/Check</b>		
Reference Value: <b>1413 uS/cm @ 25 C</b>				Reference Value: <b>220 mV</b>		
	Value	Temp		Value	Temp	
1. Time (24 hr):	<b>0636</b>	<b>1321.1</b>	<b>21.34</b>	1. Time (24 hr):	<b>0628</b>	<b>220.8</b>
2. Time (24 hr):	<b>1329</b>	<b>1340.1</b>	<b>22.11</b>	2. Time (24 hr):	<b>1323</b>	<b>220.8</b>
3. Time (24 hr):				3. Time (24 hr):		
4. Time (24 hr):				4. Time (24 hr):		
Standard Lot No.: <b>1GE263</b>		Expiration Date.: <b>MAY/22</b>		Standard Lot No.: <b>1GD902</b>		Expiration Date.: <b>JAN/22</b>
<b>DO Calibration/Check</b>						
Calibration Value:		81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time (24 hr):	<b>0627</b>	<b>99.38</b>		<b>26.97</b>		
2. Time (24 hr):	<b>1322</b>	<b>99.73</b>		<b>27.06</b>		
3. Time (24 hr):						
4. Time (24 hr):						

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

SNL/NM Project Name: <b>MWL</b>				
Calibration done by: <b>R Lynch</b>			Date: <b>11/03/21</b>	
TURBIDIMETER				
Make & Model: <b>HACH 2100Q</b>			Serial No. S/N <b>21090D000519</b>	
Reference Value	10	20	100	800
Standard Lot No.	<b>A1215R</b>	<b>A1215R</b>	<b>A1205</b>	<b>A1243</b>
1. Time (24 hr): <b>0626</b>	<b>9.98</b>	<b>19.9</b>	<b>99.6</b>	<b>829</b>
2. Time (24 hr): <b>1321</b>	<b>9.99</b>	<b>19.7</b>	<b>101</b>	<b>833</b>
3. Time (24 hr):				
4. Time (24 hr):				
Comments:				

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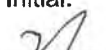
# GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG Page 1 of 2

SNL/NM Project Name: <b>MWL</b>						
Calibrations done by: <b>R Lynch</b>				Date: <b>11/04/21</b>		
Make & Model: <b>In-Situ Aqua Troll 600</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>571114</b>						
Other (SN): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>NA</b>			pH sloped to (std): <b>NA</b>			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time (24 hr):	<b>0648</b>	<b>3.98</b>	<b>22.21</b>	<b>7.01</b>	<b>22.27</b>	<b>10.01</b>
2. Time (24 hr):	<b>1303</b>	<b>3.99</b>	<b>22.31</b>	<b>7.01</b>	<b>22.35</b>	<b>10.00</b>
3. Time (24 hr):						
4. Time (24 hr):						
Standard Lot No.:	<b>1GC758</b>		<b>1GD1201</b>		<b>1GE278</b>	
Expiration Date.:	<b>MAR/23</b>		<b>APR/23</b>		<b>MAY/23</b>	
<b>SC Calibration/Check</b>			<b>ORP Calibration/Check</b>			
Reference Value: <b>1413 uS/cm @ 25 C</b>			Reference Value: <b>220 mV</b>			
	Value	Temp		Value	Temp	
1. Time (24 hr):	<b>0647</b>	<b>1338.4</b>	<b>22.26</b>	1. Time (24 hr):	<b>0646</b>	<b>222.1</b>
2. Time (24 hr):	<b>1301</b>	<b>1335.1</b>	<b>22.30</b>	2. Time (24 hr):	<b>1302</b>	<b>221.5</b>
3. Time (24 hr):				3. Time (24 hr):		
4. Time (24 hr):				4. Time (24 hr):		
Standard Lot No.:	<b>1GE263</b>		Expiration Date.:	<b>MAY/22</b>		Standard Lot No.:
				<b>JAN/22</b>		
<b>DO Calibration/Check</b>						
Calibration Value:	81% air saturation @ 5200 ft.			Atmospheric Pressure in Hg		
1. Time (24 hr):	<b>0645</b>	<b>99.87</b>	<b>27.07</b>			
2. Time (24 hr):	<b>1300</b>	<b>99.85</b>	<b>27.08</b>			
3. Time (24 hr):						
4. Time (24 hr):						

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


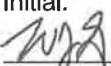
SNL/NM Project Name: MWL				
Calibration done by: R Lynch			Date: 11/04/21	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 21090D000519	
Reference Value	10	20	100	800
Standard Lot No.	A1215R	A1215R	A1205	A1243
1. Time (24 hr): 0644	9.97	19.3	97.2	853
2. Time (24 hr): 1259	10.1	19.7	99.3	861
3. Time (24 hr):				
4. Time (24 hr):				
Comments:				

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

<b>SNL/NM</b> <b>Project Name:</b> MWL	<b>Monitoring Well ID #:</b> Pre Decon	<b>Date:</b> 10/29/2021 <b>Date:</b> _____
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03.		
<b>Pump and Tubing Bundle ID #:</b> 1807B-950	<b>Water Level Indicator ID #:</b> 362721	
<b>Personnel Performing Decontamination:</b>		
Denisha Sanchez Print Name: _____ Zach Tenorio Print Name: _____	 Initial: _____  Initial: _____	
<b>Condition of Equipment</b>		
<b>Pump:</b> Good	<b>Tubing Bundle:</b> Good	<b>Water Level Indicator:</b> Excellent
<b>List of Decontamination Materials</b>		
<b>Deionized Water</b> <b>Source:</b> Culligan <b>Lot Number:</b> 09/30/21 - 10/6/21 _____ _____	<b>HNO<sub>3</sub></b> <b>Grade:</b> NA <b>UN #:</b> NA <b>Manufacturer:</b> NA <b>Lot Number:</b> NA	<b>Detergent</b> <b>Manufacturer:</b> Liquinox <b>Lot Number:</b> L1L0 <b>Expiration Date:</b> 11/22



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

<b>SNL/NM</b> <b>Project Name:</b> MWL	<b>Monitoring Well ID #:</b> MWL-BW2	<b>Date:</b> 11/1/2021 <b>Date:</b> _____
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03.		
<b>Pump and Tubing Bundle ID #:</b> 1807B-950	<b>Water Level Indicator ID #:</b> 362721	
<b>Personnel Performing Decontamination:</b>		
Robert Lynch Print Name: _____	 Initial: _____	
William Gibson Print Name: _____	 Initial: _____	
<b>Condition of Equipment</b>		
<b>Pump:</b> Good	<b>Tubing Bundle:</b> Good	<b>Water Level Indicator:</b> Excellent
<b>List of Decontamination Materials</b>		
<b>Deionized Water</b>	<b>HNO<sub>3</sub></b>	<b>Detergent</b>
<b>Source:</b> Culligan	<b>Grade:</b> NA	<b>Manufacturer:</b> liquinox
<b>Lot Number:</b> 10/22/21	<b>UN #:</b> NA	<b>Lot Number:</b> L1L0
_____	<b>Manufacturer:</b> NA	<b>Expiration Date:</b> 11/22
_____	<b>Lot Number:</b> NA	


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

<b>SNL/NM</b> <b>Project Name:</b> MWL	<b>Monitoring Well ID #:</b> MWL-MW7	<b>Date:</b> 11/2/2021 <b>Date:</b> _____
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03.		
<b>Pump and Tubing Bundle ID #:</b> 1807B-950	<b>Water Level Indicator ID #:</b> 362721	
<b>Personnel Performing Decontamination:</b>		
Zach Tenorio Print Name: _____	<div style="text-align: center;">           Initial: _____       </div>	
Denisha Sanchez Print Name: _____	<div style="text-align: center;">           Initial: _____       </div>	
<b>Condition of Equipment</b>		
<b>Pump:</b> Good	<b>Tubing Bundle:</b> Good	<b>Water Level Indicator:</b> Excellent
<b>List of Decontamination Materials</b>		
<b>Deionized Water</b> <b>Source:</b> Culligan <b>Lot Number:</b> 10/22/21 _____ _____	<b>HNO<sub>3</sub></b> <b>Grade:</b> NA <b>UN #:</b> NA <b>Manufacturer:</b> NA <b>Lot Number:</b> NA	<b>Detergent</b> <b>Manufacturer:</b> liquinox <b>Lot Number:</b> L1L0 <b>Expiration Date:</b> 11/22

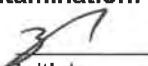
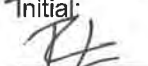
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## Portable Pump and Tubing / Water Level Indicator Decontamination Log Form

<b>SNL/NM</b> <b>Project Name:</b> <u>MWL</u>	<b>Monitoring Well ID #:</b> <u>MWL-MW8</u>	<b>Date:</b> <u>11/4/2021</u> <b>Date:</b> _____
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03.		
<b>Pump and Tubing Bundle ID #:</b> <u>1807B-950</u>	<b>Water Level Indicator ID #:</b> <u>362721</u>	
<b>Personnel Performing Decontamination:</b>		
<u>William Gibson</u> Print Name: _____	 Initial: _____	
<u>Denisha Sanchez</u> Print Name: _____	 Initial: _____	
<b>Condition of Equipment</b>		
<b>Pump:</b> <u>Good</u>	<b>Tubing Bundle:</b> <u>Good</u>	<b>Water Level Indicator:</b> <u>Excellent</u>
<b>List of Decontamination Materials</b>		
<b>Deionized Water</b> <b>Source:</b> <u>Culligan</u> <b>Lot Number:</b> <u>10/22/21</u> _____ _____	<b>HNO<sub>3</sub></b> <b>Grade:</b> <u>NA</u> <b>UN #:</b> <u>NA</u> <b>Manufacturer:</b> <u>NA</u> <b>Lot Number:</b> <u>NA</u>	<b>Detergent</b> <b>Manufacturer:</b> <u>liquinox</u> <b>Lot Number:</b> <u>L1L0</u> <b>Expiration Date:</b> <u>11/22</u>

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

<b>SNL/NM</b> <b>Project Name:</b> MWL	<b>Monitoring Well ID #:</b> MWL-MW9	<b>Date:</b> 11/3/2021 <b>Date:</b> _____
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03.		
<b>Pump and Tubing Bundle ID #:</b> 1807B-950	<b>Water Level Indicator ID #:</b> 362721	
<b>Personnel Performing Decontamination:</b>		
Zach Tenorio Print Name: _____	 Initial: _____	
Robert Lynch Print Name: _____	 Initial: _____	
<b>Condition of Equipment</b>		
<b>Pump:</b> Good	<b>Tubing Bundle:</b> Good	<b>Water Level Indicator:</b> Excellent
<b>List of Decontamination Materials</b>		
<b>Deionized Water</b> <b>Source:</b> Culligan <b>Lot Number:</b> 10/22/21 _____ _____	<b>HNO<sub>3</sub></b> <b>Grade:</b> NA <b>UN #:</b> NA <b>Manufacturer:</b> NA <b>Lot Number:</b> NA	<b>Detergent</b> <b>Manufacturer:</b> liquinox <b>Lot Number:</b> L1L0 <b>Expiration Date:</b> 11/22

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**Summary Sheet For**  
**November 2021 Groundwater Samples**



**Sample Summary for Mixed Waste Landfill Groundwater Monitoring  
November 2021**

<b>Sample ID</b>	<b>Sample Date</b>	<b>ARCOC</b>	<b>Sample Number</b>	<b>Sample Type</b>	<b>Associated Equipment Blank (ARCOC #/Sample #)</b>	<b>Associated Trip Blank (ARCOC #/ Sample #)</b>	<b>Associated Field Blank (ARCOC #/ Sample #)</b>	<b>Comments</b>
<b>GEL Analytical Data: Project Task # 195122.10.11.08, Service Order # CF01-22</b>								
MWL-BW2	1-Nov-21	622632	116167	Environmental	n/a	622632 / 116168	622632 / 116166	
MWL-MW7	2-Nov-21	622633	116170	Environmental	n/a	622633 / 116171	622633 / 116169	
MWL-MW8	4-Nov-21	622636	116179	Environmental	n/a	622636 / 116180	622636 / 116178	
MWL-MW9	3-Nov-21	622635	116175	Environmental	622634 / 116172	622635 / 116177	622635 / 116174	
MWL-MW9	3-Nov-21	622635	116176	Duplicate	622634 / 116172	622635 / 116177	622635 / 116174	
MWL-EB1	2-Nov-21	622634	116172	Equipment Blank	n/a	622634 / 116173	n/a	Equipment blank sample prior to MWL-MW9.
MWL-FB1	1-Nov-21	622632	116166	Field Blank	n/a	622632 / 116168	n/a	at MWL-BW2
MWL-FB2	2-Nov-21	622633	116169	Field Blank	n/a	622633 / 116171	n/a	at MWL-MW7
MWL-FB3	3-Nov-21	622635	116174	Field Blank	n/a	622635 / 116177	n/a	at MWL-MW9
MWL-FB4	4-Nov-21	622636	116178	Field Blank	n/a	622636 / 116180	n/a	at MWL-MW8
MWL-DIWQC	4-Nov-21	622637	116181	Field Blank	n/a	622637 / 116182	n/a	DI source water for equipment decontamination

**Data Validation Reports For Environmental Samples**

**Groundwater Monitoring**

**November 2021**

**AR/COC Number 622632**

## Memorandum

Date: December 9, 2021

To: File

From: Mary Donovan

Subject: GC/MS Organic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCO: 622632  
SDG: 560722  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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 8260D (VOCs). All compounds were successfully analyzed. Problems were identified with the data package that resulted in the qualification of data.

1. The initial calibration intercepts were negative with absolute values  $>$  the MDL but  $\leq 3X$  the MDL for acetone and methylene chloride. All associated sample results were non-detect and will be **qualified UJ, I5**.

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

### Holding Times and Preservation

The samples were 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 except as noted above in the Summary section and as follows.

The ICV %Ds were >20% but ≤40% with negative bias for chloromethane and chloroethane. All associated sample results were non-detect and since no other calibration infractions occurred for these compounds, will not be qualified.

The CCV %Ds were >20% and positive for chloromethane, vinyl chloride and bromomethane. All associated sample results were non-detect and will not be qualified.

### **Blanks**

No target analytes were detected in any of the blanks except as follows.

Bromoform was detected at ≤ the PQL and bromodichloromethane, chloroform and dibromochloromethane were detected at > the PQL in FB 1, sample -001 associated with sample -002. 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.

### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

### **Detection Limits/Dilutions**

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

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

TIC reports were not required.

### **Other QC**

A TB was submitted on the ARCOC. FB 1 was submitted on ARCOC 622632 and was associated with the sample on the same ARCOC.

Mass spectra acceptability were verified during data validation and met QC acceptance criteria.

No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 12/10/2021

## Memorandum

Date: December 10, 2021  
To: File  
From: Mary Donovan  
Subject: Inorganic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCO: 622632  
SDG: 560722  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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 except as follows. U was detected at  $\leq$  the PQL in the MB and in a CCB associated with sample 560722003. The associated sample result was a detect  $>$  the PQL and  $> 5X$  the blank values and will not be qualified.

#### **ICP -MS Internal Standards**

The ICP-MS internal standards met QC acceptance criteria.

#### **Matrix Spike (MS)**

The MS met all QC acceptance criteria.

#### **Laboratory Replicate**

The replicate met all QC acceptance criteria.

#### **Laboratory Control Sample (LCS)**

The LCS met all QC acceptance criteria.

#### **Detection Limits/Dilutions**

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

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

Results of the ICS A and AB analyses were not evaluated because the sample concentrations for Al, Ca, Mg and Fe were  $<$  those in the ICS A and AB solutions.

#### **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:** Linda Thal

**Level:** I

**Date:** 12/10/2021

## Memorandum

Date: December 10, 2021

To: File

From: Mary Donovan

Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCOC: 622632  
SDG: 560722  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
Analysis: RAD

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 methods EPA 901.1 (gamma spec - short list), EPA 900.0/ SW846 9310 (gross alpha/beta), SM 7500 Rn B (Rn-222) and EPA 906.0 modified (tritium). Problems were identified with the data package that resulted in the qualification of data.

#### Gammascpec and tritium:

1. The sample results that were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3**.

### Holding Times and Preservation

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

### Quantification

All quantification criteria were met except as noted above in the Summary section.

### Calibration

The case narratives stated that the instruments used were properly calibrated.

### Blanks

No target analytes were detected in the blanks at concentrations  $\geq$  the MDA and 2-sigma TPU.



**Tracer/Carrier Recovery**

Tracer/Carriers were not a method requirement.

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

The MS and/or MSD met QC acceptance criteria.

**Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

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

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

**Detection Limits/Dilutions**

The sample was not diluted. All required detection limits were met.

**Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 12/10/2021

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## Sample Findings Summary



AR/COC: 622632

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 901.1			
	116167-003/MWL-BW2	Americium-241 (14596-10-2)	BD, FR3
	116167-003/MWL-BW2	Cesium-137 (10045-97-3)	BD, FR3
	116167-003/MWL-BW2	Cobalt-60 (10198-40-0)	BD, FR3
	116167-003/MWL-BW2	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	116167-005/MWL-BW2	Tritium (10028-17-8)	BD, FR3
SW846 8260D			
	116166-001/MWL - FB 1	Acetone (67-64-1)	UJ, I5
	116166-001/MWL - FB 1	Methylene chloride (75-09-2)	UJ, I5
	116167-001/MWL-BW2	Acetone (67-64-1)	UJ, I5
	116167-001/MWL-BW2	Methylene chloride (75-09-2)	UJ, I5
	116168-001/MWL- TB 1	Acetone (67-64-1)	UJ, I5
	116168-001/MWL- TB 1	Methylene chloride (75-09-2)	UJ, I5

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

## Sandia Data Validation Summary Worksheet

ARCOG#: 622632	Site/Project: MWL LTMMP	Validation Date: 12/09/2021
SDG #: 560722	Laboratory: GEL Laboratories, LLC	Validator: Mary Donovan
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 checked="" 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: 11/01/2021

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

Validated by:

*Mary A. Donovan*

## Sandia Organic Worksheet (GC/MS VOC)

ARCO #s: 622632	SDG: 560722	Matrix: Aqueous
Laboratory Sample IDs: 560722001, -002, -008		
Method/Batch #s: <b>8260D</b> 2196023	Tuning (pass/fail): pass	TICs Required? (yes/no): no

[illegible]

### Surrogate Recovery Outliers

[illegible]

## IS Outliers

[illegible]

Comments: HTs OK.

MS/MSD on sample -002

VOA3.I 10/11/21 Linear: Dichlorodifluoromethane, Chloromethane, Acetone, Methylene chloride

## Sandia Inorganic Metals Worksheet

ARCOC #(s): 622632	SDG #(s): 560722	Matrix: Aqueous
Laboratory Sample IDs: 560722003		
Method/Batch #s: <b>3005A/6020B</b> :2198208/2198210		

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 <sup>2</sup>	ICV	CCV	ICB ug/L	CCB ug/L											
U	NA	✓	✓	✓	✓	0.118J	0.000082J	0.00059 0.00041	✓	✓	✓	✓	NA	NA	✓		

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 on sample -003.  
Al, Ca, Fe Mg all <ICSA in sample -003

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS/D %R	MS %R	MSD %R	MS/ MSD RER	Lab Rep. RER				
none													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	
NA													

Tritium: DUP and MS on sample -006.

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

560722

Internal Lab

Batch No.

Page 1 of 1

Project Name: MWL LTMMMP		Date Samples Shipped: 11/1/2021		SMO Use		AR/COC 622632	
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. 338721		SMO Authorization: [Signature]		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius	
Project/Task Number: 195122.10.11.08		Lab Contact: Zac Worsham/843-300-4224		SMO Contact Phone: Wendy Palencia/505-844-3132			
Service Order: CF01-22		Lab Destination: GEL		Send Report to SMO: Stephanie Montaño/505-284-2553			
Tech Area:		Contract No.: 1983530		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					
116166	001	MWL - FB 1	NA	11/1/21 10:36	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMMP (SW846-8260D)	001
116167	001	MWL-BW2	496	11/1/21 10:56	GW	G	3x40 ml	HCl	G	SA	VOC-LTMMMP (SW846-8260D)	002
116167	002	MWL-BW2	496	11/1/21 10:57	GW	P	500 ml	HNO3	G	SA	METALS, LTMMMP - Cd, Cr, Ni, U	003
116167	003	MWL-BW2	496	11/1/21 10:58	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	004
116167	004	MWL-BW2	496	11/1/21 10:59	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900)	005
116167	005	MWL-BW2	496	11/1/21 11:00	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	006
116167	006	MWL-BW2	496	11/1/21 11:01	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	007
116168	001	MWL- TB 1	NA	11/1/21 10:36	DIW	G	3x40 ml	HCl	G	TB	VOC-LTMMMP (SW846-8260D)	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:		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				Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Return Samples By:		

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell
	William Gibson	[Signature]	WG	SNL/08888/505-284-3307/505-239-7367
	Robert Lynch	[Signature]	RL	SNL/08888/505-844-4013/505-250-7090
	Zachary Tenorio	[Signature]	ZT	SNL/08888/505-845-8636/505-259-5765

Relinquished by [Signature]		Org. 08888	Date 11/1/21	Time 1135	Relinquished by	Org.	Date	Time
Received by [Signature]		Org. 0618	Date 11/1/21	Time 1135	Received by	Org.	Date	Time
Relinquished by [Signature]		Org. 0618	Date 11/1/21	Time 1205	Relinquished by	Org.	Date	Time
Received by [Signature]		Org. GEL	Date 11/1/21	Time 0900	Received by	Org.	Date	Time

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

**AR/COC Numbers 622633, 622634**



## Memorandum

Date: December 7, 2021

To: File

From: Mary Donovan

Subject: GC/MS Organic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCO: 622633 and 622634  
SDG: 560851  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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 8260D (VOCs). All compounds were successfully analyzed. Problems were identified with the data package that resulted in the qualification of data.

1. The initial calibration intercepts were negative with absolute values  $>$  the MDL but  $\leq 3X$  the MDL for acetone and methylene chloride. The acetone result for sample 560851009 was a detect  $< 3X$  the value of the intercept and will be **qualified J-I5**. The remaining associated sample results were non-detect and will be **qualified UJ-I5**.

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

### Holding Times and Preservation

The samples were 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 except as noted above in the Summary section and as follows.

The ICV %Ds were >20% but ≤40% with negative bias for chloromethane and chloroethane. All associated sample results were non-detect and since no other calibration infractions occurred for these compounds, will not be qualified.

The CCV %Ds were >20% and positive for chloromethane, vinyl chloride and bromomethane. All associated sample results were non-detect and will not be qualified.

### **Blanks**

No target analytes were detected in any of the blanks except as follows.

Bromoform was detected at ≤ the PQL and bromodichloromethane, chloroform and dibromochloromethane were detected at > the PQL in FB 2, sample -001 associated with sample -002. The associated sample results were non-detect and will not be qualified.

Acetone was detected at ≤ the PQL and bromodichloromethane, chloroform and dibromochloromethane were detected at > the PQL in EB 1, sample -009 associated with the samples submitted on ARCO 622635 in another SDG. No data from this SDG 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**

A TB was submitted on each ARCOC. FB 2 was submitted on ARCOC 622633 and was associated with the sample on the same ARCOC. EB 1 was submitted on ARCOC 622634 in this SDG and was associated with the samples on ARCOC 622635 submitted in another SDG.

Mass spectra acceptability were verified during data validation and met QC acceptance criteria.

No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 12/08/2021

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## Memorandum

Date: December 8, 2021

To: File

From: Mary Donovan

Subject: Inorganic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCOG: 622633 and 622634  
SDG: 560851  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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 except as follows. U was detected at  $\leq$  the PQL in the MB and in a CCB associated with sample 560851003. The U result for sample -003 was a detect  $>$  the PQL and  $> 5X$  the blank values and the U result for sample -010 was non-detect. Neither sample result will be qualified.

### **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 not evaluated because the sample concentrations for Al, Ca, Mg and Fe were  $<$  those in the ICS A and AB solutions.

### **ICP Serial Dilution**

The serial dilution met all QC acceptance criteria.

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

### **Other QC**

EB 1 was submitted on ARCOG 622634 and was associated with samples on ARCOG 622635 submitted in another SDG.

No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 12/08/2021

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## Memorandum

Date: December 8, 2021

To: File

From: Mary Donovan

Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCOC: 622633 and 622634  
SDG: 560851  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
Analysis: RAD

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 methods EPA 901.1 (gamma spec - short list), EPA 900.0/ SW846 9310 (gross alpha/beta), SM 7500 Rn B (Rn-222) and EPA 906.0 modified (tritium). Problems were identified with the data package that resulted in the qualification of data.

#### All analyses:

1. The sample results that were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3**.

#### Gross beta and Rn-222:

1. The sample results that were  $\geq$  the MDA but <3X the MDA will be **qualified J,FR7**.

#### Gammascpec:

1. The K-40 results for samples 560851004 and-011 were X-flagged by the laboratory due to the peak not meeting identification criteria and will be **qualified R,Z2**.

### Holding Times and Preservation

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

### Quantification

All quantification criteria were met except as noted above in the Summary section.

### **Calibration**

The case narratives stated that the instruments used were properly calibrated.

### **Blanks**

No target analytes were detected in the blanks at concentrations  $\geq$  the MDA and 2-sigma TPU.

### **Tracer/Carrier Recovery**

Tracer/Carriers were not a method requirement.

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

The MS and/or MSD met QC acceptance criteria except as noted above in the Summary section.

It should be noted that the MS/MSD analyses for all analytes were performed on SNL samples of similar matrix from another SDG. No data will be qualified.

### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

It should be noted that the replicate analyses for all analytes were performed on SNL samples of similar matrix from another SDG. No data will be qualified.

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

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

### **Detection Limits/Dilutions**

The samples were not diluted. All required detection limits were met.

### **Other QC**

EB 1 was submitted on ARCOG 622634 and was associated with the samples on ARCOG 622635 submitted in another SDG.

No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 12/08/2021





## Sample Findings Summary



AR/COC: 622633, 622634

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	116170-004/MWL-MW7	BETA (12587-47-2)	J, FR7
	116172-004/MWL - EB 1	ALPHA (12587-46-1)	BD, FR3
	116172-004/MWL - EB 1	BETA (12587-47-2)	BD, FR3
EPA 901.1			
	116170-003/MWL-MW7	Americium-241 (14596-10-2)	BD, FR3
	116170-003/MWL-MW7	Cesium-137 (10045-97-3)	BD, FR3
	116170-003/MWL-MW7	Cobalt-60 (10198-40-0)	BD, FR3
	116170-003/MWL-MW7	Potassium-40 (13966-00-2)	R, Z2
	116172-003/MWL - EB 1	Americium-241 (14596-10-2)	BD, FR3
	116172-003/MWL - EB 1	Cesium-137 (10045-97-3)	BD, FR3
	116172-003/MWL - EB 1	Cobalt-60 (10198-40-0)	BD, FR3
	116172-003/MWL - EB 1	Potassium-40 (13966-00-2)	R, Z2
EPA 906.0 Modified			
	116170-005/MWL-MW7	Tritium (10028-17-8)	BD, FR3
	116172-005/MWL - EB 1	Tritium (10028-17-8)	BD, FR3
SM 7500 Rn B			
	116170-006/MWL-MW7	Radon-222 (14859-67-7)	J, FR7
	116172-006/MWL - EB 1	Radon-222 (14859-67-7)	BD, FR3
SW846 8260D			
	116169-001/MWL - FB 2	Acetone (67-64-1)	UJ, I5
	116169-001/MWL - FB 2	Methylene chloride (75-09-2)	UJ, I5
	116170-001/MWL-MW7	Acetone (67-64-1)	UJ, I5
	116170-001/MWL-MW7	Methylene chloride (75-09-2)	UJ, I5
	116171-001/MWL - TB 2	Acetone (67-64-1)	UJ, I5
	116171-001/MWL - TB 2	Methylene chloride (75-09-2)	UJ, I5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	116172-001/MWL - EB 1	Acetone (67-64-1)	J-, I5
	116172-001/MWL - EB 1	Methylene chloride (75-09-2)	UJ, I5
	116173-001/MWL - TB 3	Acetone (67-64-1)	UJ, I5
	116173-001/MWL - TB 3	Methylene chloride (75-09-2)	UJ, I5

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

## Sandia Data Validation Summary Worksheet

ARCOG#: 622633 and 622634	Site/Project: MWL LTMMP	Validation Date: 12/07/2021
SDG #: 560851	Laboratory: GEL Laboratories, LLC	Validator: Mary Donovan
Matrix: Aqueous	# of Samples: 15	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 checked="" 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: 11/02/2021

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

EB1 was submitted on ARCOG 622634 in this SDG and was associated with the samples on ARCOG 622635 submitted in another SDG.

Validated by:

*Mary A. Donovan*

[illegible][illegible][illegible]

VOA3.I 10/11/21 Linear: Dichlorodifluoromethane, Chloromethane, Acetone, Methylene chloride

## Sandia Inorganic Metals Worksheet

ARCO #s: 622633 and 622634	SDG #(s): 560851	Matrix: Aqueous
Laboratory Sample IDs: 560851003, -010		
Method/Batch #s: <b>3005A/6020B</b> :2198208/2198210		

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	EB 1 -010	
	Int. ug/L	R <sup>2</sup>	ICV	CCV	ICB ug/L	CCB ug/L											
U	NA	✓	✓	✓	✓	0.118J <sup>1</sup>	0.000082J	0.00059 <sup>1</sup> 0.00041	✓	✓	✓	✓	NA	NA	✓	✓	

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 on SNL sample 560722003.

Al, Ca, Fe Mg all <ICSA in samples -003 and -010

<sup>1</sup>Associated with sample -003

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS/D %R	MS %R	MSD %R	MS/ MSD RER	Lab Rep. RER	EB 1			
none													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	
NA													

Tritium: DUP and MS on SNL sample 560722006

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

560851

Page 1 of 1

Internal Lab

Batch No. *214*

SMO Use

AR/COC **622633**

Project Name: MWL LTMMMP		Date Samples Shipped: <i>11/02/2021</i>		SMO Authorization: <i>[Signature]</i>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> <b>4° Celsius</b>
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>338835</i>		SMO Contact Phone: <i>[Signature]</i>		
Project/Task Number: 195122.10.11.08		Lab Contact: Zac Worsham/843-300-4224		Wendy Palencia/505-844-3132		
Service Order: CF01-22		Lab Destination: GEL		Send Report to SMO: Stephanie Montaño/505-284-2553		
Tech Area:		Contract No.: 1983530		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					
116169	001	MWL - FB 2	NA	11/2/21 09:26	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMMP (SW846-8260D)	001
116170	001	MWL-MW7	496	11/2/21 09:41	GW	G	3x40 ml	HCl	G	SA	VOC-LTMMMP (SW846-8260D)	002
116170	002	MWL-MW7	496	11/2/21 09:42	GW	P	500 ml	HNO3	G	SA	METALS, LTMMMP - Cd, Cr, Ni, U	003
116170	003	MWL-MW7	496	11/2/21 09:43	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	004
116170	004	MWL-MW7	496	11/2/21 09:44	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900)	005
116170	005	MWL-MW7	496	11/2/21 09:45	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	006
116170	006	MWL-MW7	496	11/2/21 09:46	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	007
116171	001	MWL - TB 2	NA	11/2/21 09:26	DIW	G	3x40 ml	HCl	G	TB	VOC-LTMMMP (SW846-8260D)	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:		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		Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Return Samples By:		
Sample Team Members	Name	Signature	Init.	SNL/08888/505-284-3307/505-239-7367		Comments: Trip blanks received from lab with head space.		Lab Use
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/08888/505-844-4013/505-250-7090				
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/08888/505-845-8636/505-259-5765				
	Zachary Tenorio	<i>[Signature]</i>	<i>ZT</i>	SNL/08888/505-845-7829/505-208-1375				
Denisha Sanchez	<i>[Signature]</i>	<i>DS</i>						

Relinquished by <i>[Signature]</i>	Org. <i>08888</i> Date <i>11/2/21</i> Time <i>1105</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>0618</i> Date <i>11/2/21</i> Time <i>1105</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org. <i>0618</i> Date <i>11/2/21</i> Time <i>1205</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. Date <i>11/3/21</i> Time <i>805</i>	Received by	Org.	Date	Time

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

CONTRACT LABORATORY  
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab		Batch No. <u>MA</u>		SMO Use		AR/COC <b>622634</b>						
Project Name: MWL LTMMMP		Date Samples Shipped: <u>11/2/2011</u>		SMO Authorization: <u>[Signature]</u>		<input type="checkbox"/> Waste Characterization						
Project/Task Manager: Timmie Jackson		Carrier/Waybill No: <u>338835</u>		SMO Contact Phone: <u>Wendy Palencia/505-844-3132</u>		<input type="checkbox"/> RMA						
Project/Task Number: 195122.10.11.08		Lab Contact: <u>Zac Worsham/843-300-4224</u>		Send Report to SMO: <u>Stephanie Montaño/505-284-2553</u>		<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius						
Service Order: CF01-22		Lab Destination: <u>GEL</u>				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 Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
116172	✓ 001	MWL - EB 1	NA	11/2/21 10:51	DIW	G	3x40 ml	HCl	G	EB	VOC-LTMMMP (SW846-8260D)	009
116172	✓ 002	MWL - EB 1	NA	11/2/21 10:52	DIW	P	500 ml	HNO3	G	EB	METALS, LTMMMP - Cd, Cr, Ni, U	010
116172	✓ 003	MWL - EB 1	NA	11/2/21 10:53	DIW	P	1 L	HNO3	G	EB	GAMMA SPEC, SHORT LIST (EPA 901)	011
116172	✓ 004	MWL - EB 1	NA	11/2/21 10:54	DIW	P	1 L	HNO3	G	EB	GROSS-ALPHA/BETA (EPA 900)	012
116172	✓ 005	MWL - EB 1	NA	11/2/21 10:55	DIW	AG	250 ml	NONE	G	EB	TRITIUM (EPA 906)	013
116172	✓ 006	MWL - EB 1	NA	11/2/21 10:56	DIW	G	2x40 ml	NONE	G	EB	RADON (SM7500 Rn B)	014
116173	✓ 001	MWL - TB 3	NA	11/2/21 10:51	DIW	G	3x40 ml	HCl	G	TB	VOC-LTMMMP (SW846-8260D)	015
Last Chain: <input type="checkbox"/> Yes												
Validation Req'd: <input checked="" type="checkbox"/> Yes												
Background: <input type="checkbox"/> Yes												
Confirmatory: <input type="checkbox"/> Yes												
Sample Tracking			SMO Use			Special Instructions/QC Requirements:				Conditions on Receipt		
Date Entered:			Entered by:			EDD <input checked="" 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"/>						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell			Sample Disposal			Lab Use		
	William Gibson	<u>[Signature]</u>	<u>WG</u>	SNL/08888/505-284-3307/505-239-7367			<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab					
	Robert Lynch	<u>[Signature]</u>	<u>RL</u>	SNL/08888/505-844-4013/505-250-7090			Return Samples By:					
	Zachary Tenorio	<u>[Signature]</u>	<u>ZT</u>	SNL/08888/505-845-8636/505-259-5765			Comments: Trip blanks received from lab with head space.					
	Denisha Sanchez	<u>[Signature]</u>	<u>DS</u>	SNL/08888/505-845-7829/505-208-1375								
Relinquished by <u>[Signature]</u>		Org. <u>8888</u>	Date <u>11-2-21</u>	Time <u>1115</u>	Relinquished by		Org.	Date	Time			
Received by <u>[Signature]</u>		Org. <u>0618</u>	Date <u>11/2/21</u>	Time <u>1115</u>	Received by		Org.	Date	Time			
Relinquished by <u>[Signature]</u>		Org. <u>0618</u>	Date <u>11/2/21</u>	Time <u>1205</u>	Relinquished by		Org.	Date	Time			
Received by <u>[Signature]</u>		Org.	Date <u>11 3 21</u>	Time <u>805</u>	Received by		Org.	Date	Time			

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



**AR/COC Number 622635**

## Memorandum

Date: December 8, 2021

To: File

From: Mary Donovan

Subject: GC/MS Organic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCOG: 622635  
SDG: 560988  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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 8260D (VOCs). 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 MDL but  $\leq 3X$  the MDL for acetone. The associated sample results were non-detect and will be **qualified UJ,I5**.
2. The initial calibration %RSD was  $>15\%$  but  $\leq 40\%$  and the CCV %D was  $>20\%$  but  $\leq 40\%$  with negative bias for methylene chloride. The associated sample results were non-detect and will be **qualified UJ,I3,C3**.

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 except as noted above in the Summary section and as follows.

The initial calibration intercept was positive for bromoform. The associated result for sample 560988001 was a detect >3X the value of the intercept and will not be qualified. The remaining associated sample results were non-detect and will not be qualified.

The ICV %Ds were >20% but ≤40% with negative bias for chloromethane and chloroethane. All associated sample results were non-detect and since no other calibration infractions occurred for these compounds, will not be qualified.

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

### **Blanks**

No target analytes were detected in any of the blanks except as follows.

Bromodichloromethane, bromoform, chloroform and dibromochloromethane were detected at > the PQL in FB 3, sample -001 associated with samples -002 and -003. The associated sample results were non-detect and will not be qualified.

Acetone was detected at ≤ the PQL and bromodichloromethane, chloroform and dibromochloromethane were detected at > the PQL in EB 1, sample 560851009 submitted on ARCO 622634 in another SDG and associated with the samples submitted on ARCO 622635 in this SDG. 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.

### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met.

### **Detection Limits/Dilutions**

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

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

TIC reports were not required.

**Other QC**

A TB was submitted on the ARCOC. FB 3 was submitted on ARCOC 622635 and was associated with the samples on the same ARCOC. EB 1 was submitted on ARCOC 622634 in another SDG and was associated with the samples on ARCOC 622635 submitted in this SDG. A field duplicate pair was submitted on ARCOC 622635. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

Mass spectra acceptability were verified during data validation and met QC acceptance criteria.

No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 12/10/2021

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## Memorandum

Date: December 8, 2021  
To: File  
From: Mary Donovan  
Subject: Inorganic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCO: 622635  
SDG: 560988  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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 except as follows. U was detected at  $\leq$  the PQL in the MB. The associated sample results were detects  $>$  the PQL and  $>$  5X the blank value and will not be qualified.

### **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 not evaluated because the sample concentrations for Al, Ca, Mg and Fe were  $<$  those in the ICS A and AB solutions.

### **ICP Serial Dilution**

The serial dilution met all QC acceptance criteria.

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

### **Other QC**

EB 1 was submitted on ARCOG 622634 in another SDG and was associated with samples on ARCOG 622635 submitted in this SDG. A field duplicate pair was submitted on ARCOG 622635. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 12/10/2021

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## Memorandum

Date: December 8, 2021

To: File

From: Mary Donovan

Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCOG: 622635  
SDG: 560988  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
Analysis: RAD

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 methods EPA 901.1 (gamma spec - short list), EPA 900.0/ SW846 9310 (gross alpha/beta), SM 7500 Rn B (Rn-222) and EPA 906.0 modified (tritium). Problems were identified with the data package that resulted in the qualification of data.

#### Gammascpec and Tritium:

1. The sample results that were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3**.

### Holding Times and Preservation

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

### Quantification

All quantification criteria were met except as noted above in the Summary section.

### Calibration

The case narratives stated that the instruments used were properly calibrated.

### Blanks



No target analytes were detected in the blanks at concentrations  $\geq$  the MDA and 2-sigma TPU.

#### **Tracer/Carrier Recovery**

Tracer/Carriers were not a method requirement.

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

The MS and/or MSD met QC acceptance criteria.

It should be noted that the MS/MSD analyses for all analytes were performed on SNL samples of similar matrix from another SDG. No data will be qualified.

#### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

It should be noted that the replicate analyses for all analytes were performed on SNL samples of similar matrix from another SDG. No data will be qualified.

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

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

#### **Detection Limits/Dilutions**

The samples were not diluted. All required detection limits were met.

#### **Other QC**

EB 1 was submitted on ARCOG 622634 in another SDG and was associated with samples on ARCOG 622635 submitted in this SDG. A field duplicate pair was submitted on ARCOG 622635. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 12/10/2021



## Sample Findings Summary



AR/COC: 622635

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 901.1			
	116175-003/MWL-MW9	Americium-241 (14596-10-2)	BD, FR3
	116175-003/MWL-MW9	Cesium-137 (10045-97-3)	BD, FR3
	116175-003/MWL-MW9	Cobalt-60 (10198-40-0)	BD, FR3
	116175-003/MWL-MW9	Potassium-40 (13966-00-2)	BD, FR3
	116176-003/MWL-MW9	Americium-241 (14596-10-2)	BD, FR3
	116176-003/MWL-MW9	Cesium-137 (10045-97-3)	BD, FR3
	116176-003/MWL-MW9	Cobalt-60 (10198-40-0)	BD, FR3
	116176-003/MWL-MW9	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	116175-005/MWL-MW9	Tritium (10028-17-8)	BD, FR3
	116176-005/MWL-MW9	Tritium (10028-17-8)	BD, FR3
SW846 8260D			
	116174-001/MWL - FB 3	Acetone (67-64-1)	UJ, I5
	116174-001/MWL - FB 3	Methylene chloride (75-09-2)	UJ, I3,C3
	116175-001/MWL-MW9	Acetone (67-64-1)	UJ, I5
	116175-001/MWL-MW9	Methylene chloride (75-09-2)	UJ, I3,C3
	116176-001/MWL-MW9	Acetone (67-64-1)	UJ, I5
	116176-001/MWL-MW9	Methylene chloride (75-09-2)	UJ, I3,C3
	116177-001/MWL - TB 4	Acetone (67-64-1)	UJ, I5
	116177-001/MWL - TB 4	Methylene chloride (75-09-2)	UJ, I3,C3

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

## Sandia Data Validation Summary Worksheet

ARCOG#: 622635	Site/Project: MWL LTMMP	Validation Date: 12/08/2021
SDG #: 560988	Laboratory: GEL Laboratories, LLC	Validator: Mary Donovan
Matrix: Aqueous	# of Samples: 14	CVR present: Yes
ARCOG(s) present: Yes	Sample Container Integrity: OK	
Analysis Type: <input checked="" type="checkbox"/> Organic <input checked="" type="checkbox"/> Metals <input type="checkbox"/> Genchem <input checked="" 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: 11/03/2021

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

EB1 was submitted on ARCOG 622634 in another SDG and was associated with the samples on ARCOG 622635 submitted in this SDG.

Validated by:

*Mary A. Donovan*

## Sandia Organic Worksheet (GC/MS VOC)

ARCOC #(s): 622635	SDG: 560988	Matrix: Aqueous
Laboratory Sample IDs: 560988001, -002, -008, -014		
Method/Batch #s: <b>8260D</b> 2197439	Tuning (pass/fail): pass	TICs Required? (yes/no): no

[illegible][illegible][illegible]

Comments: HTs OK.  
MS/MSD on sample -008  
VOA4.I 11/06/21 Linear: Acetone, Bromoform

## Sandia Inorganic Metals Worksheet

ARCOC #(s): 622635	SDG #(s): 560988	Matrix: Aqueous
Laboratory Sample IDs: 560988003, -009		
Method/Batch #s: <b>3005A/6020B</b> :2198208/2198210		

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	EB 1 560851 -010	
	Int. ug/L	R <sup>2</sup>	ICV	CCV	ICB ug/L	CCB ug/L											
U	NA	✓	✓	✓	✓	✓	0.000082J	0.00041	✓	✓	✓	✓	NA	NA	✓	✓	

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 on SNL sample 560722003.  
Al, Ca, Fe Mg all <ICSA in samples -003 and -009

Analyte (outliers)	Control Freq.	Control Eval.	Method Blank	5X Blank or 5X MDC	LCS/D %R	MS %R	MSD %R	MS/ MSD RER	Lab Rep. RER	EB 1			
none													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	
NA													

Tritium: DUP and MS on SNL sample 560722006

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

560988

Page 1 of 2

Internal Lab

Batch No.

SMO Use

AR/COC

622635

Project Name: MWL LTMM	Date Samples Shipped: Nov. 3, 2021	SMO Authorization: [Signature]	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Timmie Jackson	Carrier/Waybill No: 338848	SMO Contact Phone: Wendy Palencia/505-844-3132	<input type="checkbox"/> RMA
Project/Task Number: 195122.10.11.08	Lab Contact: Zac Worsham/843-300-4224	Send Report to SMO: Stephanie Montaño/505-284-2553	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF01-22	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 Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
116174	✓001	MWL - FB 3	NA	11/3/21 09:24	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMM (SW846-8260D)	001
116175	✓001	MWL-MW9	497	11/3/21 09:45	GW	G	3x40 ml	HCl	G	SA	VOC-LTMM (SW846-8260D)	002
116175	✓002	MWL-MW9	497	11/3/21 09:47	GW	P	500 ml	HNO3	G	SA	METALS, LTMM - Cd, Cr, Ni, U	003
116175	✓003	MWL-MW9	497	11/3/21 09:49	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	004
116175	✓004	MWL-MW9	497	11/3/21 09:51	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900)	005
116175	✓005	MWL-MW9	497	11/3/21 09:53	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	006
116175	✓006	MWL-MW9	497	11/3/21 09:55	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	007
116176	✓001	MWL-MW9	497	11/3/21 09:46	GW	G	3x40 ml	HCl	G	DU	VOC-LTMM (SW846-8260D)	008
116176	✓002	MWL-MW9	497	11/3/21 09:48	GW	P	500 ml	HNO3	G	DU	METALS, LTMM - Cd, Cr, Ni, U	009
116176	✓003	MWL-MW9	497	11/3/21 09:50	GW	P	1 L	HNO3	G	DU	GAMMA SPEC, SHORT LIST (EPA 901)	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		Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day			
Background: <input type="checkbox"/> Yes		Entered by:		Negotiated TAT <input type="checkbox"/>		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			
Confirmatory: <input type="checkbox"/> Yes		QC Inits.:		Return Samples By:		Comments: Trip blanks received from lab with head space.			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell				Lab Use	
	William Gibson	[Signature]	WG	SNL/08888/505-284-3307/505-239-7367					
	Robert Lynch	[Signature]	RL	SNL/08888/505-844-4013/505-250-7090					
	Zachary Tenorio	[Signature]	ZT	SNL/08888/505-845-8636/505-259-5765					
Relinquished by [Signature]		Org. 68888	Date 11/3/21	Time 1130	Relinquished by		Org.	Date	Time
Received by [Signature]		Org. 0618	Date 11/3/21	Time 1130	Received by		Org.	Date	Time
Relinquished by [Signature]		Org. 0618	Date 11/3/21	Time 1215	Relinquished by		Org.	Date	Time
Received by [Signature]		Org.	Date 11/4/21	Time 720	Received by		Org.	Date	Time

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

## SDG: 560988

AR/COC 622635

[illegible]



**AR/COC Numbers 622636, 622637**

## Memorandum

Date: December 9, 2021

To: File

From: Mary Donovan

Subject: GC/MS Organic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCO: 622636 and 622637  
SDG: 561184  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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 8260D (VOCs). All compounds were successfully analyzed. Problems were identified with the data package that resulted in the qualification of data.

1. The initial calibration intercepts were negative with absolute values  $>$  the MDL but  $\leq 3X$  the MDL for acetone and methylene chloride. All associated sample results for methylene chloride were detects  $< 3X$  the value of the intercept and will be **qualified J-,I5**. All associated sample results for acetone were non-detect and will be **qualified UJ,I5**.
2. Methylene chloride was detected at  $\leq$  the PQL in TB5, sample 561184008, associated with samples -001 and -002, and TB6, sample -011 associated with sample -009. The associated sample results were detects  $\leq$  the PQL and will be **qualified 5.0U,B1**, non-detect at the PQL.

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 except as noted above in the Summary section and as follows.

The ICV %Ds were >20% but ≤40% with negative bias for chloromethane and chloroethane. All associated sample results were non-detect and since no other calibration infractions occurred for these compounds, will not be qualified.

The CCV %Ds were >20% and positive for chloromethane, vinyl chloride and bromomethane. All associated sample results were non-detect and will not be qualified.

### **Blanks**

No target analytes were detected in any of the blanks except as noted above and as follows.

Bromodichloromethane, chloroform and dibromochloromethane were detected at > the PQL in FB 4, sample -001 associated with sample -002. The associated sample results were non-detect and will not be qualified. Methylene chloride was detected at ≤ the PQL in FB 4 but the FB result was qualified non detect due to TB contamination and will not be applied to the associated field sample result.

Bromodichloromethane, chloroform and dibromochloromethane were detected at > the PQL in the DIWQC, sample -009. No field sample results will be qualified. It should be noted that methylene chloride was detected at ≤ the PQL in the DIWQC but the sample result was qualified non detect due to TB contamination.

### **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.

### **Laboratory Control Sample (LCS)**

All LCS acceptance criteria were met except as follows. The %R for vinyl chloride was > the upper acceptance limit. The associated sample results were non detect and will not be qualified.

### **Detection Limits/Dilutions**

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

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

TIC reports were not required.

**Other QC**

A TB was submitted on each ARCOC. The DIWQC sample was submitted on ARCOC 622637 and was the DI source water for equipment decontamination.

Mass spectra acceptability were verified during data validation and met QC acceptance criteria.

No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 12/10/2021

## Memorandum

Date: December 9, 2021

To: File

From: Mary Donovan

Subject: Inorganic Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCOG: 622636 and 622637  
SDG: 561184  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
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 except as follows. U was detected at  $\leq$  the PQL in the MB. The associated sample results were either detects  $>$  the PQL and  $> 5X$  the blank value or non-detect and will not be qualified.

### **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 not evaluated because the sample concentrations for Al, Ca, Mg and Fe were  $<$  those in the ICS A and AB solutions.

### **ICP Serial Dilution**

The serial dilution met all QC acceptance criteria.

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

### **Other QC**

The DIWQC sample was submitted on ARCO 622637 and was the DI source water for equipment decontamination.

No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 12/10/2021

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## Memorandum

Date: December 9, 2021

To: File

From: Mary Donovan

Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL LTMMP  
ARCOC: 622636  
SDG: 561184  
Laboratory: GEL  
Project/Task: 195122.10.11.08  
Analysis: RAD

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 methods EPA 901.1 (gamma spec - short list), EPA 900.0/ SW846 9310 (gross alpha/beta), SM 7500 Rn B (Rn-222) and EPA 906.0 modified (tritium). Problems were identified with the data package that resulted in the qualification of data.

#### Gammasepec and Tritium:

1. The sample results that were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3**.

#### Rn-222:

1. The sample result that was  $\geq$  the MDA but <3X the MDA will be **qualified J,FR7**.

### Holding Times and Preservation

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

### Quantification

All quantification criteria were met except as noted above in the Summary section.

### Calibration

The case narratives stated that the instruments used were properly calibrated.



### **Blanks**

No target analytes were detected in the blanks at concentrations  $\geq$  the MDA and 2-sigma TPU.

### **Tracer/Carrier Recovery**

Tracer/Carriers were not a method requirement.

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

The MS and/or MSD met QC acceptance criteria except as noted above in the Summary section.

It should be noted that the MS/MSD analyses for all analytes were performed on SNL samples of similar matrix from another SDG. No data will be qualified.

### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

It should be noted that the replicate analyses for all analytes *except* Rn-222 were performed on SNL samples of similar matrix from another SDG. No data will be qualified.

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

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

### **Detection Limits/Dilutions**

The sample was not diluted. All required detection limits were met.

### **Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level:** I

**Date:** 12/10/2021



## Sample Findings Summary



AR/COC: 622636, 622637

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 901.1			
	116179-003/MWL-MW8	Americium-241 (14596-10-2)	BD, FR3
	116179-003/MWL-MW8	Cesium-137 (10045-97-3)	BD, FR3
	116179-003/MWL-MW8	Cobalt-60 (10198-40-0)	BD, FR3
	116179-003/MWL-MW8	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	116179-005/MWL-MW8	Tritium (10028-17-8)	BD, FR3
SM 7500 Rn B			
	116179-006/MWL-MW8	Radon-222 (14859-67-7)	J, FR7
SW846 8260D			
	116178-001/MWL - FB 4	Acetone (67-64-1)	UJ, I5
	116178-001/MWL - FB 4	Methylene chloride (75-09-2)	5.0UJ, B1,I5
	116179-001/MWL-MW8	Acetone (67-64-1)	UJ, I5
	116179-001/MWL-MW8	Methylene chloride (75-09-2)	5.0UJ, B1,I5
	116180-001/MWL - TB5	Acetone (67-64-1)	UJ, I5
	116180-001/MWL - TB5	Methylene chloride (75-09-2)	J-, I5
	116181-001/MWL - DIWQC	Acetone (67-64-1)	UJ, I5
	116181-001/MWL - DIWQC	Methylene chloride (75-09-2)	5.0UJ, B1,I5
	116182-001/MWL - TB6	Acetone (67-64-1)	UJ, I5
	116182-001/MWL - TB6	Methylene chloride (75-09-2)	J-, I5

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

## Sandia Data Validation Summary Worksheet

ARCOG#: 622636 and 622637	Site/Project: MWL LTMMP	Validation Date: 12/09/2021
SDG #: 561184	Laboratory: GEL Laboratories, LLC	Validator: Mary Donovan
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 checked="" 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: 11/04/2021

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

Validated by:

*Mary A. Donovan*

[illegible][illegible][illegible]

Comments: HTs OK.  
MS/MSD on sample -002  
VOA3.I 10/11/21 Linear: Dichlorodifluoromethane, Chloromethane, Acetone, Methylene chloride

## Sandia Inorganic Metals Worksheet

ARCO #s: 622636 and 622637	SDG #(s): 561184	Matrix: Aqueous
Laboratory Sample IDs: 561184003, -010		
Method/Batch #s: <b>3005A/6020B</b> :2198208/2198210		

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 -010	
	Int. ug/L	R <sup>2</sup>	ICV	CCV	ICB ug/L	CCB ug/L											
U	NA	✓	✓	✓	✓	✓	0.000082J	0.00041	✓	✓	✓	✓	NA	NA	✓	✓	

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 on SNL sample 560722003.  
Al, Ca, Fe Mg all <ICSA in samples -003 and -010

[illegible]

Tritium: DUP and MS on SNL sample 560722006

CONTRACT LABORATORY  
ANALYSIS REQUEST AND CHAIN OF CUSTODY

561184

Page 1 of 1

Internal Lab		Batch No. <u>MA</u>		SMO Use		AR/COC		622636				
Project Name: MWL LTMMMP		Date Samples Shipped: <u>11/4/2021</u>		SMO Authorization: <u>[Signature]</u>		<input type="checkbox"/> Waste Characterization		<input checked="" type="checkbox"/> 4° Celsius				
Project/Task Manager: Timmie Jackson		Carrier/Waybill No: <u>338853</u>		SMO Contact Phone: <u>[Signature]</u>		<input type="checkbox"/> RMA						
Project/Task Number: 195122.10.11.08		Lab Contact: Zac Worsham/843-300-4224		Wendy Palencia/505-844-3132		<input type="checkbox"/> Released by COC No.						
Service Order: CF01-22		Lab Destination: GEL		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				
Contract No.: 1983530												
Tech Area:		Building:		Room:		Operational Site:						
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
116178	001	MWL - FB 4	NA	11/4/21 09:30	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMMP (SW846-8260D)	001
116179	001	MWL-MW8	497	11/4/21 09:44	GW	G	3x40 ml	HCl	G	SA	VOC-LTMMMP (SW846-8260D)	002
116179	002	MWL-MW8	497	11/4/21 09:45	GW	P	500 ml	HNO3	G	SA	METALS, LTMMMP - Cd, Cr, Ni, U	003
116179	003	MWL-MW8	497	11/4/21 09:46	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	004
116179	004	MWL-MW8	497	11/4/21 09:47	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900)	005
116179	005	MWL-MW8	497	11/4/21 09:48	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	006
116179	006	MWL-MW8	497	11/4/21 09:49	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	007
116180	001	MWL - TB5	NA	11/4/21 09:30	DIW	G	3x40 ml	HCl	G	TB	VOC-LTMMMP (SW846-8260D)	008
Last Chain: <input type="checkbox"/> Yes												
Validation Req'd: <input checked="" type="checkbox"/> Yes												
Background: <input type="checkbox"/> Yes												
Confirmatory: <input type="checkbox"/> Yes												
Sample Tracking			SMO Use			Special Instructions/QC Requirements:				Conditions on Receipt		
Date Entered:			Entered by:			EDD <input checked="" 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"/>						
Sample Disposal			Return to Client			<input checked="" type="checkbox"/> Disposal by Lab						
Return Samples By:			Comments: Trip blanks received from lab with head space.									
Lab Use												
Relinquished by <u>[Signature]</u> Org. <u>08888</u> Date <u>11/4/21</u> Time <u>1025</u>												
Received by <u>[Signature]</u> Org. <u>0618</u> Date <u>11/4/21</u> Time <u>1025</u>												
Relinquished by <u>[Signature]</u> Org. <u>00618</u> Date <u>11/4/21</u> Time <u>1115</u>												
Received by <u>[Signature]</u> Org. <u>[Signature]</u> Date <u>11/5/21</u> Time <u>815</u>												

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

## CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab


Batch No. *NA*

**SMO Use**

AR/COC





Page 1 of 1

622637

Project Name:	MWVL LTMMP	Date Samples Shipped:	11/4/2021	SMO Authorization:		<input type="checkbox"/> Waste Characterization
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.	338853	SMO Contact Phone:		<input type="checkbox"/> RMA
Project/Task Number:	195122.10.11.08	Lab Contact:	Zac Worsham/843-300-4224		Wendy Palencia/505-844-3132	<input type="checkbox"/> Released by COC No.
Service Order:	CF01-22	Lab Destination:	GEL	Send Report to SMO:		<input checked="" type="checkbox"/> 4° Celsius
		Contract No.:	1983530		Stephanie Montaño/505-284-2553	
						Bill to: Sandia National Laboratories (Accounts Payable)

<b>Tech Area:</b>		<b>Operational Site:</b> P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
<b>Building:</b>	<b>Room:</b>	

[illegible]

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		Lab Use
	William Gibson		WG	SNL/08888/505-284-3307/505-239-7367		Return Samples By:		
	Robert Lynch		RL	SNL/08888/505-844-4013/505-250-7090		Comments: Trip blanks received 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.	Date	Time	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>08888</i>	Date <i>11/4/21</i>	Time <i>1025</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org. <i>0618</i>	Date <i>11/4/21</i>	Time <i>1025</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>00618</i>	Date <i>11/4/21</i>	Time <i>1115</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org.	Date <i>11/5/21</i>	Time <i>815</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org.	Date	Time	Received by	Org.	Date	Time

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



**Contract Verification Review Forms**  
**Mixed Waste Landfill Groundwater**  
**Monitoring November 2021**

<b>AR/COC Number</b>	<b>Sample Type</b>
622632	Environmental & Quality Control
622633	Environmental & Quality Control
622634	Quality Control
622635	Environmental & Quality Control
622636	Environmental & Quality Control
622637	Quality Control

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.

## Contract Verification Form (CVR)

Project Leader JACKSON

Project Name MWL LTMMMP

Project/Task No. 195122\_10.11.08

ARCOG No. 622632

Analytical Lab GEL

SDG No. 560722

*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	X		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy 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	X		
3.5	Blank data a) Method or reagent blank data reported and met for all samples		X	Uranium detected in method blank (QC1204959050)
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	X		Bromodichloromethane, bromoform, chloroform and dibromochloromethane detected in MWL - FB 1
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	X		
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		All CCV limits not met
	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: 12-07-2021 12:47:00

Closed by: Wendy Palencia Date: 12-07-2021 12:47:00

## Contract Verification Form (CVR)

Project Leader JACKSON

Project Name MWL LTMMMP

Project/Task No. 195122\_10.11.08

ARCOC No. 622633 &amp; 622634

Analytical Lab GEL

SDG No. 560851

*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	X		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy 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	X		
3.5	Blank data a) Method or reagent blank data reported and met for all samples		X	Uranium detected in method blank (QC1204959050)
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	X		Bromodichloromethane, bromoform, chloroform and dibromochloromethane detected in MWL - FB 2. Acetone, bromodichloromethane, chloroform and dibromochloromethane detected in MWL - EB 1.
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	X		
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		All CCV limits not met
	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: 12-07-2021 15:07:00

Closed by: Wendy Palencia Date: 12-07-2021 15:07:00

## Contract Verification Form (CVR)

Project Leader JACKSON

Project Name MWL LTMMMP

Project/Task No. 195122\_10.11.08

ARCOC No. 622635

Analytical Lab GEL

SDG No. 560988

*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	X		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy 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	X		
3.5	Blank data a) Method or reagent blank data reported and met for all samples		X	Uranium detected in method blank (QC1204959050)
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Bromodichloromethane, bromoform, chloroform and dibromochloromethane detected in MWL - FB 3
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	X		
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		All CCV limits not met
	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: 12-08-2021 08:44:00

Closed by: Wendy Palencia Date: 12-08-2021 08:44:00



## Contract Verification Form (CVR)

Project Leader JACKSON

Project Name MWL LTMMMP

Project/Task No. 195122\_10.11.08

ARCOC No. 622636 &amp; 622637

Analytical Lab GEL

SDG No. 561184

*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	X		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples		X	Vinyl chloride failed recovery limits for LCS (QC1204958599)
	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	X		
3.5	Blank data a) Method or reagent blank data reported and met for all samples		X	Uranium detected in method blank (QC1204959050)
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Bromodichloromethane, chloroform, dibromochloromethane and methylene chloride detected in MWL - FB 4. Methylene chloride detected in MWL - TB5 and MWL - TB6. Bromodichloromethane, chloroform, dibromochloromethane and methylene chloride detected in MWL - DIWQC.
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	X		
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		All CCV limits not met
	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: 12-08-2021 10:14:00

Closed by: Wendy Palencia Date: 12-08-2021 10:14:00

## **ANNEX F**

### **Mixed Waste Landfill Inspection Forms**

**April 2021-March 2022**

**Soil-Vapor Monitoring Network**

**Soil-Moisture Monitoring Network**

**Groundwater Monitoring Network**

**Cover Inspection**

**Biology Inspection**

**Note: Radon monitoring system inspection forms are provided in Annex A**

## Mixed Waste Landfill Soil-Vapor Monitoring Network Checklist/Form

1. Date of Inspection 5/6/21
2. Time of Inspection 0820
3. Name of Inspector Zach Tenorio

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required.

<b>I. SOIL-VAPOR MONITORING LOCATIONS [Semiannually or Annually]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	Yes	No	
B. Well cover caps 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	
<b>II. SAMPLING EQUIPMENT [Semiannually or Annually]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. 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	
<b>III. PREVIOUS DEFICIENCIES</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	

**Mixed Waste Landfill  
Soil-Vapor Monitoring Network Checklist/Form (Continued)**

**NOTES**

<b>Note Number</b>	<b>Description</b>

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_  
 Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_  
 Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_  
 Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

**Additional Comments:**

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Inspector's Signature 

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center



# Mixed Waste Landfill Soil-Vapor Monitoring Network Checklist/Form

1. Date of Inspection 11/5/21
2. Time of Inspection 0800
3. Name of Inspector Zach Tenorio

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required.

<b>I. SOIL-VAPOR MONITORING LOCATIONS [Semiannually or Annually]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	Yes	No	
B. Well cover caps 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	
<b>II. SAMPLING EQUIPMENT [Semiannually or Annually]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. 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	
<b>III. PREVIOUS DEFICIENCIES</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	

**Mixed Waste Landfill  
Soil-Vapor Monitoring Network Checklist/Form (Continued)**

**NOTES**

<b>Note Number</b>	<b>Description</b>

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_  
Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_  
Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_  
Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

**Additional Comments:**

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Inspector's Signature 3/1

Original to: Mixed Waste Landfill Operating Record

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# Mixed Waste Landfill Soil-Moisture Monitoring Network Checklist/Form

1. Date of Inspection April 19, 2021
2. Time of Inspection 14:20
3. Name of Inspector Robert Ziock, Daniel Michel

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required.

<b>I. SOIL-MOSITURE MONITORING LOCATIONS [Semiannually or Annually]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
F. Concrete pads, bollards, and protective casings in need of repair/maintenance.	yes	No	
G. Access tube cover caps in need of repair/maintenance.	yes	No	
H. Access tube casing in need of repair/maintenance.	yes	No	
I. Monitoring location properly labeled.	yes	No	
J. Locks in need of cleaning or replacement.	yes	No	
<b>II. SAMPLING EQUIPMENT [Semiannually or Annually]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Neutron probe in need of repair/maintenance.	yes	No	
B. Cable reel or cable in need of repair/maintenance.	yes	No	
<b>III. PREVIOUS DEFICIENCIES</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	

**Mixed Waste Landfill  
Soil-Moisture Monitoring Network Checklist/Form (Continued)**

**NOTES**

<b>Note Number</b>	<b>Description</b>

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_  
Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_  
Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_  
Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

**Additional Comments:**

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Inspector's Signature



Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center

# Mixed Waste Landfill

## Groundwater Monitoring Network Checklist/Form

1. Date of Inspection 05/10/21
2. Time of Inspection 0808
3. Name of Inspector Robert Lynch

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required.

<b>I. GROUNDWATER MONITORING LOCATIONS [Semiannually]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	YES	NO	
B. Well cover caps in need of repair/maintenance.	YES	NO	
C. Well casing in need of repair/maintenance.	YES	NO	
D. Monitoring well properly labeled.	YES	NO	
E. Locks in need of cleaning or replacement.	YES	NO	
<b>II. GROUNDWATER SAMPLING EQUIPMENT [Semiannually]</b>			
<i>Inspection Parameter</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.	YE	NO	
<b>III. PREVIOUS DEFICIENCIES</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	

**Mixed Waste Landfill  
Groundwater Monitoring Network Checklist/Form (Continued)**

**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 \_\_\_\_\_

**Additional Comments:**

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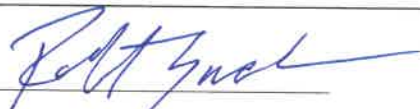


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Inspector's Signature



Original to: Mixed Waste Landfill Operating Record

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## Mixed Waste Landfill Groundwater Monitoring Network Checklist/Form

1. Date of Inspection 11/1/21
2. Time of Inspection 0800
3. Name of Inspector Zach Tenorio

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required.

<b>I. GROUNDWATER MONITORING LOCATIONS [Semiannually]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	yes	no	
B. Well cover caps in need of repair/maintenance.	yes	no	1
C. Well casing in need of repair/maintenance.	yes	no	
D. Monitoring well properly labeled.	yes	no	
E. Locks in need of cleaning or replacement.	yes	no	
<b>II. GROUNDWATER SAMPLING EQUIPMENT [Semiannually]</b>			
<i>Inspection Parameter</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	
<b>III. PREVIOUS DEFICIENCIES</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	

**Mixed Waste Landfill  
Groundwater Monitoring Network Checklist/Form (Continued)**

**NOTES**

Note Number	Description
1	Baro Ball installed at all wells

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

**Additional Comments:**

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Inspector's Signature



Original to: Mixed Waste Landfill Operating Record

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## Mixed Waste Landfill Cover Inspection Checklist/Form

1. Date of Inspection June 1, 2021
2. Time of Inspection 09:30
3. Name of Inspector Robert Zick, Caitlin LaChance

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required in notes section at the end of this form.

<b>I. COVER SYSTEM [Quarterly]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Visible settlement of the soil cover in excess of 6 inches.	yes	No	
B. Erosion of the soil cover in excess of 6 inches deep.	yes	No	
C. Evidence of water ponding on the MWL cover surface in excess of 100 square feet.	yes	No	
D. Animal intrusion burrows in excess of 4 inches in diameter. Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
E. Contiguous areas of no vegetation greater than 200 ft <sup>2</sup> . Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
F. Potentially deep-rooted plants present. Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
<b>II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. 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

**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

<b>III. SECURITY FENCE [Quarterly]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. 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 MWL visible.	yes	No	
<b>IV. PREVIOUS DEFICIENCIES</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	

**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

## NOTES

[illegible]

**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

Action (Note Number) 1. assigned to Robert Zöck Date action completed 6/1/2021

Action (Note Number) 2. assigned to Robert Zöck Date action completed 6/1/2021

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. & 2. Wind blown plant debris removed at time  
of the inspection.

Inspector's Signature 

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center



*date:* June 22, 2021

*to:* Mike Mitchell (08888)  
Robert Ziock (08888)

*from:* Jennifer Payne (00643) [jjpayne@sandia.gov](mailto:jjpayne@sandia.gov)

*subject:* **MWL June 2021 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://ecoticket-ng.sandia.gov/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://ecoticket-ng.sandia.gov/request.php>. If other wildlife is encountered that may cause a health and safety issue, contact the Ecology Program.

All proposed project activities would be conducted according to applicable requirements identified in ESH001, ES&H Policy. Detailed instruction can be found in the ES&H Manual, MN471022: "Migratory Birds, Protected Species, and Other Biota".

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**ET Cover Observations and Recommendations**

The biology quarterly evaluation of the MWL ET Cover was conducted on June 7, 2021.

- Overall, the MWL looks excellent. Extremely low presence of weeds observed.
- The grasses are mostly still in dormancy; very little green foliage was observed. This condition is normal currently in native grass communities due to low soil moisture with the ongoing drought in the KAFB area. The MWL has a crushed fine (very small) rock component within its topsoil layer, some of which has migrated to the surface. However, the MWL does not have rock mulch covering it, as is covering the CAMU and the CWL. The rock mulch the other two EUs assists with soil moisture retention and has enabled their native vegetation to currently engage in a higher level of photosynthesis. The lack of photosynthesis at the MWL is not of concern because the MWL native grass metabolic activity is in alignment with the surrounding native grass community.
- Two whiptail lizards were observed. The cover continues to be recognized as native habitat and utilized regularly by wildlife.

- The burrow system previously observed on the cover appears to be vacant. The burrow entrances have mostly collapsed and/or have spiderwebs and debris obscuring the entrances. A well-maintained tarantula burrow entrance that appears to be active was observed within one of the collapsing small mammal burrow entrances. This also shows wildlife recognize the cover as native habitat.
- There is an orange cone at the NE corner of the cover that is slowly disintegrating. If it does not have a current use it should be disposed of to prevent its break down into micro plastics on the cover.

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

cc: Customer Funded Records Center  
Ecology Library  
Matt Baumann

# Mixed Waste Landfill Cover Inspection Checklist/Form

1. Date of Inspection 9/23/2021
2. Time of Inspection 14:07 - 1431
3. Name of Inspector Robert Zock, Caitlin LaChance

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required in notes section at the end of this form.

<b>I. COVER SYSTEM [Quarterly]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Visible settlement of the soil cover in excess of 6 inches.	yes	No	
B. Erosion of the soil cover in excess of 6 inches deep.	yes	No	
C. Evidence of water ponding on the MWL cover surface in excess of 100 square feet.	yes	No	
D. Animal intrusion burrows in excess of 4 inches in diameter. Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
E. Contiguous areas of no vegetation greater than 200 ft <sup>2</sup> . Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
F. Potentially deep-rooted plants present. Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
<b>II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Channel or sidewall erosion in excess of 6 inches deep.	yes	No	
B. Channel sediment accumulation in excess of 6 inches deep.	yes	No	
C. Debris that blocks more than 1/3 of the channel width.	yes	No	

**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

<b>III. SECURITY FENCE [Quarterly]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Accumulation of wind-blown plants and debris.	yes	yes	1
B. Fence wires and posts in need of repair/maintenance.	yes	no	
C. Gates in need of oiling/repair/maintenance.	yes	no	
D. Locks in need of cleaning or replacement.	yes	yes	2
E. Warning signs in need of repair or replacement.	yes	no	
F. Survey monuments in vicinity of MWL visible.	yes	no	
<b>IV. PREVIOUS DEFICIENCIES</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	



**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

**NOTES**

Note Number	Description
1.	Wind-blown plant debris on security fence.
2.	South gate lock needs to be replaced.

**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

Action (Note Number) 1 assigned to Robert Zick Date action completed 9/23/2021

Action (Note Number) 2 assigned to Robert Zick Date action completed 9/27/2021

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

**Additional Comments:**

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Inspector's Signature



Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center

**Mixed Waste Landfill  
Cover Inspection Checklist/Form**

1. Date of Inspection 12/8/21
2. Time of Inspection 1045
3. Name of Inspector Danielle Michel, Carlin LaChance

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required in notes section at the end of this form.

<b>I. COVER SYSTEM [Quarterly]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Visible settlement of the soil cover in excess of 6 inches.	Yes	No	
B. Erosion of the soil cover in excess of 6 inches deep.	Yes	No	
C. Evidence of water ponding on the MWL cover surface in excess of 100 square feet.	Yes	No	
D. Animal intrusion burrows in excess of 4 inches in diameter. Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	Yes	No	
E. Contiguous areas of no vegetation greater than 200 ft <sup>2</sup> . Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	Yes	No	
F. Potentially deep-rooted plants present. Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	Yes	No	
<b>II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Channel or sidewall erosion in excess of 6 inches deep.	Yes	No	
B. Channel sediment accumulation in excess of 6 inches deep.	Yes	No	
C. Debris that blocks more than 1/3 of the channel width.	Yes	No	

**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

<b>III. SECURITY FENCE [Quarterly]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Accumulation of wind-blown plants and debris.	Yes	Yes	①
B. Fence wires and posts in need of repair/maintenance.	Yes	No	
C. Gates in need of oiling/repair/maintenance.	Yes	No	
D. Locks in need of cleaning or replacement.	Yes	No	
E. Warning signs in need of repair or replacement.	Yes	No	
F. Survey monuments in vicinity of MWL visible.	Yes	No	
<b>IV. PREVIOUS DEFICIENCIES</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	N/A	N/A	

**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

**NOTES**

Note Number	Description
1	windblown plants/debris (jumble weeds) on perimeter fence

**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

Action (Note Number) 1 assigned to Danielle Michel Date action completed 12/8/21

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

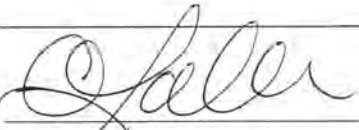
Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

**Additional Comments:**

① Windblown plants/debris removed from perimeter fence

Same day as inspection.

Inspector's Signature



Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center



*date:* December 8, 2021

*to:* Mike Mitchell (08854)  
Robert Ziock (08854)

*from:* Jennifer Payne (00643) [jjpayne@sandia.gov](mailto:jjpayne@sandia.gov)

*subject:* **December 2021 MWL Quarterly Biology Inspection**

**Biological Requirement:**

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

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

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

All proposed project activities would be conducted according to applicable requirements identified in ESH001, ES&H Policy. Detailed instruction can be found in the ES&H Manual, MN471022: "Migratory Birds, Protected Species, and Other Biota".

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**ET Cover Observations and Recommendations**

The biology quarterly evaluation of the MWL ET Cover was conducted on December 7, 2021.

- Overall, the native vegetation community on the MWL cover appears to be in excellent condition and the ET cover looks great overall. Nothing unexpected was observed.
- The native bunchgrasses appear to be healthy and in the same condition as observed during the August inspection except the grass leaves have dried out, they are no longer green and photosynthesizing. After full seed development in the summer, the leaves of warm season perennial bunchgrasses begin to dry out in the summer heat in preparation for winter dormancy. During winter dormancy the bunchgrasses remain alive using resources stored in their roots and the base of their stems.
- The fence surrounding the cover was clear of tumbleweeds, as was the cover.

cc: Customer Funded Records Center  
Ecology Library



# **Mixed Waste Landfill Cover Inspection Checklist/Form**

1. Date of Inspection 3/1/2022
2. Time of Inspection 10:50 - 11:10
3. Name of Inspector Robert Zick, Danielle Michel, Caitlin LaChance

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required in notes section at the end of this form.

## **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 MWL cover surface in excess of 100 square feet.	yes	No	
D. Animal intrusion burrows in excess of 4 inches in diameter. Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
E. Contiguous areas of no vegetation greater than 200 ft <sup>2</sup> . Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
F. Potentially deep-rooted plants present. Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	

## **II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]**

<i>Inspection Parameter</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

**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

<b>III. SECURITY FENCE [Quarterly]</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. 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 MWL visible.	yes	No	
<b>IV. PREVIOUS DEFICIENCIES</b>			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	

**Mixed Waste Landfill**  
**Cover Inspection Checklist/Form (continued)**

## NOTES

[illegible]

**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

Action (Note Number) 1 assigned to Robert Zick Date action completed 3/10/2022

Action (Note Number) 2 assigned to Robert Zick Date action completed 3/10/2022

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:**

Wind-blown plant debris was removed from the  
security fence and drainage culverts on  
March 10, 2022 by SNL personnel.  
By 3/10/2022

Inspector's Signature

Robert Zick

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center



*date:* March 14, 2022

*to:* Mike Mitchell (08888)  
Robert Ziock (08888)

*from:* Jennifer Payne (00643) [jjpayne@sandia.gov](mailto:jjpayne@sandia.gov)

*subject:* **MWL March 2022 Quarterly Inspections - Biology Follow-Up**

**Biological Requirement:**

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

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

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

All proposed project activities would be conducted according to applicable requirements identified in ESH001, ES&H Policy. Detailed instruction can be found in the ES&H Manual, MN471022: "Migratory Birds, Protected Species, and Other Biota".

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The biology quarterly evaluation of the Mixed Waste Landfill was conducted on March 14, 2022.

Observations

- Currently the MWL looks excellent. The mature native grass community appears to be very healthy while in winter dormancy.
- No late winter weeds observed on the cover.
- No biological concerns observed at this time.

Recommendations

- No recommendations at the time of this inspection.

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

cc: Customer Funded Records Center  
Ecology Library  
Sue Collins  
Matt Baumann

# **Mixed Waste Landfill** **Biology Inspection Checklist/Form for the MWL Cover**

Approximate vegetative coverage (actively photosynthesizing\*): 41 %

Approximate percent native vegetation of the total vegetative cover: 99 %

Listed below are the main plant species identified as growing on the MWL cover and the percentage of the cover populated by each species.

<u>Scientific Name</u>	<u>Common Name (optional)</u>	<u>% of Cover<sup>1</sup></u>
<u>Pleuraphis jamesii</u>	<u>Galleta grass</u>	<u>30 %</u>
<u>Bouteloua gracilis</u>	<u>Blue grama</u>	<u>1 %</u>
<u>Sporobolus flexuosus</u>	<u>Mesa dropseed</u>	<u>2 %</u>
<u>Bouteloua eriopoda</u>	<u>Black grama</u>	<u>6 %</u>
<u>Sporobolus cryptandrus</u>	<u>Sand dropseed</u>	<u>1 %</u>
<u>Salsola tragus</u>	<u>Russian thistle</u>	<u>1 %</u>
<u>Xanthisma spinulosum</u>	<u>Spiny goldenweed</u>	<u>&lt; 0.5 %</u>
<u>Sporobolus contractus</u>	<u>Spike dropseed</u>	<u>&lt; 0.5 %</u>
<u>Kallstroemia californica</u>	<u>California caltrop</u>	<u>&lt; 0.5 %</u>
<u>Sphaeralcea angustifolia</u>	<u>Narrowleaf globemallow</u>	<u>&lt; 0.5 %</u>
<u>Oryzopsis hymenoides</u>	<u>Indian ricegrass</u>	<u>&lt; 0.5 %</u>
<u>Solanum elaeagnifolium</u>	<u>Silverleaf nightshade</u>	<u>&lt; 0.5 %</u>
<u>Opuntia phaeacantha</u>	<u>Brown-spined prickly pear</u>	<u>&lt; 0.5 %</u>
<u>Euphorbia exstipulata</u>	<u>Square-seed spurge</u>	<u>&lt; 0.5 %</u>

Notes:

\* Living plants per Section 4.1 of the MWL LTMMP.

<sup>1</sup> Percentage of total MWL Cover populated by living plants of these species. All species observed to be present at less than 0.5% are not calculated into the total vegetative coverage.

**Mixed Waste Landfill**  
**Biology Inspection Checklist/Form for the MWL Cover**  
**(continued)**

Are there any contiguous areas of no vegetation greater than 200 square feet? (approximately 14 x 14 ft)? No

If "Yes," mark such areas on a map and attach to this checklist. Address actions and schedule to improve such area(s) in the notes section below.

Are there any very deeply rooted (roots greater than 8 feet deep at maturity) plant species present on the cover? No

If "Yes," describe the plant(s) and their general distribution. Address actions and schedule to remove plant(s) from the cover in the notes section below.

Notes: \_\_\_\_\_

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**Inspection for Animal and Insect Intrusion into MWL Cover**

Are any burrows present on the cover? No

Do any of the burrows appear to be active? N/A

Any ant hills/nests? Yes

Describe below observations regarding animal and insect features. If burrows with an entrance diameter of 4 inches or greater are present or appear to be that of a species that is able to burrow 6 feet deep or greater, indicate the location(s) on a map and attach to this checklist. Address actions and schedule to repair cover damage that exceeds prescribed limits. As appropriate, identify animal and insect features and have them surveyed and marked for biota sampling.

Notes: Fourteen active and one inactive ant hills were observed on the cover, occurring primarily on the side-slopes. Two ant hill locations were selected, flagged for biota sampling, and surveyed using a GPS unit. The sampling locations are shown in the biological inspection map.

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**Mixed Waste Landfill**  
**Biology Inspection Checklist/Form for the MWL Cover**  
**(continued)**

Notes (continued):

General Observations:

- Overall, the MWL ET Cover vegetation is in excellent condition. The species complexity, spacing, and appearance of the mature native perennial grasses continues to be similar to that of the surrounding area vegetation. At the time of inspection seed heads were not abundant, making the quantification of grass species difficult due to identification primarily by seed head.
- Part of mirroring of the varied age surrounding native plant communities is that some of the older, large galleta bunch grasses, or portions of them, have died off throughout the MWL cover. And quite notably, black grama has recently propagated very well across the cover. Black grama grass is considered to be an important climax species of New Mexico grasslands, a final successional species in grassland development. Reproduction by seed is rare because the natural ratio of viable seeds to sterile ones is low. Black grama instead reproduces primarily by stolons, creeping horizontal plant stems or runners that root to form new plants. Another very interesting development is what appears to be the initial formation of biological soil crusts in at least one area of the MWL cover. Biological soil crusts are most often composed of fungi, lichens, cyanobacteria, bryophytes, and algae in varying proportions. These communities of living organisms grow on the soil surface in arid and semi-arid environments and perform important ecological roles including soil stabilization, carbon fixation, and nitrogen fixation.
- Overall, there is still a low weed presence on MWL Cover. Russian thistle and other species of weed, including spotted sandmat (listed here for species inclusion) were clearly more abundant this year than last year. The application of a pre-emergent herbicide should be considered before the 2022 growing season to prevent the germination of this years' weed seeds in future years.
- A few lizards were observed on the MWL cover at the time of the inspection.

Biological Aspects Map -- [note: sketch map to locate specific features described above will be attached as appropriate]

Inspector's Signature: \_\_\_\_\_

Date: August 16, 2021

Time: 11:20AM - 2:35PM

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center

**ANNEX G**

**Mixed Waste Landfill  
Biology Report**

**April 2021-March 2022**

# **2021-2022 Mixed Waste Landfill Biology Report**

## **1.0 Introduction**

As required by the Mixed Waste Landfill (MWL) Long-Term Monitoring and Maintenance Plan (LTMMMP) (SNL/NM March 2012, Section 4.2.1), this summary report for the annual reporting period (April 1, 2021-March 31, 2022) presents the results of vegetation inspection and monitoring activities performed by the staff biologist on the MWL Evapotranspirative (ET) Cover. The purpose of this report is to provide relevant background information, describe local climate trends over the 2021 growing season and reporting period, expand on the inspection results if appropriate, and provide recommendations for future ET Cover vegetation monitoring and maintenance. The annual Biology Inspection of the ET Cover was conducted on August 16, 2021. The inspection observations are documented on the *Biology Inspection Checklist/Form for the MWL Cover* and included in Annex F of this MWL Annual Long-Term Monitoring and Maintenance (LTMM) Report. The staff biologist also provided support during the other quarterly ET Cover Inspections (June and December 2020, and March 2021) as a best practice.

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. Native grass species create the optimal, self-sustaining plant community because the species are specifically adapted to the local climate and soil conditions. The MWL is located at an elevation of 5,380 feet in a 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 are ideal due to their extensive near-surface root systems that are poised to uptake moisture throughout the year and prevent precipitation from percolating more deeply into the subsurface soil. The deeper, permanent roots of perennial native grasses enable them to withstand drought conditions, provide soil stabilization, and remove moisture from deeper within the Native Soil Layer relative to non-native or annual species.

## **2.0 Background Information**

To meet the revegetation criteria as required in the MWL LTMMMP, Section 4.1, the MWL was seeded in August 2009 after cover construction was completed. The native seed mix was drill-seeded and hand-broadcast uniformly across the cover. To facilitate seed germination and seedling growth, supplemental watering was performed as approved by NMED (Bearzi December 2008). Specific conditions and limits for supplemental watering are addressed in Section 4.2.3 of the LTMMMP (SNL/NM March 2012). All cover maintenance and supplemental watering activities from 2009 through 2011 are documented in Appendix B of the LTMMMP. ET Cover maintenance and supplemental watering activities performed since 2011 are documented in MWL Annual LTMM Reports.

ET Cover Biology Inspections were initiated in May 2013 prior to LTMMMP approval, which occurred on January 8, 2014. The ET Cover met the LTMMMP criteria for successful revegetation as documented in all quarterly inspections. In accordance with the LTMMMP, the frequency of Biology Inspections transitioned to an annual frequency after the August 2014 growing season inspection, which provided confirmation that all successful revegetation criteria had been met (SNL/NM June 2015).

## **2021-2022 Mixed Waste Landfill Biology Report**

Percentage of vegetative cover of each plant species across the site (i.e., foliar coverage of living plants of each identified species) is determined by dividing the cover into smaller sections of approximately 35 meters by 35 meters. Each section is visually assessed for the percent cover of each species; the sections are then averaged overall for the entire cover. Species that are present at a density of less than one-half of one-percent (%) are recorded as “< 0.5%.” Due to the presence of these species in very low numbers, they are not calculated into the total vegetative coverage. Species that are present between one-half and one percent are recorded as “1%” and are calculated into the total vegetative coverage.

### **3.0 Local Climate Trends for 2021 Growing Season**

Climate trends for north-central New Mexico are presented in this section as they have a significant impact on the cover vegetation. Since the seeding occurred in August 2009, the local climate has generally been characterized by below average precipitation and warmer than average temperatures across the seasons.

Precipitation, relative humidity, wind speed, and temperature all impact soil moisture and plant growth. These meteorological factors are presented in the local meteorological discussion below. They are integrated into the U. S. Drought Monitor status (briefly summarized in the two following paragraphs), which is a very useful tool that provides a regularly updated snapshot summary of soil moisture and plant stress. Table 1 and 2 at the end of this report provide local SNL Technical Area III meteorological data for the period preceding and including the CY 2021 growing season. A 25-year data set (1995-2019) provides the reference mean monthly meteorological data and is included in Table 1 and 2 for comparison; these data are hereafter referred to as the “average.” Meteorological data for the January through March 2022 period will be presented and discussed in the June 2023 MWL Annual LTMM Report.

The U.S. Drought Monitor provides a simple but robust insight into the meteorological conditions affecting the local vegetation. It is a weekly updated map that shows the parts of the U.S. in drought and breaks them into categories depending on severity. This weekly map is produced jointly by the National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of Agriculture (USDA), and the National Drought Mitigation Center (NDMC) at the University of Nebraska-Lincoln. The map authors synthesize varied drought indicator data sources to create a snapshot of current drought conditions. Data sources include climatological inputs, soil moisture indicators, hydrologic data, and contributions from a nationwide network of more than 450 scientific observers.

At the time of the 2021 Biology Inspection, the MWL area drought status was on the border between D2 Severe and D3 Extreme Drought. This status indicates crops are impacted and the native vegetation is likely under significant stress.

Soil moisture content 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. In arid and semiarid climates such as New Mexico, plant functions such

## **2021-2022 Mixed Waste Landfill Biology Report**

as growth and photosynthesis are limited by low soil moisture conditions (Xu January 2011). For this reason, monitoring the ET Cover vegetation and local meteorological conditions throughout the year is important. The following brief discussion of meteorological conditions includes the last three months of CY 2020.

### *Precipitation and Relative Humidity*

Extremely dry meteorological conditions dominated the nine months (October 2020 through June 2021) preceding the 2021 monsoon season. October 2020 through May 2021 was an eight-month period of significantly below average precipitation. June 2021 was the only month in this timeframe with above average precipitation. Monthly relative humidity was also lower than average during this timeframe except for the months of May and June 2021.

The North American Monsoon season is July through September and is an important feature of New Mexico's summer climate and growing season. Monsoonal moisture typically provides approximately half of the annual precipitation in the Kirtland Air Force Base area. Slightly above-average precipitation was received overall during the 2021 monsoon season (total of 4.35 inches versus 4.17 inches). Relative humidity was above average in July, but slightly below average in August and September.

The last three months of 2021 experienced a return to drier conditions, with below average precipitation and relative humidity. Total precipitation in 2021 was 6.81 inches, 23% below the annual average of 8.86 inches.

### *Temperature and Wind Speeds*

In CY 2021 the MWL experienced 96.5 degrees of temperature variability, with a low of 6.3°F in February and a high of 102.8°F in July. Monthly mean temperature for 2021 was 59.0°F, this was 1.6°F above the 25-year annual mean of 57.4°F. The monthly mean temperature for nine months in 2021 exceeded their 25-year monthly means, with a maximum variation of +5.6°F in November.

The 2021 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, except for November (1.1 miles per hour difference).

## **4.0 August 16, 2021 Inspection Results**

The August 16, 2021 MWL ET Cover Biology Inspection occurred during the warm New Mexico growing season after the monsoon rains had begun. Inspection during the growing season allows for the most accurate assessment of living plant coverage because the greatest amount of photosynthesis occurs during this time of the year.

The August 2021 MWL ET Cover Biology Inspection results confirmed the ET Cover continues to meet the successful revegetation criteria defined in the MWL LTMMMP, Section 4.1 (SNL/NM March 2012) as shown in the photographs of the ET Cover taken during the August 16, 2021 inspection presented at the end of this report. The approximate foliar

## **2021-2022 Mixed Waste Landfill Biology Report**

coverage of living plants was 41%, with 99% of the foliar coverage comprised of native perennial species. There were no contiguous bare areas that exceeded 200 square feet. Nearly all the MWL ET Cover vegetation was comprised of grasses, with galleta grass continuing as the dominant grass species (30% foliar coverage). The vegetative community was observed to be very healthy overall, with mature native species spaced evenly across the cover.

The overall species complexity, spacing, and appearance of the mature native grass community was very similar to the surrounding vegetation in Technical Area III. At the time of inspection seed heads were not abundant making identification of grass species difficult. Notably, some of the older, large galleta bunch grasses, or parts of them, had died and black grama (6% foliar coverage) propagated more across the cover. This is significant because black grama grass is an important climax species of New Mexico grasslands, a final successional species in grassland development. Overall there was a very low presence of weed species; however Russian thistle and other weed species were more abundant than at the time of the 2020 inspection.

No small animal burrows were observed on the MWL ET Cover during the August 2021 Biology Inspection. Fourteen active ant hills were observed across the ET Cover on both the side-slopes and cover surface, two of which were selected for biota surface soil sampling based on current ant activity and to obtain samples from different locations than last year's sampling locations. No potentially deep-rooted plants were observed on the ET Cover in 2021. Biota sampling activities and results are presented in Chapter 8 of this MWL Annual LTMM Report.

A few lizards were observed on the ET Cover. This observation is consistent with previous biology inspection observations that wildlife recognizes the MWL Cover as native habitat.

### **5.0 Cover Maintenance**

The successional development of the native grasses on the ET Cover has benefited greatly from best practice maintenance activities designed to minimize invasive weed growth. ET Cover best practice maintenance activities performed in CY 2021 are presented in Section 9.7 of this MWL Annual LTMM Report and were performed in response to inspections, general site conditions, and recommendations by the staff biologist. The four maintenance events conducted in March, May, July, and October were designed to achieve the long-term goal of establishing a healthy, self-sustaining native grass community on the ET Cover by reducing competition with weedy species for limited moisture and nutrients. This work included removal of live and dead weeds from the ET Cover, the storm-water diversion drainage, and other perimeter areas. In addition, an annual application of an herbicide sterilant (Hyvar) to the North and South Staging Areas was performed (May 2021).

### **6.0 Recommendations**

The MWL ET Cover Biology Inspections will continue on an annual frequency and be conducted in August or September. As a best practice, the SNL staff biologist will continue

## **2021-2022 Mixed Waste Landfill Biology Report**

to support quarterly ET Cover inspections, document observations, and provide recommendations to maintain the ecological health and integrity of the ET Cover.

Routine, minor weed removal events will be needed during the April 2022 – March 2023 reporting period to clear the perimeter fence and remove windblown tumbleweeds from the ET Cover, perimeter drainage, and perimeter area based on LTMMMP inspection requirements and best practice. If present, live annual weedy species on the MWL ET Cover and perimeter should also be removed during the growing season weed removal events if they pose a threat to the established native grasses. The North and South Staging Areas (graveled areas) are prone to weed growth; sterilant herbicide should be applied to these areas at the frequency recommended by the manufacturer. If observed, four-wing saltbush and any other potentially deep-rooted plants or shrubs will be pulled by hand, clipped at the ground surface, or removed for biota sampling. These routine weed control activities help the desired native grasses by reducing the availability of weed seeds and competition from the future growth of invasive plants.

The application of a pre-emergent herbicide should be considered for the ET Cover and perimeter fence area before the 2022 growing season to prevent the germination of the current weed seed bank. Given the low abundance of annual weedy species on the ET Cover in CY 2021 and the foliar coverage of mature native bunch grasses, this is not a critical weed control measure at this time.

Based upon experience since initial seeding of the ET Cover in 2009, maintenance activities have had a significant, positive impact on the establishment of healthy, self-sustaining, mature native grasses in a relatively short period of time. Successful revegetation requirements were met in 5 years after initial seeding; this is a process that could take 50 years or more without active seeding and maintenance activities.

### **8.0 References**

Bearzi, J.P. (New Mexico Environment Department), December 2008. Letter to K. Davis (U.S. Department of Energy) and F. Nimick (Sandia Corporation), "Conditional Approval, Mixed Waste Landfill Corrective Measures Implementation Plan, November 2005, Sandia National Laboratories NM5890110518, SNL-05-025." December 22, 2008.

Sandia National Laboratories/New Mexico (SNL/NM), March 2012. "Long-Term Monitoring and Maintenance Plan for the Mixed Waste Landfill," Environmental Restoration Operations, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), June 2015. "Mixed Waste Landfill Annual Long-Term Monitoring and Maintenance Report, January – March 2015," Sandia National Laboratories, Albuquerque, New Mexico.

U. S. Drought Monitor (March 2021)

Accessed March 2021.

<http://droughtmonitor.unl.edu/>

## 2021-2022 Mixed Waste Landfill Biology Report

**Table 1**  
**October-December 2020 Meteorological Data Summary for the Mixed Waste Landfill<sup>a</sup>**

Month	October	November	December	
<b>Temperature (°F)</b>				<b>3-Month Avg</b>
Monthly Mean	57.9	50.5	36.8	48.4
25-year Temp Means	58.0	46.6	37.3	47.3
<b>Precipitation (Inches)</b>				<b>3-Month Total</b>
Monthly Total	0.13	0.12	0.15	0.13
25-year Precip Means	0.95	0.47	0.57	0.66
<b>Relative Humidity (RH) (%)</b>				<b>3-Month Avg</b>
Monthly Mean	28.4	39.0	43.7	37.0
25-year RH Means	42.6	45.0	53.4	47.0
<b>Wind (Miles/hour)</b>				<b>3-Month Avg</b>
Monthly Mean	7.9	7.9	6.6	7.5
25-year Wind Means	7.9	7.1	6.7	7.2

<sup>a</sup>Information Source: SNL/NM Meteorological Monitoring Program.

% = Percent.

°F = Fahrenheit.

RH = Relative humidity.

SNL/NM = Sandia National Laboratories/New Mexico.



## 2021-2022 Mixed Waste Landfill Biology Report

**Table 2**  
**Summary of 2021 Meteorological Data at the Mixed Waste Landfill<sup>a</sup>**

Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	
Year	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	
<b>Temperature (°F)</b>													Annual <sup>b</sup>
Monthly Mean	37.9	41.3	48.1	57.2	66.9	77.5	76.5	75.9	72.5	58.8	52.2	43.4	59.0
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
<b>Precipitation (Inches)</b>													Annual <sup>c</sup>
Monthly Total	0.13	0.26	0.31	0.30	0.29	0.66	1.60	1.55	1.20	0.06	0.16	0.29	6.81
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
<b>Relative Humidity (%)</b>													Annual <sup>b</sup>
Monthly Mean	46.3	41.8	33.8	26.9	28.1	30.3	49.3	43.5	41.1	36.5	35.7	41.5	37.9
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
<b>Wind (Miles/hour)</b>													Annual <sup>b</sup>
Monthly Mean	7.7	8.8	9.4	11.1	10.7	9.8	8.4	8.6	7.2	7.8	6.0	7.0	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

<sup>a</sup>Information Source: SNL/NM Meteorological Monitoring Program.

<sup>b</sup>Values provided are averages of the monthly data.

<sup>c</sup>Values provided are totals of the monthly data.

% = Percent.

°F = Fahrenheit.

RH = Relative humidity.

SNL/NM = Sandia National Laboratories/New Mexico.

## **2021-2022 Mixed Waste Landfill Biology Report**

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## August 16, 2021 Mixed Waste Landfill Biology Inspection Photographs



Looking north from approximate center of ET Cover



Looking west from approximate center of ET Cover



## August 16, 2021 Mixed Waste Landfill Biology Inspection Photographs



Looking south from approximate center of ET Cover



Looking east from approximate center of ET Cover



## August 16, 2021 Mixed Waste Landfill Biology Inspection Photographs



North Slope of ET Cover: facing west from the upper eastern portion of slope



West Slope of ET Cover: looking south from northern end



## August 16, 2021 Mixed Waste Landfill Biology Inspection Photographs



South Slope of ET Cover: looking east from the western end



East slope of ET Cover: facing north from south of the dogleg



## August 16, 2021 Mixed Waste Landfill Biology Inspection Photographs



Northwest corner of ET Cover: facing center of cover



Southwest corner of ET Cover: facing center of cover



## August 16, 2021 Mixed Waste Landfill Biology Inspection Photographs



Southeast corner of ET Cover: facing center of cover



Northeast corner of ET Cover: facing center of cover