

6-21-2016

# Mixed Waste Landfill Annual Long-Term Monitoring & Maintenance Report, April 2015-March 2016 for Sandia National Laboratories/New Mexico, EPA ID Number NM5890110518 June 2016

Sandia National Laboratories/NM

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**National Nuclear Security Administration**  
**Sandia Field Office**  
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JUN 21 2016

Mr. John E. Kieling  
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Hazardous Waste Bureau  
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Santa Fe, New Mexico 87505

SUBJECT: Submittal of *Mixed Waste Landfill Annual Long-Term Monitoring & Maintenance Report, April 2015-March 2016*, for Sandia National Laboratories/New Mexico, Environmental Protection Agency Identification Number NM5890110518

Dear Mr. Kieling:

The Department of Energy/National Nuclear Security Administration and Sandia Corporation are submitting the *Mixed Waste Landfill Annual Long-Term Monitoring & Maintenance Report, April 2015-March 2016*, dated June 2016, to the New Mexico Environment Department. This submittal satisfies the requirements of Section 4.8.1 of the Mixed Waste Landfill (MWL) Long-Term Monitoring and Maintenance Plan and includes information for monitoring and inspection activities conducted at the MWL during the annual reporting period of April 2015-March 2016.

If you have questions, please contact David Rast of our staff at (505) 845-5349.

Sincerely,

James W. Todd  
Assistant Manager for Engineering

Enclosure

cc: See Page 2

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**Submittal of Mixed Waste Landfill  
Annual Long-Term Monitoring and Maintenance Report, April 2015-March 2016**

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

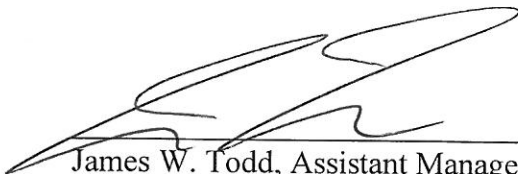
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17 Jun 2016  
Date Signed





**Sandia  
National  
Laboratories**

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**MIXED WASTE LANDFILL  
ANNUAL LONG-TERM MONITORING & MAINTENANCE REPORT  
APRIL 2015 – MARCH 2016**

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

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**JUNE 2016**



**U.S. DEPARTMENT OF  
ENERGY**



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

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National Nuclear Security Administration under contract DE-AC04-94AL85000.

**MIXED WASTE LANDFILL ANNUAL  
LONG-TERM MONITORING AND MAINTENANCE REPORT  
APRIL 2015–MARCH 2016**

**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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Annex E	Mixed Waste Landfill Groundwater Monitoring Forms and Reports April 2015 – March 2016
Annex F	Mixed Waste Landfill Inspection Forms April 2015 – March 2016
Annex G	Mixed Waste Landfill Biology Report April 2015 – March 2016

## ACRONYMS AND ABBREVIATIONS

AOP	Administrative Operating Procedure
AR/COC	Analysis Request/Chain-of-Custody
bgs	below ground surface
CAC	Corrective Action Complete
CY	Calendar Year
DI	deionized water
DO	dissolved oxygen
DOE	U.S. Department of Energy
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
ERFO	Environmental Resources Field Office
ET	evapotranspirative
eV	electron volts
FLUTE™	Flexible Liner Underground Technology, Ltd.™
FOP	Field Operating Procedure
GEL	GEL Laboratories LLC
gpm	gallons per minute
HWB	Hazardous Waste Bureau
KAFB	Kirtland Air Force Base
LTMM	Long-Term Monitoring and Maintenance
LTMMP	Long-Term Monitoring and Maintenance Plan
MDA	minimum detectable activity
MDL	method detection limit
µg/L	micrograms per liter
mg/L	milligrams per liter
MWL	Mixed Waste Landfill
NMED	New Mexico Environment Department
NTU	nephelometric turbidity units
ORP	oxidation-reduction potential
PCE	tetrachloroethene
pCi/L	picocuries per liter
pH	potential of hydrogen
PID	photoionization detector
ppbv	parts per billion by volume
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

## **ACRONYMS AND ABBREVIATIONS (Concluded)**

SAP	Sampling and Analysis Plan
Sandia	Sandia Corporation
SC	specific conductance
SME	subject matter expert
SNL	Sandia National Laboratories
SNL/NM	Sandia National Laboratories, New Mexico
TA	Technical Area
TCE	trichloroethene
VOC	volatile organic compound

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## 1.0 INTRODUCTION

Sandia National Laboratories (SNL) is a multi-purpose engineering and science laboratory owned by the U.S. Department of Energy (DOE)/National Nuclear Security Administration. SNL is managed and operated by Sandia Corporation (Sandia), a wholly-owned subsidiary of Lockheed Martin Corporation. Sandia National Laboratories, New Mexico (SNL/NM) is 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 Albuquerque International Sunport, in the north-central portion of Technical Area (TA)-III (Figure 1-2).

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

All MWL Long-Term Monitoring and Maintenance Plan (LTMMMP) (SNL/NM March 2012) monitoring, inspection, and maintenance/repair requirements have been met for the April 1, 2015 through March 31, 2016 reporting period. This MWL Annual Long-Term Monitoring and 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 Secretary of the Environment's Final Order *In the Matter of Request for a Class 3 Permit Modification for Corrective Measures for the Mixed Waste Landfill* No. HWB 04-11(M) (Curry May 2005)
- Compliance Order on Consent (NMED April 2004)
- Resource Conservation and Recovery Act (RCRA) Facility Operating Permit for Sandia National Laboratories, EPA ID No. NM5890110518 (Permit) (NMED January 2015)

On February 12, 2016, the New Mexico Environment Department (NMED) Secretary Ryan Flynn issued the Final Order *In the Matter of Proposed Permit Modification for Sandia National Laboratories EPA ID No. NM5890110518 to Determine Corrective Action Complete with Controls at the Mixed Waste Landfill*, No. HWB 15-18 (P) (Flynn 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 (CAC) with Controls.

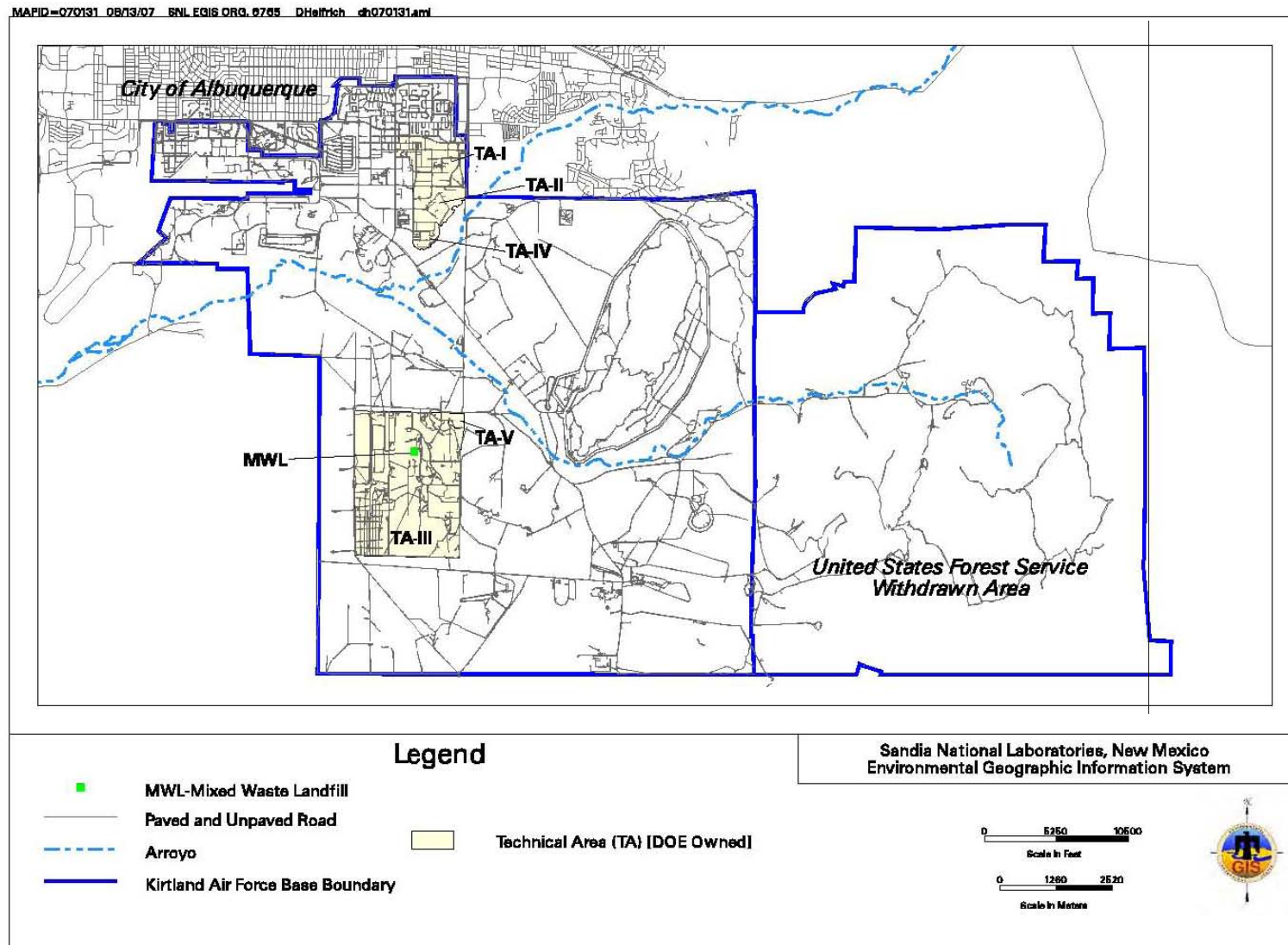


Figure 1-1  
Location of the Mixed Waste Landfill with respect to Kirtland Air Force Base and the City of Albuquerque

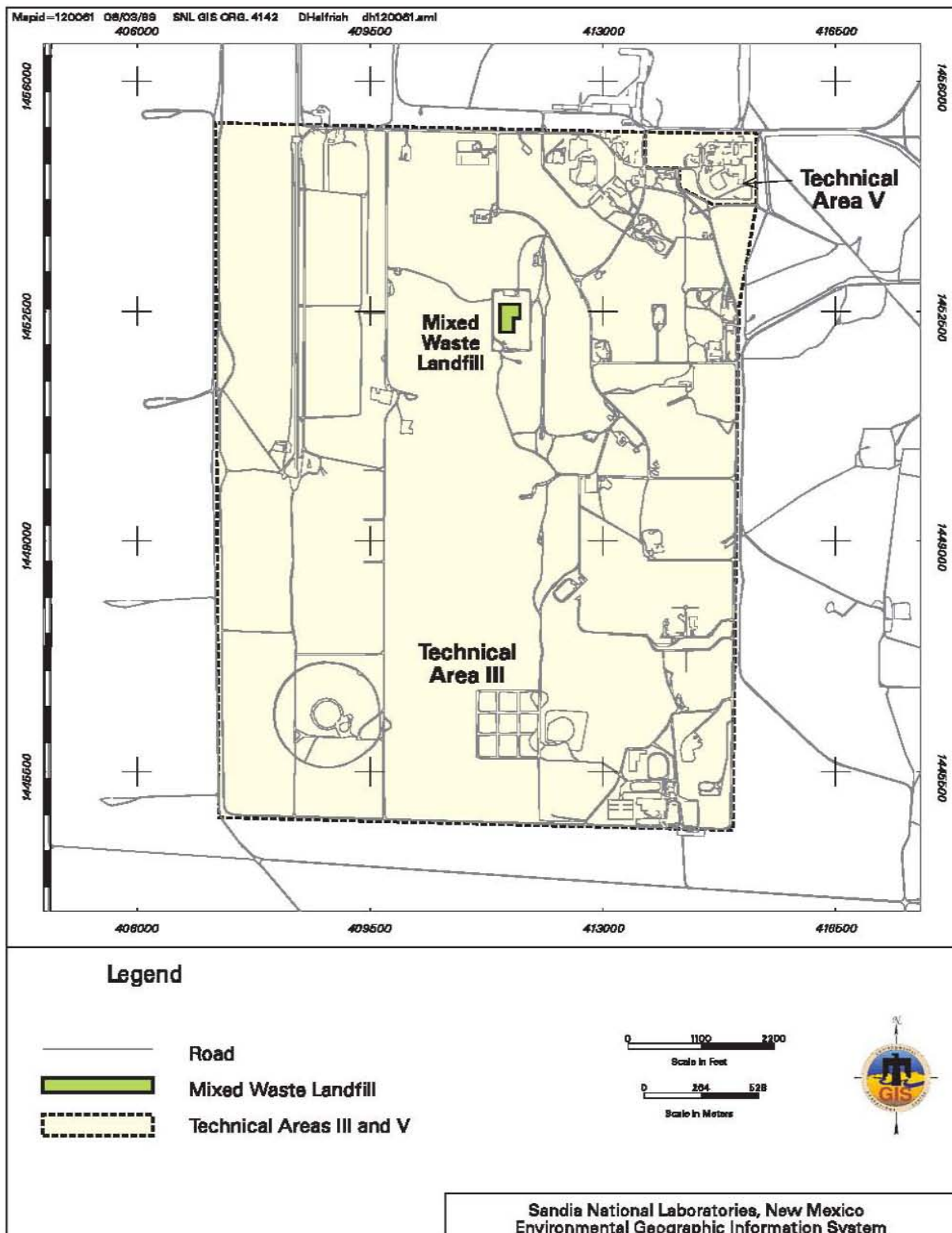


Figure 1-2  
Location of the Mixed Waste Landfill within Technical Area III

All controls required for the MWL are defined in the MWL LTMMMP that was approved by NMED on January 8, 2014 (Blaine January 2014) and was included in Attachment M of the SNL RCRA Facility Operating Permit (Kieling February 2016). The MWL LTMMMP (SNL/NM March 2012) defines all long-term monitoring, inspection, maintenance/repair, and reporting requirements that are applicable to the MWL. In addition to an annual report, DOE and Sandia are required to submit various documents as specified in the LTMMMP.

## **1.1 Purpose and Scope**

The purpose of this Annual LTMM Report is to document monitoring, inspection, maintenance, and repair activities conducted during the April 1, 2015 through March 31, 2016 reporting period. This is the third MWL Annual LTMM Report since approval of the MWL LTMMMP on January 8, 2014, and the second report that documents a complete reporting-year period. The LTMMMP includes requirements for documentation of all monitoring, inspection, and maintenance/repair activities conducted during each reporting period.

## **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 are included that provide supporting information as follows:

- Annex A – Radon Monitoring Forms
- 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 LTMMMP and are briefly summarized in this chapter. Monitoring requirements are described in Section 2.1 and generate empirical data that are evaluated to assess site conditions. Inspection requirements are described in Section 2.2 and include requirements to perform maintenance and/or repairs. As a whole, these activities ensure the physical controls at the MWL are maintained, perform as designed, and provide the information needed to assess ET Cover performance.

### **2.1 Monitoring Requirements**

The primary objective of the monitoring activities at the MWL 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 (volatile organic compounds [VOCs] in soil vapor and soil-moisture content), groundwater, and biota (surface soil and vegetation). The multi-media monitoring program is summarized in Table 2-1, which details information for each monitoring activity including the sampling media, monitoring parameters, frequency, number of samples, locations, and monitoring methods.

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 samples, and data evaluation protocols.

Sampling and Analysis Plans (SAPs) for each monitoring activity are included in MWL LTMMMP, Appendices C through G. Results for monitoring activities conducted at the MWL in the subject reporting period are presented in Chapters 3 through 8.

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

The primary objective of inspection, maintenance, and repair activities at the MWL is to ensure that the ET Cover, other physical controls at the site (i.e., surface-water diversion features, perimeter security fence, and survey monuments), 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 MWL LTMMMP 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 MWL LTMMMP, Annex I. Results of inspection activities conducted at the MWL in the subject reporting period are presented in Chapter 9. The following sections provide additional background information on MWL inspections and associated maintenance/repairs.

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	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	Track-etch detectors (at breathing zone height); sampling and analysis per LTMMP Appendix C	Samples are time-weighted average and will be collected over a 3-month 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 MWL ET Cover.	Grab samples of soil collected; moisture extracted and analyzed for tritium using liquid scintillation per LTMMP 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 LTMMP 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 LTMMP 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 MWL 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 (short list) 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 Reevaluation Report.

<sup>b</sup>Sampling and Analysis Plans and sampling requirements 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 reseedings	Within 60 days of discovery of needed repairs. Reseeding repairs may be delayed to await 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 await 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 wind-blown plants and debris	Remove wind-blown 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).

<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.

ET = Evapotranspirative.

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

MWL = Mixed Waste Landfill.

### 2.2.1 ET Cover Biology Inspection

The ET Cover consists of four main layers: Compacted Subgrade, 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 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 TA-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 ET Cover to the west (Figure 2-3).

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 are met as defined in Section 4.1 of the MWL LTMM. The August 2014 Biology Inspection was the last quarterly inspection conducted as part of the first phase. Completion of the first phase initiated transition to the second phase of annual inspections. The second phase annual inspections are performed near the end of the growing season (August–September) to determine the coverage of living plants. The staff biologist continues to document 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 LTMM is noted on the Biology Inspection Checklist/Form and appropriate maintenance/repairs must be completed within 60 days of the notation. 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 summarized the results of the annual inspection and local climate trends, and presents recommendations in a summary report included in the Annual LTMM Report (Annex G). The annual *Biology Inspection Checklist/Form* is included in the Annual LTMM Report (Annex F).

### 2.2.2 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*.



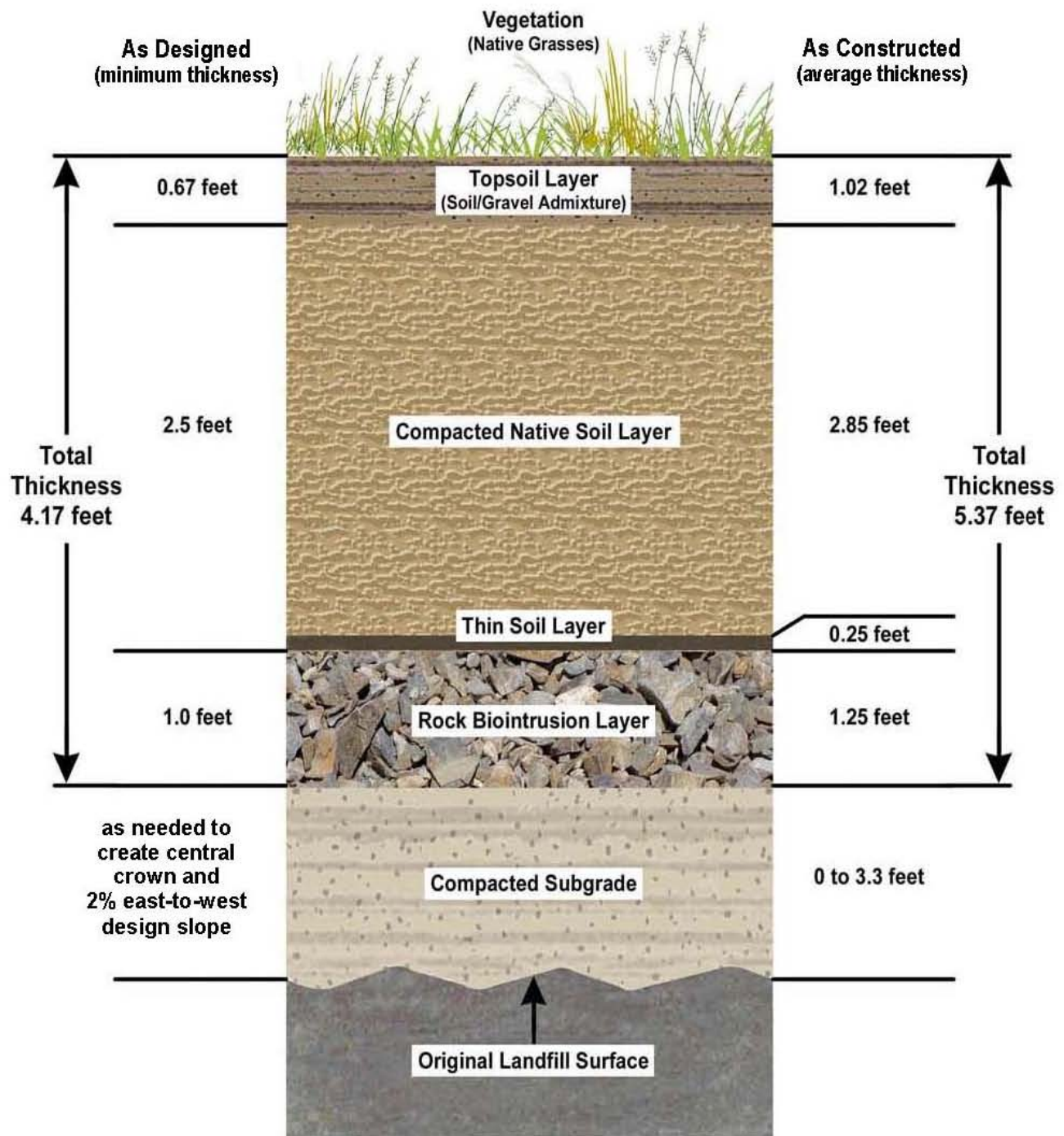


Figure 2-1  
Schematic Profile of the Mixed Waste Landfill Evapotranspirative Cover Layers

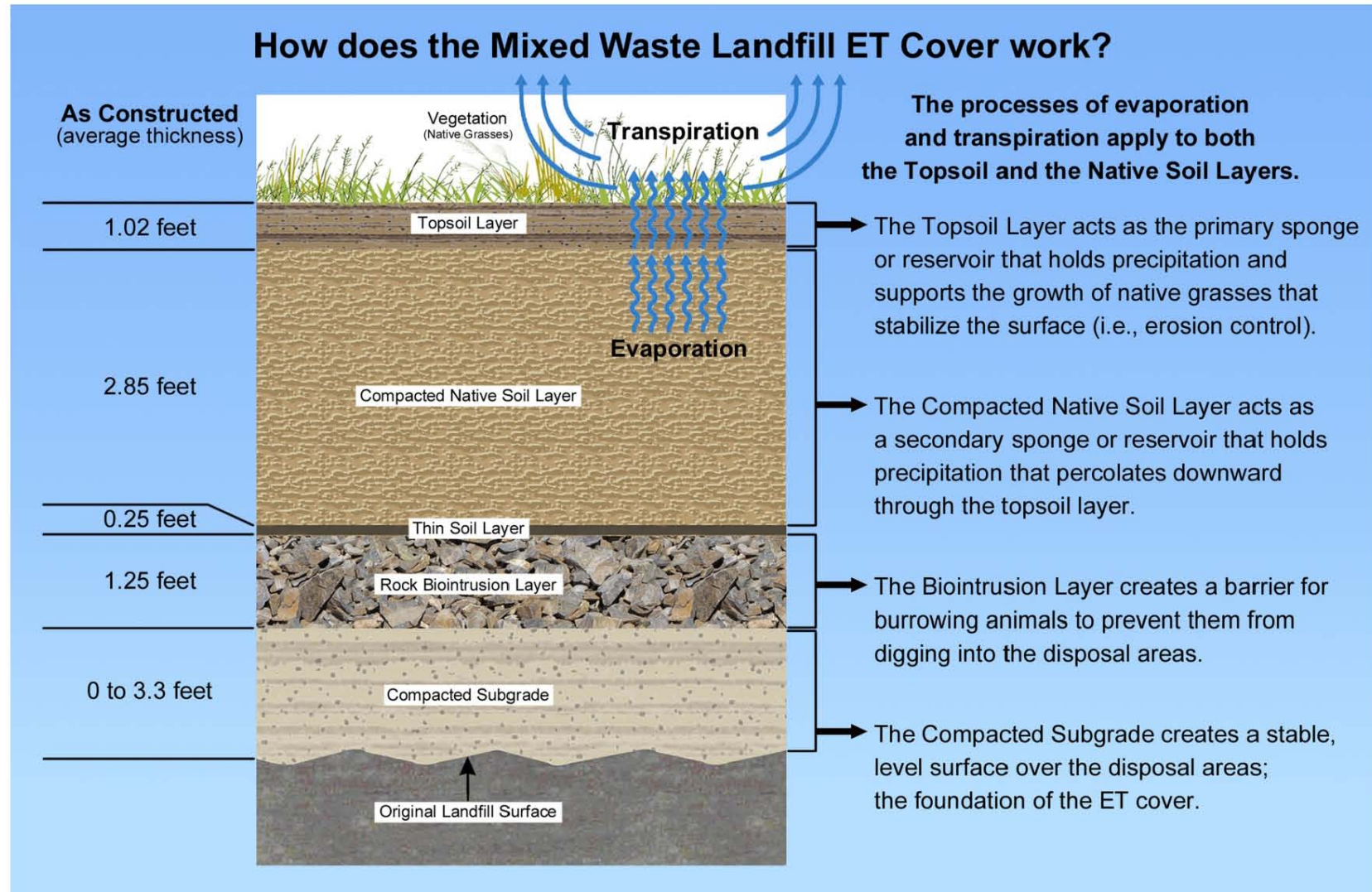


Figure 2-2  
Schematic Profile of the Mixed Waste Landfill Evapotranspirative Cover and How it Works

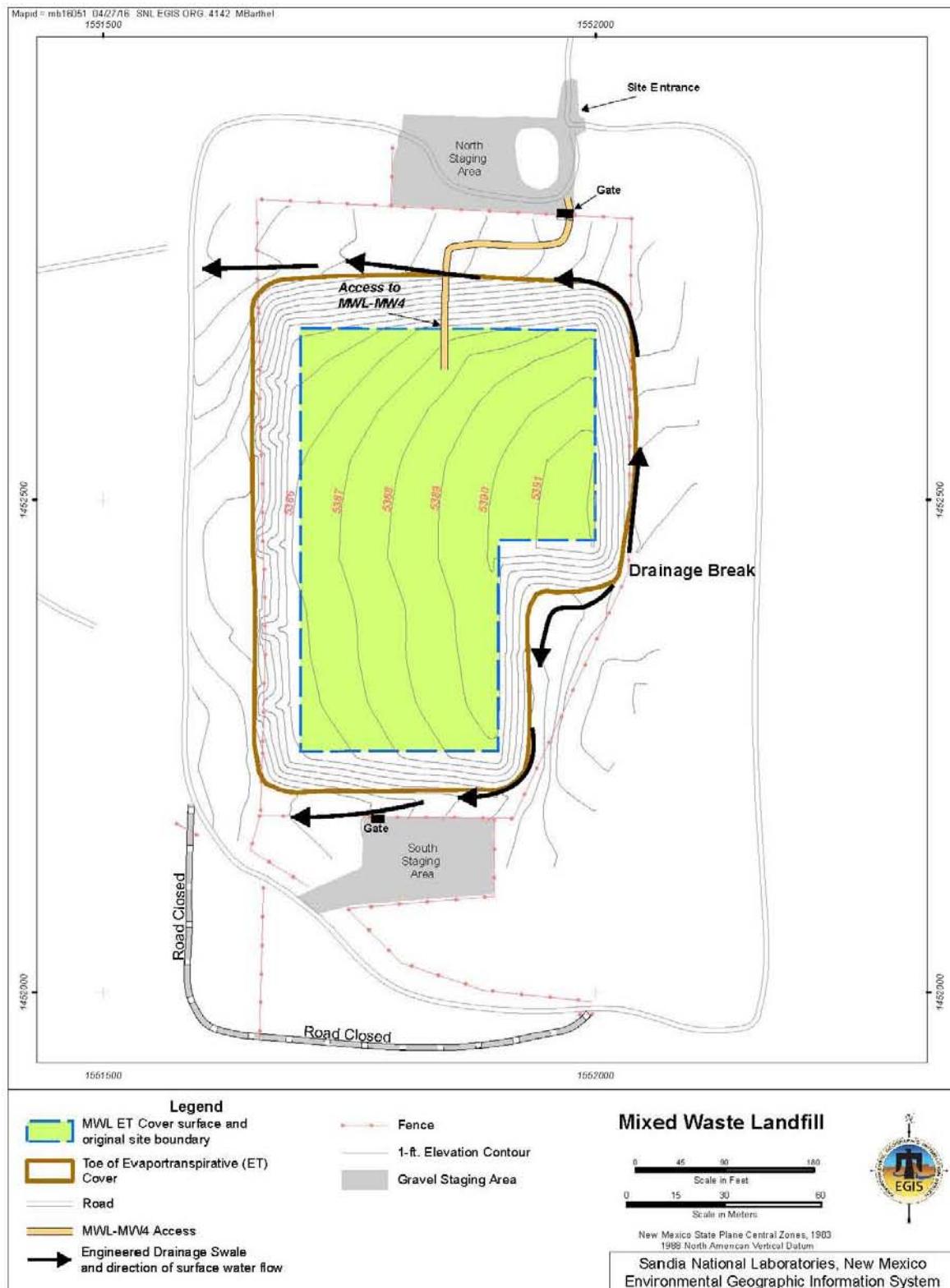


Figure 2-3  
Mixed Waste Landfill Engineered Storm-Water Drainage Swale

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 notation. Reseeding repairs may be delayed until the appropriate time during the growing season (Table 2-2).

### 2.2.3 Monitoring Networks and Sampling Equipment

Groundwater monitoring wells, soil-vapor monitoring wells, soil-moisture monitoring access tubes, and associated sampling/monitoring equipment are inspected at the same frequency and during the associated monitoring events. 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 LTMMP 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) 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. Results from the monitoring stations located along the perimeter security fence (locations RN1 through RN 10) are compared to trigger levels defined in LTMMP Section 5.2.1.

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**

This section describes radon monitoring activities conducted at the MWL in conformance with LTMMP Appendix C, which describes the procedures, methods, and analytical protocols for deploying, collecting, and analyzing radon monitoring samples.

Four monitoring events were conducted during calendar year (CY) 2015, fulfilling the LTMMP quarterly monitoring requirement. Radon monitoring presented for this April 1, 2015 through March 31, 2016 reporting period covers the CY 2015 period January 1, 2015 through December 31, 2015 due to the time required for laboratory analysis and data review after collection of the detectors in the field (i.e., the January through March 2015 monitoring results are presented in this report, and the January through March 2016 monitoring results will be presented in the next annual report).

In accordance with Chapter 3 of the LTMMP, the radon monitoring frequency will transition to semiannual for the next reporting period. Two years of quarterly radon monitoring have been completed. Detectors will be deployed and collected every six months starting in January 2016.

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 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 detector deployment and collection for each quarter, location number, quarterly average radon air concentrations in picocuries per liter (pCi/L), and the CY 2015 annual average radon air concentrations.

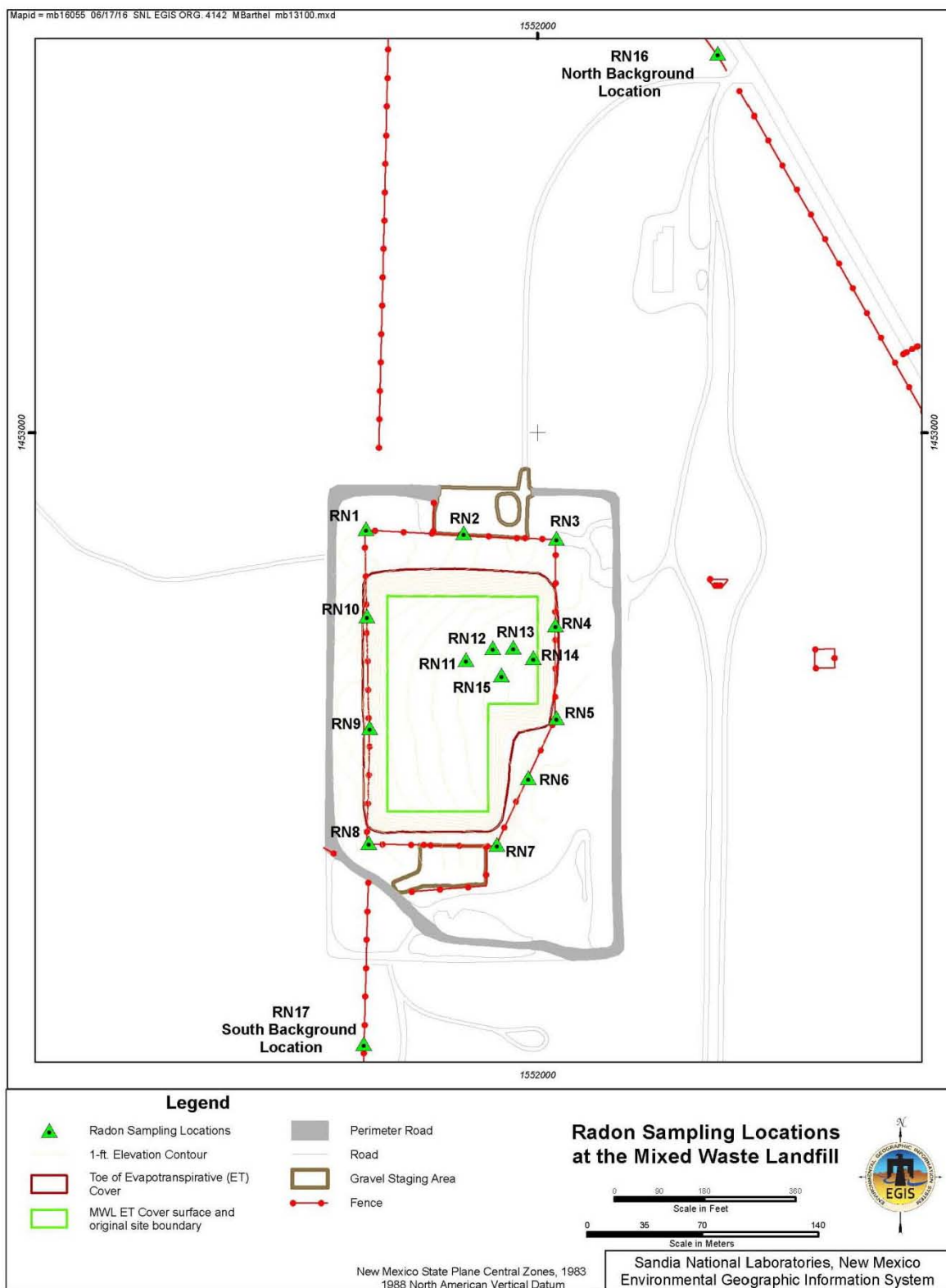


Figure 3-1  
Mixed Waste Landfill Radon Detector Locations

Table 3-1  
Summary of Radon Results  
Mixed Waste Landfill Air Monitoring  
Calendar Year 2015

Sample Location <sup>a</sup>	1 <sup>st</sup> Quarter		2 <sup>nd</sup> Quarter		3 <sup>rd</sup> Quarter		4 <sup>th</sup> Quarter		CY 2015 Average Radon Air Concentration (pCi/L)	Trigger Level (pCi/L)
	Detector Deployment Date	Detector Collection Date	Detector Deployment Date	Detector Collection Date	Detector Deployment Date	Detector Collection Date	Detector Deployment Date	Detector Collection Date		
	1/7/2015	4/2/2015	4/2/2015	7/2/2015	7/2/2015	10/5/2015	10/5/2015	1/7/2016		
	Quarterly Time-Weighted Average Radon Air Concentration (pCi/L)									
<b>RN1</b>	0.9		0.4		0.6		0.4		0.6	4
<b>RN2</b>	1.1		0.5		0.5		0.4		0.6	4
<b>RN3</b>	0.9		0.6		0.4		0.6		0.6	4
<b>RN4</b>	1.2		0.6		0.6		0.4		0.7	4
<b>RN5</b>	1.1		0.7		0.4		0.4		0.7	4
<b>RN6</b>	0.8		0.4		0.6		0.6		0.6	4
<b>RN7</b>	0.9		0.9		0.5		0.5		0.7	4
<b>RN8</b>	0.9		0.6		0.4		0.3		0.6	4
<b>RN9</b>	1.1		0.5		0.5		0.7		0.7	4
<b>RN10</b>	0.6		0.5		0.5		0.5		0.5	4
RN11	1.0		0.4		0.6		0.9		0.7	NA
RN12	0.8		0.6		0.5		0.4		0.6	NA
RN13	1.0		0.7		0.5		0.4		0.7	NA
RN14	0.9		0.5		0.4		0.6		0.6	NA
RN15	0.7		0.6		0.4		0.8		0.6	NA
<b>Background Locations and Quality Control</b>										
RN16	0.6		0.5		0.7		0.6		0.6	NA
RN17	0.7		0.8		0.6		0.7		0.7	NA
RNTB	<0.4 <sup>b</sup>		<0.3 <sup>b</sup>		<0.3 <sup>b</sup>		<0.3 <sup>b</sup>		<0.3 <sup>b</sup>	NA

Notes:

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

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

CY = Calendar year.

NA = Not applicable.

pCi/L = Picocuries per liter.

RNTB = Trip blank.

Quarterly monitoring results are reviewed and evaluated by an SNL/NM radiological subject matter expert (SME). The data evaluation letter reports prepared by the SME also include the corresponding laboratory data sheets, Analysis Request/Chain-of-Custody forms (AR/COCs), and pictures of the radon monitoring station equipment and configuration. They are provided in Annex A.

### 3.1.1 Radon Monitoring Detector Deployment and Collection

Radtrak<sup>®</sup> radon detectors were deployed and collected at the 17 sampling locations as shown in Table 3-1 and Figure 3-1. During the months in between deployment and collection, inspections were conducted to ensure the deployed detectors were in good condition. All detectors were found in good condition during the monitoring period at the times of collection.

### 3.1.2 Field Quality Control

Field quality control (QC) measures associated with each quarterly monitoring event include two types of samples, a field control sample (trip blank) and two field background samples. The trip blank analysis 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 during each sampling event at areas outside of the MWL, but within TA-III, to confirm natural radon activities in the vicinity of the MWL (Figure 3-1). The two field background sample results are compared to the sample detectors results that characterize radon activities 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. After analysis radon detectors are disposed of by the analytical laboratory.

## 3.2 Laboratory Results

This section summarizes quarterly radon air monitoring results for CY 2015. The radon air measurements were obtained using Radtrak<sup>®</sup> radon detectors. Radtrak<sup>®</sup> is an alpha-track radon gas detector designed to monitor radon exposure for three months to one year to obtain a long-term average activity over time. The detectors were submitted to Landauer<sup>®</sup> Incorporated for analysis. Analytical laboratory reports, including the analytical method, dates of analyses, results of QC analyses, and contract verification reviews are filed in the SNL/NM Record Center.

### 3.2.1 Environmental Sample Results

The compiled quarterly monitoring results are presented in Table 3-1. Figure 3-2 shows the tabulated data in graphical form along with the trigger level of 4 pCi/L. No sample locations exceeded the trigger level of 4 pCi/L. The CY 2015 average radon activity at locations RN1 through RN15 ranged from 0.5 to 0.7 pCi/L. The CY 2015 average radon activity at background



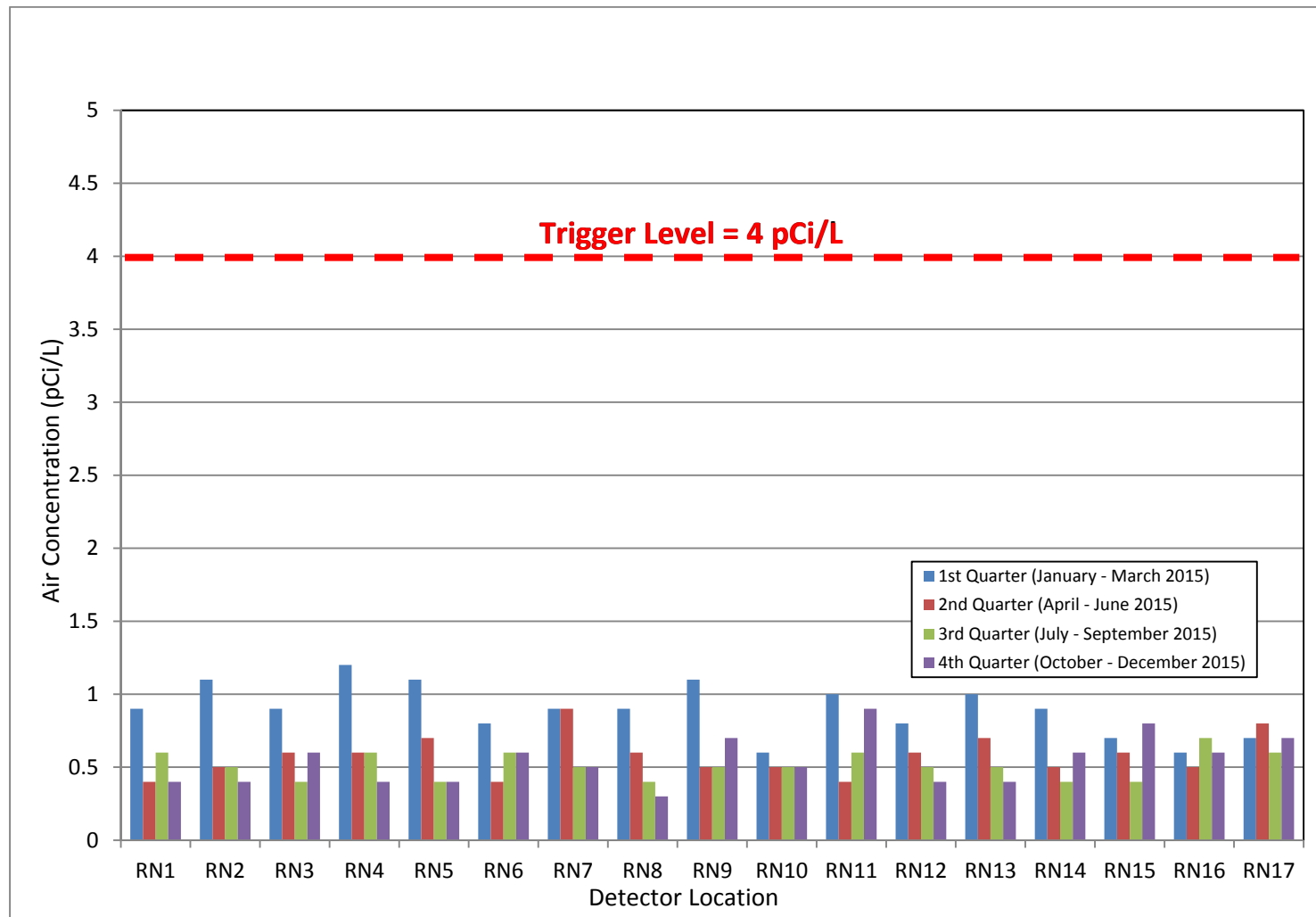


Figure 3-2  
Mixed Waste Landfill  
Calendar Year 2015 Quarterly Air Monitoring Results

locations RN16 and RN17 ranged from 0.6 to 0.7 pCi/L, respectively. The individual CY 2015 detected activity ranged from 0.3 pCi/L at location RN8 (4<sup>th</sup> Quarter results) to 1.2 pCi/L at location RN4 (1<sup>st</sup> Quarter 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 during each quarterly sampling event. The results from analysis of the trip blanks confirmed there was no contamination during storage and shipment of detectors RN1 through RN17 to the analyzing laboratory.

The two field background sample results (RN16 and RN17) for each quarter are compared to the quarterly sample results for detectors RN1 through RN15 and are shown in Figure 3-2. These background sample results show that conditions at the MWL are essentially equivalent to background conditions.

### 3.2.3 Data Quality

There were no data quality issues associated with CY 2015 radon monitoring. The radon results are acceptable and met the DQOs.

### 3.2.4 Variances and Non-Conformances

There were no variances or non-conformances for radon sampling.

## 3.3 Data Evaluation and Monitoring Trigger Level

The trigger level for radon in air is 4 pCi/L, which applies to the detectors RN1 through RN10 located on the perimeter fence. The trigger level of 4 pCi/L is the same as the U.S. Environmental Protection Agency (EPA)-recommended action level for radon in households. There was no exceedance of the 4.0 pCi/L trigger level at any of the radon sampling locations during CY 2015.

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

This chapter presents monitoring activities for tritium-in-surface soil (i.e., sampling and analysis), analytical results, and data evaluation in accordance with LTMMMP 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 trigger levels defined in LTMMMP 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 and Section 4.4 presents historic data evaluation. A summary of tritium surface soil monitoring activities and results is provided in Section 11.1.

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

This section describes activities conducted in conformance with LTMMMP Appendix G, which describes the procedures, methods, and analytical protocols for collecting and analyzing tritium surface soil samples. The August 2015 results are presented in the following sections.

Surface soil samples were collected at the four ET Cover corner monitoring locations on August 4, 2015 fulfilling the annual monitoring requirement (Figure 4-1). Samples were collected during the New Mexico monsoon season to ensure adequate soil moisture for analysis.

Quarterly monitoring results are reviewed and evaluated by an SNL/NM radiological SME. Annex B contains the AR/COC forms and the data evaluation memo prepared by the radiological SME that includes an evaluation and summary of the data.

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

A field QC sample (duplicate soil sample) was collected as part of the August 4, 2015 tritium sampling event in accordance with the Tritium and Biota SAP (Appendix G, Table G-4.2-1 of the LTMMMP), which requires that one duplicate sample pair be collected for every twenty environmental samples. The environmental-duplicate sample pair for the August 2015 sampling event was collected at the southeast corner of the ET Cover, tritium monitoring location MWL TS-2SE (Figure 4-1).

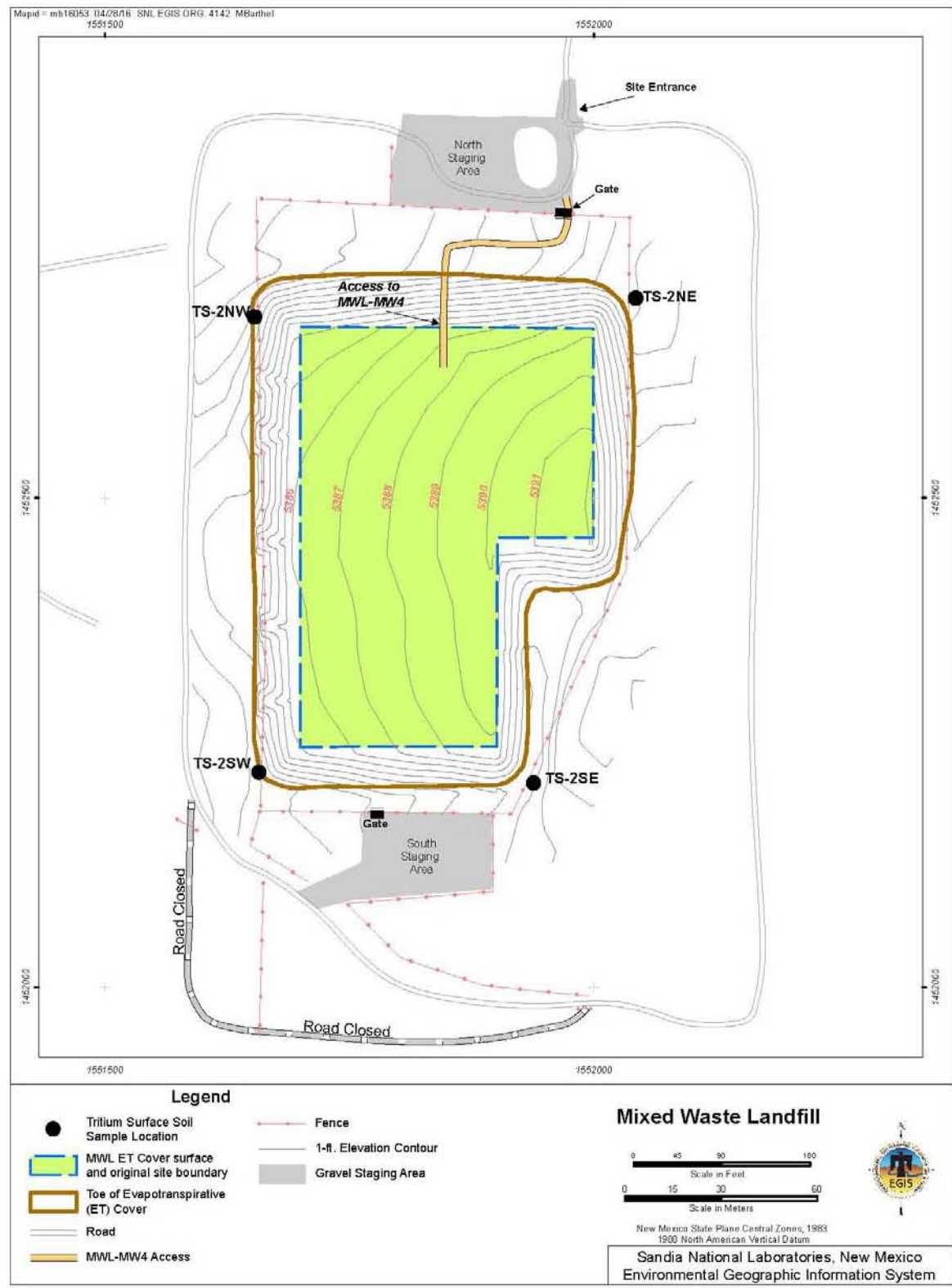


Figure 4-1  
Mixed Waste Landfill Tritium Surface Soil Sampling Locations

#### 4.1.2 Waste Management

Waste generated during sampling activities included personal protective equipment (PPE) (i.e. gloves) and decontamination wipes. Waste was managed in accordance with all applicable requirements. Analytical data collected from the sampling event was used to characterize the waste; it was determined to be non-hazardous and non-radioactive and was managed as solid waste.

### 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 analysis, in accordance with EPA Method 906.0. Tritium activity is determined in the moisture extracted from the soil sample, so results are sensitive to in-situ moisture content of the soil collected. Analytical results that are below the minimum detectable activity (MDA) are qualified with a “U” and are designated as below detection. 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 2015 sampling event. Tritium activity was detected above the MDA in all samples at very low activities, ranging from 269 pCi/L (southeast ET Cover corner location, MWL TS-2SE duplicate sample) to 719 pCi/L (northwest ET Cover corner location, MWL TS-2NW). All results were less than three times the MDA, except for the MWL TS-2NW result of 719 pCi/L. These results are consistent with the January 2015 results from the previous LTMM reporting period, which ranged from 1,010 pCi/L to 1,830 pCi/L. All results 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 duplicate results is calculated using the following formula.

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

where:  $R_1$  = Analysis result.  
 $R_2$  = Duplicate analysis result.

Table 4-1  
Summary of Tritium Results (EPA Method 906.0<sup>a</sup>)  
Mixed Waste Landfill Surface Soil Monitoring  
August 2015

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 2015					
MWL TS-2NW	719 ± 171	1.92	197	--	--	20,000
MWL TS-2SW	527 ± 152	2.51	198	--	J	
MWL TS-2SE	369 ± 136	2.60	195	--	J	
MWL TS-2SE (Duplicate)	269 ± 131	2.78	200	--	J	
MWL TS-2NE	550 ± 153	2.33	196	--	J	

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.

<sup>b</sup>Laboratory/Validation Qualifier: If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted samples. "J" indicates the associated value is an estimated quantity; result is greater than the MDA, but less than 3 times the MDA.

EPA = U.S. Environmental Protection Agency.

MDA = Minimum detectable activity.

MWL = Mixed Waste Landfill.

pCi/L = Picocuries per liter.

The RPD value for the environmental-duplicate sample pair collected at MWL TS-2SE in August 2015 shows good agreement, with a calculated value of 31. RPD values less than or equal to 35 are considered acceptable per Section 2.3 in Appendix G of the LTMMMP.

#### 4.2.3 Laboratory Quality Control and Data Quality

Field QC sample results validated the field sampling procedures and protocol. Internal laboratory QC samples were analyzed concurrently with all environmental samples in accordance with laboratory procedures and EPA methods. These included laboratory control samples, method blanks, and matrix spike 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 2014a).

Based upon the data validation and review criteria, all tritium results were determined acceptable and met the DQOs. Reported QC sample results were in compliance with analytical method and laboratory procedure requirements. Data Validation Reports and Contract Verification Review forms are provided in Annex B.

#### 4.2.4 Variances and Non-Conformances

There were no variances or non-conformances for tritium surface soil sampling.

### **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, as specified in LTMMP Section 5.2.2.1 (SNL/NM March 2012). No sample results from August 2015 exceeded the trigger level.

### **4.4 Historic Data Evaluation**

Tritium surface soil sampling has been conducted at the MWL since August 1985 at various locations around the MWL perimeter. The tritium sampling being performed under the LTMMP is a continuation of this monitoring effort. Historic tritium data from 1985 through 1999 did not go through the same rigorous data quality review process as data collected since June 2000, but the earlier data do provide useful information regarding tritium levels over time.

Trend plots are not presented in this Annual LTMM Report because the factors that affect tritium results in surface soil samples at these very low activities (e.g., soil-moisture content and barometric conditions) overwhelm the subtle changes in actual, measurable tritium flux. The data collected in August 2015 are consistent with the historical data and demonstrate consistent, tritium activity at very low levels that are close to the laboratory MDA. The results are consistent with no new releases from the disposal areas.

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## 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 LTMMP Sections 3.4.1 and Appendix D (SNL/NM March 2012). The soil-vapor monitoring objective is to provide spatial and temporal concentration data for VOCs in the soil vapor at various depths throughout the approximately 500-foot-thick vadose zone beneath the MWL (i.e., unsaturated soil and sediments above the regional groundwater aquifer). 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 LTMMP Section 5.2.3.1.

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

### 5.1 Soil-Vapor Sampling Field Activities

This section describes soil-vapor monitoring activities conducted at the MWL in conformance with the MWL Soil-Vapor SAP, LTMMP Appendix D, which describes the procedures, methods, and analytical protocols for collecting and analyzing soil-vapor samples. Field forms and documentation that address calibration of equipment, well evacuation, purge volumes, and vacuum pressure readings for each sample container are provided in Annex C.

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

Two soil-vapor monitoring events were conducted during the April 1, 2015 through March 31, 2016 reporting period fulfilling the LTMMP semiannual monitoring requirement. The two soil-vapor monitoring events are described as follows.

- The first sampling event was conducted on April 14 and 15, 2015. Soil-vapor samples were collected from all monitoring wells (MWL-SV01, MWL-SV02, MWL-SV03, MWL-SV04, and MWL-SV05). Duplicate samples were collected from two MWL-SV03 sample ports (50 and 200-foot bgs).
- The second sampling event was conducted on October 8, 2015. Soil-vapor samples were collected from all monitoring wells and duplicate samples were collected from MWL-SV01 and MWL-SV02 (sample ports located at 42.5 and 41.5 feet bgs, respectively).

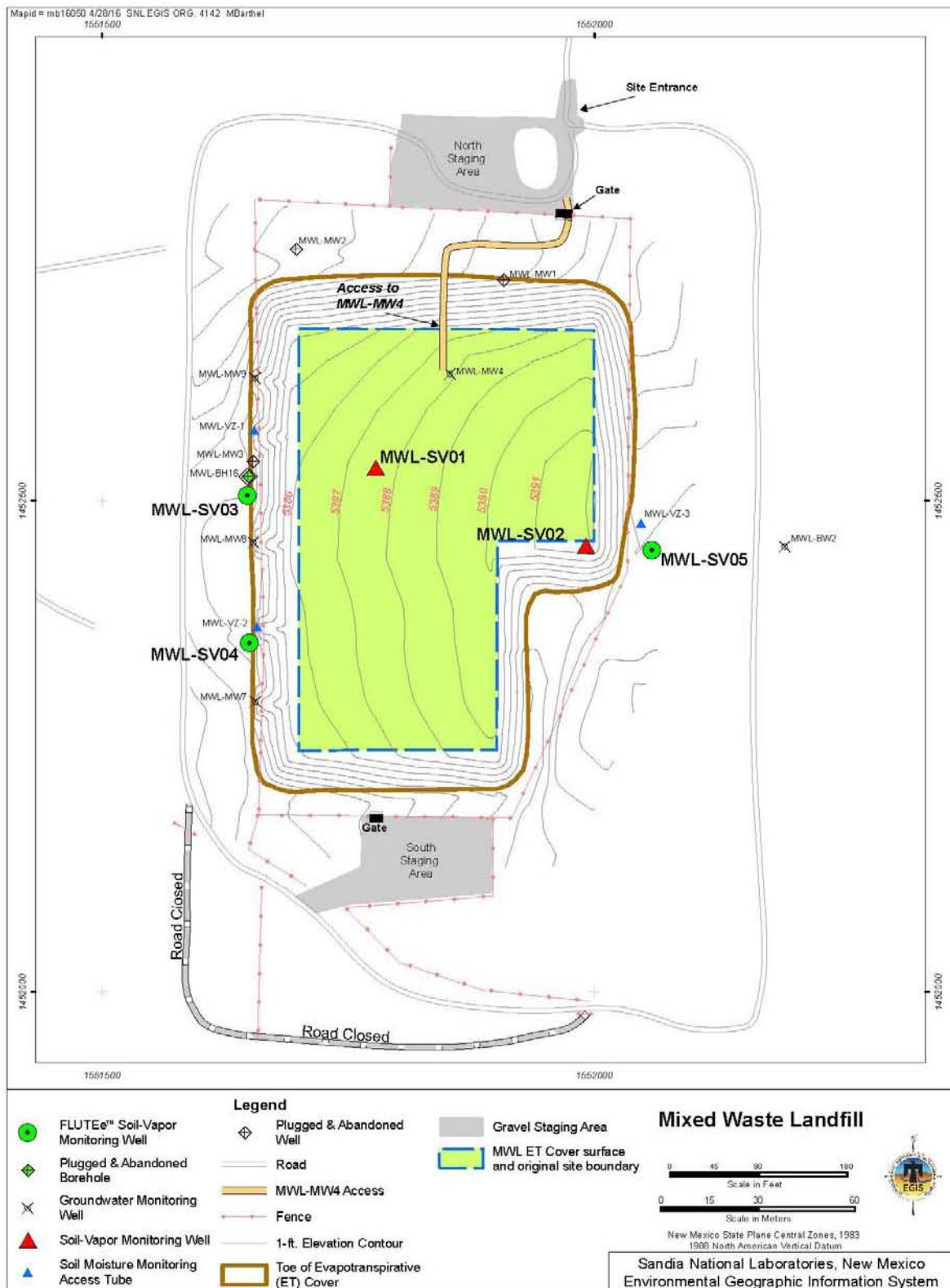


Figure 5-1  
Mixed Waste Landfill Soil-Vapor Monitoring Well Locations

### 5.1.1 Well Purging

Purging removes stagnant air from each monitoring port and associated sample tubing, and draws representative soil vapor from the soil 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 Sampling," (SNL/NM June 2014b), and LTMMMP Appendix D. All wells were purged using a dedicated (to the MWL) vacuum pump. Real time continuous VOC screening was performed with a PID to determine VOC stabilization during the purging process. After achieving stabilization, PID VOC concentrations ranged from 0.0 to 0.6 parts per million by volume (ppmv) for all wells and sampling ports.

### 5.1.2 Field Quality Control

Field QC samples include duplicate samples (minimum of two per semiannual monitoring event) and field blank samples. Field QC samples were submitted for analysis with the soil-vapor samples and analytical results are presented in Section 5.2.2 and Annex C. Two environmental-duplicate sample pairs were collected from each sample port selected for the collection of duplicate samples. One environmental-duplicate sample pair was collected simultaneously with a new sample manifold system (i.e., both samples collected at the same time), and a second environmental-duplicate sample pair was collected in series, with the duplicate sample collected immediately after the environmental sample (method previously used). Both methods are performed in a manner to reduce variability caused by time and/or sampling mechanics. These sample results were used to evaluate the new manifold system equipment, as well as the reproducibility of the sampling and analytical processes. The new sample manifold system was developed and tested to evaluate its potential as an improvement to the soil-vapor monitoring process.

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.

The field QC sampling protocol for the April and October 2015 sampling events included the collection of two environmental-duplicate sample pairs from the sample ports located at 50 feet bgs and 200 feet bgs at monitoring well MWL-SV03 in April, and from monitoring well MWL-SV01 (sample port located at 42.5 feet bgs) and MWL-SV02 (sample port located at 41.5 feet bgs) in October. A total of five QC field blank samples were submitted for analysis for each of the events. Field QC sample results are presented in Section 5.2.2 for the April and October 2015 sampling events.

### 5.1.3 Waste Management

A small volume of solid waste (e.g., PPE) was generated during the two soil-vapor monitoring events. This waste was combined with the solid waste generated during groundwater monitoring activities and managed in accordance with all applicable requirements.

## 5.2 Laboratory Results

Environmental and field QC soil-vapor samples were submitted to Test America Laboratories, Inc. 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.

### 5.2.1 Environmental Sample Results

This section summarizes soil-vapor monitoring results for the April 1, 2015 through March 31, 2016 reporting period. A summary of compounds detected in each event is provided below, along with a discussion of soil-vapor trigger levels defined in LTMMMP Section 5.2.3.1.

#### First Semiannual Sampling Event – April 14 and 15, 2015

A total of 19 compounds were detected above laboratory MDLs in April 2015 samples. Of the 19 detected VOCs, only 2-hexanone was not detected in the October samples.

Acetone	cis-1,2-Dichloroethene
Benzene	2-Hexanone
2-Butanone	Methylene Chloride
Carbon Disulfide	Tetrachloroethene (PCE)
Carbon Tetrachloride	Toluene
Chloroform	Trichloroethene (TCE)
Chloromethane	Trichlorofluoromethane
Dichlorodifluoromethane	1,1,1-Trichloroethane
1,1-Dichloroethane	1,1,2-Trichloro-1,2,2-trifluoroethane
1,1-Dichloroethene	

Tetrachloroethene (PCE) and trichloroethene (TCE) are the primary VOCs of concern, exhibited the highest concentrations, and were reported in all environmental samples. PCE was detected at concentrations ranging from 0.055 to 0.460 ppmv, and TCE concentrations ranged from 0.060 to 0.290 ppmv. Other VOCs detected in all samples, generally at lower concentrations, include acetone, dichlorodifluoromethane, 1,1-dichloroethane, 1,1-dichloroethene, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1,1-trichloroethane, and trichlorofluoromethane. The maximum VOC concentration was 0.460 ppmv PCE from MWL-SV01-42.5.

#### Second Semiannual Sampling Event – October, 2015

A total of 19 compounds were detected above laboratory MDLs in October 2015 samples. Of the 19 detected VOCs, only vinyl acetate was not detected in the April samples.

Acetone	cis-1,2-Dichloroethene
Benzene	Methylene Chloride

2-Butanone	Tetrachloroethene (PCE)
Carbon Disulfide	Toluene
Carbon Tetrachloride	Trichloroethene (TCE)
Chloroform	Trichlorofluoromethane
Chloromethane	1,1,1-Trichloroethane
Dichlorodifluoromethane	1,1,2-Trichloro-1,2,2-trifluoroethane
1,1-Dichloroethane	Vinyl Acetate
1,1-Dichloroethene	

PCE and TCE exhibited the highest concentrations, and were reported in all environmental samples. PCE was detected at concentrations ranging from 0.040 ppmv to 0.470 ppmv. TCE concentrations ranged from 0.052 ppmv to 0.350 ppmv. Other VOCs detected in all samples, generally at lower concentrations, included chloroform, dichlorodifluoromethane, 1,1-dichloroethane, 1,1-dichloroethene, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1,1-trichloroethane, and trichlorofluoromethane. The maximum VOC concentration was 0.470 ppmv PCE from MWL-SV01-42.5.

Table 5-1 and Table 5-2 summarize detected VOCs results for the April 2015 and October 2015 sampling events, respectively. Table 5-3 provides results for PCE, TCE, and Total VOCs (i.e., the sum of validated detected VOCs) for the four semiannual monitoring events conducted since implementation of the LTMMP in 2014. The following general points summarize key points from the evaluation of the 2014 and 2015 soil-vapor monitoring results.

- In general, 2015 results for all monitoring well sampling ports are all low concentrations (i.e., less 0.500 ppmv) and consistent with the 2014 results.
- The soil-vapor monitoring results are consistent with an old source (i.e., disposal period of 1958 through 1988) that has slowly dissipated throughout the vadose zone.
- The distribution of VOC concentrations beneath the MWL indicates the soil-vapor plume is stable with no new releases from the disposal area.
- 2014 and 2015 results for the shallower sampling depths closer to the disposal areas (i.e., sample port depths ranging from 41.5 to 100 feet bgs at all five monitoring wells) reflect lower concentrations than were measured during the Phase 2 RFI in 1994 (Peace et al. September 2002) and 2008 VOC Soil-Vapor Investigation (SNL/NM August 2008).
- All results for the three deepest sampling ports of MWL-SV03 through MWL-SV05 (400 feet bgs) are similar to the results from the 100 foot and 200 foot depths, and more than 25 times less than the associated trigger level.

The variation in PCE and TCE concentrations over the four sampling events conducted in 2014 and 2015 is less than 0.100 ppmv for all sampling ports except MWL-SV01-42.5 (PCE variation was 0.160 ppmv between the September and October 2014 results). Although the PCE concentrations have increased at MWL-SV03-400 since September 2014, the overall increase is very small, only 0.060 ppmv. The 42.5 foot bgs sample port of MWL-SV01 has consistently

Table 5-1  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
April 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV01-42.5</b> 15-Apr-15	Acetone	0.006	2.1	59	J, *	J
	Chloroform	0.014	1.1	3.5	--	--
	Dichlorodifluoromethane	0.130	1.7	4.7	--	--
	1,1-Dichloroethane	0.0036	0.85	3.5	--	--
	1,1-Dichloroethene	0.010	1.5	9.4	*	J
	cis-1,2-Dichloroethene	0.0011	1.1	4.7	J	--
	Tetrachloroethene	0.460	0.60	4.7	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.099	1.9	4.7	--	--
	1,1,1-Trichloroethane	0.054	0.77	3.5	--	--
	Trichloroethene	0.099	1.2	4.7	--	--
	Trichlorofluoromethane	0.240	2.3	4.7	--	--
	Total Organics <sup>d</sup>	1.1167	NA	NA	NA	NA
<b>MWL-SV02-41.5</b> 15-Apr-15	Acetone	0.0062	1.4	38	J, *	J
	2-Butanone	0.0023	1.5	6.1	J, *	J
	Chloroform	0.0032	0.73	2.3	--	--
	Dichlorodifluoromethane	0.110	1.1	3.1	--	--
	1,1-Dichloroethane	0.0022	0.55	2.3	J	--
	1,1-Dichloroethene	0.011	0.99	6.1	*	J
	cis-1,2-Dichloroethene	0.00080	0.68	3.1	J	--
	Tetrachloroethene	0.075	0.39	3.1	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.050	1.3	3.1	--	--
	1,1,1-Trichloroethane	0.077	0.50	2.3	--	--
	Trichloroethene	0.067	0.81	3.1	--	--
	Trichlorofluoromethane	0.360	1.5	3.1	--	--
	Total Organics <sup>d</sup>	0.7647	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
April 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV03-50</b> Manifold 14-Apr-15	Acetone	0.006	1.1	30	J	J
	Benzene	0.0018	0.47	2.4	J	--
	Chloroform	0.0015	0.57	1.8	J	--
	Dichlorodifluoromethane	0.024	0.87	2.4	--	--
	1,1-Dichloroethane	0.0025	0.43	1.8	--	--
	1,1-Dichloroethene	0.0092	0.77	4.8	--	J
	cis-1,2-Dichloroethene	0.0014	0.53	2.4	J	--
	Methylene Chloride	0.00067	0.43	2.4	J	J
	Tetrachloroethene	0.140	0.30	2.4	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.051	0.97	2.4	--	--
	1,1,1-Trichloroethane	0.0053	0.39	1.8	--	--
	Trichloroethene	0.092	0.63	2.4	--	--
	Trichlorofluoromethane	0.023	1.2	2.4	--	--
	Total Organics <sup>d</sup>	0.35837	NA	NA	NA	NA
<b>MWL-SV03-50</b> Manifold 14-Apr-15 (Duplicate)	Acetone	0.0069	0.88	25	J	J
	Benzene	0.0016	0.39	2.0	J	--
	Chloroform	0.0013	0.47	1.5	J	--
	Dichlorodifluoromethane	0.021	0.71	2.0	--	--
	1,1-Dichloroethane	0.002	0.35	1.5	--	--
	1,1-Dichloroethene	0.0079	0.63	3.9	--	J
	cis-1,2-Dichloroethene	0.0011	0.44	2.0	J	--
	Methylene Chloride	0.00067	0.35	2.0	J	J
	Tetrachloroethene	0.120	0.25	2.0	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.045	0.80	2.0	--	--
	1,1,1-Trichloroethane	0.0044	0.32	1.5	--	--
	Trichloroethene	0.080	0.52	2.0	--	--
	Trichlorofluoromethane	0.020	0.96	2.0	--	--
	Total Organics <sup>d</sup>	0.31187	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
April 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV03-50</b> 14-Apr-15	Acetone	0.0040	0.87	24	J	J
	Benzene	0.0019	0.39	2.0	J	--
	Chloroform	0.0013	0.46	1.5	J	--
	Dichlorodifluoromethane	0.022	0.71	2.0	--	--
	1,1-Dichloroethane	0.0021	0.35	1.5	--	--
	1,1-Dichloroethene	0.0081	0.63	3.9	--	J
	cis-1,2-Dichloroethene	0.0011	0.43	2.0	J	--
	Methylene Chloride	0.00063	0.35	2.0	J	J
	Tetrachloroethene	0.130	0.25	2.0	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.046	0.80	2.0	--	--
	1,1,1-Trichloroethane	0.0047	0.32	1.5	--	--
	Trichloroethene	0.085	0.51	2.0	--	--
	Trichlorofluoromethane	0.020	0.96	2.0	--	--
	Total Organics <sup>d</sup>	0.32683	NA	NA	NA	NA
<b>MWL-SV03-50</b> 14-Apr-15 (Duplicate)	Acetone	0.0021	1.1	30	J	J
	Benzene	0.0021	0.47	2.4	J	--
	Carbon disulfide	0.00052	0.46	4.7	J	J
	Chloroform	0.0016	0.56	1.8	J	--
	Dichlorodifluoromethane	0.026	0.86	2.4	--	--
	1,1-Dichloroethane	0.0023	0.43	1.8	--	--
	1,1-Dichloroethene	0.0087	0.76	4.7	--	J
	cis-1,2-Dichloroethene	0.0013	0.53	2.4	J	--
	Methylene Chloride	0.00074	0.43	2.4	J	J
	Tetrachloroethene	0.150	0.30	2.4	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.050	0.97	2.4	--	--
	1,1,1-Trichloroethane	0.0054	0.39	1.8	--	--
	Trichloroethene	0.097	0.62	2.4	--	--
	Trichlorofluoromethane	0.023	1.2	2.4	--	--
	Total Organics <sup>d</sup>	0.37076	NA	NA	NA	NA

Refer to footnotes at end of table.



Table 5-1 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
April 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV03-100</b> 14-Apr-15	Acetone	0.0042	1.3	37	J	J
	Chloroform	0.0024	0.71	2.2	--	--
	Dichlorodifluoromethane	0.049	1.1	3.0	--	--
	1,1-Dichloroethane	0.0058	0.54	2.2	--	--
	1,1-Dichloroethene	0.025	0.96	6.0	--	J
	cis-1,2-Dichloroethene	0.0037	0.66	3.0	--	--
	Methylene Chloride	0.0021	0.54	3.0	J	J
	Tetrachloroethene	0.240	0.38	3.0	--	--
	Toluene	0.00046	0.38	3.0	J	3.0U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.120	1.2	3.0	--	--
	1,1,1-Trichloroethane	0.0067	0.48	2.2	--	--
	Trichloroethene	0.200	0.78	3.0	--	--
	Trichlorofluoromethane	0.036	1.5	3.0	--	--
	Total Organics <sup>d</sup>	0.6949	NA	NA	NA	NA
<b>MWL-SV03-200</b> Manifold 14-Apr-15	Acetone	0.0037	1.8	50	J	J
	Carbon disulfide	0.0023	0.78	8.0	J	J
	Chloroform	0.0021	0.95	3.0	J	--
	Dichlorodifluoromethane	0.070	1.4	4.0	--	--
	1,1-Dichloroethane	0.0083	0.72	3.0	--	--
	1,1-Dichloroethene	0.041	1.3	8.0	--	J
	cis-1,2-Dichloroethene	0.0048	0.89	4.0	--	--
	Methylene Chloride	0.0041	0.72	4.0	--	J
	Tetrachloroethene	0.290	0.51	4.0	--	--
	Toluene	0.00091	0.51	4.0	J	4.0U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.180	1.6	4.0	--	--
	1,1,1-Trichloroethane	0.0029	0.65	3.0	J	--
	Trichloroethene	0.270	1.0	4.0	--	--
	Trichlorofluoromethane	0.034	2.0	4.0	--	--
	Total Organics <sup>d</sup>	0.9132	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
April 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV03-200</b> Manifold 14-Apr-15 (Duplicate)	Acetone	0.0040	1.8	51	J	J
	Chloroform	0.0021	0.96	3.0	J	--
	Dichlorodifluoromethane	0.074	1.5	4.0	--	--
	1,1-Dichloroethane	0.0086	0.73	3.0	--	--
	1,1-Dichloroethene	0.043	1.3	8.1	--	J
	cis-1,2-Dichloroethene	0.0054	0.90	4.0	--	--
	Methylene Chloride	0.0043	0.73	4.0	--	J
	Tetrachloroethene	0.300	0.52	4.0	--	--
	Toluene	0.00092	0.52	4.0	J	4.0U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.190	1.6	4.0	--	--
	1,1,1-Trichloroethane	0.0031	0.66	3.0	--	--
	Trichloroethene	0.290	1.1	4.0	--	--
	Trichlorofluoromethane	0.035	2.0	4.0	--	--
	Total Organics <sup>d</sup>	0.9595	NA	NA	NA	NA
<b>MWL-SV03-200</b> 14-Apr-15	Acetone	0.0029	1.7	49	J	J
	Chloroform	0.0020	0.92	2.9	J	--
	Dichlorodifluoromethane	0.077	1.4	3.9	--	--
	1,1-Dichloroethane	0.0087	0.70	2.9	--	--
	1,1-Dichloroethene	0.044	1.3	7.8	--	J
	cis-1,2-Dichloroethene	0.0047	0.86	3.9	--	--
	Methylene Chloride	0.0042	0.70	3.9	--	J
	Tetrachloroethene	0.310	0.49	3.9	--	--
	Toluene	0.00090	0.49	3.9	J	3.9U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.200	1.6	3.9	--	--
	1,1,1-Trichloroethane	0.0030	0.63	2.9	--	--
	Trichloroethene	0.290	1.0	3.9	--	--
	Trichlorofluoromethane	0.037	1.9	3.9	--	--
	Total Organics <sup>d</sup>	0.9835	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
April 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV03-200</b> 14-Apr-15 (Duplicate)	Acetone	0.0048	1.5	43	J, *	J
	Carbon tetrachloride	0.00056	0.55	6.9	J	--
	Chloroform	0.0021	0.82	2.6	J	--
	Dichlorodifluoromethane	0.070	1.2	3.4	--	--
	1,1-Dichloroethane	0.0091	0.62	2.6	--	--
	1,1-Dichloroethene	0.045	1.1	6.9	*	J
	cis-1,2-Dichloroethene	0.0052	0.77	3.4	--	--
	Methylene Chloride	0.0044	0.62	3.4	*	J
	Tetrachloroethene	0.310	0.44	3.4	--	--
	Toluene	0.00099	0.44	3.4	J	3.4U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.210	1.4	3.4	--	--
	1,1,1-Trichloroethane	0.0030	0.56	2.6	--	--
	Trichloroethene	0.290	0.91	3.4	--	--
	Trichlorofluoromethane	0.036	1.7	3.4	--	--
	Total Organics <sup>d</sup>	0.99016	NA	NA	NA	NA
<b>MWL-SV03-300</b> 14-Apr-15	Acetone	0.0070	1.6	46	J, *	J
	Carbon disulfide	0.0054	0.72	7.4	J, *	J
	Dichlorodifluoromethane	0.029	1.3	3.7	--	--
	1,1-Dichloroethane	0.0018	0.66	2.8	J	--
	1,1-Dichloroethene	0.014	1.2	7.4	*	J
	cis-1,2-Dichloroethene	0.0015	0.82	3.7	J	--
	Methylene Chloride	0.00086	0.66	3.7	J, *	J
	Tetrachloroethene	0.290	0.47	3.7	--	--
	Toluene	0.0023	0.47	3.7	J	3.7U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.065	1.5	3.7	--	--
	1,1,1-Trichloroethane	0.0011	0.60	2.8	J	--
	Trichloroethene	0.170	0.96	3.7	--	--
	Trichlorofluoromethane	0.0094	1.8	3.7	--	--
	Total Organics <sup>d</sup>	0.59506	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
April 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV03-400</b> 14-Apr-15	Acetone	0.0040	1.7	49	J, *	J
	Chloroform	0.0012	0.92	2.9	J	--
	Dichlorodifluoromethane	0.032	1.4	3.9	--	--
	1,1-Dichloroethane	0.0026	0.70	2.9	J	--
	1,1-Dichloroethene	0.025	1.3	7.8	*	J
	cis-1,2-Dichloroethene	0.0020	0.86	3.9	J	--
	Methylene Chloride	0.0012	0.70	3.9	J, *	J
	Tetrachloroethene	0.420	0.50	3.9	--	--
	Toluene	0.0029	0.50	3.9	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.091	1.6	3.9	--	--
	1,1,1-Trichloroethane	0.0016	0.63	2.9	J	--
	Trichloroethene	0.260	1.0	3.9	--	--
	Trichlorofluoromethane	0.016	1.9	3.9	--	--
	Total Organics <sup>d</sup>	0.8595	NA	NA	NA	NA
<b>MWL-SV04-50</b> 14-Apr-15	Acetone	0.0090	0.18	5.0	--	--
	Benzene	0.00093	0.079	0.40	--	--
	2-Butanone	0.0017	0.20	0.80	--	--
	Carbon disulfide	0.00015	0.078	0.80	J	--
	Carbon tetrachloride	0.00020	0.064	0.80	J	--
	Chloroform	0.0019	0.095	0.30	--	--
	Chloromethane	0.00077	0.20	0.80	J	--
	Dichlorodifluoromethane	0.020	0.15	0.40	--	--
	1,1-Dichloroethane	0.0015	0.072	0.30	--	--
	1,1-Dichloroethene	0.0072	0.13	0.80	--	--
	cis-1,2-Dichloroethene	0.00064	0.089	0.40	--	--
	2-Hexanone	0.00012	0.087	0.40	J	--
	Methylene Chloride	0.00013	0.072	0.40	J	--
	Tetrachloroethene	0.076	0.095	0.74	--	--
	Toluene	0.00019	0.051	0.40	J	0.4U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.065	0.30	0.74	--	--
	1,1,1-Trichloroethane	0.0070	0.065	0.30	--	--
	Trichloroethene	0.060	0.20	0.74	--	--
	Trichlorofluoromethane	0.023	0.20	0.40	--	--
	Total Organics <sup>d</sup>	0.28424	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
April 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV04-100</b> 14-Apr-15	Acetone	0.0041	0.93	26	J	--
	Benzene	0.00058	0.41	2.1	J	--
	Carbon disulfide	0.00072	0.41	4.2	J	--
	Carbon tetrachloride	0.00035	0.33	4.2	J	--
	Chloroform	0.0019	0.49	1.6	--	--
	Dichlorodifluoromethane	0.034	0.76	2.1	--	--
	1,1-Dichloroethane	0.0031	0.38	1.6	--	--
	1,1-Dichloroethene	0.018	0.67	4.2	--	--
	cis-1,2-Dichloroethene	0.0017	0.46	2.1	J	--
	Methylene Chloride	0.00061	0.38	2.1	J	--
	Tetrachloroethene	0.120	0.27	2.1	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.100	0.85	2.1	--	--
	1,1,1-Trichloroethane	0.0054	0.34	1.6	--	--
	Trichloroethene	0.120	0.55	2.1	--	--
	Trichlorofluoromethane	0.033	1.0	2.1	--	--
	Total Organics <sup>d</sup>	0.44346	NA	NA	NA	NA
<b>MWL-SV04-200</b> 14-Apr-15	Acetone	0.0039	1.5	43	J	--
	Carbon disulfide	0.0036	0.68	6.9	J	--
	Chloroform	0.0012	0.82	2.6	J	--
	Dichlorodifluoromethane	0.049	1.3	3.5	--	--
	1,1-Dichloroethane	0.0048	0.62	2.6	--	--
	1,1-Dichloroethene	0.033	1.1	6.9	--	--
	cis-1,2-Dichloroethene	0.0030	0.77	3.5	J	--
	Methylene Chloride	0.0015	0.62	3.5	J	--
	Tetrachloroethene	0.170	0.44	3.5	--	--
	Toluene	0.00070	0.44	3.5	J	3.5U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.150	1.4	3.5	--	--
	1,1,1-Trichloroethane	0.0024	0.56	2.6	J	--
	Trichloroethene	0.190	0.91	3.5	--	--
	Trichlorofluoromethane	0.031	1.7	3.5	--	--
	Total Organics <sup>d</sup>	0.6434	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
April 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV04-300</b> 14-Apr-15	Acetone	0.0045	0.68	19	J	--
	Benzene	0.00039	0.30	1.5	J	--
	Carbon disulfide	0.00091	0.30	3.1	J	--
	Dichlorodifluoromethane	0.019	0.56	1.5	--	--
	1,1-Dichloroethane	0.00073	0.28	1.1	J	--
	1,1-Dichloroethene	0.0084	0.49	3.1	--	--
	cis-1,2-Dichloroethene	0.00048	0.34	1.5	J	--
	Methylene Chloride	0.00031	0.28	1.5	J	--
	Tetrachloroethene	0.110	0.20	1.5	--	--
	Toluene	0.00093	0.20	1.5	J	1.5U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.055	0.62	1.5	--	--
	1,1,1-Trichloroethane	0.00063	0.25	1.1	J	--
	Trichloroethene	0.064	0.40	1.5	--	--
	Trichlorofluoromethane	0.0091	0.75	1.5	--	--
	Total Organics <sup>d</sup>	0.27345	NA	NA	NA	NA
<b>MWL-SV04-400</b> 14-Apr-15	Acetone	0.0087	0.90	25	J	--
	Benzene	0.0011	0.40	2.0	J	--
	2-Butanone	0.0019	1.0	4.0	J	--
	Carbon disulfide	0.0054	0.39	4.0	--	--
	Dichlorodifluoromethane	0.014	0.73	2.0	--	--
	1,1-Dichloroethane	0.00048	0.36	1.5	J	--
	1,1-Dichloroethene	0.0054	0.65	4.0	--	--
	Tetrachloroethene	0.120	0.26	2.0	--	--
	Toluene	0.00066	0.26	2.0	J	2.0U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.043	0.82	2.0	--	--
	1,1,1-Trichloroethane	0.00044	0.33	1.5	J	--
	Trichloroethene	0.060	0.53	2.0	--	--
	Trichlorofluoromethane	0.0066	0.99	2.0	--	--
	Total Organics <sup>d</sup>	0.26702	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
April 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV05-50</b> 14-Apr-15	Acetone	0.0051	0.53	15	J	--
	Benzene	0.00038	0.23	1.2	J	--
	2-Butanone	0.00073	0.59	2.4	J	--
	Carbon tetrachloride	0.00034	0.19	2.4	J	--
	Chloroform	0.0014	0.28	0.89	--	--
	Dichlorodifluoromethane	0.041	0.43	1.2	--	--
	1,1-Dichloroethane	0.0018	0.21	0.89	--	--
	1,1-Dichloroethene	0.011	0.38	2.4	--	--
	cis-1,2-Dichloroethene	0.00068	0.26	1.2	J	--
	Methylene Chloride	0.00047	0.21	1.2	J	--
	Tetrachloroethene	0.055	0.15	1.2	--	--
	Toluene	0.00055	0.15	1.2	J	1.2U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.046	0.48	1.2	--	--
	1,1,1-Trichloroethane	0.013	0.19	0.89	--	--
	Trichloroethene	0.064	0.31	1.2	--	--
	Trichlorofluoromethane	0.099	0.58	1.2	--	--
	Total Organics <sup>d</sup>	0.3399	NA	NA	NA	NA
<b>MWL-SV05-100</b> 14-Apr-15	Acetone	0.0035	1.1	31	J	--
	Carbon tetrachloride	0.00059	0.40	5.0	J	--
	Chloroform	0.0021	0.59	1.9	--	--
	Dichlorodifluoromethane	0.067	0.91	2.5	--	--
	1,1-Dichloroethane	0.0037	0.45	1.9	--	--
	1,1-Dichloroethene	0.024	0.81	5.0	--	--
	cis-1,2-Dichloroethene	0.0016	0.56	2.5	J	--
	Methylene Chloride	0.0012	0.45	2.5	J	--
	Tetrachloroethene	0.100	0.32	2.5	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.095	1.0	2.5	--	--
	1,1,1-Trichloroethane	0.013	0.41	1.9	--	--
	Trichloroethene	0.130	0.66	2.5	--	--
	Trichlorofluoromethane	0.130	1.2	2.5	--	--
	Total Organics <sup>d</sup>	0.57169	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
April 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV05-200</b> 14-Apr-15	Acetone	0.0080	1.7	49	J	--
	Carbon tetrachloride	0.0011	0.63	7.8	J	--
	Chloroform	0.0019	0.93	2.9	J	--
	Dichlorodifluoromethane	0.068	1.4	3.9	--	--
	1,1-Dichloroethane	0.0053	0.70	2.9	--	--
	1,1-Dichloroethene	0.045	1.3	7.8	--	--
	cis-1,2-Dichloroethene	0.0025	0.87	3.9	J	--
	Methylene Chloride	0.0033	0.70	3.9	J	--
	Tetrachloroethene	0.150	0.50	3.9	--	--
	Toluene	0.00072	0.50	3.9	J	3.9U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.160	1.6	3.9	--	--
	1,1,1-Trichloroethane	0.0037	0.64	2.9	--	--
	Trichloroethene	0.210	1.0	3.9	--	--
	Trichlorofluoromethane	0.078	1.9	3.9	--	--
	Total Organics <sup>d</sup>	0.7368	NA	NA	NA	NA
<b>MWL-SV05-300</b> 14-Apr-15	Acetone	0.011	0.55	16	J	--
	Benzene	0.00026	0.25	1.2	J	--
	2-Butanone	0.0014	0.62	2.5	J	--
	Carbon tetrachloride	0.00078	0.20	2.5	J	--
	Chloroform	0.00050	0.30	0.93	J	--
	Chloromethane	0.0035	0.61	2.5	--	--
	Dichlorodifluoromethane	0.024	0.45	1.2	--	--
	1,1-Dichloroethane	0.0011	0.22	0.93	--	--
	1,1-Dichloroethene	0.019	0.40	2.5	--	--
	cis-1,2-Dichloroethene	0.00054	0.28	1.2	J	--
	Methylene Chloride	0.00067	0.22	1.2	J	--
	Tetrachloroethene	0.097	0.16	1.2	--	--
	Toluene	0.0011	0.16	1.2	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.075	0.51	1.2	--	--
	1,1,1-Trichloroethane	0.00091	0.20	0.93	J	--
	Trichloroethene	0.082	0.33	1.2	--	--
	Trichlorofluoromethane	0.017	0.61	1.2	--	--
	Total Organics <sup>d</sup>	0.33576	NA	NA	NA	NA

Refer to footnotes at end of table.



Table 5-1 (Concluded)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
April 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV05-400</b> 14-Apr-15	Acetone	0.0059	0.50	14	J	--
	Benzene	0.00040	0.22	1.1	J	--
	2-Butanone	0.00059	0.56	2.2	J	--
	Carbon disulfide	0.00026	0.22	2.2	J	--
	Carbon tetrachloride	0.00035	0.18	2.2	J	--
	Chloroform	0.00038	0.27	0.84	J	--
	Chloromethane	0.00097	0.55	2.2	J	--
	Dichlorodifluoromethane	0.013	0.40	1.1	--	--
	1,1-Dichloroethane	0.00098	0.20	0.84	--	--
	1,1-Dichloroethene	0.0071	0.36	2.2	--	--
	cis-1,2-Dichloroethene	0.00036	0.25	1.1	J	--
	Methylene Chloride	0.00049	0.20	1.1	J	--
	Tetrachloroethene	0.080	0.14	1.1	--	--
	Toluene	0.029	0.14	1.1	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.033	0.45	1.1	--	--
	1,1,1-Trichloroethane	0.00097	0.18	0.84	--	--
	Trichloroethene	0.066	0.29	1.1	--	--
	Trichlorofluoromethane	0.011	0.55	1.1	--	--
	Total Organics <sup>d</sup>	0.25075	NA	NA	NA	NA

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" Center for Environmental Research Information, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio.

<sup>b</sup>Results are reported in ppmv. MDL and RL are reported in ppbv.

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

\* = Laboratory control samples outside acceptance limits.

J = Estimated value.

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 in units of ppbv, in accordance with the data validation process.

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

EPA = U.S. Environmental Protection Agency.

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

NA = Not applicable.

ppbv = parts per billion, by volume basis.

ppmv = parts per million, by volume basis.

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

Table 5-2  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
October 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL-SV01-42.5 Manifold 8-Oct-15	Acetone	0.010	4.6	130	J	--
	Chloroform	0.013	2.5	7.8	--	--
	Dichlorodifluoromethane	0.098	3.8	10	--	--
	1,1-Dichloroethene	0.0071	3.4	21	J	--
	Tetrachloroethene	0.400	1.3	10	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.084	4.2	10	--	--
	1,1,1-Trichloroethane	0.042	1.7	7.8	--	--
	Trichloroethene	0.089	2.7	10	--	--
	Trichlorofluoromethane	0.180	5.1	10	--	--
	Total Organics <sup>a</sup>	0.9231	NA	NA	NA	NA
MWL-SV01-42.5 Manifold 8-Oct-15 (Duplicate)	Acetone	0.043	4.6	130	J	--
	Chloroform	0.013	2.5	7.8	--	--
	Dichlorodifluoromethane	0.097	3.8	10	--	--
	1,1-Dichloroethane	0.0027	1.9	7.8	J	--
	1,1-Dichloroethene	0.0072	3.4	21	J	--
	Tetrachloroethene	0.410	1.3	10	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.082	4.2	10	--	--
	1,1,1-Trichloroethane	0.041	1.7	7.8	--	--
	Trichloroethene	0.088	2.7	10	--	--
	Trichlorofluoromethane	0.180	5.1	10	--	--
	Total Organics <sup>a</sup>	0.9639	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
October 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV01-42.5</b> 8-Oct-15	Acetone	0.0059	3.0	84	J	--
	Chloroform	0.013	1.6	5.0	--	--
	Dichlorodifluoromethane	0.098	2.4	6.7	--	--
	1,1-Dichloroethane	0.0027	1.2	5.0	J	--
	1,1-Dichloroethene	0.0067	2.2	13	J	--
	Tetrachloroethene	0.420	0.85	6.7	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.083	2.7	6.7	--	--
	1,1,1-Trichloroethane	0.041	1.1	5.0	--	--
	Trichloroethene	0.098	1.8	6.7	--	--
	Trichlorofluoromethane	0.180	3.3	6.7	--	--
	Total Organics <sup>d</sup>	0.9483	NA	NA	NA	NA
<b>MWL-SV01-42.5</b> 8-Oct-15 (Duplicate)	Chloroform	0.014	1.8	5.7	--	--
	Dichlorodifluoromethane	0.110	2.7	7.6	--	--
	1,1-Dichloroethane	0.0029	1.4	5.7	J	--
	1,1-Dichloroethene	0.0073	2.4	15	J	--
	Tetrachloroethene	0.470	0.96	7.6	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.089	3.1	7.6	--	--
	1,1,1-Trichloroethane	0.043	1.2	5.7	--	--
	Trichloroethene	0.110	2.0	7.6	--	--
	Trichlorofluoromethane	0.190	3.7	7.6	--	--
	Total Organics <sup>d</sup>	1.0362	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
October 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL-SV02-41.5 Manifold 8-Oct-15	Acetone	0.015	1.8	51	J	--
	2-Butanone	0.0035	2.0	8.1	J	--
	Chloroform	0.0027	0.96	3.0	J	--
	Dichlorodifluoromethane	0.093	1.5	4.0	--	--
	1,1-Dichloroethane	0.0024	0.73	3.0	J	--
	1,1-Dichloroethene	0.0096	1.3	8.1	--	--
	Tetrachloroethene	0.065	0.52	4.0	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.050	1.6	4.0	--	--
	1,1,1-Trichloroethane	0.070	0.66	3.0	--	--
	Trichloroethene	0.061	1.1	4.0	--	--
	Trichlorofluoromethane	0.300	2.0	4.0	--	--
	Vinyl acetate	0.0075	1.5	8.1	J	--
	Total Organics <sup>a</sup>	0.6797	NA	NA	NA	NA
MWL-SV02-41.5 Manifold 8-Oct-15 (Duplicate)	Acetone	0.0074	1.8	51	J	--
	2-Butanone	0.0030	2.0	8.1	J	--
	Chloroform	0.0028	0.96	3.0	J	--
	Dichlorodifluoromethane	0.095	1.5	4.0	--	--
	1,1-Dichloroethane	0.0024	0.73	3.0	J	--
	1,1-Dichloroethene	0.010	1.3	8.1	--	--
	Tetrachloroethene	0.066	0.52	4.0	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.052	1.6	4.0	--	--
	1,1,1-Trichloroethane	0.072	0.66	3.0	--	--
	Trichloroethene	0.063	1.1	4.0	--	--
	Trichlorofluoromethane	0.310	2.0	4.0	--	--
	Vinyl acetate	0.0079	1.5	8.1	J	--
	Total Organics <sup>a</sup>	0.6915	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
October 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL-SV02-41.5 8-Oct-15	Acetone	0.0061	1.9	53	J	--
	Chloroform	0.0028	1.0	3.2	J	--
	Dichlorodifluoromethane	0.091	1.5	4.2	--	--
	1,1-Dichloroethane	0.0023	0.76	3.2	J	--
	1,1-Dichloroethene	0.0096	1.4	8.4	--	--
	Tetrachloroethene	0.065	0.54	4.2	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.051	1.7	4.2	--	--
	1,1,1-Trichloroethane	0.071	0.68	3.2	--	--
	Trichloroethene	0.062	1.1	4.2	--	--
	Trichlorofluoromethane	0.300	2.1	4.2	--	--
	Vinyl acetate	0.0076	1.5	8.4	J	--
	Total Organics <sup>d</sup>	0.6684	NA	NA	NA	NA
MWL-SV02-41.5 8-Oct-15 (Duplicate)	Chloroform	0.0028	0.99	3.1	J	--
	Dichlorodifluoromethane	0.091	1.5	4.2	--	--
	1,1-Dichloroethane	0.0023	0.75	3.1	J	--
	1,1-Dichloroethene	0.0096	1.3	8.3	--	--
	Tetrachloroethene	0.068	0.53	4.2	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.050	1.7	4.2	--	--
	1,1,1-Trichloroethane	0.070	0.68	3.1	--	--
	Trichloroethene	0.065	1.1	4.2	--	--
	Trichlorofluoromethane	0.300	2.0	4.2	--	--
	Vinyl acetate	0.0074	1.5	8.3	J	--
	Total Organics <sup>d</sup>	0.6661	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
October 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV03-50</b> 8-Oct-15	Acetone	0.0027	0.61	17	J	--
	Benzene	0.0011	0.27	1.4	J	--
	Chloroform	0.0014	0.33	1.0	--	--
	Dichlorodifluoromethane	0.021	0.50	1.4	--	--
	1,1-Dichloroethane	0.0021	0.25	1.0	--	--
	1,1-Dichloroethene	0.0076	0.44	2.7	--	--
	cis-1,2-Dichloroethene	0.0011	0.31	1.4	J	--
	Methylene Chloride	0.00073	0.25	1.4	J	--
	Tetrachloroethene	0.110	0.17	1.4	--	--
	Toluene	0.0014	0.17	1.4	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.052	0.56	1.4	--	--
	1,1,1-Trichloroethane	0.0043	0.22	1.0	--	--
	Trichloroethene	0.080	0.36	1.4	--	--
	Trichlorofluoromethane	0.022	0.67	1.4	--	--
<b>MWL-SV03-100</b> 8-Oct-15	Total Organics <sup>d</sup>	0.30743	NA	NA	NA	NA
	Acetone	0.0034	1.1	30	J	--
	Chloroform	0.0027	0.58	1.8	--	--
	Dichlorodifluoromethane	0.070	0.88	2.4	--	--
	1,1-Dichloroethane	0.0069	0.44	1.8	--	--
	1,1-Dichloroethene	0.030	0.78	4.8	--	--
	Methylene Chloride	0.0023	0.44	2.4	J	--
	Tetrachloroethene	0.220	0.31	2.4	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.150	0.99	2.4	--	--
	1,1,1-Trichloroethane	0.0089	0.39	1.8	--	--
	Trichloroethene	0.200	0.64	2.4	--	--
	Trichlorofluoromethane	0.050	1.2	2.4	--	--
	Total Organics <sup>d</sup>	0.7442	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
October 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV03-200</b> 8-Oct-15	Acetone	0.0029	1.3	38	J	--
	Chloroform	0.0023	0.72	2.3	--	--
	Dichlorodifluoromethane	0.061	1.1	3.0	--	--
	1,1-Dichloroethane	0.0084	0.55	2.3	--	--
	1,1-Dichloroethene	0.033	0.98	6.1	--	--
	cis-1,2-Dichloroethene	0.0049	0.67	3.0	--	--
	Methylene Chloride	0.0041	0.55	3.0	--	--
	Tetrachloroethene	0.290	0.39	3.0	--	--
	Toluene	0.00050	0.39	3.0	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.180	1.2	3.0	--	--
	1,1,1-Trichloroethane	0.0032	0.49	2.3	--	--
	Trichloroethene	0.310	0.80	3.0	--	--
	Trichlorofluoromethane	0.032	1.5	3.0	--	--
	Total Organics <sup>d</sup>	0.9323	NA	NA	NA	NA
<b>MWL-SV03-300</b> 8-Oct-15	Acetone	0.0054	1.7	49	J	--
	Chloroform	0.0012	0.93	2.9	J	--
	Dichlorodifluoromethane	0.038	1.4	3.9	--	--
	1,1-Dichloroethane	0.0037	0.70	2.9	--	--
	1,1-Dichloroethene	0.021	1.3	7.8	--	--
	cis-1,2-Dichloroethene	0.0025	0.87	3.9	J	--
	Methylene Chloride	0.0019	0.70	3.9	J	--
	Tetrachloroethene	0.370	0.50	3.9	--	--
	Toluene	0.00080	0.50	3.9	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.110	1.6	3.9	--	--
	1,1,1-Trichloroethane	0.0017	0.63	2.9	J	--
	Trichloroethene	0.260	1.0	3.9	--	--
	Trichlorofluoromethane	0.015	1.9	3.9	--	--
	Total Organics <sup>d</sup>	0.8312	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
October 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV03-400</b> 8-Oct-15	Acetone	0.0038	1.9	53	J	--
	Chloroform	0.0014	1.0	3.2	J	--
	Dichlorodifluoromethane	0.021	1.5	4.2	--	--
	1,1-Dichloroethane	0.0037	0.76	3.2	--	--
	1,1-Dichloroethene	0.022	1.4	8.4	--	--
	cis-1,2-Dichloroethene	0.0027	0.93	4.2	J	--
	Tetrachloroethene	0.450	0.54	4.2	--	--
	Toluene	0.0017	0.54	4.2	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.085	1.7	4.2	--	--
	1,1,1-Trichloroethane	0.0019	0.68	3.2	J	--
	Trichloroethene	0.350	1.1	4.2	--	--
	Trichlorofluoromethane	0.016	2.1	4.2	--	--
<b>MWL-SV04-50</b> 8-Oct-15	Total Organics <sup>a</sup>	0.9592	NA	NA	NA	NA
	Acetone	0.0046	0.52	15	J	--
	Benzene	0.00065	0.23	1.2	J	--
	Chloroform	0.0019	0.28	0.87	--	--
	Dichlorodifluoromethane	0.020	0.42	1.2	--	--
	1,1-Dichloroethane	0.0013	0.21	0.87	--	--
	1,1-Dichloroethene	0.0064	0.37	2.3	--	--
	cis-1,2-Dichloroethene	0.00047	0.26	1.2	J	--
	Tetrachloroethene	0.074	0.15	1.2	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.072	0.47	1.2	--	--
	1,1,1-Trichloroethane	0.0070	0.19	0.87	--	--
	Trichloroethene	0.066	0.30	1.2	--	--
	Trichlorofluoromethane	0.028	0.57	1.2	--	--
	Total Organics <sup>a</sup>	0.28232	NA	NA	NA	NA

Refer to footnotes at end of table.



Table 5-2 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
October 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV04-100</b> 8-Oct-15	Acetone	0.0036	0.64	18	J	--
	Benzene	0.00042	0.29	1.4	J	--
	Carbon tetrachloride	0.00031	0.23	2.9	J	--
	Chloroform	0.0019	0.34	1.1	--	--
	Dichlorodifluoromethane	0.035	0.52	1.4	--	--
	1,1-Dichloroethane	0.0031	0.26	1.1	--	--
	1,1-Dichloroethene	0.017	0.47	2.9	--	--
	cis-1,2-Dichloroethene	0.0015	0.32	1.4	--	--
	Methylene Chloride	0.00072	0.26	1.4	J	--
	Tetrachloroethene	0.120	0.18	1.4	--	--
	Toluene	0.00021	0.18	1.4	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.110	0.59	1.4	--	--
	1,1,1-Trichloroethane	0.0054	0.24	1.1	--	--
	Trichloroethene	0.130	0.38	1.4	--	--
	Trichlorofluoromethane	0.037	0.71	1.4	--	--
	Total Organics <sup>a</sup>	0.46616	NA	NA	NA	NA
<b>MWL-SV04-200</b> 8-Oct-15	Acetone	0.0044	0.86	24	J	--
	Carbon tetrachloride	0.00048	0.31	3.9	J	--
	Chloroform	0.0014	0.46	1.5	J	--
	Dichlorodifluoromethane	0.049	0.70	1.9	--	--
	1,1-Dichloroethane	0.0049	0.35	1.5	--	--
	1,1-Dichloroethene	0.031	0.63	3.9	--	--
	cis-1,2-Dichloroethene	0.0027	0.43	1.9	--	--
	Methylene Chloride	0.0019	0.35	1.9	--	--
	Tetrachloroethene	0.150	0.25	1.9	--	--
	Toluene	0.00062	0.25	1.9	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.150	0.79	1.9	--	--
	1,1,1-Trichloroethane	0.0022	0.32	1.5	--	--
	Trichloroethene	0.200	0.51	1.9	--	--
	Trichlorofluoromethane	0.033	0.95	1.9	--	--
	Total Organics <sup>a</sup>	0.6316	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
October 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV04-300</b> 8-Oct-15	Acetone	0.0061	0.64	18	J	--
	Benzene	0.00032	0.28	1.4	J	--
	Carbon tetrachloride	0.00025	0.23	2.9	J	--
	Chloroform	0.00055	0.34	1.1	J	--
	Dichlorodifluoromethane	0.022	0.52	1.4	--	--
	1,1-Dichloroethane	0.0012	0.26	1.1	--	--
	1,1-Dichloroethene	0.012	0.46	2.9	--	--
	cis-1,2-Dichloroethene	0.00073	0.32	1.4	J	--
	Methylene Chloride	0.00044	0.26	1.4	J	--
	Tetrachloroethene	0.120	0.18	1.4	--	--
	Toluene	0.00050	0.18	1.4	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.072	0.59	1.4	--	--
	1,1,1-Trichloroethane	0.0011	0.23	1.1	--	--
	Trichloroethene	0.093	0.38	1.4	--	--
	Trichlorofluoromethane	0.015	0.71	1.4	--	--
	Total Organics <sup>d</sup>	0.34519	NA	NA	NA	NA
<b>MWL-SV04-400</b> 8-Oct-15	Acetone	0.0050	0.77	22	J	--
	Benzene	0.00085	0.34	1.7	J	--
	Chloroform	0.00055	0.41	1.3	J	--
	Chloromethane	0.0011	0.85	3.5	J	--
	Dichlorodifluoromethane	0.018	0.63	1.7	--	--
	1,1-Dichloroethane	0.0012	0.31	1.3	J	--
	1,1-Dichloroethene	0.0094	0.56	3.5	--	--
	cis-1,2-Dichloroethene	0.00070	0.39	1.7	J	--
	Methylene Chloride	0.00042	0.31	1.7	J	--
	Tetrachloroethene	0.140	0.22	1.7	--	--
	Toluene	0.00042	0.22	1.7	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.065	0.71	1.7	--	--
	1,1,1-Trichloroethane	0.0011	0.28	1.3	J	--
	Trichloroethene	0.097	0.45	1.7	--	--
	Trichlorofluoromethane	0.013	0.85	1.7	--	--
	Total Organics <sup>d</sup>	0.35374	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
October 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL-SV05-50	Acetone	0.0016	0.75	21	J	--
	Chloroform	0.0012	0.40	1.3	J	--
	Dichlorodifluoromethane	0.040	0.61	1.7	--	--
	1,1-Dichloroethane	0.0016	0.30	1.3	--	--
	1,1-Dichloroethene	0.0096	0.54	3.4	--	--
	cis-1,2-Dichloroethene	0.00051	0.37	1.7	J	--
	Methylene Chloride	0.00035	0.30	1.7	J	--
	Tetrachloroethene	0.040	0.21	1.7	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.043	0.68	1.7	--	--
	1,1,1-Trichloroethane	0.011	0.27	1.3	--	--
	Trichloroethene	0.052	0.44	1.7	--	--
	Trichlorofluoromethane	0.100	0.82	1.7	--	--
	Vinyl acetate	0.0032	0.61	3.4	J	--
	Total Organics <sup>d</sup>	0.30406	NA	NA	NA	NA
MWL-SV05-100	Acetone	0.0031	0.86	24	J	--
	Carbon tetrachloride	0.00038	0.31	3.9	J	--
	Chloroform	0.0020	0.46	1.4	--	--
	Dichlorodifluoromethane	0.066	0.70	1.9	--	--
	1,1-Dichloroethane	0.0033	0.35	1.4	--	--
	1,1-Dichloroethene	0.022	0.62	3.9	--	--
	cis-1,2-Dichloroethene	0.0014	0.43	1.9	J	--
	Methylene Chloride	0.0010	0.35	1.9	J	--
	Tetrachloroethene	0.077	0.25	1.9	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.090	0.79	1.9	--	--
	1,1,1-Trichloroethane	0.012	0.31	1.4	--	--
	Trichloroethene	0.120	0.51	1.9	--	--
	Trichlorofluoromethane	0.130	0.95	1.9	--	--
	Vinyl acetate	0.0043	0.70	3.9	--	--
	Total Organics <sup>d</sup>	0.53248	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
October 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
<b>MWL-SV05-200</b> 8-Oct-15	Acetone	0.0028	1.3	36	J	--
	Carbon tetrachloride	0.0010	0.46	5.8	J	--
	Chloroform	0.0020	0.68	2.2	J	--
	Dichlorodifluoromethane	0.074	1.0	2.9	--	--
	1,1-Dichloroethane	0.0042	0.52	2.2	--	--
	1,1-Dichloroethene	0.038	0.93	5.8	--	--
	cis-1,2-Dichloroethene	0.0025	0.64	2.9	J	--
	Methylene Chloride	0.0026	0.52	2.9	J	--
	Tetrachloroethene	0.120	0.37	2.9	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.130	1.2	2.9	--	--
	1,1,1-Trichloroethane	0.0040	0.47	2.2	--	--
	Trichloroethene	0.200	0.75	2.9	--	--
	Trichlorofluoromethane	0.076	1.4	2.9	--	--
	Vinyl acetate	0.0012	1.0	5.8	J	--
	Total Organics <sup>d</sup>	0.6583	NA	NA	NA	NA
<b>MWL-SV05-300</b> 8-Oct-15	Acetone	0.0079	0.71	20	J	--
	Benzene	0.00037	0.32	1.6	J	--
	Carbon disulfide	0.00032	0.31	3.2	J	--
	Carbon tetrachloride	0.00092	0.26	3.2	J	--
	Chloroform	0.00069	0.38	1.2	J	--
	Dichlorodifluoromethane	0.040	0.58	1.6	--	--
	1,1-Dichloroethane	0.0018	0.29	1.2	--	--
	1,1-Dichloroethene	0.026	0.52	3.2	--	--
	cis-1,2-Dichloroethene	0.00075	0.36	1.6	J	--
	Methylene Chloride	0.00098	0.29	1.6	J	--
	Tetrachloroethene	0.110	0.20	1.6	--	--
	Toluene	0.00043	0.20	1.6	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.097	0.65	1.6	--	--
	1,1,1-Trichloroethane	0.0022	0.26	1.2	--	--
	Trichloroethene	0.120	0.42	1.6	--	--
	Trichlorofluoromethane	0.034	0.79	1.6	--	--
	Total Organics <sup>d</sup>	0.44336	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Concluded)  
Summary of Detected Volatile Organic Compounds (EPA Method TO-15<sup>a</sup>)  
Mixed Waste Landfill Soil-Vapor Monitoring  
October 2015

Well ID/Sample Port	Analyte	Result <sup>b</sup> (ppmv)	MDL <sup>b</sup> (ppbv)	RL <sup>b</sup> (ppbv)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>c</sup>
MWL-SV05-400 8-Oct-15	Acetone	0.0055	0.62	18	J	--
	Benzene	0.00043	0.28	1.4	J	--
	Carbon tetrachloride	0.00056	0.22	2.8	J	--
	Chloroform	0.00077	0.33	1.1	J	--
	Chloromethane	0.0010	0.69	2.8	J	--
	Dichlorodifluoromethane	0.020	0.51	1.4	--	--
	1,1-Dichloroethane	0.0016	0.25	1.1	--	--
	1,1-Dichloroethene	0.017	0.45	2.8	--	--
	Methylene Chloride	0.00089	0.25	1.4	J	--
	Tetrachloroethene	0.120	0.18	1.4	--	--
	Toluene	0.0051	0.18	1.4	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.074	0.57	1.4	--	--
	1,1,1-Trichloroethane	0.0021	0.23	1.1	--	--
	Trichloroethene	0.120	0.37	1.4	--	--
	Trichlorofluoromethane	0.034	0.69	1.4	--	--
	Total Organics <sup>d</sup>	0.40295	NA	NA	NA	NA

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," Center for Environmental Research Information, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio.

<sup>b</sup>Results are reported in ppmv. MDL and RL are reported in ppbv.

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

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

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

EPA = U.S. Environmental Protection Agency.

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

NA = Not applicable.

ppbv = Parts per billion, by volume basis.

ppmv = Parts per million, by volume basis.

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

Table 5-3  
Summary of Historic PCE, TCE, and Total VOCs Concentrations  
Mixed Waste Landfill Soil-Vapor Monitoring

Well ID & Sample Port Depth <sup>b</sup>	PCE <sup>a</sup>		PCE <sup>a</sup>	
	September 2014 (ppmv)	October 2014 (ppmv)	April 2015 (ppmv)	October 2015 (ppmv)
MWL-SV01-42.5	0.560	0.400	0.460	0.470
MWL-SV02-41.5	0.086	0.067	0.075	0.068
MWL-SV03-50	0.140	0.120	0.150	0.110
MWL-SV03-100	0.210	0.230	0.240	0.220
MWL-SV03-200	0.300	0.320	0.310	0.290
MWL-SV03-300	0.290	0.320	0.290	0.370
MWL-SV03-400	0.390	0.400	0.420	0.450
MWL-SV04-50	0.072	0.076	0.076	0.074
MWL-SV04-100	0.130	0.120	0.120	0.120
MWL-SV04-200	0.180	0.180	0.170	0.150
MWL-SV04-300	0.110	0.130	0.110	0.120
MWL-SV04-400	0.110	0.140	0.120	0.140
MWL-SV05-50	0.052	0.048	0.055	0.040
MWL-SV05-100	0.092	0.096	0.100	0.077
MWL-SV05-200	0.140	0.170	0.150	0.120
MWL-SV05-300	0.090	0.120	0.097	0.110
MWL-SV05-400	0.100	0.110	0.080	0.120
Well ID & Sample Port Depth <sup>b</sup>	TCE <sup>a</sup>		TCE <sup>a</sup>	
	September 2014 (ppmv)	October 2014 (ppmv)	April 2015 (ppmv)	October 2015 (ppmv)
MWL-SV01-42.5	0.110	0.090	0.099	0.110
MWL-SV02-41.5	0.075	0.058	0.067	0.065
MWL-SV03-50	0.100	0.082	0.097	0.080
MWL-SV03-100	0.190	0.190	0.200	0.200
MWL-SV03-200	0.300	0.300	0.290	0.310
MWL-SV03-300	0.190	0.210	0.170	0.260
MWL-SV03-400	0.290	0.280	0.260	0.350
MWL-SV04-50	0.061	0.059	0.060	0.066
MWL-SV04-100	0.130	0.120	0.120	0.130
MWL-SV04-200	0.210	0.210	0.190	0.200
MWL-SV04-300	0.076	0.091	0.064	0.093
MWL-SV04-400	0.075	0.096	0.060	0.097
MWL-SV05-50	0.067	0.061	0.064	0.052
MWL-SV05-100	0.140	0.130	0.130	0.120
MWL-SV05-200	0.200	0.240	0.210	0.200
MWL-SV05-300	0.100	0.130	0.082	0.120
MWL-SV05-400	0.094	0.100	0.066	0.120

Refer to footnotes at end of table.

Table 5-3 (Concluded)  
Summary of Historic PCE, TCE, and Total VOCs Concentrations  
Mixed Waste Landfill Soil-Vapor Monitoring

Well ID & Sample Port Depth <sup>b</sup>	Total VOCs <sup>a</sup>		Total VOCs <sup>a</sup>	
	September 2014 (ppmv)	October 2014 (ppmv)	April 2015 (ppmv)	October 2015 (ppmv)
MWL-SV01-42.5	1.14010	1.0087	1.1167	1.0362
MWL-SV02-41.5	0.71822	0.6788	0.7647	0.6915
MWL-SV03-50	0.36957	0.3175	0.37076	0.30743
MWL-SV03-100	0.61151	0.6382	0.6949	0.7442
MWL-SV03-200	0.91906	0.94754	0.99016	0.9323
MWL-SV03-300	0.64917	0.67835	0.59506	0.8312
MWL-SV03-400	0.87270	0.8141	0.8595	0.9592
MWL-SV04-50	0.25949	0.26359	0.28424	0.28232
MWL-SV04-100	0.45631	0.42879	0.44346	0.46616
MWL-SV04-200	0.68361	0.66935	0.6434	0.6316
MWL-SV04-300	0.26624	0.32355	0.27345	0.34519
MWL-SV04-400	0.25031	0.3246	0.26702	0.35374
MWL-SV05-50	0.36547	0.31833	0.3399	0.30406
MWL-SV05-100	0.56578	0.54556	0.57169	0.53248
MWL-SV05-200	0.70237	0.82115	0.7368	0.6583
MWL-SV05-300	0.35628	0.42371	0.33576	0.44336
MWL-SV05-400	0.54096	0.39521	0.25075	0.45245

Notes:

All concentrations are not rounded so they exactly match the reported concentrations in corresponding data tables.

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

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

PCE = Tetrachloroethene.  
ppmv = Parts per million by volume.  
TCE = Trichloroethene.  
VOCs = Volatile organic compounds.

shown the highest VOC concentration (PCE ranging from 0.400 to 0.560 ppmv) and Total VOCs concentration (1.0087 to 1.14010 ppmv). For the combined 2014 - 2015 data sets, PCE concentrations ranged from 0.040 ppmv (October 2015, MWL-SV05-50) to 0.560 ppmv (September 2014, MWL-SV01-42.5), TCE concentrations ranged from 0.052 ppmv (October 2015, MWL-SV05-50) to 0.350 ppmv (October 2015, MWL-SV03-400), and Total VOC concentrations ranged from 0.25031 ppmv (September 2014, MWL-SV04-400) to 1.14010 ppmv (September 2014, MWL-SV01-42.5).

## 5.2.2 Field Quality Control Sample Results

As described in Section 5.1.2, the field QC sampling protocol for the April and October 2015 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 5-4 summarizes results of environmental-duplicate sample pair analyses and the calculated RPD values for the April and October 2015 environmental-duplicate 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 RL. The designation in Table 5-4 of “with manifold” after the monitoring well identification indicates a sample pair that was collected simultaneously; no designation indicates the samples were collected in series, with the duplicate sample collected immediately after the environmental sample. The environmental-duplicate sample pair results and QC field blank results are discussed by sampling event below.

#### First Semiannual Sampling Event – April 14 and 15, 2015

The four environmental-duplicate sample pairs collected during the April sampling event were analyzed for all analytical parameters. The calculated RPDs show good agreement for all April environmental-duplicate sample pairs. The RPD values for the duplicate pairs collected simultaneously with the manifold system ranged from 3 to 15. The RPD values for the duplicate pairs collected in series ranged from <1 to 17. Both sets of duplicate sample results demonstrate good precision and reproducibility, indicating both duplicate sample collection methods are effective. An RPD of 50 or less demonstrates acceptable reproducibility of the sampling and analytical processes as previously demonstrated during soil-vapor monitoring at the SNL/NM Chemical Waste Landfill (NMED October 2009 and subsequent revisions).

A total of five QC field blank samples were submitted for analysis with the April 2015 samples. VOCs detected above laboratory MDLs in QC field blanks included acetone (2 samples), methylene chloride (2 samples), toluene (5 samples), and PCE (1 sample). As a result, 12 low-concentration toluene environmental sample results (out of 15 total toluene detections) were qualified during data validation as not detected. These qualified results were less than 10 times the associated QC field blank concentration. No corrective action was required for acetone and methylene chloride since all associated environmental sample results were greater than ten times the QC field blank concentration. No corrective action was required for PCE since all associated environmental sample results were greater than five times the QC field blank concentration. Acetone, methylene chloride, and toluene are all common laboratory contaminants.

#### Second Semiannual Sampling Event – October 8 and 9, 2015

The four environmental-duplicate sample pairs collected during the October sampling event were analyzed for all analytical parameters. The calculated RPDs show good agreement for all October environmental-duplicate sample pairs. The RPD values for the duplicate pairs collected simultaneously with the manifold system ranged from <1 to 4. The RPD values for the duplicate pairs collected in series ranged from <1 to 12. Both sets of duplicate sample results demonstrate good precision and reproducibility, indicating both duplicate sample collection methods are effective.



Table 5-4  
Summary of Duplicate Samples  
Mixed Waste Landfill Soil-Vapor Monitoring  
April and October 2015

Well ID/Parameter	Environmental Sample (R <sub>1</sub> )	Duplicate Sample (R <sub>2</sub> )	RPD <sup>a</sup> (%)
	(ppmv)		
April 2015 Environmental-Duplicate Sample Pair Results			
MWL-SV03-50 (with manifold)			
Dichlorodifluoromethane	0.024	0.021	13
Tetrachloroethene	0.140	0.120	15
1,1,2-Trichloro-1,2,2-trifluoroethane	0.051	0.045	13
Trichloroethene	0.092	0.080	14
Trichlorofluoromethane	0.023	0.020	14
MWL-SV03-50			
Dichlorodifluoromethane	0.022	0.026	17
Tetrachloroethene	0.130	0.150	14
1,1,2-Trichloro-1,2,2-trifluoroethane	0.046	0.050	8
Trichloroethene	0.085	0.097	13
Trichlorofluoromethane	0.020	0.023	14
MWL-SV03-200 (with manifold)			
Dichlorodifluoromethane	0.070	0.074	6
1,1-Dichloroethene	0.041	0.043	5
Tetrachloroethene	0.290	0.300	3
1,1,2-Trichloro-1,2,2-trifluoroethane	0.180	0.190	5
Trichloroethene	0.270	0.290	7
Trichlorofluoromethane	0.034	0.035	3
MWL-SV03-200			
Dichlorodifluoromethane	0.077	0.070	10
1,1-Dichloroethene	0.044	0.045	2
Tetrachloroethene	0.310	0.310	<1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.200	0.210	5
Trichloroethene	0.290	0.290	<1
Trichlorofluoromethane	0.037	0.036	3
October 2015 Environmental-Duplicate Sample Pair Results			
MWL-SV01-42.5 (with manifold)			
Dichlorodifluoromethane	0.098	0.097	1
Tetrachloroethene	0.400	0.410	2
1,1,2-Trichloro-1,2,2-trifluoroethane	0.084	0.082	2
1,1,1-Trichloroethane	0.042	0.041	2
Trichloroethene	0.089	0.088	1
Trichlorofluoromethane	0.180	0.180	<1
MWL-SV01-42.5			
Dichlorodifluoromethane	0.098	0.110	12
Tetrachloroethene	0.420	0.470	11
1,1,2-Trichloro-1,2,2-trifluoroethane	0.083	0.089	7
1,1,1-Trichloroethane	0.041	0.043	5
Trichloroethene	0.098	0.110	12
Trichlorofluoromethane	0.180	0.190	5

Refer to footnotes at end of table.

Table 5-4 (Concluded)  
Summary of Duplicate Samples  
Mixed Waste Landfill Soil-Vapor Monitoring  
April and October 2015

Well ID/Parameter	Environmental Sample (R <sub>1</sub> )	Duplicate Sample (R <sub>2</sub> )	RPD <sup>a</sup> (%)
	(ppmv)		
October 2015 Environmental-Duplicate Sample Pair Results (continued)			
MWL-SV02-42.5 (with manifold)			
Dichlorodifluoromethane	0.093	0.095	2
Tetrachloroethene	0.065	0.066	2
1,1,2-Trichloro-1,2,2-trifluoroethane	0.050	0.052	4
1,1,1-Trichloroethane	0.070	0.072	3
Trichloroethene	0.061	0.063	3
Trichlorofluoromethane	0.300	0.310	3
MWL-SV02-42.5			
Dichlorodifluoromethane	0.091	0.091	< 1
Tetrachloroethene	0.065	0.068	5
1,1,2-Trichloro-1,2,2-trifluoroethane	0.051	0.050	2
1,1,1-Trichloroethane	0.071	0.070	1
Trichloroethene	0.062	0.065	5
Trichlorofluoromethane	0.300	0.300	< 1

Notes:

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

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

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

ppmv = Parts per million by volume basis.

Based on these results, the new manifold system will be used in future sampling events as the preferred method for the collection of duplicate soil-vapor samples.

A total of five QC field blank samples were submitted for analysis with the October 2015 samples. VOCs detected above laboratory MDLs in QC field blanks included methylene chloride (1 sample) and PCE (1 sample). No corrective action was required since all associated environmental sample results were not detected for methylene chloride, and PCE results were greater than 5 times the field QC sample concentration.

### 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 spike samples, and replicate samples. The results were used to evaluate potential contamination associated with the laboratory analytical process and to determine the accuracy

and precision of the analytical methods. All laboratory control sample results for both sampling events met the accuracy (i.e., % recovery) requirement of 50 to 130% for detected compounds (Section 2.2 of LTMMP Appendix D). Minor issues associated with laboratory QC samples documented during the data validation process are summarized below.

For the April sampling event, the RPD for acetone, methylene chloride, 1,1-dichloroethene, 2-butanone, carbon disulfide, and vinyl acetate for one laboratory control sample and associated duplicate were greater than acceptance criteria. Associated environmental samples with detections of these compounds were qualified as estimated values (i.e., “J” data validation qualifiers in Table 5-1).

Based upon the data validation and review criteria, all April and October analytical data were determined acceptable and met the DQOs. Reported QC sample results were in compliance with analytical method and laboratory procedure requirements. Data Validation Reports, Contract Verification Review forms, and Certificates of Analysis are provided in Annex C.

#### 5.2.4 Variances and Non-Conformances

One variance from requirements in the LTMMP was identified for the April and October 2015 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 LTMMP. 11.8 eV lamps are not currently available from the manufacturer or the distributors.

### 5.3 Data Evaluation and Monitoring Trigger Level

Trigger levels for VOCs in soil vapor at the MWL are 20 ppmv for PCE and TCE (i.e., the trigger level of 20 ppmv applies to both PCE and TCE) and 25 ppmv for Total VOCs as defined in the LTMMP Section 5.2.3.1 (SNL/NM March 2012). The trigger levels apply only to samples collected from the deepest sampling port (i.e., 400 feet bgs) in each of the three FLUTE™ multi-port soil-vapor monitoring wells (MWL-SV03, MWL-SV04, and MWL-SV05). No results from the three deepest sampling ports exceeded the trigger levels. The results for the 400-foot bgs sampling ports for wells MWL-SV03, MWL-SV04, and MWL-SV05 are summarized below.

For the April 2015 results, the PCE concentrations ranged from 0.080 ppmv (MWL-SV05-400) to 0.420 ppmv (MWL-SV03-400). TCE concentrations ranged from 0.060 ppmv (MWL-SV04-400) to 0.260 ppmv (MWL-SV03-400). Total VOCs concentrations ranged from 0.25075 ppmv (MWL-SV05-400) to 0.8595 ppmv (MWL-SV03-400).

For the October 2015 results, the PCE concentrations ranged from 0.120 ppmv (MWL-SV05-400) to 0.450 ppmv (MWL-SV03-400). TCE concentrations ranged from 0.097 ppmv (MWL-SV04-400) to 0.350 ppmv (MWL-SV03-400). Total VOCs concentrations ranged from 0.35374 ppmv (MWL-SV04-400) to 0.9592 ppmv (MWL-SV03-400).

In summary, all VOC concentrations for the three deepest sampling ports are well below the trigger levels. The maximum Total VOCs concentration of 0.9592 ppmv from MWL-SV03-400 (October sample) is less than 4% of the Total VOCs trigger level of 25 ppmv (i.e., 25 times lower than the trigger level). The maximum PCE concentration of 0.450 ppmv from MWL-SV03-400 (October sample) is less than 2.5% of the PCE trigger level of 25 ppmv (i.e., 44 times less than the trigger level). Soil-vapor monitoring results indicate a relatively uniform distribution of low concentration VOCs distributed throughout the 500-foot thick vadose zone that are not a threat to groundwater.

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

This chapter presents soil-moisture monitoring activities (i.e., data collection and analysis) in accordance with LTMMMP Sections 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 so that timely action can be taken, if necessary. Results for the depth range of 8.7 to 86.6 feet 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**

Two semiannual soil-moisture monitoring events were conducted during the April 1, 2015 through March 31, 2016 reporting period fulfilling the LTMMMP semiannual monitoring requirement. The first monitoring event was conducted on April 21 and April 23, 2015. The second monitoring event was conducted on October 8, 2015. Figure 6-1 shows the soil-moisture monitoring locations MWL-VZ-1, MWL-VZ-2, and MWL-VZ-3. 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). A baseline for soil-moisture content was determined for each access tube prior to deployment of the ET Cover subgrade work in September 2006. The baseline was determined by averaging data collected during ten monitoring events 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 once daily during each 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.

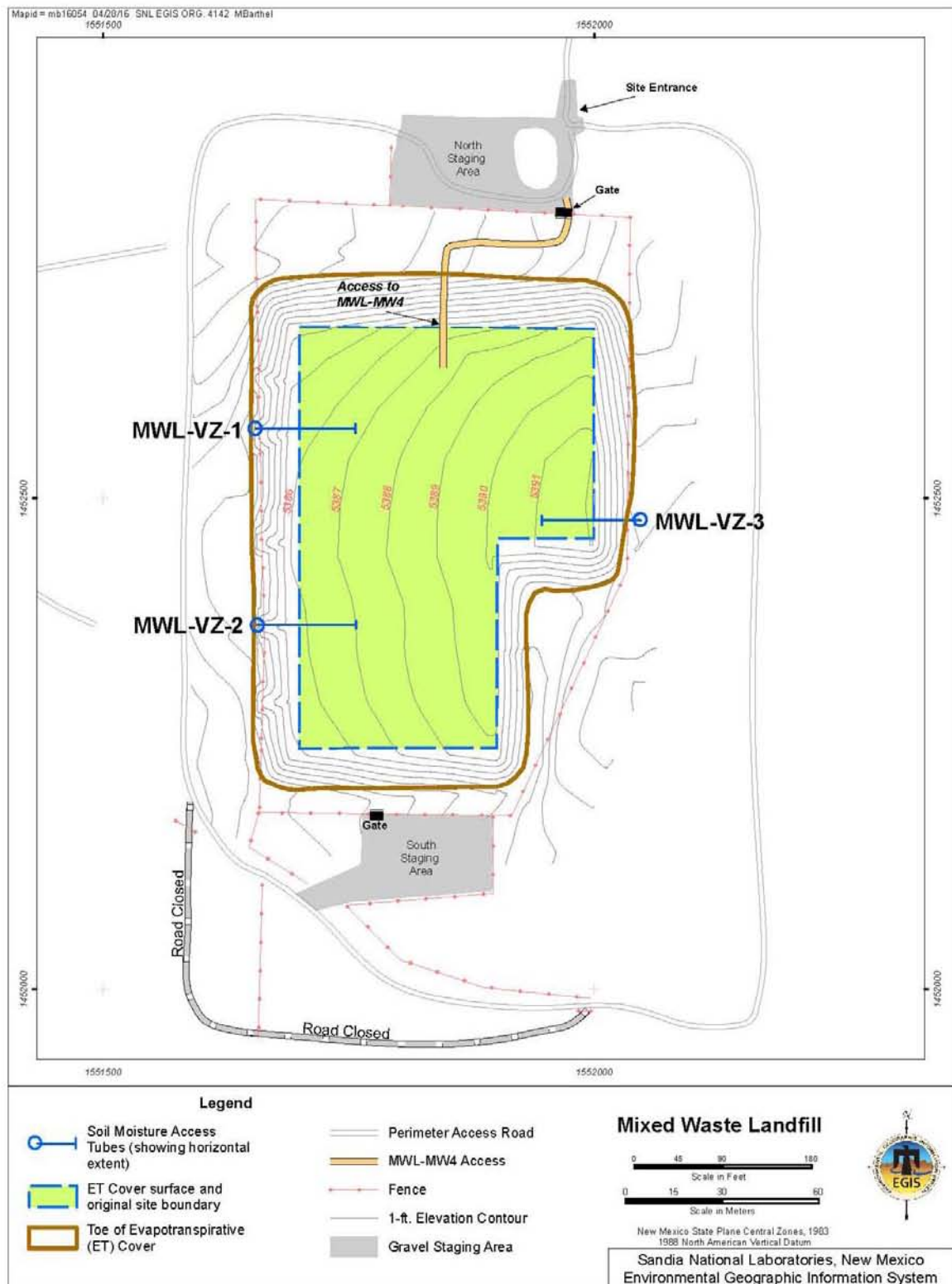


Figure 6-1  
Mixed Waste Landfill Soil-Moisture Monitoring Locations

## **6.2 Monitoring Results**

Soil-moisture monitoring data for this reporting period are presented in Figures 6-2, 6-3, and 6-4 for MW-VZ-1, MWLVZ-2, and MWL-VZ-3, respectively. The results for April and October are plotted on these figures along with the baseline soil-moisture content and the trigger level for comparison. Results track very closely with the established soil-moisture baseline for the three access tubes. Soil moisture content by volume is generally consistent with depth, with some slight increases above 5% at depths below 80 feet bgs. The April and October data are consistent with the baseline data and indicate a dry vadose zone.

## **6.3 Data Evaluation and Monitoring Trigger Level**

Soil-moisture data collected during the reporting period were compared to the trigger level, which is 23 percent soil moisture by volume, and applies to the shallow depth range beneath the ET Cover of 8.7 to 86.6 feet bgs for each monitoring location as specified in LTMMMP Section 5.2.3.2 (SNL/NM March 2012). This comparison is shown graphically in Figures 6-2, 6-3, and 6-4.

During this reporting period, the soil-moisture content measurements for the shallow trigger level depth interval at MWL-VZ-1 ranged from 1.4 to 5.2 percent, compared to 1.7 to 5.6 percent baseline. At MWL-VZ-2 the soil-moisture content ranged from 2.0 to 4.8 percent, compared to 2.1 to 5.5 percent baseline. At MWL-VZ-3 the soil-moisture content ranged from 1.4 to 5.1 percent, compared to 1.8 to 4.5 percent baseline.

In summary, all values are below the 23 percent soil-moisture content trigger level and track closely to baseline soil-moisture values, indicating the ET Cover is performing as designed.

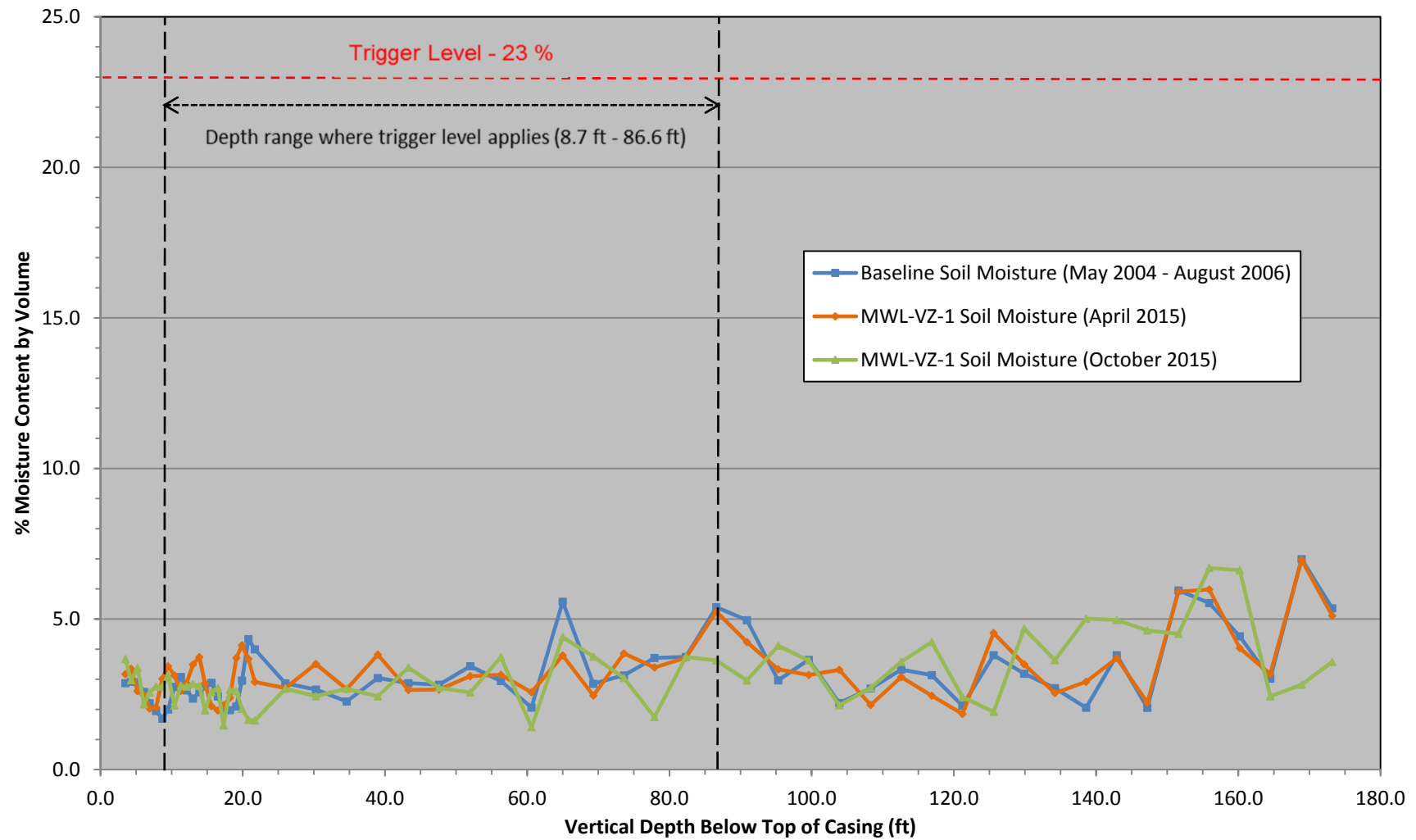


Figure 6-2  
Mixed Waste Landfill MWL-VZ-1 Soil-Moisture Monitoring Results



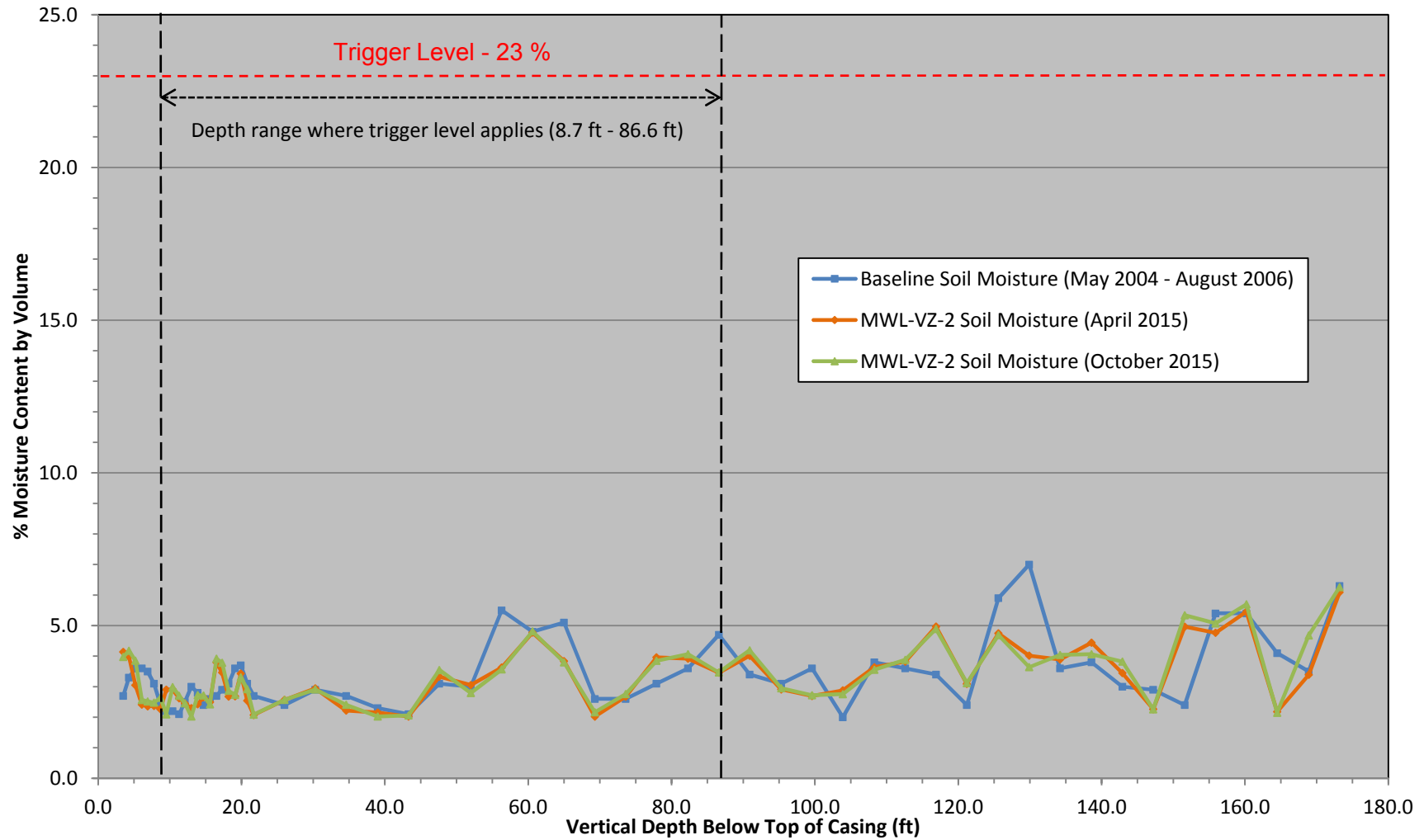


Figure 6-3  
Mixed Waste Landfill MWL-VZ-2 Soil-Moisture Monitoring Results

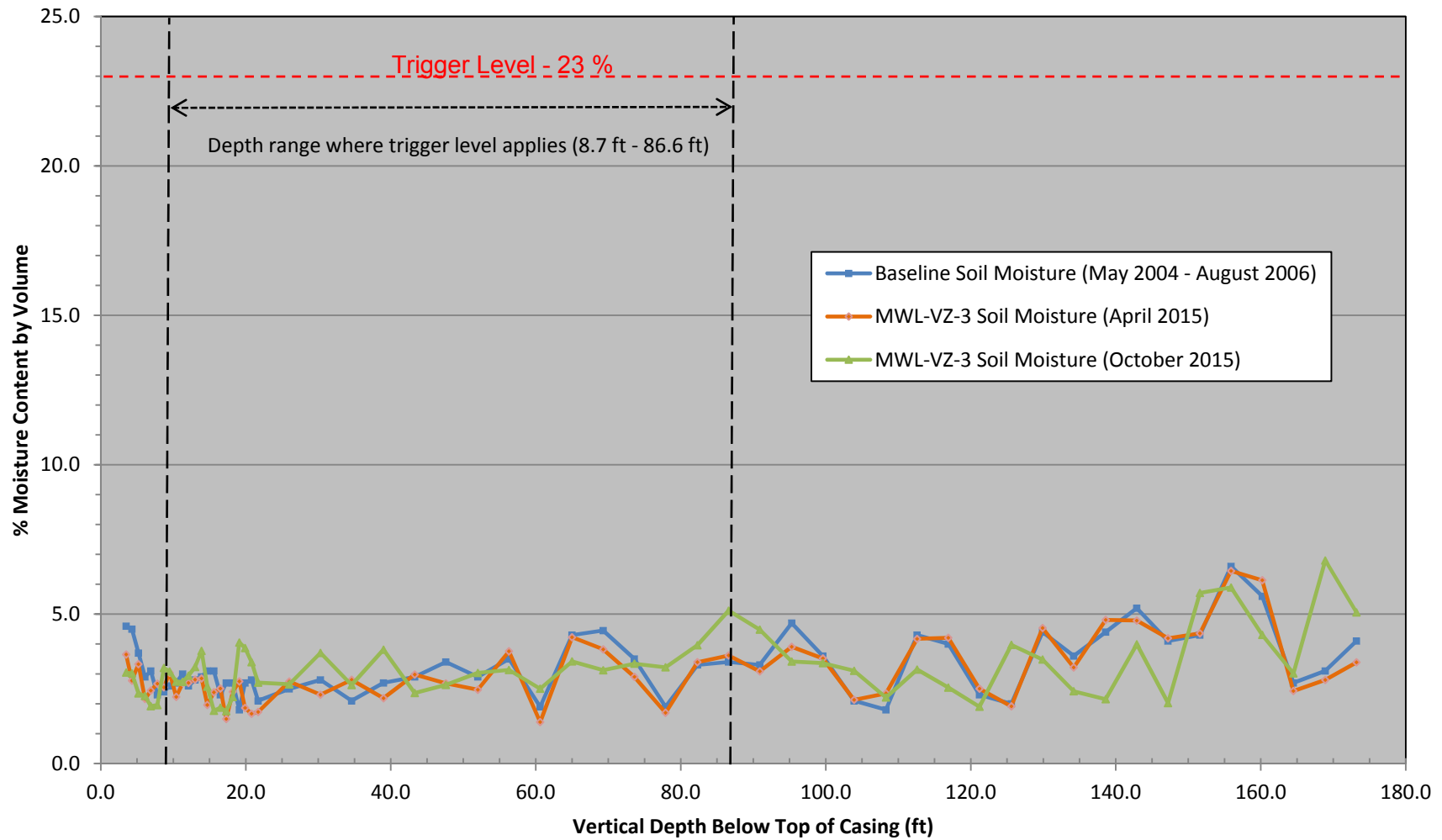


Figure 6-4  
Mixed Waste Landfill MWL-VZ-3 Soil-Moisture Monitoring Results

## **7.0 GROUNDWATER MONITORING RESULTS**

This chapter presents groundwater monitoring activities (i.e., sampling and analysis), analytical results, and data evaluation in accordance with LTMMP Sections 3.5 and Appendix F (SNL/NM March 2012). The monitoring objective is to assess concentrations of hazardous constituents in the groundwater in the uppermost part of the aquifer beneath the MWL and compare them to the trigger levels defined in Table 5.2.4-1 of the MWL 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. 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 semiannual environmental sampling events were conducted during the April 1, 2015 through March 31, 2016 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), specific radionuclides, gross alpha and beta, 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 April 6 and 13, 2015. An environmental-duplicate sample pair was collected from MWL-MW9.

The second sampling event was conducted between October 12 and 15, 2015. An environmental-duplicate sample pair was collected from MWL-MW8. MWL-MW7 was originally sampled on October 13, 2015, but was resampled for radon-222 only on December 14, 2015 due to a hold time issue with the October environmental sample.

#### **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 for a portable piston pump is one saturated screen volume. Purging continued until four stable field measurements for temperature, specific conductance (SC), potential of hydrogen (pH), and turbidity were obtained. Field measurements for water quality parameters were collected using an YSI™ Model EXO1 Water Quality Meter, and a HACH™ Model 2100Q portable turbidity meter. Additional water quality measurements included oxidation-reduction potential (ORP) and dissolved oxygen (DO).

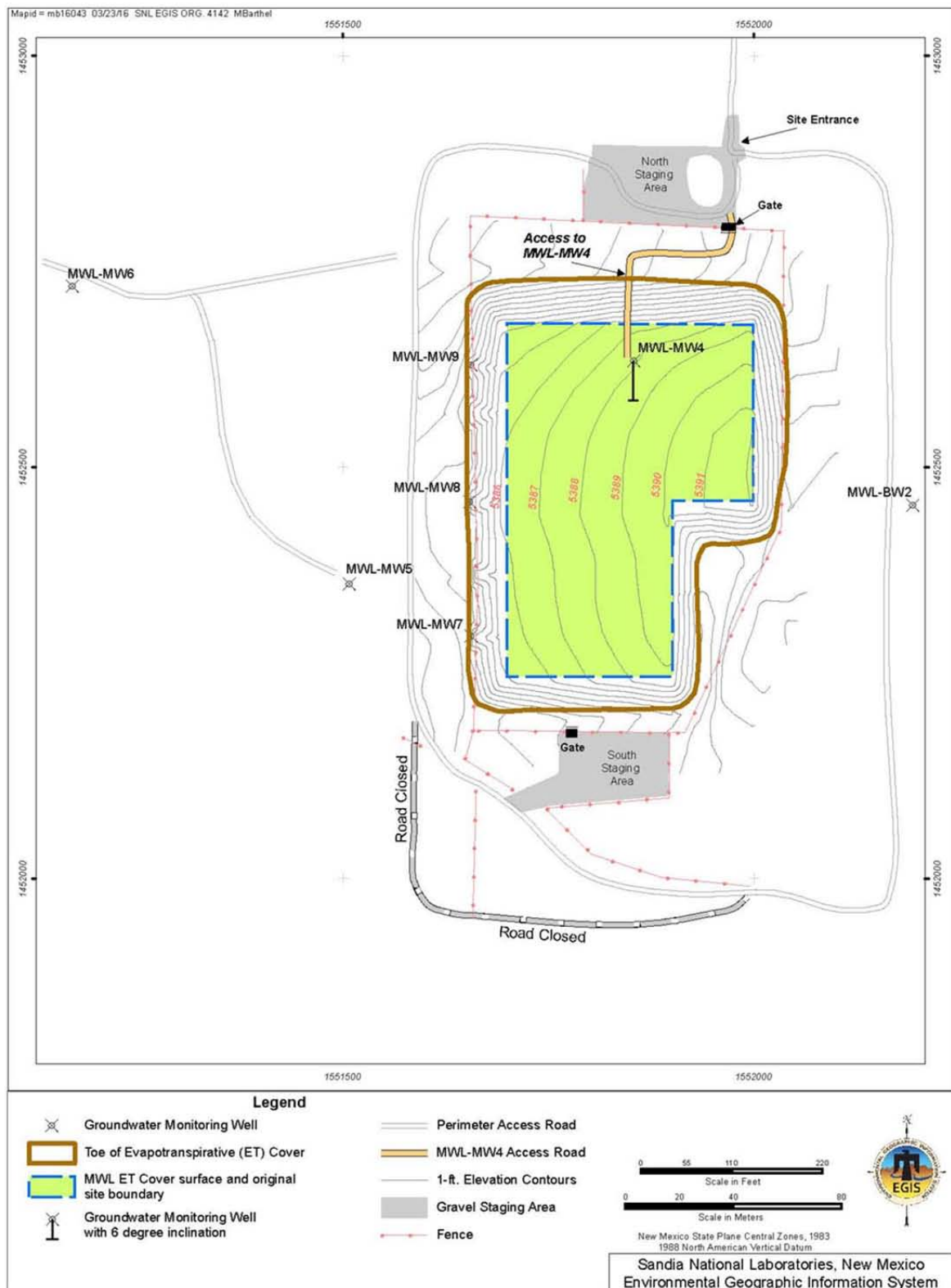


Figure 7-1  
Mixed Waste Landfill Groundwater Monitoring Well Locations

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 (3/8-inch outer diameter and 1/4-inch inner diameter). The average flow rates ranged from 0.098 gallons per minute (gpm) at MWL-MW7 to 0.262 gpm at MWL-BW2 for the April 2015 sampling event. The average flow rates ranged from 0.12 gpm at MWL-MW9 to 0.31 gpm at MWL-BW2 for the October 2015 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.

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 original 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 the decontamination process. Equipment blank samples consisted of deionized (DI) water that was pumped through the sampling system and analyzed for the same constituents as the groundwater samples.

Field blank samples were collected and analyzed for VOCs to detect any potential sample contamination resulting from ambient field conditions. The field blanks were prepared by pouring DI 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. Additional field blank samples were collected at the Environmental Resources Field Office (ERFO) during the decontamination process to assess the DI water and ERFO ambient conditions. The DI water is provided by Culligan® in 5-gallon sealed plastic containers that are stored at ERFO.

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 VOC analysis 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 April and October sampling events is provided below. Analytical results are presented in Section 7.2.

### First Semiannual Sampling Event – April 6-13, 2015

One equipment blank sample was collected prior to sampling monitoring well MWL-MW9. One duplicate sample was collected at MWL-MW9. Five field blank samples were collected; one at ERFO and four at the site (one at each monitoring well). Five trip blank samples were also submitted for analysis with VOC groundwater samples.

### Second Semiannual Sampling Event – October 12-15, 2015

One equipment blank sample was collected prior to sampling MWL-MW8. One duplicate sample was collected at MWL-MW8. Five field blank samples were collected; one at ERFO, and four at the site (one at each monitoring well). Five trip blank samples were also submitted for analysis with VOC groundwater samples.

## 7.1.3 Waste Management

Purge and decontamination wastewater generated from sampling activities was collected in 55-gallon containers and stored at the ERFO 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 requirements after characterization data were compared to discharge limits. Approximately 207 gallons of wastewater were generated during the April 2015 groundwater sampling event and approximately 272 gallons were generated during the October and December 2015 sampling event.

PPE and other solid waste generated during April, October, and December 2015 monitoring activities were managed in accordance with all applicable requirements. Analytical data collected from the sampling event was used to supplement the waste management process. 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 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 defined in Section 5.2.4 of the LTMMMP (SNL/NM March 2012) and were comparable to historic MWL groundwater monitoring results.

Table 7-1 summarizes detected VOCs for the April and October sampling events. Table 7-2 summarizes MDLs for all VOCs. Table 7-3 summarizes the cadmium, chromium, nickel, and uranium results for the April and October 2015 groundwater sampling events. Table 7-4 summarizes radionuclide, gross alpha, gross beta, tritium, and radon results for the April, October, and December 2015 sampling events. Table 7-5 summarizes field water quality measurements collected prior to sampling for all events.

Radionuclide activity in groundwater samples is determined through specific radiological analyses as presented in Table 7-4. 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 to subtract naturally occurring uranium in accordance to 40 Code of Federal Regulations Parts 9, 141, and 142, Table I-4. Uranium is measured independently and results are presented in Table 7-3.

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 7-4. The units for the tritium and gross beta triggers relate to a dose rate and not a specific “pCi/L activity.” For tritium, the approximate equivalent activity is 20,000 pCi/L, assuming an onsite resident using the groundwater 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). These 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 (i.e., if the gross beta activity is significantly different than 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 determined 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. If performed, the new radioisotope results would then be further evaluated and the corresponding dose determined and compared to the trigger of 4 millirem per year. For these reasons, a direct comparison of gross beta results to the LTMMMP trigger level is not possible. However, 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 Detected Volatile Organic Compounds (EPA Method 8260B<sup>a</sup>)  
Mixed Waste Landfill Groundwater Monitoring  
April and October 2015

Well ID	Analyte	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	Trigger Levels (µg/L)	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>
<b>April 2015 Sampling Event – No volatile organic compounds were detected in April 2015 groundwater samples</b>							
<b>October 2015 Sampling Event</b>							
<b>MWL-BW2</b> 12-Oct-2015	Methylene chloride	1.20	1.00	10.0	3.00	B,J	10U

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.

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

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

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

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 in units of µg/L, in accordance with the data validation process.

EPA = U.S. Environmental Protection Agency.

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

µg/L = Micrograms per liter.

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 7-2  
Summary of Method Detection Limits for Volatile Organic Compounds (EPA Method 8260B<sup>a</sup>)  
Mixed Waste Landfill Groundwater Monitoring  
April and October 2015

Analyte	MDL (µg/L)
1,1,1-Trichloroethane	0.300
1,1,2,2-Tetrachloroethane	0.300
1,1,2-Trichloroethane	0.300
1,1-Dichloroethane	0.300
1,1-Dichloroethene	0.300
1,2-Dichloroethane	0.300
1,2-Dichloropropane	0.300
2-Butanone	1.50 – 2.00
2-Hexanone	1.50 – 2.20
4-methyl-, 2-Pentanone	1.50
Acetone	1.50 – 2.50
Benzene	0.300
Bromodichloromethane	0.300
Bromoform	0.300
Bromomethane	0.300
Carbon disulfide	1.50
Carbon tetrachloride	0.300
Chlorobenzene	0.300
Chloroethane	0.300
Chloroform	0.300
Chloromethane	0.300
Dibromochloromethane	0.300
Dichlorodifluoromethane	0.300
Ethyl benzene	0.300
Methylene chloride	1.00 – 1.70
Styrene	0.300
Tetrachloroethene	0.300
Toluene	0.300
Trichloroethene	0.300
Vinyl acetate	1.50
Vinyl chloride	0.300
Xylene	0.300
cis-1,2-Dichloroethene	0.300
cis-1,3-Dichloropropene	0.300
trans-1,2-Dichloroethene	0.300
trans-1,3-Dichloropropene	0.300

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.

EPA = U.S. Environmental Protection Agency.

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

µg/L = Micrograms per liter.

Table 7-3  
Summary of Cadmium, Chromium, Nickel, and Uranium Results (EPA Method 6020<sup>a</sup>)  
Mixed Waste Landfill Groundwater Monitoring  
April and October 2015

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>April 2015 Sampling Event</b>							
<b>MWL-BW2</b> 6-Apr-15	Cadmium	ND	0.00011	0.001	0.0025	U	--
	Chromium	ND	0.002	0.010	0.043	U	--
	Nickel	0.000726	0.0005	0.002	0.050	J	--
	Uranium	0.00755	0.000067	0.0002	0.015	--	--
<b>MWL-MW7</b> 7-Apr-15	Cadmium	ND	0.00011	0.001	0.0025	U	--
	Chromium	ND	0.002	0.010	0.043	U	--
	Nickel	0.000726	0.0005	0.002	0.050	J	--
	Uranium	0.00821	0.000067	0.0002	0.015	--	--
<b>MWL-MW8</b> 13-Apr-15	Cadmium	ND	0.00011	0.001	0.0025	U	--
	Chromium	ND	0.002	0.010	0.043	U	--
	Nickel	0.000692	0.0005	0.002	0.050	J	J-
	Uranium	0.00889	0.000067	0.0002	0.015	--	--
<b>MWL-MW9</b> 8-Apr-15	Cadmium	ND	0.00011	0.001	0.0025	U	--
	Chromium	ND	0.002	0.010	0.043	U	--
	Nickel	0.000564	0.0005	0.002	0.050	J	--
	Uranium	0.00977	0.000067	0.0002	0.015	--	--
<b>MWL-MW9</b> 8-Apr-15 (Duplicate)	Cadmium	ND	0.00011	0.001	0.0025	U	--
	Chromium	ND	0.002	0.010	0.043	U	--
	Nickel	0.000582	0.0005	0.002	0.050	J	--
	Uranium	0.00974	0.000067	0.0002	0.015	--	--

Refer to notes at end of table.

Table 7-3 (Concluded)  
Summary of Cadmium, Chromium, Nickel, and Uranium Results (EPA Method 6020<sup>a</sup>)  
Mixed Waste Landfill Groundwater Monitoring  
April and October 2015

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>October 2015 Sampling Event</b>							
<b>MWL-BW2</b> 12-Oct-15	Cadmium	ND	0.00011	0.001	0.0025	U	--
	Chromium	ND	0.002	0.010	0.043	U	--
	Nickel	0.000772	0.0005	0.002	0.050	J	--
	Uranium	0.00752	0.000067	0.0002	0.015	--	--
<b>MWL-MW7</b> 13-Oct-15	Cadmium	ND	0.00011	0.001	0.0025	U	--
	Chromium	ND	0.002	0.010	0.043	U	--
	Nickel	0.000615	0.0005	0.002	0.050	J	--
	Uranium	0.00822	0.000067	0.0002	0.015	--	--
<b>MWL-MW8</b> 15-Oct-15	Cadmium	ND	0.00011	0.001	0.0025	U	--
	Chromium	ND	0.002	0.010	0.043	U	--
	Nickel	0.000701	0.0005	0.002	0.050	J	--
	Uranium	0.00806	0.000067	0.0002	0.015	--	--
<b>MWL-MW8</b> 15-Oct-15 (Duplicate)	Cadmium	ND	0.00011	0.001	0.0025	U	--
	Chromium	ND	0.002	0.010	0.043	U	--
	Nickel	0.000627	0.0005	0.002	0.050	J	--
	Uranium	0.00809	0.000067	0.0002	0.015	--	--
<b>MWL-MW9</b> 14-Oct-15	Cadmium	ND	0.00011	0.001	0.0025	U	--
	Chromium	ND	0.002	0.010	0.043	U	--
	Nickel	0.000633	0.0005	0.002	0.050	J	--
	Uranium	0.00978	0.000067	0.0002	0.015	--	--

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.

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

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

J- = Estimated value with a suspected negative bias.

U = Analyte was not detected.

EPA = U.S. Environmental Protection Agency.

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

mg/L = Milligrams per liter.

ND = Not detected (at MDL).

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

Table 7-4  
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Tritium, and Radon Results  
Mixed Waste Landfill Groundwater Monitoring  
April and October 2015

Well ID	Analyte	Result <sup>a</sup> (pCi/L)	Trigger Level	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>	Analytical Method <sup>c</sup>
<b>April 2015 Sampling Event</b>						
<b>MWL-BW2</b> 6-Apr-15	Americium-241	5.29 ± 7.29	NE	U	BD	EPA 901.1
	Cesium-137	0.989 ± 1.61	NE	U	BD	EPA 901.1
	Cobalt-60	0.00502 ± 1.58	NE	U	BD	EPA 901.1
	Gross Alpha	8.34	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>d</sup>	6.70 ± 1.54	4 mrem/yr	--	--	EPA 900.0
	Tritium <sup>e</sup>	-49.2 ± 65.7	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	417 ± 111	1000 pCi/L	--	--	SM7500 RnB
<b>MWL-MW7</b> 7-Apr-15	Americium-241	4.64 ± 15.4	NE	U	BD	EPA 901.1
	Cesium-137	-2.63 ± 3.40	NE	U	BD	EPA 901.1
	Cobalt-60	1.16 ± 1.99	NE	U	BD	EPA 901.1
	Gross Alpha	4.36	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>d</sup>	8.86 ± 1.97	4 mrem/yr	--	--	EPA 900.0
	Tritium <sup>e</sup>	-21.8 ± 71.1	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	80.2 ± 52.5	1000 pCi/L	--	J	SM7500 RnB
<b>MWL-MW8</b> 13-Apr-15	Americium-241	8.79 ± 12.6	NE	U	BD	EPA 901.1
	Cesium-137	-2.01 ± 3.52	NE	U	BD	EPA 901.1
	Cobalt-60	-0.976 ± 2.24	NE	U	BD	EPA 901.1
	Gross Alpha	1.75	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>d</sup>	7.15 ± 1.49	4 mrem/yr	--	--	EPA 900.0
	Tritium <sup>e</sup>	40.8 ± 98.1	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	107 ± 70.1	1000 pCi/L	H, U	BD	SM7500 RnB
<b>MWL-MW9</b> 8-Apr-15	Americium-241	-1.62 ± 19.8	NE	U	BD	EPA 901.1
	Cesium-137	-0.865 ± 2.09	NE	U	BD	EPA 901.1
	Cobalt-60	-0.66 ± 1.91	NE	U	BD	EPA 901.1
	Gross Alpha	6.95	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>d</sup>	11.6 ± 2.33	4 mrem/yr	--	--	EPA 900.0
	Tritium <sup>e</sup>	1.62 ± 74.6	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	240 ± 73.1	1000 pCi/L	--	--	SM7500 RnB

Refer to notes at end of table.

Table 7-4 (Continued)  
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Tritium, and Radon Results  
Mixed Waste Landfill Groundwater Monitoring  
April and October 2015

Well ID	Analyte	Result <sup>a</sup> (pCi/L)	Trigger Level	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>	Analytical Method <sup>c</sup>
<b>April 2015 Sampling Event (Continued)</b>						
<b>MWL-MW9</b> 8-Apr-15 (Duplicate)	Americium-241	1.58 ± 13.1	NE	U	BD	EPA 901.1
	Cesium-137	0.0147 ± 1.98	NE	U	BD	EPA 901.1
	Cobalt-60	-1.6 ± 2.15	NE	U	BD	EPA 901.1
	Gross Alpha	11.87	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>d</sup>	7.44 ± 1.65	4 mrem/yr	--	--	EPA 900.0
	Tritium <sup>e</sup>	-37.3 ± 68.2	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	307 ± 86.1	1000 pCi/L	--	--	SM7500 RnB

Refer to notes at end of table.

Table 7-4 (Continued)  
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Tritium, and Radon Results  
Mixed Waste Landfill Groundwater Monitoring  
April and October 2015

Well ID	Analyte	Result <sup>a</sup> (pCi/L)	Trigger Level	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>	Analytical Method <sup>c</sup>
<b>October 2015 Sampling Event</b>						
<b>MWL-BW2</b> 12-Oct-15	Americium-241	-13.1 ± 15.5	NE	U	BD	EPA 901.1
	Cesium-137	3.02 ± 3.02	NE	U	BD	EPA 901.1
	Cobalt-60	-1.06 ± 2.45	NE	U	BD	EPA 901.1
	Gross Alpha	12.06	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>d</sup>	5.73 ± 2.64	4 mrem/yr	--	J	EPA 900.0
	Tritium <sup>e</sup>	-7.74 ± 71.9	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	419 ± 138	1000 pCi/L	H	J	SM7500 Rn B
<b>MWL-MW7</b> 13-Oct-15	Americium-241	-44.5 ± 26.5	NE	U	BD	EPA 901.1
	Cesium-137	-1.11 ± 2.09	NE	U	BD	EPA 901.1
	Cobalt-60	0.346 ± 2.00	NE	U	BD	EPA 901.1
	Gross Alpha	7.89	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>d</sup>	7.07 ± 3.53	4 mrem/yr	--	J	EPA 900.0
	Tritium <sup>e</sup>	-7.83 ± 73.0	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	106 ± 80.7	1000 pCi/L	H, U	R	SM7500 Rn B
<b>MWL-MW7</b> (Resample) 14-Dec-15	Radon-222	100 ± 66.7	1000 pCi/L	H, U	BD	SM7500 Rn B
<b>MWL-MW8</b> 15-Oct-15	Americium-241	-8.71 ± 12.8	NE	U	BD	EPA 901.1
	Cesium-137	-0.61 ± 1.80	NE	U	BD	EPA 901.1
	Cobalt-60	-0.541 ± 1.83	NE	U	BD	EPA 901.1
	Gross Alpha	8.10	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>d</sup>	5.87 ± 3.33	4 mrem/yr	--	J	EPA 900.0
	Tritium <sup>e</sup>	-49.5 ± 69.1	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	153 ± 66.6	1000 pCi/L	H	J	SM7500 Rn B
<b>MWL-MW8</b> 15-Oct-15 (Duplicate)	Americium-241	7.93 ± 9.74	NE	U	BD	EPA 901.1
	Cesium-137	0.968 ± 1.82	NE	U	BD	EPA 901.1
	Cobalt-60	2.04 ± 2.49	NE	U	BD	EPA 901.1
	Gross Alpha	4.98	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>d</sup>	5.08 ± 2.29	4 mrem/yr	--	J	EPA 900.0
	Tritium <sup>e</sup>	-31.4 ± 70.0	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	163 ± 68.3	1000 pCi/L	H	J	SM7500 Rn B

Refer to notes at end of table.

Table 7-4 (Concluded)  
Summary of Gamma Spectroscopy, Gross Alpha, Gross Beta, Tritium, and Radon Results  
Mixed Waste Landfill Groundwater Monitoring  
April and October 2015

Well ID	Analyte	Result <sup>a</sup> (pCi/L)	Trigger Level	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>	Analytical Method <sup>c</sup>
<b>October 2015 Sampling Event (Continued)</b>						
<b>MWL-MW9</b> 14-Oct-15	Americium-241	-5.53 ± 18.3	NE	U	BD	EPA 901.1
	Cesium-137	0.0607 ± 2.32	NE	U	BD	EPA 901.1
	Cobalt-60	-2.45 ± 2.98	NE	U	BD	EPA 901.1
	Gross Alpha	11.25	15 pCi/L	NA	None	EPA 900.0
	Gross Beta <sup>d</sup>	8.35 ± 2.88	4 mrem/yr	--	--	EPA 900.0
	Tritium <sup>e</sup>	-49.6 ± 69.0	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	427 ± 121	1000 pCi/L	H	J	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 (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; result is below the minimum detectable activity.

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

BD = Below detection limit as used in radiochemistry to identify results that are not statistically different from zero.

H = Analytical holding time was exceeded.

J = Estimated value.

None = No data validation for corrected gross alpha activity.

R = The value is unusable, resampling and analysis are necessary for verification.

U = Analyte was below detection limit.

<sup>c</sup>Analytical Methods EPA 900.0, EPA 900.6, and EPA 906.0:

- U.S. Environmental Protection Agency, 1980, "Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA-600/4-80-032, U.S. Environmental Protection Agency, Cincinnati, Ohio. Analytical Method SM7500 RnB

- American Public Health Association, American Water Works Association, and Water Environment Federation, 1988, "Standard Methods for the Examination of Water and Wastewater," 7500-Rn B Method, 20th Edition, published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation, Washington, D.C., 1988.

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

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

EPA = U.S. Environmental Protection Agency.

mrem/yr = Millirem per year.

NA = Not applicable.

NE = Not established.

pCi/L = Picocuries per liter.

Table 7-5  
Summary of Field Water Quality Measurements<sup>a</sup>  
Mixed Waste Landfill Groundwater Monitoring  
April and October 2015

Well ID/ Sample Date	Temperature (°C)	SC (µmhos/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (% Sat)	DO (mg/L)
<b>April 2015 Sampling Event</b>							
MWL-BW2	21.18	707.5	118.5	7.53	0.28	11.1	0.98
MWL-MW7	21.58	593.8	179.4	7.76	0.16	73.1	6.40
MWL-MW8	16.53	534.5	144.5	7.72	0.25	34.7	3.37
MWL-MW9	20.37	580.1	143.7	7.66	0.32	19.9	1.77
<b>October 2015 Sampling Event</b>							
MWL-BW2	20.71	705.2	239.6	7.22	0.81	20.1	1.80
MWL-MW7	21.54	593.6	349.9	7.50	0.25	72.0	6.30
MWL-MW8	21.45	593.3	369.5	7.44	0.47	37.5	3.30
MWL-MW9	21.50	594.2	354.0	7.41	0.45	16.0	1.38
<b>December 2015 Sampling Event</b>							
MWL-MW7	16.39	527.9	219.4	7.42	0.58	65.9	6.43

Notes:

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

°C = Degrees Celsius.

% Sat = Percent saturation.

DO = Dissolved oxygen.

mg/L = Milligrams per liter.

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 Conductance.

#### First Semiannual Sampling Event – April 6-13, 2015

No VOCs were detected in environmental samples above MDLs.

Cadmium and chromium were not detected above the associated MDLs. Nickel and uranium were detected above the associated MDLs and below LTMMMP trigger levels in all groundwater samples. Nickel concentrations ranged from 0.000564 milligrams per liter (mg/L) at MWL-MW9 to 0.000726 mg/L at MWL-MW7 and MWL-BW2. Uranium concentrations ranged from 0.00755 mg/L at MWL-BW2 to 0.00977 mg/L at MWL-MW9. All 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). Negative results in Table 7-4 indicate the sample result was lower than the instrument background (i.e., below the instrument detection limit). Radon-222 was detected in all samples, with activities ranging from 80.2 pCi/L at MWL-MW7 to 417 pCi/L at MWL-BW2. All radiological results were reviewed by an SNL/NM radiological 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 below LTMMMP trigger levels.



### Second Semiannual Sampling Event – October 12-15, and December 14, 2015

No VOCs were detected in environmental samples above MDLs, except for methylene chloride in the sample from well MWL-BW2. Methylene chloride was qualified as not detected during data validation since this compound was also detected in the associated laboratory method blank sample (i.e., associated with laboratory contamination).

Cadmium and chromium were not detected above the associated MDLs. Nickel and uranium were detected above the associated MDLs and below LTMMMP trigger levels in all groundwater samples. Nickel concentrations ranged from 0.000615 mg/L at MWL-MW7 to 0.000772 mg/L at MWL-BW2. Uranium concentrations ranged from 0.00752 mg/L at MWL-BW2 to 0.00978 mg/L at MWL-MW9. All 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. Resampling of MWL-MW7 for radon-222 was performed on December 14, 2015 due to a holding time issue with the October environmental sample. There were no detections of gamma-emitting radionuclides (as determined by gamma spectroscopy) or tritium (as determined by liquid scintillation counting). Radon-222 was detected in all samples, with activities ranging from 100 pCi/L at MWL-MW7 (December 14, 2015) to 427 pCi/L at MWL-MW9. All radiological results were reviewed by an SNL/NM radiological 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 below LTMMMP trigger levels.

#### 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 7-6 summarizes results of environmental-duplicate sample pair results and the calculated RPD values for the April and October 2015 data sets. Only the metals nickel and uranium were detected above the associated MDLs in the two sample pairs. Calculated RPDs for the detected metal constituents show good agreement (i.e., RPD values less than or equal to 35 for metals) for both sampling events, ranging from <1 to 11.

A discussion of equipment, field, and trip blank results for the April and October sampling events is provided below for the April and October sampling events.

### First Semiannual Sampling Event – April 6-13, 2015

The equipment blank sample in April was analyzed for all constituents. Bromodichloromethane, bromoform, chloroform, and dibromochloromethane were detected above laboratory MDLs. No corrective action was necessary since these compounds were not detected in the associated MWL-MW9 environmental sample.

Table 7-6  
Summary of Duplicate Sample Results  
Mixed Waste Landfill Groundwater Monitoring  
April and October 2015

Well ID/Parameter	Environmental Sample (R <sub>1</sub> )	Duplicate Sample (R <sub>2</sub> )	RPD <sup>a</sup>
<b>April Sampling Event</b>			
<b>MWL-MW9</b>			
Nickel (mg/L)	0.000564	0.000582	3
Uranium (mg/L)	0.00977	0.00974	< 1
<b>October Sampling Event</b>			
<b>MWL-MW8</b>			
Nickel (mg/L)	0.000701	0.000627	11
Uranium (mg/L)	0.00806	0.00809	< 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.

mg/L = Milligram(s) per liter.

The field blank collected at ERFO during the decontamination process and the four field blanks collected at the monitoring well locations during April all showed detections of bromodichloromethane, chloroform, and dibromochloromethane above laboratory MDLs. Bromoform was detected in the field blank samples associated with MWL-BW2, MWL-MW7, and MWL-MW8. Acetone was detected in the field blank sample associated with the source DI water at ERFO. No corrective action was required since these compounds were not detected in associated environmental samples.

No VOCs were detected in the five trip blank samples associated with the April sampling event.

#### Second Semiannual Sampling Event – October 12-15, 2015

The equipment blank sample collected in October was analyzed for all constituents. Only acetone was detected above laboratory MDLs. No corrective action was necessary since this compound was not detected in the associated MWL-MW8 environmental and duplicate sample pair.

The field blank collected at ERFO during the decontamination process and the four field blanks collected at the monitoring wells all showed detections of acetone. The compound 2-butanone was detected in field blanks associated with MWL-BW2 and the source DI water at ERFO. No corrective action was required since these compounds were not detected in associated environmental samples.

No VOCs were detected in the five trip blanks associated with the October sampling event.

### 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 QC sample results were in compliance with analytical method and laboratory procedure requirements. Laboratory QC sample results that effected environmental sample results are discussed below.

Methylene chloride was detected in the laboratory method blank associated with the October MWL-BW2 environmental sample. Therefore, the methylene chloride detection in the MWL-BW2 environmental sample was qualified as not detected during data validation.

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 2014a). Based upon the data validation and review criteria, all analytical data were determined acceptable and met the DQOs. Data Validation Reports and Contract Verification Review forms are provided in Annex E.

### 7.2.4 Variances and Non-Conformances

No variances or non-conformances were identified during the April and October 2015 semiannual groundwater sampling events. Project-specific issues from the April and October sampling events are summarized as follows.

Bromodichloromethane, bromoform, chloroform, dibromochloromethane were detected at very low concentrations in both the April equipment blank and field blank samples. These compounds are a by-product of the deionized water purification process (i.e., chlorination) and are routinely detected in equipment blank and field blank samples at very low concentrations. Acetone, a common laboratory contaminant, was also detected in one field blank sample but not in any environmental samples.

As part of the October groundwater monitoring event and in accordance with LTMMP requirements, resampling of well MWL-MW7 for radon-222 was performed since the original sample result was qualified during data validation as unusable because the holding time requirement was exceeded. Acetone and 2-butanone were detected at very low concentrations in equipment blank and field blank samples, but were not detected in any environmental samples.

## 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. 2002). An update to the conceptual site model integrating the

findings from the four monitoring wells 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 feet bgs and groundwater flows generally westward, away from the Manzanita Mountains and towards the Rio Grande. Several water-supply wells operated by KAFB and the Albuquerque Bernalillo County Water Utility Authority 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 continued to decline since monitoring began in 1990.

Since 2009, the rate of groundwater elevation decline in all wells except MWL-MW4 and MWL-BW2 has been relatively slow and constant, and less than 2 feet overall. The rate of groundwater elevation decline in the upper screen interval of MWL-MW4 has stabilized since April 2010. The overall decline in MWL-BW2 since 2009 has been approximately 3 feet, reflecting a slightly higher rate of decline than observed in the other wells. 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 MWL ET Cover. Groundwater recharge of the regional aquifer occurs by the infiltration of precipitation in the Manzanita Mountains located approximately 5 miles to the east.

Figure 7-2 shows the October 2015 potentiometric surface of the regional aquifer beneath the MWL. Groundwater flows towards the west and northwest. Measured orthogonally from the potentiometric surface contours, the horizontal gradient for October 2015 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 the slug testing of four monitoring wells, and an effective porosity of 25 percent. The calculated 2015 groundwater velocity was the same as 2014, and ranges from 0.02 to 0.06 feet per day. The average 2015 groundwater velocity is 0.04 feet per day. These very low values are consistent with previous estimates for horizontal groundwater flow at the water table in the MWL vicinity.

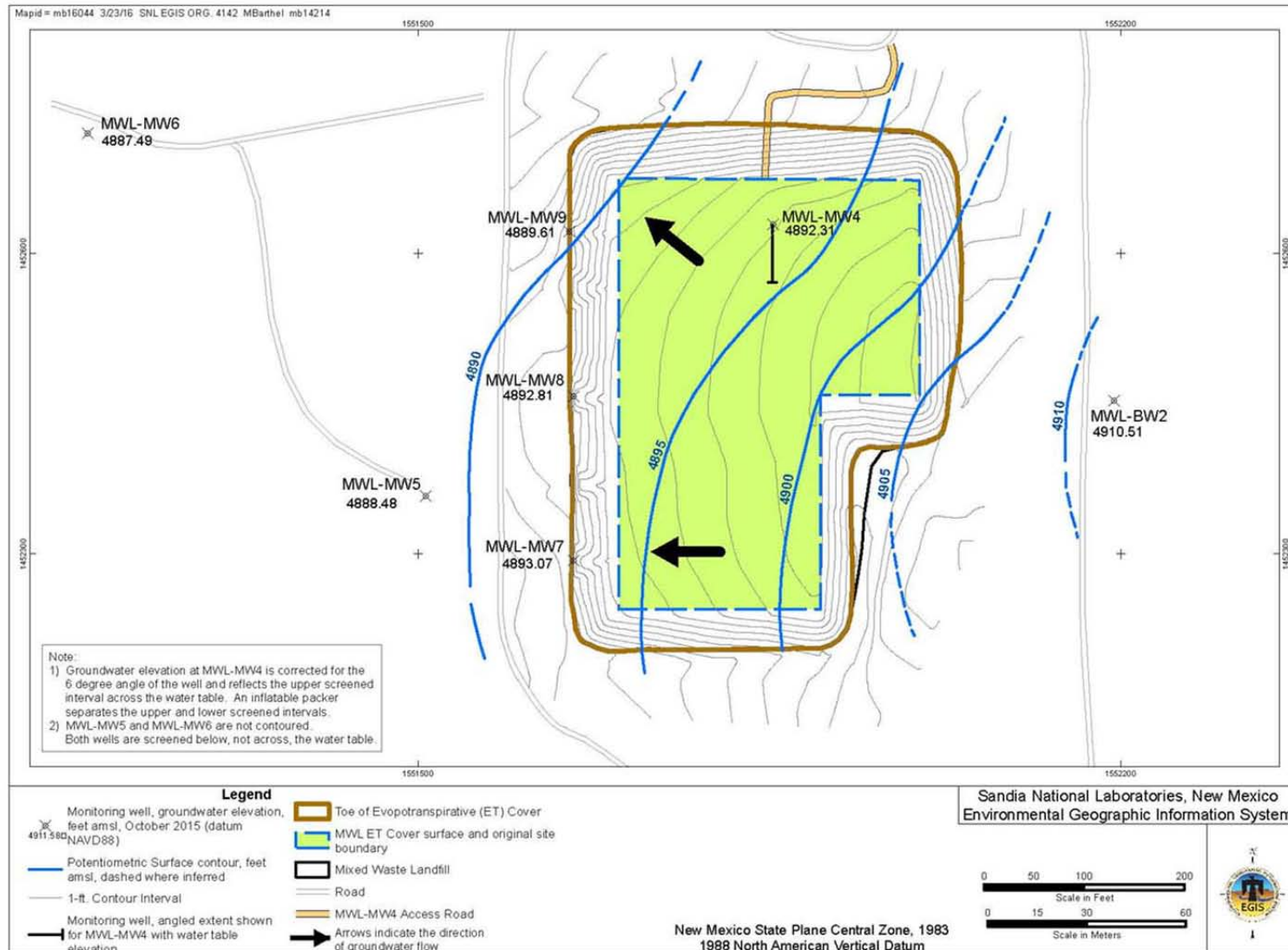


Figure 7-2  
Localized Potentiometric Surface of the Basin Fill Aquifer at the Mixed Waste Landfill, October 2015

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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 the LTMMMP Section 3.6 and Appendix F (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 is performed, as well as sampling of potentially deep-rooted vegetation, if present. Biota monitoring functions as an early warning detection system for biotic mobilization of contaminants to the surface so that timely action can be taken, if necessary. Results are compared to trigger 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 annual sampling event was conducted during the April 1, 2015 through March 31, 2016 reporting period fulfilling the LTMMMP annual monitoring requirement. The biota sampling locations were identified during the growing season ET Cover Biology Inspection performed on August 3, 2015. The sampling locations are shown in Figure 8-1 and consist of two ant hills (MWL AHSS-01-2015 and MWL AHSS-02-2015). There were no animal burrows or potentially deep-rooted plants identified on the ET Cover during Biology Inspection. The two ant hill locations selected for surface soil sampling by the staff biologist were the largest and most active ant hills. The locations were also selected to provide good spatial coverage. Surface soil samples were collected at these locations on August 11, 2015 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 (MWL LTMMMP Appendix G, Table G-4.2-1), one field QC sample (duplicate sample) was collected at MWL AHSS-02-2015.

#### **8.1.2 Waste Management**

Waste generated during sampling activities included PPE (i.e., gloves), and decontamination wipes. Analytical data collected from the sampling event was used to characterize the waste as non-hazardous; it was managed as solid waste.



Figure 8-1  
Mixed Waste Landfill Biota Sampling Locations



## 8.2 Laboratory Results

Biota samples were submitted to GEL for analyses. Samples were analyzed in accordance with applicable EPA analytical methods. Gamma spectroscopy analytical results that are below the MDA are qualified with a “U” and are designated as below detection. 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, results of QC analyses, and data validation reports are filed in the SNL/NM Record Center.

### 8.2.1 Environmental Sample Results

Table 8-1 summarizes metal results and Table 8-2 summarizes gamma spectroscopy results. NMED-approved background concentrations and activities (Dinwiddie September 1997) and LTMMMP trigger levels are included in Tables 8-1 and 8-2 for comparison.

All metals results were at or below the respective NMED-approved background concentrations and below trigger levels. The vanadium concentration (20.9 mg/kg) in the environmental duplicate sample from location MWL-AHSS-02-2015 slightly exceeded the background concentration of 20.4 mg/kg. However, the vanadium concentration in the corresponding environmental sample (18.7 mg/kg) was below the background concentration. The selenium concentration for the same environmental sample (1.43 mg/kg) slightly exceeded the background concentration of <1 mg/kg. However, the selenium concentration in the corresponding the duplicate sample was 0.902 mg/kg. All cadmium, selenium, and silver results were non-detects or estimated concentrations near the MDL.

All gamma spectroscopy radionuclide results are very low activities below the respective NMED-approved background activities. Six of the 18 results were non-detects, and two results (U-238 for the MWL-AHSS-01-2015 sample and the U-235 result for the MWL-AHSS-02-2015 sample) were determined by the laboratory to be invalid (see Section 8.2.3, i.e., false positives) due to analytical uncertainty. The gamma spectroscopy results were reviewed by an SNL/NM radiological 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 environmental-duplicate sample pairs and the RPD values calculated for the August data set. An RPD was calculated when metal analytes were reported in both the environmental and duplicate sample at concentrations greater than the RL, 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  $\leq 1$  to 18. As defined in Section 2.3, Appendix G of the LTMMMP, an RPD of less than or equal to 35 is considered acceptable for biota duplicate sampling results.

Table 8-1  
Summary of Metals Results (EPA Method 6020/7470<sup>a</sup>)  
Mixed Waste Landfill Biota Monitoring  
August 2015

Sample Location	Parameter	NMED Background <sup>b</sup> (mg/kg)	Result (mg/kg)	Reporting Limit (mg/kg)	Trigger Level (mg/kg)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>d</sup>
MWL AHSS-01-2015 11-Aug-15	Arsenic	5.6	4.61	2.83	17.7	--	--
	Barium	130	80.7	0.472	100,000	N	J+
	Beryllium	0.65	0.459	0.472	2,260	J	--
	Cadmium	<1	ND	0.472	897	U	--
	Chromium	17.3	7.17	0.472	63.1	--	--
	Cobalt	5.2	2.92	0.472	20,500	--	--
	Copper	15.4	7.63	0.943	45,400	--	--
	Lead	21.4	6.70	0.943	800	*	--
	Mercury	<0.25	0.00383	0.0108	73.6	J	--
	Nickel	11.5	5.70	0.472	22,500	--	--
	Selenium	<1	0.742	2.83	5,680	J	--
	Silver	<1	0.110	0.472	5,680	J	--
	Vanadium	20.4	20.4	0.472	5,680	--	J
	Zinc	62	24.5	0.943	100,000	--	--
MWL AHSS-02-2015 11-Aug-15	Arsenic	5.6	4.94	2.99	17.7	--	--
	Barium	130	84.6	0.498	100,000	N	J+
	Beryllium	0.65	0.483	0.498	2,260	J	--
	Cadmium	<1	ND	0.498	897	U	--
	Chromium	17.3	7.72	0.498	63.1	--	--
	Cobalt	5.2	3.16	0.498	20,500	--	--
	Copper	15.4	6.71	0.996	45,400	--	--
	Lead	21.4	7.85	0.996	800	*	--
	Mercury	<0.25	0.0058	0.0112	73.6	J	--
	Nickel	11.5	6.40	0.498	22,500	--	--
	Selenium	<1	1.43	2.99	5,680	J	--
	Silver	<1	0.131	0.498	5,680	J	--
	Vanadium	20.4	18.7	0.498	5,680	--	J
	Zinc	62	23.0	0.0996	100,000	--	--

Refer to notes at end of table.

Table 8-1 (Concluded)  
Summary of Metals Results (EPA Method 6020/7470<sup>a</sup>)  
Mixed Waste Landfill Biota Monitoring  
August 2015

Sample Location	Parameter	NMED Background <sup>b</sup> (mg/kg)	Result (mg/kg)	Reporting Limit (mg/kg)	Trigger Level (mg/kg)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>d</sup>
MWL AHSS-02-2015 11-Aug-15 (Duplicate)	Arsenic	5.6	4.74	2.90	17.7	--	--
	Barium	130	87.8	0.483	100,000	N	J+
	Beryllium	0.65	0.509	0.483	2,260	--	--
	Cadmium	<1	ND	0.483	897	U	--
	Chromium	17.3	8.27	0.483	63.1	--	--
	Cobalt	5.2	3.41	0.483	20,500	--	--
	Copper	15.4	6.71	0.965	45,400	--	--
	Lead	21.4	7.92	0.965	800	*	--
	Mercury	<0.25	0.00406	0.0119	73.6	J	--
	Nickel	11.5	6.81	0.483	22,500	--	--
	Selenium	<1	0.902	2.90	5,680	J	--
	Silver	<1	0.136	0.483	5,680	J	--
	Vanadium	20.4	20.9	0.483	5,680	--	J
	Zinc	62	24.5	0.0965	100,000	--	--

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.

<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 Qualifier:

If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted samples.

\* = Relative Percent Difference (RPD) for replicate sample was greater than 20%, but less than 35%.

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

N = Result for the associated matrix spike had high recovery.

U = Analyte was not detected.

<sup>d</sup>Validation Qualifier:

If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted samples.

J = Estimated value.

J+ = Value is estimated with a suspected positive bias.

DOE = U.S. Department of Energy

EPA = U.S. Environmental Protection Agency.

mg/kg = Milligram(s) per kilogram.

ND = Not detected above the MDL, shown in parentheses.

NMED = New Mexico Environment Department.

Table 8-2  
Summary of Gamma Spectroscopy Results (EPA Method 901.1<sup>a</sup>)  
Mixed Waste Landfill Biota Monitoring  
August 2015

Sample Location	Parameter	Result (pCi/g)	MDA (pCi/g)	NMED Background <sup>b</sup> (pCi/g)	Laboratory Qualifier <sup>c</sup>	Validation Qualifier <sup>d</sup>
<b>MWL AHSS-01-2015</b> 11-Aug-15	Cesium-137	0.105 ± 0.0276	0.0277	1.5	--	--
	Cobalt-60	-0.00399 ± 0.0148	0.0261	NA	U	BD
	Radium-226	0.633 ± 0.0884	0.0548	2.7	--	--
	Thorium-232 <sup>e</sup>	0.876 ± 0.0885	0.0439	1.5	--	--
	Uranium-235	0.117 ± 0.140	0.153	0.18	U	BD
	Uranium-238	1.24 ± 1.30	1.23	2.3	X	R
<b>MWL AHSS-02-2015</b> 11-Aug-15	Cesium-137	0.108 ± 0.0175	0.0166	1.5	--	--
	Cobalt-60	0.000383 ± 0.0101	0.0181	NA	U	BD
	Radium-226	0.725 ± 0.0782	0.0292	2.7	--	--
	Thorium-232 <sup>e</sup>	0.979 ± 0.101	0.0269	1.5	--	--
	Uranium-235	0.0317 ± 0.0846	0.0955	0.18	U	BD
	Uranium-238	0.977 ± 0.659	0.491	2.3	--	J
<b>MWL AHSS-02-2015</b> (Duplicate) 11-Aug-15	Cesium-137	0.101 ± 0.0176	0.0161	1.5	--	--
	Cobalt-60	-0.0000702 ± 0.0119	0.0176	NA	U	BD
	Radium-226	0.694 ± 0.0742	0.0314	2.7	--	--
	Thorium-232 <sup>e</sup>	0.953 ± 0.0832	0.0256	1.5	--	--
	Uranium-235	0.112 ± 0.0975	0.089	0.18	X	R
	Uranium-238	0.259 ± 1.01	0.744	2.3	U	BD

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.

<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. There are no established background activities for vegetation.

<sup>c</sup>Laboratory Qualifier:

If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted samples.

U = Analyte is below detection limit.

X = Analytical value is not valid due to peak not meeting identification criteria.

<sup>d</sup>Validation Qualifier:

If cell is blank (--), then all quality control samples met acceptance criteria with respect to submitted samples.

BD = Value is below the MDA or less than the 2-sigma uncertainty.

J = Estimated value.

R = Value is not valid, peak could not be identified.

<sup>e</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.

NA = Not applicable.

NMED = New Mexico Environment Department.

pCi/g = Picocuries per gram.

Table 8-3  
Summary of Duplicate Sample Results  
Mixed Waste Landfill Biota Monitoring  
August 2015

Sample Location	Environmental Sample (R <sub>1</sub> )	Duplicate Sample (R <sub>2</sub> )	RPD <sup>a</sup>
<b>MWL AHSS-02-2015 – Metals (mg/kg)</b>			
Arsenic	4.94	4.74	4
Barium	80.7	87.8	8
Chromium	7.17	8.27	14
Cobalt	2.92	3.41	15
Copper	7.63	6.71	13
Lead	6.70	7.92	17
Nickel	5.70	6.81	18
Vanadium	20.4	20.9	2
Zinc	24.5	24.5	<1
<b>MWL AHSS-02-2015 – Radionuclides (pCi/g)</b>			
Cesium-137	0.108	0.101	7
Radium-226	0.725	0.694	4
Thorium-232	0.979	0.953	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.

mg/kg = Milligram(s) per kilograms(s).  
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 methods. These included laboratory control samples, method blanks, matrix spike, and matrix spike duplicate samples for the metals analyses. For the radiological analyses, method blank and laboratory control 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. 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 2014a). Data Validation Reports and Contract Verification Review forms are provided in Annex B.

No significant issues were identified with the metals results. For the radiological analyses, two results (U-238 for the MWL-AHSS-01-2015 sample and the U-235 result for the MWL-AHSS-02-2015 duplicate sample) were determined by the laboratory to be invalid. The U-238 result was rejected due to high counting uncertainty, and the U-235 result was rejected due to peak identification uncertainty. Both of these issues are related to the very low activity of these radionuclides in the sample, which makes it very difficult to both accurately identify the presence of the radionuclide and determine the activity. This is reflected in the 2-sigma error (plus or

minus value next to the result in Table 8-3) being very close to, or larger, than the result. For the U-235 result from the MWL-AHSS-02-2015 duplicate sample, the corresponding U-235 result in the associated environmental sample was a non-detect (i.e., result was less than the MDA). For these reasons, there is no requirement for resampling.

Based upon the data validation and review criteria, all analytical data were determined acceptable and met the DQOs. Reported QC samples results were in compliance with analytical method and laboratory procedure requirements.

### **8.3 Data Evaluation and Monitoring Trigger Level**

Trigger levels for metals in surface soil samples collected at ant hills are specified in the MWL LTMMMP, Table 5.2.2-1 and 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 the 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 surface soil samples collected at ant hills were below the NMED-approved background activity levels. No animal burrows or deep-rooted vegetation were identified for sampling.

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

This chapter presents a summary of inspection, maintenance, and repair activities 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(s) each type of inspection was performed during the April 1, 2015 through March 31, 2016 reporting period. Inspection results are presented in the following sections and documented on the inspection forms/checklists called out 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 Form/Checklist 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 MWL 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 survey monuments (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 3, 2015 fulfilling the requirement for an annual Biology Inspection during the reporting period growing season (Table 9-1). The ET Cover met all LTMM criteria. The approximate foliar coverage on the ET Cover was 54 percent, with 100 percent of this coverage composed of native vegetation. The foliar coverage is dominated by native grasses, with James' galleta (native grass species) comprising approximately 40 percent of the total foliar coverage. There were no contiguous areas without vegetation exceeding 200 square feet in size. No plants capable of developing deep root systems were observed. Fourteen ant hills were observed and noted on a site map included with the inspection form. The ant hills were located predominantly on the side slopes or on the cover surface near the side slopes. No animal burrows were observed on the ET Cover. No action or repairs were required based on the August 3, 2015 Biology Inspection. Additional information is provided on the August 3, 2015 Biology Inspection Form/Checklist (Annex F) and in the Biology Report (Annex G), which summarizes local climate trends and presents recommendations for the ET Cover.

#### **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 LTMM quarterly inspection requirement (Table 9-1). Inspection items that required maintenance or repairs are summarized as follows for each quarterly inspection.

Table 9-1  
Inspection Frequency and Dates Performed  
Mixed Waste Landfill  
April 2015 – March 2016 Reporting Period

Inspection Type	Frequency	Form/Checklist <sup>a</sup>	Date Performed
ET Cover Biology Inspection	Annual <sup>b</sup>	Biology Inspection Checklist/Form	August 3, 2015
ET Cover Surface Inspection	Quarterly	Cover Inspection Checklist/Form	May 21, 2015
			August 7, 2015
			November 4, 2015
			February 17, 2016
Storm-Water Diversion Structure Inspection <sup>c</sup>	Quarterly	Cover Inspection Checklist/Form	May 21, 2015
			August 7, 2015
			November 4, 2015
			February 17, 2016
Soil-Vapor Monitoring Network Inspection	Semiannually <sup>d</sup>	Soil-Vapor Monitoring Network Checklist/Form	April 13, 2015
Groundwater Monitoring Network Inspection	Semiannually <sup>d</sup>	Groundwater Monitoring Network Checklist/Form	October 8, 2015
			April 6, 2015
Soil-Moisture Monitoring Network Inspection	Semiannually <sup>d</sup>	Soil-Moisture Monitoring Network Checklist/Form	October 12, 2015
			April 21 & 23, 2015
Security Fence Inspection <sup>c</sup>	Quarterly	Cover Inspection Checklist/Form	October 8, 2015
			May 21, 2015
			August 7, 2015
			November 4, 2015
			February 17, 2016

Notes:

<sup>a</sup>All reporting period inspection forms are provided in Annex F.

<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 are conducted at the same time as the ET Cover Surface Inspection and 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.

### May 21, 2015 Inspection

Early growth seedlings of Russian thistle (i.e., tumbleweeds) were noted on and around the ET Cover. From July 6 – 8, 2015, tumbleweeds were removed from the ET Cover and perimeter area. As a preventive measure to reduce the abundance of local weed seeds, post-emergent herbicide was applied to the North and South Staging Areas after the removal of tumbleweeds in these perimeter areas. During the inspection, dead, dry tumbleweeds were also removed from the perimeter fence line.

### August 7, 2015

No inspection items required maintenance or repairs.

### November 4, 2015

During this inspection two SNL/NM staff biologists assisted the field technician in the inspection of the ET Cover and surrounding perimeter area for signs of animal intrusion (i.e., burrows). No burrows were observed on the ET Cover, but small animal burrows (less than 4-inches in



diameter) were observed in the perimeter area, including in the soil pile north of the ET Cover within the security fence area, and in the vicinity of some of the perimeter monitoring wells. No maintenance or repairs were required, but monitoring of the ET Cover and perimeter area for animal burrows will continue to be performed on a quarterly frequency.

### February 17, 2016

During this inspection the SNL/NM staff biologist assisted the field technician in the inspection of the ET Cover and surrounding perimeter area for biological parameters. Observations of the ET Cover vegetation were consistent with the August 2015 Biology Inspection (i.e., vegetation is in good condition with good spatial coverage). No burrows were observed on the ET Cover. Ant hills were observed on the cover but were all inactive due to winter dormancy. Animal burrows were observed in the perimeter area and noted for continued observation in future inspections. Small animal burrows adjacent to the MWL-VZ-3 and MWL VZ-1 soil-moisture monitoring access tube concrete pads were investigated and backfilled to protect the monitoring wells. A gravel-soil mixture was used to backfill the MWL-VZ-3 burrows to discourage future burrowing in this area after taking measures to allow the animals to vacate. The burrow near MWL-VZ-1 was inadvertently backfilled by foot traffic along the western ET Cover perimeter, where seven monitoring wells are located. A small animal burrow was previously noted, inspected, and backfilled at the MWL-VZ-3 location based on the October 8, 2015 soil-moisture monitoring network inspection (see Section 9.4). More detailed information is provided with the February 2016 inspection form (Annex F).

Based on this experience, planning is underway to establish a protective surface barrier around each of the perimeter monitoring well concrete pads to prevent burrowing in the future. This best management practice will protect the integrity of the monitoring wells and minimize long-term maintenance.

## **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 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 were documented on the same Cover Inspection Checklist/Form. No inspection items required follow-up actions. However, live or windblown weeds that were present were removed from the swale during the July 6 – 8, 2015 ET Cover weed removal event as a best management practice.

## **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**

Two inspections of the soil-moisture monitoring network were performed as part of the semiannual monitoring events conducted during the reporting period, fulfilling the LTMMMP inspection requirement (Table 9-1). A small animal burrow entrance leading under the concrete pad of MWL-VZ-3 was identified during the October 8, 2015 inspection. On November 4, 2015 an inspection of the area, including a downhole video inspection of the burrow, was performed by an SNL/NM staff biologist. The burrow was backfilled as a best management practice after the staff biologist determined no animal was present in the burrow. No other inspection items required action.

#### **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.

##### May 21, 2015 – Quarterly Inspection

Accumulation of dead, dry wind-blown tumbleweeds was identified and removed from the fence at time of the inspection. No other inspection items required action.

##### August 7, 2015 – Quarterly Inspection

The lock on the south gate required maintenance, and was replaced at time of the inspection. No other inspection items required action.

##### November 4, 2015 – Quarterly Inspection

Several warning signs were coming loose from the perimeter security fence. They were repaired at time of the inspection. No other inspection items required action.

February 17, 2016 – Quarterly Inspection

No inspection items required action.

## **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 a result, minimal maintenance was required during this reporting period, and no supplemental watering was conducted. Routine ET Cover maintenance for the removal of invasive weed growth was conducted as part of the quarterly ET Cover System/Surface Inspections discussed in Section 9.1.2.

No supplemental watering was required during the 2015 growing season due to the mature condition of the native grasses and adequate natural precipitation. The temporary irrigation system installed on top of the ET Cover surface in 2011 was dismantled and removed from July 30 through August 3, 2015. The polyvinyl chloride pipe was deteriorating and it no longer appears that supplemental watering is needed based on current ET Cover conditions. If supplemental watering is needed in the future, other options will be used to apply the water.

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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 since full implementation of the LTMM are summarized in Section 10.1, along with submittals that occurred during this April 1, 2015 through March 31, 2016 reporting period. The Class 3 Permit Modification for CAC with Controls status for the MWL was approved during this reporting period and is summarized in Section 10.2.

Post-LTMM implementation submittals, including submittals associated with the April 2015 through March 2016 reporting period, are summarized in this Section. There were no modification requests during the reporting period related to changing the LTMM.

### 10.1 MWL Regulatory Submittals

This section addresses post-LTMM implementation MWL regulatory submittals, including submittals that occurred during this reporting period. All MWL post-LTMM implementation regulatory submittals are summarized in Table 10-1. Previous regulatory submittals associated with full implementation of the LTMM are summarized in the MWL Annual LTMM Report, April 2014 – March 2015 (SNL/NM June 2015).

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
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.
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 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.

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.

LTMM = Long-Term Monitoring and Maintenance Plan.

MWL = Mixed Waste Landfill.

SNL/NM = Sandia National Laboratories/New Mexico

Regulatory submittals during this reporting period included the MWL Annual LTMM Report, April 2014 – March 2015 (SNL/NM June 2015). This second Annual LTMM Report was approved by NMED in October 2015 (Kielling October 2015 and March 2016).

## **10.2 Class 3 Permit Modification Request for Corrective Action Complete With Controls for the Mixed Waste Landfill**

DOE and Sandia requested a Certification of Completion for the MWL in accordance with Section VII.D.6 of the Compliance Order on Consent on September 25, 2014 (Beausoleil September 2014). On October 8, 2014, NMED determined that all LTMM monitoring systems were deployed for long-term controls and issued the Certificate of Completion (Cobrain October 2014). DOE and Sandia submitted a request dated October 17, 2014 to NMED for a Class 3 Permit Modification for CAC with Controls at the MWL (Beausoleil October 2014). The request and associated legal notice initiated the DOE and Sandia 60-day public comment period that ended on January 5, 2015 and included a DOE and Sandia-hosted public meeting on November 18, 2014. NMED initiated a 60-day public comment period that started on January 12, 2015 (Cobrain January 2015). On March 17, 2015 NMED extended this public comment period an additional 30 days, to April 13, 2015.

During this reporting period on April 29 and May 4, 2015, the NMED conducted informal negotiations open to all parties that requested a hearing during the public comment period. These meetings did not resolve identified issues to the satisfaction of all parties that requested a hearing, so the NMED proceeded with a public hearing from July 8 through 11, 2015. The Hearing Officer issued a report on October 13, 2015 recommending that the NMED Secretary modify the Permit to reflect that the MWL is CAC with Controls. On February 12, 2016, the NMED Secretary issued a Final Order (Flynn February 2016) adopting the Hearing Officer Report with minor modifications, and granting the Class 3 Permit Modification to reflect that the MWL is CAC with Controls. The Final Order became effective on March 13, 2016 after no party filed a legal challenge to the Final Order.

## 11.0 SUMMARY AND CONCLUSIONS

This chapter presents a summary and conclusions of all MWL LTMMMP monitoring, inspection, and maintenance/repair activities in this reporting period.

### 11.1 Monitoring Activities

All monitoring activities for the April 1, 2015 through March 31, 2016 reporting period were completed in accordance with LTMMMP requirements. The results for each monitoring activity are summarized as follows.

#### Radon Monitoring

The radon air monitoring frequency is quarterly. The average radon concentrations for the four quarters ranged from 0.5 to 0.7 pCi/L at monitoring locations RN1 through RN15, and average background radon concentrations at locations RN16 and RN17 ranged from 0.6 to 0.7 pCi/L. The results for locations RN1 through RN10 were all below the trigger level of 4.0 pCi/L.

In accordance with the LTMMMP, the radon monitoring frequency will transition to semiannual for the next reporting period. Two years of quarterly radon monitoring have been completed.

#### Tritium Surface Soil Monitoring

The tritium surface soil monitoring frequency is annual. Soil samples were collected on August 4, 2015. Tritium activities ranged from 269 to 719 pCi/L, which are low activities and consistent with historical data. All values were below the trigger level of 20,000 pCi/L.

#### Soil-Vapor Monitoring

The vadose zone soil-vapor monitoring frequency is semiannual. A total of 20 compounds were detected above laboratory MDLs between the two sampling events. Results for PCE, TCE, and Total VOCs from the deepest port of wells MWL-SV03, MWL-SV04, and MWL-SV05 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 feet bgs sampling ports were 0.450 ppmv and 0.350 ppmv, respectively. The maximum concentration for Total VOCs was 0.9592 ppmv. 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 with no new releases from the disposal area.

### Soil-Moisture Monitoring

The vadose zone soil-moisture monitoring frequency is semiannual. The trigger level for soil moisture applies to the shallow depth interval of 8.7 to 86.6 feet bgs at the three monitoring locations. The soil-moisture content by volume for this depth interval ranged from 1.4 to 5.2 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.

### Groundwater Monitoring

The groundwater monitoring frequency is semiannual. No constituents were detected in groundwater at concentrations exceeding trigger levels and the results are consistent with historical MWL groundwater monitoring results.

### Biota Monitoring

Biota monitoring frequency is annual. All results were below the trigger levels and radionuclide results were below background activities.

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

The annual ET Cover Biology Inspection was performed in August 2015 during the 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 was required during this reporting period, and no supplemental watering was needed. The ET Cover vegetation is in good condition and no issues requiring maintenance or repairs were identified.

The ET Cover System/Surface Inspection was performed quarterly. Minor maintenance was performed during the inspections or within 60 days of the inspection, including the removal of Russian thistle weeds in early July 2015 from the ET Cover and perimeter area. Small animal burrows identified during the February 2016 inspection in the immediate vicinity of perimeter monitoring wells MWL-VZ-1 and MWL-VZ-3 were backfilled in March 2016. Planning is underway to establish a protective surface barrier around the perimeter monitoring well concrete pads to prevent burrowing in the future. This best management practice will protect the integrity of the monitoring wells and minimize long-term maintenance.

The engineered storm-water drainage swale inspection was performed quarterly. There were no issues identified. During the July 6 – 8, 2015 ET Cover weed removal event, dead and/or live weeds present in the swale were removed as a best management practice.

The soil-vapor monitoring network inspection was performed semiannually. There were no issues identified.



The soil-moisture monitoring network inspection was performed semiannually. Small animal burrows in the immediate vicinity MWL-VZ-3 were backfilled in November 2015 after inspection by the staff biologist as part of the October 2015 inspection. There were no other issues identified.

The groundwater monitoring network inspection was performed semiannually. There were no issues identified.

The perimeter security fence inspection that also includes access controls (i.e., gates, locks, signs) and survey monuments was performed quarterly. Minor maintenance was performed during three of the four inspections, including the removal of wind-blown plant debris from the fence, repair of warning signs, and the replacement of the lock on the south gate. There were no other issues identified.

### **11.3 Regulatory Activities**

Regulatory activities during the April 2015 – March 2016 reporting period included submittal of the second MWL Annual LTMM Report, April 2014 – March 2015, in June 2015. NMED approved the report in October 2015.

The Class 3 Permit Modification for CAC with Controls for the MWL that DOE and Sandia requested in October 2014 was granted by NMED in February 2016. During this reporting period the associated regulatory process included completion of the NMED public comment period in April 2015, informal negotiations held by NMED on April 29 and May 4, 2014, a four-day public hearing held from July 8 – 11, 2015, the Hearing Officer Report issued on October 13, 2015, and the Final Order issued by the NMED Secretary on February 12, 2016. The February 2016 Final Order became effective on March 13, 2016.

### **11.4 Conclusions**

DOE and Sandia have performed and documented all required MWL LTMM monitoring, inspection, and maintenance/repair requirements for the April 1, 2015 through March 31, 2016 reporting period. This third Annual LTMM Report presents the monitoring, inspection, and maintenance/repair activities and results for the reporting period as required by the MWL LTMM, Section 4.8.1. The monitoring and inspection results indicate the final remedy, which includes the ET Cover and related physical controls, is performing as designed. DOE and Sandia continue to maintain institutional controls related to the MWL. No monitoring trigger levels were exceeded. Based on monitoring and inspection results, site conditions continue to be protective of human health and the environment.

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U.S. Environmental Protection Agency (EPA), 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.

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

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

**ANNEX A**

**Mixed Waste Landfill  
Radon Monitoring**

**January-December 2015**

**Data Evaluation Memos**

**Field Forms**

**Inspection Forms**

**Contract Verification Reviews**

**MIXED WASTE LANDFILL**

**RADON MONITORING**

**January-March 2015 Monitoring Period**





**Sandia National Laboratories**

Operated for the U.S. Department of Energy by  
**Sandia Corporation**

Albuquerque, New Mexico 87185-

*date:* April 22, 2015

*to:* Mike Mitchell (6234), Robert Ziock (4142), Bonnie Little (4142) and Annemarie Rader (4143)

*from:* Mark Miller (41281), CHP

*subject:* Review of MWL Radon-in-Air Data – 1<sup>st</sup> Quarter of 2015, January through March 2015

The purpose of this memo is to document my review of the radon-in-air monitoring data results for the 1<sup>st</sup> Quarter of Calendar Year (CY) 2015, January through March 2015, 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. Monitoring results provide radon emission data from across the site and at two background locations (Figure 1). These results are compared to historic results to evaluate radon air emission trends and for direct comparison to the LTMMMP trigger level of 4 picocuries per liter. This DQO and these monitoring objectives are met through the implementation of standard operating procedures, analytical procedures/methods, quality assurance and control measures, and data evaluation protocol.

The radon-in-air monitoring measurements for the monitoring period January through March 2015 were obtained using Radtrak® radon detectors that were submitted to Landauer® Incorporated for analysis on Analysis Request/Chain of Custody (AR/COC) #615960. On January 7, 2015, the detectors were deployed on and around the MWL (locations RN1 through RN15 at the MWL, background locations RN16 and RN17, and a trip blank that was never exposed, RN18) in accordance with the requirements of Section 3.2.1 of the LTMMMP. These detectors remained in the field for approximately 3 months (one quarter), and were collected on April 2, 2015. The protective casing and mounting hardware were inspected during the collection effort and repairs were made if needed. The location of these detectors is shown in Figure 1.

I have reviewed the results for this monitoring period along with supporting field documentation and determined the results meet the LTMMMP DQO and monitoring objectives. The radon trigger level was not exceeded by any of the individual sample results; however, it only applies to the results from the perimeter locations (locations RN1 through RN10, Figure 1). The results from this quarterly monitoring event will be presented in the next MWL Annual LTMM Report that will be submitted to NMED in June 2016 (reporting period is April 1, 2015 through March 31, 2016).

**Attachments:**

Analysis Request/Chain of Custody #616121

Landauer Radon Monitoring Report (analytical laboratory results)

Figure 1 Location of the Radon Track Etch® Detectors at the MWL

SMO 2012-ARCO (4-2012)

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-16

Internal Lab

Page 1 of 2

Batch No. N/A

SMO Use

AR/COC **616121**

Project Name: MWL Radon monitoring	Date Samples Shipped: <u>4/2/15</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: R. Ziack	Carrier/Waybill No. <u>231732</u>	SMO Contact Phone: <u>Robert Ziack/505-845-0485</u>	<input type="checkbox"/> RMMA
Project/Task Number: 146422/10.11.08	Lab Contact: Landauer 800.528.8327	Send Report to SMO:	<input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius
Service Order: CFO 378-15	Lab Destination: Landauer, INC.	Rita Kavanaugh/505.284.2553	
	Contract No.: Acct # 0410548		

Tech Area: TA3 MWL  
Building: Room: Operational Site: TA3 MWL  
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
097656	--001	RN 1/ 4982883 ✓	N/A	4/2/15 1033	F	N/A	N/A	None	Collection	Sample	Radon	
097657	--001	RN 2/ 4982884 ✓	N/A	4/2/15 959	F	N/A	N/A	None	Collection	Sample	Radon	
097658	--001	RN 3/ 4982885 ✓	N/A	4/2/15 1003	F	N/A	N/A	None	Collection	Sample	Radon	
097659	--001	RN 4/ 4982886 ✓	N/A	4/2/15 1007	F	N/A	N/A	None	Collection	Sample	Radon	
097660	--001	RN 5/ 4982887 ✓	N/A	4/2/15 1019	F	N/A	N/A	None	Collection	Sample	Radon	
097661	--001	RN 6/ 4982984 ✓	N/A	4/2/15 1021	F	N/A	N/A	None	Collection	Sample	Radon	
097662	--001	RN 7/ 4982985 ✓	N/A	4/2/15 1023	F	N/A	N/A	None	Collection	Sample	Radon	
097663	--001	RN 8/ 4982986 ✓	N/A	4/2/15 1027	F	N/A	N/A	None	Collection	Sample	Radon	
097664	--001	RN 9/ 4982988 ✓	N/A	4/2/15 1030	F	N/A	N/A	None	Collection	Sample	Radon	
097665	--001	RN 10/ 4983142 ✓	N/A	4/2/15 1031	F	N/A	N/A	None	Collection	Sample	Radon	

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use	Special Instructions/QC Requirements:	Parameter & Method	Conditions on Receipt
Validation Req'd: <input type="checkbox"/> Yes		Date Entered:			EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
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	
	Annemarie Rader	<u>[Signature]</u>	<u>[Init.]</u>	SNL/4143/844-2640	Return Samples By:		
					Comments:		
					Samples deployed on 01/07/14 and collected on 04/02/15		

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

[illegible]

SANDIA NATIONAL LABORATORY  
ATTN: ALTA KAVANAGH  
1015 EUBANK SE, ORG 4142  
Bldg 1090/120, Mail 103  
ALBUQUERQUE, NM 87123

## Radon Monitoring Report

LICENSES: 101146AL, 100504RT

Acct. No. 0410548

**LANDAUER®**

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1786  
Telephone: (800)538-6327 Fax: (708) 735-7006

Correction Data: LOCATION CORRECTION

\*\*\* UNCOLLECTED RESPONSE \*\*\*

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi-days	Avg. Radon Conc. pCi/l	
4981883	LDN2	07 JAN 15	02 APR 15	007656 J001	79.8 17.07	0.9 10.08	
4981884	LDN2	07 JAN 15	02 APR 15	007657 J002	91.7 ±8.16	1.1 ±0.10	
4981885	LDN2	07 JAN 15	02 APR 15	007658 J003	76.8 17.19	0.9 10.08	
4981886	LDN2	07 JAN 15	02 APR 15	007659 J004	59.6 ±6.65	1.2 ±0.10	
4981887	LDN2	07 JAN 15	02 APR 15	007660 J005	54.6 16.49	1.1 10.10	
4981888	LDN2	07 JAN 15	02 APR 15	007661 J006	63.0 ±6.56	0.8 ±0.08	
4981903	LDN2	07 JAN 15	02 APR 15	007662 J007	77.0 ±7.45	0.9 ±0.09	
4981906	LDN2	07 JAN 15	02 APR 15	007663 J008	73.8 ±7.51	0.9 ±0.09	
4981909	LDN2	07 JAN 15	02 APR 15	007664 J009	56.6 ±6.54	1.1 ±0.10	
4981957	LDN2	07 JAN 15	02 APR 15	007665 J014	60.7 ±7.63	0.9 ±0.09	

RESULTS RELATE ONLY TO MONITORS  
AS RECEIVED BY LANDAUER. RADON IS  
ATD BY ALPHA TRACK FOR 400 ROLL 004.

Q.C. Release	Process No.	Report Date	Date Received
LOW	A23020	00 APR 15	08 APR 15

*Mark Salaskey*  
Radon Measurement Specialist

SANDIA NATIONAL LABORATORIES  
ATTN: RITA KAVANAUGH  
1515 EUBANK SE, ORG 4142  
BLDG 1090/120, MS1103  
ALBUQUERQUE, NM 87123

## Radon Monitoring Report

LICENSES: 101146AL,100584RT

Acct. No. 0410548

**LANDAUER®**

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586  
Telephone: (800)528-8327 Facsimile: (708) 755-7048

Correction Data: LOCATION CORRECTION

\*\*\* CORRECTED REPORT \*\*\*

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	
4983058	DRNF	07-JAN-15	02-APR-15	097670 RN15	59.9 ±6.28	0.7 ±0.07	
4983059	DRNF	07-JAN-15	02-APR-15	097671 RN16	55.0 ±5.93	0.6 ±0.07	
4983060	DRNF	07-JAN-15	02-APR-15	097672 RN17	60.9 ±6.35	0.7 ±0.07	
4983142	DRNF	07-JAN-15	02-APR-15	097665 RN10	54.0 ±5.86	0.6 ±0.07	
4983144	DRNF	07-JAN-15	02-APR-15	097666 RN11	84.7 ±7.87	1.0 ±0.09	
4983145	DRNF	07-JAN-15	02-APR-15	097667 RN12	64.9 ±6.62	0.8 ±0.08	
4983152	DRNF	07-JAN-15	02-APR-15	* - LESS THAN INDICATED VALUE 097673 RNTB	* 30.0	* 0.4 ±0.05	
4983154	DRNF	07-JAN-15	02-APR-15	097668 RN13	85.7 ±7.92	1.0 ±0.09	

①

②

③

④

⑤

⑥

⑦

⑧

RESULTS RELATED ONLY TO MONITORS  
AS RECEIVED BY LANDAUER. RADON IN  
AIR BY ALPHA TRACK - EPA 402-R92-004.

Q.C. Release	Process No.	Report Date	Date Received
LMR	A23220	20-APR-15	08-APR-15

*Mark Salaskey*

Radon Measurement Specialist



The United States Environmental Protection Agency recommends fixing your home if the results of one long-term test or the average of two short-term tests taken in the lowest lived-in level of the home show radon levels of 4.0 pCi/l or higher. A short term test remains in your home for two days to 90 days, whereas a long-term test remains in your home for more than 90 days under these guidelines.

Column 7 of this report indicates the radon test result, i.e., the average radon concentration in pCi/l for the test period. If you did not provide us the starting and ending dates (days the detector was exposed) we are unable to calculate the average radon concentration. To calculate the average radon concentration, divide the total exposure in pCi/l-days (column 6) by the number of days the detector was exposed.

For more information about the interpretation of your test result or about other radon related issues we suggest you contact your state radon office. Your state radon office should have available the following EPA publications:

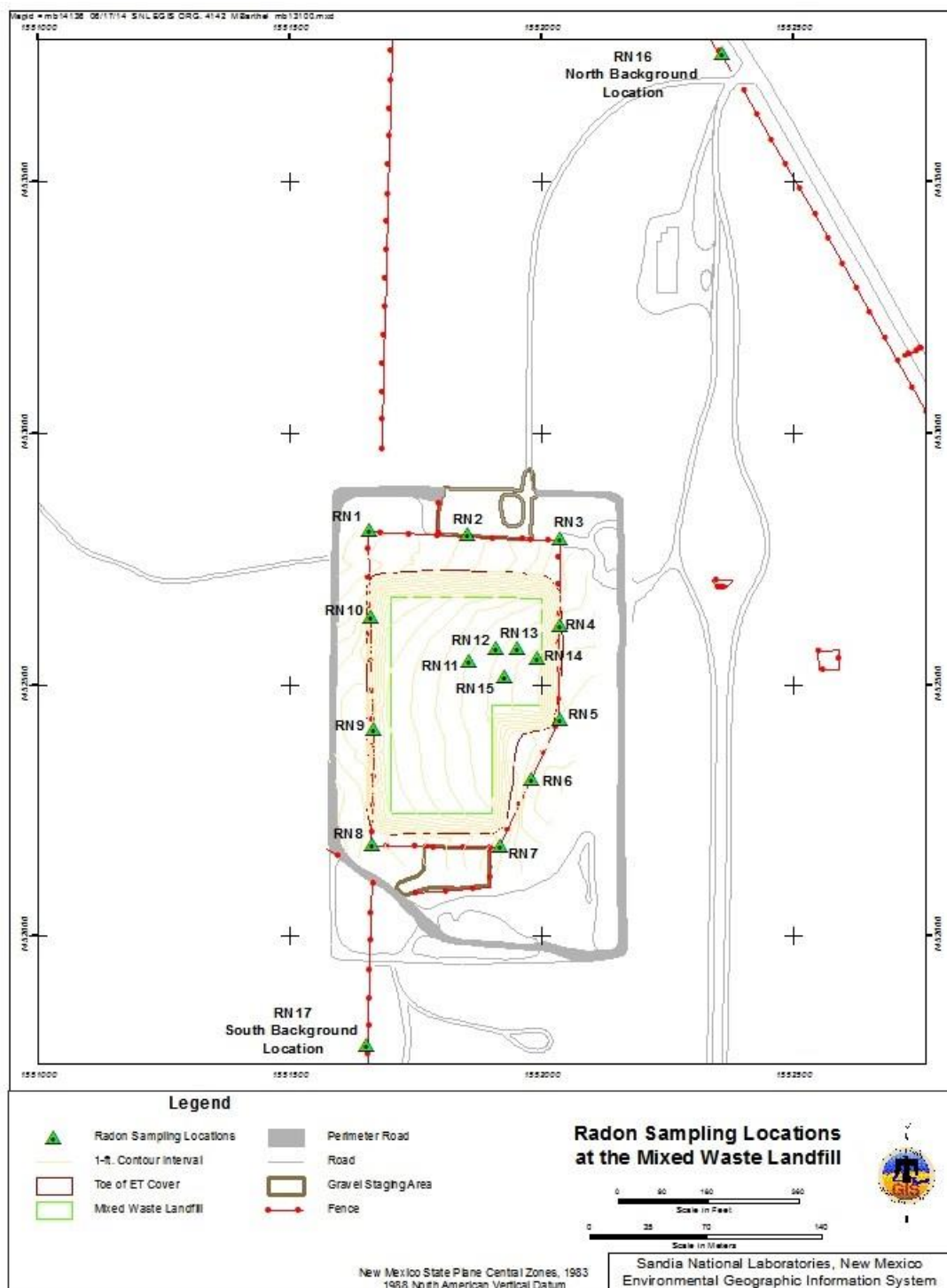
- A Citizen's Guide to Radon
- Home Buyer's and Seller's Guide to Radon
- Consumer's Guide to Radon Reduction

#### DISCLAIMER

Landauer, Inc. makes no warranty of any kind, express or implied, as regards to the use, operation or analysis of any Landauer, Inc. monitor. Landauer, Inc. specifically disclaims implied warranties of merchantability and fitness for a particular purpose. Landauer, Inc. is not responsible for any damage, including consequential damages, to persons or property resulting from the use of the monitor or the resulting data.

## LANDAUER®

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586 Telephone: (800) 528-8327 Facsimile: (708) 755-7048  
Email: radon@landauer.com Website: www.landauer.com



**Figure 1. Location of the Radon Track Etch<sup>®</sup> Detectors at the MWL**

# LANDAUER®



## RADTRAK® RADON TEST DATA SHEET

Company: Sandia Nat'l Labs  
Acct. Number: 0410548  
Contact: Robert Ziock  
Phone: 505-845-0485  
Email: rziock@sandia.gov

### Send Radon Report To:

(If different from account settings)

Company: Sandia Nat'l Labs  
Attn: Robert Ziock  
Address: PO Box 5800  
MS-1103  
City: Albuquerque  
ST/Prov: NM Post Code: 87185  
Country: USA  
Phone: 505-845-0485  
Email: rziock@sandia.gov

### Site Information:

(Please provide information on where detectors are being deployed. Reports will be labeled and sorted by value provided in 'Site Name' below.)

Site Name: SNL/MWL  
Site Type: OUTDOOR  
Additional Information: \_\_\_\_\_

#### If Applicable:

Technician Name: Annemarie Rader  
Technician Number: \_\_\_\_\_  
Technician Signature: [Signature]

Please include all detector numbers, exposure periods and location information to appear on report

Detector Number	Building Name / Nbr	Unit Nbr	Floor	Comment / Note	Start Date mm/dd/yyyy	End Date mm/dd/yyyy

PLEASE SEE ATTACHED LIST.

Landauer Use Only: Processed By: \_\_\_\_\_ Date: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_




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

COC # 616121

Detector Serial Number	Sample Number	Sampling Location	Deployment Date	Collection Date	Time	Comments
4982883	097656	RN1	01/07/2015	04/02/2015	1033	
4982884	097657	RN2	01/07/2015	04/02/2015	0959	
4982885	097658	RN3	01/07/2015	04/02/2015	1003	
4982886	097659	RN4	01/07/2015	04/02/2015	1007	
4982887	097660	RN5	01/07/2015	04/02/2015	1019	
4982984	097661	RN6	01/07/2015	04/02/2015	1021	
4982985	097662	RN7	01/07/2015	04/02/2015	1023	
4982986	097663	RN8	01/07/2015	04/02/2015	1027	
4982988	097664	RN9	01/07/2015	04/02/2015	1030	
4983142	097665	RN10	01/07/2015	04/02/2015	1031	
4983144	097666	RN11	01/07/2015	04/02/2015	1014	
4983145	097667	RN12	01/07/2015	04/02/2015	1013	
4983154	097668	RN13	01/07/2015	04/02/2015	1012	
4983057	097669	RN14	01/07/2015	04/02/2015	1011	
4983058	097670	RN15	01/07/2015	04/02/2015	1016	
4983059	097671	RN16	01/07/2015	04/02/2015	1106	
4983060	097672	RN17	01/07/2015	04/02/2015	1054	
4983152	097673	RNTB	01/07/2015	04/02/2015	1110	

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

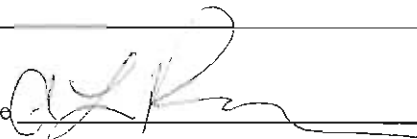
Name of Inspector Annemarie RaderCollection Date 01/07/2015Deployment Date 10/02/2014 Radon Monitoring Frequency: ~ Quarterly ~ Semiannually ~ Annually

<i>Radon Monitoring Location Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Action Required at Location Numbers</i>
A. Monitoring location identification labeling.	Yes	No	
B. Mounting (fence) post condition.	Yes	No	
C. Radon monitoring outer metal housing securely fastened (mounting bracket and stainless steel clamp).	Yes	No	
D. Radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic retaining ring, and plastic cup)	Yes	No	
E. Radon monitoring apparatus interior clean of debris (dirt, insects, spider webs, etc.).	Yes	No	
F. Radon monitoring apparatus assembled and detector securely fastened with Velcro® to inside of plastic cup.	Yes	No	
<i>Radon Monitoring Detectors Inspection Parameters</i>			
A. Condition of Radtrak® detector at time of collection.	Yes	No	
B. Condition of Radtrak® detector at time of deployment.	Yes	No	

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

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

Inspector's Signature



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

**Mixed Waste Landfill Radon Monitoring Location Monthly Inspection Form**Name of Inspector Annemarie RaderDate of Inspection 02/26/2015

Inspection parameters: Identification labeling; mounting post; mounting bracket and stainless steel clamp; radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic retaining ring, plastic cup, Velcro<sup>®</sup>, Radtrak<sup>®</sup> detector).

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

Inspector's Signature



Original to: Mixed Waste Landfill Operating Record

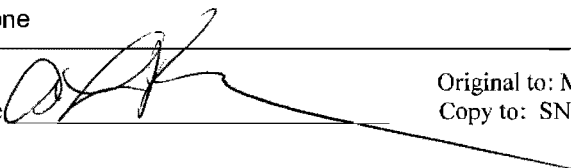
Copy to: SNL/NM Records Center

**Mixed Waste Landfill Radon Monitoring Location Monthly Inspection Form**Name of Inspector Annemarie RaderDate of Inspection 03/26/2015

Inspection parameters: Identification labeling; mounting post; mounting bracket and stainless steel clamp; radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic retaining ring, plastic cup, Velcro<sup>®</sup>, Radtrak<sup>®</sup> detector).

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

Inspector's Signature



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

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

Name of Inspector Annemarie RaderCollection Date 04/02/2015Deployment Date 01/07/2015Radon Monitoring Frequency: ☒ Quarterly    ☐ Semiannually    ☐ Annually


<i>Radon Monitoring Location Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Action Required at Location Numbers</i>
A. Monitoring location identification labeling.	yes	No	
B. Mounting (fence) post condition.	yes	No	
C. Radon monitoring outer metal housing securely fastened (mounting bracket and stainless steel clamp).	yes	No	
D. Radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic retaining ring, and plastic cup)	yes	No	
E. Radon monitoring apparatus interior clean of debris (dirt, insects, spider webs, etc.).	yes	No	
F. Radon monitoring apparatus assembled and detector securely fastened with Velcro® to inside of plastic cup.	yes	No	
<i>Radon Monitoring Detectors Inspection Parameters</i>			
A. Condition of Radtrak® detector at time of collection.	yes	No	
B. Condition of Radtrak® detector at time of deployment.	yes	No	

*aym* 4/2/2015

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

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

Inspector's Signature

  
4/2/2015

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

## Contract Verification Review (CVR)

Project Leader MILLER Project Name MWL RADON MONITORING Project/Task No. 146422\_10.11.08  
 ARCOG No. 616121 Analytical Lab LANDAUER SDG No. A23220

*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	N/A		
1.7	Date samples received	X		
1.8	Condition upon receipt information provided	N/A		

### 2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	No	
2.1	Data reviewed, signature	N/A		
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 L <sub>c</sub>	N/A		
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	N/A		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	N/A		
2.10	Narrative provided	N/A		
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		



## Contract Verification Review (Continued)

### 3.0 Data Quality Evaluation

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	N/A		
3.3 Accuracy	N/A		
a) Laboratory control sample accuracy reported and met for all samples			
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	N/A		
c) Matrix spike recovery data reported and met	N/A		
3.4 Precision	N/A		
a) Replicate sample precision reported and met for all inorganic and radiochemistry samples			
b) Matrix spike duplicate RPD data reported and met for all organic samples	N/A		
3.5 Blank data	N/A		
a) Method or reagent blank data reported and met for all samples			
b) Sampling blank (e.g., field, trip, and equipment) data reported and met	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	N/A		
3.7 Narrative addresses planchet flaming for gross alpha/beta	N/A		
3.8 Narrative included, correct, and complete	N/A		
3.9 Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151	N/A		

## Contract Verification Review (Continued)

### 4.0 Calibration and Validation Documentation

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

## Contract Verification Review (Continued)

f) RRTs for samples and standards provided	N/A		
g) Ion abundance ratios for samples and standards provided	N/A		
h) Instrument run logs provided	N/A		
4.4 LC/MS/MS (6850)			
a) Initial calibration provided	N/A		
b) Continuing calibration provided	N/A		
c) CRI provided	N/A		
d) Internal standard performance data provided	N/A		
e) Chlorine isotope ratios provided (perchlorate only)	N/A		
f) ICS provided (perchlorate only)	N/A		
4.5 Inorganics (metals)			
a) Initial calibration provided	N/A		
b) Continuing calibration provided	N/A		
c) ICP interference check sample data provided	N/A		
d) ICP serial dilution provided	N/A		
e) Instrument run logs provided	N/A		
4.6 Radiochemistry and General Chemistry	N/A		
a) Instrument run logs provided			

## Contract Verification Review (Concluded)

### 5.0 Data Anomaly Report

Item	Yes	No	Comments
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 have been noted.*

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions

Were deficiencies unresolved?      ☐ Yes      ☒ No

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

If no, provide nonconformance report or correction request number \_\_\_\_\_ and date correction request was submitted: \_\_\_\_\_

Reviewed by: W. Palencia Date: 4.20.2015

Were resolutions adequate and data package complete?      ☐ Yes      ☐ No

Closed by: \_\_\_\_\_ Date: \_\_\_\_\_

**MIXED WASTE LANDFILL**

**RADON MONITORING**

**April-June 2015 Monitoring Period**



**Sandia National Laboratories**

Operated for the U.S. Department of Energy by  
**Sandia Corporation**

Albuquerque, New Mexico 87185-

*date:* July 20, 2015

*to:* Mike Mitchell (6234), Robert Ziock (4142), Bonnie Little (4142) and Annemarie Rader (4143)

*from:* Mark Miller (41281), CHP

*subject:* Review of MWL Radon-in-Air Data – 2<sup>nd</sup> Quarter of 2015, April through June 2015

The purpose of this memo is to document my review of the radon-in-air monitoring data results for the 2<sup>nd</sup> Quarter of Calendar Year (CY) 2015, April through June 2015, 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. Monitoring results provide radon emission data from across the site and at two background locations (Figure 1). These results are compared to historic results to evaluate radon air emission trends and for direct comparison to the LTMMMP trigger level of 4 picocuries per liter. This DQO and these monitoring objectives are met through the implementation of standard operating procedures, analytical procedures/methods, quality assurance and control measures, and data evaluation protocol.

The radon-in-air monitoring measurements for the monitoring period April through June 2015 were obtained using Radtrak® radon detectors that were submitted to Landauer® Incorporated for analysis on Analysis Request/Chain of Custody (AR/COC) #616122. On April 2, 2015, the detectors were deployed on and around the MWL (locations RN1 through RN15 at the MWL, background locations RN16 and RN17, and a trip blank that was never exposed, RNTB) in accordance with the requirements of Section 3.2.1 of the LTMMMP. These detectors remained in the field for approximately 3 months (one quarter), and were collected on July 2, 2015. The protective casing and mounting hardware were inspected during the collection effort and repairs were made if needed. The location of these detectors is shown in Figure 1.

I have reviewed the results for this monitoring period along with supporting field documentation and determined the results meet the LTMMMP DQO and monitoring objectives. The radon trigger level was not exceeded by any of the individual sample results; however, it only applies to the results from the perimeter locations (locations RN1 through RN10, Figure 1). The results from this quarterly monitoring event will be presented in the next MWL Annual LTMM Report that will be submitted to NMED in June 2016 (reporting period is April 1, 2015 through March 31, 2016).

**Attachments:**

Analysis Request/Chain of Custody #616122

Landauer Radon Monitoring Report (analytical laboratory results)

Figure 1 Location of the Radon Track Etch® Detectors at the MWL

AOP 95-

AR/COC 616122

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

## Analysis Request and Chain of Custody for the 2<sup>nd</sup> Quarter of CY 2015 at the MWL



SANDIA NATIONAL LABORATORIES  
ATTN: RADON REPORTS  
1515 EUBANK SE, ORG 4142  
BLDG 1090/120, MS1103  
ALBUQUERQUE, NM 87123

## Radon Monitoring Report

LICENSES: 101146AL,100584RT

Acct. No. 0410548

**LANDAUER®**

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586  
Telephone: (800)528-8327 Facsimile: (708) 755-7048

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	
5501972	DRNF	02-APR-15	02-JUL-15	* - LESS THAN INDICATED VALUE 097691-001 RNTB	* 30.0	* 0.3 ±0.07	
5502379	DRNF	02-APR-15	02-JUL-15	097689-001 RN 16	44.7 ±5.09	0.5 ±0.06	
5502381	DRNF	02-APR-15	02-JUL-15	097677-001 RN 4	52.8 ±5.69	0.6 ±0.06	
5502382	DRNF	02-APR-15	02-JUL-15	097674-001 RN 1	37.5 ±4.51	0.4 ±0.05	
5502383	DRNF	02-APR-15	02-JUL-15	097683-001 RN 10	47.4 ±5.30	0.5 ±0.06	
5502384	DRNF	02-APR-15	02-JUL-15	097688-001 RN 15	54.6 ±5.82	0.6 ±0.06	
5502612	DRNF	02-APR-15	02-JUL-15	097685-001 RN 12	54.6 ±5.82	0.6 ±0.06	
5502613	DRNF	02-APR-15	02-JUL-15	097682-001 RN 9	49.2 ±5.43	0.5 ±0.06	
5502614	DRNF	02-APR-15	02-JUL-15	097675-001 RN 2	48.3 ±5.36	0.5 ±0.06	

RESULTS RELATED ONLY TO MONITORS  
AS RECEIVED BY LANDAUER. RADON IN  
AIR BY ALPHA TRACK - EPA 402-R92-004.

Q.C. Release	Process No.	Report Date	Date Received
LMR	A23282	16-JUL-15	07-JUL-15

*Mark Salaskey*  
Radon Measurement Specialist

SANDIA NATIONAL LABORATORIES  
ATTN: RADON REPORTS  
1515 EUBANK SE, ORG 4142  
BLDG 1090/120, MS1103  
ALBUQUERQUE, NM 87123

## Radon Monitoring Report

LICENSES: 101146AL, 100584RT

Acct. No. 0410548

**LANDAUER®**

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586  
Telephone: (800)528-8327 Facsimile: (708) 755-7048

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	
5502615	DRNF	02-APR-15	02-JUL-15	097687-001 RN 14	44.7 ±5.09	0.5 ±0.06	
5502616	DRNF	02-APR-15	02-JUL-15	097676-001 RN 3	51.9 ±5.63	0.6 ±0.06	
5502617	DRNF	02-APR-15	02-JUL-15	097690-001 RN 17	69.0 ±6.76	0.8 ±0.07	
5502642	DRNF	02-APR-15	02-JUL-15	097681-001 RN 8	55.5 ±5.88	0.6 ±0.06	
5502643	DRNF	02-APR-15	02-JUL-15	097679-001 RN 6	37.5 ±4.51	0.4 ±0.05	
5502644	DRNF	02-APR-15	02-JUL-15	097681-001 RN 11	34.8 ±4.28	0.4 ±0.05	
5502645	DRNF	02-APR-15	02-JUL-15	097686-001 RN 13	60.9 ±6.24	0.7 ±0.07	
5502646	DRNF	02-APR-15	02-JUL-15	097680-001 RN 7	86.1 ±7.76	0.9 ±0.09	
5502648	DRNF	02-APR-15	02-JUL-15	097678-001 RN 5	64.5 ±6.48	0.7 ±0.07	

① ② ③ ④ ⑤ ⑥ ⑦ ⑧  
RESULTS RELATED ONLY TO MONITORS  
AS RECEIVED BY LANDAUER. RADON IN  
AIR BY ALPHA TRACK - EPA 402-R92-004.

Q.C. Release	Process No.	Report Date	Date Received
LMR	A23282	16-JUL-15	07-JUL-15

*Mark Salaskey*  
Radon Measurement Specialist

The United States Environmental Protection Agency recommends fixing your home if the results of one long-term test or the average of two short-term tests taken in the lowest lived-in level of the home show radon levels of 4.0 pCi/l or higher. A short term test remains in your home for two days to 90 days, whereas a long-term test remains in your home for more than 90 days under these guidelines.

Column 7 of this report indicates the radon test result, i.e., the average radon concentration in pCi/l for the test period. If you did not provide us the starting and ending dates (days the detector was exposed) we are unable to calculate the average radon concentration. To calculate the average radon concentration, divide the total exposure in pCi/l-days (column 6) by the number of days the detector was exposed.

For more information about the interpretation of your test result or about other radon related issues we suggest you contact your state radon office. Your state radon office should have available the following EPA publications:

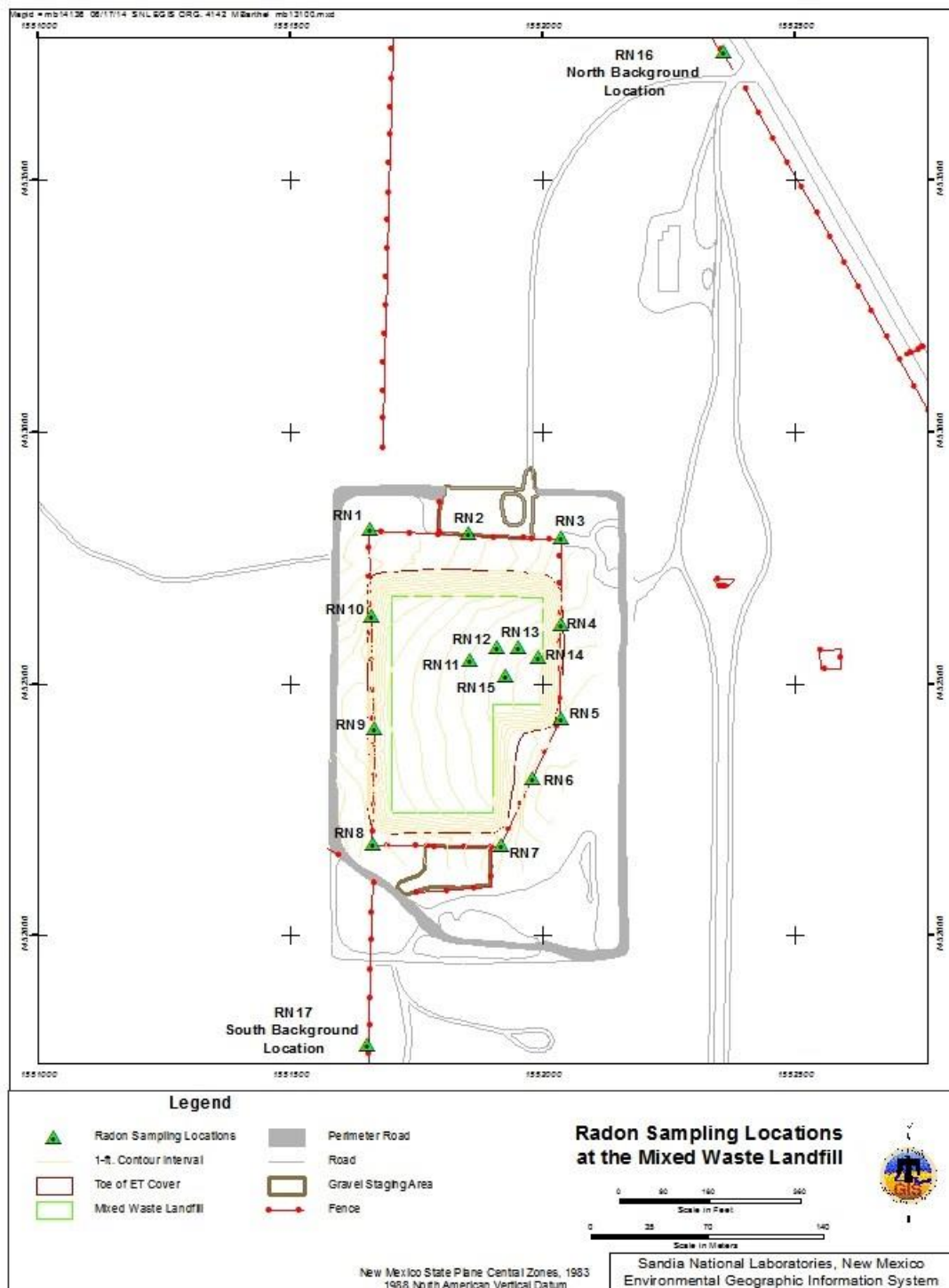
- A Citizen's Guide to Radon
- Home Buyer's and Seller's Guide to Radon
- Consumer's Guide to Radon Reduction

#### DISCLAIMER

Landauer, Inc. makes no warranty of any kind, express or implied, as regards to the use, operation or analysis of any Landauer, Inc. monitor. Landauer, Inc. specifically disclaims implied warranties of merchantability and fitness for a particular purpose. Landauer, Inc. is not responsible for any damage, including consequential damages, to persons or property resulting from the use of the monitor or the resulting data.

## LANDAUER®

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586 Telephone: (800) 528-8327 Facsimile: (708) 755-7048  
Email: [radon@landauer.com](mailto:radon@landauer.com) Website: [www.landauer.com](http://www.landauer.com)



**Figure 1. Location of the Radon Track Etch<sup>®</sup> Detectors at the MWL**



## RADTRAK® RADON TEST DATA SHEET

Company: Sandia Nat'l Labs  
 Acct. Number: 0410548  
 Contact: Mark Miller  
 Phone: 505.284.2107  
 Email: mmiller@sandia.gov

### Send Radon Report To:

(If different from account settings)

Company: Sandia Nat'l Labs  
 Attn: Mark Miller  
 Address: PO Box 5800  
MS-0729  
 City: Albuquerque  
 ST/Prov: NM Post Code: 87185  
 Country: USA  
 Phone: 505-284-2107  
 Email: mmiller@sandia.gov

### Site Information:

(Please provide information on where detectors are being deployed. Reports will be labeled and sorted by value provided in 'Site Name' below.)

Site Name: SNL/MWL  
 Site Type: outdoor  
 Additional Information: \_\_\_\_\_

#### If Applicable:

Technician Name: A.L. Radar  
 Technician Number: \_\_\_\_\_  
 Technician Signature: [Signature]

Please include all detector numbers, exposure periods and location information to appear on report

Detector Number	Building Name / Nbr	Unit Nbr	Floor	Comment / Note	Start Date mm/dd/yyyy	End Date mm/dd/yyyy

please see Attached page

Landauer Use Only: Processed By: \_\_\_\_\_ Date: \_\_\_\_\_ Page \_\_\_\_ of \_\_\_\_

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

COC # 616122

Detector Serial Number	Sample Number	Sampling Location	Deployment Date	Collection Date	Time	Comments
5502382	097674-001	RN1	04/02/2015	07/02/2015	1540	
5502614	097675-001	RN2	04/02/2015	07/02/2015	1458	
5502616	097676-001	RN3	04/02/2015	07/02/2015	1535	
5502381	097677-001	RN4	04/02/2015	07/02/2015	1610	
5502648	097678-001	RN5	04/02/2015	07/02/2015	1603	
5502643	097679-001	RN6	04/02/2015	07/02/2015	1600	
5502646	097680-001	RN7	04/02/2015	07/02/2015	1557	
5502642	097681-001	RN8	04/02/2015	07/02/2015	1552	
5502613	097682-001	RN9	04/02/2015	07/02/2015	1548	
5502383	097683-001	RN10	04/02/2015	07/02/2015	1545	
5502644	097684-001	RN11	04/02/2015	07/02/2015	1528	
5502612	097685-001	RN12	04/02/2015	07/02/2015	1523	
5502645	097686-001	RN13	04/02/2015	07/02/2015	1516	
5502615	097687-001	RN14	04/02/2015	07/02/2015	1514	
5502384	097688-001	RN15	04/02/2015	07/02/2015	1510	
5502379	097689-001	RN16	04/02/2015	07/02/2015	1450	
5502617	097690-001	RN17	04/02/2015	07/02/2015	1617	
5501972	097691-001	RNTB	04/02/2015	07/02/2015	NA 1802	

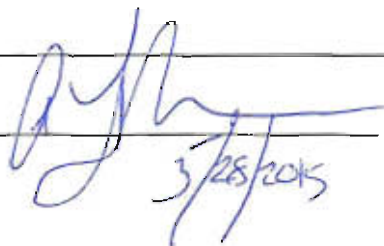


**Mixed Waste Landfill Radon Monitoring Location Monthly Inspection Form**Name of Inspector Annemarie RaderDate of Inspection 05/27/2015

Inspection parameters: Identification labeling; mounting post; mounting bracket and stainless steel clamp; radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic retaining ring, plastic cup, Velcro<sup>®</sup>, Radtrak<sup>®</sup> detector).

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

Inspector's Signature



3/28/2015

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

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

Name of Inspector Annemarie Rader Collection Date 07/02/2015Deployment Date 04/02/2015Radon Monitoring Frequency: ☒ Quarterly ☐ Semiannually ☐ Annually

<i>Radon Monitoring Location Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Action Required at Location Numbers</i>
A. Monitoring location identification labeling.	Yes	No	NA
B. Mounting (fence) post condition.	Yes	No	NA
C. Radon monitoring outer metal housing securely fastened (mounting bracket and stainless steel clamp).	Yes	No	NA
D. Radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic retaining ring, and plastic cup)	Yes	No	NA
E. Radon monitoring apparatus interior clean of debris (dirt, insects, spider webs, etc.).	Yes	No	NA
F. Radon monitoring apparatus assembled and detector securely fastened with Velcro <sup>®</sup> to inside of plastic cup.	Yes	No	NA
<i>Radon Monitoring Detectors Inspection Parameters</i>			
A. Condition of Radtrak <sup>®</sup> detector at time of collection.	Yes	No	NA
B. Condition of Radtrak <sup>®</sup> detector at time of deployment.	Yes	No	NA



**Mixed Waste Landfill Radon Monitoring Location Monthly Inspection Form**Name of Inspector Annemarie RaderDate of Inspection 07/02/2015

Inspection parameters: Identification labeling; mounting post; mounting bracket and stainless steel clamp; radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic retaining ring, plastic cup, Velcro<sup>®</sup>, Radtrak<sup>®</sup> detector).

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

Inspector's Signature

  
7/2/15

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

## Contract Verification Review (CVR)

Project Leader ZIOCK Project Name MWL RADON MONITORING Project/Task No. 146422\_10.11.08  
 ARCOG No. 616122 Analytical Lab LANDAUER SDG No. A23282

*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	N/A		
1.7	Date samples received	X		
1.8	Condition upon receipt information provided	N/A		

### 2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	No	
2.1	Data reviewed, signature	N/A		
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 L <sub>c</sub>	N/A		
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	N/A		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	N/A		
2.10	Narrative provided	N/A		
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		

## Contract Verification Review (Continued)

### 3.0 Data Quality Evaluation

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	N/A		
3.3 Accuracy	N/A		
a) Laboratory control sample accuracy reported and met for all samples			
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	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		
b) Matrix spike duplicate RPD data reported and met for all organic samples	N/A		
3.5 Blank data			
a) Method or reagent blank data reported and met for all samples	N/A		
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	N/A		
3.7 Narrative addresses planchet flaming for gross alpha/beta	N/A		
3.8 Narrative included, correct, and complete	N/A		
3.9 Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151	N/A		

## Contract Verification Review (Continued)

### 4.0 Calibration and Validation Documentation

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

## Contract Verification Review (Continued)

f) RRTs for samples and standards provided	N/A		
g) Ion abundance ratios for samples and standards provided	N/A		
h) Instrument run logs provided	N/A		
4.4 LC/MS/MS (6850)			
a) Initial calibration provided	N/A		
b) Continuing calibration provided	N/A		
c) CRI provided	N/A		
d) Internal standard performance data provided	N/A		
e) Chlorine isotope ratios provided (perchlorate only)	N/A		
f) ICS provided (perchlorate only)	N/A		
4.5 Inorganics (metals)			
a) Initial calibration provided	N/A		
b) Continuing calibration provided	N/A		
c) ICP interference check sample data provided	N/A		
d) ICP serial dilution provided	N/A		
e) Instrument run logs provided	N/A		
4.6 Radiochemistry and General Chemistry	N/A		
a) Instrument run logs provided			

## Contract Verification Review (Concluded)

### 5.0 Data Anomaly Report

Item	Yes	No	Comments
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 have been noted.*

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions

Were deficiencies unresolved?      ☐ Yes      ☒ No

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

If no, provide nonconformance report or correction request number \_\_\_\_\_ and date correction request was submitted: \_\_\_\_\_

Reviewed by: W. Palencia Date: 8.3.2015

Were resolutions adequate and data package complete?      ☐ Yes      ☐ No

Closed by: \_\_\_\_\_ Date: \_\_\_\_\_

**MIXED WASTE LANDFILL**

**RADON MONITORING**

**July-September 2015 Monitoring Period**



**Sandia National Laboratories**

Operated for the U.S. Department of Energy by  
**Sandia Corporation**

Albuquerque, New Mexico 87185-

date: November 5, 2015

to: Mike Mitchell (6234), Robert Ziock (4142), Bonnie Little (4142) and Annemarie Rader (4143)

from: Kelly Green (41283) *Kelly Green*

subject: Review of MWL Radon-in-Air Data – 3<sup>rd</sup> Quarter of 2015, July through September 2015

The purpose of this memo is to document my review of the radon-in-air monitoring data results for the 3<sup>rd</sup> Quarter of Calendar Year (CY) 2015, July through September 2015, 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. Monitoring results provide radon emission data from across the site and at two background locations (Figure 1). These results are compared to historic results to evaluate radon air emission trends and for direct comparison to the LTMMMP trigger level of 4 picocuries per liter. This DQO and these monitoring objectives are met through the implementation of standard operating procedures, analytical procedures/methods, quality assurance and control measures, and data evaluation protocol.

The radon-in-air monitoring measurements for the monitoring period July through September 2015 were obtained using Radtrak® radon detectors that were submitted to Landauer® Incorporated for analysis on Analysis Request/Chain of Custody (AR/COC) #616366. On July 2, 2015, the detectors were deployed on and around the MWL (locations RN1 through RN15 at the MWL, background locations RN16 and RN17, and a trip blank that was never exposed, RNTB) in accordance with the requirements of Section 3.2.1 of the LTMMMP. These detectors remained in the field for approximately 3 months (one quarter), and were collected on October 5, 2015. The protective casing and mounting hardware were inspected during the collection effort and repairs were made if needed. The location of these detectors is shown in Figure 1.

I have reviewed the results for this monitoring period along with supporting field documentation and determined the results meet the LTMMMP DQO and monitoring objectives. The radon trigger level was not exceeded by any of the individual sample results; however, it only applies to the results from the perimeter locations (locations RN1 through RN10, Figure 1). The results from this quarterly monitoring event will be presented in the next MWL Annual LTMM Report that will be submitted to NMED in June 2016 (reporting period is April 1, 2015 through March 31, 2016).

**Attachments:**

Analysis Request/Chain of Custody #616366

Landauer Radon Monitoring Report (analytical laboratory results)

Figure 1 Location of the Radon Track Etch® Detectors at the MWL



SMO 2012-ARCO (4-2012)

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

AOP 95-1

Internal Lab

Page 1 of 2

Batch No. <u>114</u>		SMO Use		AR/COC <b>616366</b>									
Project Name: MWL Radon monitoring		Date Samples Shipped: <u>10/7/15</u>		SMO Authorization: <u>[Signature]</u>									
Project/Task Manager: Kelly Green		Carrier/Waybill No. <u>239702</u>		SMO Contact Phone: Kelly Green/505.845.0787									
Project/Task Number: 146422/10.11.08		Lab Contact: Landauer 800.528.8327		Send Report to SMO									
Service Order: CFO 378-16		Lab Destination: Landauer, INC.		Wendy palencia/505.844.3132									
Contract No. Acct # 0410548													
Tech Area: TA3 MWL		Operational Site: TA3 MWL		Bill to: Sandia National Laboratories (Accounts Payable): P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154									
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	
098379	--001	RN 1/ 5508721	N/A	10/5/15 1440	F	N/A	N/A	None	Collection	Sample	Radon		
098380	--001	RN 2/ 5508745	N/A	10/5/15 1431	F	N/A	N/A	None	Collection	Sample	Radon		
098381	--001	RN 3/ 5508723	N/A	10/5/15 1511	F	N/A	N/A	None	Collection	Sample	Radon		
098382	--001	RN 4/ 5508724	N/A	10/5/15 1517	F	N/A	N/A	None	Collection	Sample	Radon		
098383	--001	RN 5/ 5508726	N/A	10/5/15 1537	F	N/A	N/A	None	Collection	Sample	Radon		
098384	--001	RN 6/ 5508727	N/A	10/5/15 1530	F	N/A	N/A	None	Collection	Sample	Radon		
098385	--001	RN 7/ 5508734	N/A	10/5/15 1525	F	N/A	N/A	None	Collection	Sample	Radon		
098386	--001	RN 8/ 5508735	N/A	10/5/15 1505	F	N/A	N/A	None	Collection	Sample	Radon		
098387	--001	RN 9/ 5508736	N/A	10/5/15 1457	F	N/A	N/A	None	Collection	Sample	Radon		
098388	--001	RN 10/ 5508737	N/A	10/5/15 1450	F	N/A	N/A	None	Collection	Sample	Radon		
Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Parameter & Method		Conditions on Receipt			
Validation Req'd: <input type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No							
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		Return Samples By:					
	Annemarie Rader	<u>[Signature]</u>	<u>AR</u>	SNL/4143/844-2640									
						Comments:							
						Samples deployed on 07/02/15 and collected on 10/05/15							
												Lab Use	
1. Relinquished by <u>[Signature]</u>		Org. 4143		Date 10-6-15 Time 12:19		3. Relinquished by		Org.		Date		Time	
1. Received by <u>[Signature]</u>		Org. 4142		Date 10-6-15 Time 12:19		3. Received by		Org.		Date		Time	
2. Relinquished by <u>[Signature]</u>		Org. 4142		Date 10-7-15 Time 06:30		4. Relinquished by		Org.		Date		Time	
2. Received by <u>[Signature]</u>		Org.		Date 10-14-15 Time 12:30pm		4. Received by		Org.		Date		Time	

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

SMO 2012-ARCO (4-2012)

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

AOP 95-1

Page 2 of 2

AR/COC 616366

[illegible]

## Analysis Request and Chain of Custody for the 3<sup>rd</sup> Quarter of CY 2015 at the MWL

SANDIA NATIONAL LABORATORIES  
ATTN: WENDY PALENCIA  
1515 EUBANK SE, ORG 4142  
BLDG 1090/120, MS1103  
ALBUQUERQUE, NM 87123

## Radon Monitoring Report

LICENSES: 101146AL, 100584RT

Acct. No.

0410548

**LANDAUER®**

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586  
Telephone: (800)528-8327 Facsimile: (708) 755-7048

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	
5508721	DRNF	02-JUL-15	05-OCT-15	RN1	60.5 ±5.93	0.6 ±0.06	
5508723	DRNF	02-JUL-15	05-OCT-15	RN3	41.3 ±4.50	0.4 ±0.05	
5508724	DRNF	02-JUL-15	05-OCT-15	RN4	61.4 ±6.00	0.6 ±0.06	
5508726	DRNF	02-JUL-15	05-OCT-15	RN5	41.3 ±4.50	0.4 ±0.05	
5508727	DRNF	02-JUL-15	05-OCT-15	RN6	55.7 ±5.60	0.6 ±0.06	
5508734	DRNF	02-JUL-15	05-OCT-15	RN7	48.0 ±5.03	0.5 ±0.05	
5508735	DRNF	02-JUL-15	05-OCT-15	RN8	41.3 ±4.50	0.4 ±0.05	
5508736	DRNF	02-JUL-15	05-OCT-15	RN9	47.0 ±4.96	0.5 ±0.05	
5508737	DRNF	02-JUL-15	05-OCT-15	RN10	48.0 ±5.03	0.5 ±0.05	
5508738	DRNF	02-JUL-15	05-OCT-15	RN11	55.7 ±5.60	0.6 ±0.06	

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RESULTS RELATED ONLY TO MONITORS  
AS RECEIVED BY LANDAUER. RADON IN  
AIR BY ALPHA TRACK - EPA 402-R92-004.

Q.C. Release	Process No.	Report Date	Date Received
KJT	A23332	27-OCT-15	14-OCT-15

*Mark Salaskey*  
Radon Measurement Specialist

SANDIA NATIONAL LABORATORIES  
ATTN: WENDY PALENCIA  
1515 EUBANK SE, ORG 4142  
BLDG 1090/120, MS1103  
ALBUQUERQUE, NM 87123

## Radon Monitoring Report

LICENSES: 101146AL,100584RT

Acct. No.

0410548

**LANDAUER®**

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586  
Telephone: (800)528-8327 Facsimile: (708) 755-7048

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	
5508739	DRNF	02-JUL-15	05-OCT-15	RN12	45.1 ±4.81	0.5 ±0.05	
5508740	DRNF	02-JUL-15	05-OCT-15	RN13	44.2 ±4.73	0.5 ±0.05	
5508741	DRNF	02-JUL-15	05-OCT-15	RN14	38.4 ±4.27	0.4 ±0.04	
5508742	DRNF	02-JUL-15	05-OCT-15	RN15	38.4 ±4.27	0.4 ±0.04	
5508743	DRNF	02-JUL-15	05-OCT-15	RN16	68.2 ±6.44	0.7 ±0.07	
5508744	DRNF	02-JUL-15	05-OCT-15	RN17	59.5 ±5.86	0.6 ±0.06	
5508745	DRNF	02-JUL-15	05-OCT-15	RN2	43.2 ±4.66	0.5 ±0.05	
5509057	DRNF	02-JUL-15	05-OCT-15	* - LESS THAN INDICATED VALUE NO GOLD SEAL RNTB	* 30.0	* 0.3 ±0.06	

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RESULTS RELATED ONLY TO MONITORS  
AS RECEIVED BY LANDAUER. RADON IN  
AIR BY ALPHA TRACK - EPA 402-R92-004.

Q.C. Release	Process No.	Report Date	Date Received
KJT	A23332	27-OCT-15	14-OCT-15

*Mark Salaskey*  
Radon Measurement Specialist

The United States Environmental Protection Agency recommends fixing your home if the results of one long-term test or the average of two short-term tests taken in the lowest lived-in level of the home show radon levels of 4.0 pCi/l or higher. A short term test remains in your home for two days to 90 days, whereas a long-term test remains in your home for more than 90 days under these guidelines.

Column 7 of this report indicates the radon test result, i.e., the average radon concentration in pCi/l for the test period. If you did not provide us the starting and ending dates (days the detector was exposed) we are unable to calculate the average radon concentration. To calculate the average radon concentration, divide the total exposure in pCi/l-days (column 6) by the number of days the detector was exposed.

For more information about the interpretation of your test result or about other radon related issues we suggest you contact your state radon office. Your state radon office should have available the following EPA publications:

- A Citizen's Guide to Radon
- Home Buyer's and Seller's Guide to Radon
- Consumer's Guide to Radon Reduction

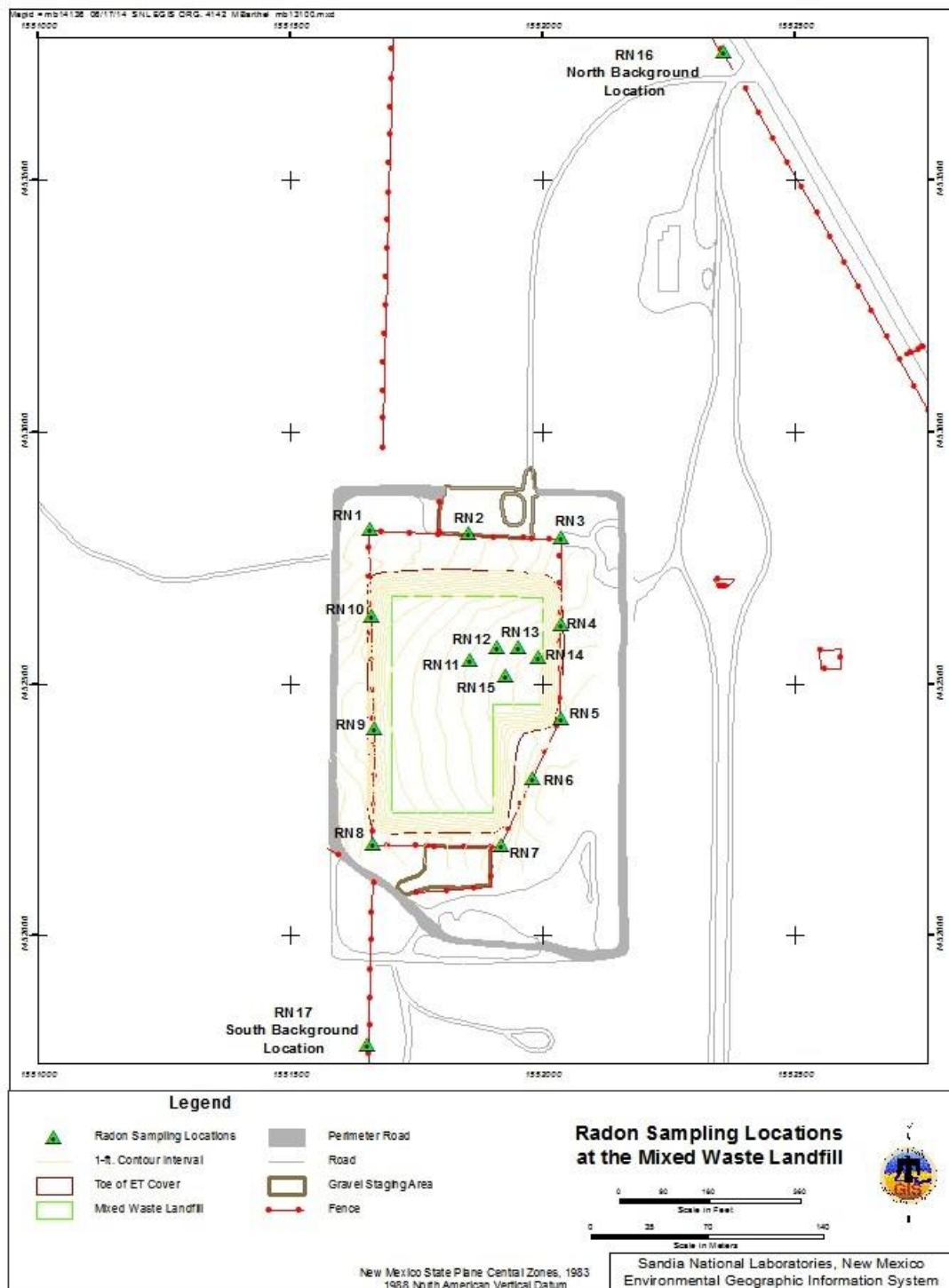
#### DISCLAIMER

Landauer, Inc. makes no warranty of any kind, express or implied, as regards to the use, operation or analysis of any Landauer, Inc. monitor. Landauer, Inc. specifically disclaims implied warranties of merchantability and fitness for a particular purpose. Landauer, Inc. is not responsible for any damage, including consequential damages, to persons or property resulting from the use of the monitor or the resulting data.

## LANDAUER®

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586 Telephone: (800) 528-8327 Facsimile: (708) 755-7048  
Email: radon@landauer.com Website: www.landauer.com





**Figure 1. Location of the Radon Track Etch<sup>®</sup> Detectors at the MWL**



## RADTRAK® RADON TEST DATA SHEET

Company: Sandia Nat'l Labs  
 Acct. Number: \_\_\_\_\_  
 Contact: Kelly Green  
 Phone: 505-845-0787  
 Email: kagreen@sandia.gov

### Send Radon Report To:

(If different from account settings)

Company: Sandia Nat'l Labs  
 Attn: Kelly Green  
 Address: PO Box 5800  
MS 1198  
 City: Albuquerque  
 ST/Prov: NM Post Code: 87185  
 Country: USA  
 Phone: 505-845-0787  
 Email: kagreen@sandia.gov

### Site Information:

(Please provide information on where detectors are being deployed. Reports will be labeled and sorted by value provided in 'Site Name' below.)

Site Name: SVL/MWL  
 Site Type: out door  
 Additional Information: \_\_\_\_\_

#### If Applicable:

Technician Name: Annamarie Rader  
 Technician Number: \_\_\_\_\_  
 Technician Signature: [Signature]

Please include all detector numbers, exposure periods and location information to appear on report

Detector Number	Building Name / Nbr	Unit Nbr	Floor	Comment / Note	Start Date mm/dd/yyyy	End Date mm/dd/yyyy

*please see attached list for info.*

Landauer Use Only: Processed By: \_\_\_\_\_ Date: \_\_\_\_\_ Page \_\_\_\_ of \_\_\_\_

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

COC # 616399

Detector Serial Number	Sample Number	Sampling Location	Deployment Date	Collection Date	Time	Comments
5508721	098379-001	RN1	07/02/2015	10/05/2015	1440	
5508745	098380-001	RN2	07/02/2015	10/05/2015	1431	
5508723	098381-001	RN3	07/02/2015	10/05/2015	1511	
5508724	098382-001	RN4	07/02/2015	10/05/2015	1517	
5508726	098383-001	RN5	07/02/2015	10/05/2015	1537	
5508727	098384-001	RN6	07/02/2015	10/05/2015	1530	
5508734	098385-001	RN7	07/02/2015	10/05/2015	1525	
5508735	098386-001	RN8	07/02/2015	10/05/2015	1505	
5508736	098387-001	RN9	07/02/2015	10/05/2015	1457	
5508737	098388-001	RN10	07/02/2015	10/05/2015	1450	
5508738	098389-001	RN11	07/02/2015	10/05/2015	1542	
5508739	098390-001	RN12	07/02/2015	10/05/2015	1549	
5508740	098391-001	RN13	07/02/2015	10/05/2015	1554	
5508741	098392-001	RN14	07/02/2015	10/05/2015	1600	
5508742	098393-001	RN15	07/02/2015	10/05/2015	1605	
5508743	098394-001	RN16	07/02/2015	10/05/2015	1615	
5508744	098395-001	RN17	07/02/2015	10/05/2015	1415	
5509057	098396-001	RNTB	07/02/2015	10/05/2015	1403	

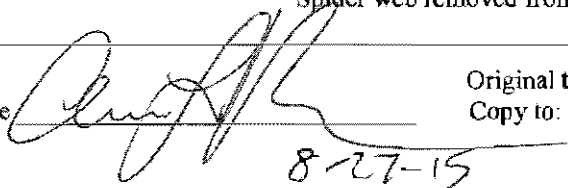


**Mixed Waste Landfill Radon Monitoring Location Monthly Inspection Form**Name of Inspector Annemarie RaderDate of Inspection 08/27/2015

Inspection parameters: Identification labeling; mounting post; mounting bracket and stainless steel clamp; radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic retaining ring, plastic cup, Velcro<sup>®</sup>, Radtrak<sup>®</sup> detector).

Location	Action Required (Note any action required and date resolved, otherwise note "None")
RN1	Spider web removed from cup, 8/27/15
RN2	None
RN3	Spider web removed from cup, 8/27/15
RN4	None
RN5	None
RN6	None
RN7	None
RN8	None
RN9	Spider web removed from cup, 8/27/15
RN10	Spider web removed from cup, 8/27/15
RN11	None
RN12	None
RN13	None
RN14	None
RN15	None
RN16	None
RN17	Spider web removed from cup, 8/27/15

Inspector's Signature



8-27-15

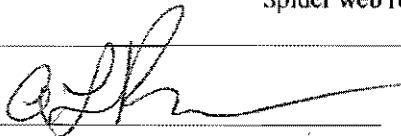
Original to: Mixed Waste Landfill Operating Record  
Copy to: SNL/NM Records Center

**Mixed Waste Landfill Radon Monitoring Location Monthly Inspection Form**Name of Inspector Annemarie RaderDate of Inspection 09/17/2015

Inspection parameters: Identification labeling; mounting post; mounting bracket and stainless steel clamp; radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic retaining ring, plastic cup, Velcro<sup>®</sup>, Radtrak<sup>®</sup> detector).

<b>Location</b>	<b>Action Required</b> (Note any action required and date resolved, otherwise note "None")
RN1	None
RN2	None
RN3	None
RN4	None
RN5	Spider web removed from cup, 9/17/15
RN6	Spider web removed from cup, 9/17/15
RN7	None
RN8	None
RN9	None
RN10	None
RN11	Spider web removed from cup, 9/17/15
RN12	None
RN13	None
RN14	None
RN15	None
RN16	None
RN17	Spider web removed from cup, 9/17/15

Inspector's Signature



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

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

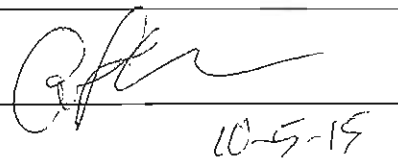
Name of Inspector Annemarie RaderARH 10-5-15Collection Date 10/05/2015Deployment Date 07/02/2015Radon Monitoring Frequency: ~ Quarterly ~ Semiannually ~ Annually

<i>Radon Monitoring Location Inspection Parameters</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Action Required at Location Numbers</i>
A. Monitoring location identification labeling.	Yes	No	
B. Mounting (fence) post condition.	Yes	No	
C. Radon monitoring outer metal housing securely fastened (mounting bracket and stainless steel clamp).	Yes	No	
D. Radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic retaining ring, and plastic cup)	Yes	No	
E. Radon monitoring apparatus interior clean of debris (dirt, insects, spider webs, etc.).	Yes	No	
F. Radon monitoring apparatus assembled and detector securely fastened with Velcro <sup>®</sup> to inside of plastic cup.	Yes	No	
<i>Radon Monitoring Detectors Inspection Parameters</i>			
A. Condition of Radtrak <sup>®</sup> detector at time of collection.	Yes	No	
B. Condition of Radtrak <sup>®</sup> detector at time of deployment.	Yes	No	

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

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

Inspector's Signature

  
10-5-15

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

## Contract Verification Form (CVR)

Project Leader Green

Project Name MWL Radon Monitoring

Project/Task No. 146422\_10.11.08

ARCOC No. 616366

Analytical Lab Landauer

SDG No. A23332

*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	N/A		
1.7	Date samples received	X		
1.8	Condition upon receipt information provided	N/A		

### 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		
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) and tracer recovery (if applicable) reported	X		
2.10	Narrative provided	N/A		
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		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	N/A		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	N/A		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	N/A		

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

#### 4.0 Calibration and Validation Documentation

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



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

Line No.	Item	Yes	No	Comments
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) ICP interference check sample data provided	N/A		
	d) ICP serial dilution provided	N/A		
	e) Instrument run logs provided	N/A		
4.6	Radiochemistry and General Chemistry	N/A		
	a) Instrument run logs provided			

## 5.0 Data Anomaly Report

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

## 6.0 Problem Resolution

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

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

Were deficiencies unresolved? ☐ Yes ☒ No

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

Reviewed by: Wendy Palencia Date: 11-03-2015 13:05:00

Closed by: Wendy Palencia Date: 11-03-2015 13:05:00

**MIXED WASTE LANDFILL**

**RADON MONITORING**

**October-December 2015 Monitoring Period**



**Sandia National Laboratories**

Operated for the U.S. Department of Energy by  
**Sandia Corporation**

Albuquerque, New Mexico 87185-

date: February 8, 2016

to: Mike Mitchell (6234), Robert Ziock (4142), Bonnie Little (4142) and Annemarie Rader (4143)

from: Kelly Green (41283) *Kelly Green*

subject: Review of MWL Radon-in-Air Data – 4<sup>th</sup> Quarter of 2015, October through December 2015

The purpose of this memo is to document my review of the radon-in-air monitoring data results for the 4<sup>th</sup> Quarter of Calendar Year (CY) 2015, October through December 2015, 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. Monitoring results provide radon emission data from across the site and at two background locations (Figure 1). These results are compared to historic results to evaluate radon air emission trends and for direct comparison to the LTMMMP trigger level of 4 picocuries per liter. This DQO and these monitoring objectives are met through the implementation of standard operating procedures, analytical procedures/methods, quality assurance and control measures, and data evaluation protocol.

The radon-in-air monitoring measurements for the monitoring period October through December 2015 were obtained using Radtrak® radon detectors that were submitted to Landauer® Incorporated for analysis on Analysis Request/Chain of Custody (AR/COC) #616481. On October 5, 2015, the detectors were deployed on and around the MWL (locations RN1 through RN15 at the MWL, background locations RN16 and RN17, and a trip blank that was never exposed, RNTB) in accordance with the requirements of Section 3.2.1 of the LTMMMP. These detectors remained in the field for approximately 3 months (one quarter), and were collected on January 7, 2016. The protective casing and mounting hardware were inspected during the collection effort and repairs were made if needed. The location of these detectors is shown in Figure 1.

I have reviewed the results for this monitoring period along with supporting field documentation and determined the results meet the LTMMMP DQO and monitoring objectives. The radon trigger level was not exceeded by any of the individual sample results; however, it only applies to the results from the perimeter locations (locations RN1 through RN10, Figure 1). The results from this quarterly monitoring event will be presented in the next MWL Annual LTMM Report that will be submitted to NMED in June 2016 (reporting period is April 1, 2015 through March 31, 2016).

**Attachments:**

Analysis Request/Chain of Custody #616481

Landauer Radon Monitoring Report (analytical laboratory results)

Figure 1 Location of the Radon Track Etch® Detectors at the MWL

AOP 95-16

Batch No.

**SMO Use**

AR/COC 616481

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

## Analysis Request and Chain of Custody for the 4<sup>th</sup> Quarter of CY 2015 at the MWL



SANDIA NATIONAL LABORATORIES  
ATTN: WENDY PALENCIA  
1515 EUBANK SE, ORG 4142  
BLDG 1090/120, MS1103  
ALBUQUERQUE, NM 87123

## Radon Monitoring Report

LICENSES: 101146AL, 100584RT

Acct. No. 0410548

**LANDAUER®**

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586  
Telephone: (800)528-8327 Facsimile: (708) 755-7048

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	
5509849	DRNF	05-OCT-15	07-JAN-16	* - LESS THAN INDICATED VALUE NO GOLD SEAL 098762-001 RNTB	* 30.0	* 0.3 ±0.06	
5511025	DRNF	05-OCT-15	07-JAN-16	098751-001 RN7	50.6 ±5.39	0.5 ±0.06	
5511026	DRNF	05-OCT-15	07-JAN-16	098752-001 RN8	30.7 ±3.78	0.3 ±0.04	
5511027	DRNF	05-OCT-15	07-JAN-16	098753-001 RN9	62.4 ±6.21	0.7 ±0.07	
5511028	DRNF	05-OCT-15	07-JAN-16	098754-001 RN10	44.3 ±4.92	0.5 ±0.05	
5511029	DRNF	05-OCT-15	07-JAN-16	098746-001 RN2	41.5 ±4.70	0.4 ±0.05	
5511030	DRNF	05-OCT-15	07-JAN-16	098745-001 RN1	41.5 ±4.70	0.4 ±0.05	
5511056	DRNF	05-OCT-15	07-JAN-16	098748-001 RN4	40.6 ±4.63	0.4 ±0.05	
5511057	DRNF	05-OCT-15	07-JAN-16	098760-001 RN16	59.7 ±6.03	0.6 ±0.06	

① ② ③ ④ ⑤ ⑥ ⑦ ⑧  
RESULTS RELATED ONLY TO MONITORS  
AS RECEIVED BY LANDAUER. RADON IN  
AIR BY ALPHA TRACK - EPA 402-R92-004.

Q.C. Release	Process No.	Report Date	Date Received
LMR	A23374	02-FEB-16	12-JAN-16

*Mark Salaskey*  
Radon Measurement Specialist



SANDIA NATIONAL LABORATORIES  
ATTN: WENDY PALENCIA  
1515 EUBANK SE, ORG 4142  
BLDG 1090/120, MS1103  
ALBUQUERQUE, NM 87123

## Radon Monitoring Report

LICENSES: 101146AL, 100584RT

Acct. No. 0410548

**LANDAUER®**

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586  
Telephone: (800)528-8327 Facsimile: (708) 755-7048

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	
5511059	DRNF	05-OCT-15	07-JAN-16	098750-001 RN6	55.1 ±5.72	0.6 ±0.06	
5511060	DRNF	05-OCT-15	07-JAN-16	098749-001 RN5	38.8 ±4.48	0.4 ±0.05	
5511061	DRNF	05-OCT-15	07-JAN-16	098761-001 RN17	66.0 ±6.44	0.7 ±0.07	
5511156	DRNF	05-OCT-15	07-JAN-16	098757-001 RN13	41.5 ±4.70	0.4 ±0.05	
5511157	DRNF	05-OCT-15	07-JAN-16	098759-001 RN15	76.9 ±7.11	0.8 ±0.08	
5511158	DRNF	05-OCT-15	07-JAN-16	098747-001 RN3	52.4 ±5.52	0.6 ±0.06	
5511159	DRNF	05-OCT-15	07-JAN-16	098756-001 RN12	38.8 ±4.48	0.4 ±0.05	
5511160	DRNF	05-OCT-15	07-JAN-16	098755-001 RN11	80.5 ±7.32	0.9 ±0.08	
5511161	DRNF	05-OCT-15	07-JAN-16	098758-001 RN14	52.4 ±5.52	0.6 ±0.06	

①

②

③

④

⑤

⑥

⑦

⑧

RESULTS RELATED ONLY TO MONITORS  
AS RECEIVED BY LANDAUER. RADON IN  
AIR BY ALPHA TRACK - EPA 402-R92-004.

Q.C. Release	Process No.	Report Date	Date Received
LMR	A23374	02-FEB-16	12-JAN-16

*Mark Salaskey*  
Radon Measurement Specialist

The United States Environmental Protection Agency recommends fixing your home if the results of one long-term test or the average of two short-term tests taken in the lowest lived-in level of the home show radon levels of 4.0 pCi/l or higher. A short term test remains in your home for two days to 90 days, whereas a long-term test remains in your home for more than 90 days under these guidelines.

Column 7 of this report indicates the radon test result, i.e., the average radon concentration in pCi/l for the test period. If you did not provide us the starting and ending dates (days the detector was exposed) we are unable to calculate the average radon concentration. To calculate the average radon concentration, divide the total exposure in pCi/l-days (column 6) by the number of days the detector was exposed.

For more information about the interpretation of your test result or about other radon related issues we suggest you contact your state radon office. Your state radon office should have available the following EPA publications:

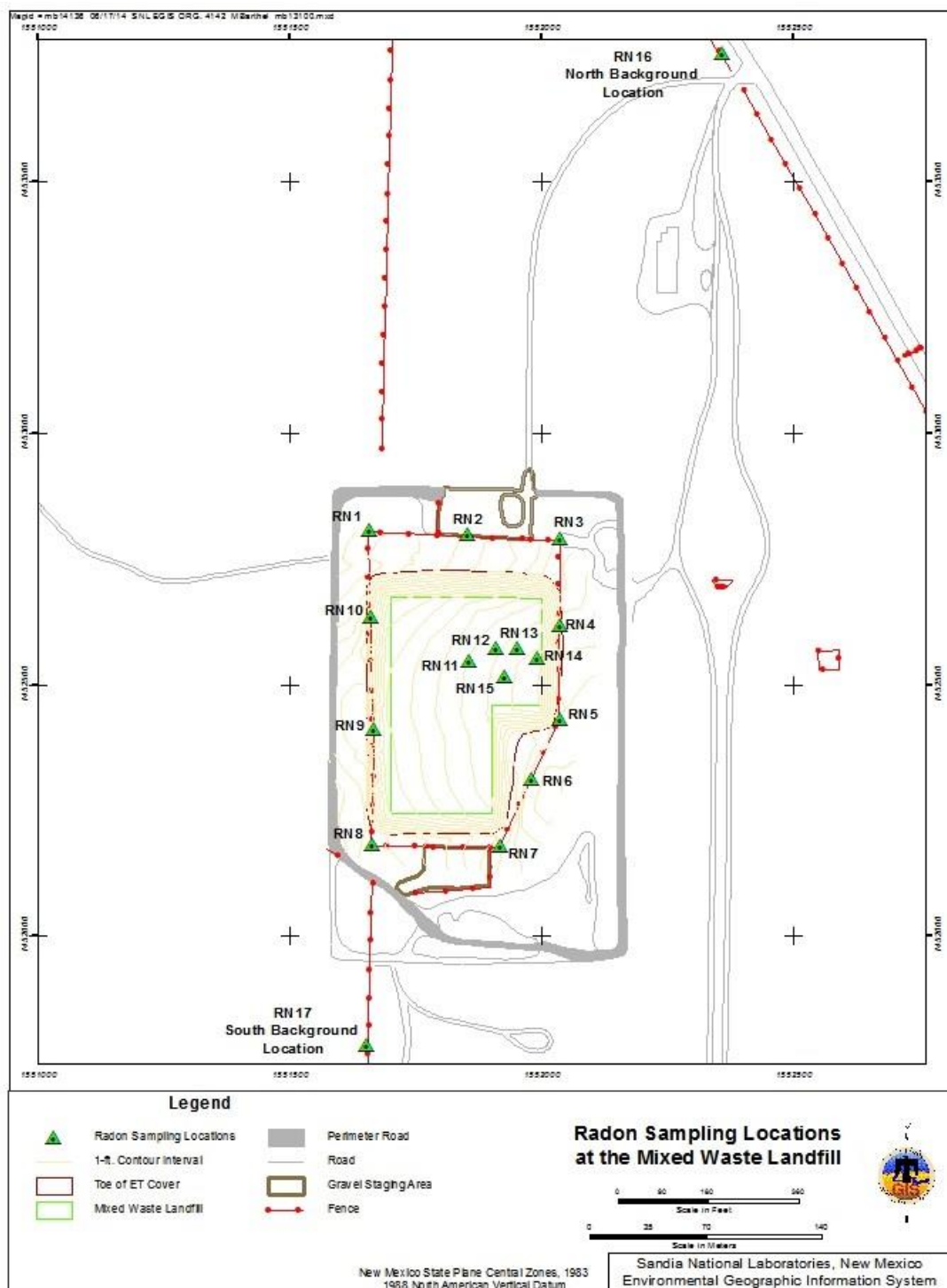
- A Citizen's Guide to Radon
- Home Buyer's and Seller's Guide to Radon
- Consumer's Guide to Radon Reduction

#### DISCLAIMER

Landauer, Inc. makes no warranty of any kind, express or implied, as regards to the use, operation or analysis of any Landauer, Inc. monitor. Landauer, Inc. specifically disclaims implied warranties of merchantability and fitness for a particular purpose. Landauer, Inc. is not responsible for any damage, including consequential damages, to persons or property resulting from the use of the monitor or the resulting data.

## LANDAUER®

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586 Telephone: (800) 528-8327 Facsimile: (708) 755-7048  
Email: [radon@landauer.com](mailto:radon@landauer.com) Website: [www.landauer.com](http://www.landauer.com)



**Figure 1. Location of the Radon Track Etch<sup>®</sup> Detectors at the MWL**



## RADTRAK® RADON TEST DATA SHEET

Company: Sandia Nat'l Labs  
 Acct. Number: \_\_\_\_\_  
 Contact: Kelly Green  
 Phone: 505-845-0787  
 Email: kagreen@sandia.gov

### Send Radon Report To:

(If different from account settings)

Company: Sandia Nat'l Labs  
 Attn: Kelly Green  
 Address: PO Box 5800  
MS 1198  
 City: Albuquerque  
 ST/Prov: NM Post Code: 87185  
 Country: USA  
 Phone: 505-845-0787  
 Email: kagreen@sandia.gov

### Site Information:

(Please provide information on where detectors are being deployed. Repens will be labeled and sorted by value provided in "Site Name" below.)

Site Name: SWL/MWL  
 Site Type: out door  
 Additional Information: \_\_\_\_\_

### If Applicable:

Technician Name: Annemari Rader  
 Technician Number: \_\_\_\_\_  
 Technician Signature: [Signature]

Please include all detector numbers, exposure periods and location information to appear on report

Detector Number	Building Name / Nbr	Unit Nbr	Floor	Comment / Note	Start Date mm/dd/yyyy	End Date mm/dd/yyyy

*please see attached list for info*

R-10305-0114

Landauer Use Only: Processed By: \_\_\_\_\_ Date: \_\_\_\_\_ Page \_\_\_\_\_ of \_\_\_\_\_

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

COC # 616481

Detector Serial Number	Sample Number	Sampling Location	Deployment Date	Collection Date	Time	Comments
5511030	098745-001	RN1	10/05/2015	01/07/2016	1530	
5511029	098746-001	RN2	10/05/2015	01/07/2016	1529	
5511158	098747-001	RN3	10/05/2015	01/07/2016	1611	
5511056	098748-001	RN4	10/05/2015	01/07/2016	1606	
5511060	098749-001	RN5	10/05/2015	01/07/2016	1609	
5511059	098750-001	RN6	10/05/2015	01/07/2016	1601	
5511025	098751-001	RN7	10/05/2015	01/07/2016	1558	
5511026	098752-001	RN8	10/05/2015	01/07/2016	1547	
5511027	098753-001	RN9	10/05/2015	01/07/2016	1543	
5511028	098754-001	RN10	10/05/2015	01/07/2016	1538	
5511160	098755-001	RN11	10/05/2015	01/07/2016	1528	
5511159	098756-001	RN12	10/05/2015	01/07/2016	1626	
5511156	098757-001	RN13	10/05/2015	01/07/2016	1624	
5511161	098758-001	RN14	10/05/2015	01/07/2016	1621	
5511157	098759-001	RN15	10/05/2015	01/07/2016	1630	
5511057	098760-001	RN16	10/05/2015	01/07/2016	1640	
5511061	098761-001	RN17	10/05/2015	01/07/2016	1550	
5509849	098762-001	RNTB	10/05/2015	01/07/2016	1515	

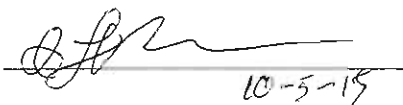
### Mixed Waste Landfill Radon Monitoring Location Monthly Inspection Form

Name of Inspector Annemarie RaderDate of Inspection 10/05/2015

Inspection parameters: Identification labeling; mounting post; mounting bracket and stainless steel clamp; radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic retaining ring, plastic cup, Velcro<sup>®</sup>, Radtrak<sup>®</sup> detector).

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

Inspector's Signature


  
10-5-15

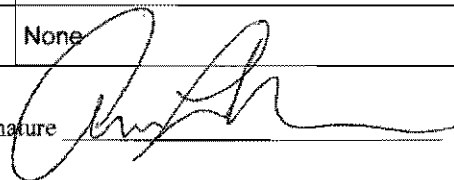
Original to: Mixed Waste Landfill Operating Record  
Copy to: SNL/NM Records Center

**Mixed Waste Landfill Radon Monitoring Location Monthly Inspection Form**Name of Inspector Annemarie RaderDate of Inspection 11/25/2015

Inspection parameters: Identification labeling; mounting post; mounting bracket and stainless steel clamp; radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic retaining ring, plastic cup, Velcro<sup>®</sup>, Radtrak<sup>®</sup> detector).

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

Inspector's Signature



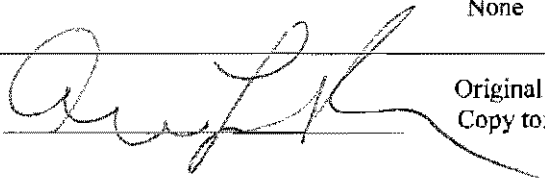
Original to: Mixed Waste Landfill Operating Record  
Copy to: SNL/NM Records Center

**Mixed Waste Landfill Radon Monitoring Location Monthly Inspection Form**Name of Inspector Annemarie RaderDate of Inspection 12/24/2015

Inspection parameters: Identification labeling; mounting post; mounting bracket and stainless steel clamp; radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic retaining ring, plastic cup, Velcro<sup>®</sup>, Radtrak<sup>®</sup> detector).

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

Inspector's Signature



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



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

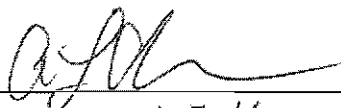
Name of Inspector Annemarie RaderCollection Date 01/07/2016Deployment Date 10/05/2015Radon Monitoring Frequency: Quarterly ~ Semiannually ~ Annually

<b>Radon Monitoring Location Inspection Parameters</b>	<b>Parameter Inspected (Yes or No)</b>	<b>Action Required (Yes or No)</b>	<b>Action Required at Location Numbers</b>
A. Monitoring location identification labeling.	Yes	No	
B. Mounting (fence) post condition.	Yes	No	
C. Radon monitoring outer metal housing securely fastened (mounting bracket and stainless steel clamp).	Yes	No	
D. Radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic retaining ring, and plastic cup)	Yes	No	
E. Radon monitoring apparatus interior clean of debris (dirt, insects, spider webs, etc.).	Yes	No	
F. Radon monitoring apparatus assembled and detector securely fastened with Velcro <sup>®</sup> to inside of plastic cup.	Yes	No	
<b>Radon Monitoring Detectors Inspection Parameters</b>			
A. Condition of Radtrak <sup>®</sup> detector at time of collection.	Yes	No	
B. Condition of Radtrak <sup>®</sup> detector at time of deployment.	Yes	No	

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

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

Inspector's Signature

  
1-7-16

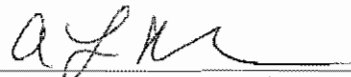
Original to: Mixed Waste Landfill Operating Record  
Copy to: SNL/NM Records Center

**Mixed Waste Landfill Radon Monitoring Location Supplemental Inspection Form**Name of Inspector Annemarie RaderDate of Inspection 01/07/2016

Inspection parameters: Identification labeling; mounting post; mounting bracket and stainless steel clamp; radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic retaining ring, plastic cup, Velcro<sup>®</sup>, Radtrak<sup>®</sup> detector).

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

Inspector's Signature

  
1-7-16

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

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

## Contract Verification Form (CVR)

Project Leader Green

Project Name MWL Radon Monitoring

Project/Task No. 146422\_10.11.08

ARCOC No. 616481

Analytical Lab LAND

SDG No. A23374

*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	N/A		
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		
2.6	QC batch numbers provided	X		
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) and tracer recovery (if applicable) reported	X		
2.10	Narrative provided	N/A		
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		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	N/A		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	N/A		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	N/A		

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

#### 4.0 Calibration and Validation Documentation

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

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



Line No.	Item	Yes	No	Comments
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) ICP interference check sample data provided	N/A		
	d) ICP serial dilution provided	N/A		
	e) Instrument run logs provided	N/A		
4.6	Radiochemistry and General Chemistry	N/A		
	a) Instrument run logs provided			

## 5.0 Data Anomaly Report

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

## 6.0 Problem Resolution

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

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

Were deficiencies unresolved? ☐ Yes ☒ No

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

Reviewed by: Wendy Palencia Date: 02-04-2016 10:13:00

Closed by: Wendy Palencia Date: 02-04-2016 10:13:00

**ANNEX B**

**Mixed Waste Landfill  
Surface Soil Tritium and Biota Monitoring Forms and Reports**

**April 2015-March 2016**

**Data Evaluation Memo**

**Data Validation Reports**

**Contract Verification Reviews**



date: October 18, 2015

to: Mike Mitchell (6234), Robert Ziock (4142), and Bonnie Little (4142)

from: Kelly Green (41281) *Kelly Green*

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

The purpose of this memo is to document my review of the tritium-in-soil monitoring data results for the 8/04/15 sample event.

Summary of Tritium Results (EPA Method 906.0<sup>a</sup>)  
Mixed Waste Landfill Surface Soil Monitoring  
August 4, 2015

Sample Location	Result (pCi/L)	Percent Soil Moisture	Laboratory Qualifier <sup>b</sup>	Validation Qualifier <sup>b</sup>	Trigger Level (pCi/L)
MWL TS-2NW	719 ± 171	1.92	--	--	20,000
MWL TS-2SW	527 ± 152	2.51	--	J, FR7	
MWL TS-2SE	369 ± 136	2.60	--	J, FR7	
MWL TS-2SE (Duplicate)	269 ± 131	2.78	--	J, FR7	
MWL TS-2NE	550 ± 153	2.33	--	J, FR7	

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.

<sup>b</sup>Blank (--) cell means all quality control samples met acceptance criteria.

BD = Result is below the MDA.

EPA = U.S. Environmental Protection Agency.

FR7 = Result is ≥ the MDA and <3X the MDA (Reason code).

J = The associated value is an estimated quantity

MDA = Minimum detectable activity.

MWL = Mixed Waste Landfill.

pCi/L = Picocuries per liter.

These results are consistent with the January 2015 monitoring data (MWL Annual LTMM Report, June 2015) which ranged from 1010 pCi/L to 1830 pCi/L and are far below the Mixed Waste Landfill (MWL) Long-Term Monitoring and Maintenance Plan (LTMMMP) trigger level of 20,000 pCi/L. The results are also consistent with historic monitoring data collected at the MWL as part of the routine Terrestrial Surveillance Program where the data collected between 2000 and 2014 ranged from 182 pCi/L ("not detected, or "U" qualified) to 6140 pCi/L.

I recommend results be presented in tabular form and be evaluated relative to the historic data set and the LTMMMP trigger level of 20,000 pCi/L. If the tritium flux from the disposal areas increases in the future due to changing conditions, they will be detected, compared to the trigger level, and reported appropriately.

cc: CFRC

**Mixed Waste Landfill**  
**Surface Soil Tritium and Biota Monitoring**  
**August 2015 Sampling Event**

## Memorandum

Date: September 28, 2015  
To: File  
From: Linda Thal  
Subject: Inorganic Data Review and Validation – SNL  
Site: MWL Biota  
AR/COC: 616324  
SDG: 379275  
Laboratory: GEL  
Project/Task: 146422.10.11.08  
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 ER Project AOP 00-03 Rev 4.

### Summary

Three samples were prepared and analyzed with approved procedures using methods SW846 6010B (ICP-AES) and 7471A (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. The MS %R was >125% for Ba. The associated sample results were detects and will be **qualified J+,MS2** due to high MS recovery.
2. The original V result for the serial dilution parent sample was >50X the MDL and the serial dilution %D was >10%. The associated sample results were detects and will be **qualified J,D1**.

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

### Holding Times and Preservation

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

### ICP-MS Instrument Tune

Tunes were not a method requirement.

### Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

### **Reporting Limit Verification**

All CRA/CRI recoveries met QC acceptance criteria except as follows. The CRI %R was >130% for Zn. The associated sample results were detects >5X the PQL and will not be qualified.

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

### **Blanks**

No target analyte was detected in the blanks.

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

Internal standards were not a method requirement.

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

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

### **Laboratory Replicate**

The replicate met all QC acceptance criteria except as follows. The replicate RPD was >20% for Pb and both the parent sample result and the replicate result were >5X the PQL. The replicate RPD was <35% and since the samples were soils, no data were qualified based on professional judgment.

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

The LCS met all QC acceptance criteria.

### **Detection Limits/Dilutions**

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

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

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

### **ICP Serial Dilution**

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

### **Other QC**

A field duplicate pair was submitted with AR/COC 616324. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

**Reviewed by:** Mary Donivan

**Level:** I

**Date:** 09/30/15

## Memorandum

Date: September 28, 2015

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL Biota  
AR/COC: 616324  
SDG: 379275  
Laboratory: GEL  
Project/Task: 146422.10.11.08  
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 ER Project AOP 00-03 Rev 4.

### Summary

Three samples were prepared and analyzed with approved procedures using method DOE HASL 300, 4.5.2.3/Ga-01-R (gamma spec). Problems were identified with the data package that resulted in the qualification of data.

1. The U-235 result for sample 379275006 was rejected by the laboratory due to high counting uncertainty and will be **qualified R,Z2**.
2. The Th-234 and U-238 results for sample -002 were rejected by the laboratory due to the peak not meeting identification criteria and will be **qualified R,Z2**.
3. All sample results which were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3**.
4. All sample results that were > the MDA but  $\leq 3X$  the MDA will be **qualified J,FR7**.

### Holding Times and Preservation

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

### 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 > the MDA and 2-sigma TPU.

### **Tracer/Carrier Recovery**

Tracers/carriers were not a method requirement.

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

An MS was not a method requirement.

### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

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

All LCS recoveries met 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 with AR/COC 616324. 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:** 09/30/15



## Sample Findings Summary



AR/COC: 616324

Page 1 of 3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE HASL 300, 4.5.2.3/Ga-			
	098241-002/MWL AHSS-01-2015	Americium-241 (14596-10-2)	BD, FR3
	098241-002/MWL AHSS-01-2015	Beryllium-7 (13966-02-4)	J, FR7
	098241-002/MWL AHSS-01-2015	Bismuth-212 (14913-49-6)	J, FR7
	098241-002/MWL AHSS-01-2015	Cobalt-60 (10198-40-0)	BD, FR3
	098241-002/MWL AHSS-01-2015	Neptunium-237 (13994-20-2)	BD, FR3
	098241-002/MWL AHSS-01-2015	Radium-223 (15623-45-7)	BD, FR3
	098241-002/MWL AHSS-01-2015	Radium-224 (13233-32-4)	BD, FR3
	098241-002/MWL AHSS-01-2015	Sodium-22 (13966-32-0)	BD, FR3
	098241-002/MWL AHSS-01-2015	Thorium-227 (15623-47-9)	BD, FR3
	098241-002/MWL AHSS-01-2015	Thorium-231 (14932-40-2)	BD, FR3
	098241-002/MWL AHSS-01-2015	Thorium-234 (15065-10-8)	R, Z2
	098241-002/MWL AHSS-01-2015	Uranium-235 (15117-96-1)	BD, FR3
	098241-002/MWL AHSS-01-2015	Uranium-238 (7440-61-1)	R, Z2
	098242-002/MWL AHSS-02-2015	Americium-241 (14596-10-2)	BD, FR3
	098242-002/MWL AHSS-02-2015	Beryllium-7 (13966-02-4)	J, FR7

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	098242-002/MWL AHSS-02-2015	Cobalt-60 (10198-40-0)	BD, FR3
	098242-002/MWL AHSS-02-2015	Neptunium-237 (13994-20-2)	BD, FR3
	098242-002/MWL AHSS-02-2015	Radium-223 (15623-45-7)	BD, FR3
	098242-002/MWL AHSS-02-2015	Sodium-22 (13966-32-0)	BD, FR3
	098242-002/MWL AHSS-02-2015	Thorium-227 (15623-47-9)	BD, FR3
	098242-002/MWL AHSS-02-2015	Thorium-231 (14932-40-2)	BD, FR3
	098242-002/MWL AHSS-02-2015	Thorium-234 (15065-10-8)	J, FR7
	098242-002/MWL AHSS-02-2015	Uranium-235 (15117-96-1)	BD, FR3
	098242-002/MWL AHSS-02-2015	Uranium-238 (7440-61-1)	J, FR7
	098243-002/MWL AHSS-02-2015	Americium-241 (14596-10-2)	BD, FR3
	098243-002/MWL AHSS-02-2015	Beryllium-7 (13966-02-4)	J, FR7
	098243-002/MWL AHSS-02-2015	Cobalt-60 (10198-40-0)	BD, FR3
	098243-002/MWL AHSS-02-2015	Neptunium-237 (13994-20-2)	BD, FR3
	098243-002/MWL AHSS-02-2015	Radium-223 (15623-45-7)	BD, FR3
	098243-002/MWL AHSS-02-2015	Sodium-22 (13966-32-0)	BD, FR3
	098243-002/MWL AHSS-02-2015	Thorium-227 (15623-47-9)	BD, FR3
	098243-002/MWL AHSS-02-2015	Thorium-231 (14932-40-2)	BD, FR3
	098243-002/MWL AHSS-02-2015	Thorium-234 (15065-10-8)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	098243-002/MWL AHSS-02-2015	Uranium-235 (15117-96-1)	R, Z2
	098243-002/MWL AHSS-02-2015	Uranium-238 (7440-61-1)	BD, FR3
SW846 3050B/6010B			
	098241-001/MWL AHSS-01-2015	Barium (7440-39-3)	J+, MS2
	098241-001/MWL AHSS-01-2015	Vanadium (7440-62-2)	J, D1
	098242-001/MWL AHSS-02-2015	Barium (7440-39-3)	J+, MS2
	098242-001/MWL AHSS-02-2015	Vanadium (7440-62-2)	J, D1
	098243-001/MWL AHSS-02-2015	Barium (7440-39-3)	J+, MS2
	098243-001/MWL AHSS-02-2015	Vanadium (7440-62-2)	J, D1

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

## Sandia Data Validation Summary Worksheet

ARCOC#: 616324	Site/Project: MWL Biota	Validation Date: 09/28/2015
SDG #:379275	Laboratory: GEL	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								

Comments: Sampled 08/11/2015

Validated by:

*L. Thal*

## Sandia Inorganic Metals Worksheet

ARCOG #(s):616324	SDG #(s):379275	Matrix: Soil
Laboratory Sample IDs:379275001, -003, -005		
Method/Batch #s:SW846 3050B/6010B: 1500303/1500304; SW846 7471A: 1503109/1503110		

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

Analyte (outliers)	Calibration						MB mg/L	5X Blank (5X MDL) mg/L	LCS %R	MS %R	Lab Rep RPD	Serial Dil. %D	ICS AB %R	ICS A ±MDL ug/L (x50)	CRA CRI %R				
	Int. mg/L	R <sup>2</sup>	ICV	CCV	ICB ug/L	CCB ug/L													
Ba	NA	✓	✓	✓	✓	✓	✓	NA	✓	133	✓	✓	NA	NA	✓				
Pb	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	28	✓	NA	NA	✓				
V	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	18	NA	NA	✓				
Zn	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	NA	NA	172				

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

Comments: HTs OK; Matrix QC -001  
All samples < 500 000 for Al, Ca, Mg and <200 000 for Fe

## Sandia Radiochemistry Worksheet

ARCOC #(s): 616324	SDG #:379275	Matrix:Soil
Laboratory Sample IDs:379275002, -004, -006		
Method/Batch#s: DOE HASL 300, 4.5.2.3/Ga-01-R (gammascpec) 1500294/1500329		
Method/Batch#s:		
Method/Batch#s:		
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				
None													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID	Tracer/Carrier	%R	Sample ID	Tracer/Carrier	%R	Sample ID	Tracer/Carrier	%R	Sample ID	Tracer/Carrier
NA													

Comments: HTs OK; DUP -002

Data rejected due to high counting uncertainty: U-235 sample -006

Data rejected due to peak not meeting identification criteria: Th-234, U-238 sample -002; K-40, Th-234, U-238 DUP

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. MA

SMO Use

AR/COC **616324**

Project Name: MWL Biota	Date Samples Shipped: <u>8/12/15</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: R. Ziock	Carrier/Waybill No. <u>237285</u>	SMO Contact Phone: <u>SMO</u>	<input type="checkbox"/> RMMA
Project/Task Number: 146422/10.11.08	Lab Contact: Edie Kent	Wendy Palencia/505.844.3132	<input checked="" type="checkbox"/> Released by COC No.
Service Order: CF426-15	Lab Destination: GEL	Send Report to SMO:	<input checked="" type="checkbox"/> 4° Celsius
	Contract No.: 1303873	Stephanie Montano/505.284.2553	

Tech Area:	Operational Site:	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <u>379275</u>
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					
098241	-001	MWL AHSS-01-2015	N/A	8/11/15 <u>0913</u>	S	P	250 ml	None	G	SA	RCRA Metals <sup>1</sup>	<u>001</u>
098241	-002	MWL AHSS-01-2015	N/A	8/11/15 <u>0913</u>	S	P	250 ml	None	G	SA	Gamma Spec <sup>2</sup>	<u>002</u>
098242	-001	MWL AHSS-02-2015	N/A	8/11/15 <u>0907</u>	S	P	250 ml	None	G	SA	RCRA Metals <sup>1</sup>	<u>003</u>
098242	-002	MWL AHSS-02-2015	N/A	8/11/15 <u>0907</u>	S	P	250 ml	None	G	SA	Gamma Spec <sup>2</sup>	<u>004</u>
098243	-001	MWL AHSS-02-2015	N/A	8/11/15 <u>0907</u>	S	P	250 ml	None	G	DU	RCRA Metals <sup>1</sup>	<u>005</u>
098243	-002	MWL AHSS-02-2015	N/A	8/11/15 <u>0907</u>	S	P	250 ml	None	G	DU	Gamma Spec <sup>2</sup>	<u>006</u>

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt																			
Validation Req'd: <input type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																				
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day																				
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>																				
<b>Sample Team Members</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Name</th> <th>Signature</th> <th>Init.</th> <th>Company/Organization/Phone/Cell</th> </tr> <tr> <td>Robert Ziock</td> <td><u>[Signature]</u></td> <td></td> <td>SNL/4142/845-0485</td> </tr> <tr> <td>Danielle M. Nieto</td> <td><u>[Signature]</u></td> <td></td> <td>SNL/4143/845-7706 <u>8/11/15</u></td> </tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>	Name	Signature	Init.		Company/Organization/Phone/Cell	Robert Ziock	<u>[Signature]</u>		SNL/4142/845-0485	Danielle M. Nieto	<u>[Signature]</u>		SNL/4143/845-7706 <u>8/11/15</u>									Sample Disposal <input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab	Return Samples By:
	Name	Signature	Init.	Company/Organization/Phone/Cell																			
	Robert Ziock	<u>[Signature]</u>		SNL/4142/845-0485																			
	Danielle M. Nieto	<u>[Signature]</u>		SNL/4143/845-7706 <u>8/11/15</u>																			
			<sup>1</sup> Include Cu, Ni, V, Zn Co, and Be <sup>2</sup> Use Pb-212 to determine Th-232																				
Lab Use																							

1. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>8/11/15</u> Time <u>1024</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>8/11/15</u> Time <u>1024</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>8/12/15</u> Time <u>0645</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <u>[Signature]</u> Org. _____ Date <u>8/13/15</u> Time <u>0845</u>	4. Received by _____ Org. _____ Date _____ Time _____

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



## Contract Verification Form (CVR)

Project Leader Ziock

Project Name MWL Biota

Project/Task No. 146422\_10.11.08

ARCOC No. 616324

Analytical Lab GEL

SDG No. 379275

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

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

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

### 2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	No	
2.1	Data reviewed, signature	X		
2.2	Method reference number(s) complete and correct	X		
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X		
2.4	Matrix spike/matrix spike duplicate data provided	X		
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and Lc	X		
2.6	QC batch numbers provided	X		
2.7	Dilution factors provided and all dilution levels reported	X		
2.8	Data reported in appropriate units and using correct significant figures	X		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	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		Barium failed recovery limits for matrix spike (QC1203373955)
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples		X	RPD for lead outside acceptance range for duplicate (QC1203373954)
	b) Matrix spike duplicate RPD data reported and met for all organic samples	N/A		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	X		

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

#### 4.0 Calibration and Validation Documentation

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

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

Line No.	Item	Yes	No	Comments
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	X		
	a) Initial calibration provided			
	b) Continuing calibration provided	X		
	c) ICP interference check sample data provided	X		
	d) ICP serial dilution provided	X		
	e) Instrument run logs provided	X		
4.6	Radiochemistry and General Chemistry	X		
	a) Instrument run logs provided			

## 5.0 Data Anomaly Report

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

## 6.0 Problem Resolution

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

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

Were deficiencies unresolved? ☐ Yes ☒ No

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

Reviewed by: Wendy Palencia Date: 09-22-2015 09:30:00

Closed by: Wendy Palencia Date: 09-22-2015 09:30:00

## Memorandum

Date: September 11, 2015

To: File

From: Linda Thal

Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL Surface Soil  
AR/COC: 616317  
SDG: 378762  
Laboratory: GEL  
Project/Task: 146422.10.11.08  
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 ER Project AOP 00-03 Rev 4.

### 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 associated results for all samples *except* 378762001 were > the MDA but  $\leq 3X$  the MDA and will be **qualified J,FR7**.

### Holding Times and Preservation

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

### 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 > the MDA and 2-sigma TPU.

### Tracer/Carrier Recovery



Tracers/carriers were not a method requirement.

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

The MS met all QC acceptance criteria.

**Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

**Laboratory Control Sample (LCS)**

All LCS recoveries met 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 with AR/COC 616317. 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:** 09/11/15

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## Sample Findings Summary



AR/COC: 616317

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
GL-RAD-A-002			
	098221-002/MWL TS-2SW	Tritium (10028-17-8)	J, FR7
	098221-003/MWL TS-2SE	Tritium (10028-17-8)	J, FR7
	098221-004/MWL TS-2SE	Tritium (10028-17-8)	J, FR7
	098221-005/MWL TS-2NE	Tritium (10028-17-8)	J, FR7

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

## Sandia Data Validation Summary Worksheet

ARCOC#: 616317	Site/Project: MWL Surface Soil	Validation Date: 09/11/2015
SDG #:378762	Laboratory: GEL	Validator: Linda Thal
Matrix: Soil	# of Samples: 5	CVR present: Yes
ARCOC(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 <2X HT	Analysis ≥2X HT
none								

Comments: Sampled 08/04/2015

Validated by:

*L Thal*

## Sandia Radiochemistry Worksheet

ARCOC #(s):616317	SDG #:378762	Matrix:Soil
Laboratory Sample IDs:378762001 through -005		
Method/Batch#s: GL-RAD-A-002 (Tritium)/1500008		
Method/Batch#s:		
Method/Batch#s:		
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				
none													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID	Tracer/Carrier	%R	Sample ID	Tracer/Carrier	%R	Sample ID	Tracer/Carrier	%R	Sample ID	Tracer/Carrier
NA													

Comments: HTs OK. MS and DUP -002.

All samples realiquotted and recounted to verify results. The realiquot results are similar to the original results. Original results reported.

Page 1 of 1

### SMO Use

616317

☒ 4° Celsius

Building:	Room:	Operational Site:
-----------	-------	-------------------

Albuquerque, NM 87185-0154

378762

Conditions on  
Receipt

### Lab Use

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

## Contract Verification Form (CVR)

Project Leader Ziock

Project Name MWL Surface Soil

Project/Task No. 146422\_10.11.08

ARCOC No. 616317

Analytical Lab GEL

SDG No. 378762

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

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

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

### 2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	No	
2.1	Data reviewed, signature	X		
2.2	Method reference number(s) complete and correct	X		
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X		
2.4	Matrix spike/matrix spike duplicate data provided	X		
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and Lc	X		
2.6	QC batch numbers provided	X		
2.7	Dilution factors provided and all dilution levels reported	X		
2.8	Data reported in appropriate units and using correct significant figures	X		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	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		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	N/A		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	N/A		



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

#### 4.0 Calibration and Validation Documentation

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

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

Line No.	Item	Yes	No	Comments
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) ICP interference check sample data provided	N/A		
	d) ICP serial dilution provided	N/A		
	e) Instrument run logs provided	N/A		
4.6	Radiochemistry and General Chemistry	X		
	a) Instrument run logs provided			

## 5.0 Data Anomaly Report

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

## 6.0 Problem Resolution

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

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

Were deficiencies unresolved? ☐ Yes ☒ No

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

Reviewed by: Wendy Palencia Date: 09-11-2015 07:21:00

Closed by: Wendy Palencia Date: 09-11-2015 07:21:00

**ANNEX C**

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

**April 2015-March 2016**

**Field Forms**

**Data Validation Reports**

**Contract Verification Reviews**

**Certificates of Analysis – provided on compact disc in plastic sleeve insert**

**FIELD SAMPLING FORMS**  
**MIXED WASTE LANDFILL**  
**LONG-TERM MONITORING AND MAINTENANCE**  
**SOIL-VAPOR MONITORING**

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

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

**FIELD SAMPLING FORMS**  
**APRIL 2015 SOIL-VAPOR MONITORING**

# TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: MWLDate: 04/14/15Time: 0800Activities: Soil Vapor Sampling

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

Weather Conditions:

Temp: 52 °F Wind Speed: 2 MPHHumidity: 79.7 %

Chemicals Used: \_\_\_\_\_

Other: \_\_\_\_\_

## Safety Topics Presented

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

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

## Attendees

Robert T Lynch  
Printed Name

ALFRED SANTILLANES  
Printed Name

William Gibson  
Printed Name

Gilbert L. Quintana  
Printed Name

Tim Jackson  
Printed Name

Sue Collins  
Printed Name

[Signature]  
Signature

[Signature]  
Signature

[Signature]  
Signature

[Signature]  
Signature

[Signature]  
Signature

[Signature]  
Signature

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**TAILGATE SAFETY MEETING FORM**Dept: 4142 Well Location: MWLDate: 04/15/15Time: 0839Activities: Soil Vapor Sampling

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

Weather Conditions:

Temp: 61.3 °F Wind Speed: 6 MPHHumidity: 25.8 %

Chemicals Used: \_\_\_\_\_

Other: \_\_\_\_\_

*Safety Topics Presented*

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

Hospital/Clinic: Sandia Medical Clinic Phone: 844-0911/911*Attendees*William Gibson  
Printed NameALFRED SANTILLANES  
Printed NameRobert Lynch  
Printed Name\_\_\_\_\_  
Printed Name\_\_\_\_\_  
Printed NameWilliam Gibson  
SignatureAlfred Santillanes  
SignatureRobert Lynch  
Signature\_\_\_\_\_  
Signature\_\_\_\_\_  
Signature

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SUMMA® Canister Log

Serial #	Date Received	Date Tested for Initial VAC	Initial VAC at 5400 ft (in. Hg)	Date Used	End VAC at 5400 ft (in. Hg)	Date Returned to SMO
34001143	4/10/15	4/14/15	-26	4/14/15	-8	4/14/15
34001276			-24		-8	
34000370			-24		-8	
34000411			-25		-8	
34000095			-25		-8	
34002050			-25		-8	
34000475			-24		-8	
34001662			-24		-8	
34000781			-25		-8	
34001609			-25		-8	
34001304			-24		-8	
34001386			-24		-8	
34001360			-26		-8	
34001662			-24		-8	
34001513			-24		-8	
34001178			-25		-8	
34002109			-25		-8	
34001465			-24		-8	
FB 34001339			-25		-8	
34001528			-24		-8	
34000717			-24		-8	
34000565			-24		-8	4/14/15
8243			-25		-8	-7
34000472			-25 -24		-8	

SUMMA® Canister Log completed by:

Robert Lynch

Printed Name

Signature

[illegible]

ALFRED SANTILLANES  
Printed Name

*Alfred S. Tillman*  
Signature

*IMPORTANT NOTICE: A printed copy of this document may not be the document currently in effect. The official version is located on the Sandia Restricted Network (SRN), department home page*

- continuous PID readings at each monitoring well
- final/stable PID reading

### Soil Vapor Sampling Log

Location	Date	Time	Canister #	PID (ppm)	Starting Vacuum (in. Hg)	Ending Vacuum (in. Hg)	Location Comments
MWL-SV03-FB3	4/14/15	0835	34001143	0.	-26	-8	
MWL-SV03-50		0850	34001776	0.0	-24	-8	SA WM
MWL-SV03-50		0850	34000370		-24	-8	DU WM
MWL-SV03-50		0855	34000411		-25	-8	SA WO/m
MWL-SV03-50		0855	34000095		-25	-8	DU WO/m
MWL-SV03-100		0900	34002056		-25	-8	
MWL-SV03-200		0905	34000475		-24	-8	SA WO/m
MWL-SV03-200		0905	34001662		-24	-8	DU WO/m
MWL-SV03-200		0910	34000878		-25	-8	SA WO/m
MWL-SV03-200		0910	34001609		-25	-8	DU WO/m
MWL-SV03-300		0928	34001364		-24	-8	
MWL-SV03-400		0956	34001326	✓	-24	-8	
MWL-SV04-FB	4/14/15	10:16	34001360	NA	-26	-8	
MWL-SV04-50		1030	34001060	0.0	-24	-8	
MWL-SV04-100		1032	34001513	0.0	-24	-8	
MWL-SV04-200		1035	34001178	0.0	-25	-8	
MWL-SV04-300		1038	34002109	0.0	-25	-8	
MWL-SV04-400		1041	34001465	0.6	-24	-8	
MWL-SV05-50	4/14/15	1112	34001528	0.0	-24	-8	
MWL-SV05-100		1115	34000717		-24	-8	
MWL-SV05-200		1120	34000565		-24	-8	
MWL-SV05-300		1129	34000472		-24	-8	
MWL-SV05-400		1133	8243	✓	-25	-7	
MWL-SV05-FB		1107	34001339	NA	-25	-8	

[illegible]

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**SUMMARY SHEET FOR**  
**APRIL 2015 SOIL-VAPOR SAMPLES**

### Sample Summary for April 2015 MWL Soil Vapor Monitoring

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 146422.10.11.08 / Service Order Number CF 01-15</b>								
MWL-SV01	15-Apr-15	MWL-SV01-42.5	34000107	616085	097531	Environmental	616085 / 097532	
		MWL-SV-FB1	34001486		097532	Field QC	n/a	Ultra Pure N2
MWL-SV02	15-Apr-15	MWL-SV02-41.5	34000202	616086	097533	Environmental	616086 / 097534	
		MWL-SV-FB2	34000595		097534	Field QC	n/a	Ultra Pure N2
MWL-SV03	14-Apr-15	MWL-SV03-50	34001276	616087	097535	Environmental	616087 / 097546	collected with manifold
		MWL-SV03-50	34000370		097536	Duplicate		collected with manifold
		MWL-SV03-50	34000411		097537	Environmental		no manifold - in sequence
		MWL-SV03-50	34000095		097538	Duplicate		no manifold - in sequence
		MWL-SV03-100	34002050		097539	Environmental		
		MWL-SV03-200	34000475		097540	Environmental		collected with manifold
		MWL-SV03-200	34001662		097541	Duplicate		collected with manifold
		MWL-SV03-200	34000781		097542	Environmental		no manifold - in sequence
		MWL-SV03-200	34001609		097543	Duplicate		no manifold - in sequence
		MWL-SV03-300	34001304		097544	Environmental		
		MWL-SV03-400	34001386		097545	Environmental		
		MWL-SV-FB3	34001143		097546	Field QC	n/a	Ultra Pure N2
MWL-SV04	14-Apr-15	MWL-SV04-50	34001062	616088	097547	Environmental	616088 / 097552	
		MWL-SV04-100	34001513		097548	Environmental		
		MWL-SV04-200	34001178		097549	Environmental		
		MWL-SV04-300	34002109		097550	Environmental		
		MWL-SV04-400	34001465		097551	Environmental		
		MWL-SV-FB4	34001360		097552	Field QC	n/a	Ultra Pure N2
MWL-SV05	14-Apr-15	MWL-SV05-50	34001528	616089	097553	Environmental	616089 / 097558	
		MWL-SV05-100	34000717		097554	Environmental		
		MWL-SV05-200	34000565		097555	Environmental		
		MWL-SV05-300	34000472		097556	Environmental		
		MWL-SV05-400	8243		097557	Environmental		
		MWL-SV-FB5	34001339		097558	Field QC	n/a	Ultra Pure N2

**DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES**

**SOIL-VAPOR MONITORING**

**APRIL 2015**



**AR/COC NUMBERS 616085, 616086, 616087, 616088, 616089**

## Memorandum

Date: May 14, 2015

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL  
Site: MWL-SVM  
AR/COC: 616085, 616086, 616087, 616088 and 616089  
SDG: 320-12611-1; 320-12612-1; 320-12599-1; 320-12597-1 and 320-12598-1  
Laboratory: TestAmerica Laboratories, Inc. -West Sacramento  
Project/Task: 146422.10.11.08  
Analysis: VOCs by method TO-15

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

### Summary

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

1. Toluene was detected at < practical quantitation limit (PQL) in the FB, sample 320-12599-12, associated with samples 320-12599-1 through -11. The associated results for samples 320-12599-5 through -10 were detects < the PQL and  $\leq 10X$  the FB result and will be **qualified U,B2** at the PQL.
2. Toluene was detected at < PQL in the FB, sample 320-12597-6, associated with samples 320-12597-1 through -5. The associated results for samples 320-12597-1, and -3 through -5 were detects < the PQL and  $\leq 10X$  the FB result and will be **qualified U,B2** at the PQL.
3. Toluene was detected at < PQL in the FB, sample 320-12598-6, associated with samples 320-12598-1 through -5. The associated results for samples 320-12598-1 and -3 were detects < the PQL and  $\leq 10X$  the FB result and will be **qualified U,B2** at the PQL.
4. The acetone; methylene chloride; 1,1-dichloroethene; 2-butanone; carbon disulfide and vinyl acetate RPDs were > acceptance criteria for the LCS/LCSD associated with samples 320-12611-1 and -2; 320-12612-1 and -2 and 320-12599-9 through -12. The acetone and 1,1-dichloroethene results for sample 320-12611-1 and 320-12612-1; the acetone and methylene chloride results for sample 320-12611-2; the methylene chloride and toluene results for sample 320-12612-2; the acetone, methylene chloride and 1,1-dichloroethene results for samples 320-12599-9 through -11

and the carbon disulfide result for sample 320-12599-10 were detects and will be **qualified J,L5**. The remaining associated sample results were non-detects and will be **qualified UJ,L5**.

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

### **Holding Times**

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

### **Instrument Tune**

All instrument tune requirements were met.

### **Calibration**

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

### **Blanks**

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

Acetone, toluene and methylene chloride were detected at < the PQL in the FB, sample 320-12611-2, associated with sample 320-12611-1. The associated sample result for acetone was a detect 10X > the FB result and will not be qualified. The associated sample results for toluene and methylene chloride were non-detects and will not be qualified.

Toluene and methylene chloride were detected at < the PQL in the FB, sample 320-12612-2, associated with sample 320-12612-1. The associated sample results for toluene and methylene chloride were non-detects and will not be qualified.

Toluene and tetrachloroethene were detected at < the PQL in the FB, sample 320-12599-12, associated with samples 320-12599-1 through -11. The toluene results for samples -1 through -4 were non-detects and will not be qualified. The toluene result for sample -11 was a detect >10X the FB result and will not be qualified. The tetrachloroethene results for all samples were detects >10X the FB result and will not be qualified.

Toluene was detected at < PQL in the FB, sample 320-12597-6, associated with samples 320-12597-1 through -5. The associated result for sample -2 was non-detect and will not be qualified. Acetone was detected at < PQL in the FB, sample 320-12597-6, associated with samples 320-12597-1 through -5. The associated result for sample -2 was a detect >10X the FB result and will not be qualified.

Toluene was detected at < PQL in the FB, sample 320-12598-6, associated with samples 320-12598-1 through -5. The associated result for sample -2 was non-detect and will not be qualified. The associated results for samples -4 and -5 were detects >10X the FB result and will not be qualified.

1,2-Dichlorobenzene and 1,3-dichlorobenzene were detected at < the PQL in the method blank associated with samples 320-12599-1 through -8. The associated sample results were non-detects and will not be qualified.

### **Surrogates**

All surrogate acceptance criteria were met.

#### **Internal Standards**

All internal standards met QC acceptance criteria.

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

An MS/MSD was not performed.

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

The LCS/LCSD met all QC acceptance criteria except as noted above in the Summary section and as follows. The chloromethane and 1,2-dichloro-1,1,2,2-tetrafluoroethane recoveries were > the upper acceptance limit for the LCS or LCSD associated with samples 320-12611-1 and -2; 320-12612-1 and -2 and 320-12599-9 through -12. The associated sample results were non-detects and will not be qualified.

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

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

Sample 320-12611-1 was diluted 11.8X and sample 320-12612-1 7.67X for all target analytes .  
Sample 320-12599-1 was diluted 5.98X; sample -2 4.92X; sample -3 4.88X; sample -4 5.93X; sample -5 7.45X; sample -6 9.95X; sample -7 10.1X; sample -8 9.7X; sample -9 8.62X; sample -10 9.19X and sample -11 9.71X for all target analytes.

Sample 320-12597-1 was diluted 1.86X for tetrachloroethane; 1,1,2-trichloro-1,2,2-trifluoroethane and trichloroethene only; sample -2 5.21X; sample -3 8.68X; sample -4 3.83X and sample -5 5.06X for all target analytes.

Sample 320-12598-1 was diluted 2.96X; sample -2 6.26X; sample -3 9.77X; sample -4 3.11X and sample -5 2.79X for all target analytes.

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

TIC reports were not required.

#### **Other QC**

Mass spectra acceptability were verified during data validation and met QC acceptance criteria.

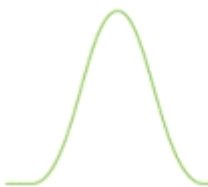
FBs were submitted with each AR/COC. Four field duplicate pairs were submitted with ARCO 616087. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

**Reviewed by:** Monica Dymerski

**Level I**

**Date:** 05/19/15



## Sample Findings Summary



AR/COC: 616085, 616086, 616087, 616088, 616089

Page 1 of 6

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
TO15			
	097531-001/MWL-SV01-42.5	1,1-DICHLOROETHENE (75-35-4)	J, L5
	097531-001/MWL-SV01-42.5	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	097531-001/MWL-SV01-42.5	ACETONE (67-64-1)	J, L5
	097531-001/MWL-SV01-42.5	CARBON DISULFIDE (75-15-0)	UJ, L5
	097531-001/MWL-SV01-42.5	METHYLENE CHLORIDE (75-09-2)	UJ, L5
	097531-001/MWL-SV01-42.5	VINYL ACETATE (108-05-4)	UJ, L5
	097532-001/MWL-SV-FB1	1,1-DICHLOROETHENE (75-35-4)	UJ, L5
	097532-001/MWL-SV-FB1	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	097532-001/MWL-SV-FB1	ACETONE (67-64-1)	J, L5
	097532-001/MWL-SV-FB1	CARBON DISULFIDE (75-15-0)	UJ, L5
	097532-001/MWL-SV-FB1	METHYLENE CHLORIDE (75-09-2)	J, L5
	097532-001/MWL-SV-FB1	VINYL ACETATE (108-05-4)	UJ, L5
	097533-001/MWL-SV02-41.5	1,1-DICHLOROETHENE (75-35-4)	J, L5
	097533-001/MWL-SV02-41.5	2-BUTANONE (MEK) (78-93-3)	J, L5
	097533-001/MWL-SV02-41.5	ACETONE (67-64-1)	J, L5
	097533-001/MWL-SV02-41.5	CARBON DISULFIDE (75-15-0)	UJ, L5
	097533-001/MWL-SV02-41.5	METHYLENE CHLORIDE (75-09-2)	UJ, L5
	097533-001/MWL-SV02-41.5	VINYL ACETATE (108-05-4)	UJ, L5
	097534-001/MWL-SV-FB2	1,1-DICHLOROETHENE (75-35-4)	UJ, L5
	097534-001/MWL-SV-FB2	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	097534-001/MWL-SV-FB2	ACETONE (67-64-1)	UJ, L5
	097534-001/MWL-SV-FB2	CARBON DISULFIDE (75-15-0)	UJ, L5
	097534-001/MWL-SV-FB2	METHYLENE CHLORIDE (75-09-2)	J, L5
	097534-001/MWL-SV-FB2	VINYL ACETATE (108-05-4)	UJ, L5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	097535-001/MWL-SV03-50 W/M	1,1-DICHLOROETHENE (75-35-4)	J, L5
	097535-001/MWL-SV03-50 W/M	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	097535-001/MWL-SV03-50 W/M	ACETONE (67-64-1)	J, L5
	097535-001/MWL-SV03-50 W/M	CARBON DISULFIDE (75-15-0)	UJ, L5
	097535-001/MWL-SV03-50 W/M	METHYLENE CHLORIDE (75-09-2)	J, L5
	097535-001/MWL-SV03-50 W/M	VINYL ACETATE (108-05-4)	UJ, L5
	097536-001/MWL-SV03-50 W/M	1,1-DICHLOROETHENE (75-35-4)	J, L5
	097536-001/MWL-SV03-50 W/M	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	097536-001/MWL-SV03-50 W/M	ACETONE (67-64-1)	J, L5
	097536-001/MWL-SV03-50 W/M	CARBON DISULFIDE (75-15-0)	UJ, L5
	097536-001/MWL-SV03-50 W/M	METHYLENE CHLORIDE (75-09-2)	J, L5
	097536-001/MWL-SV03-50 W/M	VINYL ACETATE (108-05-4)	UJ, L5
	097537-001/MWL-SV03-50 WO/M	1,1-DICHLOROETHENE (75-35-4)	J, L5
	097537-001/MWL-SV03-50 WO/M	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	097537-001/MWL-SV03-50 WO/M	ACETONE (67-64-1)	J, L5
	097537-001/MWL-SV03-50 WO/M	CARBON DISULFIDE (75-15-0)	UJ, L5
	097537-001/MWL-SV03-50 WO/M	METHYLENE CHLORIDE (75-09-2)	J, L5
	097537-001/MWL-SV03-50 WO/M	VINYL ACETATE (108-05-4)	UJ, L5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	097538-001/MWL-SV03-50 WO/M	1,1-DICHLOROETHENE (75-35-4)	J, L5
	097538-001/MWL-SV03-50 WO/M	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	097538-001/MWL-SV03-50 WO/M	ACETONE (67-64-1)	J, L5
	097538-001/MWL-SV03-50 WO/M	CARBON DISULFIDE (75-15-0)	J, L5
	097538-001/MWL-SV03-50 WO/M	METHYLENE CHLORIDE (75-09-2)	J, L5
	097538-001/MWL-SV03-50 WO/M	VINYL ACETATE (108-05-4)	UJ, L5
	097539-001/MWL-SV03-100	1,1-DICHLOROETHENE (75-35-4)	J, L5
	097539-001/MWL-SV03-100	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	097539-001/MWL-SV03-100	ACETONE (67-64-1)	J, L5
	097539-001/MWL-SV03-100	CARBON DISULFIDE (75-15-0)	UJ, L5
	097539-001/MWL-SV03-100	METHYLENE CHLORIDE (75-09-2)	J, L5
	097539-001/MWL-SV03-100	TOLUENE (108-88-3)	3.0U, B2
	097539-001/MWL-SV03-100	VINYL ACETATE (108-05-4)	UJ, L5
	097540-001/MWL-SV03-200 W/M	1,1-DICHLOROETHENE (75-35-4)	J, L5
	097540-001/MWL-SV03-200 W/M	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	097540-001/MWL-SV03-200 W/M	ACETONE (67-64-1)	J, L5
	097540-001/MWL-SV03-200 W/M	CARBON DISULFIDE (75-15-0)	J, L5
	097540-001/MWL-SV03-200 W/M	METHYLENE CHLORIDE (75-09-2)	J, L5
	097540-001/MWL-SV03-200 W/M	TOLUENE (108-88-3)	4.0U, B2
	097540-001/MWL-SV03-200 W/M	VINYL ACETATE (108-05-4)	UJ, L5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	097541-001/MWL-SV03-200 W/M	1,1-DICHLOROETHENE (75-35-4)	J, L5
	097541-001/MWL-SV03-200 W/M	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	097541-001/MWL-SV03-200 W/M	ACETONE (67-64-1)	J, L5
	097541-001/MWL-SV03-200 W/M	CARBON DISULFIDE (75-15-0)	UJ, L5
	097541-001/MWL-SV03-200 W/M	METHYLENE CHLORIDE (75-09-2)	J, L5
	097541-001/MWL-SV03-200 W/M	TOLUENE (108-88-3)	4.0U, B2
	097541-001/MWL-SV03-200 W/M	VINYL ACETATE (108-05-4)	UJ, L5
	097542-001/MWL-SV03-200 WO/M	1,1-DICHLOROETHENE (75-35-4)	J, L5
	097542-001/MWL-SV03-200 WO/M	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	097542-001/MWL-SV03-200 WO/M	ACETONE (67-64-1)	J, L5
	097542-001/MWL-SV03-200 WO/M	CARBON DISULFIDE (75-15-0)	UJ, L5
	097542-001/MWL-SV03-200 WO/M	METHYLENE CHLORIDE (75-09-2)	J, L5
	097542-001/MWL-SV03-200 WO/M	TOLUENE (108-88-3)	3.9U, B2
	097542-001/MWL-SV03-200 WO/M	VINYL ACETATE (108-05-4)	UJ, L5
	097543-001/MWL-SV03-200 WO/M	1,1-DICHLOROETHENE (75-35-4)	J, L5
	097543-001/MWL-SV03-200 WO/M	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	097543-001/MWL-SV03-200 WO/M	ACETONE (67-64-1)	J, L5
	097543-001/MWL-SV03-200 WO/M	CARBON DISULFIDE (75-15-0)	UJ, L5



Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	097543-001/MWL-SV03-200 WO/M	METHYLENE CHLORIDE (75-09-2)	J, L5
	097543-001/MWL-SV03-200 WO/M	TOLUENE (108-88-3)	3.4U, B2
	097543-001/MWL-SV03-200 WO/M	VINYL ACETATE (108-05-4)	UJ, L5
	097544-001/MWL-SV03-300	1,1-DICHLOROETHENE (75-35-4)	J, L5
	097544-001/MWL-SV03-300	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	097544-001/MWL-SV03-300	ACETONE (67-64-1)	J, L5
	097544-001/MWL-SV03-300	CARBON DISULFIDE (75-15-0)	J, L5
	097544-001/MWL-SV03-300	METHYLENE CHLORIDE (75-09-2)	J, L5
	097544-001/MWL-SV03-300	TOLUENE (108-88-3)	3.7U, B2
	097544-001/MWL-SV03-300	VINYL ACETATE (108-05-4)	UJ, L5
	097545-001/MWL-SV03-400	1,1-DICHLOROETHENE (75-35-4)	J, L5
	097545-001/MWL-SV03-400	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	097545-001/MWL-SV03-400	ACETONE (67-64-1)	J, L5
	097545-001/MWL-SV03-400	CARBON DISULFIDE (75-15-0)	UJ, L5
	097545-001/MWL-SV03-400	METHYLENE CHLORIDE (75-09-2)	J, L5
	097545-001/MWL-SV03-400	VINYL ACETATE (108-05-4)	UJ, L5
	097546-001/MWL-SV-FB3	1,1-DICHLOROETHENE (75-35-4)	UJ, L5
	097546-001/MWL-SV-FB3	2-BUTANONE (MEK) (78-93-3)	UJ, L5
	097546-001/MWL-SV-FB3	ACETONE (67-64-1)	UJ, L5
	097546-001/MWL-SV-FB3	CARBON DISULFIDE (75-15-0)	UJ, L5
	097546-001/MWL-SV-FB3	METHYLENE CHLORIDE (75-09-2)	UJ, L5
	097546-001/MWL-SV-FB3	VINYL ACETATE (108-05-4)	UJ, L5
	097547-001/MWL-SV04-50	TOLUENE (108-88-3)	0.4U, B2
	097549-001/MWL-SV04-200	TOLUENE (108-88-3)	3.5U, B2
	097550-001/MWL-SV04-300	TOLUENE (108-88-3)	1.5U, B2
	097551-001/MWL-SV04-400	TOLUENE (108-88-3)	2.0U, B2
	097553-001/MWL-SV05-50	TOLUENE (108-88-3)	1.2U, B2

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Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	097555-001/MWL-SV05-200	TOLUENE (108-88-3)	3.9U, B2

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

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## Data Validation Summary Worksheet

AR/COC #: 616085, 616086, 616087, 616088 and 616089

Site/Project: MWL-SVM

Validation Date: 05/14/2015

SDG #: 320-12611-1; 320-12612-1; 320-12599-1; 320-12597-1 and 320-12598-1

Laboratory: TA West Sacramento, CA

Validator: Linda Thal

Matrix: Air

# of Samples: 28 CVR present: Yes

Analysis Type: X ☐ Organic ☐ Metals

AR/COC(s) present: Yes

Sample Container Integrity: OK

☐ Rad ☐ Gen Chem

Requested Analyses Not Reported						
Sample Number	Laboratory ID	organic	genchem	metals	rad	Comments
None						

Hold Time/Preservation Outliers								
Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT
None								

Comments: Collected 04/14/2015 and 04/15/2015

Validated by: 

Revised 7/2007

## Organic Worksheet (GC/MS) Page 1 of 5

AR/COC #: 616085

SDG #: 320-12611-1

Matrix: Air

Laboratory Sample IDs: 320-12611-1 and -2

Method/Batch #s: TO-15:72755

Tuning (pass/fail): Pass    TICs Required? (yes/no): NA

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	LCSD %R	LCS LCSD RPD	FB -2	5X (10X) FB			
	Int.	RF	RSD/ R <sup>2</sup>	(ICV) CCV %D										
72755														
Acetone	NA	✓	✓	✓	✓	NA	✓	✓	29	.23J	(2.3)			
Toluene	NA	✓	✓	✓	✓	NA	✓	✓	✓	.25J	(2.5)			
Methylene chloride	NA	✓	✓	✓	✓	NA	✓	✓	39	.086J	(.86)			
Chloromethane	NA	✓	✓	✓	✓	NA	✓	129	✓	✓	NA			
1,2-Dichloro-1,1,2,2-tetrafluoroethane	NA	✓	✓	✓	✓	NA	127	✓	✓	✓	NA			
1,1-Dichloroethene	NA	✓	✓	✓	✓	NA	✓	✓	30	✓	NA			
2-Butanone	NA	✓	✓	✓	✓	NA	✓	✓	26	✓	NA			
Carbon Disulfide	NA	✓	✓	✓	✓	NA	✓	✓	27	✓	NA			
Vinyl acetate	NA	✓	✓	✓	✓	NA	✓	✓	31	✓	NA			
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HTs OK. Mass spectra validated. MDLs and RLS reported. Samples spiked with 3 surrogates. Instrument ATMS 2 ICAL 03/18/2015.

Canister Certifications were provided in the data package.

Revised 7/2007

## Organic Worksheet (GC/MS) page 2 of 5

AR/COC #: 616086

SDG #: 320-12612-1

Matrix: Air

Laboratory Sample IDs: 320-12612-1 and -2

Method/Batch #s: TO-15:72755

Tuning (pass/fail): Pass    TICs Required? (yes/no): NA

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	LCSD %R	LCS LCSD RPD	FB -2	5X (10X) FB			
	Int.	RF	RSD/ R <sup>2</sup>	(ICV) CCV %D										
72755														
Acetone	NA	✓	✓	✓	✓	NA	✓	✓	29	✓	NA			
Toluene	NA	✓	✓	✓	✓	NA	✓	✓	✓	.22J	(2.2)			
Methylene chloride	NA	✓	✓	✓	✓	NA	✓	✓	39	.084J	(.84)			
Chloromethane	NA	✓	✓	✓	✓	NA	✓	129	✓	✓	NA			
1,2-Dichloro-1,1,2,2-tetrafluoroethane	NA	✓	✓	✓	✓	NA	127	✓	✓	✓	NA			
1,1-Dichloroethene	NA	✓	✓	✓	✓	NA	✓	✓	30	✓	NA			
2-Butanone	NA	✓	✓	✓	✓	NA	✓	✓	26	✓	NA			
Carbon Disulfide	NA	✓	✓	✓	✓	NA	✓	✓	27	✓	NA			
Vinyl acetate	NA	✓	✓	✓	✓	NA	✓	✓	31	✓	NA			
<b>Surrogate Recovery Outliers</b>														
<b>Sample ID</b>														
None														
<b>IS Outliers</b>														
<b>Sample ID</b>	<b>Area</b>	<b>RT</b>	<b>Area</b>	<b>RT</b>	<b>Area</b>	<b>RT</b>	<b>Area</b>	<b>RT</b>	<b>Area</b>	<b>RT</b>	<b>Area</b>	<b>RT</b>		
None														

Comments: HTs OK. Mass spectra validated. MDLs and RLS reported. Samples spiked with 3 surrogates. Instrument ATMS 2 ICAL 03/18/2015.

Canister Certifications were provided in the data package.

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## Organic Worksheet (GC/MS) page 3 of 5

AR/COC #: 616087

SDG #: 320-12599-1

Matrix: Air

Laboratory Sample IDs: 320-12599-1 through -12

Method/Batch #s: TO-15:72525 and 72755

Tuning (pass/fail): Pass

TICs Required? (yes/no): NA

Analyte (outliers)	Calibration				Method Blank	5X (10X) MB	LCS %R	LCSD %R	LCS LCSD RPD	FB -12	5X (10X) FB			
	Int.	RF	RSD/ R <sup>2</sup>	(ICV) CCV %D										
72755 -9 thru -12														
Acetone	NA	✓	✓	✓	✓	NA	✓	✓	29	✓	NA			
Tetrachloroethene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.056J	0.28			
Toluene	NA	✓	✓	✓	✓	NA	✓	✓	✓	0.25J	(2.5)			
Methylene chloride	NA	✓	✓	✓	✓	NA	✓	✓	39	✓	NA			
Chloromethane	NA	✓	✓	✓	✓	NA	✓	129	✓	✓	NA			
1,2-Dichloro-1,1,2,2-tetrafluoroethane	NA	✓	✓	✓	✓	NA	127	✓	✓	✓	NA			
1,1-Dichloroethene	NA	✓	✓	✓	✓	NA	✓	✓	30	✓	NA			
2-Butanone	NA	✓	✓	✓	✓	NA	✓	✓	26	✓	NA			
Carbon Disulfide	NA	✓	✓	✓	✓	NA	✓	✓	27	✓	NA			
Vinyl acetate	NA	✓	✓	✓	✓	NA	✓	✓	31	✓	NA			
72525 -1 thru -8														
1,2-Dichlorobenzene	NA	✓	✓	✓	.136J	NA	✓	✓	✓	✓	NA			
1,3-Dichlorobenzene	NA	✓	✓	✓	.121J	NA	✓	✓	✓	✓	NA			
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HTs OK. Mass spectra validated. MDLs and RLS reported. Samples spiked with 3 surrogates. Instrument ATMS 2 ICAL 03/18/2015.

Canister Certifications were provided in the data package.

No case narrative for batch 72525

## Organic Worksheet (GC/MS) page 4 of 5

AR/COC #: 616088

SDG #: 320-12597-1

Matrix: Air

Laboratory Sample IDs: 320-12597-1 through -6

Method/Batch #s: TO-15:71804

Tuning (pass/fail): Pass      TICs Required? (yes/no): NA

[illegible]

Comments: HTs OK. Mass spectra validated. MDLs and RLS reported. Samples spiked with 3 surrogates. Instrument ATMS 2 ICAL 03/18/2015.

Canister Certifications were provided in the data package.

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## Organic Worksheet (GC/MS) page 5 of 5

AR/COC #: 616089

SDG #: 320-12598-1

Matrix: Air

Laboratory Sample IDs: 320-12598-1 through -6

Method/Batch #s: TO-15:72057

Tuning (pass/fail): Pass      TICs Required? (yes/no): NA

[illegible]

Comments: HTs OK. Mass spectra validated. MDLs and RLS reported. Samples spiked with 3 surrogates. Instrument ATMS 2 ICAL 03/18/2015.

Canister Certifications were provided in the data package.

Revised 7/2007





## ANALYSIS REQUEST AND CHAIN OF CUSTODY


Internal Lab

Page 1 of 1

Batch No. *N/A*

### SMO Use

AR/COC	616086
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Project Name: MWL-SVM		Date Samples Shipped: 4/15/15		SMO Authorization: [Signature]		<input type="checkbox"/> Waste Characterization						
Project/Task Manager: Tim Jackson		Carrier/Waybill No. 232336		SMO Contact Phone: Wendy Palencia/505-844-3132		<input type="checkbox"/> RMMA						
Project/Task Number: 146422.10.11.08		Lab Contact: Beth Riley/916-373-5600		Send Report to SMO: Rita Kavanaugh/505-284-2553		<input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius						
Service Order: CF01-15		Lab Destination: TA/West Sacramento				Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154						
Tech Area:		Contract No.: PO 691437										
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	
097533	-001	MWL-SV02-41.5		4/15/15 9:11	SG	SC 6 L	None	G	SA	VOC-TO-15		
097534	-001	MWL-SV-FB2		4/15/15 9:06	UPN	SC 6 L	None	G	FB	VOC-TO-15		
 320-12612 Chain of Custody												
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 <input type="checkbox"/> No						
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
	Robert Lynch	[Signature]	RL	SNL/4142/505-844-4013/505-250-7090								
	Alfred Santillanes	[Signature]	AS	SNL/4142/505-284-6870/505-228-0710								
	William Gibson	[Signature]	WG	SNL/4142/505-284-3307/505-239-7367								
1. Relinquished by [Signature] Org. 4142 Date 4/15/15 Time 1000												
1. Received by [Signature] Org. 4142 Date 4/15/15 Time 1000												
2. Relinquished by [Signature] Org. 4142 Date 4/15/15 Time 1100												
2. Received by [Signature] Org. 4142 Date 4/15/15 Time 910												
3. Relinquished by Org. Date Time												
3. Received by Org. Date Time												
4. Relinquished by Org. Date Time												
4. Received by Org. Date Time												

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

CONTRACT LABORATORY  
ANALYSIS REQUEST AND CHAIN OF CUSTODY



320-12599 Chain of Custody

Internal Lab

Batch No. N/A

SMO Use

AR/COC **616087**

Project Name: MWL-SVM

Project/Task Manager: Tim Jackson

Project/Task Number: 146422.10.11.08

Service Order: CF01-15

Date Samples Shipped: 4/14/15

Carrier/Waybill No. 232265

Lab Contact: Beth Riley/916-373-5600

Lab Destination: TA/West Sacramento

Contract No.: PO 691437

SMO Authorization: [Signature]

SMO Contact Phone: Wendy Palencia/505-844-3132

Send Report to SMO: Rita Kavanaugh/505-284-2553

☐ Waste Characterization

☐ RMMA

☐ Released by COC No. ☐ 4° Celsius

Bill to: Sandia National Laboratories (Accounts Payable),

P.O. Box 5800, MS-0154

Albuquerque, NM 87185-0154

Tech Area:

Building: Room: Operational Site:

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
097535	-001	MWL-SV03-50 W/M		4/14/15 8:50	SG	SC	6 L	None	G	SA	VOC-TO-15	
097536	-001	MWL-SV03-50 W/M		4/14/15 8:50	SG	SC	6 L	None	G	DU	VOC-TO-15	
097537	-001	MWL-SV03-50 WO/M		4/14/15 8:55	SG	SC	6 L	None	G	SA	VOC-TO-15	
097538	-001	MWL-SV03-50 WO/M		4/14/15 8:55	SG	SC	6 L	None	G	DU	VOC-TO-15	
097539	-001	MWL-SV03-100		4/14/15 9:00	SG	SC	6 L	None	G	SA	VOC-TO-15	
097540	-001	MWL-SV03-200 W/M		4/14/15 9:05	SG	SC	6 L	None	G	SA	VOC-TO-15	
097541	-001	MWL-SV03-200 W/M		4/14/15 9:05	SG	SC	6 L	None	G	DU	VOC-TO-15	
097542	-001	MWL-SV03-200 WO/M		4/14/15 9:10	SG	SC	6 L	None	G	SA	VOC-TO-15	
097543	-001	MWL-SV03-200 WO/M		4/14/15 9:10	SG	SC	6 L	None	G	DU	VOC-TO-15	
097544	-001	MWL-SV03-300		4/14/15 9:28	SG	SC	6 L	None	G	SA	VOC-TO-15	

Last Chain: ☐ Yes

Validation Req'd: ☒ Yes

Background: ☐ Yes

Confirmatory: ☐ Yes

Sample Tracking

Date Entered:

Entered by:

QC initials:

SMO Use

Special Instructions/QC Requirements:

EDD ☒ Yes ☐ No

Turnaround Time ☐ 7 Day\* ☐ 15 Day\* ☒ 30 Day

Negotiated TAT

Sample Disposal ☐ Return to Client ☒ Disposal by Lab

Return Samples By:

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

Conditions on Receipt

Sample Team Members

Name	Signature	Init.	Company/Organization/Phone/Cell
Robert Lynch	<u>[Signature]</u>	<u>RL</u>	SNL/4142/505-844-4013/505-250-7090
Alfred Santillanes	<u>[Signature]</u>	<u>AS</u>	SNL/4142/505-284-6870/505-228-0710
William Gibson	<u>[Signature]</u>	<u>WG</u>	SNL/4142/505-284-3307/505-239-7367
Gilbert Quintana	<u>[Signature]</u>	<u>GQ</u>	SNL/4143/505-284-2507/505-228-2606

1. Relinquished by [Signature] Org. 4142 Date 4/14/15 Time 1338

2. Received by [Signature] Org. 4142 Date 4/14/15 Time 1338

3. Relinquished by [Signature] Org. 4142 Date 4/14/15 Time 1405

4. Received by [Signature] Org. 4142 Date 4/14/15 Time 945

Prior confirmation with SMO required for 7 and 15 day TAT

Lab Use

Page 811 of 813

CONTRACT LABORATORY  
ANALYSIS REQUEST AND CHAIN OF CUSTODY (Continuation)

AR/COC 616087

Project Name: MWL-SVM			Project/Task Manager: Tim Jackson			Project/Task No.: 146422.10.11.08								
Tech Area:														
Building:		Room:											Lab use	
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		
097545	-001	MWL-SV03-400		4/14/15 9:56	SG	SC	6 L	None	G	SA	VOC-TO-15			
097546	-001	MWL-SV-FB3		4/14/15 8:35	UPN	SC	6 L	None	G	FB	VOC-TO-15			
Recipient Initials _____														


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05/06/2015

**CONTRACT LABORATORY**Page 1 of 1

### SMO Use


AR/COC 616088

Project Name:	MWL-SVM	Date Samples Shipped:	4/14/15	SMO Authorization:		<input type="checkbox"/> Waste Characterization
Project/Task Manager:	Tim Jackson	Carrier/Waybill No	232265	SMO Contact Phone:	Wendy Palencia/505-844-3132	<input type="checkbox"/> RMMA
Project/Task Number:	146422.10.11.08	Lab Contact:	Beth Riley/916-373-5600	Send Report to SMO:	Rita Kavanaugh/505-284-2553	<input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius
Service Order:	CF01-15	Lab Destination:	TA/West Sacramento	Bill to Sandia National Laboratories (Accounts Payable).		
		Contract No.:	PO 691437			

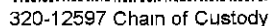
Building:	Room:	Operational Site:
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Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
097547	-001	MWL-SV04-50		4/14/15 10:30	SG	SC	6 L	None	G	SA	VOC-TO-15	
097548	-001	MWL-SV04-100		4/14/15 10:32	SG	SC	6 L	None	G	SA	VOC-TO-15	
097549	-001	MWL-SV04-200		4/14/15 10:35	SG	SC	6 L	None	G	SA	VOC-TO-15	
097550	-001	MWL-SV04-300		4/14/15 10:38	SG	SC	6 L	None	G	SA	VOC-TO-15	
097551	-001	MWL-SV04-400		4/14/15 10:41	SG	SC	6 L	None	G	SA	VOC-TO-15	
097552	-001	MWL-SV-FB4		4/14/15 10:16	UPN	SC	6 L	None	G	FB	VOC-TO-15	

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320-12597 Chain of Custody



Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
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 Lynch	<i>Robert Lynch</i>	<i>RL</i>	SNL/4142/505-844-4013/505-250-7090		Return Samples By:		
	Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/4142/505-284-6870/505-228-0710		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547		
	William Gibson	<i>William Gibson</i>	<i>WG</i>	SNL/4142/505-284-3307/505-239-7367				
	Gilbert Quintana	<i>Gilbert Quintana</i>	<i>GQ</i>	SNL/4142/505-284-2507/505-228-2606				

1. Relinquished by	H. G. Suttell	Org.	4142	Date	4/14/15	Time	1338	3. Relinquished by		Org.		Date		Time	
2. Received by	D. R. Papp	Org.	4142	Date	4/14/15	Time	1338	3. Received by		Org.		Date		Time	
3. Relinquished by	L. J. Linn	Org.	4142	Date	4/14/15	Time	1405	4. Relinquished by		Org.		Date		Time	
4. Received by	[Signature]	Org.		Date	4/17/15	Time	945	4. Received by		Org.		Date		Time	

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

## Internal Lab


Page 1 of 1

Batch No. 1/A

**SMO Use**

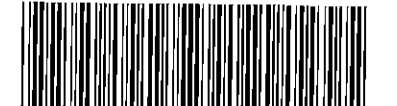
AR/COC 616089

**616089**

Project Name:	MWL-SVM	Date Samples Shipped:	1/14/15	SMO Authorization:		<input type="checkbox"/> Waste Characterization
Project/Task Manager:	Tim Jackson	Carrier/Waybill No	232265	SMO Contact Phone:		<input type="checkbox"/> RMMA
Project/Task Number:	146422.10.11.08	Lab Contact:	Beth Riley/916-373-5600		Wendy Palencia/505-844-3132	<input type="checkbox"/> Released by COC No.
Service Order:	CF01-15	Lab Destination:	TA/West Sacramento	Send Report to SMO:		<input type="checkbox"/> 4° Celsius
		Contract No :	PO 691437		Rita Kavanaugh/505-284-2553	Bill to Sandia National Laboratories (Accounts Payable),

<b>Tech Area:</b>		<b>Operational Site:</b>	P O Box 5800, MS-0154
<b>Building:</b>	<b>Room:</b>		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					
097553	-001	MWL-SV05-50		4/14/15 11:12	SG	SC	6 L	None	G	SA	VOC-TO-15	
097554	-001	MWL-SV05-100		4/14/15 11:15	SG	SC	6 L	None	G	SA	VOC-TO-15	
097555	-001	MWL-SV05-200		4/14/15 11:20	SG	SC	6 L	None	G	SA	VOC-TO-15	
097556	-001	MWL-SV05-300		4/14/15 11:29	SG	SC	6 L	None	G	SA	VOC-TO-15	
097557	-001	MWL-SV05-400		4/14/15 11:33	SG	SC	6 L	None	G	SA	VOC-TO-15	
097558	-001	MWL-SV-FB5		4/14/15 11:07	UPN	SC	6 L	None	G	FB	VOC-TO-15	



320-12598 Chain of Custody

Last Chain: <input type="checkbox"/> Yes			Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Comments on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes			Date Entered:				EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Background: <input type="checkbox"/> Yes			Entered by:				Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day			
Confirmatory: <input type="checkbox"/> Yes			QC inits.:				Negotiated TAT <input type="checkbox"/>			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab				
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/4142/505-844-4013/505-250-7090		Return Samples By:				
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/4142/505-284-6870/505-228-0710		Comments:		Send report to Tim Jackson/4142/MS 0729/284-2547		
	William Gibson	<i>William Gibson</i>	WG	SNL/4142/505-284-3307/505-239-7367						
	Gilbert Quintana	<i>Gilbert Quintana</i>	GQ	SNL/4143/505-284-2507/505-228-2606						
								Lab Use		

1. Relinquished by	<i>[Signature]</i>	Org.	4142	Date	4/14/15	Time	1338	3. Relinquished by		Org.		Date		Time	
2. Received by	<i>[Signature]</i>	Org.	4142	Date	4/14/15	Time	1338	3. Received by		Org.		Date		Time	
1. Relinquished by	<i>[Signature]</i>	Org.	4142	Date	4/14/15	Time	1405	4. Relinquished by		Org.		Date		Time	
2. Received by	<i>[Signature]</i>	Org.		Date	4/17/15	Time	215	4. Received by		Org.		Date		Time	

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

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## CONTRACT VERIFICATION REVIEW FORMS

### SOIL-VAPOR MONITORING

APRIL 2015

AR/COC Number	Sample Type
616085	Environmental*
616086	Environmental*
616087	Environmental*
616088	Environmental*
616089	Environmental*

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

## Contract Verification Form (CVR)

Project Leader Jackson

Project Name MWL SVM

Project/Task No. 146422\_10.11.08

ARCOC No. 616085

Analytical Lab TA West Sacramento

SDG No. 320-12611-1

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

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

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

### 2.0 Analytical Laboratory Report



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

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples		X	Chloromethane and 1,2-Dichloro-1,1,2,2-tetrafluoroethane failed recovery limits for LCS/LCSD (Batch 72755)
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	N/A		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	N/A		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	N/A		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Acetone, methylene chloride and toluene detected in FB1

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

#### 4.0 Calibration and Validation Documentation

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

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

Line No.	Item	Yes	No	Comments
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) ICP interference check sample data provided	N/A		
	d) ICP serial dilution provided	N/A		
	e) Instrument run logs provided	N/A		
4.6	Radiochemistry and General Chemistry	N/A		
	a) Instrument run logs provided			

## 5.0 Data Anomaly Report

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

## 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: 05-11-2015 13:41:00

Closed by: Wendy Palencia Date: 05-11-2015 15:01:00

## Contract Verification Form (CVR)

Project Leader Jackson

Project Name MWL SVM

Project/Task No. 146422\_10.11.08

ARCOC No. 616086

Analytical Lab TA West Sacramento

SDG No. 320-12612-1

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

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

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

### 2.0 Analytical Laboratory Report

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

### 3.0 Data Quality Evaluation



Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples		X	Chloromethane and 1,2-Dichloro-1,1,2,2-tetrafluoroethane failed recovery limits for LCS/LCSD (Batch 72755)
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	N/A		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	N/A		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	N/A		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Methylene chloride and toluene detected in FB2

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

#### 4.0 Calibration and Validation Documentation

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

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

Line No.	Item	Yes	No	Comments
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) ICP interference check sample data provided	N/A		
	d) ICP serial dilution provided	N/A		
	e) Instrument run logs provided	N/A		
4.6	Radiochemistry and General Chemistry	N/A		
	a) Instrument run logs provided			

## 5.0 Data Anomaly Report

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

## 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: 05-12-2015 08:06:00

Closed by: Wendy Palencia Date: 05-12-2015 08:06:00

## Contract Verification Form (CVR)

**Project Leader** Jackson

**Project Name** MWL SVM

**Project/Task No.** 146422\_10.11.08

**ARCOC No.** 616087

**Analytical Lab** TA West Sacramento

**SDG No.** 320-12599-1

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

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

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

### 2.0 Analytical Laboratory Report

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

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples		X	Chloromethane and 1,2-Dichloro-1,1,2,2-tetrafluoroethane failed recovery limits for LCS/LCSD (Batch 72755)
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	N/A		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	N/A		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	N/A		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Tetrachloroethene and toluene detected in FB3



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

#### 4.0 Calibration and Validation Documentation

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

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

Line No.	Item	Yes	No	Comments
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) ICP interference check sample data provided	N/A		
	d) ICP serial dilution provided	N/A		
	e) Instrument run logs provided	N/A		
4.6	Radiochemistry and General Chemistry	N/A		
	a) Instrument run logs provided			

## 5.0 Data Anomaly Report

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

## 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: 05-12-2015 14:17:00

Closed by: Wendy Palencia Date: 05-12-2015 14:24:00

## Contract Verification Form (CVR)

Project Leader Jackson

Project Name MWL SVM

Project/Task No. 146422\_10.11.08

ARCOC No. 616088

Analytical Lab TA West Sacramento

SDG No. 320-12597-1

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

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

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

### 2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	No	
2.1	Data reviewed, signature	X		
2.2	Method reference number(s) complete and correct	X		
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)		X	LCS data not provided with package
2.4	Matrix spike/matrix spike duplicate data provided	N/A		
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and Lc	X		
2.6	QC batch numbers provided	X		
2.7	Dilution factors provided and all dilution levels reported	X		
2.8	Data reported in appropriate units and using correct significant figures	X		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	N/A		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met	X		
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	X		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	N/A		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	X		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	N/A		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Acetone and toluene detected in FB4

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

#### 4.0 Calibration and Validation Documentation

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



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

Line No.	Item	Yes	No	Comments
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) ICP interference check sample data provided	N/A		
	d) ICP serial dilution provided	N/A		
	e) Instrument run logs provided	N/A		
4.6	Radiochemistry and General Chemistry	N/A		
	a) Instrument run logs provided			

## 5.0 Data Anomaly Report

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

## 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
LCS	TO-15	LCS not provided
x		

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: 04-30-2015

Reviewed by: Wendy Palencia Date: 04-30-2015 13:47:00

Were resolutions adequate and data package complete? ☒ Yes ☐ No

Closed by: Wendy Palencia Date: 05-05-2015 08:20:00

## Contract Verification Form (CVR)

Project Leader Jackson

Project Name MWL SVM

Project/Task No. 146422\_10.11.08

ARCOC No. 616089

Analytical Lab TA West Sacramento

SDG No. 320-12598-1

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

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

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

### 2.0 Analytical Laboratory Report

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

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	X		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	N/A		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	X		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	N/A		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Toluene detected in FB5

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

#### 4.0 Calibration and Validation Documentation

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

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



Line No.	Item	Yes	No	Comments
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) ICP interference check sample data provided	N/A		
	d) ICP serial dilution provided	N/A		
	e) Instrument run logs provided	N/A		
4.6	Radiochemistry and General Chemistry	N/A		
	a) Instrument run logs provided			

## 5.0 Data Anomaly Report

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

## 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: 05-04-2015 08:08:00

Closed by: Wendy Palencia Date: 05-04-2015 08:08:00

**FIELD SAMPLING FORMS**  
**OCTOBER 2015 SOIL-VAPOR MONITORING**

# TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: MWL Date: 10/08/15 Time: 0805

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

Weather Conditions:

Temp: \_\_\_\_\_ °F Wind Speed: \_\_\_\_\_ MPH Humidity: \_\_\_\_\_ %

Chemicals Used: \_\_\_\_\_

Other: Be aware of possible UXO

## Safety Topics Presented

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

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

## Attendees

Robert T Lynch  
Printed Name

Tim Jackson  
Printed Name

ALFRED SANTILLANES  
Printed Name

William Gibson  
Printed Name

Jessica Morning  
Printed Name

Sue Collins  
Luke deArast

[Signature]  
Signature

T. G. G. G. G.  
Signature

[Signature]  
Signature

[Signature]  
Signature

[Signature]  
Signature

[Signature]  
Luke deArast

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

### SUMMA® Canister Log

	Serial #	Date Received	Date Tested for Initial VAC	Initial VAC at 5400 ft (in. Hg)	Date Used	End VAC at 5400 ft (in. Hg)	Date Returned to SMO
SV01 - FB	34002106	10/7/15	10/8/15	-26	10/8/15	-8	10/8/15
SV02 - FB	34000299			-26		-8	
	1443			-24		-8	
	1503			-24		-8	
	0019			-24		-8	
	0815			-25		-8	
	0558			-24		-8	
	1127			-24		-8	
	0424			-24		-8	
	0345			-24		-8	
	0299			-26		-8	
SV03 - FB	2014			-26		-8	
	1210			-24		-8	
	✓ 1508			-24		-8	
	7761			-24		-8	
	34001658			-24		-8	
	8246			-24		-8	
SV04 - FB	34000492			-26		-8	
	1548			-25		-8	
	0609			-25		-8	
	0564			-23		-8	
	1591			-25		-8	
	0523			-25		-8	
SV05 - FB	0456			-26		-8	
	1395			-26		-8	
	0695			-26		-8	
	1389			-26		-8	
	↓ 2097			-26		-8	
	7533	↓	↓	-26	↓	-8	↓

→ duplicate information

SUMMA® Canister Log completed by:

Tim Jackson  
Printed Name

Tim Jackson  
Signature

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

Background = 0.0 ppm

continuous purge readings  
w/ PID

PID # RAE PGM7370  
# 17221  
117 EV

# Soil Vapor Sampling Log

1 of 3

Location	Date	Time	Canister #	PID (ppm)	Starting Vacuum (in. Hg)	Ending Vacuum (in. Hg)	Location Comments
MWL-5001	10/8/15						
FB		0819	34002106	NA	-26	-8	FB
MWL-5001		0836	NA	0.0	NA	NA	
		0838	34001443	NA	-24	-8	w/ manifold SA
		↓	1503	↓	-24	-8	↓ DU
		0840	0019	↓	-24	-8	w/o manifold SA
		0841	↓ 0815	↓	-25	-8	↓ DU
MWL-5002							
FB		0820	34000299	NA	-24	-8	FB
MWL-5002		0852	NA	0.0	NA	NA	
		0856	34000558	NA	-24	-8	w/ manifold SA
			1127	↓	-24	-8	↓ DU
		0857	0424	↓	-24	-8	w/o manifold SA
		0859	↓ 0345	↓	-24	-8	↓ DU
MWL-5003							
FB		0920	34002014	NA	-26	-8	FB
MWL-5003-50		0934	NA	0.0	NA	NA	
		0936	34001210	NA	-24	-8	
MWL-5003-100		0937	NA	0.0	NA	NA	
		0938	NA	0.0	NA	NA	
		0940	34001508	NA	-24	-8	
MWL-5003-200		0941	NA	0.0	NA	NA	
		0943	NA	0.0	NA	NA	
		0944	7761	NA	-24	-8	
MWL-5003-300		0946	NA	0.1	NA	NA	
		0948	NA	0.1	NA	NA	
		0952-0949	34001655	NA	-24	-8	slow sample fill begin @ 0949
		1110/511					

# Soil Vapor Sampling Log

2 of 3

Location	Date	Time	Canister #	PID (ppm)	Starting Vacuum (in. Hg)	Ending Vacuum (in. Hg)	Location Comments
MWL-5003-400	10/8/15	0957	NA	0.0	NA	NA	
↓		0958	NA	0.0	NA	NA	
↓		1010	8246	NA	-24	-8	0954 shift fill slow fill
MWL-5004							
FB		1035	34000492	NA	-26	-8	
MWL-5004-50		1037	NA	0.0	NA	NA	
↓		1040	34001548	NA	-25	-8	
MWL-5004-100		1042	NA	0.0	NA	NA	
↓		1044	34001609	NA	-25	-8	
MWL-5004-200		1045	NA	0.0	NA	NA	
↓		1046	NA	0.0	NA	NA	
↓		1048	34000564	NA	-23	-8	
MWL-5004-300		1049	NA	0.0	NA	NA	
↓		1050	NA	0.0	NA	NA	
↓		1052	34001591	NA	-25	-8	
MWL-5004-400		1056	NA	0.0	NA	NA	
↓		1057	NA	0.0	NA	NA	
↓		1058	NA	0.0	NA	NA	
↓		1100	34000523	NA	-25	-8	
MWL-5005							
FB		1124	34000456	NA	-26	-8	FB
MWL-5005-50		1127	NA	0.0	NA	NA	
↓		1128	34001395	NA	-26	-8	
MWL-5005-100		1129	NA	0.0	NA	NA	
↓		1132	34000695	NA	-26	-8	
MWL-5005-200		1133	NA	0.0	NA	NA	
↓		1134	NA	0.0	NA	NA	
↓		1135	34001389	NA	-26	-8	

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*IMPORTANT NOTICE: A printed copy of this document may not be the document currently in effect. The official version is located on the Sandia Restricted Network (SRN), department home page*



**SUMMARY SHEET FOR  
OCTOBER 2015 SOIL-VAPOR SAMPLES**

**Sample Summary for October 2015 MWL Soil Vapor Monitoring**

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 146422.10.11.08 / Service Order Number CF 01-16</b>								
MWL-SV01	8-Oct-15	MWL-SV01-42.5 W/M	34001443	616350	098316	Environmental	616350 / 098315	collected with manifold
		MWL-SV01-42.5 W/M	34001503		098317	Duplicate		collected with manifold
		MWL-SV01-42.5 I/S	34000019		098318	Environmental		no manifold - in sequence
		MWL-SV01-42.5 I/S	34000815		098319	Duplicate		no manifold - in sequence
		MWL-SV-FB1	34002106		098315	Field QC	n/a	Ultra Pure N2
MWL-SV02	8-Oct-15	MWL-SV02-41.5 W/M	34000558	616351	098321	Environmental	616351 / 098320	collected with manifold
		MWL-SV02-41.5 W/M	34001127		098322	Duplicate		collected with manifold
		MWL-SV02-41.5 I/S	34000424		098323	Environmental		no manifold - in sequence
		MWL-SV02-41.5 I/S	34000345		098324	Duplicate		no manifold - in sequence
		MWL-SV-FB2	34000299		098320	Field QC	n/a	Ultra Pure N2
MWL-SV03	8-Oct-15	MWL-SV03-50	34001210	616352	098326	Environmental	616352 / 098325	
		MWL-SV03-100	34001508		098327	Environmental		
		MWL-SV03-200	7761		098328	Environmental		
		MWL-SV03-300	34001658		098329	Environmental		
		MWL-SV03-400	8246		098330	Environmental		
		MWL-SV-FB3	34002014		098325	Field QC	n/a	Ultra Pure N2
MWL-SV04	8-Oct-15	MWL-SV04-50	34001548	616353	098332	Environmental	616353 / 098331	
		MWL-SV04-100	34000609		098333	Environmental		
		MWL-SV04-200	34000564		098334	Environmental		
		MWL-SV04-300	34001591		098335	Environmental		
		MWL-SV04-400	34000523		098336	Environmental		
		MWL-SV-FB4	34000492		098331	Field QC	n/a	Ultra Pure N2
MWL-SV05	8-Oct-15	MWL-SV05-50	34001395	616354	098338	Environmental	616354 / 098337	
		MWL-SV05-100	34000695		098339	Environmental		
		MWL-SV05-200	34001389		098340	Environmental		
		MWL-SV05-300	34002097		098341	Environmental		
		MWL-SV05-400	7533		098342	Environmental		
		MWL-SV-FB5	34000456		098337	Field QC	n/a	Ultra Pure N2

**DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES**

**SOIL-VAPOR MONITORING**

**OCTOBER 2015**

**AR/COC NUMBERS 616350, 616351, 616352, 616353, 616354**

## Memorandum

Date: November 18, 2015

To: File

From: Mary Donovan

Subject: GC/MS Organic Data Review and Validation – SNL  
Site: MWL SVM  
AR/COC: 616350, 616351, 616352, 616353 and 616354  
SDG: 320-15492-1  
Laboratory: TestAmerica Laboratories, Inc. - West Sacramento  
Project/Task: 146422.10.11.08  
Analysis: VOCs by method TO-15

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

### Summary

Twenty-eight samples were prepared and analyzed with accepted procedures using method EPA TO-15 (Determination of VOCs in Air collected in specially prepared canisters and analyzed by GC/MS). All compounds were successfully analyzed. No problems were identified with the data package that resulted in the qualification of data.

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

### Holding Times

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

### Instrument Tune

All instrument tune requirements were met.

### Calibration

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

### Blanks

No target analytes were detected in the blanks except as follows.

Methylene chloride was detected at < the PQL in FB1, sample 320-15492-1, associated with samples 320-15492-2 through -5. The associated sample results were non-detects and will not be qualified.

Tetrachloroethene was detected at < the PQL in FB4, sample 320-15492-17, associated with samples 320-15492-18 through -22. The associated sample results were detects >5X the FB result and will not be qualified.

### **Surrogates**

All surrogate acceptance criteria were met.

### **Internal Standards**

All internal standards met QC acceptance criteria.

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

An MS/MSD was not performed.

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

The LCS/LCSD met all QC acceptance criteria except as follows. The 1,3-dichlorobenzene and 1,4-dichlorobenzene recoveries were > the upper acceptance limits for the LCS and/or LCSD associated with samples 320-15492-24 through -28. The associated sample results were non-detects and will not be qualified.

### **Detection Limits/Dilutions**

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

Samples 320-15492-2 and -3 were diluted 26X, sample -4 was diluted 16.7X, sample -5 was diluted 18.9X, samples -7 and -8 were diluted 10.1X, sample -9 was diluted 10.5X, sample -10 was diluted 10.4X, sample -12 was diluted 3.43X, sample -13 was diluted 6.06X, sample -14 was diluted 7.58X, sample -15 was diluted 9.75X, sample -16 was diluted 10.5X, sample -18 was diluted 2.9X, sample -19 was diluted 3.62X, sample -20 was diluted 4.85X, sample -21 was diluted 3.6X, sample -22 was diluted 4.33X, sample -24 was diluted 4.2X, sample -25 was diluted 4.83X, sample -26 was diluted 7.19X, sample -27 was diluted 4.01X and sample -28 was diluted 3.5X for all target analytes.

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

TIC reports were not required.

### **Other QC**

Mass spectra were verified during data validation and met QC acceptance criteria.

FBs were submitted with each AR/COC. Four field duplicate pairs were submitted, two with ARCO 616350 and two with ARCO 616351. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

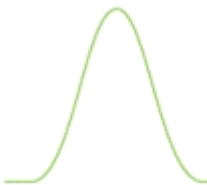
No other specific issues that affect data quality were identified.

**Reviewed by:** Linda Thal

**Level I**

**Date:** 11/30/2015

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Sample Findings Summary



AR/COC: 616350, 616351, 616352, 616353, 616354

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

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



## Sandia Data Validation Summary Worksheet

ARCOC#: 616350, 616351, 616352, 616353 and 616354		Site/Project: MWL SVM		Validation Date: 11/18/15	
SDG #: 320-15492-1		Laboratory: TestAmerica – West Sacramento		Validator: Mary Donovan	
Matrix: Air		# of Samples: 28	CVR present: Yes		
ARCOC(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: 10/08/2015

Validated by:

*Mary A. Donovan*

## Sandia Organic Worksheet (GC/MS VOC)

ARCOC #:616350, 616351, 616352, 616353 and 616354	SDG: 320-15492-1	Matrix: Air
Laboratory Sample IDs: 320-15492-1 through -28		
Method/Batch #s: <b>TO-15</b> /91165 (samples 1-5); 91290 (samples 6-23); 91424 (samples 24-28)	Tuning (pass/fail):pass	TICs Required? (yes/no):no

Analyte (outliers)		Calibration				MB	5X (10X) MB	LCS %R	LCSD %R	LCS/ LCSD RPD	FB1*	FB4**				
		Int.	RF/ Slope	RSD/r <sup>2</sup>	(ICV)/CCV %D											
methylene chloride		NA	✓	✓	✓	✓	NA	✓	✓	✓	0.078J	✓				
tetrachloroethene		NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	0.054J				
1,3-dichlorobenzene		NA	✓	✓	✓	✓	NA	✓	137^	✓	✓	✓				
1,4-dichlorobenzene		NA	✓	✓	✓	✓	NA	144^	146^	✓	✓	✓				
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		DFB		CBZ											
Sample ID	Area	RT	Area	RT	Area	RT										
None																

Comments: HTs OK. ICAL ATMS7 10/20-21/15. Mass spectra validated. MDLs and RLS reported. Samples spiked with 3 surrogates. Canister Certifications were provided in the data package.

\*associated with samples -2 through -5; \*\*associated with samples -18 through -22

<sup>a</sup>associated with batch 91424 (samples -24 through -28)

# **CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY**

Internal Lab

Page 1 of 1Batch No. 1/A

SMO Use

AR/COC **616350**

Project Name: <u>MWL SVM</u>	Date Samples Shipped: <u>229173</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius
Project/Task Manager: <u>Tim Jackson</u>	Carrier/Waybill No. <u>101215</u>	SMO Contact Phone: <u>Wendy Palencia/505-844-3132</u>	
Project/Task Number: <u>146422.10.11.08</u>	Lab Contact: <u>Beth Riley-916-373-5600</u>	Send Report to SMO: <u>Stephanie Montano/505-284-2553</u>	
Service Order: <u>CF01-16</u>	Lab Destination: <u>TA/West Sacramento, CA</u>	Contract No.: <u>PO 691437</u>	

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

Tech Area:				P O. Box 5800, MS-0154								
Building:		Room:		Albuquerque, NM 87185-0154								
Operational Site:												
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
098315	-001	MWL-SV-FB1		10/8/15 8:19	UPN	SC	6 L	None	G	FB	VOC-TO-15	
098316	-001	MWL-SV01-42.5 W/M		10/8/15 8:38	SG	SC	6 L	None	G	SA	VOC-TO-15	
098317	-001	MWL-SV01-42.5 W/M		10/8/15 8:38	SG	SC	6 L	None	G	DU	VOC-TO-15	
098318	-001	MWL-SV01-42.5 I/S		10/8/15 8:40	SG	SC	6 L	None	G	SA	VOC-TO-15	
098319	-001	MWL-SV01-42.5 I/S		10/8/15 8:41	SG	SC	6 L	None	G	DU	VOC-TO-15	



320-15492 Chain of Custody

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		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		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: Send report to Tim Jackson/4142/MS 0729/284-2547 Elevation and ambient pressure information on attached forms.		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Lab Use		
	Robert Lynch	[Signature]	RL	SNL/4142/505-844-4013/505-250-7090				
	Alfred Santillanes	[Signature]	AS	SNL/4142/505-284-6870/505-228-0710				
	William Gibson	[Signature]	WG	SNL/4142/505-284-3307/505-239-7367				
	Tim Jackson	[Signature]	TJ	SNL/4142/505-284-2547/505-263-6639				

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>10/9/15</u> Time <u>0837</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>10/9/15</u> Time <u>0837</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>10/9/15</u> Time <u>0900</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <u>[Signature]</u> Org. _____ Date <u>10/15/15</u> Time <u>1030</u>	4. Received by _____ Org. _____ Date _____ Time _____

Prior confirmation with SMO required for 7 and 15 day TAT

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**CONTRACT LABORATORY**

Page 1 of 1

### SMO Use

AR/COC

616351

Project Name:	MWL SVM	Date Samples Shipped:	10/12/15	SMO Authorization:		<input type="checkbox"/> Waste Characterization
Project/Task Manager:	Tim Jackson	Carrier/Waybill No.	229123	SMO Contact Phone:	916	<input type="checkbox"/> RMMA
Project/Task Number:	146422.10.11.08	Lab Contact:	Beth Riley-916-373-5600	Wendy Palencia/505-844-3132		<input type="checkbox"/> Released by COC No.
Service Order:	CF01-16	Lab Destination:	TA/West Sacramento, CA	Send Report to SMO:		<input type="checkbox"/> 4° Celsius
		Contract No.:	PO 691437	Stephanie Montano/505-284-2553		Bill to Sandia National Laboratories (Accounts Payable)

Tech Area:		Operational Site:	P O. Box 5800, MS-0154
Building:	Room:		Albuquerque, NM 87185-0154

[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 <input type="checkbox"/> No					
Background:			<input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day					
Confirmatory:			<input type="checkbox"/> Yes		QC inits.:				Negotiated TAT <input type="checkbox"/>					
Sample Team Members	Name		Signature		Init.		Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab				Lab Use	
	Robert Lynch		<i>Robert Lynch</i>		RL		SNL/4142/505-844-4013/505-250-7090		Return Samples By:					
	Alfred Santillanes		<i>Alfred Santillanes</i>		AS		SNL/4142/505-284-6870/505-228-0710		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547					
	William Gibson		<i>William Gibson</i>		WG		SNL/4142/505-284-3307/505-239-7367		Elevation and ambient pressure information on attached forms.					
	Tim Jackson		<i>Tim Jackson</i>		TJ		SNL/4142/505-284-2547/505-263-6639							

1. Relinquished by <u>H. J. Sattler</u>	Org.	4142	Date	10/9/15	Time	0837	3. Relinquished by _____	Org.	_____	Date	_____	Time	_____
1. Received by <u>C. L. Sattler</u>	Org.	4142	Date	10/9/15	Time	0837	3. Received by _____	Org.	_____	Date	_____	Time	_____
2. Relinquished by <u>M. J. Sattler</u>	Org.	4142	Date	10/12/15	Time	0900	4. Relinquished by _____	Org.	_____	Date	_____	Time	_____
2. Received by <u>Sattler</u>	Org.	_____	Date	10/15/15	Time	1030	4. Received by _____	Org.	_____	Date	_____	Time	_____

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

CONTRACT LABORATORY  
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. *N/A*

SMO Use

AR/COC **616352**

Project Name: MWL SVM	Date Samples Shipped: <i>10/12/15</i>	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius
Project/Task Manager: Tim Jackson	Carrier/Waybill No. <i>229123</i>	SMO Contact Phone: Wendy Palencia/505-844-3132	
Project/Task Number: 146422.10.11.08	Lab Contact: Beth Riley-916-373-5600	Send Report to SMO.	
Service Order: CF01-16	Lab Destination: TA/West Sacramento, CA	Stephanie Montano/505-284-2553	
Contract No.: PO 691437		Bill to Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154	

Tech Area:				P.O. Box 5800, MS-0154								
Building:		Room:		Operational Site: 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					
098325	-001	MWL-SV-FB3		10/8/15 9:20	UPN	SC	6 L	None	G	FB	VOC-TO-15	
098326	-001	MWL-SV03-50 (port 1)		10/8/15 9:36	SG	SC	6 L	None	G	SA	VOC-TO-15	
098327	-001	MWL-SV03-100 (port 2)		10/8/15 9:40	SG	SC	6 L	None	G	SA	VOC-TO-15	
098328	-001	MWL-SV03-200 (port 3)		10/8/15 9:44	SG	SC	6 L	None	G	SA	VOC-TO-15	
098329	-001	MWL-SV03-300 (port 4)		10/8/15 9:52	SG	SC	6 L	None	G	SA	VOC-TO-15	
098330	-001	MWL-SV03-400 (port 5)		10/8/15 10:10	SG	SC	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 <input type="checkbox"/> No		
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		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Lab Use
	Robert Lynch			SNL/4142/505-844-4013/505-250-7090		Return Samples By:		
	Alfred Santillanes	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-284-6870/505-228-0710		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547		
	William Gibson	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-284-3307/505-239-7367		Elevation and ambient pressure information on attached forms.		
	Tim Jackson	<i>[Signature]</i>	<i>[Init]</i>	SNL/4142/505-284-2547/505-263-6639				

1. Relinquished by <i>Alfred Santillanes</i> Org. <i>4142</i> Date <i>10/9/15</i> Time <i>0837</i>	3. Relinquished by	Org.	Date	Time
2. Received by <i>Wendy Palencia</i> Org. <i>4142</i> Date <i>10/9/15</i> Time <i>0837</i>	3. Received by	Org.	Date	Time
4. Relinquished by <i>Wendy Palencia</i> Org. <i>7142</i> Date <i>10/12/15</i> Time <i>0900</i>	4. Relinquished by	Org.	Date	Time
5. Received by <i>[Signature]</i> Org. <i>7142</i> Date <i>10/15/15</i> Time <i>1030</i>	4. Received by	Org.	Date	Time

Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY  
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No.		SMO Use		AR/COC		616353					
Project Name: MWL SVM		Date Samples Shipped: 10/12/15		SMO Authorization: [Signature]		<input type="checkbox"/> Waste Characterization					
Project/Task Manager: Tim Jackson		Carrier/Waybill No. 229173		SMO Contact Phone: Wendy Palencia/505-844-3132		<input type="checkbox"/> RMMA					
Project/Task Number: 146422.10.11.08		Lab Contact: Beth Riley-916-373-5600		Send Report to SMO.		<input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius					
Service Order: CF01-16		Lab Destination: TA/West Sacramento, CA		Stephanie Montano/505-284-2553		Bill to Sandia National Laboratories (Accounts Payable), P O. Box 5800, MS-0154 Albuquerque, NM 87185-0154					
Contract No.: PO 691437											
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
098331	-001	MWL-SV-FB4		10/8/15 10:35	UPN	SC 6 L	None	G	FB	VOC-TO-15	
098332	-001	MWL-SV04-50 (port 1)		10/8/15 10:40	SG	SC 6 L	None	G	SA	VOC-TO-15	
098333	-001	MWL-SV04-100 (port 2)		10/8/15 10:44	SG	SC 6 L	None	G	SA	VOC-TO-15	
098334	-001	MWL-SV04-200 (port 3)		10/8/15 10:48	SG	SC 6 L	None	G	SA	VOC-TO-15	
098335	-001	MWL-SV04-300 (port 4)		10/8/15 10:52	SG	SC 6 L	None	G	SA	VOC-TO-15	
098336	-001	MWL-SV04-400 (port 5)		10/8/15 11:00	SG	SC 6 L	None	G	SA	VOC-TO-15	
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 <input type="checkbox"/> No			Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
QC Inits.:			Negotiated TAT			Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			Return Samples By:		
Sample Team Members			Company/Organization/Phone/Cell			Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 Elevation and ambient pressure information on attached forms			Lab Use		
Robert Lynch			SNL/4142/505-844-4013/505-250-7090								
Alfred Santillanes			SNL/4142/505-284-6870/505-228-0710								
William Gibson			SNL/4142/505-284-3307/505-239-7367								
Tim Jackson			SNL/4142/505-284-2547/505-263-6639								
1 Relinquished by [Signature] Org. 4142 Date 10/9/15 Time 0837											
1 Received by [Signature] Org. 4142 Date 10/9/15 Time 0837											
2 Relinquished by [Signature] Org. 4142 Date 10/12/15 Time 0805											
2 Received by [Signature] Org. 4142 Date 10/15/15 Time 1030											
3 Relinquished by Org. Date Time											
3 Received by Org. Date Time											
4 Relinquished by Org. Date Time											
4 Received by Org. Date Time											

Prior confirmation with SMO required for 7 and 15 day TAT

**CONTRACT LABORATORY**Page 1 of 1

**SMO Use**

AR/COC	616354
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**616354**

Project Name: MWL SVM		Date Samples Shipped: 10/12/15		SMO Authorization: [Signature]		<input type="checkbox"/> Waste Characterization						
Project/Task Manager: Tim Jackson		Carrier/Waybill No: 229123		SMO Contact Phone: Wendy Palencia/505-844-3132		<input type="checkbox"/> RMMA						
Project/Task Number: 146422.10.11.08		Lab Contact: Beth Riley-916-373-5600		Send Report to SMO: Stephanie Montano/505-284-2553		<input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius						
Service Order: CF01-16		Lab Destination: TA/West Sacramento, CA				Bill to: Sandra National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154						
Contract No.: PO 691437												
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
098337	-001	MWL-SV-FB5		10/8/15 11:24	UPN	SC	6 L	None	G	FB	VOC-TO-15	
098338	-001	MWL-SV05-50 (port 1)		10/8/15 11:28	SG	SC	6 L	None	G	SA	VOC-TO-15	
098339	-001	MWL-SV05-100 (port 2)		10/8/15 11:32	SG	SC	6 L	None	G	SA	VOC-TO-15	
098340	-001	MWL-SV05-200 (port 3)		10/8/15 11:35	SG	SC	6 L	None	G	SA	VOC-TO-15	
098341	-001	MWL-SV05-300 (port 4)		10/8/15 11:41	SG	SC	6 L	None	G	SA	VOC-TO-15	
098342	-001	MWL-SV05-400 (port 5)		10/8/15 11:48	SG	SC	6 L	None	G	SA	VOC-TO-15	
Last Chain: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No												
Validation Req'd: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No												
Background: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No												
Confirmatory: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No												
Sample Tracking			SMO Use			Special Instructions/QC Requirements:				Conditions on Receipt		
Date Entered:						EDD <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						
Entered by:						Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day						
QC inits.:						Negotiated TAT <input type="checkbox"/>						
Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab						Return Samples By:						
Comments: Send report to Tim Jackson/4142/MS 0729/284-2547						Elevation and ambient pressure information on attached forms.						
Lab Use												
1. Relinquished by [Signature] Org. 4142 Date 10/9/15 Time 0837						3. Relinquished by Org. Date Time						
1. Received by [Signature] Org. 4142 Date 10/9/15 Time 0837						3. Received by Org. Date Time						
2. Relinquished by [Signature] Org. 4142 Date 10/12/15 Time 0900						4. Relinquished by Org. Date Time						
2. Received by [Signature] Org. Date 10/15/15 Time 1030						4. Received by Org. Date Time						

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

**CONTRACT VERIFICATION REVIEW FORMS**  
**SOIL-VAPOR MONITORING**  
**OCTOBER 2015**

<b>AR/COC Number</b>	<b>Sample Type</b>
616350	Environmental*
616351	Environmental*
616352	Environmental*
616353	Environmental*
616354	Environmental*

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



## Contract Verification Form (CVR)

**Project Leader** Jackson

**Project Name** MWL SVM **Project/Task No.** 146422\_10.11.08

**ARCOC No.** 616350, 616351, 616352, 616353 & 616354

**Analytical Lab** TAL-WS

**SDG No.** 320-15492-1

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

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

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

### 2.0 Analytical Laboratory Report

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

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples		X	1,3-dichlorobenzene and 1,4-dichlorobenzene failed recovery limits for LCS/LCSD (320-91424)
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	N/A		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	N/A		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	N/A		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Methylene chloride detected in MWL-SV-FB1. Tetrachloroethene detected in MWL-SV-FB4.

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

#### 4.0 Calibration and Validation Documentation

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

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

Line No.	Item	Yes	No	Comments
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) ICP interference check sample data provided	N/A		
	d) ICP serial dilution provided	N/A		
	e) Instrument run logs provided	N/A		
4.6	Radiochemistry and General Chemistry	N/A		
	a) Instrument run logs provided			

## 5.0 Data Anomaly Report

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

## 6.0 Problem Resolution

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

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

Were deficiencies unresolved? ☐ Yes ☒ No

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

Reviewed by: Wendy Palencia Date: 11-18-2015 08:07:00

Closed by: Wendy Palencia Date: 11-18-2015 08:07:00

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

**Mixed Waste Landfill**

**April 2015-March 2016 Reporting Period**

Note: Certificates of Analysis are provided on compact disc only,  
for printed copies of this report.



**APRIL 2015 SOIL-VAPOR SAMPLING RESULTS**  
**CERTIFICATES OF ANALYSIS**

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12611-1

**Client Sample ID: 097531-001/MWL-SV01-42.5**

**Lab Sample ID: 320-12611-1**

**Date Collected: 04/15/15 08:55**

**Matrix: Air**

**Date Received: 04/20/15 09:10**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>6.0</b>	<b>J *</b>	59	2.1	ppb v/v			05/01/15 23:15	11.8
Benzene	ND		4.7	0.93	ppb v/v			05/01/15 23:15	11.8
Benzyl chloride	ND		9.4	1.9	ppb v/v			05/01/15 23:15	11.8
Bromodichloromethane	ND		3.5	0.78	ppb v/v			05/01/15 23:15	11.8
Bromoform	ND		4.7	0.83	ppb v/v			05/01/15 23:15	11.8
Bromomethane	ND		9.4	4.0	ppb v/v			05/01/15 23:15	11.8
2-Butanone (MEK)	ND	*	9.4	2.3	ppb v/v			05/01/15 23:15	11.8
Carbon disulfide	ND	*	9.4	0.92	ppb v/v			05/01/15 23:15	11.8
Carbon tetrachloride	ND		9.4	0.76	ppb v/v			05/01/15 23:15	11.8
Chlorobenzene	ND		3.5	0.76	ppb v/v			05/01/15 23:15	11.8
Chloroethane	ND		9.4	3.6	ppb v/v			05/01/15 23:15	11.8
<b>Chloroform</b>	<b>14</b>		3.5	1.1	ppb v/v			05/01/15 23:15	11.8
Chloromethane	ND	*	9.4	2.3	ppb v/v			05/01/15 23:15	11.8
Dibromochloromethane	ND		4.7	0.93	ppb v/v			05/01/15 23:15	11.8
1,2-Dibromoethane (EDB)	ND		9.4	0.89	ppb v/v			05/01/15 23:15	11.8
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	4.7	1.8	ppb v/v			05/01/15 23:15	11.8
1,2-Dichlorobenzene	ND		4.7	1.5	ppb v/v			05/01/15 23:15	11.8
1,3-Dichlorobenzene	ND		4.7	1.3	ppb v/v			05/01/15 23:15	11.8
1,4-Dichlorobenzene	ND		4.7	1.8	ppb v/v			05/01/15 23:15	11.8
<b>Dichlorodifluoromethane</b>	<b>130</b>		4.7	1.7	ppb v/v			05/01/15 23:15	11.8
<b>1,1-Dichloroethane</b>	<b>3.6</b>		3.5	0.85	ppb v/v			05/01/15 23:15	11.8
1,2-Dichloroethane	ND		9.4	1.0	ppb v/v			05/01/15 23:15	11.8
<b>1,1-Dichloroethene</b>	<b>10</b>	<b>*</b>	9.4	1.5	ppb v/v			05/01/15 23:15	11.8
<b>cis-1,2-Dichloroethene</b>	<b>1.1</b>	<b>J</b>	4.7	1.1	ppb v/v			05/01/15 23:15	11.8
trans-1,2-Dichloroethene	ND		4.7	1.2	ppb v/v			05/01/15 23:15	11.8
1,2-Dichloropropane	ND		4.7	2.8	ppb v/v			05/01/15 23:15	11.8
cis-1,3-Dichloropropene	ND		4.7	1.2	ppb v/v			05/01/15 23:15	11.8
trans-1,3-Dichloropropene	ND		4.7	1.0	ppb v/v			05/01/15 23:15	11.8
Ethylbenzene	ND		4.7	0.74	ppb v/v			05/01/15 23:15	11.8
4-Ethyltoluene	ND		4.7	2.2	ppb v/v			05/01/15 23:15	11.8
Hexachlorobutadiene	ND		24	5.1	ppb v/v			05/01/15 23:15	11.8
2-Hexanone	ND		4.7	1.0	ppb v/v			05/01/15 23:15	11.8
4-Methyl-2-pentanone (MIBK)	ND		4.7	1.6	ppb v/v			05/01/15 23:15	11.8
Methylene Chloride	ND	*	4.7	0.85	ppb v/v			05/01/15 23:15	11.8
Styrene	ND		4.7	0.70	ppb v/v			05/01/15 23:15	11.8
1,1,2,2-Tetrachloroethane	ND		4.7	0.81	ppb v/v			05/01/15 23:15	11.8
<b>Tetrachloroethene</b>	<b>460</b>		4.7	0.60	ppb v/v			05/01/15 23:15	11.8
Toluene	ND		4.7	0.60	ppb v/v			05/01/15 23:15	11.8
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>99</b>		4.7	1.9	ppb v/v			05/01/15 23:15	11.8
1,2,4-Trichlorobenzene	ND		24	5.1	ppb v/v			05/01/15 23:15	11.8
<b>1,1,1-Trichloroethane</b>	<b>54</b>		3.5	0.77	ppb v/v			05/01/15 23:15	11.8
1,1,2-Trichloroethane	ND		4.7	0.79	ppb v/v			05/01/15 23:15	11.8
<b>Trichloroethene</b>	<b>99</b>		4.7	1.2	ppb v/v			05/01/15 23:15	11.8
<b>Trichlorofluoromethane</b>	<b>240</b>		4.7	2.3	ppb v/v			05/01/15 23:15	11.8
1,2,4-Trimethylbenzene	ND		9.4	1.9	ppb v/v			05/01/15 23:15	11.8
1,3,5-Trimethylbenzene	ND		4.7	1.5	ppb v/v			05/01/15 23:15	11.8
Vinyl acetate	ND	*	9.4	1.7	ppb v/v			05/01/15 23:15	11.8

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12611-1

**Client Sample ID: 097531-001/MWL-SV01-42.5**

**Lab Sample ID: 320-12611-1**

**Date Collected: 04/15/15 08:55**

**Matrix: Air**

**Date Received: 04/20/15 09:10**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		4.7	1.4	ppb v/v			05/01/15 23:15	11.8
m,p-Xylene	ND		9.4	1.2	ppb v/v			05/01/15 23:15	11.8
o-Xylene	ND		4.7	0.64	ppb v/v			05/01/15 23:15	11.8
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		70 - 130					05/01/15 23:15	11.8
1,2-Dichloroethane-d4 (Surr)	108		70 - 130					05/01/15 23:15	11.8
Toluene-d8 (Surr)	95		70 - 130					05/01/15 23:15	11.8

**Client Sample ID: 097532-001/MWL-SV-FB1**

**Lab Sample ID: 320-12611-2**

**Date Collected: 04/15/15 08:50**

**Matrix: Air**

**Date Received: 04/20/15 09:10**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	0.23	J *	5.0	0.18	ppb v/v			05/02/15 00:01	1
Benzene	ND		0.40	0.079	ppb v/v			05/02/15 00:01	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			05/02/15 00:01	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			05/02/15 00:01	1
Bromoform	ND		0.40	0.070	ppb v/v			05/02/15 00:01	1
Bromomethane	ND		0.80	0.34	ppb v/v			05/02/15 00:01	1
2-Butanone (MEK)	ND	*	0.80	0.20	ppb v/v			05/02/15 00:01	1
Carbon disulfide	ND	*	0.80	0.078	ppb v/v			05/02/15 00:01	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			05/02/15 00:01	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			05/02/15 00:01	1
Chloroethane	ND		0.80	0.31	ppb v/v			05/02/15 00:01	1
Chloroform	ND		0.30	0.095	ppb v/v			05/02/15 00:01	1
Chloromethane	ND	*	0.80	0.20	ppb v/v			05/02/15 00:01	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			05/02/15 00:01	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			05/02/15 00:01	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	0.40	0.16	ppb v/v			05/02/15 00:01	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			05/02/15 00:01	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			05/02/15 00:01	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			05/02/15 00:01	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			05/02/15 00:01	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			05/02/15 00:01	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			05/02/15 00:01	1
1,1-Dichloroethene	ND	*	0.80	0.13	ppb v/v			05/02/15 00:01	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			05/02/15 00:01	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			05/02/15 00:01	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			05/02/15 00:01	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			05/02/15 00:01	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			05/02/15 00:01	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			05/02/15 00:01	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			05/02/15 00:01	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			05/02/15 00:01	1
2-Hexanone	ND		0.40	0.087	ppb v/v			05/02/15 00:01	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			05/02/15 00:01	1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12611-1

Client Sample ID: 097532-001/MWL-SV-FB1

Lab Sample ID: 320-12611-2

Date Collected: 04/15/15 08:50

Matrix: Air

Date Received: 04/20/15 09:10

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Chloride	0.086	J *	0.40	0.072	ppb v/v			05/02/15 00:01	1
Styrene	ND		0.40	0.059	ppb v/v			05/02/15 00:01	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			05/02/15 00:01	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			05/02/15 00:01	1
Toluene	0.25	J	0.40	0.051	ppb v/v			05/02/15 00:01	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			05/02/15 00:01	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			05/02/15 00:01	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			05/02/15 00:01	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			05/02/15 00:01	1
Trichloroethene	ND		0.40	0.11	ppb v/v			05/02/15 00:01	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			05/02/15 00:01	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			05/02/15 00:01	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			05/02/15 00:01	1
Vinyl acetate	ND *		0.80	0.15	ppb v/v			05/02/15 00:01	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			05/02/15 00:01	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			05/02/15 00:01	1
o-Xylene	ND		0.40	0.054	ppb v/v			05/02/15 00:01	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	117		70 - 130					05/02/15 00:01	1
1,2-Dichloroethane-d4 (Surr)	109		70 - 130					05/02/15 00:01	1
Toluene-d8 (Surr)	101		70 - 130					05/02/15 00:01	1

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616086

TestAmerica Job ID: 320-12612-1

**Client Sample ID: 097533-001/MWL-SV02-41.5**

**Lab Sample ID: 320-12612-1**

**Date Collected: 04/15/15 09:11**

**Matrix: Air**

**Date Received: 04/20/15 09:10**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>6.2</b>	<b>J *</b>	38	1.4	ppb v/v			05/02/15 00:42	7.67
Benzene	ND		3.1	0.61	ppb v/v			05/02/15 00:42	7.67
Benzyl chloride	ND		6.1	1.3	ppb v/v			05/02/15 00:42	7.67
Bromodichloromethane	ND		2.3	0.51	ppb v/v			05/02/15 00:42	7.67
Bromoform	ND		3.1	0.54	ppb v/v			05/02/15 00:42	7.67
Bromomethane	ND		6.1	2.6	ppb v/v			05/02/15 00:42	7.67
<b>2-Butanone (MEK)</b>	<b>2.3</b>	<b>J *</b>	6.1	1.5	ppb v/v			05/02/15 00:42	7.67
Carbon disulfide	ND	*	6.1	0.60	ppb v/v			05/02/15 00:42	7.67
Carbon tetrachloride	ND		6.1	0.49	ppb v/v			05/02/15 00:42	7.67
Chlorobenzene	ND		2.3	0.49	ppb v/v			05/02/15 00:42	7.67
Chloroethane	ND		6.1	2.4	ppb v/v			05/02/15 00:42	7.67
<b>Chloroform</b>	<b>3.2</b>		2.3	0.73	ppb v/v			05/02/15 00:42	7.67
Chloromethane	ND	*	6.1	1.5	ppb v/v			05/02/15 00:42	7.67
Dibromochloromethane	ND		3.1	0.61	ppb v/v			05/02/15 00:42	7.67
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ppb v/v			05/02/15 00:42	7.67
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	3.1	1.2	ppb v/v			05/02/15 00:42	7.67
1,2-Dichlorobenzene	ND		3.1	1.0	ppb v/v			05/02/15 00:42	7.67
1,3-Dichlorobenzene	ND		3.1	0.84	ppb v/v			05/02/15 00:42	7.67
1,4-Dichlorobenzene	ND		3.1	1.1	ppb v/v			05/02/15 00:42	7.67
<b>Dichlorodifluoromethane</b>	<b>110</b>		3.1	1.1	ppb v/v			05/02/15 00:42	7.67
<b>1,1-Dichloroethane</b>	<b>2.2</b>	<b>J</b>	2.3	0.55	ppb v/v			05/02/15 00:42	7.67
1,2-Dichloroethane	ND		6.1	0.67	ppb v/v			05/02/15 00:42	7.67
<b>1,1-Dichloroethene</b>	<b>11</b>	<b>*</b>	6.1	0.99	ppb v/v			05/02/15 00:42	7.67
<b>cis-1,2-Dichloroethene</b>	<b>0.80</b>	<b>J</b>	3.1	0.68	ppb v/v			05/02/15 00:42	7.67
trans-1,2-Dichloroethene	ND		3.1	0.77	ppb v/v			05/02/15 00:42	7.67
1,2-Dichloropropane	ND		3.1	1.8	ppb v/v			05/02/15 00:42	7.67
cis-1,3-Dichloropropene	ND		3.1	0.80	ppb v/v			05/02/15 00:42	7.67
trans-1,3-Dichloropropene	ND		3.1	0.67	ppb v/v			05/02/15 00:42	7.67
Ethylbenzene	ND		3.1	0.48	ppb v/v			05/02/15 00:42	7.67
4-Ethyltoluene	ND		3.1	1.4	ppb v/v			05/02/15 00:42	7.67
Hexachlorobutadiene	ND		15	3.3	ppb v/v			05/02/15 00:42	7.67
2-Hexanone	ND		3.1	0.67	ppb v/v			05/02/15 00:42	7.67
4-Methyl-2-pentanone (MIBK)	ND		3.1	1.0	ppb v/v			05/02/15 00:42	7.67
Methylene Chloride	ND	*	3.1	0.55	ppb v/v			05/02/15 00:42	7.67
Styrene	ND		3.1	0.45	ppb v/v			05/02/15 00:42	7.67
1,1,2,2-Tetrachloroethane	ND		3.1	0.53	ppb v/v			05/02/15 00:42	7.67
<b>Tetrachloroethene</b>	<b>75</b>		3.1	0.39	ppb v/v			05/02/15 00:42	7.67
Toluene	ND		3.1	0.39	ppb v/v			05/02/15 00:42	7.67
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>50</b>		3.1	1.3	ppb v/v			05/02/15 00:42	7.67
1,2,4-Trichlorobenzene	ND		15	3.3	ppb v/v			05/02/15 00:42	7.67
<b>1,1,1-Trichloroethane</b>	<b>77</b>		2.3	0.50	ppb v/v			05/02/15 00:42	7.67
1,1,2-Trichloroethane	ND		3.1	0.51	ppb v/v			05/02/15 00:42	7.67
<b>Trichloroethene</b>	<b>67</b>		3.1	0.81	ppb v/v			05/02/15 00:42	7.67
<b>Trichlorofluoromethane</b>	<b>360</b>		3.1	1.5	ppb v/v			05/02/15 00:42	7.67
1,2,4-Trimethylbenzene	ND		6.1	1.2	ppb v/v			05/02/15 00:42	7.67
1,3,5-Trimethylbenzene	ND		3.1	0.96	ppb v/v			05/02/15 00:42	7.67
Vinyl acetate	ND	*	6.1	1.1	ppb v/v			05/02/15 00:42	7.67

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616086

TestAmerica Job ID: 320-12612-1

**Client Sample ID: 097533-001/MWL-SV02-41.5**

**Lab Sample ID: 320-12612-1**

**Date Collected: 04/15/15 09:11**

**Matrix: Air**

**Date Received: 04/20/15 09:10**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		3.1	0.92	ppb v/v			05/02/15 00:42	7.67
m,p-Xylene	ND		6.1	0.77	ppb v/v			05/02/15 00:42	7.67
o-Xylene	ND		3.1	0.41	ppb v/v			05/02/15 00:42	7.67

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	123		70 - 130		05/02/15 00:42	7.67
1,2-Dichloroethane-d4 (Surr)	97		70 - 130		05/02/15 00:42	7.67
Toluene-d8 (Surr)	95		70 - 130		05/02/15 00:42	7.67

**Client Sample ID: 097534-001/MWL-SV-FB2**

**Lab Sample ID: 320-12612-2**

**Date Collected: 04/15/15 09:06**

**Matrix: Air**

**Date Received: 04/20/15 09:10**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND	*	5.0	0.18	ppb v/v			05/02/15 01:29	1
Benzene	ND		0.40	0.079	ppb v/v			05/02/15 01:29	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			05/02/15 01:29	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			05/02/15 01:29	1
Bromoform	ND		0.40	0.070	ppb v/v			05/02/15 01:29	1
Bromomethane	ND		0.80	0.34	ppb v/v			05/02/15 01:29	1
2-Butanone (MEK)	ND	*	0.80	0.20	ppb v/v			05/02/15 01:29	1
Carbon disulfide	ND	*	0.80	0.078	ppb v/v			05/02/15 01:29	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			05/02/15 01:29	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			05/02/15 01:29	1
Chloroethane	ND		0.80	0.31	ppb v/v			05/02/15 01:29	1
Chloroform	ND		0.30	0.095	ppb v/v			05/02/15 01:29	1
Chloromethane	ND	*	0.80	0.20	ppb v/v			05/02/15 01:29	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			05/02/15 01:29	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			05/02/15 01:29	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	0.40	0.16	ppb v/v			05/02/15 01:29	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			05/02/15 01:29	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			05/02/15 01:29	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			05/02/15 01:29	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			05/02/15 01:29	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			05/02/15 01:29	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			05/02/15 01:29	1
1,1-Dichloroethene	ND	*	0.80	0.13	ppb v/v			05/02/15 01:29	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			05/02/15 01:29	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			05/02/15 01:29	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			05/02/15 01:29	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			05/02/15 01:29	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			05/02/15 01:29	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			05/02/15 01:29	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			05/02/15 01:29	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			05/02/15 01:29	1
2-Hexanone	ND		0.40	0.087	ppb v/v			05/02/15 01:29	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			05/02/15 01:29	1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616086

TestAmerica Job ID: 320-12612-1

Client Sample ID: 097534-001/MWL-SV-FB2

Lab Sample ID: 320-12612-2

Date Collected: 04/15/15 09:06

Matrix: Air

Date Received: 04/20/15 09:10

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Chloride	0.084	J *	0.40	0.072	ppb v/v			05/02/15 01:29	1
Styrene	ND		0.40	0.059	ppb v/v			05/02/15 01:29	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			05/02/15 01:29	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			05/02/15 01:29	1
Toluene	0.22	J	0.40	0.051	ppb v/v			05/02/15 01:29	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			05/02/15 01:29	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			05/02/15 01:29	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			05/02/15 01:29	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			05/02/15 01:29	1
Trichloroethene	ND		0.40	0.11	ppb v/v			05/02/15 01:29	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			05/02/15 01:29	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			05/02/15 01:29	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			05/02/15 01:29	1
Vinyl acetate	ND	*	0.80	0.15	ppb v/v			05/02/15 01:29	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			05/02/15 01:29	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			05/02/15 01:29	1
o-Xylene	ND		0.40	0.054	ppb v/v			05/02/15 01:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130					05/02/15 01:29	1
1,2-Dichloroethane-d4 (Surr)	102		70 - 130					05/02/15 01:29	1
Toluene-d8 (Surr)	97		70 - 130					05/02/15 01:29	1

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

Client Sample ID: 097535-001/MWL-SV03-50 W/M

Lab Sample ID: 320-12599-1

Date Collected: 04/14/15 08:50

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	6.0	J	30	1.1	ppb v/v			04/30/15 01:51	5.98
Benzene	1.8	J	2.4	0.47	ppb v/v			04/30/15 01:51	5.98
Benzyl chloride	ND		4.8	0.97	ppb v/v			04/30/15 01:51	5.98
Bromodichloromethane	ND		1.8	0.39	ppb v/v			04/30/15 01:51	5.98
Bromoform	ND		2.4	0.42	ppb v/v			04/30/15 01:51	5.98
Bromomethane	ND		4.8	2.0	ppb v/v			04/30/15 01:51	5.98
2-Butanone (MEK)	ND		4.8	1.2	ppb v/v			04/30/15 01:51	5.98
Carbon disulfide	ND		4.8	0.47	ppb v/v			04/30/15 01:51	5.98
Carbon tetrachloride	ND		4.8	0.38	ppb v/v			04/30/15 01:51	5.98
Chlorobenzene	ND		1.8	0.38	ppb v/v			04/30/15 01:51	5.98
Chloroethane	ND		4.8	1.8	ppb v/v			04/30/15 01:51	5.98
Chloroform	1.5	J	1.8	0.57	ppb v/v			04/30/15 01:51	5.98
Chloromethane	ND		4.8	1.2	ppb v/v			04/30/15 01:51	5.98
Dibromochloromethane	ND		2.4	0.47	ppb v/v			04/30/15 01:51	5.98
1,2-Dibromoethane (EDB)	ND		4.8	0.45	ppb v/v			04/30/15 01:51	5.98
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.4	0.93	ppb v/v			04/30/15 01:51	5.98
1,2-Dichlorobenzene	ND		2.4	0.78	ppb v/v			04/30/15 01:51	5.98
1,3-Dichlorobenzene	ND		2.4	0.66	ppb v/v			04/30/15 01:51	5.98
1,4-Dichlorobenzene	ND		2.4	0.89	ppb v/v			04/30/15 01:51	5.98
Dichlorodifluoromethane	24		2.4	0.87	ppb v/v			04/30/15 01:51	5.98
1,1-Dichloroethane	2.5		1.8	0.43	ppb v/v			04/30/15 01:51	5.98
1,2-Dichloroethane	ND		4.8	0.53	ppb v/v			04/30/15 01:51	5.98
1,1-Dichloroethene	9.2		4.8	0.77	ppb v/v			04/30/15 01:51	5.98
cis-1,2-Dichloroethene	1.4	J	2.4	0.53	ppb v/v			04/30/15 01:51	5.98
trans-1,2-Dichloroethene	ND		2.4	0.60	ppb v/v			04/30/15 01:51	5.98
1,2-Dichloropropane	ND		2.4	1.4	ppb v/v			04/30/15 01:51	5.98
cis-1,3-Dichloropropene	ND		2.4	0.62	ppb v/v			04/30/15 01:51	5.98
trans-1,3-Dichloropropene	ND		2.4	0.53	ppb v/v			04/30/15 01:51	5.98
Ethylbenzene	ND		2.4	0.38	ppb v/v			04/30/15 01:51	5.98
4-Ethyltoluene	ND		2.4	1.1	ppb v/v			04/30/15 01:51	5.98
Hexachlorobutadiene	ND		12	2.6	ppb v/v			04/30/15 01:51	5.98
2-Hexanone	ND		2.4	0.52	ppb v/v			04/30/15 01:51	5.98
4-Methyl-2-pentanone (MIBK)	ND		2.4	0.81	ppb v/v			04/30/15 01:51	5.98
Methylene Chloride	0.67	J	2.4	0.43	ppb v/v			04/30/15 01:51	5.98
Styrene	ND		2.4	0.35	ppb v/v			04/30/15 01:51	5.98
1,1,2,2-Tetrachloroethane	ND		2.4	0.41	ppb v/v			04/30/15 01:51	5.98
Tetrachloroethene	140		2.4	0.30	ppb v/v			04/30/15 01:51	5.98
Toluene	ND		2.4	0.30	ppb v/v			04/30/15 01:51	5.98
1,1,2-Trichloro-1,2,2-trifluoroethane	51		2.4	0.97	ppb v/v			04/30/15 01:51	5.98
1,2,4-Trichlorobenzene	ND		12	2.6	ppb v/v			04/30/15 01:51	5.98
1,1,1-Trichloroethane	5.3		1.8	0.39	ppb v/v			04/30/15 01:51	5.98
1,1,2-Trichloroethane	ND		2.4	0.40	ppb v/v			04/30/15 01:51	5.98
Trichloroethene	92		2.4	0.63	ppb v/v			04/30/15 01:51	5.98
Trichlorofluoromethane	23		2.4	1.2	ppb v/v			04/30/15 01:51	5.98
1,2,4-Trimethylbenzene	ND		4.8	0.97	ppb v/v			04/30/15 01:51	5.98
1,3,5-Trimethylbenzene	ND		2.4	0.75	ppb v/v			04/30/15 01:51	5.98
Vinyl acetate	ND		4.8	0.87	ppb v/v			04/30/15 01:51	5.98

TestAmerica Sacramento



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

**Client Sample ID: 097535-001/MWL-SV03-50 W/M**

**Lab Sample ID: 320-12599-1**

**Date Collected: 04/14/15 08:50**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		2.4	0.72	ppb v/v			04/30/15 01:51	5.98
m,p-Xylene	ND		4.8	0.60	ppb v/v			04/30/15 01:51	5.98
o-Xylene	ND		2.4	0.32	ppb v/v			04/30/15 01:51	5.98
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		70 - 130					04/30/15 01:51	5.98
1,2-Dichloroethane-d4 (Surr)	104		70 - 130					04/30/15 01:51	5.98
Toluene-d8 (Surr)	99		70 - 130					04/30/15 01:51	5.98

**Client Sample ID: 097536-001/MWL-SV03-50 W/M**

**Lab Sample ID: 320-12599-2**

**Date Collected: 04/14/15 08:50**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	6.9	J	25	0.88	ppb v/v			04/30/15 02:33	4.92
Benzene	1.6	J	2.0	0.39	ppb v/v			04/30/15 02:33	4.92
Benzyl chloride	ND		3.9	0.80	ppb v/v			04/30/15 02:33	4.92
Bromodichloromethane	ND		1.5	0.32	ppb v/v			04/30/15 02:33	4.92
Bromoform	ND		2.0	0.34	ppb v/v			04/30/15 02:33	4.92
Bromomethane	ND		3.9	1.6	ppb v/v			04/30/15 02:33	4.92
2-Butanone (MEK)	ND		3.9	0.98	ppb v/v			04/30/15 02:33	4.92
Carbon disulfide	ND		3.9	0.38	ppb v/v			04/30/15 02:33	4.92
Carbon tetrachloride	ND		3.9	0.31	ppb v/v			04/30/15 02:33	4.92
Chlorobenzene	ND		1.5	0.31	ppb v/v			04/30/15 02:33	4.92
Chloroethane	ND		3.9	1.5	ppb v/v			04/30/15 02:33	4.92
Chloroform	1.3	J	1.5	0.47	ppb v/v			04/30/15 02:33	4.92
Chloromethane	ND		3.9	0.97	ppb v/v			04/30/15 02:33	4.92
Dibromochloromethane	ND		2.0	0.39	ppb v/v			04/30/15 02:33	4.92
1,2-Dibromoethane (EDB)	ND		3.9	0.37	ppb v/v			04/30/15 02:33	4.92
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0	0.76	ppb v/v			04/30/15 02:33	4.92
1,2-Dichlorobenzene	ND		2.0	0.64	ppb v/v			04/30/15 02:33	4.92
1,3-Dichlorobenzene	ND		2.0	0.54	ppb v/v			04/30/15 02:33	4.92
1,4-Dichlorobenzene	ND		2.0	0.73	ppb v/v			04/30/15 02:33	4.92
Dichlorodifluoromethane	21		2.0	0.71	ppb v/v			04/30/15 02:33	4.92
1,1-Dichloroethane	2.0		1.5	0.35	ppb v/v			04/30/15 02:33	4.92
1,2-Dichloroethane	ND		3.9	0.43	ppb v/v			04/30/15 02:33	4.92
1,1-Dichloroethene	7.9		3.9	0.63	ppb v/v			04/30/15 02:33	4.92
cis-1,2-Dichloroethene	1.1	J	2.0	0.44	ppb v/v			04/30/15 02:33	4.92
trans-1,2-Dichloroethene	ND		2.0	0.49	ppb v/v			04/30/15 02:33	4.92
1,2-Dichloropropane	ND		2.0	1.2	ppb v/v			04/30/15 02:33	4.92
cis-1,3-Dichloropropene	ND		2.0	0.51	ppb v/v			04/30/15 02:33	4.92
trans-1,3-Dichloropropene	ND		2.0	0.43	ppb v/v			04/30/15 02:33	4.92
Ethylbenzene	ND		2.0	0.31	ppb v/v			04/30/15 02:33	4.92
4-Ethyltoluene	ND		2.0	0.92	ppb v/v			04/30/15 02:33	4.92
Hexachlorobutadiene	ND		9.8	2.1	ppb v/v			04/30/15 02:33	4.92
2-Hexanone	ND		2.0	0.43	ppb v/v			04/30/15 02:33	4.92
4-Methyl-2-pentanone (MIBK)	ND		2.0	0.66	ppb v/v			04/30/15 02:33	4.92

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

**Client Sample ID: 097536-001/MWL-SV03-50 W/M**

**Lab Sample ID: 320-12599-2**

**Date Collected: 04/14/15 08:50**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Methylene Chloride</b>	<b>0.67</b>	<b>J</b>	2.0	0.35	ppb v/v			04/30/15 02:33	4.92
Styrene	ND		2.0	0.29	ppb v/v			04/30/15 02:33	4.92
1,1,2,2-Tetrachloroethane	ND		2.0	0.34	ppb v/v			04/30/15 02:33	4.92
<b>Tetrachloroethene</b>	<b>120</b>		2.0	0.25	ppb v/v			04/30/15 02:33	4.92
Toluene	ND		2.0	0.25	ppb v/v			04/30/15 02:33	4.92
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>45</b>		2.0	0.80	ppb v/v			04/30/15 02:33	4.92
1,2,4-Trichlorobenzene	ND		9.8	2.1	ppb v/v			04/30/15 02:33	4.92
<b>1,1,1-Trichloroethane</b>	<b>4.4</b>		1.5	0.32	ppb v/v			04/30/15 02:33	4.92
1,1,2-Trichloroethane	ND		2.0	0.33	ppb v/v			04/30/15 02:33	4.92
<b>Trichloroethene</b>	<b>80</b>		2.0	0.52	ppb v/v			04/30/15 02:33	4.92
<b>Trichlorofluoromethane</b>	<b>20</b>		2.0	0.96	ppb v/v			04/30/15 02:33	4.92
1,2,4-Trimethylbenzene	ND		3.9	0.80	ppb v/v			04/30/15 02:33	4.92
1,3,5-Trimethylbenzene	ND		2.0	0.62	ppb v/v			04/30/15 02:33	4.92
Vinyl acetate	ND		3.9	0.71	ppb v/v			04/30/15 02:33	4.92
Vinyl chloride	ND		2.0	0.59	ppb v/v			04/30/15 02:33	4.92
m,p-Xylene	ND		3.9	0.49	ppb v/v			04/30/15 02:33	4.92
o-Xylene	ND		2.0	0.27	ppb v/v			04/30/15 02:33	4.92
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	113		70 - 130					04/30/15 02:33	4.92
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					04/30/15 02:33	4.92
Toluene-d8 (Surr)	91		70 - 130					04/30/15 02:33	4.92

**Client Sample ID: 097537-001/MWL-SV03-50 WO/M**

**Lab Sample ID: 320-12599-3**

**Date Collected: 04/14/15 08:55**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>4.0</b>	<b>J</b>	24	0.87	ppb v/v			04/30/15 03:16	4.88
<b>Benzene</b>	<b>1.9</b>	<b>J</b>	2.0	0.39	ppb v/v			04/30/15 03:16	4.88
Benzyl chloride	ND		3.9	0.80	ppb v/v			04/30/15 03:16	4.88
Bromodichloromethane	ND		1.5	0.32	ppb v/v			04/30/15 03:16	4.88
Bromoform	ND		2.0	0.34	ppb v/v			04/30/15 03:16	4.88
Bromomethane	ND		3.9	1.6	ppb v/v			04/30/15 03:16	4.88
2-Butanone (MEK)	ND		3.9	0.97	ppb v/v			04/30/15 03:16	4.88
Carbon disulfide	ND		3.9	0.38	ppb v/v			04/30/15 03:16	4.88
Carbon tetrachloride	ND		3.9	0.31	ppb v/v			04/30/15 03:16	4.88
Chlorobenzene	ND		1.5	0.31	ppb v/v			04/30/15 03:16	4.88
Chloroethane	ND		3.9	1.5	ppb v/v			04/30/15 03:16	4.88
<b>Chloroform</b>	<b>1.3</b>	<b>J</b>	1.5	0.46	ppb v/v			04/30/15 03:16	4.88
Chloromethane	ND		3.9	0.96	ppb v/v			04/30/15 03:16	4.88
Dibromochloromethane	ND		2.0	0.39	ppb v/v			04/30/15 03:16	4.88
1,2-Dibromoethane (EDB)	ND		3.9	0.37	ppb v/v			04/30/15 03:16	4.88
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0	0.76	ppb v/v			04/30/15 03:16	4.88
1,2-Dichlorobenzene	ND		2.0	0.63	ppb v/v			04/30/15 03:16	4.88
1,3-Dichlorobenzene	ND		2.0	0.54	ppb v/v			04/30/15 03:16	4.88

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

Client Sample ID: 097537-001/MWL-SV03-50 WO/M

Lab Sample ID: 320-12599-3

Date Collected: 04/14/15 08:55

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		2.0	0.73	ppb v/v			04/30/15 03:16	4.88
Dichlorodifluoromethane	22		2.0	0.71	ppb v/v			04/30/15 03:16	4.88
1,1-Dichloroethane	2.1		1.5	0.35	ppb v/v			04/30/15 03:16	4.88
1,2-Dichloroethane	ND		3.9	0.43	ppb v/v			04/30/15 03:16	4.88
1,1-Dichloroethene	8.1		3.9	0.63	ppb v/v			04/30/15 03:16	4.88
cis-1,2-Dichloroethene	1.1	J	2.0	0.43	ppb v/v			04/30/15 03:16	4.88
trans-1,2-Dichloroethene	ND		2.0	0.49	ppb v/v			04/30/15 03:16	4.88
1,2-Dichloropropane	ND		2.0	1.2	ppb v/v			04/30/15 03:16	4.88
cis-1,3-Dichloropropene	ND		2.0	0.51	ppb v/v			04/30/15 03:16	4.88
trans-1,3-Dichloropropene	ND		2.0	0.43	ppb v/v			04/30/15 03:16	4.88
Ethylbenzene	ND		2.0	0.31	ppb v/v			04/30/15 03:16	4.88
4-Ethyltoluene	ND		2.0	0.91	ppb v/v			04/30/15 03:16	4.88
Hexachlorobutadiene	ND		9.8	2.1	ppb v/v			04/30/15 03:16	4.88
2-Hexanone	ND		2.0	0.42	ppb v/v			04/30/15 03:16	4.88
4-Methyl-2-pentanone (MIBK)	ND		2.0	0.66	ppb v/v			04/30/15 03:16	4.88
Methylene Chloride	0.63	J	2.0	0.35	ppb v/v			04/30/15 03:16	4.88
Styrene	ND		2.0	0.29	ppb v/v			04/30/15 03:16	4.88
1,1,2,2-Tetrachloroethane	ND		2.0	0.34	ppb v/v			04/30/15 03:16	4.88
Tetrachloroethene	130		2.0	0.25	ppb v/v			04/30/15 03:16	4.88
Toluene	ND		2.0	0.25	ppb v/v			04/30/15 03:16	4.88
1,1,2-Trichloro-1,2,2-trifluoroethane	46		2.0	0.80	ppb v/v			04/30/15 03:16	4.88
1,2,4-Trichlorobenzene	ND		9.8	2.1	ppb v/v			04/30/15 03:16	4.88
1,1,1-Trichloroethane	4.7		1.5	0.32	ppb v/v			04/30/15 03:16	4.88
1,1,2-Trichloroethane	ND		2.0	0.33	ppb v/v			04/30/15 03:16	4.88
Trichloroethene	85		2.0	0.51	ppb v/v			04/30/15 03:16	4.88
Trichlorofluoromethane	20		2.0	0.96	ppb v/v			04/30/15 03:16	4.88
1,2,4-Trimethylbenzene	ND		3.9	0.79	ppb v/v			04/30/15 03:16	4.88
1,3,5-Trimethylbenzene	ND		2.0	0.61	ppb v/v			04/30/15 03:16	4.88
Vinyl acetate	ND		3.9	0.71	ppb v/v			04/30/15 03:16	4.88
Vinyl chloride	ND		2.0	0.59	ppb v/v			04/30/15 03:16	4.88
m,p-Xylene	ND		3.9	0.49	ppb v/v			04/30/15 03:16	4.88
o-Xylene	ND		2.0	0.26	ppb v/v			04/30/15 03:16	4.88
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					04/30/15 03:16	4.88
1,2-Dichloroethane-d4 (Surr)	102		70 - 130					04/30/15 03:16	4.88
Toluene-d8 (Surr)	86		70 - 130					04/30/15 03:16	4.88

Client Sample ID: 097538-001/MWL-SV03-50 WO/M

Lab Sample ID: 320-12599-4

Date Collected: 04/14/15 08:55

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	2.1	J	30	1.1	ppb v/v			04/30/15 03:58	5.93
Benzene	2.1	J	2.4	0.47	ppb v/v			04/30/15 03:58	5.93
Benzyl chloride	ND		4.7	0.97	ppb v/v			04/30/15 03:58	5.93

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

Client Sample ID: 097538-001/MWL-SV03-50 WO/M

Lab Sample ID: 320-12599-4

Date Collected: 04/14/15 08:55

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	ND		1.8	0.39	ppb v/v			04/30/15 03:58	5.93
Bromoform	ND		2.4	0.42	ppb v/v			04/30/15 03:58	5.93
Bromomethane	ND		4.7	2.0	ppb v/v			04/30/15 03:58	5.93
2-Butanone (MEK)	ND		4.7	1.2	ppb v/v			04/30/15 03:58	5.93
Carbon disulfide	0.52	J	4.7	0.46	ppb v/v			04/30/15 03:58	5.93
Carbon tetrachloride	ND		4.7	0.38	ppb v/v			04/30/15 03:58	5.93
Chlorobenzene	ND		1.8	0.38	ppb v/v			04/30/15 03:58	5.93
Chloroethane	ND		4.7	1.8	ppb v/v			04/30/15 03:58	5.93
Chloroform	1.6	J	1.8	0.56	ppb v/v			04/30/15 03:58	5.93
Chloromethane	ND		4.7	1.2	ppb v/v			04/30/15 03:58	5.93
Dibromochloromethane	ND		2.4	0.47	ppb v/v			04/30/15 03:58	5.93
1,2-Dibromoethane (EDB)	ND		4.7	0.44	ppb v/v			04/30/15 03:58	5.93
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.4	0.92	ppb v/v			04/30/15 03:58	5.93
1,2-Dichlorobenzene	ND		2.4	0.77	ppb v/v			04/30/15 03:58	5.93
1,3-Dichlorobenzene	ND		2.4	0.65	ppb v/v			04/30/15 03:58	5.93
1,4-Dichlorobenzene	ND		2.4	0.88	ppb v/v			04/30/15 03:58	5.93
Dichlorodifluoromethane	26		2.4	0.86	ppb v/v			04/30/15 03:58	5.93
1,1-Dichloroethane	2.3		1.8	0.43	ppb v/v			04/30/15 03:58	5.93
1,2-Dichloroethane	ND		4.7	0.52	ppb v/v			04/30/15 03:58	5.93
1,1-Dichloroethene	8.7		4.7	0.76	ppb v/v			04/30/15 03:58	5.93
cis-1,2-Dichloroethene	1.3	J	2.4	0.53	ppb v/v			04/30/15 03:58	5.93
trans-1,2-Dichloroethene	ND		2.4	0.59	ppb v/v			04/30/15 03:58	5.93
1,2-Dichloropropane	ND		2.4	1.4	ppb v/v			04/30/15 03:58	5.93
cis-1,3-Dichloropropene	ND		2.4	0.62	ppb v/v			04/30/15 03:58	5.93
trans-1,3-Dichloropropene	ND		2.4	0.52	ppb v/v			04/30/15 03:58	5.93
Ethylbenzene	ND		2.4	0.37	ppb v/v			04/30/15 03:58	5.93
4-Ethyltoluene	ND		2.4	1.1	ppb v/v			04/30/15 03:58	5.93
Hexachlorobutadiene	ND		12	2.6	ppb v/v			04/30/15 03:58	5.93
2-Hexanone	ND		2.4	0.52	ppb v/v			04/30/15 03:58	5.93
4-Methyl-2-pentanone (MIBK)	ND		2.4	0.80	ppb v/v			04/30/15 03:58	5.93
Methylene Chloride	0.74	J	2.4	0.43	ppb v/v			04/30/15 03:58	5.93
Styrene	ND		2.4	0.35	ppb v/v			04/30/15 03:58	5.93
1,1,2,2-Tetrachloroethane	ND		2.4	0.41	ppb v/v			04/30/15 03:58	5.93
Tetrachloroethene	150		2.4	0.30	ppb v/v			04/30/15 03:58	5.93
Toluene	ND		2.4	0.30	ppb v/v			04/30/15 03:58	5.93
1,1,2-Trichloro-1,2,2-trifluoroethane	50		2.4	0.97	ppb v/v			04/30/15 03:58	5.93
1,2,4-Trichlorobenzene	ND		12	2.6	ppb v/v			04/30/15 03:58	5.93
1,1,1-Trichloroethane	5.4		1.8	0.39	ppb v/v			04/30/15 03:58	5.93
1,1,2-Trichloroethane	ND		2.4	0.40	ppb v/v			04/30/15 03:58	5.93
Trichloroethene	97		2.4	0.62	ppb v/v			04/30/15 03:58	5.93
Trichlorofluoromethane	23		2.4	1.2	ppb v/v			04/30/15 03:58	5.93
1,2,4-Trimethylbenzene	ND		4.7	0.96	ppb v/v			04/30/15 03:58	5.93
1,3,5-Trimethylbenzene	ND		2.4	0.74	ppb v/v			04/30/15 03:58	5.93
Vinyl acetate	ND		4.7	0.86	ppb v/v			04/30/15 03:58	5.93
Vinyl chloride	ND		2.4	0.71	ppb v/v			04/30/15 03:58	5.93
m,p-Xylene	ND		4.7	0.59	ppb v/v			04/30/15 03:58	5.93
o-Xylene	ND		2.4	0.32	ppb v/v			04/30/15 03:58	5.93

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

**Client Sample ID: 097538-001/MWL-SV03-50 WO/M**

**Lab Sample ID: 320-12599-4**

**Date Collected: 04/14/15 08:55**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130		04/30/15 03:58	5.93
1,2-Dichloroethane-d4 (Surr)	107		70 - 130		04/30/15 03:58	5.93
Toluene-d8 (Surr)	98		70 - 130		04/30/15 03:58	5.93

**Client Sample ID: 097539-001/MWL-SV03-100**

**Lab Sample ID: 320-12599-5**

**Date Collected: 04/14/15 09:00**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>4.2</b>	<b>J</b>	37	1.3	ppb v/v			04/30/15 08:55	7.45
Benzene	ND		3.0	0.59	ppb v/v			04/30/15 08:55	7.45
Benzyl chloride	ND		6.0	1.2	ppb v/v			04/30/15 08:55	7.45
Bromodichloromethane	ND		2.2	0.49	ppb v/v			04/30/15 08:55	7.45
Bromoform	ND		3.0	0.52	ppb v/v			04/30/15 08:55	7.45
Bromomethane	ND		6.0	2.5	ppb v/v			04/30/15 08:55	7.45
2-Butanone (MEK)	ND		6.0	1.5	ppb v/v			04/30/15 08:55	7.45
Carbon disulfide	ND		6.0	0.58	ppb v/v			04/30/15 08:55	7.45
Carbon tetrachloride	ND		6.0	0.48	ppb v/v			04/30/15 08:55	7.45
Chlorobenzene	ND		2.2	0.48	ppb v/v			04/30/15 08:55	7.45
Chloroethane	ND		6.0	2.3	ppb v/v			04/30/15 08:55	7.45
<b>Chloroform</b>	<b>2.4</b>		2.2	0.71	ppb v/v			04/30/15 08:55	7.45
Chloromethane	ND		6.0	1.5	ppb v/v			04/30/15 08:55	7.45
Dibromochloromethane	ND		3.0	0.59	ppb v/v			04/30/15 08:55	7.45
1,2-Dibromoethane (EDB)	ND		6.0	0.56	ppb v/v			04/30/15 08:55	7.45
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.0	1.2	ppb v/v			04/30/15 08:55	7.45
1,2-Dichlorobenzene	ND		3.0	0.97	ppb v/v			04/30/15 08:55	7.45
1,3-Dichlorobenzene	ND		3.0	0.82	ppb v/v			04/30/15 08:55	7.45
1,4-Dichlorobenzene	ND		3.0	1.1	ppb v/v			04/30/15 08:55	7.45
<b>Dichlorodifluoromethane</b>	<b>49</b>		3.0	1.1	ppb v/v			04/30/15 08:55	7.45
<b>1,1-Dichloroethane</b>	<b>5.8</b>		2.2	0.54	ppb v/v			04/30/15 08:55	7.45
1,2-Dichloroethane	ND		6.0	0.66	ppb v/v			04/30/15 08:55	7.45
<b>1,1-Dichloroethene</b>	<b>25</b>		6.0	0.96	ppb v/v			04/30/15 08:55	7.45
<b>cis-1,2-Dichloroethene</b>	<b>3.7</b>		3.0	0.66	ppb v/v			04/30/15 08:55	7.45
trans-1,2-Dichloroethene	ND		3.0	0.75	ppb v/v			04/30/15 08:55	7.45
1,2-Dichloropropane	ND		3.0	1.8	ppb v/v			04/30/15 08:55	7.45
cis-1,3-Dichloropropene	ND		3.0	0.77	ppb v/v			04/30/15 08:55	7.45
trans-1,3-Dichloropropene	ND		3.0	0.66	ppb v/v			04/30/15 08:55	7.45
Ethylbenzene	ND		3.0	0.47	ppb v/v			04/30/15 08:55	7.45
4-Ethyltoluene	ND		3.0	1.4	ppb v/v			04/30/15 08:55	7.45
Hexachlorobutadiene	ND		15	3.2	ppb v/v			04/30/15 08:55	7.45
2-Hexanone	ND		3.0	0.65	ppb v/v			04/30/15 08:55	7.45
4-Methyl-2-pentanone (MIBK)	ND		3.0	1.0	ppb v/v			04/30/15 08:55	7.45
<b>Methylene Chloride</b>	<b>2.1</b>	<b>J</b>	3.0	0.54	ppb v/v			04/30/15 08:55	7.45
Styrene	ND		3.0	0.44	ppb v/v			04/30/15 08:55	7.45
1,1,2,2-Tetrachloroethane	ND		3.0	0.51	ppb v/v			04/30/15 08:55	7.45
<b>Tetrachloroethene</b>	<b>240</b>		3.0	0.38	ppb v/v			04/30/15 08:55	7.45
<b>Toluene</b>	<b>0.46</b>	<b>J</b>	3.0	0.38	ppb v/v			04/30/15 08:55	7.45

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

**Client Sample ID: 097539-001/MWL-SV03-100**

**Lab Sample ID: 320-12599-5**

**Date Collected: 04/14/15 09:00**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>120</b>		3.0	1.2	ppb v/v			04/30/15 08:55	7.45
1,2,4-Trichlorobenzene	ND		15	3.2	ppb v/v			04/30/15 08:55	7.45
<b>1,1,1-Trichloroethane</b>	<b>6.7</b>		2.2	0.48	ppb v/v			04/30/15 08:55	7.45
1,1,2-Trichloroethane	ND		3.0	0.50	ppb v/v			04/30/15 08:55	7.45
<b>Trichloroethene</b>	<b>200</b>		3.0	0.78	ppb v/v			04/30/15 08:55	7.45
<b>Trichlorofluoromethane</b>	<b>36</b>		3.0	1.5	ppb v/v			04/30/15 08:55	7.45
1,2,4-Trimethylbenzene	ND		6.0	1.2	ppb v/v			04/30/15 08:55	7.45
1,3,5-Trimethylbenzene	ND		3.0	0.93	ppb v/v			04/30/15 08:55	7.45
Vinyl acetate	ND		6.0	1.1	ppb v/v			04/30/15 08:55	7.45
Vinyl chloride	ND		3.0	0.89	ppb v/v			04/30/15 08:55	7.45
m,p-Xylene	ND		6.0	0.75	ppb v/v			04/30/15 08:55	7.45
o-Xylene	ND		3.0	0.40	ppb v/v			04/30/15 08:55	7.45

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130		04/30/15 08:55	7.45
1,2-Dichloroethane-d4 (Surr)	104		70 - 130		04/30/15 08:55	7.45
Toluene-d8 (Surr)	100		70 - 130		04/30/15 08:55	7.45

**Client Sample ID: 097540-001/MWL-SV03-200 W/M**

**Lab Sample ID: 320-12599-6**

**Date Collected: 04/14/15 09:05**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>3.7</b>	<b>J</b>	50	1.8	ppb v/v			04/30/15 09:37	9.95
Benzene	ND		4.0	0.79	ppb v/v			04/30/15 09:37	9.95
Benzyl chloride	ND		8.0	1.6	ppb v/v			04/30/15 09:37	9.95
Bromodichloromethane	ND		3.0	0.66	ppb v/v			04/30/15 09:37	9.95
Bromoform	ND		4.0	0.70	ppb v/v			04/30/15 09:37	9.95
Bromomethane	ND		8.0	3.3	ppb v/v			04/30/15 09:37	9.95
2-Butanone (MEK)	ND		8.0	2.0	ppb v/v			04/30/15 09:37	9.95
<b>Carbon disulfide</b>	<b>2.3</b>	<b>J</b>	8.0	0.78	ppb v/v			04/30/15 09:37	9.95
Carbon tetrachloride	ND		8.0	0.64	ppb v/v			04/30/15 09:37	9.95
Chlorobenzene	ND		3.0	0.64	ppb v/v			04/30/15 09:37	9.95
Chloroethane	ND		8.0	3.1	ppb v/v			04/30/15 09:37	9.95
<b>Chloroform</b>	<b>2.1</b>	<b>J</b>	3.0	0.95	ppb v/v			04/30/15 09:37	9.95
Chloromethane	ND		8.0	2.0	ppb v/v			04/30/15 09:37	9.95
Dibromochloromethane	ND		4.0	0.79	ppb v/v			04/30/15 09:37	9.95
1,2-Dibromoethane (EDB)	ND		8.0	0.75	ppb v/v			04/30/15 09:37	9.95
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.0	1.5	ppb v/v			04/30/15 09:37	9.95
1,2-Dichlorobenzene	ND		4.0	1.3	ppb v/v			04/30/15 09:37	9.95
1,3-Dichlorobenzene	ND		4.0	1.1	ppb v/v			04/30/15 09:37	9.95
1,4-Dichlorobenzene	ND		4.0	1.5	ppb v/v			04/30/15 09:37	9.95
<b>Dichlorodifluoromethane</b>	<b>70</b>		4.0	1.4	ppb v/v			04/30/15 09:37	9.95
<b>1,1-Dichloroethane</b>	<b>8.3</b>		3.0	0.72	ppb v/v			04/30/15 09:37	9.95
1,2-Dichloroethane	ND		8.0	0.88	ppb v/v			04/30/15 09:37	9.95
<b>1,1-Dichloroethene</b>	<b>41</b>		8.0	1.3	ppb v/v			04/30/15 09:37	9.95

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

Client Sample ID: 097540-001/MWL-SV03-200 W/M

Lab Sample ID: 320-12599-6

Date Collected: 04/14/15 09:05

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	4.8		4.0	0.89	ppb v/v			04/30/15 09:37	9.95
trans-1,2-Dichloroethene	ND		4.0	1.0	ppb v/v			04/30/15 09:37	9.95
1,2-Dichloropropane	ND		4.0	2.4	ppb v/v			04/30/15 09:37	9.95
cis-1,3-Dichloropropene	ND		4.0	1.0	ppb v/v			04/30/15 09:37	9.95
trans-1,3-Dichloropropene	ND		4.0	0.88	ppb v/v			04/30/15 09:37	9.95
Ethylbenzene	ND		4.0	0.63	ppb v/v			04/30/15 09:37	9.95
4-Ethyltoluene	ND		4.0	1.9	ppb v/v			04/30/15 09:37	9.95
Hexachlorobutadiene	ND		20	4.3	ppb v/v			04/30/15 09:37	9.95
2-Hexanone	ND		4.0	0.87	ppb v/v			04/30/15 09:37	9.95
4-Methyl-2-pentanone (MIBK)	ND		4.0	1.3	ppb v/v			04/30/15 09:37	9.95
Methylene Chloride	4.1		4.0	0.72	ppb v/v			04/30/15 09:37	9.95
Styrene	ND		4.0	0.59	ppb v/v			04/30/15 09:37	9.95
1,1,2,2-Tetrachloroethane	ND		4.0	0.69	ppb v/v			04/30/15 09:37	9.95
Tetrachloroethene	290		4.0	0.51	ppb v/v			04/30/15 09:37	9.95
Toluene	0.91	J	4.0	0.51	ppb v/v			04/30/15 09:37	9.95
1,1,2-Trichloro-1,2,2-trifluoroethane	180		4.0	1.6	ppb v/v			04/30/15 09:37	9.95
1,2,4-Trichlorobenzene	ND		20	4.3	ppb v/v			04/30/15 09:37	9.95
1,1,1-Trichloroethane	2.9	J	3.0	0.65	ppb v/v			04/30/15 09:37	9.95
1,1,2-Trichloroethane	ND		4.0	0.67	ppb v/v			04/30/15 09:37	9.95
Trichloroethene	270		4.0	1.0	ppb v/v			04/30/15 09:37	9.95
Trichlorofluoromethane	34		4.0	2.0	ppb v/v			04/30/15 09:37	9.95
1,2,4-Trimethylbenzene	ND		8.0	1.6	ppb v/v			04/30/15 09:37	9.95
1,3,5-Trimethylbenzene	ND		4.0	1.2	ppb v/v			04/30/15 09:37	9.95
Vinyl acetate	ND		8.0	1.4	ppb v/v			04/30/15 09:37	9.95
Vinyl chloride	ND		4.0	1.2	ppb v/v			04/30/15 09:37	9.95
m,p-Xylene	ND		8.0	1.0	ppb v/v			04/30/15 09:37	9.95
o-Xylene	ND		4.0	0.54	ppb v/v			04/30/15 09:37	9.95
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130					04/30/15 09:37	9.95
1,2-Dichloroethane-d4 (Surr)	105		70 - 130					04/30/15 09:37	9.95
Toluene-d8 (Surr)	96		70 - 130					04/30/15 09:37	9.95

Client Sample ID: 097541-001/MWL-SV03-200 W/M

Lab Sample ID: 320-12599-7

Date Collected: 04/14/15 09:05

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	4.0	J	51	1.8	ppb v/v			04/30/15 10:19	10.1
Benzene	ND		4.0	0.80	ppb v/v			04/30/15 10:19	10.1
Benzyl chloride	ND		8.1	1.6	ppb v/v			04/30/15 10:19	10.1
Bromodichloromethane	ND		3.0	0.67	ppb v/v			04/30/15 10:19	10.1
Bromoform	ND		4.0	0.71	ppb v/v			04/30/15 10:19	10.1
Bromomethane	ND		8.1	3.4	ppb v/v			04/30/15 10:19	10.1
2-Butanone (MEK)	ND		8.1	2.0	ppb v/v			04/30/15 10:19	10.1
Carbon disulfide	ND		8.1	0.79	ppb v/v			04/30/15 10:19	10.1

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

Client Sample ID: 097541-001/MWL-SV03-200 W/M

Lab Sample ID: 320-12599-7

Date Collected: 04/14/15 09:05

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	ND		8.1	0.65	ppb v/v			04/30/15 10:19	10.1
Chlorobenzene	ND		3.0	0.65	ppb v/v			04/30/15 10:19	10.1
Chloroethane	ND		8.1	3.1	ppb v/v			04/30/15 10:19	10.1
<b>Chloroform</b>	<b>2.1</b>	<b>J</b>	3.0	0.96	ppb v/v			04/30/15 10:19	10.1
Chloromethane	ND		8.1	2.0	ppb v/v			04/30/15 10:19	10.1
Dibromochloromethane	ND		4.0	0.80	ppb v/v			04/30/15 10:19	10.1
1,2-Dibromoethane (EDB)	ND		8.1	0.76	ppb v/v			04/30/15 10:19	10.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.0	1.6	ppb v/v			04/30/15 10:19	10.1
1,2-Dichlorobenzene	ND		4.0	1.3	ppb v/v			04/30/15 10:19	10.1
1,3-Dichlorobenzene	ND		4.0	1.1	ppb v/v			04/30/15 10:19	10.1
1,4-Dichlorobenzene	ND		4.0	1.5	ppb v/v			04/30/15 10:19	10.1
<b>Dichlorodifluoromethane</b>	<b>74</b>		4.0	1.5	ppb v/v			04/30/15 10:19	10.1
<b>1,1-Dichloroethane</b>	<b>8.6</b>		3.0	0.73	ppb v/v			04/30/15 10:19	10.1
1,2-Dichloroethane	ND		8.1	0.89	ppb v/v			04/30/15 10:19	10.1
<b>1,1-Dichloroethene</b>	<b>43</b>		8.1	1.3	ppb v/v			04/30/15 10:19	10.1
<b>cis-1,2-Dichloroethene</b>	<b>5.4</b>		4.0	0.90	ppb v/v			04/30/15 10:19	10.1
trans-1,2-Dichloroethene	ND		4.0	1.0	ppb v/v			04/30/15 10:19	10.1
1,2-Dichloropropane	ND		4.0	2.4	ppb v/v			04/30/15 10:19	10.1
cis-1,3-Dichloropropene	ND		4.0	1.1	ppb v/v			04/30/15 10:19	10.1
trans-1,3-Dichloropropene	ND		4.0	0.89	ppb v/v			04/30/15 10:19	10.1
Ethylbenzene	ND		4.0	0.64	ppb v/v			04/30/15 10:19	10.1
4-Ethyltoluene	ND		4.0	1.9	ppb v/v			04/30/15 10:19	10.1
Hexachlorobutadiene	ND		20	4.4	ppb v/v			04/30/15 10:19	10.1
2-Hexanone	ND		4.0	0.88	ppb v/v			04/30/15 10:19	10.1
4-Methyl-2-pentanone (MIBK)	ND		4.0	1.4	ppb v/v			04/30/15 10:19	10.1
<b>Methylene Chloride</b>	<b>4.3</b>		4.0	0.73	ppb v/v			04/30/15 10:19	10.1
Styrene	ND		4.0	0.60	ppb v/v			04/30/15 10:19	10.1
1,1,1,2-Tetrachloroethane	ND		4.0	0.70	ppb v/v			04/30/15 10:19	10.1
<b>Tetrachloroethene</b>	<b>300</b>		4.0	0.52	ppb v/v			04/30/15 10:19	10.1
<b>Toluene</b>	<b>0.92</b>	<b>J</b>	4.0	0.52	ppb v/v			04/30/15 10:19	10.1
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>190</b>		4.0	1.6	ppb v/v			04/30/15 10:19	10.1
1,2,4-Trichlorobenzene	ND		20	4.4	ppb v/v			04/30/15 10:19	10.1
<b>1,1,1-Trichloroethane</b>	<b>3.1</b>		3.0	0.66	ppb v/v			04/30/15 10:19	10.1
1,1,2-Trichloroethane	ND		4.0	0.68	ppb v/v			04/30/15 10:19	10.1
<b>Trichloroethene</b>	<b>290</b>		4.0	1.1	ppb v/v			04/30/15 10:19	10.1
<b>Trichlorofluoromethane</b>	<b>35</b>		4.0	2.0	ppb v/v			04/30/15 10:19	10.1
1,2,4-Trimethylbenzene	ND		8.1	1.6	ppb v/v			04/30/15 10:19	10.1
1,3,5-Trimethylbenzene	ND		4.0	1.3	ppb v/v			04/30/15 10:19	10.1
Vinyl acetate	ND		8.1	1.5	ppb v/v			04/30/15 10:19	10.1
Vinyl chloride	ND		4.0	1.2	ppb v/v			04/30/15 10:19	10.1
m,p-Xylene	ND		8.1	1.0	ppb v/v			04/30/15 10:19	10.1
o-Xylene	ND		4.0	0.55	ppb v/v			04/30/15 10:19	10.1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					04/30/15 10:19	10.1
1,2-Dichloroethane-d4 (Surr)	108		70 - 130					04/30/15 10:19	10.1
Toluene-d8 (Surr)	96		70 - 130					04/30/15 10:19	10.1

TestAmerica Sacramento



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

Client Sample ID: 097542-001/MWL-SV03-200 WO/M

Lab Sample ID: 320-12599-8

Date Collected: 04/14/15 09:10

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>2.9</b>	<b>J</b>	49	1.7	ppb v/v			04/30/15 11:01	9.7
Benzene	ND		3.9	0.77	ppb v/v			04/30/15 11:01	9.7
Benzyl chloride	ND		7.8	1.6	ppb v/v			04/30/15 11:01	9.7
Bromodichloromethane	ND		2.9	0.64	ppb v/v			04/30/15 11:01	9.7
Bromoform	ND		3.9	0.68	ppb v/v			04/30/15 11:01	9.7
Bromomethane	ND		7.8	3.2	ppb v/v			04/30/15 11:01	9.7
2-Butanone (MEK)	ND		7.8	1.9	ppb v/v			04/30/15 11:01	9.7
Carbon disulfide	ND		7.8	0.76	ppb v/v			04/30/15 11:01	9.7
Carbon tetrachloride	ND		7.8	0.62	ppb v/v			04/30/15 11:01	9.7
Chlorobenzene	ND		2.9	0.62	ppb v/v			04/30/15 11:01	9.7
Chloroethane	ND		7.8	3.0	ppb v/v			04/30/15 11:01	9.7
<b>Chloroform</b>	<b>2.0</b>	<b>J</b>	2.9	0.92	ppb v/v			04/30/15 11:01	9.7
Chloromethane	ND		7.8	1.9	ppb v/v			04/30/15 11:01	9.7
Dibromochloromethane	ND		3.9	0.77	ppb v/v			04/30/15 11:01	9.7
1,2-Dibromoethane (EDB)	ND		7.8	0.73	ppb v/v			04/30/15 11:01	9.7
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.9	1.5	ppb v/v			04/30/15 11:01	9.7
1,2-Dichlorobenzene	ND		3.9	1.3	ppb v/v			04/30/15 11:01	9.7
1,3-Dichlorobenzene	ND		3.9	1.1	ppb v/v			04/30/15 11:01	9.7
1,4-Dichlorobenzene	ND		3.9	1.4	ppb v/v			04/30/15 11:01	9.7
<b>Dichlorodifluoromethane</b>	<b>77</b>		3.9	1.4	ppb v/v			04/30/15 11:01	9.7
<b>1,1-Dichloroethane</b>	<b>8.7</b>		2.9	0.70	ppb v/v			04/30/15 11:01	9.7
1,2-Dichloroethane	ND		7.8	0.85	ppb v/v			04/30/15 11:01	9.7
<b>1,1-Dichloroethene</b>	<b>44</b>		7.8	1.3	ppb v/v			04/30/15 11:01	9.7
<b>cis-1,2-Dichloroethene</b>	<b>4.7</b>		3.9	0.86	ppb v/v			04/30/15 11:01	9.7
trans-1,2-Dichloroethene	ND		3.9	0.97	ppb v/v			04/30/15 11:01	9.7
1,2-Dichloropropane	ND		3.9	2.3	ppb v/v			04/30/15 11:01	9.7
cis-1,3-Dichloropropene	ND		3.9	1.0	ppb v/v			04/30/15 11:01	9.7
trans-1,3-Dichloropropene	ND		3.9	0.85	ppb v/v			04/30/15 11:01	9.7
Ethylbenzene	ND		3.9	0.61	ppb v/v			04/30/15 11:01	9.7
4-Ethyltoluene	ND		3.9	1.8	ppb v/v			04/30/15 11:01	9.7
Hexachlorobutadiene	ND		19	4.2	ppb v/v			04/30/15 11:01	9.7
2-Hexanone	ND		3.9	0.84	ppb v/v			04/30/15 11:01	9.7
4-Methyl-2-pentanone (MIBK)	ND		3.9	1.3	ppb v/v			04/30/15 11:01	9.7
<b>Methylene Chloride</b>	<b>4.2</b>		3.9	0.70	ppb v/v			04/30/15 11:01	9.7
Styrene	ND		3.9	0.57	ppb v/v			04/30/15 11:01	9.7
1,1,2,2-Tetrachloroethane	ND		3.9	0.67	ppb v/v			04/30/15 11:01	9.7
<b>Tetrachloroethene</b>	<b>310</b>		3.9	0.49	ppb v/v			04/30/15 11:01	9.7
<b>Toluene</b>	<b>0.90</b>	<b>J</b>	3.9	0.49	ppb v/v			04/30/15 11:01	9.7
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>200</b>		3.9	1.6	ppb v/v			04/30/15 11:01	9.7
1,2,4-Trichlorobenzene	ND		19	4.2	ppb v/v			04/30/15 11:01	9.7
<b>1,1,1-Trichloroethane</b>	<b>3.0</b>		2.9	0.63	ppb v/v			04/30/15 11:01	9.7
1,1,2-Trichloroethane	ND		3.9	0.65	ppb v/v			04/30/15 11:01	9.7
<b>Trichloroethene</b>	<b>290</b>		3.9	1.0	ppb v/v			04/30/15 11:01	9.7
<b>Trichlorofluoromethane</b>	<b>37</b>		3.9	1.9	ppb v/v			04/30/15 11:01	9.7
1,2,4-Trimethylbenzene	ND		7.8	1.6	ppb v/v			04/30/15 11:01	9.7
1,3,5-Trimethylbenzene	ND		3.9	1.2	ppb v/v			04/30/15 11:01	9.7
Vinyl acetate	ND		7.8	1.4	ppb v/v			04/30/15 11:01	9.7
Vinyl chloride	ND		3.9	1.2	ppb v/v			04/30/15 11:01	9.7

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

**Client Sample ID: 097542-001/MWL-SV03-200 WO/M**

**Lab Sample ID: 320-12599-8**

**Date Collected: 04/14/15 09:10**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		7.8	0.97	ppb v/v			04/30/15 11:01	9.7
o-Xylene	ND		3.9	0.52	ppb v/v			04/30/15 11:01	9.7
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					04/30/15 11:01	9.7
1,2-Dichloroethane-d4 (Surr)	102		70 - 130					04/30/15 11:01	9.7
Toluene-d8 (Surr)	91		70 - 130					04/30/15 11:01	9.7

**Client Sample ID: 097543-001/MWL-SV03-200 WO/M**

**Lab Sample ID: 320-12599-9**

**Date Collected: 04/14/15 09:10**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	4.8	J *	43	1.5	ppb v/v			05/01/15 20:22	8.62
Benzene	ND		3.4	0.68	ppb v/v			05/01/15 20:22	8.62
Benzyl chloride	ND		6.9	1.4	ppb v/v			05/01/15 20:22	8.62
Bromodichloromethane	ND		2.6	0.57	ppb v/v			05/01/15 20:22	8.62
Bromoform	ND		3.4	0.60	ppb v/v			05/01/15 20:22	8.62
Bromomethane	ND		6.9	2.9	ppb v/v			05/01/15 20:22	8.62
2-Butanone (MEK)	ND	*	6.9	1.7	ppb v/v			05/01/15 20:22	8.62
Carbon disulfide	ND	*	6.9	0.67	ppb v/v			05/01/15 20:22	8.62
Carbon tetrachloride	0.56	J	6.9	0.55	ppb v/v			05/01/15 20:22	8.62
Chlorobenzene	ND		2.6	0.55	ppb v/v			05/01/15 20:22	8.62
Chloroethane	ND		6.9	2.7	ppb v/v			05/01/15 20:22	8.62
Chloroform	2.1	J	2.6	0.82	ppb v/v			05/01/15 20:22	8.62
Chloromethane	ND	*	6.9	1.7	ppb v/v			05/01/15 20:22	8.62
Dibromochloromethane	ND		3.4	0.68	ppb v/v			05/01/15 20:22	8.62
1,2-Dibromoethane (EDB)	ND		6.9	0.65	ppb v/v			05/01/15 20:22	8.62
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	3.4	1.3	ppb v/v			05/01/15 20:22	8.62
1,2-Dichlorobenzene	ND		3.4	1.1	ppb v/v			05/01/15 20:22	8.62
1,3-Dichlorobenzene	ND		3.4	0.95	ppb v/v			05/01/15 20:22	8.62
1,4-Dichlorobenzene	ND		3.4	1.3	ppb v/v			05/01/15 20:22	8.62
Dichlorodifluoromethane	70		3.4	1.2	ppb v/v			05/01/15 20:22	8.62
1,1-Dichloroethane	9.1		2.6	0.62	ppb v/v			05/01/15 20:22	8.62
1,2-Dichloroethane	ND		6.9	0.76	ppb v/v			05/01/15 20:22	8.62
1,1-Dichloroethene	45	*	6.9	1.1	ppb v/v			05/01/15 20:22	8.62
cis-1,2-Dichloroethene	5.2		3.4	0.77	ppb v/v			05/01/15 20:22	8.62
trans-1,2-Dichloroethene	ND		3.4	0.86	ppb v/v			05/01/15 20:22	8.62
1,2-Dichloropropane	ND		3.4	2.1	ppb v/v			05/01/15 20:22	8.62
cis-1,3-Dichloropropene	ND		3.4	0.90	ppb v/v			05/01/15 20:22	8.62
trans-1,3-Dichloropropene	ND		3.4	0.76	ppb v/v			05/01/15 20:22	8.62
Ethylbenzene	ND		3.4	0.54	ppb v/v			05/01/15 20:22	8.62
4-Ethyltoluene	ND		3.4	1.6	ppb v/v			05/01/15 20:22	8.62
Hexachlorobutadiene	ND		17	3.7	ppb v/v			05/01/15 20:22	8.62
2-Hexanone	ND		3.4	0.75	ppb v/v			05/01/15 20:22	8.62
4-Methyl-2-pentanone (MIBK)	ND		3.4	1.2	ppb v/v			05/01/15 20:22	8.62
Methylene Chloride	4.4	*	3.4	0.62	ppb v/v			05/01/15 20:22	8.62

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

**Client Sample ID: 097543-001/MWL-SV03-200 WO/M**

**Lab Sample ID: 320-12599-9**

**Date Collected: 04/14/15 09:10**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		3.4	0.51	ppb v/v			05/01/15 20:22	8.62
1,1,2,2-Tetrachloroethane	ND		3.4	0.59	ppb v/v			05/01/15 20:22	8.62
<b>Tetrachloroethene</b>	<b>310</b>		3.4	0.44	ppb v/v			05/01/15 20:22	8.62
<b>Toluene</b>	<b>0.99</b>	<b>J</b>	3.4	0.44	ppb v/v			05/01/15 20:22	8.62
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>210</b>		3.4	1.4	ppb v/v			05/01/15 20:22	8.62
1,2,4-Trichlorobenzene	ND		17	3.7	ppb v/v			05/01/15 20:22	8.62
<b>1,1,1-Trichloroethane</b>	<b>3.0</b>		2.6	0.56	ppb v/v			05/01/15 20:22	8.62
1,1,2-Trichloroethane	ND		3.4	0.58	ppb v/v			05/01/15 20:22	8.62
<b>Trichloroethene</b>	<b>290</b>		3.4	0.91	ppb v/v			05/01/15 20:22	8.62
<b>Trichlorofluoromethane</b>	<b>36</b>		3.4	1.7	ppb v/v			05/01/15 20:22	8.62
1,2,4-Trimethylbenzene	ND		6.9	1.4	ppb v/v			05/01/15 20:22	8.62
1,3,5-Trimethylbenzene	ND		3.4	1.1	ppb v/v			05/01/15 20:22	8.62
Vinyl acetate	ND	*	6.9	1.2	ppb v/v			05/01/15 20:22	8.62
Vinyl chloride	ND		3.4	1.0	ppb v/v			05/01/15 20:22	8.62
m,p-Xylene	ND		6.9	0.86	ppb v/v			05/01/15 20:22	8.62
o-Xylene	ND		3.4	0.47	ppb v/v			05/01/15 20:22	8.62
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130					05/01/15 20:22	8.62
1,2-Dichloroethane-d4 (Surr)	107		70 - 130					05/01/15 20:22	8.62
Toluene-d8 (Surr)	96		70 - 130					05/01/15 20:22	8.62

**Client Sample ID: 097544-001/MWL-SV03-300**

**Lab Sample ID: 320-12599-10**

**Date Collected: 04/14/15 09:28**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>7.0</b>	<b>J *</b>	46	1.6	ppb v/v			05/01/15 21:04	9.19
Benzene	ND		3.7	0.73	ppb v/v			05/01/15 21:04	9.19
Benzyl chloride	ND		7.4	1.5	ppb v/v			05/01/15 21:04	9.19
Bromodichloromethane	ND		2.8	0.61	ppb v/v			05/01/15 21:04	9.19
Bromoform	ND		3.7	0.64	ppb v/v			05/01/15 21:04	9.19
Bromomethane	ND		7.4	3.1	ppb v/v			05/01/15 21:04	9.19
2-Butanone (MEK)	ND	*	7.4	1.8	ppb v/v			05/01/15 21:04	9.19
<b>Carbon disulfide</b>	<b>5.4</b>	<b>J *</b>	7.4	0.72	ppb v/v			05/01/15 21:04	9.19
Carbon tetrachloride	ND		7.4	0.59	ppb v/v			05/01/15 21:04	9.19
Chlorobenzene	ND		2.8	0.59	ppb v/v			05/01/15 21:04	9.19
Chloroethane	ND		7.4	2.8	ppb v/v			05/01/15 21:04	9.19
Chloroform	ND		2.8	0.87	ppb v/v			05/01/15 21:04	9.19
Chloromethane	ND	*	7.4	1.8	ppb v/v			05/01/15 21:04	9.19
Dibromochloromethane	ND		3.7	0.73	ppb v/v			05/01/15 21:04	9.19
1,2-Dibromoethane (EDB)	ND		7.4	0.69	ppb v/v			05/01/15 21:04	9.19
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	3.7	1.4	ppb v/v			05/01/15 21:04	9.19
1,2-Dichlorobenzene	ND		3.7	1.2	ppb v/v			05/01/15 21:04	9.19
1,3-Dichlorobenzene	ND		3.7	1.0	ppb v/v			05/01/15 21:04	9.19
1,4-Dichlorobenzene	ND		3.7	1.4	ppb v/v			05/01/15 21:04	9.19

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

Client Sample ID: 097544-001/MWL-SV03-300

Lab Sample ID: 320-12599-10

Date Collected: 04/14/15 09:28

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	29		3.7	1.3	ppb v/v			05/01/15 21:04	9.19
1,1-Dichloroethane	1.8	J	2.8	0.66	ppb v/v			05/01/15 21:04	9.19
1,2-Dichloroethane	ND		7.4	0.81	ppb v/v			05/01/15 21:04	9.19
1,1-Dichloroethene	14	*	7.4	1.2	ppb v/v			05/01/15 21:04	9.19
cis-1,2-Dichloroethene	1.5	J	3.7	0.82	ppb v/v			05/01/15 21:04	9.19
trans-1,2-Dichloroethene	ND		3.7	0.92	ppb v/v			05/01/15 21:04	9.19
1,2-Dichloropropane	ND		3.7	2.2	ppb v/v			05/01/15 21:04	9.19
cis-1,3-Dichloropropene	ND		3.7	0.96	ppb v/v			05/01/15 21:04	9.19
trans-1,3-Dichloropropene	ND		3.7	0.81	ppb v/v			05/01/15 21:04	9.19
Ethylbenzene	ND		3.7	0.58	ppb v/v			05/01/15 21:04	9.19
4-Ethyltoluene	ND		3.7	1.7	ppb v/v			05/01/15 21:04	9.19
Hexachlorobutadiene	ND		18	4.0	ppb v/v			05/01/15 21:04	9.19
2-Hexanone	ND		3.7	0.80	ppb v/v			05/01/15 21:04	9.19
4-Methyl-2-pentanone (MIBK)	ND		3.7	1.2	ppb v/v			05/01/15 21:04	9.19
Methylene Chloride	0.86	J *	3.7	0.66	ppb v/v			05/01/15 21:04	9.19
Styrene	ND		3.7	0.54	ppb v/v			05/01/15 21:04	9.19
1,1,2,2-Tetrachloroethane	ND		3.7	0.63	ppb v/v			05/01/15 21:04	9.19
Tetrachloroethene	290		3.7	0.47	ppb v/v			05/01/15 21:04	9.19
Toluene	2.3	J	3.7	0.47	ppb v/v			05/01/15 21:04	9.19
1,1,2-Trichloro-1,2,2-trifluoroethane	65		3.7	1.5	ppb v/v			05/01/15 21:04	9.19
1,2,4-Trichlorobenzene	ND		18	4.0	ppb v/v			05/01/15 21:04	9.19
1,1,1-Trichloroethane	1.1	J	2.8	0.60	ppb v/v			05/01/15 21:04	9.19
1,1,2-Trichloroethane	ND		3.7	0.62	ppb v/v			05/01/15 21:04	9.19
Trichloroethene	170		3.7	0.96	ppb v/v			05/01/15 21:04	9.19
Trichlorofluoromethane	9.4		3.7	1.8	ppb v/v			05/01/15 21:04	9.19
1,2,4-Trimethylbenzene	ND		7.4	1.5	ppb v/v			05/01/15 21:04	9.19
1,3,5-Trimethylbenzene	ND		3.7	1.1	ppb v/v			05/01/15 21:04	9.19
Vinyl acetate	ND	*	7.4	1.3	ppb v/v			05/01/15 21:04	9.19
Vinyl chloride	ND		3.7	1.1	ppb v/v			05/01/15 21:04	9.19
m,p-Xylene	ND		7.4	0.92	ppb v/v			05/01/15 21:04	9.19
o-Xylene	ND		3.7	0.50	ppb v/v			05/01/15 21:04	9.19
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		70 - 130					05/01/15 21:04	9.19
1,2-Dichloroethane-d4 (Surr)	106		70 - 130					05/01/15 21:04	9.19
Toluene-d8 (Surr)	101		70 - 130					05/01/15 21:04	9.19

Client Sample ID: 097545-001/MWL-SV03-400

Lab Sample ID: 320-12599-11

Date Collected: 04/14/15 09:56

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	4.0	J *	49	1.7	ppb v/v			05/01/15 21:46	9.71
Benzene	ND		3.9	0.77	ppb v/v			05/01/15 21:46	9.71
Benzyl chloride	ND		7.8	1.6	ppb v/v			05/01/15 21:46	9.71
Bromodichloromethane	ND		2.9	0.64	ppb v/v			05/01/15 21:46	9.71

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

**Client Sample ID: 097545-001/MWL-SV03-400**

**Lab Sample ID: 320-12599-11**

**Date Collected: 04/14/15 09:56**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromoform	ND		3.9	0.68	ppb v/v			05/01/15 21:46	9.71
Bromomethane	ND		7.8	3.3	ppb v/v			05/01/15 21:46	9.71
2-Butanone (MEK)	ND *		7.8	1.9	ppb v/v			05/01/15 21:46	9.71
Carbon disulfide	ND *		7.8	0.76	ppb v/v			05/01/15 21:46	9.71
Carbon tetrachloride	ND		7.8	0.62	ppb v/v			05/01/15 21:46	9.71
Chlorobenzene	ND		2.9	0.62	ppb v/v			05/01/15 21:46	9.71
Chloroethane	ND		7.8	3.0	ppb v/v			05/01/15 21:46	9.71
<b>Chloroform</b>	<b>1.2</b>	<b>J</b>	2.9	0.92	ppb v/v			05/01/15 21:46	9.71
Chloromethane	ND *		7.8	1.9	ppb v/v			05/01/15 21:46	9.71
Dibromochloromethane	ND		3.9	0.77	ppb v/v			05/01/15 21:46	9.71
1,2-Dibromoethane (EDB)	ND		7.8	0.73	ppb v/v			05/01/15 21:46	9.71
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND *		3.9	1.5	ppb v/v			05/01/15 21:46	9.71
1,2-Dichlorobenzene	ND		3.9	1.3	ppb v/v			05/01/15 21:46	9.71
1,3-Dichlorobenzene	ND		3.9	1.1	ppb v/v			05/01/15 21:46	9.71
1,4-Dichlorobenzene	ND		3.9	1.4	ppb v/v			05/01/15 21:46	9.71
<b>Dichlorodifluoromethane</b>	<b>32</b>		3.9	1.4	ppb v/v			05/01/15 21:46	9.71
<b>1,1-Dichloroethane</b>	<b>2.6</b>	<b>J</b>	2.9	0.70	ppb v/v			05/01/15 21:46	9.71
1,2-Dichloroethane	ND		7.8	0.85	ppb v/v			05/01/15 21:46	9.71
<b>1,1-Dichloroethene</b>	<b>25</b>	<b>*</b>	7.8	1.3	ppb v/v			05/01/15 21:46	9.71
<b>cis-1,2-Dichloroethene</b>	<b>2.0</b>	<b>J</b>	3.9	0.86	ppb v/v			05/01/15 21:46	9.71
trans-1,2-Dichloroethene	ND		3.9	0.97	ppb v/v			05/01/15 21:46	9.71
1,2-Dichloropropane	ND		3.9	2.3	ppb v/v			05/01/15 21:46	9.71
cis-1,3-Dichloropropene	ND		3.9	1.0	ppb v/v			05/01/15 21:46	9.71
trans-1,3-Dichloropropene	ND		3.9	0.85	ppb v/v			05/01/15 21:46	9.71
Ethylbenzene	ND		3.9	0.61	ppb v/v			05/01/15 21:46	9.71
4-Ethyltoluene	ND		3.9	1.8	ppb v/v			05/01/15 21:46	9.71
Hexachlorobutadiene	ND		19	4.2	ppb v/v			05/01/15 21:46	9.71
2-Hexanone	ND		3.9	0.84	ppb v/v			05/01/15 21:46	9.71
4-Methyl-2-pentanone (MIBK)	ND		3.9	1.3	ppb v/v			05/01/15 21:46	9.71
<b>Methylene Chloride</b>	<b>1.2</b>	<b>J *</b>	3.9	0.70	ppb v/v			05/01/15 21:46	9.71
Styrene	ND		3.9	0.57	ppb v/v			05/01/15 21:46	9.71
1,1,2,2-Tetrachloroethane	ND		3.9	0.67	ppb v/v			05/01/15 21:46	9.71
<b>Tetrachloroethene</b>	<b>420</b>		3.9	0.50	ppb v/v			05/01/15 21:46	9.71
<b>Toluene</b>	<b>2.9</b>	<b>J</b>	3.9	0.50	ppb v/v			05/01/15 21:46	9.71
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>91</b>		3.9	1.6	ppb v/v			05/01/15 21:46	9.71
1,2,4-Trichlorobenzene	ND		19	4.2	ppb v/v			05/01/15 21:46	9.71
<b>1,1,1-Trichloroethane</b>	<b>1.6</b>	<b>J</b>	2.9	0.63	ppb v/v			05/01/15 21:46	9.71
1,1,2-Trichloroethane	ND		3.9	0.65	ppb v/v			05/01/15 21:46	9.71
<b>Trichloroethene</b>	<b>260</b>		3.9	1.0	ppb v/v			05/01/15 21:46	9.71
<b>Trichlorofluoromethane</b>	<b>16</b>		3.9	1.9	ppb v/v			05/01/15 21:46	9.71
1,2,4-Trimethylbenzene	ND		7.8	1.6	ppb v/v			05/01/15 21:46	9.71
1,3,5-Trimethylbenzene	ND		3.9	1.2	ppb v/v			05/01/15 21:46	9.71
Vinyl acetate	ND *		7.8	1.4	ppb v/v			05/01/15 21:46	9.71
Vinyl chloride	ND		3.9	1.2	ppb v/v			05/01/15 21:46	9.71
m,p-Xylene	ND		7.8	0.97	ppb v/v			05/01/15 21:46	9.71
o-Xylene	ND		3.9	0.52	ppb v/v			05/01/15 21:46	9.71

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

**Client Sample ID: 097545-001/MWL-SV03-400**

**Lab Sample ID: 320-12599-11**

**Date Collected: 04/14/15 09:56**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		70 - 130		05/01/15 21:46	9.71
1,2-Dichloroethane-d4 (Surr)	108		70 - 130		05/01/15 21:46	9.71
Toluene-d8 (Surr)	95		70 - 130		05/01/15 21:46	9.71

**Client Sample ID: 097546-001/MWL-SV-FB3**

**Lab Sample ID: 320-12599-12**

**Date Collected: 04/14/15 08:35**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND	*	5.0	0.18	ppb v/v			05/01/15 22:33	1
Benzene	ND		0.40	0.079	ppb v/v			05/01/15 22:33	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			05/01/15 22:33	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			05/01/15 22:33	1
Bromoform	ND		0.40	0.070	ppb v/v			05/01/15 22:33	1
Bromomethane	ND		0.80	0.34	ppb v/v			05/01/15 22:33	1
2-Butanone (MEK)	ND	*	0.80	0.20	ppb v/v			05/01/15 22:33	1
Carbon disulfide	ND	*	0.80	0.078	ppb v/v			05/01/15 22:33	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			05/01/15 22:33	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			05/01/15 22:33	1
Chloroethane	ND		0.80	0.31	ppb v/v			05/01/15 22:33	1
Chloroform	ND		0.30	0.095	ppb v/v			05/01/15 22:33	1
Chloromethane	ND	*	0.80	0.20	ppb v/v			05/01/15 22:33	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			05/01/15 22:33	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			05/01/15 22:33	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	0.40	0.16	ppb v/v			05/01/15 22:33	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			05/01/15 22:33	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			05/01/15 22:33	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			05/01/15 22:33	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			05/01/15 22:33	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			05/01/15 22:33	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			05/01/15 22:33	1
1,1-Dichloroethene	ND	*	0.80	0.13	ppb v/v			05/01/15 22:33	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			05/01/15 22:33	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			05/01/15 22:33	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			05/01/15 22:33	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			05/01/15 22:33	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			05/01/15 22:33	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			05/01/15 22:33	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			05/01/15 22:33	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			05/01/15 22:33	1
2-Hexanone	ND		0.40	0.087	ppb v/v			05/01/15 22:33	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			05/01/15 22:33	1
Methylene Chloride	ND	*	0.40	0.072	ppb v/v			05/01/15 22:33	1
Styrene	ND		0.40	0.059	ppb v/v			05/01/15 22:33	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			05/01/15 22:33	1
<b>Tetrachloroethene</b>	<b>0.056</b>	<b>J</b>	0.40	0.051	ppb v/v			05/01/15 22:33	1
<b>Toluene</b>	<b>0.25</b>	<b>J</b>	0.40	0.051	ppb v/v			05/01/15 22:33	1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM 616087

TestAmerica Job ID: 320-12599-1

**Client Sample ID: 097546-001/MWL-SV-FB3**

**Lab Sample ID: 320-12599-12**

**Date Collected: 04/14/15 08:35**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			05/01/15 22:33	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			05/01/15 22:33	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			05/01/15 22:33	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			05/01/15 22:33	1
Trichloroethene	ND		0.40	0.11	ppb v/v			05/01/15 22:33	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			05/01/15 22:33	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			05/01/15 22:33	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			05/01/15 22:33	1
Vinyl acetate	ND	*	0.80	0.15	ppb v/v			05/01/15 22:33	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			05/01/15 22:33	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			05/01/15 22:33	1
o-Xylene	ND		0.40	0.054	ppb v/v			05/01/15 22:33	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		70 - 130					05/01/15 22:33	1
1,2-Dichloroethane-d4 (Surr)	120		70 - 130					05/01/15 22:33	1
Toluene-d8 (Surr)	80		70 - 130					05/01/15 22:33	1



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12597-1

Client Sample ID: 097547-001/MWL-SV04-50

Lab Sample ID: 320-12597-1

Date Collected: 04/14/15 10:30

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	9.0		5.0	0.18	ppb v/v			04/23/15 00:21	1
Benzene	0.93		0.40	0.079	ppb v/v			04/23/15 00:21	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			04/23/15 00:21	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			04/23/15 00:21	1
Bromoform	ND		0.40	0.070	ppb v/v			04/23/15 00:21	1
Bromomethane	ND		0.80	0.34	ppb v/v			04/23/15 00:21	1
2-Butanone (MEK)	1.7		0.80	0.20	ppb v/v			04/23/15 00:21	1
Carbon disulfide	0.15	J	0.80	0.078	ppb v/v			04/23/15 00:21	1
Carbon tetrachloride	0.20	J	0.80	0.064	ppb v/v			04/23/15 00:21	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			04/23/15 00:21	1
Chloroethane	ND		0.80	0.31	ppb v/v			04/23/15 00:21	1
Chloroform	1.9		0.30	0.095	ppb v/v			04/23/15 00:21	1
Chloromethane	0.77	J	0.80	0.20	ppb v/v			04/23/15 00:21	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			04/23/15 00:21	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			04/23/15 00:21	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			04/23/15 00:21	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			04/23/15 00:21	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			04/23/15 00:21	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			04/23/15 00:21	1
Dichlorodifluoromethane	20		0.40	0.15	ppb v/v			04/23/15 00:21	1
1,1-Dichloroethane	1.5		0.30	0.072	ppb v/v			04/23/15 00:21	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			04/23/15 00:21	1
1,1-Dichloroethene	7.2		0.80	0.13	ppb v/v			04/23/15 00:21	1
cis-1,2-Dichloroethene	0.64		0.40	0.089	ppb v/v			04/23/15 00:21	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			04/23/15 00:21	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			04/23/15 00:21	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			04/23/15 00:21	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			04/23/15 00:21	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			04/23/15 00:21	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			04/23/15 00:21	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			04/23/15 00:21	1
2-Hexanone	0.12	J	0.40	0.087	ppb v/v			04/23/15 00:21	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			04/23/15 00:21	1
Methylene Chloride	0.13	J	0.40	0.072	ppb v/v			04/23/15 00:21	1
Styrene	ND		0.40	0.059	ppb v/v			04/23/15 00:21	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			04/23/15 00:21	1
Toluene	0.19	J	0.40	0.051	ppb v/v			04/23/15 00:21	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			04/23/15 00:21	1
1,1,1-Trichloroethane	7.0		0.30	0.065	ppb v/v			04/23/15 00:21	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			04/23/15 00:21	1
Trichlorofluoromethane	23		0.40	0.20	ppb v/v			04/23/15 00:21	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			04/23/15 00:21	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			04/23/15 00:21	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			04/23/15 00:21	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			04/23/15 00:21	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			04/23/15 00:21	1
o-Xylene	ND		0.40	0.054	ppb v/v			04/23/15 00:21	1

TestAmerica Sacramento



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12597-1

**Client Sample ID: 097547-001/MWL-SV04-50**

**Lab Sample ID: 320-12597-1**

**Date Collected: 04/14/15 10:30**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130		04/23/15 00:21	1
1,2-Dichloroethane-d4 (Surr)	94		70 - 130		04/23/15 00:21	1
Toluene-d8 (Surr)	97		70 - 130		04/23/15 00:21	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	76		0.74	0.095	ppb v/v			04/23/15 08:30	1.86
1,1,2-Trichloro-1,2,2-trifluoroethane	65		0.74	0.30	ppb v/v			04/23/15 08:30	1.86
Trichloroethene	60		0.74	0.20	ppb v/v			04/23/15 08:30	1.86

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130		04/23/15 08:30	1.86
1,2-Dichloroethane-d4 (Surr)	95		70 - 130		04/23/15 08:30	1.86
Toluene-d8 (Surr)	100		70 - 130		04/23/15 08:30	1.86

**Client Sample ID: 097548-001/MWL-SV04-100**

**Lab Sample ID: 320-12597-2**

**Date Collected: 04/14/15 10:32**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	4.1	J	26	0.93	ppb v/v			04/23/15 01:04	5.21
Benzene	0.58	J	2.1	0.41	ppb v/v			04/23/15 01:04	5.21
Benzyl chloride	ND		4.2	0.85	ppb v/v			04/23/15 01:04	5.21
Bromodichloromethane	ND		1.6	0.34	ppb v/v			04/23/15 01:04	5.21
Bromoform	ND		2.1	0.36	ppb v/v			04/23/15 01:04	5.21
Bromomethane	ND		4.2	1.7	ppb v/v			04/23/15 01:04	5.21
2-Butanone (MEK)	ND		4.2	1.0	ppb v/v			04/23/15 01:04	5.21
Carbon disulfide	0.72	J	4.2	0.41	ppb v/v			04/23/15 01:04	5.21
Carbon tetrachloride	0.35	J	4.2	0.33	ppb v/v			04/23/15 01:04	5.21
Chlorobenzene	ND		1.6	0.33	ppb v/v			04/23/15 01:04	5.21
Chloroethane	ND		4.2	1.6	ppb v/v			04/23/15 01:04	5.21
Chloroform	1.9		1.6	0.49	ppb v/v			04/23/15 01:04	5.21
Chloromethane	ND		4.2	1.0	ppb v/v			04/23/15 01:04	5.21
Dibromochloromethane	ND		2.1	0.41	ppb v/v			04/23/15 01:04	5.21
1,2-Dibromoethane (EDB)	ND		4.2	0.39	ppb v/v			04/23/15 01:04	5.21
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.1	0.81	ppb v/v			04/23/15 01:04	5.21
1,2-Dichlorobenzene	ND		2.1	0.68	ppb v/v			04/23/15 01:04	5.21
1,3-Dichlorobenzene	ND		2.1	0.57	ppb v/v			04/23/15 01:04	5.21
1,4-Dichlorobenzene	ND		2.1	0.78	ppb v/v			04/23/15 01:04	5.21
Dichlorodifluoromethane	34		2.1	0.76	ppb v/v			04/23/15 01:04	5.21
1,1-Dichloroethane	3.1		1.6	0.38	ppb v/v			04/23/15 01:04	5.21
1,2-Dichloroethane	ND		4.2	0.46	ppb v/v			04/23/15 01:04	5.21
1,1-Dichloroethene	18		4.2	0.67	ppb v/v			04/23/15 01:04	5.21
cis-1,2-Dichloroethene	1.7	J	2.1	0.46	ppb v/v			04/23/15 01:04	5.21
trans-1,2-Dichloroethene	ND		2.1	0.52	ppb v/v			04/23/15 01:04	5.21
1,2-Dichloropropane	ND		2.1	1.3	ppb v/v			04/23/15 01:04	5.21
cis-1,3-Dichloropropene	ND		2.1	0.54	ppb v/v			04/23/15 01:04	5.21

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12597-1

**Client Sample ID: 097548-001/MWL-SV04-100**

**Lab Sample ID: 320-12597-2**

**Date Collected: 04/14/15 10:32**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,3-Dichloropropene	ND		2.1	0.46	ppb v/v			04/23/15 01:04	5.21
Ethylbenzene	ND		2.1	0.33	ppb v/v			04/23/15 01:04	5.21
4-Ethyltoluene	ND		2.1	0.97	ppb v/v			04/23/15 01:04	5.21
Hexachlorobutadiene	ND		10	2.3	ppb v/v			04/23/15 01:04	5.21
2-Hexanone	ND		2.1	0.45	ppb v/v			04/23/15 01:04	5.21
4-Methyl-2-pentanone (MIBK)	ND		2.1	0.70	ppb v/v			04/23/15 01:04	5.21
<b>Methylene Chloride</b>	<b>0.61</b>	<b>J</b>	2.1	0.38	ppb v/v			04/23/15 01:04	5.21
Styrene	ND		2.1	0.31	ppb v/v			04/23/15 01:04	5.21
1,1,2,2-Tetrachloroethane	ND		2.1	0.36	ppb v/v			04/23/15 01:04	5.21
<b>Tetrachloroethene</b>	<b>120</b>		2.1	0.27	ppb v/v			04/23/15 01:04	5.21
Toluene	ND		2.1	0.27	ppb v/v			04/23/15 01:04	5.21
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>100</b>		2.1	0.85	ppb v/v			04/23/15 01:04	5.21
1,2,4-Trichlorobenzene	ND		10	2.3	ppb v/v			04/23/15 01:04	5.21
<b>1,1,1-Trichloroethane</b>	<b>5.4</b>		1.6	0.34	ppb v/v			04/23/15 01:04	5.21
1,1,2-Trichloroethane	ND		2.1	0.35	ppb v/v			04/23/15 01:04	5.21
<b>Trichloroethene</b>	<b>120</b>		2.1	0.55	ppb v/v			04/23/15 01:04	5.21
<b>Trichlorofluoromethane</b>	<b>33</b>		2.1	1.0	ppb v/v			04/23/15 01:04	5.21
1,2,4-Trimethylbenzene	ND		4.2	0.84	ppb v/v			04/23/15 01:04	5.21
1,3,5-Trimethylbenzene	ND		2.1	0.65	ppb v/v			04/23/15 01:04	5.21
Vinyl acetate	ND		4.2	0.76	ppb v/v			04/23/15 01:04	5.21
Vinyl chloride	ND		2.1	0.63	ppb v/v			04/23/15 01:04	5.21
m,p-Xylene	ND		4.2	0.52	ppb v/v			04/23/15 01:04	5.21
o-Xylene	ND		2.1	0.28	ppb v/v			04/23/15 01:04	5.21
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130					04/23/15 01:04	5.21
1,2-Dichloroethane-d4 (Surr)	92		70 - 130					04/23/15 01:04	5.21
Toluene-d8 (Surr)	98		70 - 130					04/23/15 01:04	5.21

**Client Sample ID: 097549-001/MWL-SV04-200**

**Lab Sample ID: 320-12597-3**

**Date Collected: 04/14/15 10:35**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>3.9</b>	<b>J</b>	43	1.5	ppb v/v			04/23/15 01:46	8.68
Benzene	ND		3.5	0.69	ppb v/v			04/23/15 01:46	8.68
Benzyl chloride	ND		6.9	1.4	ppb v/v			04/23/15 01:46	8.68
Bromodichloromethane	ND		2.6	0.57	ppb v/v			04/23/15 01:46	8.68
Bromoform	ND		3.5	0.61	ppb v/v			04/23/15 01:46	8.68
Bromomethane	ND		6.9	2.9	ppb v/v			04/23/15 01:46	8.68
2-Butanone (MEK)	ND		6.9	1.7	ppb v/v			04/23/15 01:46	8.68
<b>Carbon disulfide</b>	<b>3.6</b>	<b>J</b>	6.9	0.68	ppb v/v			04/23/15 01:46	8.68
Carbon tetrachloride	ND		6.9	0.56	ppb v/v			04/23/15 01:46	8.68
Chlorobenzene	ND		2.6	0.56	ppb v/v			04/23/15 01:46	8.68
Chloroethane	ND		6.9	2.7	ppb v/v			04/23/15 01:46	8.68
<b>Chloroform</b>	<b>1.2</b>	<b>J</b>	2.6	0.82	ppb v/v			04/23/15 01:46	8.68

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12597-1

Client Sample ID: 097549-001/MWL-SV04-200

Lab Sample ID: 320-12597-3

Date Collected: 04/14/15 10:35

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloromethane	ND		6.9	1.7	ppb v/v			04/23/15 01:46	8.68
Dibromochloromethane	ND		3.5	0.69	ppb v/v			04/23/15 01:46	8.68
1,2-Dibromoethane (EDB)	ND		6.9	0.65	ppb v/v			04/23/15 01:46	8.68
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.5	1.3	ppb v/v			04/23/15 01:46	8.68
1,2-Dichlorobenzene	ND		3.5	1.1	ppb v/v			04/23/15 01:46	8.68
1,3-Dichlorobenzene	ND		3.5	0.95	ppb v/v			04/23/15 01:46	8.68
1,4-Dichlorobenzene	ND		3.5	1.3	ppb v/v			04/23/15 01:46	8.68
Dichlorodifluoromethane	49		3.5	1.3	ppb v/v			04/23/15 01:46	8.68
1,1-Dichloroethane	4.8		2.6	0.62	ppb v/v			04/23/15 01:46	8.68
1,2-Dichloroethane	ND		6.9	0.76	ppb v/v			04/23/15 01:46	8.68
1,1-Dichloroethene	33		6.9	1.1	ppb v/v			04/23/15 01:46	8.68
cis-1,2-Dichloroethene	3.0	J	3.5	0.77	ppb v/v			04/23/15 01:46	8.68
trans-1,2-Dichloroethene	ND		3.5	0.87	ppb v/v			04/23/15 01:46	8.68
1,2-Dichloropropane	ND		3.5	2.1	ppb v/v			04/23/15 01:46	8.68
cis-1,3-Dichloropropene	ND		3.5	0.90	ppb v/v			04/23/15 01:46	8.68
trans-1,3-Dichloropropene	ND		3.5	0.76	ppb v/v			04/23/15 01:46	8.68
Ethylbenzene	ND		3.5	0.55	ppb v/v			04/23/15 01:46	8.68
4-Ethyltoluene	ND		3.5	1.6	ppb v/v			04/23/15 01:46	8.68
Hexachlorobutadiene	ND		17	3.7	ppb v/v			04/23/15 01:46	8.68
2-Hexanone	ND		3.5	0.76	ppb v/v			04/23/15 01:46	8.68
4-Methyl-2-pentanone (MIBK)	ND		3.5	1.2	ppb v/v			04/23/15 01:46	8.68
Methylene Chloride	1.5	J	3.5	0.62	ppb v/v			04/23/15 01:46	8.68
Styrene	ND		3.5	0.51	ppb v/v			04/23/15 01:46	8.68
1,1,2,2-Tetrachloroethane	ND		3.5	0.60	ppb v/v			04/23/15 01:46	8.68
Tetrachloroethene	170		3.5	0.44	ppb v/v			04/23/15 01:46	8.68
Toluene	0.70	J	3.5	0.44	ppb v/v			04/23/15 01:46	8.68
1,1,2-Trichloro-1,2,2-trifluoroethane	150		3.5	1.4	ppb v/v			04/23/15 01:46	8.68
1,2,4-Trichlorobenzene	ND		17	3.8	ppb v/v			04/23/15 01:46	8.68
1,1,1-Trichloroethane	2.4	J	2.6	0.56	ppb v/v			04/23/15 01:46	8.68
1,1,2-Trichloroethane	ND		3.5	0.58	ppb v/v			04/23/15 01:46	8.68
Trichloroethene	190		3.5	0.91	ppb v/v			04/23/15 01:46	8.68
Trichlorofluoromethane	31		3.5	1.7	ppb v/v			04/23/15 01:46	8.68
1,2,4-Trimethylbenzene	ND		6.9	1.4	ppb v/v			04/23/15 01:46	8.68
1,3,5-Trimethylbenzene	ND		3.5	1.1	ppb v/v			04/23/15 01:46	8.68
Vinyl acetate	ND		6.9	1.3	ppb v/v			04/23/15 01:46	8.68
Vinyl chloride	ND		3.5	1.0	ppb v/v			04/23/15 01:46	8.68
m,p-Xylene	ND		6.9	0.87	ppb v/v			04/23/15 01:46	8.68
o-Xylene	ND		3.5	0.47	ppb v/v			04/23/15 01:46	8.68
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130					04/23/15 01:46	8.68
1,2-Dichloroethane-d4 (Surr)	94		70 - 130					04/23/15 01:46	8.68
Toluene-d8 (Surr)	95		70 - 130					04/23/15 01:46	8.68

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12597-1

Client Sample ID: 097550-001/MWL-SV04-300

Lab Sample ID: 320-12597-4

Date Collected: 04/14/15 10:38

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	4.5	J	19	0.68	ppb v/v			04/23/15 02:29	3.83
Benzene	0.39	J	1.5	0.30	ppb v/v			04/23/15 02:29	3.83
Benzyl chloride	ND		3.1	0.62	ppb v/v			04/23/15 02:29	3.83
Bromodichloromethane	ND		1.1	0.25	ppb v/v			04/23/15 02:29	3.83
Bromoform	ND		1.5	0.27	ppb v/v			04/23/15 02:29	3.83
Bromomethane	ND		3.1	1.3	ppb v/v			04/23/15 02:29	3.83
2-Butanone (MEK)	ND		3.1	0.76	ppb v/v			04/23/15 02:29	3.83
Carbon disulfide	0.91	J	3.1	0.30	ppb v/v			04/23/15 02:29	3.83
Carbon tetrachloride	ND		3.1	0.25	ppb v/v			04/23/15 02:29	3.83
Chlorobenzene	ND		1.1	0.25	ppb v/v			04/23/15 02:29	3.83
Chloroethane	ND		3.1	1.2	ppb v/v			04/23/15 02:29	3.83
Chloroform	ND		1.1	0.36	ppb v/v			04/23/15 02:29	3.83
Chloromethane	ND		3.1	0.75	ppb v/v			04/23/15 02:29	3.83
Dibromochloromethane	ND		1.5	0.30	ppb v/v			04/23/15 02:29	3.83
1,2-Dibromoethane (EDB)	ND		3.1	0.29	ppb v/v			04/23/15 02:29	3.83
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.5	0.59	ppb v/v			04/23/15 02:29	3.83
1,2-Dichlorobenzene	ND		1.5	0.50	ppb v/v			04/23/15 02:29	3.83
1,3-Dichlorobenzene	ND		1.5	0.42	ppb v/v			04/23/15 02:29	3.83
1,4-Dichlorobenzene	ND		1.5	0.57	ppb v/v			04/23/15 02:29	3.83
Dichlorodifluoromethane	19		1.5	0.56	ppb v/v			04/23/15 02:29	3.83
1,1-Dichloroethane	0.73	J	1.1	0.28	ppb v/v			04/23/15 02:29	3.83
1,2-Dichloroethane	ND		3.1	0.34	ppb v/v			04/23/15 02:29	3.83
1,1-Dichloroethene	8.4		3.1	0.49	ppb v/v			04/23/15 02:29	3.83
cis-1,2-Dichloroethene	0.48	J	1.5	0.34	ppb v/v			04/23/15 02:29	3.83
trans-1,2-Dichloroethene	ND		1.5	0.38	ppb v/v			04/23/15 02:29	3.83
1,2-Dichloropropane	ND		1.5	0.92	ppb v/v			04/23/15 02:29	3.83
cis-1,3-Dichloropropene	ND		1.5	0.40	ppb v/v			04/23/15 02:29	3.83
trans-1,3-Dichloropropene	ND		1.5	0.34	ppb v/v			04/23/15 02:29	3.83
Ethylbenzene	ND		1.5	0.24	ppb v/v			04/23/15 02:29	3.83
4-Ethyltoluene	ND		1.5	0.72	ppb v/v			04/23/15 02:29	3.83
Hexachlorobutadiene	ND		7.7	1.7	ppb v/v			04/23/15 02:29	3.83
2-Hexanone	ND		1.5	0.33	ppb v/v			04/23/15 02:29	3.83
4-Methyl-2-pentanone (MIBK)	ND		1.5	0.52	ppb v/v			04/23/15 02:29	3.83
Methylene Chloride	0.31	J	1.5	0.28	ppb v/v			04/23/15 02:29	3.83
Styrene	ND		1.5	0.23	ppb v/v			04/23/15 02:29	3.83
1,1,2,2-Tetrachloroethane	ND		1.5	0.26	ppb v/v			04/23/15 02:29	3.83
Tetrachloroethene	110		1.5	0.20	ppb v/v			04/23/15 02:29	3.83
Toluene	0.93	J	1.5	0.20	ppb v/v			04/23/15 02:29	3.83
1,1,2-Trichloro-1,2,2-trifluoroethane	55		1.5	0.62	ppb v/v			04/23/15 02:29	3.83
1,2,4-Trichlorobenzene	ND		7.7	1.7	ppb v/v			04/23/15 02:29	3.83
1,1,1-Trichloroethane	0.63	J	1.1	0.25	ppb v/v			04/23/15 02:29	3.83
1,1,2-Trichloroethane	ND		1.5	0.26	ppb v/v			04/23/15 02:29	3.83
Trichloroethene	64		1.5	0.40	ppb v/v			04/23/15 02:29	3.83
Trichlorofluoromethane	9.1		1.5	0.75	ppb v/v			04/23/15 02:29	3.83
1,2,4-Trimethylbenzene	ND		3.1	0.62	ppb v/v			04/23/15 02:29	3.83
1,3,5-Trimethylbenzene	ND		1.5	0.48	ppb v/v			04/23/15 02:29	3.83
Vinyl acetate	ND		3.1	0.56	ppb v/v			04/23/15 02:29	3.83
Vinyl chloride	ND		1.5	0.46	ppb v/v			04/23/15 02:29	3.83

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12597-1

**Client Sample ID: 097550-001/MWL-SV04-300**

**Lab Sample ID: 320-12597-4**

**Date Collected: 04/14/15 10:38**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		3.1	0.38	ppb v/v			04/23/15 02:29	3.83
o-Xylene	ND		1.5	0.21	ppb v/v			04/23/15 02:29	3.83
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130					04/23/15 02:29	3.83
1,2-Dichloroethane-d4 (Surr)	95		70 - 130					04/23/15 02:29	3.83
Toluene-d8 (Surr)	97		70 - 130					04/23/15 02:29	3.83

**Client Sample ID: 097551-001/MWL-SV04-400**

**Lab Sample ID: 320-12597-5**

**Date Collected: 04/14/15 10:41**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	8.7	J	25	0.90	ppb v/v			04/23/15 03:11	5.06
Benzene	1.1	J	2.0	0.40	ppb v/v			04/23/15 03:11	5.06
Benzyl chloride	ND		4.0	0.82	ppb v/v			04/23/15 03:11	5.06
Bromodichloromethane	ND		1.5	0.33	ppb v/v			04/23/15 03:11	5.06
Bromoform	ND		2.0	0.35	ppb v/v			04/23/15 03:11	5.06
Bromomethane	ND		4.0	1.7	ppb v/v			04/23/15 03:11	5.06
2-Butanone (MEK)	1.9	J	4.0	1.0	ppb v/v			04/23/15 03:11	5.06
Carbon disulfide	5.4		4.0	0.39	ppb v/v			04/23/15 03:11	5.06
Carbon tetrachloride	ND		4.0	0.32	ppb v/v			04/23/15 03:11	5.06
Chlorobenzene	ND		1.5	0.32	ppb v/v			04/23/15 03:11	5.06
Chloroethane	ND		4.0	1.6	ppb v/v			04/23/15 03:11	5.06
Chloroform	ND		1.5	0.48	ppb v/v			04/23/15 03:11	5.06
Chloromethane	ND		4.0	1.0	ppb v/v			04/23/15 03:11	5.06
Dibromochloromethane	ND		2.0	0.40	ppb v/v			04/23/15 03:11	5.06
1,2-Dibromoethane (EDB)	ND		4.0	0.38	ppb v/v			04/23/15 03:11	5.06
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.0	0.78	ppb v/v			04/23/15 03:11	5.06
1,2-Dichlorobenzene	ND		2.0	0.66	ppb v/v			04/23/15 03:11	5.06
1,3-Dichlorobenzene	ND		2.0	0.56	ppb v/v			04/23/15 03:11	5.06
1,4-Dichlorobenzene	ND		2.0	0.75	ppb v/v			04/23/15 03:11	5.06
Dichlorodifluoromethane	14		2.0	0.73	ppb v/v			04/23/15 03:11	5.06
1,1-Dichloroethane	0.48	J	1.5	0.36	ppb v/v			04/23/15 03:11	5.06
1,2-Dichloroethane	ND		4.0	0.45	ppb v/v			04/23/15 03:11	5.06
1,1-Dichloroethene	5.4		4.0	0.65	ppb v/v			04/23/15 03:11	5.06
cis-1,2-Dichloroethene	ND		2.0	0.45	ppb v/v			04/23/15 03:11	5.06
trans-1,2-Dichloroethene	ND		2.0	0.51	ppb v/v			04/23/15 03:11	5.06
1,2-Dichloropropane	ND		2.0	1.2	ppb v/v			04/23/15 03:11	5.06
cis-1,3-Dichloropropene	ND		2.0	0.53	ppb v/v			04/23/15 03:11	5.06
trans-1,3-Dichloropropene	ND		2.0	0.45	ppb v/v			04/23/15 03:11	5.06
Ethylbenzene	ND		2.0	0.32	ppb v/v			04/23/15 03:11	5.06
4-Ethyltoluene	ND		2.0	0.95	ppb v/v			04/23/15 03:11	5.06
Hexachlorobutadiene	ND		10	2.2	ppb v/v			04/23/15 03:11	5.06
2-Hexanone	ND		2.0	0.44	ppb v/v			04/23/15 03:11	5.06
4-Methyl-2-pentanone (MIBK)	ND		2.0	0.68	ppb v/v			04/23/15 03:11	5.06
Methylene Chloride	ND		2.0	0.36	ppb v/v			04/23/15 03:11	5.06

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12597-1

**Client Sample ID: 097551-001/MWL-SV04-400**

**Lab Sample ID: 320-12597-5**

**Date Collected: 04/14/15 10:41**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		2.0	0.30	ppb v/v			04/23/15 03:11	5.06
1,1,2,2-Tetrachloroethane	ND		2.0	0.35	ppb v/v			04/23/15 03:11	5.06
<b>Tetrachloroethene</b>	<b>120</b>		2.0	0.26	ppb v/v			04/23/15 03:11	5.06
<b>Toluene</b>	<b>0.66</b>	<b>J</b>	2.0	0.26	ppb v/v			04/23/15 03:11	5.06
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>43</b>		2.0	0.82	ppb v/v			04/23/15 03:11	5.06
1,2,4-Trichlorobenzene	ND		10	2.2	ppb v/v			04/23/15 03:11	5.06
<b>1,1,1-Trichloroethane</b>	<b>0.44</b>	<b>J</b>	1.5	0.33	ppb v/v			04/23/15 03:11	5.06
1,1,2-Trichloroethane	ND		2.0	0.34	ppb v/v			04/23/15 03:11	5.06
<b>Trichloroethene</b>	<b>60</b>		2.0	0.53	ppb v/v			04/23/15 03:11	5.06
<b>Trichlorofluoromethane</b>	<b>6.6</b>		2.0	0.99	ppb v/v			04/23/15 03:11	5.06
1,2,4-Trimethylbenzene	ND		4.0	0.82	ppb v/v			04/23/15 03:11	5.06
1,3,5-Trimethylbenzene	ND		2.0	0.63	ppb v/v			04/23/15 03:11	5.06
Vinyl acetate	ND		4.0	0.73	ppb v/v			04/23/15 03:11	5.06
Vinyl chloride	ND		2.0	0.61	ppb v/v			04/23/15 03:11	5.06
m,p-Xylene	ND		4.0	0.51	ppb v/v			04/23/15 03:11	5.06
o-Xylene	ND		2.0	0.27	ppb v/v			04/23/15 03:11	5.06
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130					04/23/15 03:11	5.06
1,2-Dichloroethane-d4 (Surr)	95		70 - 130					04/23/15 03:11	5.06
Toluene-d8 (Surr)	96		70 - 130					04/23/15 03:11	5.06

**Client Sample ID: 097552-001/MWL-SV-FB4**

**Lab Sample ID: 320-12597-6**

**Date Collected: 04/14/15 10:16**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>0.37</b>	<b>J</b>	5.0	0.18	ppb v/v			04/23/15 03:59	1
Benzene	ND		0.40	0.079	ppb v/v			04/23/15 03:59	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			04/23/15 03:59	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			04/23/15 03:59	1
Bromoform	ND		0.40	0.070	ppb v/v			04/23/15 03:59	1
Bromomethane	ND		0.80	0.34	ppb v/v			04/23/15 03:59	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			04/23/15 03:59	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			04/23/15 03:59	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			04/23/15 03:59	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			04/23/15 03:59	1
Chloroethane	ND		0.80	0.31	ppb v/v			04/23/15 03:59	1
Chloroform	ND		0.30	0.095	ppb v/v			04/23/15 03:59	1
Chloromethane	ND		0.80	0.20	ppb v/v			04/23/15 03:59	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			04/23/15 03:59	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			04/23/15 03:59	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			04/23/15 03:59	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			04/23/15 03:59	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			04/23/15 03:59	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			04/23/15 03:59	1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12597-1

Client Sample ID: 097552-001/MWL-SV-FB4

Lab Sample ID: 320-12597-6

Date Collected: 04/14/15 10:16

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			04/23/15 03:59	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			04/23/15 03:59	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			04/23/15 03:59	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			04/23/15 03:59	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			04/23/15 03:59	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			04/23/15 03:59	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			04/23/15 03:59	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			04/23/15 03:59	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			04/23/15 03:59	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			04/23/15 03:59	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			04/23/15 03:59	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			04/23/15 03:59	1
2-Hexanone	ND		0.40	0.087	ppb v/v			04/23/15 03:59	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			04/23/15 03:59	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			04/23/15 03:59	1
Styrene	ND		0.40	0.059	ppb v/v			04/23/15 03:59	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			04/23/15 03:59	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			04/23/15 03:59	1
<b>Toluene</b>	<b>0.36</b>	<b>J</b>	0.40	0.051	ppb v/v			04/23/15 03:59	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			04/23/15 03:59	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			04/23/15 03:59	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			04/23/15 03:59	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			04/23/15 03:59	1
Trichloroethene	ND		0.40	0.11	ppb v/v			04/23/15 03:59	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			04/23/15 03:59	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			04/23/15 03:59	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			04/23/15 03:59	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			04/23/15 03:59	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			04/23/15 03:59	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			04/23/15 03:59	1
o-Xylene	ND		0.40	0.054	ppb v/v			04/23/15 03:59	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	85		70 - 130					04/23/15 03:59	1
1,2-Dichloroethane-d4 (Surr)	92		70 - 130					04/23/15 03:59	1
Toluene-d8 (Surr)	91		70 - 130					04/23/15 03:59	1



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12598-1

Client Sample ID: 097553-001/MWL-SV05-50

Lab Sample ID: 320-12598-1

Date Collected: 04/14/15 11:12

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	5.1	J	15	0.53	ppb v/v			04/24/15 22:09	2.96
Benzene	0.38	J	1.2	0.23	ppb v/v			04/24/15 22:09	2.96
Benzyl chloride	ND		2.4	0.48	ppb v/v			04/24/15 22:09	2.96
Bromodichloromethane	ND		0.89	0.20	ppb v/v			04/24/15 22:09	2.96
Bromoform	ND		1.2	0.21	ppb v/v			04/24/15 22:09	2.96
Bromomethane	ND		2.4	0.99	ppb v/v			04/24/15 22:09	2.96
2-Butanone (MEK)	0.73	J	2.4	0.59	ppb v/v			04/24/15 22:09	2.96
Carbon disulfide	ND		2.4	0.23	ppb v/v			04/24/15 22:09	2.96
Carbon tetrachloride	0.34	J	2.4	0.19	ppb v/v			04/24/15 22:09	2.96
Chlorobenzene	ND		0.89	0.19	ppb v/v			04/24/15 22:09	2.96
Chloroethane	ND		2.4	0.91	ppb v/v			04/24/15 22:09	2.96
Chloroform	1.4		0.89	0.28	ppb v/v			04/24/15 22:09	2.96
Chloromethane	ND		2.4	0.58	ppb v/v			04/24/15 22:09	2.96
Dibromochloromethane	ND		1.2	0.23	ppb v/v			04/24/15 22:09	2.96
1,2-Dibromoethane (EDB)	ND		2.4	0.22	ppb v/v			04/24/15 22:09	2.96
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.2	0.46	ppb v/v			04/24/15 22:09	2.96
1,2-Dichlorobenzene	ND		1.2	0.38	ppb v/v			04/24/15 22:09	2.96
1,3-Dichlorobenzene	ND		1.2	0.33	ppb v/v			04/24/15 22:09	2.96
1,4-Dichlorobenzene	ND		1.2	0.44	ppb v/v			04/24/15 22:09	2.96
Dichlorodifluoromethane	41		1.2	0.43	ppb v/v			04/24/15 22:09	2.96
1,1-Dichloroethane	1.8		0.89	0.21	ppb v/v			04/24/15 22:09	2.96
1,2-Dichloroethane	ND		2.4	0.26	ppb v/v			04/24/15 22:09	2.96
1,1-Dichloroethene	11		2.4	0.38	ppb v/v			04/24/15 22:09	2.96
cis-1,2-Dichloroethene	0.68	J	1.2	0.26	ppb v/v			04/24/15 22:09	2.96
trans-1,2-Dichloroethene	ND		1.2	0.30	ppb v/v			04/24/15 22:09	2.96
1,2-Dichloropropane	ND		1.2	0.71	ppb v/v			04/24/15 22:09	2.96
cis-1,3-Dichloropropene	ND		1.2	0.31	ppb v/v			04/24/15 22:09	2.96
trans-1,3-Dichloropropene	ND		1.2	0.26	ppb v/v			04/24/15 22:09	2.96
Ethylbenzene	ND		1.2	0.19	ppb v/v			04/24/15 22:09	2.96
4-Ethyltoluene	ND		1.2	0.55	ppb v/v			04/24/15 22:09	2.96
Hexachlorobutadiene	ND		5.9	1.3	ppb v/v			04/24/15 22:09	2.96
2-Hexanone	ND		1.2	0.26	ppb v/v			04/24/15 22:09	2.96
4-Methyl-2-pentanone (MIBK)	ND		1.2	0.40	ppb v/v			04/24/15 22:09	2.96
Methylene Chloride	0.47	J	1.2	0.21	ppb v/v			04/24/15 22:09	2.96
Styrene	ND		1.2	0.17	ppb v/v			04/24/15 22:09	2.96
1,1,2,2-Tetrachloroethane	ND		1.2	0.20	ppb v/v			04/24/15 22:09	2.96
Tetrachloroethene	55		1.2	0.15	ppb v/v			04/24/15 22:09	2.96
Toluene	0.55	J	1.2	0.15	ppb v/v			04/24/15 22:09	2.96
1,1,2-Trichloro-1,2,2-trifluoroethane	46		1.2	0.48	ppb v/v			04/24/15 22:09	2.96
1,2,4-Trichlorobenzene	ND		5.9	1.3	ppb v/v			04/24/15 22:09	2.96
1,1,1-Trichloroethane	13		0.89	0.19	ppb v/v			04/24/15 22:09	2.96
1,1,2-Trichloroethane	ND		1.2	0.20	ppb v/v			04/24/15 22:09	2.96
Trichloroethene	64		1.2	0.31	ppb v/v			04/24/15 22:09	2.96
Trichlorofluoromethane	99		1.2	0.58	ppb v/v			04/24/15 22:09	2.96
1,2,4-Trimethylbenzene	ND		2.4	0.48	ppb v/v			04/24/15 22:09	2.96
1,3,5-Trimethylbenzene	ND		1.2	0.37	ppb v/v			04/24/15 22:09	2.96
Vinyl acetate	ND		2.4	0.43	ppb v/v			04/24/15 22:09	2.96

TestAmerica Sacramento



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12598-1

**Client Sample ID: 097553-001/MWL-SV05-50**

**Lab Sample ID: 320-12598-1**

**Date Collected: 04/14/15 11:12**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		1.2	0.36	ppb v/v			04/24/15 22:09	2.96
m,p-Xylene	ND		2.4	0.30	ppb v/v			04/24/15 22:09	2.96
o-Xylene	ND		1.2	0.16	ppb v/v			04/24/15 22:09	2.96
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130					04/24/15 22:09	2.96
1,2-Dichloroethane-d4 (Surr)	96		70 - 130					04/24/15 22:09	2.96
Toluene-d8 (Surr)	97		70 - 130					04/24/15 22:09	2.96

**Client Sample ID: 097554-001/MWL-SV05-100**

**Lab Sample ID: 320-12598-2**

**Date Collected: 04/14/15 11:15**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	3.5	J	31	1.1	ppb v/v			04/24/15 22:50	6.26
Benzene	ND		2.5	0.49	ppb v/v			04/24/15 22:50	6.26
Benzyl chloride	ND		5.0	1.0	ppb v/v			04/24/15 22:50	6.26
Bromodichloromethane	ND		1.9	0.41	ppb v/v			04/24/15 22:50	6.26
Bromoform	ND		2.5	0.44	ppb v/v			04/24/15 22:50	6.26
Bromomethane	ND		5.0	2.1	ppb v/v			04/24/15 22:50	6.26
2-Butanone (MEK)	ND		5.0	1.2	ppb v/v			04/24/15 22:50	6.26
Carbon disulfide	ND		5.0	0.49	ppb v/v			04/24/15 22:50	6.26
Carbon tetrachloride	0.59	J	5.0	0.40	ppb v/v			04/24/15 22:50	6.26
Chlorobenzene	ND		1.9	0.40	ppb v/v			04/24/15 22:50	6.26
Chloroethane	ND		5.0	1.9	ppb v/v			04/24/15 22:50	6.26
Chloroform	2.1		1.9	0.59	ppb v/v			04/24/15 22:50	6.26
Chloromethane	ND		5.0	1.2	ppb v/v			04/24/15 22:50	6.26
Dibromochloromethane	ND		2.5	0.49	ppb v/v			04/24/15 22:50	6.26
1,2-Dibromoethane (EDB)	ND		5.0	0.47	ppb v/v			04/24/15 22:50	6.26
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.5	0.97	ppb v/v			04/24/15 22:50	6.26
1,2-Dichlorobenzene	ND		2.5	0.81	ppb v/v			04/24/15 22:50	6.26
1,3-Dichlorobenzene	ND		2.5	0.69	ppb v/v			04/24/15 22:50	6.26
1,4-Dichlorobenzene	ND		2.5	0.93	ppb v/v			04/24/15 22:50	6.26
Dichlorodifluoromethane	67		2.5	0.91	ppb v/v			04/24/15 22:50	6.26
1,1-Dichloroethane	3.7		1.9	0.45	ppb v/v			04/24/15 22:50	6.26
1,2-Dichloroethane	ND		5.0	0.55	ppb v/v			04/24/15 22:50	6.26
1,1-Dichloroethene	24		5.0	0.81	ppb v/v			04/24/15 22:50	6.26
cis-1,2-Dichloroethene	1.6	J	2.5	0.56	ppb v/v			04/24/15 22:50	6.26
trans-1,2-Dichloroethene	ND		2.5	0.63	ppb v/v			04/24/15 22:50	6.26
1,2-Dichloropropane	ND		2.5	1.5	ppb v/v			04/24/15 22:50	6.26
cis-1,3-Dichloropropene	ND		2.5	0.65	ppb v/v			04/24/15 22:50	6.26
trans-1,3-Dichloropropene	ND		2.5	0.55	ppb v/v			04/24/15 22:50	6.26
Ethylbenzene	ND		2.5	0.39	ppb v/v			04/24/15 22:50	6.26
4-Ethyltoluene	ND		2.5	1.2	ppb v/v			04/24/15 22:50	6.26
Hexachlorobutadiene	ND		13	2.7	ppb v/v			04/24/15 22:50	6.26
2-Hexanone	ND		2.5	0.54	ppb v/v			04/24/15 22:50	6.26
4-Methyl-2-pentanone (MIBK)	ND		2.5	0.85	ppb v/v			04/24/15 22:50	6.26

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12598-1

**Client Sample ID: 097554-001/MWL-SV05-100**

**Lab Sample ID: 320-12598-2**

**Date Collected: 04/14/15 11:15**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Methylene Chloride</b>	<b>1.2</b>	<b>J</b>	2.5	0.45	ppb v/v			04/24/15 22:50	6.26
Styrene	ND		2.5	0.37	ppb v/v			04/24/15 22:50	6.26
1,1,2,2-Tetrachloroethane	ND		2.5	0.43	ppb v/v			04/24/15 22:50	6.26
<b>Tetrachloroethene</b>	<b>100</b>		2.5	0.32	ppb v/v			04/24/15 22:50	6.26
Toluene	ND		2.5	0.32	ppb v/v			04/24/15 22:50	6.26
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>95</b>		2.5	1.0	ppb v/v			04/24/15 22:50	6.26
1,2,4-Trichlorobenzene	ND		13	2.7	ppb v/v			04/24/15 22:50	6.26
<b>1,1,1-Trichloroethane</b>	<b>13</b>		1.9	0.41	ppb v/v			04/24/15 22:50	6.26
1,1,2-Trichloroethane	ND		2.5	0.42	ppb v/v			04/24/15 22:50	6.26
<b>Trichloroethene</b>	<b>130</b>		2.5	0.66	ppb v/v			04/24/15 22:50	6.26
<b>Trichlorofluoromethane</b>	<b>130</b>		2.5	1.2	ppb v/v			04/24/15 22:50	6.26
1,2,4-Trimethylbenzene	ND		5.0	1.0	ppb v/v			04/24/15 22:50	6.26
1,3,5-Trimethylbenzene	ND		2.5	0.78	ppb v/v			04/24/15 22:50	6.26
Vinyl acetate	ND		5.0	0.91	ppb v/v			04/24/15 22:50	6.26
Vinyl chloride	ND		2.5	0.75	ppb v/v			04/24/15 22:50	6.26
m,p-Xylene	ND		5.0	0.63	ppb v/v			04/24/15 22:50	6.26
o-Xylene	ND		2.5	0.34	ppb v/v			04/24/15 22:50	6.26
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130					04/24/15 22:50	6.26
1,2-Dichloroethane-d4 (Surr)	94		70 - 130					04/24/15 22:50	6.26
Toluene-d8 (Surr)	97		70 - 130					04/24/15 22:50	6.26

**Client Sample ID: 097555-001/MWL-SV05-200**

**Lab Sample ID: 320-12598-3**

**Date Collected: 04/14/15 11:20**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>8.0</b>	<b>J</b>	49	1.7	ppb v/v			04/24/15 23:31	9.77
Benzene	ND		3.9	0.77	ppb v/v			04/24/15 23:31	9.77
Benzyl chloride	ND		7.8	1.6	ppb v/v			04/24/15 23:31	9.77
Bromodichloromethane	ND		2.9	0.64	ppb v/v			04/24/15 23:31	9.77
Bromoform	ND		3.9	0.68	ppb v/v			04/24/15 23:31	9.77
Bromomethane	ND		7.8	3.3	ppb v/v			04/24/15 23:31	9.77
2-Butanone (MEK)	ND		7.8	1.9	ppb v/v			04/24/15 23:31	9.77
Carbon disulfide	ND		7.8	0.76	ppb v/v			04/24/15 23:31	9.77
<b>Carbon tetrachloride</b>	<b>1.1</b>	<b>J</b>	7.8	0.63	ppb v/v			04/24/15 23:31	9.77
Chlorobenzene	ND		2.9	0.63	ppb v/v			04/24/15 23:31	9.77
Chloroethane	ND		7.8	3.0	ppb v/v			04/24/15 23:31	9.77
<b>Chloroform</b>	<b>1.9</b>	<b>J</b>	2.9	0.93	ppb v/v			04/24/15 23:31	9.77
Chloromethane	ND		7.8	1.9	ppb v/v			04/24/15 23:31	9.77
Dibromochloromethane	ND		3.9	0.77	ppb v/v			04/24/15 23:31	9.77
1,2-Dibromoethane (EDB)	ND		7.8	0.73	ppb v/v			04/24/15 23:31	9.77
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.9	1.5	ppb v/v			04/24/15 23:31	9.77
1,2-Dichlorobenzene	ND		3.9	1.3	ppb v/v			04/24/15 23:31	9.77
1,3-Dichlorobenzene	ND		3.9	1.1	ppb v/v			04/24/15 23:31	9.77

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12598-1

Client Sample ID: 097555-001/MWL-SV05-200

Lab Sample ID: 320-12598-3

Date Collected: 04/14/15 11:20

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		3.9	1.5	ppb v/v			04/24/15 23:31	9.77
Dichlorodifluoromethane	68		3.9	1.4	ppb v/v			04/24/15 23:31	9.77
1,1-Dichloroethane	5.3		2.9	0.70	ppb v/v			04/24/15 23:31	9.77
1,2-Dichloroethane	ND		7.8	0.86	ppb v/v			04/24/15 23:31	9.77
1,1-Dichloroethene	45		7.8	1.3	ppb v/v			04/24/15 23:31	9.77
cis-1,2-Dichloroethene	2.5	J	3.9	0.87	ppb v/v			04/24/15 23:31	9.77
trans-1,2-Dichloroethene	ND		3.9	0.98	ppb v/v			04/24/15 23:31	9.77
1,2-Dichloropropane	ND		3.9	2.3	ppb v/v			04/24/15 23:31	9.77
cis-1,3-Dichloropropene	ND		3.9	1.0	ppb v/v			04/24/15 23:31	9.77
trans-1,3-Dichloropropene	ND		3.9	0.86	ppb v/v			04/24/15 23:31	9.77
Ethylbenzene	ND		3.9	0.62	ppb v/v			04/24/15 23:31	9.77
4-Ethyltoluene	ND		3.9	1.8	ppb v/v			04/24/15 23:31	9.77
Hexachlorobutadiene	ND		20	4.2	ppb v/v			04/24/15 23:31	9.77
2-Hexanone	ND		3.9	0.85	ppb v/v			04/24/15 23:31	9.77
4-Methyl-2-pentanone (MIBK)	ND		3.9	1.3	ppb v/v			04/24/15 23:31	9.77
Methylene Chloride	3.3	J	3.9	0.70	ppb v/v			04/24/15 23:31	9.77
Styrene	ND		3.9	0.58	ppb v/v			04/24/15 23:31	9.77
1,1,2,2-Tetrachloroethane	ND		3.9	0.67	ppb v/v			04/24/15 23:31	9.77
Tetrachloroethene	150		3.9	0.50	ppb v/v			04/24/15 23:31	9.77
Toluene	0.72	J	3.9	0.50	ppb v/v			04/24/15 23:31	9.77
1,1,2-Trichloro-1,2,2-trifluoroethane	160		3.9	1.6	ppb v/v			04/24/15 23:31	9.77
1,2,4-Trichlorobenzene	ND		20	4.2	ppb v/v			04/24/15 23:31	9.77
1,1,1-Trichloroethane	3.7		2.9	0.64	ppb v/v			04/24/15 23:31	9.77
1,1,2-Trichloroethane	ND		3.9	0.65	ppb v/v			04/24/15 23:31	9.77
Trichloroethene	210		3.9	1.0	ppb v/v			04/24/15 23:31	9.77
Trichlorofluoromethane	78		3.9	1.9	ppb v/v			04/24/15 23:31	9.77
1,2,4-Trimethylbenzene	ND		7.8	1.6	ppb v/v			04/24/15 23:31	9.77
1,3,5-Trimethylbenzene	ND		3.9	1.2	ppb v/v			04/24/15 23:31	9.77
Vinyl acetate	ND		7.8	1.4	ppb v/v			04/24/15 23:31	9.77
Vinyl chloride	ND		3.9	1.2	ppb v/v			04/24/15 23:31	9.77
m,p-Xylene	ND		7.8	0.98	ppb v/v			04/24/15 23:31	9.77
o-Xylene	ND		3.9	0.53	ppb v/v			04/24/15 23:31	9.77
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130					04/24/15 23:31	9.77
1,2-Dichloroethane-d4 (Surr)	92		70 - 130					04/24/15 23:31	9.77
Toluene-d8 (Surr)	96		70 - 130					04/24/15 23:31	9.77

Client Sample ID: 097556-001/MWL-SV05-300

Lab Sample ID: 320-12598-4

Date Collected: 04/14/15 11:29

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	11	J	16	0.55	ppb v/v			04/25/15 00:14	3.11
Benzene	0.26	J	1.2	0.25	ppb v/v			04/25/15 00:14	3.11
Benzyl chloride	ND		2.5	0.51	ppb v/v			04/25/15 00:14	3.11

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12598-1

Client Sample ID: 097556-001/MWL-SV05-300

Lab Sample ID: 320-12598-4

Date Collected: 04/14/15 11:29

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	ND		0.93	0.21	ppb v/v			04/25/15 00:14	3.11
Bromoform	ND		1.2	0.22	ppb v/v			04/25/15 00:14	3.11
Bromomethane	ND		2.5	1.0	ppb v/v			04/25/15 00:14	3.11
2-Butanone (MEK)	1.4	J	2.5	0.62	ppb v/v			04/25/15 00:14	3.11
Carbon disulfide	ND		2.5	0.24	ppb v/v			04/25/15 00:14	3.11
Carbon tetrachloride	0.78	J	2.5	0.20	ppb v/v			04/25/15 00:14	3.11
Chlorobenzene	ND		0.93	0.20	ppb v/v			04/25/15 00:14	3.11
Chloroethane	ND		2.5	0.96	ppb v/v			04/25/15 00:14	3.11
Chloroform	0.50	J	0.93	0.30	ppb v/v			04/25/15 00:14	3.11
Chloromethane	3.5		2.5	0.61	ppb v/v			04/25/15 00:14	3.11
Dibromochloromethane	ND		1.2	0.25	ppb v/v			04/25/15 00:14	3.11
1,2-Dibromoethane (EDB)	ND		2.5	0.23	ppb v/v			04/25/15 00:14	3.11
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.2	0.48	ppb v/v			04/25/15 00:14	3.11
1,2-Dichlorobenzene	ND		1.2	0.40	ppb v/v			04/25/15 00:14	3.11
1,3-Dichlorobenzene	ND		1.2	0.34	ppb v/v			04/25/15 00:14	3.11
1,4-Dichlorobenzene	ND		1.2	0.46	ppb v/v			04/25/15 00:14	3.11
Dichlorodifluoromethane	24		1.2	0.45	ppb v/v			04/25/15 00:14	3.11
1,1-Dichloroethane	1.1		0.93	0.22	ppb v/v			04/25/15 00:14	3.11
1,2-Dichloroethane	ND		2.5	0.27	ppb v/v			04/25/15 00:14	3.11
1,1-Dichloroethene	19		2.5	0.40	ppb v/v			04/25/15 00:14	3.11
cis-1,2-Dichloroethene	0.54	J	1.2	0.28	ppb v/v			04/25/15 00:14	3.11
trans-1,2-Dichloroethene	ND		1.2	0.31	ppb v/v			04/25/15 00:14	3.11
1,2-Dichloropropane	ND		1.2	0.75	ppb v/v			04/25/15 00:14	3.11
cis-1,3-Dichloropropene	ND		1.2	0.32	ppb v/v			04/25/15 00:14	3.11
trans-1,3-Dichloropropene	ND		1.2	0.27	ppb v/v			04/25/15 00:14	3.11
Ethylbenzene	ND		1.2	0.20	ppb v/v			04/25/15 00:14	3.11
4-Ethyltoluene	ND		1.2	0.58	ppb v/v			04/25/15 00:14	3.11
Hexachlorobutadiene	ND		6.2	1.3	ppb v/v			04/25/15 00:14	3.11
2-Hexanone	ND		1.2	0.27	ppb v/v			04/25/15 00:14	3.11
4-Methyl-2-pentanone (MIBK)	ND		1.2	0.42	ppb v/v			04/25/15 00:14	3.11
Methylene Chloride	0.67	J	1.2	0.22	ppb v/v			04/25/15 00:14	3.11
Styrene	ND		1.2	0.18	ppb v/v			04/25/15 00:14	3.11
1,1,2,2-Tetrachloroethane	ND		1.2	0.21	ppb v/v			04/25/15 00:14	3.11
Tetrachloroethene	97		1.2	0.16	ppb v/v			04/25/15 00:14	3.11
Toluene	1.1	J	1.2	0.16	ppb v/v			04/25/15 00:14	3.11
1,1,2-Trichloro-1,2,2-trifluoroethane	75		1.2	0.51	ppb v/v			04/25/15 00:14	3.11
1,2,4-Trichlorobenzene	ND		6.2	1.3	ppb v/v			04/25/15 00:14	3.11
1,1,1-Trichloroethane	0.91	J	0.93	0.20	ppb v/v			04/25/15 00:14	3.11
1,1,2-Trichloroethane	ND		1.2	0.21	ppb v/v			04/25/15 00:14	3.11
Trichloroethene	82		1.2	0.33	ppb v/v			04/25/15 00:14	3.11
Trichlorofluoromethane	17		1.2	0.61	ppb v/v			04/25/15 00:14	3.11
1,2,4-Trimethylbenzene	ND		2.5	0.50	ppb v/v			04/25/15 00:14	3.11
1,3,5-Trimethylbenzene	ND		1.2	0.39	ppb v/v			04/25/15 00:14	3.11
Vinyl acetate	ND		2.5	0.45	ppb v/v			04/25/15 00:14	3.11
Vinyl chloride	ND		1.2	0.37	ppb v/v			04/25/15 00:14	3.11
m,p-Xylene	ND		2.5	0.31	ppb v/v			04/25/15 00:14	3.11
o-Xylene	ND		1.2	0.17	ppb v/v			04/25/15 00:14	3.11

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12598-1

**Client Sample ID: 097556-001/MWL-SV05-300**

**Lab Sample ID: 320-12598-4**

**Date Collected: 04/14/15 11:29**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130		04/25/15 00:14	3.11
1,2-Dichloroethane-d4 (Surr)	96		70 - 130		04/25/15 00:14	3.11
Toluene-d8 (Surr)	96		70 - 130		04/25/15 00:14	3.11

**Client Sample ID: 097557-001/MWL-SV05-400**

**Lab Sample ID: 320-12598-5**

**Date Collected: 04/14/15 11:33**

**Matrix: Air**

**Date Received: 04/17/15 09:45**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	5.9	J	14	0.50	ppb v/v			04/25/15 00:57	2.79
Benzene	0.40	J	1.1	0.22	ppb v/v			04/25/15 00:57	2.79
Benzyl chloride	ND		2.2	0.45	ppb v/v			04/25/15 00:57	2.79
Bromodichloromethane	ND		0.84	0.18	ppb v/v			04/25/15 00:57	2.79
Bromoform	ND		1.1	0.20	ppb v/v			04/25/15 00:57	2.79
Bromomethane	ND		2.2	0.93	ppb v/v			04/25/15 00:57	2.79
2-Butanone (MEK)	0.59	J	2.2	0.56	ppb v/v			04/25/15 00:57	2.79
Carbon disulfide	0.26	J	2.2	0.22	ppb v/v			04/25/15 00:57	2.79
Carbon tetrachloride	0.35	J	2.2	0.18	ppb v/v			04/25/15 00:57	2.79
Chlorobenzene	ND		0.84	0.18	ppb v/v			04/25/15 00:57	2.79
Chloroethane	ND		2.2	0.86	ppb v/v			04/25/15 00:57	2.79
Chloroform	0.38	J	0.84	0.27	ppb v/v			04/25/15 00:57	2.79
Chloromethane	0.97	J	2.2	0.55	ppb v/v			04/25/15 00:57	2.79
Dibromochloromethane	ND		1.1	0.22	ppb v/v			04/25/15 00:57	2.79
1,2-Dibromoethane (EDB)	ND		2.2	0.21	ppb v/v			04/25/15 00:57	2.79
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.1	0.43	ppb v/v			04/25/15 00:57	2.79
1,2-Dichlorobenzene	ND		1.1	0.36	ppb v/v			04/25/15 00:57	2.79
1,3-Dichlorobenzene	ND		1.1	0.31	ppb v/v			04/25/15 00:57	2.79
1,4-Dichlorobenzene	ND		1.1	0.42	ppb v/v			04/25/15 00:57	2.79
Dichlorodifluoromethane	13		1.1	0.40	ppb v/v			04/25/15 00:57	2.79
1,1-Dichloroethane	0.98		0.84	0.20	ppb v/v			04/25/15 00:57	2.79
1,2-Dichloroethane	ND		2.2	0.25	ppb v/v			04/25/15 00:57	2.79
1,1-Dichloroethene	7.1		2.2	0.36	ppb v/v			04/25/15 00:57	2.79
cis-1,2-Dichloroethene	0.36	J	1.1	0.25	ppb v/v			04/25/15 00:57	2.79
trans-1,2-Dichloroethene	ND		1.1	0.28	ppb v/v			04/25/15 00:57	2.79
1,2-Dichloropropane	ND		1.1	0.67	ppb v/v			04/25/15 00:57	2.79
cis-1,3-Dichloropropene	ND		1.1	0.29	ppb v/v			04/25/15 00:57	2.79
trans-1,3-Dichloropropene	ND		1.1	0.25	ppb v/v			04/25/15 00:57	2.79
Ethylbenzene	ND		1.1	0.18	ppb v/v			04/25/15 00:57	2.79
4-Ethyltoluene	ND		1.1	0.52	ppb v/v			04/25/15 00:57	2.79
Hexachlorobutadiene	ND		5.6	1.2	ppb v/v			04/25/15 00:57	2.79
2-Hexanone	ND		1.1	0.24	ppb v/v			04/25/15 00:57	2.79
4-Methyl-2-pentanone (MIBK)	ND		1.1	0.38	ppb v/v			04/25/15 00:57	2.79
Methylene Chloride	0.49	J	1.1	0.20	ppb v/v			04/25/15 00:57	2.79
Styrene	ND		1.1	0.16	ppb v/v			04/25/15 00:57	2.79
1,1,2,2-Tetrachloroethane	ND		1.1	0.19	ppb v/v			04/25/15 00:57	2.79
Tetrachloroethene	80		1.1	0.14	ppb v/v			04/25/15 00:57	2.79
Toluene	29		1.1	0.14	ppb v/v			04/25/15 00:57	2.79

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12598-1

Client Sample ID: 097557-001/MWL-SV05-400

Lab Sample ID: 320-12598-5

Date Collected: 04/14/15 11:33

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloro-1,2,2-trifluoroethane	33		1.1	0.45	ppb v/v			04/25/15 00:57	2.79
1,2,4-Trichlorobenzene	ND		5.6	1.2	ppb v/v			04/25/15 00:57	2.79
1,1,1-Trichloroethane	0.97		0.84	0.18	ppb v/v			04/25/15 00:57	2.79
1,1,2-Trichloroethane	ND		1.1	0.19	ppb v/v			04/25/15 00:57	2.79
Trichloroethene	66		1.1	0.29	ppb v/v			04/25/15 00:57	2.79
Trichlorofluoromethane	11		1.1	0.55	ppb v/v			04/25/15 00:57	2.79
1,2,4-Trimethylbenzene	ND		2.2	0.45	ppb v/v			04/25/15 00:57	2.79
1,3,5-Trimethylbenzene	ND		1.1	0.35	ppb v/v			04/25/15 00:57	2.79
Vinyl acetate	ND		2.2	0.40	ppb v/v			04/25/15 00:57	2.79
Vinyl chloride	ND		1.1	0.33	ppb v/v			04/25/15 00:57	2.79
m,p-Xylene	ND		2.2	0.28	ppb v/v			04/25/15 00:57	2.79
o-Xylene	ND		1.1	0.15	ppb v/v			04/25/15 00:57	2.79
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130					04/25/15 00:57	2.79
1,2-Dichloroethane-d4 (Surr)	94		70 - 130					04/25/15 00:57	2.79
Toluene-d8 (Surr)	97		70 - 130					04/25/15 00:57	2.79

Client Sample ID: 097558-001/MWL-SV-FB5

Lab Sample ID: 320-12598-6

Date Collected: 04/14/15 11:07

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			04/25/15 01:44	1
Benzene	ND		0.40	0.079	ppb v/v			04/25/15 01:44	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			04/25/15 01:44	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			04/25/15 01:44	1
Bromoform	ND		0.40	0.070	ppb v/v			04/25/15 01:44	1
Bromomethane	ND		0.80	0.34	ppb v/v			04/25/15 01:44	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			04/25/15 01:44	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			04/25/15 01:44	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			04/25/15 01:44	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			04/25/15 01:44	1
Chloroethane	ND		0.80	0.31	ppb v/v			04/25/15 01:44	1
Chloroform	ND		0.30	0.095	ppb v/v			04/25/15 01:44	1
Chloromethane	ND		0.80	0.20	ppb v/v			04/25/15 01:44	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			04/25/15 01:44	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			04/25/15 01:44	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			04/25/15 01:44	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			04/25/15 01:44	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			04/25/15 01:44	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			04/25/15 01:44	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			04/25/15 01:44	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			04/25/15 01:44	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			04/25/15 01:44	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			04/25/15 01:44	1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL-SVM

TestAmerica Job ID: 320-12598-1

Client Sample ID: 097558-001/MWL-SV-FB5

Lab Sample ID: 320-12598-6

Date Collected: 04/14/15 11:07

Matrix: Air

Date Received: 04/17/15 09:45

Sample Container: Summa Canister 6L

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			04/25/15 01:44	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			04/25/15 01:44	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			04/25/15 01:44	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			04/25/15 01:44	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			04/25/15 01:44	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			04/25/15 01:44	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			04/25/15 01:44	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			04/25/15 01:44	1
2-Hexanone	ND		0.40	0.087	ppb v/v			04/25/15 01:44	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			04/25/15 01:44	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			04/25/15 01:44	1
Styrene	ND		0.40	0.059	ppb v/v			04/25/15 01:44	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			04/25/15 01:44	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			04/25/15 01:44	1
<b>Toluene</b>	<b>0.094</b>	<b>J</b>	0.40	0.051	ppb v/v			04/25/15 01:44	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			04/25/15 01:44	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			04/25/15 01:44	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			04/25/15 01:44	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			04/25/15 01:44	1
Trichloroethene	ND		0.40	0.11	ppb v/v			04/25/15 01:44	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			04/25/15 01:44	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			04/25/15 01:44	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			04/25/15 01:44	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			04/25/15 01:44	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			04/25/15 01:44	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			04/25/15 01:44	1
o-Xylene	ND		0.40	0.054	ppb v/v			04/25/15 01:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	85		70 - 130					04/25/15 01:44	1
1,2-Dichloroethane-d4 (Surr)	88		70 - 130					04/25/15 01:44	1
Toluene-d8 (Surr)	99		70 - 130					04/25/15 01:44	1

**OCTOBER 2015 SOIL-VAPOR SAMPLING RESULTS**  
**CERTIFICATES OF ANALYSIS**



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098315-001/MWL-SV-FB1**

**Lab Sample ID: 320-15492-1**

**Date Collected: 10/08/15 08:19**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			11/03/15 15:39	1
Benzene	ND		0.40	0.079	ppb v/v			11/03/15 15:39	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			11/03/15 15:39	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			11/03/15 15:39	1
Bromoform	ND		0.40	0.070	ppb v/v			11/03/15 15:39	1
Bromomethane	ND		0.80	0.34	ppb v/v			11/03/15 15:39	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			11/03/15 15:39	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			11/03/15 15:39	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			11/03/15 15:39	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			11/03/15 15:39	1
Chloroethane	ND		0.80	0.31	ppb v/v			11/03/15 15:39	1
Chloroform	ND		0.30	0.095	ppb v/v			11/03/15 15:39	1
Chloromethane	ND		0.80	0.20	ppb v/v			11/03/15 15:39	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			11/03/15 15:39	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			11/03/15 15:39	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			11/03/15 15:39	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			11/03/15 15:39	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			11/03/15 15:39	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			11/03/15 15:39	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			11/03/15 15:39	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			11/03/15 15:39	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			11/03/15 15:39	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			11/03/15 15:39	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			11/03/15 15:39	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			11/03/15 15:39	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			11/03/15 15:39	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			11/03/15 15:39	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			11/03/15 15:39	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			11/03/15 15:39	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			11/03/15 15:39	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			11/03/15 15:39	1
2-Hexanone	ND		0.40	0.087	ppb v/v			11/03/15 15:39	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			11/03/15 15:39	1
<b>Methylene Chloride</b>	<b>0.078</b>	<b>J</b>	0.40	0.072	ppb v/v			11/03/15 15:39	1
Styrene	ND		0.40	0.059	ppb v/v			11/03/15 15:39	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			11/03/15 15:39	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			11/03/15 15:39	1
Toluene	ND		0.40	0.051	ppb v/v			11/03/15 15:39	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			11/03/15 15:39	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			11/03/15 15:39	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			11/03/15 15:39	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			11/03/15 15:39	1
Trichloroethene	ND		0.40	0.11	ppb v/v			11/03/15 15:39	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			11/03/15 15:39	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			11/03/15 15:39	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			11/03/15 15:39	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			11/03/15 15:39	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			11/03/15 15:39	1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098315-001/MWL-SV-FB1**

**Lab Sample ID: 320-15492-1**

**Date Collected: 10/08/15 08:19**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		0.80	0.10	ppb v/v			11/03/15 15:39	1
o-Xylene	ND		0.40	0.054	ppb v/v			11/03/15 15:39	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130					11/03/15 15:39	1
1,2-Dichloroethane-d4 (Surr)	98		70 - 130					11/03/15 15:39	1
Toluene-d8 (Surr)	97		70 - 130					11/03/15 15:39	1

**Client Sample ID: 098316-001/MWL-SV01-42.5 W/M**

**Lab Sample ID: 320-15492-2**

**Date Collected: 10/08/15 08:38**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>10</b>	<b>J</b>	130	4.6	ppb v/v			11/03/15 16:30	26
Benzene	ND		10	2.1	ppb v/v			11/03/15 16:30	26
Benzyl chloride	ND		21	4.2	ppb v/v			11/03/15 16:30	26
Bromodichloromethane	ND		7.8	1.7	ppb v/v			11/03/15 16:30	26
Bromoform	ND		10	1.8	ppb v/v			11/03/15 16:30	26
Bromomethane	ND		21	8.7	ppb v/v			11/03/15 16:30	26
2-Butanone (MEK)	ND		21	5.2	ppb v/v			11/03/15 16:30	26
Carbon disulfide	ND		21	2.0	ppb v/v			11/03/15 16:30	26
Carbon tetrachloride	ND		21	1.7	ppb v/v			11/03/15 16:30	26
Chlorobenzene	ND		7.8	1.7	ppb v/v			11/03/15 16:30	26
Chloroethane	ND		21	8.0	ppb v/v			11/03/15 16:30	26
<b>Chloroform</b>	<b>13</b>		7.8	2.5	ppb v/v			11/03/15 16:30	26
Chloromethane	ND		21	5.1	ppb v/v			11/03/15 16:30	26
Dibromochloromethane	ND		10	2.1	ppb v/v			11/03/15 16:30	26
1,2-Dibromoethane (EDB)	ND		21	2.0	ppb v/v			11/03/15 16:30	26
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		10	4.0	ppb v/v			11/03/15 16:30	26
1,2-Dichlorobenzene	ND		10	3.4	ppb v/v			11/03/15 16:30	26
1,3-Dichlorobenzene	ND		10	2.9	ppb v/v			11/03/15 16:30	26
1,4-Dichlorobenzene	ND		10	3.9	ppb v/v			11/03/15 16:30	26
<b>Dichlorodifluoromethane</b>	<b>98</b>		10	3.8	ppb v/v			11/03/15 16:30	26
1,1-Dichloroethane	ND		7.8	1.9	ppb v/v			11/03/15 16:30	26
1,2-Dichloroethane	ND		21	2.3	ppb v/v			11/03/15 16:30	26
<b>1,1-Dichloroethene</b>	<b>7.1</b>	<b>J</b>	21	3.4	ppb v/v			11/03/15 16:30	26
cis-1,2-Dichloroethene	ND		10	2.3	ppb v/v			11/03/15 16:30	26
trans-1,2-Dichloroethene	ND		10	2.6	ppb v/v			11/03/15 16:30	26
1,2-Dichloropropane	ND		10	6.2	ppb v/v			11/03/15 16:30	26
cis-1,3-Dichloropropene	ND		10	2.7	ppb v/v			11/03/15 16:30	26
trans-1,3-Dichloropropene	ND		10	2.3	ppb v/v			11/03/15 16:30	26
Ethylbenzene	ND		10	1.6	ppb v/v			11/03/15 16:30	26
4-Ethyltoluene	ND		10	4.9	ppb v/v			11/03/15 16:30	26
Hexachlorobutadiene	ND		52	11	ppb v/v			11/03/15 16:30	26
2-Hexanone	ND		10	2.3	ppb v/v			11/03/15 16:30	26
4-Methyl-2-pentanone (MIBK)	ND		10	3.5	ppb v/v			11/03/15 16:30	26
Methylene Chloride	ND		10	1.9	ppb v/v			11/03/15 16:30	26

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098316-001/MWL-SV01-42.5 W/M**

**Lab Sample ID: 320-15492-2**

**Date Collected: 10/08/15 08:38**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		10	1.5	ppb v/v			11/03/15 16:30	26
1,1,2,2-Tetrachloroethane	ND		10	1.8	ppb v/v			11/03/15 16:30	26
<b>Tetrachloroethene</b>	<b>400</b>		10	1.3	ppb v/v			11/03/15 16:30	26
Toluene	ND		10	1.3	ppb v/v			11/03/15 16:30	26
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>84</b>		10	4.2	ppb v/v			11/03/15 16:30	26
1,2,4-Trichlorobenzene	ND		52	11	ppb v/v			11/03/15 16:30	26
<b>1,1,1-Trichloroethane</b>	<b>42</b>		7.8	1.7	ppb v/v			11/03/15 16:30	26
1,1,2-Trichloroethane	ND		10	1.7	ppb v/v			11/03/15 16:30	26
<b>Trichloroethene</b>	<b>89</b>		10	2.7	ppb v/v			11/03/15 16:30	26
<b>Trichlorofluoromethane</b>	<b>180</b>		10	5.1	ppb v/v			11/03/15 16:30	26
1,2,4-Trimethylbenzene	ND		21	4.2	ppb v/v			11/03/15 16:30	26
1,3,5-Trimethylbenzene	ND		10	3.3	ppb v/v			11/03/15 16:30	26
Vinyl acetate	ND		21	3.8	ppb v/v			11/03/15 16:30	26
Vinyl chloride	ND		10	3.1	ppb v/v			11/03/15 16:30	26
m,p-Xylene	ND		21	2.6	ppb v/v			11/03/15 16:30	26
o-Xylene	ND		10	1.4	ppb v/v			11/03/15 16:30	26

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	85		70 - 130		11/03/15 16:30	26
1,2-Dichloroethane-d4 (Surr)	101		70 - 130		11/03/15 16:30	26
Toluene-d8 (Surr)	99		70 - 130		11/03/15 16:30	26

**Client Sample ID: 098317-001/MWL-SV01-42.5 W/M**

**Lab Sample ID: 320-15492-3**

**Date Collected: 10/08/15 08:38**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>43</b>	<b>J</b>	130	4.6	ppb v/v			11/03/15 17:21	26
Benzene	ND		10	2.1	ppb v/v			11/03/15 17:21	26
Benzyl chloride	ND		21	4.2	ppb v/v			11/03/15 17:21	26
Bromodichloromethane	ND		7.8	1.7	ppb v/v			11/03/15 17:21	26
Bromoform	ND		10	1.8	ppb v/v			11/03/15 17:21	26
Bromomethane	ND		21	8.7	ppb v/v			11/03/15 17:21	26
2-Butanone (MEK)	ND		21	5.2	ppb v/v			11/03/15 17:21	26
Carbon disulfide	ND		21	2.0	ppb v/v			11/03/15 17:21	26
Carbon tetrachloride	ND		21	1.7	ppb v/v			11/03/15 17:21	26
Chlorobenzene	ND		7.8	1.7	ppb v/v			11/03/15 17:21	26
Chloroethane	ND		21	8.0	ppb v/v			11/03/15 17:21	26
<b>Chloroform</b>	<b>13</b>		7.8	2.5	ppb v/v			11/03/15 17:21	26
Chloromethane	ND		21	5.1	ppb v/v			11/03/15 17:21	26
Dibromochloromethane	ND		10	2.1	ppb v/v			11/03/15 17:21	26
1,2-Dibromoethane (EDB)	ND		21	2.0	ppb v/v			11/03/15 17:21	26
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		10	4.0	ppb v/v			11/03/15 17:21	26
1,2-Dichlorobenzene	ND		10	3.4	ppb v/v			11/03/15 17:21	26
1,3-Dichlorobenzene	ND		10	2.9	ppb v/v			11/03/15 17:21	26
1,4-Dichlorobenzene	ND		10	3.9	ppb v/v			11/03/15 17:21	26

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098317-001/MWL-SV01-42.5 W/M**

**Lab Sample ID: 320-15492-3**

**Date Collected: 10/08/15 08:38**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	97		10	3.8	ppb v/v			11/03/15 17:21	26
1,1-Dichloroethane	2.7	J	7.8	1.9	ppb v/v			11/03/15 17:21	26
1,2-Dichloroethane	ND		21	2.3	ppb v/v			11/03/15 17:21	26
1,1-Dichloroethene	7.2	J	21	3.4	ppb v/v			11/03/15 17:21	26
cis-1,2-Dichloroethene	ND		10	2.3	ppb v/v			11/03/15 17:21	26
trans-1,2-Dichloroethene	ND		10	2.6	ppb v/v			11/03/15 17:21	26
1,2-Dichloropropane	ND		10	6.2	ppb v/v			11/03/15 17:21	26
cis-1,3-Dichloropropene	ND		10	2.7	ppb v/v			11/03/15 17:21	26
trans-1,3-Dichloropropene	ND		10	2.3	ppb v/v			11/03/15 17:21	26
Ethylbenzene	ND		10	1.6	ppb v/v			11/03/15 17:21	26
4-Ethyltoluene	ND		10	4.9	ppb v/v			11/03/15 17:21	26
Hexachlorobutadiene	ND		52	11	ppb v/v			11/03/15 17:21	26
2-Hexanone	ND		10	2.3	ppb v/v			11/03/15 17:21	26
4-Methyl-2-pentanone (MIBK)	ND		10	3.5	ppb v/v			11/03/15 17:21	26
Methylene Chloride	ND		10	1.9	ppb v/v			11/03/15 17:21	26
Styrene	ND		10	1.5	ppb v/v			11/03/15 17:21	26
1,1,2,2-Tetrachloroethane	ND		10	1.8	ppb v/v			11/03/15 17:21	26
Tetrachloroethene	410		10	1.3	ppb v/v			11/03/15 17:21	26
Toluene	ND		10	1.3	ppb v/v			11/03/15 17:21	26
1,1,2-Trichloro-1,2,2-trifluoroethane	82		10	4.2	ppb v/v			11/03/15 17:21	26
1,2,4-Trichlorobenzene	ND		52	11	ppb v/v			11/03/15 17:21	26
1,1,1-Trichloroethane	41		7.8	1.7	ppb v/v			11/03/15 17:21	26
1,1,2-Trichloroethane	ND		10	1.7	ppb v/v			11/03/15 17:21	26
Trichloroethene	88		10	2.7	ppb v/v			11/03/15 17:21	26
Trichlorofluoromethane	180		10	5.1	ppb v/v			11/03/15 17:21	26
1,2,4-Trimethylbenzene	ND		21	4.2	ppb v/v			11/03/15 17:21	26
1,3,5-Trimethylbenzene	ND		10	3.3	ppb v/v			11/03/15 17:21	26
Vinyl acetate	ND		21	3.8	ppb v/v			11/03/15 17:21	26
Vinyl chloride	ND		10	3.1	ppb v/v			11/03/15 17:21	26
m,p-Xylene	ND		21	2.6	ppb v/v			11/03/15 17:21	26
o-Xylene	ND		10	1.4	ppb v/v			11/03/15 17:21	26

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		70 - 130		11/03/15 17:21	26
1,2-Dichloroethane-d4 (Surr)	101		70 - 130		11/03/15 17:21	26
Toluene-d8 (Surr)	97		70 - 130		11/03/15 17:21	26

**Client Sample ID: 098318-001/MWL-SV01-42.5 I/S**

**Lab Sample ID: 320-15492-4**

**Date Collected: 10/08/15 08:40**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	5.9	J	84	3.0	ppb v/v			11/04/15 08:41	16.7
Benzene	ND		6.7	1.3	ppb v/v			11/04/15 08:41	16.7
Benzyl chloride	ND		13	2.7	ppb v/v			11/04/15 08:41	16.7
Bromodichloromethane	ND		5.0	1.1	ppb v/v			11/04/15 08:41	16.7

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098318-001/MWL-SV01-42.5 I/S**

**Lab Sample ID: 320-15492-4**

**Date Collected: 10/08/15 08:40**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromoform	ND		6.7	1.2	ppb v/v			11/04/15 08:41	16.7
Bromomethane	ND		13	5.6	ppb v/v			11/04/15 08:41	16.7
2-Butanone (MEK)	ND		13	3.3	ppb v/v			11/04/15 08:41	16.7
Carbon disulfide	ND		13	1.3	ppb v/v			11/04/15 08:41	16.7
Carbon tetrachloride	ND		13	1.1	ppb v/v			11/04/15 08:41	16.7
Chlorobenzene	ND		5.0	1.1	ppb v/v			11/04/15 08:41	16.7
Chloroethane	ND		13	5.1	ppb v/v			11/04/15 08:41	16.7
<b>Chloroform</b>	<b>13</b>		5.0	1.6	ppb v/v			11/04/15 08:41	16.7
Chloromethane	ND		13	3.3	ppb v/v			11/04/15 08:41	16.7
Dibromochloromethane	ND		6.7	1.3	ppb v/v			11/04/15 08:41	16.7
1,2-Dibromoethane (EDB)	ND		13	1.3	ppb v/v			11/04/15 08:41	16.7
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		6.7	2.6	ppb v/v			11/04/15 08:41	16.7
1,2-Dichlorobenzene	ND		6.7	2.2	ppb v/v			11/04/15 08:41	16.7
1,3-Dichlorobenzene	ND		6.7	1.8	ppb v/v			11/04/15 08:41	16.7
1,4-Dichlorobenzene	ND		6.7	2.5	ppb v/v			11/04/15 08:41	16.7
<b>Dichlorodifluoromethane</b>	<b>98</b>		6.7	2.4	ppb v/v			11/04/15 08:41	16.7
<b>1,1-Dichloroethane</b>	<b>2.7 J</b>		5.0	1.2	ppb v/v			11/04/15 08:41	16.7
1,2-Dichloroethane	ND		13	1.5	ppb v/v			11/04/15 08:41	16.7
<b>1,1-Dichloroethene</b>	<b>6.7 J</b>		13	2.2	ppb v/v			11/04/15 08:41	16.7
cis-1,2-Dichloroethene	ND		6.7	1.5	ppb v/v			11/04/15 08:41	16.7
trans-1,2-Dichloroethene	ND		6.7	1.7	ppb v/v			11/04/15 08:41	16.7
1,2-Dichloropropane	ND		6.7	4.0	ppb v/v			11/04/15 08:41	16.7
cis-1,3-Dichloropropene	ND		6.7	1.7	ppb v/v			11/04/15 08:41	16.7
trans-1,3-Dichloropropene	ND		6.7	1.5	ppb v/v			11/04/15 08:41	16.7
Ethylbenzene	ND		6.7	1.1	ppb v/v			11/04/15 08:41	16.7
4-Ethyltoluene	ND		6.7	3.1	ppb v/v			11/04/15 08:41	16.7
Hexachlorobutadiene	ND		33	7.2	ppb v/v			11/04/15 08:41	16.7
2-Hexanone	ND		6.7	1.5	ppb v/v			11/04/15 08:41	16.7
4-Methyl-2-pentanone (MIBK)	ND		6.7	2.3	ppb v/v			11/04/15 08:41	16.7
Methylene Chloride	ND		6.7	1.2	ppb v/v			11/04/15 08:41	16.7
Styrene	ND		6.7	0.99	ppb v/v			11/04/15 08:41	16.7
1,1,2,2-Tetrachloroethane	ND		6.7	1.2	ppb v/v			11/04/15 08:41	16.7
<b>Tetrachloroethene</b>	<b>420</b>		6.7	0.85	ppb v/v			11/04/15 08:41	16.7
Toluene	ND		6.7	0.85	ppb v/v			11/04/15 08:41	16.7
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>83</b>		6.7	2.7	ppb v/v			11/04/15 08:41	16.7
1,2,4-Trichlorobenzene	ND		33	7.2	ppb v/v			11/04/15 08:41	16.7
<b>1,1,1-Trichloroethane</b>	<b>41</b>		5.0	1.1	ppb v/v			11/04/15 08:41	16.7
1,1,2-Trichloroethane	ND		6.7	1.1	ppb v/v			11/04/15 08:41	16.7
<b>Trichloroethene</b>	<b>98</b>		6.7	1.8	ppb v/v			11/04/15 08:41	16.7
<b>Trichlorofluoromethane</b>	<b>180</b>		6.7	3.3	ppb v/v			11/04/15 08:41	16.7
1,2,4-Trimethylbenzene	ND		13	2.7	ppb v/v			11/04/15 08:41	16.7
1,3,5-Trimethylbenzene	ND		6.7	2.1	ppb v/v			11/04/15 08:41	16.7
Vinyl acetate	ND		13	2.4	ppb v/v			11/04/15 08:41	16.7
Vinyl chloride	ND		6.7	2.0	ppb v/v			11/04/15 08:41	16.7
m,p-Xylene	ND		13	1.7	ppb v/v			11/04/15 08:41	16.7
o-Xylene	ND		6.7	0.90	ppb v/v			11/04/15 08:41	16.7

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098318-001/MWL-SV01-42.5 I/S**

**Date Collected: 10/08/15 08:40**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

**Lab Sample ID: 320-15492-4**

**Matrix: Air**

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		70 - 130		11/04/15 08:41	16.7
1,2-Dichloroethane-d4 (Surr)	117		70 - 130		11/04/15 08:41	16.7
Toluene-d8 (Surr)	103		70 - 130		11/04/15 08:41	16.7

**Client Sample ID: 098319-001/MWL-SV01-42.5 I/S**

**Date Collected: 10/08/15 08:41**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

**Lab Sample ID: 320-15492-5**

**Matrix: Air**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		95	3.4	ppb v/v			11/04/15 09:31	18.9
Benzene	ND		7.6	1.5	ppb v/v			11/04/15 09:31	18.9
Benzyl chloride	ND		15	3.1	ppb v/v			11/04/15 09:31	18.9
Bromodichloromethane	ND		5.7	1.2	ppb v/v			11/04/15 09:31	18.9
Bromoform	ND		7.6	1.3	ppb v/v			11/04/15 09:31	18.9
Bromomethane	ND		15	6.3	ppb v/v			11/04/15 09:31	18.9
2-Butanone (MEK)	ND		15	3.8	ppb v/v			11/04/15 09:31	18.9
Carbon disulfide	ND		15	1.5	ppb v/v			11/04/15 09:31	18.9
Carbon tetrachloride	ND		15	1.2	ppb v/v			11/04/15 09:31	18.9
Chlorobenzene	ND		5.7	1.2	ppb v/v			11/04/15 09:31	18.9
Chloroethane	ND		15	5.8	ppb v/v			11/04/15 09:31	18.9
<b>Chloroform</b>	<b>14</b>		5.7	1.8	ppb v/v			11/04/15 09:31	18.9
Chloromethane	ND		15	3.7	ppb v/v			11/04/15 09:31	18.9
Dibromochloromethane	ND		7.6	1.5	ppb v/v			11/04/15 09:31	18.9
1,2-Dibromoethane (EDB)	ND		15	1.4	ppb v/v			11/04/15 09:31	18.9
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		7.6	2.9	ppb v/v			11/04/15 09:31	18.9
1,2-Dichlorobenzene	ND		7.6	2.5	ppb v/v			11/04/15 09:31	18.9
1,3-Dichlorobenzene	ND		7.6	2.1	ppb v/v			11/04/15 09:31	18.9
1,4-Dichlorobenzene	ND		7.6	2.8	ppb v/v			11/04/15 09:31	18.9
<b>Dichlorodifluoromethane</b>	<b>110</b>		7.6	2.7	ppb v/v			11/04/15 09:31	18.9
<b>1,1-Dichloroethane</b>	<b>2.9 J</b>		5.7	1.4	ppb v/v			11/04/15 09:31	18.9
1,2-Dichloroethane	ND		15	1.7	ppb v/v			11/04/15 09:31	18.9
<b>1,1-Dichloroethene</b>	<b>7.3 J</b>		15	2.4	ppb v/v			11/04/15 09:31	18.9
cis-1,2-Dichloroethene	ND		7.6	1.7	ppb v/v			11/04/15 09:31	18.9
trans-1,2-Dichloroethene	ND		7.6	1.9	ppb v/v			11/04/15 09:31	18.9
1,2-Dichloropropane	ND		7.6	4.5	ppb v/v			11/04/15 09:31	18.9
cis-1,3-Dichloropropene	ND		7.6	2.0	ppb v/v			11/04/15 09:31	18.9
trans-1,3-Dichloropropene	ND		7.6	1.7	ppb v/v			11/04/15 09:31	18.9
Ethylbenzene	ND		7.6	1.2	ppb v/v			11/04/15 09:31	18.9
4-Ethyltoluene	ND		7.6	3.5	ppb v/v			11/04/15 09:31	18.9
Hexachlorobutadiene	ND		38	8.2	ppb v/v			11/04/15 09:31	18.9
2-Hexanone	ND		7.6	1.6	ppb v/v			11/04/15 09:31	18.9
4-Methyl-2-pentanone (MIBK)	ND		7.6	2.6	ppb v/v			11/04/15 09:31	18.9
Methylene Chloride	ND		7.6	1.4	ppb v/v			11/04/15 09:31	18.9
Styrene	ND		7.6	1.1	ppb v/v			11/04/15 09:31	18.9
1,1,2,2-Tetrachloroethane	ND		7.6	1.3	ppb v/v			11/04/15 09:31	18.9
<b>Tetrachloroethene</b>	<b>470</b>		7.6	0.96	ppb v/v			11/04/15 09:31	18.9
Toluene	ND		7.6	0.96	ppb v/v			11/04/15 09:31	18.9

TestAmerica Sacramento



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098319-001/MWL-SV01-42.5 I/S**

**Lab Sample ID: 320-15492-5**

**Date Collected: 10/08/15 08:41**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>89</b>		7.6	3.1	ppb v/v			11/04/15 09:31	18.9
1,2,4-Trichlorobenzene	ND		38	8.2	ppb v/v			11/04/15 09:31	18.9
<b>1,1,1-Trichloroethane</b>	<b>43</b>		5.7	1.2	ppb v/v			11/04/15 09:31	18.9
1,1,2-Trichloroethane	ND		7.6	1.3	ppb v/v			11/04/15 09:31	18.9
<b>Trichloroethene</b>	<b>110</b>		7.6	2.0	ppb v/v			11/04/15 09:31	18.9
<b>Trichlorofluoromethane</b>	<b>190</b>		7.6	3.7	ppb v/v			11/04/15 09:31	18.9
1,2,4-Trimethylbenzene	ND		15	3.1	ppb v/v			11/04/15 09:31	18.9
1,3,5-Trimethylbenzene	ND		7.6	2.4	ppb v/v			11/04/15 09:31	18.9
Vinyl acetate	ND		15	2.7	ppb v/v			11/04/15 09:31	18.9
Vinyl chloride	ND		7.6	2.3	ppb v/v			11/04/15 09:31	18.9
m,p-Xylene	ND		15	1.9	ppb v/v			11/04/15 09:31	18.9
o-Xylene	ND		7.6	1.0	ppb v/v			11/04/15 09:31	18.9

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	82		70 - 130		11/04/15 09:31	18.9
1,2-Dichloroethane-d4 (Surr)	118		70 - 130		11/04/15 09:31	18.9
Toluene-d8 (Surr)	99		70 - 130		11/04/15 09:31	18.9

**Client Sample ID: 098320-001/MWL-SV-FB2**

**Lab Sample ID: 320-15492-6**

**Date Collected: 10/08/15 08:20**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			11/04/15 17:40	1
Benzene	ND		0.40	0.079	ppb v/v			11/04/15 17:40	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			11/04/15 17:40	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			11/04/15 17:40	1
Bromoform	ND		0.40	0.070	ppb v/v			11/04/15 17:40	1
Bromomethane	ND		0.80	0.34	ppb v/v			11/04/15 17:40	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			11/04/15 17:40	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			11/04/15 17:40	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			11/04/15 17:40	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			11/04/15 17:40	1
Chloroethane	ND		0.80	0.31	ppb v/v			11/04/15 17:40	1
Chloroform	ND		0.30	0.095	ppb v/v			11/04/15 17:40	1
Chloromethane	ND		0.80	0.20	ppb v/v			11/04/15 17:40	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			11/04/15 17:40	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			11/04/15 17:40	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			11/04/15 17:40	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			11/04/15 17:40	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			11/04/15 17:40	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			11/04/15 17:40	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			11/04/15 17:40	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			11/04/15 17:40	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			11/04/15 17:40	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			11/04/15 17:40	1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098320-001/MWL-SV-FB2**

**Lab Sample ID: 320-15492-6**

**Date Collected: 10/08/15 08:20**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			11/04/15 17:40	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			11/04/15 17:40	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			11/04/15 17:40	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			11/04/15 17:40	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			11/04/15 17:40	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			11/04/15 17:40	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			11/04/15 17:40	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			11/04/15 17:40	1
2-Hexanone	ND		0.40	0.087	ppb v/v			11/04/15 17:40	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			11/04/15 17:40	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			11/04/15 17:40	1
Styrene	ND		0.40	0.059	ppb v/v			11/04/15 17:40	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			11/04/15 17:40	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			11/04/15 17:40	1
Toluene	ND		0.40	0.051	ppb v/v			11/04/15 17:40	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			11/04/15 17:40	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			11/04/15 17:40	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			11/04/15 17:40	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			11/04/15 17:40	1
Trichloroethene	ND		0.40	0.11	ppb v/v			11/04/15 17:40	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			11/04/15 17:40	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			11/04/15 17:40	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			11/04/15 17:40	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			11/04/15 17:40	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			11/04/15 17:40	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			11/04/15 17:40	1
o-Xylene	ND		0.40	0.054	ppb v/v			11/04/15 17:40	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		70 - 130					11/04/15 17:40	1
1,2-Dichloroethane-d4 (Surr)	105		70 - 130					11/04/15 17:40	1
Toluene-d8 (Surr)	99		70 - 130					11/04/15 17:40	1

**Client Sample ID: 098321-001/MWL-SV02-41.5 W/M**

**Lab Sample ID: 320-15492-7**

**Date Collected: 10/08/15 08:56**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	15	J	51	1.8	ppb v/v			11/04/15 18:30	10.1
Benzene	ND		4.0	0.80	ppb v/v			11/04/15 18:30	10.1
Benzyl chloride	ND		8.1	1.6	ppb v/v			11/04/15 18:30	10.1
Bromodichloromethane	ND		3.0	0.67	ppb v/v			11/04/15 18:30	10.1
Bromoform	ND		4.0	0.71	ppb v/v			11/04/15 18:30	10.1
Bromomethane	ND		8.1	3.4	ppb v/v			11/04/15 18:30	10.1
2-Butanone (MEK)	3.5	J	8.1	2.0	ppb v/v			11/04/15 18:30	10.1
Carbon disulfide	ND		8.1	0.79	ppb v/v			11/04/15 18:30	10.1
Carbon tetrachloride	ND		8.1	0.65	ppb v/v			11/04/15 18:30	10.1

TestAmerica Sacramento



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098321-001/MWL-SV02-41.5 W/M**

**Lab Sample ID: 320-15492-7**

**Date Collected: 10/08/15 08:56**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	ND		3.0	0.65	ppb v/v			11/04/15 18:30	10.1
Chloroethane	ND		8.1	3.1	ppb v/v			11/04/15 18:30	10.1
<b>Chloroform</b>	<b>2.7</b>	<b>J</b>	3.0	0.96	ppb v/v			11/04/15 18:30	10.1
Chloromethane	ND		8.1	2.0	ppb v/v			11/04/15 18:30	10.1
Dibromochloromethane	ND		4.0	0.80	ppb v/v			11/04/15 18:30	10.1
1,2-Dibromoethane (EDB)	ND		8.1	0.76	ppb v/v			11/04/15 18:30	10.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.0	1.6	ppb v/v			11/04/15 18:30	10.1
1,2-Dichlorobenzene	ND		4.0	1.3	ppb v/v			11/04/15 18:30	10.1
1,3-Dichlorobenzene	ND		4.0	1.1	ppb v/v			11/04/15 18:30	10.1
1,4-Dichlorobenzene	ND		4.0	1.5	ppb v/v			11/04/15 18:30	10.1
<b>Dichlorodifluoromethane</b>	<b>93</b>		4.0	1.5	ppb v/v			11/04/15 18:30	10.1
<b>1,1-Dichloroethane</b>	<b>2.4</b>	<b>J</b>	3.0	0.73	ppb v/v			11/04/15 18:30	10.1
1,2-Dichloroethane	ND		8.1	0.89	ppb v/v			11/04/15 18:30	10.1
<b>1,1-Dichloroethene</b>	<b>9.6</b>		8.1	1.3	ppb v/v			11/04/15 18:30	10.1
cis-1,2-Dichloroethene	ND		4.0	0.90	ppb v/v			11/04/15 18:30	10.1
trans-1,2-Dichloroethene	ND		4.0	1.0	ppb v/v			11/04/15 18:30	10.1
1,2-Dichloropropane	ND		4.0	2.4	ppb v/v			11/04/15 18:30	10.1
cis-1,3-Dichloropropene	ND		4.0	1.1	ppb v/v			11/04/15 18:30	10.1
trans-1,3-Dichloropropene	ND		4.0	0.89	ppb v/v			11/04/15 18:30	10.1
Ethylbenzene	ND		4.0	0.64	ppb v/v			11/04/15 18:30	10.1
4-Ethyltoluene	ND		4.0	1.9	ppb v/v			11/04/15 18:30	10.1
Hexachlorobutadiene	ND		20	4.4	ppb v/v			11/04/15 18:30	10.1
2-Hexanone	ND		4.0	0.88	ppb v/v			11/04/15 18:30	10.1
4-Methyl-2-pentanone (MIBK)	ND		4.0	1.4	ppb v/v			11/04/15 18:30	10.1
Methylene Chloride	ND		4.0	0.73	ppb v/v			11/04/15 18:30	10.1
Styrene	ND		4.0	0.60	ppb v/v			11/04/15 18:30	10.1
1,1,2,2-Tetrachloroethane	ND		4.0	0.70	ppb v/v			11/04/15 18:30	10.1
<b>Tetrachloroethene</b>	<b>65</b>		4.0	0.52	ppb v/v			11/04/15 18:30	10.1
Toluene	ND		4.0	0.52	ppb v/v			11/04/15 18:30	10.1
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>50</b>		4.0	1.6	ppb v/v			11/04/15 18:30	10.1
1,2,4-Trichlorobenzene	ND		20	4.4	ppb v/v			11/04/15 18:30	10.1
<b>1,1,1-Trichloroethane</b>	<b>70</b>		3.0	0.66	ppb v/v			11/04/15 18:30	10.1
1,1,2-Trichloroethane	ND		4.0	0.68	ppb v/v			11/04/15 18:30	10.1
<b>Trichloroethene</b>	<b>61</b>		4.0	1.1	ppb v/v			11/04/15 18:30	10.1
<b>Trichlorofluoromethane</b>	<b>300</b>		4.0	2.0	ppb v/v			11/04/15 18:30	10.1
1,2,4-Trimethylbenzene	ND		8.1	1.6	ppb v/v			11/04/15 18:30	10.1
1,3,5-Trimethylbenzene	ND		4.0	1.3	ppb v/v			11/04/15 18:30	10.1
<b>Vinyl acetate</b>	<b>7.5</b>	<b>J</b>	8.1	1.5	ppb v/v			11/04/15 18:30	10.1
Vinyl chloride	ND		4.0	1.2	ppb v/v			11/04/15 18:30	10.1
m,p-Xylene	ND		8.1	1.0	ppb v/v			11/04/15 18:30	10.1
o-Xylene	ND		4.0	0.55	ppb v/v			11/04/15 18:30	10.1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130					11/04/15 18:30	10.1
1,2-Dichloroethane-d4 (Surr)	104		70 - 130					11/04/15 18:30	10.1
Toluene-d8 (Surr)	98		70 - 130					11/04/15 18:30	10.1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098322-001/MWL-SV02-41.5 W/M**

**Lab Sample ID: 320-15492-8**

**Date Collected: 10/08/15 08:56**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>7.4</b>	<b>J</b>	51	1.8	ppb v/v			11/04/15 19:20	10.1
Benzene	ND		4.0	0.80	ppb v/v			11/04/15 19:20	10.1
Benzyl chloride	ND		8.1	1.6	ppb v/v			11/04/15 19:20	10.1
Bromodichloromethane	ND		3.0	0.67	ppb v/v			11/04/15 19:20	10.1
Bromoform	ND		4.0	0.71	ppb v/v			11/04/15 19:20	10.1
Bromomethane	ND		8.1	3.4	ppb v/v			11/04/15 19:20	10.1
<b>2-Butanone (MEK)</b>	<b>3.0</b>	<b>J</b>	8.1	2.0	ppb v/v			11/04/15 19:20	10.1
Carbon disulfide	ND		8.1	0.79	ppb v/v			11/04/15 19:20	10.1
Carbon tetrachloride	ND		8.1	0.65	ppb v/v			11/04/15 19:20	10.1
Chlorobenzene	ND		3.0	0.65	ppb v/v			11/04/15 19:20	10.1
Chloroethane	ND		8.1	3.1	ppb v/v			11/04/15 19:20	10.1
<b>Chloroform</b>	<b>2.8</b>	<b>J</b>	3.0	0.96	ppb v/v			11/04/15 19:20	10.1
Chloromethane	ND		8.1	2.0	ppb v/v			11/04/15 19:20	10.1
Dibromochloromethane	ND		4.0	0.80	ppb v/v			11/04/15 19:20	10.1
1,2-Dibromoethane (EDB)	ND		8.1	0.76	ppb v/v			11/04/15 19:20	10.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.0	1.6	ppb v/v			11/04/15 19:20	10.1
1,2-Dichlorobenzene	ND		4.0	1.3	ppb v/v			11/04/15 19:20	10.1
1,3-Dichlorobenzene	ND		4.0	1.1	ppb v/v			11/04/15 19:20	10.1
1,4-Dichlorobenzene	ND		4.0	1.5	ppb v/v			11/04/15 19:20	10.1
<b>Dichlorodifluoromethane</b>	<b>95</b>		4.0	1.5	ppb v/v			11/04/15 19:20	10.1
<b>1,1-Dichloroethane</b>	<b>2.4</b>	<b>J</b>	3.0	0.73	ppb v/v			11/04/15 19:20	10.1
1,2-Dichloroethane	ND		8.1	0.89	ppb v/v			11/04/15 19:20	10.1
<b>1,1-Dichloroethene</b>	<b>10</b>		8.1	1.3	ppb v/v			11/04/15 19:20	10.1
cis-1,2-Dichloroethene	ND		4.0	0.90	ppb v/v			11/04/15 19:20	10.1
trans-1,2-Dichloroethene	ND		4.0	1.0	ppb v/v			11/04/15 19:20	10.1
1,2-Dichloropropane	ND		4.0	2.4	ppb v/v			11/04/15 19:20	10.1
cis-1,3-Dichloropropene	ND		4.0	1.1	ppb v/v			11/04/15 19:20	10.1
trans-1,3-Dichloropropene	ND		4.0	0.89	ppb v/v			11/04/15 19:20	10.1
Ethylbenzene	ND		4.0	0.64	ppb v/v			11/04/15 19:20	10.1
4-Ethyltoluene	ND		4.0	1.9	ppb v/v			11/04/15 19:20	10.1
Hexachlorobutadiene	ND		20	4.4	ppb v/v			11/04/15 19:20	10.1
2-Hexanone	ND		4.0	0.88	ppb v/v			11/04/15 19:20	10.1
4-Methyl-2-pentanone (MIBK)	ND		4.0	1.4	ppb v/v			11/04/15 19:20	10.1
Methylene Chloride	ND		4.0	0.73	ppb v/v			11/04/15 19:20	10.1
Styrene	ND		4.0	0.60	ppb v/v			11/04/15 19:20	10.1
1,1,2,2-Tetrachloroethane	ND		4.0	0.70	ppb v/v			11/04/15 19:20	10.1
<b>Tetrachloroethene</b>	<b>66</b>		4.0	0.52	ppb v/v			11/04/15 19:20	10.1
Toluene	ND		4.0	0.52	ppb v/v			11/04/15 19:20	10.1
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>52</b>		4.0	1.6	ppb v/v			11/04/15 19:20	10.1
1,2,4-Trichlorobenzene	ND		20	4.4	ppb v/v			11/04/15 19:20	10.1
<b>1,1,1-Trichloroethane</b>	<b>72</b>		3.0	0.66	ppb v/v			11/04/15 19:20	10.1
1,1,2-Trichloroethane	ND		4.0	0.68	ppb v/v			11/04/15 19:20	10.1
<b>Trichloroethene</b>	<b>63</b>		4.0	1.1	ppb v/v			11/04/15 19:20	10.1
<b>Trichlorofluoromethane</b>	<b>310</b>		4.0	2.0	ppb v/v			11/04/15 19:20	10.1
1,2,4-Trimethylbenzene	ND		8.1	1.6	ppb v/v			11/04/15 19:20	10.1
1,3,5-Trimethylbenzene	ND		4.0	1.3	ppb v/v			11/04/15 19:20	10.1
<b>Vinyl acetate</b>	<b>7.9</b>	<b>J</b>	8.1	1.5	ppb v/v			11/04/15 19:20	10.1
Vinyl chloride	ND		4.0	1.2	ppb v/v			11/04/15 19:20	10.1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098322-001/MWL-SV02-41.5 W/M**

**Lab Sample ID: 320-15492-8**

**Date Collected: 10/08/15 08:56**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		8.1	1.0	ppb v/v			11/04/15 19:20	10.1
o-Xylene	ND		4.0	0.55	ppb v/v			11/04/15 19:20	10.1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		70 - 130					11/04/15 19:20	10.1
1,2-Dichloroethane-d4 (Surr)	106		70 - 130					11/04/15 19:20	10.1
Toluene-d8 (Surr)	99		70 - 130					11/04/15 19:20	10.1

**Client Sample ID: 098323-001/MWL-SV02-41.5 I/S**

**Lab Sample ID: 320-15492-9**

**Date Collected: 10/08/15 08:57**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	6.1	J	53	1.9	ppb v/v			11/04/15 20:10	10.5
Benzene	ND		4.2	0.83	ppb v/v			11/04/15 20:10	10.5
Benzyl chloride	ND		8.4	1.7	ppb v/v			11/04/15 20:10	10.5
Bromodichloromethane	ND		3.2	0.69	ppb v/v			11/04/15 20:10	10.5
Bromoform	ND		4.2	0.74	ppb v/v			11/04/15 20:10	10.5
Bromomethane	ND		8.4	3.5	ppb v/v			11/04/15 20:10	10.5
2-Butanone (MEK)	ND		8.4	2.1	ppb v/v			11/04/15 20:10	10.5
Carbon disulfide	ND		8.4	0.82	ppb v/v			11/04/15 20:10	10.5
Carbon tetrachloride	ND		8.4	0.67	ppb v/v			11/04/15 20:10	10.5
Chlorobenzene	ND		3.2	0.67	ppb v/v			11/04/15 20:10	10.5
Chloroethane	ND		8.4	3.2	ppb v/v			11/04/15 20:10	10.5
Chloroform	2.8	J	3.2	1.0	ppb v/v			11/04/15 20:10	10.5
Chloromethane	ND		8.4	2.1	ppb v/v			11/04/15 20:10	10.5
Dibromochloromethane	ND		4.2	0.83	ppb v/v			11/04/15 20:10	10.5
1,2-Dibromoethane (EDB)	ND		8.4	0.79	ppb v/v			11/04/15 20:10	10.5
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.2	1.6	ppb v/v			11/04/15 20:10	10.5
1,2-Dichlorobenzene	ND		4.2	1.4	ppb v/v			11/04/15 20:10	10.5
1,3-Dichlorobenzene	ND		4.2	1.2	ppb v/v			11/04/15 20:10	10.5
1,4-Dichlorobenzene	ND		4.2	1.6	ppb v/v			11/04/15 20:10	10.5
Dichlorodifluoromethane	91		4.2	1.5	ppb v/v			11/04/15 20:10	10.5
1,1-Dichloroethane	2.3	J	3.2	0.76	ppb v/v			11/04/15 20:10	10.5
1,2-Dichloroethane	ND		8.4	0.92	ppb v/v			11/04/15 20:10	10.5
1,1-Dichloroethene	9.6		8.4	1.4	ppb v/v			11/04/15 20:10	10.5
cis-1,2-Dichloroethene	ND		4.2	0.93	ppb v/v			11/04/15 20:10	10.5
trans-1,2-Dichloroethene	ND		4.2	1.1	ppb v/v			11/04/15 20:10	10.5
1,2-Dichloropropane	ND		4.2	2.5	ppb v/v			11/04/15 20:10	10.5
cis-1,3-Dichloropropene	ND		4.2	1.1	ppb v/v			11/04/15 20:10	10.5
trans-1,3-Dichloropropene	ND		4.2	0.92	ppb v/v			11/04/15 20:10	10.5
Ethylbenzene	ND		4.2	0.66	ppb v/v			11/04/15 20:10	10.5
4-Ethyltoluene	ND		4.2	2.0	ppb v/v			11/04/15 20:10	10.5
Hexachlorobutadiene	ND		21	4.5	ppb v/v			11/04/15 20:10	10.5
2-Hexanone	ND		4.2	0.91	ppb v/v			11/04/15 20:10	10.5
4-Methyl-2-pentanone (MIBK)	ND		4.2	1.4	ppb v/v			11/04/15 20:10	10.5
Methylene Chloride	ND		4.2	0.76	ppb v/v			11/04/15 20:10	10.5

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098323-001/MWL-SV02-41.5 I/S**

**Lab Sample ID: 320-15492-9**

**Date Collected: 10/08/15 08:57**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		4.2	0.62	ppb v/v			11/04/15 20:10	10.5
1,1,2,2-Tetrachloroethane	ND		4.2	0.72	ppb v/v			11/04/15 20:10	10.5
<b>Tetrachloroethene</b>	<b>65</b>		4.2	0.54	ppb v/v			11/04/15 20:10	10.5
Toluene	ND		4.2	0.54	ppb v/v			11/04/15 20:10	10.5
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>51</b>		4.2	1.7	ppb v/v			11/04/15 20:10	10.5
1,2,4-Trichlorobenzene	ND		21	4.5	ppb v/v			11/04/15 20:10	10.5
<b>1,1,1-Trichloroethane</b>	<b>71</b>		3.2	0.68	ppb v/v			11/04/15 20:10	10.5
1,1,2-Trichloroethane	ND		4.2	0.70	ppb v/v			11/04/15 20:10	10.5
<b>Trichloroethene</b>	<b>62</b>		4.2	1.1	ppb v/v			11/04/15 20:10	10.5
<b>Trichlorofluoromethane</b>	<b>300</b>		4.2	2.1	ppb v/v			11/04/15 20:10	10.5
1,2,4-Trimethylbenzene	ND		8.4	1.7	ppb v/v			11/04/15 20:10	10.5
1,3,5-Trimethylbenzene	ND		4.2	1.3	ppb v/v			11/04/15 20:10	10.5
<b>Vinyl acetate</b>	<b>7.6 J</b>		8.4	1.5	ppb v/v			11/04/15 20:10	10.5
Vinyl chloride	ND		4.2	1.3	ppb v/v			11/04/15 20:10	10.5
m,p-Xylene	ND		8.4	1.1	ppb v/v			11/04/15 20:10	10.5
o-Xylene	ND		4.2	0.57	ppb v/v			11/04/15 20:10	10.5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	86		70 - 130		11/04/15 20:10	10.5
1,2-Dichloroethane-d4 (Surr)	108		70 - 130		11/04/15 20:10	10.5
Toluene-d8 (Surr)	100		70 - 130		11/04/15 20:10	10.5

**Client Sample ID: 098324-001/MWL-SV02-41.5 I/S**

**Lab Sample ID: 320-15492-10**

**Date Collected: 10/08/15 08:59**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		52	1.9	ppb v/v			11/04/15 21:00	10.4
Benzene	ND		4.2	0.82	ppb v/v			11/04/15 21:00	10.4
Benzyl chloride	ND		8.3	1.7	ppb v/v			11/04/15 21:00	10.4
Bromodichloromethane	ND		3.1	0.69	ppb v/v			11/04/15 21:00	10.4
Bromoform	ND		4.2	0.73	ppb v/v			11/04/15 21:00	10.4
Bromomethane	ND		8.3	3.5	ppb v/v			11/04/15 21:00	10.4
2-Butanone (MEK)	ND		8.3	2.1	ppb v/v			11/04/15 21:00	10.4
Carbon disulfide	ND		8.3	0.81	ppb v/v			11/04/15 21:00	10.4
Carbon tetrachloride	ND		8.3	0.67	ppb v/v			11/04/15 21:00	10.4
Chlorobenzene	ND		3.1	0.67	ppb v/v			11/04/15 21:00	10.4
Chloroethane	ND		8.3	3.2	ppb v/v			11/04/15 21:00	10.4
<b>Chloroform</b>	<b>2.8 J</b>		3.1	0.99	ppb v/v			11/04/15 21:00	10.4
Chloromethane	ND		8.3	2.0	ppb v/v			11/04/15 21:00	10.4
Dibromochloromethane	ND		4.2	0.82	ppb v/v			11/04/15 21:00	10.4
1,2-Dibromoethane (EDB)	ND		8.3	0.78	ppb v/v			11/04/15 21:00	10.4
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.2	1.6	ppb v/v			11/04/15 21:00	10.4
1,2-Dichlorobenzene	ND		4.2	1.4	ppb v/v			11/04/15 21:00	10.4
1,3-Dichlorobenzene	ND		4.2	1.1	ppb v/v			11/04/15 21:00	10.4
1,4-Dichlorobenzene	ND		4.2	1.5	ppb v/v			11/04/15 21:00	10.4

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098324-001/MWL-SV02-41.5 I/S**

**Lab Sample ID: 320-15492-10**

**Date Collected: 10/08/15 08:59**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	91		4.2	1.5	ppb v/v			11/04/15 21:00	10.4
1,1-Dichloroethane	2.3	J	3.1	0.75	ppb v/v			11/04/15 21:00	10.4
1,2-Dichloroethane	ND		8.3	0.92	ppb v/v			11/04/15 21:00	10.4
1,1-Dichloroethene	9.6		8.3	1.3	ppb v/v			11/04/15 21:00	10.4
cis-1,2-Dichloroethene	ND		4.2	0.93	ppb v/v			11/04/15 21:00	10.4
trans-1,2-Dichloroethene	ND		4.2	1.0	ppb v/v			11/04/15 21:00	10.4
1,2-Dichloropropane	ND		4.2	2.5	ppb v/v			11/04/15 21:00	10.4
cis-1,3-Dichloropropene	ND		4.2	1.1	ppb v/v			11/04/15 21:00	10.4
trans-1,3-Dichloropropene	ND		4.2	0.92	ppb v/v			11/04/15 21:00	10.4
Ethylbenzene	ND		4.2	0.66	ppb v/v			11/04/15 21:00	10.4
4-Ethyltoluene	ND		4.2	1.9	ppb v/v			11/04/15 21:00	10.4
Hexachlorobutadiene	ND		21	4.5	ppb v/v			11/04/15 21:00	10.4
2-Hexanone	ND		4.2	0.90	ppb v/v			11/04/15 21:00	10.4
4-Methyl-2-pentanone (MIBK)	ND		4.2	1.4	ppb v/v			11/04/15 21:00	10.4
Methylene Chloride	ND		4.2	0.75	ppb v/v			11/04/15 21:00	10.4
Styrene	ND		4.2	0.61	ppb v/v			11/04/15 21:00	10.4
1,1,2,2-Tetrachloroethane	ND		4.2	0.72	ppb v/v			11/04/15 21:00	10.4
Tetrachloroethene	68		4.2	0.53	ppb v/v			11/04/15 21:00	10.4
Toluene	ND		4.2	0.53	ppb v/v			11/04/15 21:00	10.4
1,1,2-Trichloro-1,2,2-trifluoroethane	50		4.2	1.7	ppb v/v			11/04/15 21:00	10.4
1,2,4-Trichlorobenzene	ND		21	4.5	ppb v/v			11/04/15 21:00	10.4
1,1,1-Trichloroethane	70		3.1	0.68	ppb v/v			11/04/15 21:00	10.4
1,1,2-Trichloroethane	ND		4.2	0.70	ppb v/v			11/04/15 21:00	10.4
Trichloroethene	65		4.2	1.1	ppb v/v			11/04/15 21:00	10.4
Trichlorofluoromethane	300		4.2	2.0	ppb v/v			11/04/15 21:00	10.4
1,2,4-Trimethylbenzene	ND		8.3	1.7	ppb v/v			11/04/15 21:00	10.4
1,3,5-Trimethylbenzene	ND		4.2	1.3	ppb v/v			11/04/15 21:00	10.4
Vinyl acetate	7.4	J	8.3	1.5	ppb v/v			11/04/15 21:00	10.4
Vinyl chloride	ND		4.2	1.2	ppb v/v			11/04/15 21:00	10.4
m,p-Xylene	ND		8.3	1.0	ppb v/v			11/04/15 21:00	10.4
o-Xylene	ND		4.2	0.56	ppb v/v			11/04/15 21:00	10.4

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		70 - 130		11/04/15 21:00	10.4
1,2-Dichloroethane-d4 (Surr)	109		70 - 130		11/04/15 21:00	10.4
Toluene-d8 (Surr)	100		70 - 130		11/04/15 21:00	10.4

**Client Sample ID: 098325-001/MWL-SV-FB3**

**Lab Sample ID: 320-15492-11**

**Date Collected: 10/08/15 09:20**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			11/04/15 21:58	1
Benzene	ND		0.40	0.079	ppb v/v			11/04/15 21:58	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			11/04/15 21:58	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			11/04/15 21:58	1

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098325-001/MWL-SV-FB3**

**Lab Sample ID: 320-15492-11**

**Date Collected: 10/08/15 09:20**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromoform	ND		0.40	0.070	ppb v/v			11/04/15 21:58	1
Bromomethane	ND		0.80	0.34	ppb v/v			11/04/15 21:58	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			11/04/15 21:58	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			11/04/15 21:58	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			11/04/15 21:58	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			11/04/15 21:58	1
Chloroethane	ND		0.80	0.31	ppb v/v			11/04/15 21:58	1
Chloroform	ND		0.30	0.095	ppb v/v			11/04/15 21:58	1
Chloromethane	ND		0.80	0.20	ppb v/v			11/04/15 21:58	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			11/04/15 21:58	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			11/04/15 21:58	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			11/04/15 21:58	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			11/04/15 21:58	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			11/04/15 21:58	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			11/04/15 21:58	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			11/04/15 21:58	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			11/04/15 21:58	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			11/04/15 21:58	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			11/04/15 21:58	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			11/04/15 21:58	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			11/04/15 21:58	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			11/04/15 21:58	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			11/04/15 21:58	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			11/04/15 21:58	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			11/04/15 21:58	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			11/04/15 21:58	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			11/04/15 21:58	1
2-Hexanone	ND		0.40	0.087	ppb v/v			11/04/15 21:58	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			11/04/15 21:58	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			11/04/15 21:58	1
Styrene	ND		0.40	0.059	ppb v/v			11/04/15 21:58	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			11/04/15 21:58	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			11/04/15 21:58	1
Toluene	ND		0.40	0.051	ppb v/v			11/04/15 21:58	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			11/04/15 21:58	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			11/04/15 21:58	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			11/04/15 21:58	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			11/04/15 21:58	1
Trichloroethene	ND		0.40	0.11	ppb v/v			11/04/15 21:58	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			11/04/15 21:58	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			11/04/15 21:58	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			11/04/15 21:58	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			11/04/15 21:58	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			11/04/15 21:58	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			11/04/15 21:58	1
o-Xylene	ND		0.40	0.054	ppb v/v			11/04/15 21:58	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	83		70 - 130		11/04/15 21:58	1

TestAmerica Sacramento



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098325-001/MWL-SV-FB3**

**Lab Sample ID: 320-15492-11**

**Date Collected: 10/08/15 09:20**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	109		70 - 130		11/04/15 21:58	1
Toluene-d8 (Surr)	99		70 - 130		11/04/15 21:58	1

**Client Sample ID: 098326-001/MWL-SV03-50 (port 1)**

**Lab Sample ID: 320-15492-12**

**Date Collected: 10/08/15 09:36**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	2.7	J	17	0.61	ppb v/v			11/04/15 22:49	3.43
Benzene	1.1	J	1.4	0.27	ppb v/v			11/04/15 22:49	3.43
Benzyl chloride	ND		2.7	0.56	ppb v/v			11/04/15 22:49	3.43
Bromodichloromethane	ND		1.0	0.23	ppb v/v			11/04/15 22:49	3.43
Bromoform	ND		1.4	0.24	ppb v/v			11/04/15 22:49	3.43
Bromomethane	ND		2.7	1.1	ppb v/v			11/04/15 22:49	3.43
2-Butanone (MEK)	ND		2.7	0.68	ppb v/v			11/04/15 22:49	3.43
Carbon disulfide	ND		2.7	0.27	ppb v/v			11/04/15 22:49	3.43
Carbon tetrachloride	ND		2.7	0.22	ppb v/v			11/04/15 22:49	3.43
Chlorobenzene	ND		1.0	0.22	ppb v/v			11/04/15 22:49	3.43
Chloroethane	ND		2.7	1.1	ppb v/v			11/04/15 22:49	3.43
Chloroform	1.4		1.0	0.33	ppb v/v			11/04/15 22:49	3.43
Chloromethane	ND		2.7	0.68	ppb v/v			11/04/15 22:49	3.43
Dibromochloromethane	ND		1.4	0.27	ppb v/v			11/04/15 22:49	3.43
1,2-Dibromoethane (EDB)	ND		2.7	0.26	ppb v/v			11/04/15 22:49	3.43
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.53	ppb v/v			11/04/15 22:49	3.43
1,2-Dichlorobenzene	ND		1.4	0.45	ppb v/v			11/04/15 22:49	3.43
1,3-Dichlorobenzene	ND		1.4	0.38	ppb v/v			11/04/15 22:49	3.43
1,4-Dichlorobenzene	ND		1.4	0.51	ppb v/v			11/04/15 22:49	3.43
Dichlorodifluoromethane	21		1.4	0.50	ppb v/v			11/04/15 22:49	3.43
1,1-Dichloroethane	2.1		1.0	0.25	ppb v/v			11/04/15 22:49	3.43
1,2-Dichloroethane	ND		2.7	0.30	ppb v/v			11/04/15 22:49	3.43
1,1-Dichloroethene	7.6		2.7	0.44	ppb v/v			11/04/15 22:49	3.43
cis-1,2-Dichloroethene	1.1	J	1.4	0.31	ppb v/v			11/04/15 22:49	3.43
trans-1,2-Dichloroethene	ND		1.4	0.34	ppb v/v			11/04/15 22:49	3.43
1,2-Dichloropropane	ND		1.4	0.82	ppb v/v			11/04/15 22:49	3.43
cis-1,3-Dichloropropene	ND		1.4	0.36	ppb v/v			11/04/15 22:49	3.43
trans-1,3-Dichloropropene	ND		1.4	0.30	ppb v/v			11/04/15 22:49	3.43
Ethylbenzene	ND		1.4	0.22	ppb v/v			11/04/15 22:49	3.43
4-Ethyltoluene	ND		1.4	0.64	ppb v/v			11/04/15 22:49	3.43
Hexachlorobutadiene	ND		6.9	1.5	ppb v/v			11/04/15 22:49	3.43
2-Hexanone	ND		1.4	0.30	ppb v/v			11/04/15 22:49	3.43
4-Methyl-2-pentanone (MIBK)	ND		1.4	0.46	ppb v/v			11/04/15 22:49	3.43
Methylene Chloride	0.73	J	1.4	0.25	ppb v/v			11/04/15 22:49	3.43
Styrene	ND		1.4	0.20	ppb v/v			11/04/15 22:49	3.43
1,1,2,2-Tetrachloroethane	ND		1.4	0.24	ppb v/v			11/04/15 22:49	3.43
Tetrachloroethene	110		1.4	0.17	ppb v/v			11/04/15 22:49	3.43
Toluene	1.4		1.4	0.17	ppb v/v			11/04/15 22:49	3.43

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098326-001/MWL-SV03-50 (port 1)**

**Lab Sample ID: 320-15492-12**

**Date Collected: 10/08/15 09:36**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>52</b>		1.4	0.56	ppb v/v			11/04/15 22:49	3.43
1,2,4-Trichlorobenzene	ND		6.9	1.5	ppb v/v			11/04/15 22:49	3.43
<b>1,1,1-Trichloroethane</b>	<b>4.3</b>		1.0	0.22	ppb v/v			11/04/15 22:49	3.43
1,1,2-Trichloroethane	ND		1.4	0.23	ppb v/v			11/04/15 22:49	3.43
<b>Trichloroethene</b>	<b>80</b>		1.4	0.36	ppb v/v			11/04/15 22:49	3.43
<b>Trichlorofluoromethane</b>	<b>22</b>		1.4	0.67	ppb v/v			11/04/15 22:49	3.43
1,2,4-Trimethylbenzene	ND		2.7	0.56	ppb v/v			11/04/15 22:49	3.43
1,3,5-Trimethylbenzene	ND		1.4	0.43	ppb v/v			11/04/15 22:49	3.43
Vinyl acetate	ND		2.7	0.50	ppb v/v			11/04/15 22:49	3.43
Vinyl chloride	ND		1.4	0.41	ppb v/v			11/04/15 22:49	3.43
m,p-Xylene	ND		2.7	0.34	ppb v/v			11/04/15 22:49	3.43
o-Xylene	ND		1.4	0.19	ppb v/v			11/04/15 22:49	3.43

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		70 - 130		11/04/15 22:49	3.43
1,2-Dichloroethane-d4 (Surr)	107		70 - 130		11/04/15 22:49	3.43
Toluene-d8 (Surr)	98		70 - 130		11/04/15 22:49	3.43

**Client Sample ID: 098327-001/MWL-SV03-100 (port 2)**

**Lab Sample ID: 320-15492-13**

**Date Collected: 10/08/15 09:40**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>3.4</b>	<b>J</b>	30	1.1	ppb v/v			11/04/15 23:40	6.06
Benzene	ND		2.4	0.48	ppb v/v			11/04/15 23:40	6.06
Benzyl chloride	ND		4.8	0.99	ppb v/v			11/04/15 23:40	6.06
Bromodichloromethane	ND		1.8	0.40	ppb v/v			11/04/15 23:40	6.06
Bromoform	ND		2.4	0.42	ppb v/v			11/04/15 23:40	6.06
Bromomethane	ND		4.8	2.0	ppb v/v			11/04/15 23:40	6.06
2-Butanone (MEK)	ND		4.8	1.2	ppb v/v			11/04/15 23:40	6.06
Carbon disulfide	ND		4.8	0.47	ppb v/v			11/04/15 23:40	6.06
Carbon tetrachloride	ND		4.8	0.39	ppb v/v			11/04/15 23:40	6.06
Chlorobenzene	ND		1.8	0.39	ppb v/v			11/04/15 23:40	6.06
Chloroethane	ND		4.8	1.9	ppb v/v			11/04/15 23:40	6.06
<b>Chloroform</b>	<b>2.7</b>		1.8	0.58	ppb v/v			11/04/15 23:40	6.06
Chloromethane	ND		4.8	1.2	ppb v/v			11/04/15 23:40	6.06
Dibromochloromethane	ND		2.4	0.48	ppb v/v			11/04/15 23:40	6.06
1,2-Dibromoethane (EDB)	ND		4.8	0.45	ppb v/v			11/04/15 23:40	6.06
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.4	0.94	ppb v/v			11/04/15 23:40	6.06
1,2-Dichlorobenzene	ND		2.4	0.79	ppb v/v			11/04/15 23:40	6.06
1,3-Dichlorobenzene	ND		2.4	0.67	ppb v/v			11/04/15 23:40	6.06
1,4-Dichlorobenzene	ND		2.4	0.90	ppb v/v			11/04/15 23:40	6.06
<b>Dichlorodifluoromethane</b>	<b>70</b>		2.4	0.88	ppb v/v			11/04/15 23:40	6.06
<b>1,1-Dichloroethane</b>	<b>6.9</b>		1.8	0.44	ppb v/v			11/04/15 23:40	6.06
1,2-Dichloroethane	ND		4.8	0.53	ppb v/v			11/04/15 23:40	6.06
<b>1,1-Dichloroethene</b>	<b>30</b>		4.8	0.78	ppb v/v			11/04/15 23:40	6.06

TestAmerica Sacramento



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098327-001/MWL-SV03-100 (port 2)**

**Lab Sample ID: 320-15492-13**

**Date Collected: 10/08/15 09:40**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		2.4	0.54	ppb v/v			11/04/15 23:40	6.06
trans-1,2-Dichloroethene	ND		2.4	0.61	ppb v/v			11/04/15 23:40	6.06
1,2-Dichloropropane	ND		2.4	1.5	ppb v/v			11/04/15 23:40	6.06
cis-1,3-Dichloropropene	ND		2.4	0.63	ppb v/v			11/04/15 23:40	6.06
trans-1,3-Dichloropropene	ND		2.4	0.53	ppb v/v			11/04/15 23:40	6.06
Ethylbenzene	ND		2.4	0.38	ppb v/v			11/04/15 23:40	6.06
4-Ethyltoluene	ND		2.4	1.1	ppb v/v			11/04/15 23:40	6.06
Hexachlorobutadiene	ND		12	2.6	ppb v/v			11/04/15 23:40	6.06
2-Hexanone	ND		2.4	0.53	ppb v/v			11/04/15 23:40	6.06
4-Methyl-2-pentanone (MIBK)	ND		2.4	0.82	ppb v/v			11/04/15 23:40	6.06
<b>Methylene Chloride</b>	<b>2.3</b>	<b>J</b>	2.4	0.44	ppb v/v			11/04/15 23:40	6.06
Styrene	ND		2.4	0.36	ppb v/v			11/04/15 23:40	6.06
1,1,2,2-Tetrachloroethane	ND		2.4	0.42	ppb v/v			11/04/15 23:40	6.06
<b>Tetrachloroethene</b>	<b>220</b>		2.4	0.31	ppb v/v			11/04/15 23:40	6.06
Toluene	ND		2.4	0.31	ppb v/v			11/04/15 23:40	6.06
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>150</b>		2.4	0.99	ppb v/v			11/04/15 23:40	6.06
1,2,4-Trichlorobenzene	ND		12	2.6	ppb v/v			11/04/15 23:40	6.06
<b>1,1,1-Trichloroethane</b>	<b>8.9</b>		1.8	0.39	ppb v/v			11/04/15 23:40	6.06
1,1,2-Trichloroethane	ND		2.4	0.41	ppb v/v			11/04/15 23:40	6.06
<b>Trichloroethene</b>	<b>200</b>		2.4	0.64	ppb v/v			11/04/15 23:40	6.06
<b>Trichlorofluoromethane</b>	<b>50</b>		2.4	1.2	ppb v/v			11/04/15 23:40	6.06
1,2,4-Trimethylbenzene	ND		4.8	0.98	ppb v/v			11/04/15 23:40	6.06
1,3,5-Trimethylbenzene	ND		2.4	0.76	ppb v/v			11/04/15 23:40	6.06
Vinyl acetate	ND		4.8	0.88	ppb v/v			11/04/15 23:40	6.06
Vinyl chloride	ND		2.4	0.73	ppb v/v			11/04/15 23:40	6.06
m,p-Xylene	ND		4.8	0.61	ppb v/v			11/04/15 23:40	6.06
o-Xylene	ND		2.4	0.33	ppb v/v			11/04/15 23:40	6.06
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130					11/04/15 23:40	6.06
1,2-Dichloroethane-d4 (Surr)	116		70 - 130					11/04/15 23:40	6.06
Toluene-d8 (Surr)	93		70 - 130					11/04/15 23:40	6.06

**Client Sample ID: 098328-001/MWL-SV03-200 (port 3)**

**Lab Sample ID: 320-15492-14**

**Date Collected: 10/08/15 09:44**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>2.9</b>	<b>J</b>	38	1.3	ppb v/v			11/05/15 00:31	7.58
Benzene	ND		3.0	0.60	ppb v/v			11/05/15 00:31	7.58
Benzyl chloride	ND		6.1	1.2	ppb v/v			11/05/15 00:31	7.58
Bromodichloromethane	ND		2.3	0.50	ppb v/v			11/05/15 00:31	7.58
Bromoform	ND		3.0	0.53	ppb v/v			11/05/15 00:31	7.58
Bromomethane	ND		6.1	2.5	ppb v/v			11/05/15 00:31	7.58
2-Butanone (MEK)	ND		6.1	1.5	ppb v/v			11/05/15 00:31	7.58
Carbon disulfide	ND		6.1	0.59	ppb v/v			11/05/15 00:31	7.58

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098328-001/MWL-SV03-200 (port 3)**

**Lab Sample ID: 320-15492-14**

**Date Collected: 10/08/15 09:44**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	ND		6.1	0.49	ppb v/v			11/05/15 00:31	7.58
Chlorobenzene	ND		2.3	0.49	ppb v/v			11/05/15 00:31	7.58
Chloroethane	ND		6.1	2.3	ppb v/v			11/05/15 00:31	7.58
<b>Chloroform</b>	<b>2.3</b>		2.3	0.72	ppb v/v			11/05/15 00:31	7.58
Chloromethane	ND		6.1	1.5	ppb v/v			11/05/15 00:31	7.58
Dibromochloromethane	ND		3.0	0.60	ppb v/v			11/05/15 00:31	7.58
1,2-Dibromoethane (EDB)	ND		6.1	0.57	ppb v/v			11/05/15 00:31	7.58
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.0	1.2	ppb v/v			11/05/15 00:31	7.58
1,2-Dichlorobenzene	ND		3.0	0.99	ppb v/v			11/05/15 00:31	7.58
1,3-Dichlorobenzene	ND		3.0	0.83	ppb v/v			11/05/15 00:31	7.58
1,4-Dichlorobenzene	ND		3.0	1.1	ppb v/v			11/05/15 00:31	7.58
<b>Dichlorodifluoromethane</b>	<b>61</b>		3.0	1.1	ppb v/v			11/05/15 00:31	7.58
<b>1,1-Dichloroethane</b>	<b>8.4</b>		2.3	0.55	ppb v/v			11/05/15 00:31	7.58
1,2-Dichloroethane	ND		6.1	0.67	ppb v/v			11/05/15 00:31	7.58
<b>1,1-Dichloroethene</b>	<b>33</b>		6.1	0.98	ppb v/v			11/05/15 00:31	7.58
<b>cis-1,2-Dichloroethene</b>	<b>4.9</b>		3.0	0.67	ppb v/v			11/05/15 00:31	7.58
trans-1,2-Dichloroethene	ND		3.0	0.76	ppb v/v			11/05/15 00:31	7.58
1,2-Dichloropropane	ND		3.0	1.8	ppb v/v			11/05/15 00:31	7.58
cis-1,3-Dichloropropene	ND		3.0	0.79	ppb v/v			11/05/15 00:31	7.58
trans-1,3-Dichloropropene	ND		3.0	0.67	ppb v/v			11/05/15 00:31	7.58
Ethylbenzene	ND		3.0	0.48	ppb v/v			11/05/15 00:31	7.58
4-Ethyltoluene	ND		3.0	1.4	ppb v/v			11/05/15 00:31	7.58
Hexachlorobutadiene	ND		15	3.3	ppb v/v			11/05/15 00:31	7.58
2-Hexanone	ND		3.0	0.66	ppb v/v			11/05/15 00:31	7.58
4-Methyl-2-pentanone (MIBK)	ND		3.0	1.0	ppb v/v			11/05/15 00:31	7.58
<b>Methylene Chloride</b>	<b>4.1</b>		3.0	0.55	ppb v/v			11/05/15 00:31	7.58
Styrene	ND		3.0	0.45	ppb v/v			11/05/15 00:31	7.58
1,1,2,2-Tetrachloroethane	ND		3.0	0.52	ppb v/v			11/05/15 00:31	7.58
<b>Tetrachloroethene</b>	<b>290</b>		3.0	0.39	ppb v/v			11/05/15 00:31	7.58
<b>Toluene</b>	<b>0.50 J</b>		3.0	0.39	ppb v/v			11/05/15 00:31	7.58
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>180</b>		3.0	1.2	ppb v/v			11/05/15 00:31	7.58
1,2,4-Trichlorobenzene	ND		15	3.3	ppb v/v			11/05/15 00:31	7.58
<b>1,1,1-Trichloroethane</b>	<b>3.2</b>		2.3	0.49	ppb v/v			11/05/15 00:31	7.58
1,1,2-Trichloroethane	ND		3.0	0.51	ppb v/v			11/05/15 00:31	7.58
<b>Trichloroethene</b>	<b>310</b>		3.0	0.80	ppb v/v			11/05/15 00:31	7.58
<b>Trichlorofluoromethane</b>	<b>32</b>		3.0	1.5	ppb v/v			11/05/15 00:31	7.58
1,2,4-Trimethylbenzene	ND		6.1	1.2	ppb v/v			11/05/15 00:31	7.58
1,3,5-Trimethylbenzene	ND		3.0	0.95	ppb v/v			11/05/15 00:31	7.58
Vinyl acetate	ND		6.1	1.1	ppb v/v			11/05/15 00:31	7.58
Vinyl chloride	ND		3.0	0.91	ppb v/v			11/05/15 00:31	7.58
m,p-Xylene	ND		6.1	0.76	ppb v/v			11/05/15 00:31	7.58
o-Xylene	ND		3.0	0.41	ppb v/v			11/05/15 00:31	7.58

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	85		70 - 130		11/05/15 00:31	7.58
1,2-Dichloroethane-d4 (Surr)	120		70 - 130		11/05/15 00:31	7.58
Toluene-d8 (Surr)	104		70 - 130		11/05/15 00:31	7.58

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098329-001/MWL-SV03-300 (port 4)**

**Lab Sample ID: 320-15492-15**

**Date Collected: 10/08/15 09:52**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>5.4</b>	<b>J</b>	49	1.7	ppb v/v			11/05/15 01:21	9.75
Benzene	ND		3.9	0.77	ppb v/v			11/05/15 01:21	9.75
Benzyl chloride	ND		7.8	1.6	ppb v/v			11/05/15 01:21	9.75
Bromodichloromethane	ND		2.9	0.64	ppb v/v			11/05/15 01:21	9.75
Bromoform	ND		3.9	0.68	ppb v/v			11/05/15 01:21	9.75
Bromomethane	ND		7.8	3.3	ppb v/v			11/05/15 01:21	9.75
2-Butanone (MEK)	ND		7.8	1.9	ppb v/v			11/05/15 01:21	9.75
Carbon disulfide	ND		7.8	0.76	ppb v/v			11/05/15 01:21	9.75
Carbon tetrachloride	ND		7.8	0.62	ppb v/v			11/05/15 01:21	9.75
Chlorobenzene	ND		2.9	0.62	ppb v/v			11/05/15 01:21	9.75
Chloroethane	ND		7.8	3.0	ppb v/v			11/05/15 01:21	9.75
<b>Chloroform</b>	<b>1.2</b>	<b>J</b>	2.9	0.93	ppb v/v			11/05/15 01:21	9.75
Chloromethane	ND		7.8	1.9	ppb v/v			11/05/15 01:21	9.75
Dibromochloromethane	ND		3.9	0.77	ppb v/v			11/05/15 01:21	9.75
1,2-Dibromoethane (EDB)	ND		7.8	0.73	ppb v/v			11/05/15 01:21	9.75
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.9	1.5	ppb v/v			11/05/15 01:21	9.75
1,2-Dichlorobenzene	ND		3.9	1.3	ppb v/v			11/05/15 01:21	9.75
1,3-Dichlorobenzene	ND		3.9	1.1	ppb v/v			11/05/15 01:21	9.75
1,4-Dichlorobenzene	ND		3.9	1.5	ppb v/v			11/05/15 01:21	9.75
<b>Dichlorodifluoromethane</b>	<b>38</b>		3.9	1.4	ppb v/v			11/05/15 01:21	9.75
<b>1,1-Dichloroethane</b>	<b>3.7</b>		2.9	0.70	ppb v/v			11/05/15 01:21	9.75
1,2-Dichloroethane	ND		7.8	0.86	ppb v/v			11/05/15 01:21	9.75
<b>1,1-Dichloroethene</b>	<b>21</b>		7.8	1.3	ppb v/v			11/05/15 01:21	9.75
<b>cis-1,2-Dichloroethene</b>	<b>2.5</b>	<b>J</b>	3.9	0.87	ppb v/v			11/05/15 01:21	9.75
trans-1,2-Dichloroethene	ND		3.9	0.98	ppb v/v			11/05/15 01:21	9.75
1,2-Dichloropropane	ND		3.9	2.3	ppb v/v			11/05/15 01:21	9.75
cis-1,3-Dichloropropene	ND		3.9	1.0	ppb v/v			11/05/15 01:21	9.75
trans-1,3-Dichloropropene	ND		3.9	0.86	ppb v/v			11/05/15 01:21	9.75
Ethylbenzene	ND		3.9	0.61	ppb v/v			11/05/15 01:21	9.75
4-Ethyltoluene	ND		3.9	1.8	ppb v/v			11/05/15 01:21	9.75
Hexachlorobutadiene	ND		20	4.2	ppb v/v			11/05/15 01:21	9.75
2-Hexanone	ND		3.9	0.85	ppb v/v			11/05/15 01:21	9.75
4-Methyl-2-pentanone (MIBK)	ND		3.9	1.3	ppb v/v			11/05/15 01:21	9.75
<b>Methylene Chloride</b>	<b>1.9</b>	<b>J</b>	3.9	0.70	ppb v/v			11/05/15 01:21	9.75
Styrene	ND		3.9	0.58	ppb v/v			11/05/15 01:21	9.75
1,1,2,2-Tetrachloroethane	ND		3.9	0.67	ppb v/v			11/05/15 01:21	9.75
<b>Tetrachloroethene</b>	<b>370</b>		3.9	0.50	ppb v/v			11/05/15 01:21	9.75
<b>Toluene</b>	<b>0.80</b>	<b>J</b>	3.9	0.50	ppb v/v			11/05/15 01:21	9.75
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>110</b>		3.9	1.6	ppb v/v			11/05/15 01:21	9.75
1,2,4-Trichlorobenzene	ND		20	4.2	ppb v/v			11/05/15 01:21	9.75
<b>1,1,1-Trichloroethane</b>	<b>1.7</b>	<b>J</b>	2.9	0.63	ppb v/v			11/05/15 01:21	9.75
1,1,2-Trichloroethane	ND		3.9	0.65	ppb v/v			11/05/15 01:21	9.75
<b>Trichloroethene</b>	<b>260</b>		3.9	1.0	ppb v/v			11/05/15 01:21	9.75
<b>Trichlorofluoromethane</b>	<b>15</b>		3.9	1.9	ppb v/v			11/05/15 01:21	9.75
1,2,4-Trimethylbenzene	ND		7.8	1.6	ppb v/v			11/05/15 01:21	9.75
1,3,5-Trimethylbenzene	ND		3.9	1.2	ppb v/v			11/05/15 01:21	9.75
Vinyl acetate	ND		7.8	1.4	ppb v/v			11/05/15 01:21	9.75
Vinyl chloride	ND		3.9	1.2	ppb v/v			11/05/15 01:21	9.75

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098329-001/MWL-SV03-300 (port 4)**

**Lab Sample ID: 320-15492-15**

**Date Collected: 10/08/15 09:52**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		7.8	0.98	ppb v/v			11/05/15 01:21	9.75
o-Xylene	ND		3.9	0.53	ppb v/v			11/05/15 01:21	9.75
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		70 - 130					11/05/15 01:21	9.75
1,2-Dichloroethane-d4 (Surr)	118		70 - 130					11/05/15 01:21	9.75
Toluene-d8 (Surr)	87		70 - 130					11/05/15 01:21	9.75

**Client Sample ID: 098330-001/MWL-SV03-400 (port 5)**

**Lab Sample ID: 320-15492-16**

**Date Collected: 10/08/15 10:10**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	3.8	J	53	1.9	ppb v/v			11/05/15 02:11	10.5
Benzene	ND		4.2	0.83	ppb v/v			11/05/15 02:11	10.5
Benzyl chloride	ND		8.4	1.7	ppb v/v			11/05/15 02:11	10.5
Bromodichloromethane	ND		3.2	0.69	ppb v/v			11/05/15 02:11	10.5
Bromoform	ND		4.2	0.74	ppb v/v			11/05/15 02:11	10.5
Bromomethane	ND		8.4	3.5	ppb v/v			11/05/15 02:11	10.5
2-Butanone (MEK)	ND		8.4	2.1	ppb v/v			11/05/15 02:11	10.5
Carbon disulfide	ND		8.4	0.82	ppb v/v			11/05/15 02:11	10.5
Carbon tetrachloride	ND		8.4	0.67	ppb v/v			11/05/15 02:11	10.5
Chlorobenzene	ND		3.2	0.67	ppb v/v			11/05/15 02:11	10.5
Chloroethane	ND		8.4	3.2	ppb v/v			11/05/15 02:11	10.5
Chloroform	1.4	J	3.2	1.0	ppb v/v			11/05/15 02:11	10.5
Chloromethane	ND		8.4	2.1	ppb v/v			11/05/15 02:11	10.5
Dibromochloromethane	ND		4.2	0.83	ppb v/v			11/05/15 02:11	10.5
1,2-Dibromoethane (EDB)	ND		8.4	0.79	ppb v/v			11/05/15 02:11	10.5
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.2	1.6	ppb v/v			11/05/15 02:11	10.5
1,2-Dichlorobenzene	ND		4.2	1.4	ppb v/v			11/05/15 02:11	10.5
1,3-Dichlorobenzene	ND		4.2	1.2	ppb v/v			11/05/15 02:11	10.5
1,4-Dichlorobenzene	ND		4.2	1.6	ppb v/v			11/05/15 02:11	10.5
Dichlorodifluoromethane	21		4.2	1.5	ppb v/v			11/05/15 02:11	10.5
1,1-Dichloroethane	3.7		3.2	0.76	ppb v/v			11/05/15 02:11	10.5
1,2-Dichloroethane	ND		8.4	0.92	ppb v/v			11/05/15 02:11	10.5
1,1-Dichloroethene	22		8.4	1.4	ppb v/v			11/05/15 02:11	10.5
cis-1,2-Dichloroethene	2.7	J	4.2	0.93	ppb v/v			11/05/15 02:11	10.5
trans-1,2-Dichloroethene	ND		4.2	1.1	ppb v/v			11/05/15 02:11	10.5
1,2-Dichloropropane	ND		4.2	2.5	ppb v/v			11/05/15 02:11	10.5
cis-1,3-Dichloropropene	ND		4.2	1.1	ppb v/v			11/05/15 02:11	10.5
trans-1,3-Dichloropropene	ND		4.2	0.92	ppb v/v			11/05/15 02:11	10.5
Ethylbenzene	ND		4.2	0.66	ppb v/v			11/05/15 02:11	10.5
4-Ethyltoluene	ND		4.2	2.0	ppb v/v			11/05/15 02:11	10.5
Hexachlorobutadiene	ND		21	4.5	ppb v/v			11/05/15 02:11	10.5
2-Hexanone	ND		4.2	0.91	ppb v/v			11/05/15 02:11	10.5
4-Methyl-2-pentanone (MIBK)	ND		4.2	1.4	ppb v/v			11/05/15 02:11	10.5
Methylene Chloride	ND		4.2	0.76	ppb v/v			11/05/15 02:11	10.5

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098330-001/MWL-SV03-400 (port 5)**

**Lab Sample ID: 320-15492-16**

**Date Collected: 10/08/15 10:10**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		4.2	0.62	ppb v/v			11/05/15 02:11	10.5
1,1,2,2-Tetrachloroethane	ND		4.2	0.72	ppb v/v			11/05/15 02:11	10.5
<b>Tetrachloroethene</b>	<b>450</b>		4.2	0.54	ppb v/v			11/05/15 02:11	10.5
<b>Toluene</b>	<b>1.7</b>	<b>J</b>	4.2	0.54	ppb v/v			11/05/15 02:11	10.5
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>85</b>		4.2	1.7	ppb v/v			11/05/15 02:11	10.5
1,2,4-Trichlorobenzene	ND		21	4.5	ppb v/v			11/05/15 02:11	10.5
<b>1,1,1-Trichloroethane</b>	<b>1.9</b>	<b>J</b>	3.2	0.68	ppb v/v			11/05/15 02:11	10.5
1,1,2-Trichloroethane	ND		4.2	0.70	ppb v/v			11/05/15 02:11	10.5
<b>Trichloroethene</b>	<b>350</b>		4.2	1.1	ppb v/v			11/05/15 02:11	10.5
<b>Trichlorofluoromethane</b>	<b>16</b>		4.2	2.1	ppb v/v			11/05/15 02:11	10.5
1,2,4-Trimethylbenzene	ND		8.4	1.7	ppb v/v			11/05/15 02:11	10.5
1,3,5-Trimethylbenzene	ND		4.2	1.3	ppb v/v			11/05/15 02:11	10.5
Vinyl acetate	ND		8.4	1.5	ppb v/v			11/05/15 02:11	10.5
Vinyl chloride	ND		4.2	1.3	ppb v/v			11/05/15 02:11	10.5
m,p-Xylene	ND		8.4	1.1	ppb v/v			11/05/15 02:11	10.5
o-Xylene	ND		4.2	0.57	ppb v/v			11/05/15 02:11	10.5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		70 - 130		11/05/15 02:11	10.5
1,2-Dichloroethane-d4 (Surr)	117		70 - 130		11/05/15 02:11	10.5
Toluene-d8 (Surr)	98		70 - 130		11/05/15 02:11	10.5

**Client Sample ID: 098331-001/MWL-SV-FB4**

**Lab Sample ID: 320-15492-17**

**Date Collected: 10/08/15 10:35**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			11/05/15 03:09	1
Benzene	ND		0.40	0.079	ppb v/v			11/05/15 03:09	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			11/05/15 03:09	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			11/05/15 03:09	1
Bromoform	ND		0.40	0.070	ppb v/v			11/05/15 03:09	1
Bromomethane	ND		0.80	0.34	ppb v/v			11/05/15 03:09	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			11/05/15 03:09	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			11/05/15 03:09	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			11/05/15 03:09	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			11/05/15 03:09	1
Chloroethane	ND		0.80	0.31	ppb v/v			11/05/15 03:09	1
Chloroform	ND		0.30	0.095	ppb v/v			11/05/15 03:09	1
Chloromethane	ND		0.80	0.20	ppb v/v			11/05/15 03:09	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			11/05/15 03:09	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			11/05/15 03:09	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			11/05/15 03:09	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			11/05/15 03:09	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			11/05/15 03:09	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			11/05/15 03:09	1

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098331-001/MWL-SV-FB4**

**Lab Sample ID: 320-15492-17**

**Date Collected: 10/08/15 10:35**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			11/05/15 03:09	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			11/05/15 03:09	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			11/05/15 03:09	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			11/05/15 03:09	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			11/05/15 03:09	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			11/05/15 03:09	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			11/05/15 03:09	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			11/05/15 03:09	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			11/05/15 03:09	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			11/05/15 03:09	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			11/05/15 03:09	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			11/05/15 03:09	1
2-Hexanone	ND		0.40	0.087	ppb v/v			11/05/15 03:09	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			11/05/15 03:09	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			11/05/15 03:09	1
Styrene	ND		0.40	0.059	ppb v/v			11/05/15 03:09	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			11/05/15 03:09	1
<b>Tetrachloroethene</b>	<b>0.054</b>	<b>J</b>	0.40	0.051	ppb v/v			11/05/15 03:09	1
Toluene	ND		0.40	0.051	ppb v/v			11/05/15 03:09	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			11/05/15 03:09	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			11/05/15 03:09	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			11/05/15 03:09	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			11/05/15 03:09	1
Trichloroethene	ND		0.40	0.11	ppb v/v			11/05/15 03:09	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			11/05/15 03:09	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			11/05/15 03:09	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			11/05/15 03:09	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			11/05/15 03:09	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			11/05/15 03:09	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			11/05/15 03:09	1
o-Xylene	ND		0.40	0.054	ppb v/v			11/05/15 03:09	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130		11/05/15 03:09	1
1,2-Dichloroethane-d4 (Surr)	119		70 - 130		11/05/15 03:09	1
Toluene-d8 (Surr)	93		70 - 130		11/05/15 03:09	1

**Client Sample ID: 098332-001/MWL-SV04-50 (port 1)**

**Lab Sample ID: 320-15492-18**

**Date Collected: 10/08/15 10:40**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>4.6</b>	<b>J</b>	15	0.52	ppb v/v			11/05/15 04:01	2.9
<b>Benzene</b>	<b>0.65</b>	<b>J</b>	1.2	0.23	ppb v/v			11/05/15 04:01	2.9
Benzyl chloride	ND		2.3	0.47	ppb v/v			11/05/15 04:01	2.9
Bromodichloromethane	ND		0.87	0.19	ppb v/v			11/05/15 04:01	2.9
Bromoform	ND		1.2	0.20	ppb v/v			11/05/15 04:01	2.9

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098332-001/MWL-SV04-50 (port 1)**

**Lab Sample ID: 320-15492-18**

**Date Collected: 10/08/15 10:40**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromomethane	ND		2.3	0.97	ppb v/v			11/05/15 04:01	2.9
2-Butanone (MEK)	ND		2.3	0.58	ppb v/v			11/05/15 04:01	2.9
Carbon disulfide	ND		2.3	0.23	ppb v/v			11/05/15 04:01	2.9
Carbon tetrachloride	ND		2.3	0.19	ppb v/v			11/05/15 04:01	2.9
Chlorobenzene	ND		0.87	0.19	ppb v/v			11/05/15 04:01	2.9
Chloroethane	ND		2.3	0.89	ppb v/v			11/05/15 04:01	2.9
<b>Chloroform</b>	<b>1.9</b>		0.87	0.28	ppb v/v			11/05/15 04:01	2.9
Chloromethane	ND		2.3	0.57	ppb v/v			11/05/15 04:01	2.9
Dibromochloromethane	ND		1.2	0.23	ppb v/v			11/05/15 04:01	2.9
1,2-Dibromoethane (EDB)	ND		2.3	0.22	ppb v/v			11/05/15 04:01	2.9
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.2	0.45	ppb v/v			11/05/15 04:01	2.9
1,2-Dichlorobenzene	ND		1.2	0.38	ppb v/v			11/05/15 04:01	2.9
1,3-Dichlorobenzene	ND		1.2	0.32	ppb v/v			11/05/15 04:01	2.9
1,4-Dichlorobenzene	ND		1.2	0.43	ppb v/v			11/05/15 04:01	2.9
<b>Dichlorodifluoromethane</b>	<b>20</b>		1.2	0.42	ppb v/v			11/05/15 04:01	2.9
<b>1,1-Dichloroethane</b>	<b>1.3</b>		0.87	0.21	ppb v/v			11/05/15 04:01	2.9
1,2-Dichloroethane	ND		2.3	0.26	ppb v/v			11/05/15 04:01	2.9
<b>1,1-Dichloroethene</b>	<b>6.4</b>		2.3	0.37	ppb v/v			11/05/15 04:01	2.9
<b>cis-1,2-Dichloroethene</b>	<b>0.47 J</b>		1.2	0.26	ppb v/v			11/05/15 04:01	2.9
trans-1,2-Dichloroethene	ND		1.2	0.29	ppb v/v			11/05/15 04:01	2.9
1,2-Dichloropropane	ND		1.2	0.70	ppb v/v			11/05/15 04:01	2.9
cis-1,3-Dichloropropene	ND		1.2	0.30	ppb v/v			11/05/15 04:01	2.9
trans-1,3-Dichloropropene	ND		1.2	0.26	ppb v/v			11/05/15 04:01	2.9
Ethylbenzene	ND		1.2	0.18	ppb v/v			11/05/15 04:01	2.9
4-Ethyltoluene	ND		1.2	0.54	ppb v/v			11/05/15 04:01	2.9
Hexachlorobutadiene	ND		5.8	1.3	ppb v/v			11/05/15 04:01	2.9
2-Hexanone	ND		1.2	0.25	ppb v/v			11/05/15 04:01	2.9
4-Methyl-2-pentanone (MIBK)	ND		1.2	0.39	ppb v/v			11/05/15 04:01	2.9
Methylene Chloride	ND		1.2	0.21	ppb v/v			11/05/15 04:01	2.9
Styrene	ND		1.2	0.17	ppb v/v			11/05/15 04:01	2.9
1,1,2,2-Tetrachloroethane	ND		1.2	0.20	ppb v/v			11/05/15 04:01	2.9
<b>Tetrachloroethene</b>	<b>74</b>		1.2	0.15	ppb v/v			11/05/15 04:01	2.9
Toluene	ND		1.2	0.15	ppb v/v			11/05/15 04:01	2.9
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>72</b>		1.2	0.47	ppb v/v			11/05/15 04:01	2.9
1,2,4-Trichlorobenzene	ND		5.8	1.3	ppb v/v			11/05/15 04:01	2.9
<b>1,1,1-Trichloroethane</b>	<b>7.0</b>		0.87	0.19	ppb v/v			11/05/15 04:01	2.9
1,1,2-Trichloroethane	ND		1.2	0.19	ppb v/v			11/05/15 04:01	2.9
<b>Trichloroethene</b>	<b>66</b>		1.2	0.30	ppb v/v			11/05/15 04:01	2.9
<b>Trichlorofluoromethane</b>	<b>28</b>		1.2	0.57	ppb v/v			11/05/15 04:01	2.9
1,2,4-Trimethylbenzene	ND		2.3	0.47	ppb v/v			11/05/15 04:01	2.9
1,3,5-Trimethylbenzene	ND		1.2	0.36	ppb v/v			11/05/15 04:01	2.9
Vinyl acetate	ND		2.3	0.42	ppb v/v			11/05/15 04:01	2.9
Vinyl chloride	ND		1.2	0.35	ppb v/v			11/05/15 04:01	2.9
m,p-Xylene	ND		2.3	0.29	ppb v/v			11/05/15 04:01	2.9
o-Xylene	ND		1.2	0.16	ppb v/v			11/05/15 04:01	2.9

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		70 - 130		11/05/15 04:01	2.9

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098332-001/MWL-SV04-50 (port 1)**

**Lab Sample ID: 320-15492-18**

**Date Collected: 10/08/15 10:40**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	120		70 - 130		11/05/15 04:01	2.9
Toluene-d8 (Surr)	99		70 - 130		11/05/15 04:01	2.9

**Client Sample ID: 098333-001/MWL-SV04-100 (port 2)**

**Lab Sample ID: 320-15492-19**

**Date Collected: 10/08/15 10:44**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	3.6	J	18	0.64	ppb v/v			11/05/15 04:53	3.62
Benzene	0.42	J	1.4	0.29	ppb v/v			11/05/15 04:53	3.62
Benzyl chloride	ND		2.9	0.59	ppb v/v			11/05/15 04:53	3.62
Bromodichloromethane	ND		1.1	0.24	ppb v/v			11/05/15 04:53	3.62
Bromoform	ND		1.4	0.25	ppb v/v			11/05/15 04:53	3.62
Bromomethane	ND		2.9	1.2	ppb v/v			11/05/15 04:53	3.62
2-Butanone (MEK)	ND		2.9	0.72	ppb v/v			11/05/15 04:53	3.62
Carbon disulfide	ND		2.9	0.28	ppb v/v			11/05/15 04:53	3.62
Carbon tetrachloride	0.31	J	2.9	0.23	ppb v/v			11/05/15 04:53	3.62
Chlorobenzene	ND		1.1	0.23	ppb v/v			11/05/15 04:53	3.62
Chloroethane	ND		2.9	1.1	ppb v/v			11/05/15 04:53	3.62
Chloroform	1.9		1.1	0.34	ppb v/v			11/05/15 04:53	3.62
Chloromethane	ND		2.9	0.71	ppb v/v			11/05/15 04:53	3.62
Dibromochloromethane	ND		1.4	0.29	ppb v/v			11/05/15 04:53	3.62
1,2-Dibromoethane (EDB)	ND		2.9	0.27	ppb v/v			11/05/15 04:53	3.62
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.56	ppb v/v			11/05/15 04:53	3.62
1,2-Dichlorobenzene	ND		1.4	0.47	ppb v/v			11/05/15 04:53	3.62
1,3-Dichlorobenzene	ND		1.4	0.40	ppb v/v			11/05/15 04:53	3.62
1,4-Dichlorobenzene	ND		1.4	0.54	ppb v/v			11/05/15 04:53	3.62
Dichlorodifluoromethane	35		1.4	0.52	ppb v/v			11/05/15 04:53	3.62
1,1-Dichloroethane	3.1		1.1	0.26	ppb v/v			11/05/15 04:53	3.62
1,2-Dichloroethane	ND		2.9	0.32	ppb v/v			11/05/15 04:53	3.62
1,1-Dichloroethene	17		2.9	0.47	ppb v/v			11/05/15 04:53	3.62
cis-1,2-Dichloroethene	1.5		1.4	0.32	ppb v/v			11/05/15 04:53	3.62
trans-1,2-Dichloroethene	ND		1.4	0.36	ppb v/v			11/05/15 04:53	3.62
1,2-Dichloropropane	ND		1.4	0.87	ppb v/v			11/05/15 04:53	3.62
cis-1,3-Dichloropropene	ND		1.4	0.38	ppb v/v			11/05/15 04:53	3.62
trans-1,3-Dichloropropene	ND		1.4	0.32	ppb v/v			11/05/15 04:53	3.62
Ethylbenzene	ND		1.4	0.23	ppb v/v			11/05/15 04:53	3.62
4-Ethyltoluene	ND		1.4	0.68	ppb v/v			11/05/15 04:53	3.62
Hexachlorobutadiene	ND		7.2	1.6	ppb v/v			11/05/15 04:53	3.62
2-Hexanone	ND		1.4	0.31	ppb v/v			11/05/15 04:53	3.62
4-Methyl-2-pentanone (MIBK)	ND		1.4	0.49	ppb v/v			11/05/15 04:53	3.62
Methylene Chloride	0.72	J	1.4	0.26	ppb v/v			11/05/15 04:53	3.62
Styrene	ND		1.4	0.21	ppb v/v			11/05/15 04:53	3.62
1,1,2,2-Tetrachloroethane	ND		1.4	0.25	ppb v/v			11/05/15 04:53	3.62
Tetrachloroethene	120		1.4	0.18	ppb v/v			11/05/15 04:53	3.62
Toluene	0.21	J	1.4	0.18	ppb v/v			11/05/15 04:53	3.62

TestAmerica Sacramento



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098333-001/MWL-SV04-100 (port 2)**

**Lab Sample ID: 320-15492-19**

**Date Collected: 10/08/15 10:44**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>110</b>		1.4	0.59	ppb v/v			11/05/15 04:53	3.62
1,2,4-Trichlorobenzene	ND		7.2	1.6	ppb v/v			11/05/15 04:53	3.62
<b>1,1,1-Trichloroethane</b>	<b>5.4</b>		1.1	0.24	ppb v/v			11/05/15 04:53	3.62
1,1,2-Trichloroethane	ND		1.4	0.24	ppb v/v			11/05/15 04:53	3.62
<b>Trichloroethene</b>	<b>130</b>		1.4	0.38	ppb v/v			11/05/15 04:53	3.62
<b>Trichlorofluoromethane</b>	<b>37</b>		1.4	0.71	ppb v/v			11/05/15 04:53	3.62
1,2,4-Trimethylbenzene	ND		2.9	0.59	ppb v/v			11/05/15 04:53	3.62
1,3,5-Trimethylbenzene	ND		1.4	0.45	ppb v/v			11/05/15 04:53	3.62
Vinyl acetate	ND		2.9	0.52	ppb v/v			11/05/15 04:53	3.62
Vinyl chloride	ND		1.4	0.43	ppb v/v			11/05/15 04:53	3.62
m,p-Xylene	ND		2.9	0.36	ppb v/v			11/05/15 04:53	3.62
o-Xylene	ND		1.4	0.20	ppb v/v			11/05/15 04:53	3.62

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	83		70 - 130		11/05/15 04:53	3.62
1,2-Dichloroethane-d4 (Surr)	117		70 - 130		11/05/15 04:53	3.62
Toluene-d8 (Surr)	101		70 - 130		11/05/15 04:53	3.62

**Client Sample ID: 098334-001/MWL-SV04-200 (port 3)**

**Lab Sample ID: 320-15492-20**

**Date Collected: 10/08/15 10:48**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>4.4</b>	<b>J</b>	24	0.86	ppb v/v			11/05/15 05:44	4.85
Benzene	ND		1.9	0.38	ppb v/v			11/05/15 05:44	4.85
Benzyl chloride	ND		3.9	0.79	ppb v/v			11/05/15 05:44	4.85
Bromodichloromethane	ND		1.5	0.32	ppb v/v			11/05/15 05:44	4.85
Bromoform	ND		1.9	0.34	ppb v/v			11/05/15 05:44	4.85
Bromomethane	ND		3.9	1.6	ppb v/v			11/05/15 05:44	4.85
2-Butanone (MEK)	ND		3.9	0.97	ppb v/v			11/05/15 05:44	4.85
Carbon disulfide	ND		3.9	0.38	ppb v/v			11/05/15 05:44	4.85
<b>Carbon tetrachloride</b>	<b>0.48</b>	<b>J</b>	3.9	0.31	ppb v/v			11/05/15 05:44	4.85
Chlorobenzene	ND		1.5	0.31	ppb v/v			11/05/15 05:44	4.85
Chloroethane	ND		3.9	1.5	ppb v/v			11/05/15 05:44	4.85
<b>Chloroform</b>	<b>1.4</b>	<b>J</b>	1.5	0.46	ppb v/v			11/05/15 05:44	4.85
Chloromethane	ND		3.9	0.96	ppb v/v			11/05/15 05:44	4.85
Dibromochloromethane	ND		1.9	0.38	ppb v/v			11/05/15 05:44	4.85
1,2-Dibromoethane (EDB)	ND		3.9	0.36	ppb v/v			11/05/15 05:44	4.85
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.9	0.75	ppb v/v			11/05/15 05:44	4.85
1,2-Dichlorobenzene	ND		1.9	0.63	ppb v/v			11/05/15 05:44	4.85
1,3-Dichlorobenzene	ND		1.9	0.53	ppb v/v			11/05/15 05:44	4.85
1,4-Dichlorobenzene	ND		1.9	0.72	ppb v/v			11/05/15 05:44	4.85
<b>Dichlorodifluoromethane</b>	<b>49</b>		1.9	0.70	ppb v/v			11/05/15 05:44	4.85
<b>1,1-Dichloroethane</b>	<b>4.9</b>		1.5	0.35	ppb v/v			11/05/15 05:44	4.85
1,2-Dichloroethane	ND		3.9	0.43	ppb v/v			11/05/15 05:44	4.85
<b>1,1-Dichloroethene</b>	<b>31</b>		3.9	0.63	ppb v/v			11/05/15 05:44	4.85

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098334-001/MWL-SV04-200 (port 3)**

**Lab Sample ID: 320-15492-20**

**Date Collected: 10/08/15 10:48**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>cis-1,2-Dichloroethene</b>	<b>2.7</b>		1.9	0.43	ppb v/v			11/05/15 05:44	4.85
trans-1,2-Dichloroethene	ND		1.9	0.49	ppb v/v			11/05/15 05:44	4.85
1,2-Dichloropropane	ND		1.9	1.2	ppb v/v			11/05/15 05:44	4.85
cis-1,3-Dichloropropene	ND		1.9	0.50	ppb v/v			11/05/15 05:44	4.85
trans-1,3-Dichloropropene	ND		1.9	0.43	ppb v/v			11/05/15 05:44	4.85
Ethylbenzene	ND		1.9	0.31	ppb v/v			11/05/15 05:44	4.85
4-Ethyltoluene	ND		1.9	0.91	ppb v/v			11/05/15 05:44	4.85
Hexachlorobutadiene	ND		9.7	2.1	ppb v/v			11/05/15 05:44	4.85
2-Hexanone	ND		1.9	0.42	ppb v/v			11/05/15 05:44	4.85
4-Methyl-2-pentanone (MIBK)	ND		1.9	0.65	ppb v/v			11/05/15 05:44	4.85
<b>Methylene Chloride</b>	<b>1.9</b>		1.9	0.35	ppb v/v			11/05/15 05:44	4.85
Styrene	ND		1.9	0.29	ppb v/v			11/05/15 05:44	4.85
1,1,2,2-Tetrachloroethane	ND		1.9	0.33	ppb v/v			11/05/15 05:44	4.85
<b>Tetrachloroethene</b>	<b>150</b>		1.9	0.25	ppb v/v			11/05/15 05:44	4.85
<b>Toluene</b>	<b>0.62 J</b>		1.9	0.25	ppb v/v			11/05/15 05:44	4.85
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>150</b>		1.9	0.79	ppb v/v			11/05/15 05:44	4.85
1,2,4-Trichlorobenzene	ND		9.7	2.1	ppb v/v			11/05/15 05:44	4.85
<b>1,1,1-Trichloroethane</b>	<b>2.2</b>		1.5	0.32	ppb v/v			11/05/15 05:44	4.85
1,1,2-Trichloroethane	ND		1.9	0.32	ppb v/v			11/05/15 05:44	4.85
<b>Trichloroethene</b>	<b>200</b>		1.9	0.51	ppb v/v			11/05/15 05:44	4.85
<b>Trichlorofluoromethane</b>	<b>33</b>		1.9	0.95	ppb v/v			11/05/15 05:44	4.85
1,2,4-Trimethylbenzene	ND		3.9	0.79	ppb v/v			11/05/15 05:44	4.85
1,3,5-Trimethylbenzene	ND		1.9	0.61	ppb v/v			11/05/15 05:44	4.85
Vinyl acetate	ND		3.9	0.70	ppb v/v			11/05/15 05:44	4.85
Vinyl chloride	ND		1.9	0.58	ppb v/v			11/05/15 05:44	4.85
m,p-Xylene	ND		3.9	0.49	ppb v/v			11/05/15 05:44	4.85
o-Xylene	ND		1.9	0.26	ppb v/v			11/05/15 05:44	4.85
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	86		70 - 130					11/05/15 05:44	4.85
1,2-Dichloroethane-d4 (Surr)	118		70 - 130					11/05/15 05:44	4.85
Toluene-d8 (Surr)	100		70 - 130					11/05/15 05:44	4.85

**Client Sample ID: 098335-001/MWL-SV04-300 (port 4)**

**Lab Sample ID: 320-15492-21**

**Date Collected: 10/08/15 10:52**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>6.1 J</b>		18	0.64	ppb v/v			11/05/15 07:12	3.6
<b>Benzene</b>	<b>0.32 J</b>		1.4	0.28	ppb v/v			11/05/15 07:12	3.6
Benzyl chloride	ND		2.9	0.59	ppb v/v			11/05/15 07:12	3.6
Bromodichloromethane	ND		1.1	0.24	ppb v/v			11/05/15 07:12	3.6
Bromoform	ND		1.4	0.25	ppb v/v			11/05/15 07:12	3.6
Bromomethane	ND		2.9	1.2	ppb v/v			11/05/15 07:12	3.6
2-Butanone (MEK)	ND		2.9	0.72	ppb v/v			11/05/15 07:12	3.6
Carbon disulfide	ND		2.9	0.28	ppb v/v			11/05/15 07:12	3.6

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098335-001/MWL-SV04-300 (port 4)**

**Lab Sample ID: 320-15492-21**

**Date Collected: 10/08/15 10:52**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Carbon tetrachloride</b>	<b>0.25</b>	<b>J</b>	2.9	0.23	ppb v/v			11/05/15 07:12	3.6
Chlorobenzene	ND		1.1	0.23	ppb v/v			11/05/15 07:12	3.6
Chloroethane	ND		2.9	1.1	ppb v/v			11/05/15 07:12	3.6
<b>Chloroform</b>	<b>0.55</b>	<b>J</b>	1.1	0.34	ppb v/v			11/05/15 07:12	3.6
Chloromethane	ND		2.9	0.71	ppb v/v			11/05/15 07:12	3.6
Dibromochloromethane	ND		1.4	0.28	ppb v/v			11/05/15 07:12	3.6
1,2-Dibromoethane (EDB)	ND		2.9	0.27	ppb v/v			11/05/15 07:12	3.6
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.56	ppb v/v			11/05/15 07:12	3.6
1,2-Dichlorobenzene	ND		1.4	0.47	ppb v/v			11/05/15 07:12	3.6
1,3-Dichlorobenzene	ND		1.4	0.40	ppb v/v			11/05/15 07:12	3.6
1,4-Dichlorobenzene	ND		1.4	0.54	ppb v/v			11/05/15 07:12	3.6
<b>Dichlorodifluoromethane</b>	<b>22</b>		1.4	0.52	ppb v/v			11/05/15 07:12	3.6
<b>1,1-Dichloroethane</b>	<b>1.2</b>		1.1	0.26	ppb v/v			11/05/15 07:12	3.6
1,2-Dichloroethane	ND		2.9	0.32	ppb v/v			11/05/15 07:12	3.6
<b>1,1-Dichloroethene</b>	<b>12</b>		2.9	0.46	ppb v/v			11/05/15 07:12	3.6
<b>cis-1,2-Dichloroethene</b>	<b>0.73</b>	<b>J</b>	1.4	0.32	ppb v/v			11/05/15 07:12	3.6
trans-1,2-Dichloroethene	ND		1.4	0.36	ppb v/v			11/05/15 07:12	3.6
1,2-Dichloropropane	ND		1.4	0.86	ppb v/v			11/05/15 07:12	3.6
cis-1,3-Dichloropropene	ND		1.4	0.37	ppb v/v			11/05/15 07:12	3.6
trans-1,3-Dichloropropene	ND		1.4	0.32	ppb v/v			11/05/15 07:12	3.6
Ethylbenzene	ND		1.4	0.23	ppb v/v			11/05/15 07:12	3.6
4-Ethyltoluene	ND		1.4	0.67	ppb v/v			11/05/15 07:12	3.6
Hexachlorobutadiene	ND		7.2	1.6	ppb v/v			11/05/15 07:12	3.6
2-Hexanone	ND		1.4	0.31	ppb v/v			11/05/15 07:12	3.6
4-Methyl-2-pentanone (MIBK)	ND		1.4	0.49	ppb v/v			11/05/15 07:12	3.6
<b>Methylene Chloride</b>	<b>0.44</b>	<b>J</b>	1.4	0.26	ppb v/v			11/05/15 07:12	3.6
Styrene	ND		1.4	0.21	ppb v/v			11/05/15 07:12	3.6
1,1,2,2-Tetrachloroethane	ND		1.4	0.25	ppb v/v			11/05/15 07:12	3.6
<b>Tetrachloroethene</b>	<b>120</b>		1.4	0.18	ppb v/v			11/05/15 07:12	3.6
<b>Toluene</b>	<b>0.50</b>	<b>J</b>	1.4	0.18	ppb v/v			11/05/15 07:12	3.6
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>72</b>		1.4	0.59	ppb v/v			11/05/15 07:12	3.6
1,2,4-Trichlorobenzene	ND		7.2	1.6	ppb v/v			11/05/15 07:12	3.6
<b>1,1,1-Trichloroethane</b>	<b>1.1</b>		1.1	0.23	ppb v/v			11/05/15 07:12	3.6
1,1,2-Trichloroethane	ND		1.4	0.24	ppb v/v			11/05/15 07:12	3.6
<b>Trichloroethene</b>	<b>93</b>		1.4	0.38	ppb v/v			11/05/15 07:12	3.6
<b>Trichlorofluoromethane</b>	<b>15</b>		1.4	0.71	ppb v/v			11/05/15 07:12	3.6
1,2,4-Trimethylbenzene	ND		2.9	0.58	ppb v/v			11/05/15 07:12	3.6
1,3,5-Trimethylbenzene	ND		1.4	0.45	ppb v/v			11/05/15 07:12	3.6
Vinyl acetate	ND		2.9	0.52	ppb v/v			11/05/15 07:12	3.6
Vinyl chloride	ND		1.4	0.43	ppb v/v			11/05/15 07:12	3.6
m,p-Xylene	ND		2.9	0.36	ppb v/v			11/05/15 07:12	3.6
o-Xylene	ND		1.4	0.19	ppb v/v			11/05/15 07:12	3.6

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		70 - 130		11/05/15 07:12	3.6
1,2-Dichloroethane-d4 (Surr)	114		70 - 130		11/05/15 07:12	3.6
Toluene-d8 (Surr)	101		70 - 130		11/05/15 07:12	3.6

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098336-001/MWL-SV04-400 (port 5)**

**Lab Sample ID: 320-15492-22**

**Date Collected: 10/08/15 11:00**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	5.0	J	22	0.77	ppb v/v			11/05/15 08:04	4.33
Benzene	0.85	J	1.7	0.34	ppb v/v			11/05/15 08:04	4.33
Benzyl chloride	ND		3.5	0.71	ppb v/v			11/05/15 08:04	4.33
Bromodichloromethane	ND		1.3	0.29	ppb v/v			11/05/15 08:04	4.33
Bromoform	ND		1.7	0.30	ppb v/v			11/05/15 08:04	4.33
Bromomethane	ND		3.5	1.5	ppb v/v			11/05/15 08:04	4.33
2-Butanone (MEK)	ND		3.5	0.86	ppb v/v			11/05/15 08:04	4.33
Carbon disulfide	ND		3.5	0.34	ppb v/v			11/05/15 08:04	4.33
Carbon tetrachloride	ND		3.5	0.28	ppb v/v			11/05/15 08:04	4.33
Chlorobenzene	ND		1.3	0.28	ppb v/v			11/05/15 08:04	4.33
Chloroethane	ND		3.5	1.3	ppb v/v			11/05/15 08:04	4.33
Chloroform	0.55	J	1.3	0.41	ppb v/v			11/05/15 08:04	4.33
Chloromethane	1.1	J	3.5	0.85	ppb v/v			11/05/15 08:04	4.33
Dibromochloromethane	ND		1.7	0.34	ppb v/v			11/05/15 08:04	4.33
1,2-Dibromoethane (EDB)	ND		3.5	0.32	ppb v/v			11/05/15 08:04	4.33
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.7	0.67	ppb v/v			11/05/15 08:04	4.33
1,2-Dichlorobenzene	ND		1.7	0.56	ppb v/v			11/05/15 08:04	4.33
1,3-Dichlorobenzene	ND		1.7	0.48	ppb v/v			11/05/15 08:04	4.33
1,4-Dichlorobenzene	ND		1.7	0.65	ppb v/v			11/05/15 08:04	4.33
Dichlorodifluoromethane	18		1.7	0.63	ppb v/v			11/05/15 08:04	4.33
1,1-Dichloroethane	1.2	J	1.3	0.31	ppb v/v			11/05/15 08:04	4.33
1,2-Dichloroethane	ND		3.5	0.38	ppb v/v			11/05/15 08:04	4.33
1,1-Dichloroethene	9.4		3.5	0.56	ppb v/v			11/05/15 08:04	4.33
cis-1,2-Dichloroethene	0.70	J	1.7	0.39	ppb v/v			11/05/15 08:04	4.33
trans-1,2-Dichloroethene	ND		1.7	0.43	ppb v/v			11/05/15 08:04	4.33
1,2-Dichloropropane	ND		1.7	1.0	ppb v/v			11/05/15 08:04	4.33
cis-1,3-Dichloropropene	ND		1.7	0.45	ppb v/v			11/05/15 08:04	4.33
trans-1,3-Dichloropropene	ND		1.7	0.38	ppb v/v			11/05/15 08:04	4.33
Ethylbenzene	ND		1.7	0.27	ppb v/v			11/05/15 08:04	4.33
4-Ethyltoluene	ND		1.7	0.81	ppb v/v			11/05/15 08:04	4.33
Hexachlorobutadiene	ND		8.7	1.9	ppb v/v			11/05/15 08:04	4.33
2-Hexanone	ND		1.7	0.38	ppb v/v			11/05/15 08:04	4.33
4-Methyl-2-pentanone (MIBK)	ND		1.7	0.58	ppb v/v			11/05/15 08:04	4.33
Methylene Chloride	0.42	J	1.7	0.31	ppb v/v			11/05/15 08:04	4.33
Styrene	ND		1.7	0.26	ppb v/v			11/05/15 08:04	4.33
1,1,2,2-Tetrachloroethane	ND		1.7	0.30	ppb v/v			11/05/15 08:04	4.33
Tetrachloroethene	140		1.7	0.22	ppb v/v			11/05/15 08:04	4.33
Toluene	0.42	J	1.7	0.22	ppb v/v			11/05/15 08:04	4.33
1,1,2-Trichloro-1,2,2-trifluoroethane	65		1.7	0.71	ppb v/v			11/05/15 08:04	4.33
1,2,4-Trichlorobenzene	ND		8.7	1.9	ppb v/v			11/05/15 08:04	4.33
1,1,1-Trichloroethane	1.1	J	1.3	0.28	ppb v/v			11/05/15 08:04	4.33
1,1,2-Trichloroethane	ND		1.7	0.29	ppb v/v			11/05/15 08:04	4.33
Trichloroethene	97		1.7	0.45	ppb v/v			11/05/15 08:04	4.33
Trichlorofluoromethane	13		1.7	0.85	ppb v/v			11/05/15 08:04	4.33
1,2,4-Trimethylbenzene	ND		3.5	0.70	ppb v/v			11/05/15 08:04	4.33
1,3,5-Trimethylbenzene	ND		1.7	0.54	ppb v/v			11/05/15 08:04	4.33
Vinyl acetate	ND		3.5	0.63	ppb v/v			11/05/15 08:04	4.33
Vinyl chloride	ND		1.7	0.52	ppb v/v			11/05/15 08:04	4.33

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098336-001/MWL-SV04-400 (port 5)**

**Lab Sample ID: 320-15492-22**

**Date Collected: 10/08/15 11:00**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		3.5	0.43	ppb v/v			11/05/15 08:04	4.33
o-Xylene	ND		1.7	0.23	ppb v/v			11/05/15 08:04	4.33
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		70 - 130					11/05/15 08:04	4.33
1,2-Dichloroethane-d4 (Surr)	114		70 - 130					11/05/15 08:04	4.33
Toluene-d8 (Surr)	100		70 - 130					11/05/15 08:04	4.33

**Client Sample ID: 098337-001/MWL-SV-FB5**

**Lab Sample ID: 320-15492-23**

**Date Collected: 10/08/15 11:24**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			11/05/15 09:01	1
Benzene	ND		0.40	0.079	ppb v/v			11/05/15 09:01	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			11/05/15 09:01	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			11/05/15 09:01	1
Bromoform	ND		0.40	0.070	ppb v/v			11/05/15 09:01	1
Bromomethane	ND		0.80	0.34	ppb v/v			11/05/15 09:01	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			11/05/15 09:01	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			11/05/15 09:01	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			11/05/15 09:01	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			11/05/15 09:01	1
Chloroethane	ND		0.80	0.31	ppb v/v			11/05/15 09:01	1
Chloroform	ND		0.30	0.095	ppb v/v			11/05/15 09:01	1
Chloromethane	ND		0.80	0.20	ppb v/v			11/05/15 09:01	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			11/05/15 09:01	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			11/05/15 09:01	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			11/05/15 09:01	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			11/05/15 09:01	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			11/05/15 09:01	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			11/05/15 09:01	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			11/05/15 09:01	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			11/05/15 09:01	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			11/05/15 09:01	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			11/05/15 09:01	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			11/05/15 09:01	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			11/05/15 09:01	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			11/05/15 09:01	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			11/05/15 09:01	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			11/05/15 09:01	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			11/05/15 09:01	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			11/05/15 09:01	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			11/05/15 09:01	1
2-Hexanone	ND		0.40	0.087	ppb v/v			11/05/15 09:01	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			11/05/15 09:01	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			11/05/15 09:01	1

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098337-001/MWL-SV-FB5**

**Lab Sample ID: 320-15492-23**

**Date Collected: 10/08/15 11:24**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		0.40	0.059	ppb v/v			11/05/15 09:01	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			11/05/15 09:01	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			11/05/15 09:01	1
Toluene	ND		0.40	0.051	ppb v/v			11/05/15 09:01	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			11/05/15 09:01	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			11/05/15 09:01	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			11/05/15 09:01	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			11/05/15 09:01	1
Trichloroethene	ND		0.40	0.11	ppb v/v			11/05/15 09:01	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			11/05/15 09:01	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			11/05/15 09:01	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			11/05/15 09:01	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			11/05/15 09:01	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			11/05/15 09:01	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			11/05/15 09:01	1
o-Xylene	ND		0.40	0.054	ppb v/v			11/05/15 09:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	84		70 - 130		11/05/15 09:01	1
1,2-Dichloroethane-d4 (Surr)	118		70 - 130		11/05/15 09:01	1
Toluene-d8 (Surr)	100		70 - 130		11/05/15 09:01	1

**Client Sample ID: 098338-001/MWL-SV05-50 (port 1)**

**Lab Sample ID: 320-15492-24**

**Date Collected: 10/08/15 11:28**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	1.6	J	21	0.75	ppb v/v			11/05/15 20:06	4.2
Benzene	ND		1.7	0.33	ppb v/v			11/05/15 20:06	4.2
Benzyl chloride	ND		3.4	0.68	ppb v/v			11/05/15 20:06	4.2
Bromodichloromethane	ND		1.3	0.28	ppb v/v			11/05/15 20:06	4.2
Bromoform	ND		1.7	0.29	ppb v/v			11/05/15 20:06	4.2
Bromomethane	ND		3.4	1.4	ppb v/v			11/05/15 20:06	4.2
2-Butanone (MEK)	ND		3.4	0.84	ppb v/v			11/05/15 20:06	4.2
Carbon disulfide	ND		3.4	0.33	ppb v/v			11/05/15 20:06	4.2
Carbon tetrachloride	ND		3.4	0.27	ppb v/v			11/05/15 20:06	4.2
Chlorobenzene	ND		1.3	0.27	ppb v/v			11/05/15 20:06	4.2
Chloroethane	ND		3.4	1.3	ppb v/v			11/05/15 20:06	4.2
Chloroform	1.2	J	1.3	0.40	ppb v/v			11/05/15 20:06	4.2
Chloromethane	ND		3.4	0.83	ppb v/v			11/05/15 20:06	4.2
Dibromochloromethane	ND		1.7	0.33	ppb v/v			11/05/15 20:06	4.2
1,2-Dibromoethane (EDB)	ND		3.4	0.32	ppb v/v			11/05/15 20:06	4.2
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.7	0.65	ppb v/v			11/05/15 20:06	4.2
1,2-Dichlorobenzene	ND		1.7	0.55	ppb v/v			11/05/15 20:06	4.2
1,3-Dichlorobenzene	ND	*	1.7	0.46	ppb v/v			11/05/15 20:06	4.2
1,4-Dichlorobenzene	ND	*	1.7	0.63	ppb v/v			11/05/15 20:06	4.2
Dichlorodifluoromethane	40		1.7	0.61	ppb v/v			11/05/15 20:06	4.2

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098338-001/MWL-SV05-50 (port 1)**

**Lab Sample ID: 320-15492-24**

**Date Collected: 10/08/15 11:28**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>1,1-Dichloroethane</b>	<b>1.6</b>		1.3	0.30	ppb v/v			11/05/15 20:06	4.2
1,2-Dichloroethane	ND		3.4	0.37	ppb v/v			11/05/15 20:06	4.2
<b>1,1-Dichloroethene</b>	<b>9.6</b>		3.4	0.54	ppb v/v			11/05/15 20:06	4.2
<b>cis-1,2-Dichloroethene</b>	<b>0.51</b>	<b>J</b>	1.7	0.37	ppb v/v			11/05/15 20:06	4.2
trans-1,2-Dichloroethene	ND		1.7	0.42	ppb v/v			11/05/15 20:06	4.2
1,2-Dichloropropane	ND		1.7	1.0	ppb v/v			11/05/15 20:06	4.2
cis-1,3-Dichloropropene	ND		1.7	0.44	ppb v/v			11/05/15 20:06	4.2
trans-1,3-Dichloropropene	ND		1.7	0.37	ppb v/v			11/05/15 20:06	4.2
Ethylbenzene	ND		1.7	0.26	ppb v/v			11/05/15 20:06	4.2
4-Ethyltoluene	ND		1.7	0.79	ppb v/v			11/05/15 20:06	4.2
Hexachlorobutadiene	ND		8.4	1.8	ppb v/v			11/05/15 20:06	4.2
2-Hexanone	ND		1.7	0.37	ppb v/v			11/05/15 20:06	4.2
4-Methyl-2-pentanone (MIBK)	ND		1.7	0.57	ppb v/v			11/05/15 20:06	4.2
<b>Methylene Chloride</b>	<b>0.35</b>	<b>J</b>	1.7	0.30	ppb v/v			11/05/15 20:06	4.2
Styrene	ND		1.7	0.25	ppb v/v			11/05/15 20:06	4.2
1,1,2,2-Tetrachloroethane	ND		1.7	0.29	ppb v/v			11/05/15 20:06	4.2
<b>Tetrachloroethene</b>	<b>40</b>		1.7	0.21	ppb v/v			11/05/15 20:06	4.2
Toluene	ND		1.7	0.21	ppb v/v			11/05/15 20:06	4.2
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>43</b>		1.7	0.68	ppb v/v			11/05/15 20:06	4.2
1,2,4-Trichlorobenzene	ND		8.4	1.8	ppb v/v			11/05/15 20:06	4.2
<b>1,1,1-Trichloroethane</b>	<b>11</b>		1.3	0.27	ppb v/v			11/05/15 20:06	4.2
1,1,2-Trichloroethane	ND		1.7	0.28	ppb v/v			11/05/15 20:06	4.2
<b>Trichloroethene</b>	<b>52</b>		1.7	0.44	ppb v/v			11/05/15 20:06	4.2
<b>Trichlorofluoromethane</b>	<b>100</b>		1.7	0.82	ppb v/v			11/05/15 20:06	4.2
1,2,4-Trimethylbenzene	ND		3.4	0.68	ppb v/v			11/05/15 20:06	4.2
1,3,5-Trimethylbenzene	ND		1.7	0.53	ppb v/v			11/05/15 20:06	4.2
<b>Vinyl acetate</b>	<b>3.2</b>	<b>J</b>	3.4	0.61	ppb v/v			11/05/15 20:06	4.2
Vinyl chloride	ND		1.7	0.50	ppb v/v			11/05/15 20:06	4.2
m,p-Xylene	ND		3.4	0.42	ppb v/v			11/05/15 20:06	4.2
o-Xylene	ND		1.7	0.23	ppb v/v			11/05/15 20:06	4.2

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		70 - 130		11/05/15 20:06	4.2
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		11/05/15 20:06	4.2
Toluene-d8 (Surr)	100		70 - 130		11/05/15 20:06	4.2

**Client Sample ID: 098339-001/MWL-SV05-100 (port 2)**

**Lab Sample ID: 320-15492-25**

**Date Collected: 10/08/15 11:32**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>3.1</b>	<b>J</b>	24	0.86	ppb v/v			11/05/15 20:58	4.83
Benzene	ND		1.9	0.38	ppb v/v			11/05/15 20:58	4.83
Benzyl chloride	ND		3.9	0.79	ppb v/v			11/05/15 20:58	4.83
Bromodichloromethane	ND		1.4	0.32	ppb v/v			11/05/15 20:58	4.83
Bromoform	ND		1.9	0.34	ppb v/v			11/05/15 20:58	4.83

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098339-001/MWL-SV05-100 (port 2)**

**Lab Sample ID: 320-15492-25**

**Date Collected: 10/08/15 11:32**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromomethane	ND		3.9	1.6	ppb v/v			11/05/15 20:58	4.83
2-Butanone (MEK)	ND		3.9	0.96	ppb v/v			11/05/15 20:58	4.83
Carbon disulfide	ND		3.9	0.38	ppb v/v			11/05/15 20:58	4.83
<b>Carbon tetrachloride</b>	<b>0.38</b>	<b>J</b>	3.9	0.31	ppb v/v			11/05/15 20:58	4.83
Chlorobenzene	ND		1.4	0.31	ppb v/v			11/05/15 20:58	4.83
Chloroethane	ND		3.9	1.5	ppb v/v			11/05/15 20:58	4.83
<b>Chloroform</b>	<b>2.0</b>		1.4	0.46	ppb v/v			11/05/15 20:58	4.83
Chloromethane	ND		3.9	0.95	ppb v/v			11/05/15 20:58	4.83
Dibromochloromethane	ND		1.9	0.38	ppb v/v			11/05/15 20:58	4.83
1,2-Dibromoethane (EDB)	ND		3.9	0.36	ppb v/v			11/05/15 20:58	4.83
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.9	0.75	ppb v/v			11/05/15 20:58	4.83
1,2-Dichlorobenzene	ND		1.9	0.63	ppb v/v			11/05/15 20:58	4.83
1,3-Dichlorobenzene	ND	*	1.9	0.53	ppb v/v			11/05/15 20:58	4.83
1,4-Dichlorobenzene	ND	*	1.9	0.72	ppb v/v			11/05/15 20:58	4.83
<b>Dichlorodifluoromethane</b>	<b>66</b>		1.9	0.70	ppb v/v			11/05/15 20:58	4.83
<b>1,1-Dichloroethane</b>	<b>3.3</b>		1.4	0.35	ppb v/v			11/05/15 20:58	4.83
1,2-Dichloroethane	ND		3.9	0.43	ppb v/v			11/05/15 20:58	4.83
<b>1,1-Dichloroethene</b>	<b>22</b>		3.9	0.62	ppb v/v			11/05/15 20:58	4.83
<b>cis-1,2-Dichloroethene</b>	<b>1.4</b>	<b>J</b>	1.9	0.43	ppb v/v			11/05/15 20:58	4.83
trans-1,2-Dichloroethene	ND		1.9	0.48	ppb v/v			11/05/15 20:58	4.83
1,2-Dichloropropane	ND		1.9	1.2	ppb v/v			11/05/15 20:58	4.83
cis-1,3-Dichloropropene	ND		1.9	0.50	ppb v/v			11/05/15 20:58	4.83
trans-1,3-Dichloropropene	ND		1.9	0.43	ppb v/v			11/05/15 20:58	4.83
Ethylbenzene	ND		1.9	0.30	ppb v/v			11/05/15 20:58	4.83
4-Ethyltoluene	ND		1.9	0.90	ppb v/v			11/05/15 20:58	4.83
Hexachlorobutadiene	ND		9.7	2.1	ppb v/v			11/05/15 20:58	4.83
2-Hexanone	ND		1.9	0.42	ppb v/v			11/05/15 20:58	4.83
4-Methyl-2-pentanone (MIBK)	ND		1.9	0.65	ppb v/v			11/05/15 20:58	4.83
<b>Methylene Chloride</b>	<b>1.0</b>	<b>J</b>	1.9	0.35	ppb v/v			11/05/15 20:58	4.83
Styrene	ND		1.9	0.28	ppb v/v			11/05/15 20:58	4.83
1,1,2,2-Tetrachloroethane	ND		1.9	0.33	ppb v/v			11/05/15 20:58	4.83
<b>Tetrachloroethene</b>	<b>77</b>		1.9	0.25	ppb v/v			11/05/15 20:58	4.83
Toluene	ND		1.9	0.25	ppb v/v			11/05/15 20:58	4.83
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>90</b>		1.9	0.79	ppb v/v			11/05/15 20:58	4.83
1,2,4-Trichlorobenzene	ND		9.7	2.1	ppb v/v			11/05/15 20:58	4.83
<b>1,1,1-Trichloroethane</b>	<b>12</b>		1.4	0.31	ppb v/v			11/05/15 20:58	4.83
1,1,2-Trichloroethane	ND		1.9	0.32	ppb v/v			11/05/15 20:58	4.83
<b>Trichloroethene</b>	<b>120</b>		1.9	0.51	ppb v/v			11/05/15 20:58	4.83
<b>Trichlorofluoromethane</b>	<b>130</b>		1.9	0.95	ppb v/v			11/05/15 20:58	4.83
1,2,4-Trimethylbenzene	ND		3.9	0.78	ppb v/v			11/05/15 20:58	4.83
1,3,5-Trimethylbenzene	ND		1.9	0.60	ppb v/v			11/05/15 20:58	4.83
<b>Vinyl acetate</b>	<b>4.3</b>		3.9	0.70	ppb v/v			11/05/15 20:58	4.83
Vinyl chloride	ND		1.9	0.58	ppb v/v			11/05/15 20:58	4.83
m,p-Xylene	ND		3.9	0.48	ppb v/v			11/05/15 20:58	4.83
o-Xylene	ND		1.9	0.26	ppb v/v			11/05/15 20:58	4.83

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		70 - 130		11/05/15 20:58	4.83

TestAmerica Sacramento



# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098339-001/MWL-SV05-100 (port 2)**

**Lab Sample ID: 320-15492-25**

**Date Collected: 10/08/15 11:32**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	105		70 - 130		11/05/15 20:58	4.83
Toluene-d8 (Surr)	102		70 - 130		11/05/15 20:58	4.83

**Client Sample ID: 098340-001/MWL-SV05-200 (port 3)**

**Lab Sample ID: 320-15492-26**

**Date Collected: 10/08/15 11:35**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>2.8</b>	<b>J</b>	36	1.3	ppb v/v			11/05/15 21:48	7.19
Benzene	ND		2.9	0.57	ppb v/v			11/05/15 21:48	7.19
Benzyl chloride	ND		5.8	1.2	ppb v/v			11/05/15 21:48	7.19
Bromodichloromethane	ND		2.2	0.47	ppb v/v			11/05/15 21:48	7.19
Bromoform	ND		2.9	0.50	ppb v/v			11/05/15 21:48	7.19
Bromomethane	ND		5.8	2.4	ppb v/v			11/05/15 21:48	7.19
2-Butanone (MEK)	ND		5.8	1.4	ppb v/v			11/05/15 21:48	7.19
Carbon disulfide	ND		5.8	0.56	ppb v/v			11/05/15 21:48	7.19
<b>Carbon tetrachloride</b>	<b>1.0</b>	<b>J</b>	5.8	0.46	ppb v/v			11/05/15 21:48	7.19
Chlorobenzene	ND		2.2	0.46	ppb v/v			11/05/15 21:48	7.19
Chloroethane	ND		5.8	2.2	ppb v/v			11/05/15 21:48	7.19
<b>Chloroform</b>	<b>2.0</b>	<b>J</b>	2.2	0.68	ppb v/v			11/05/15 21:48	7.19
Chloromethane	ND		5.8	1.4	ppb v/v			11/05/15 21:48	7.19
Dibromochloromethane	ND		2.9	0.57	ppb v/v			11/05/15 21:48	7.19
1,2-Dibromoethane (EDB)	ND		5.8	0.54	ppb v/v			11/05/15 21:48	7.19
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.9	1.1	ppb v/v			11/05/15 21:48	7.19
1,2-Dichlorobenzene	ND		2.9	0.93	ppb v/v			11/05/15 21:48	7.19
1,3-Dichlorobenzene	ND	*	2.9	0.79	ppb v/v			11/05/15 21:48	7.19
1,4-Dichlorobenzene	ND	*	2.9	1.1	ppb v/v			11/05/15 21:48	7.19
<b>Dichlorodifluoromethane</b>	<b>74</b>		2.9	1.0	ppb v/v			11/05/15 21:48	7.19
<b>1,1-Dichloroethane</b>	<b>4.2</b>		2.2	0.52	ppb v/v			11/05/15 21:48	7.19
1,2-Dichloroethane	ND		5.8	0.63	ppb v/v			11/05/15 21:48	7.19
<b>1,1-Dichloroethene</b>	<b>38</b>		5.8	0.93	ppb v/v			11/05/15 21:48	7.19
<b>cis-1,2-Dichloroethene</b>	<b>2.5</b>	<b>J</b>	2.9	0.64	ppb v/v			11/05/15 21:48	7.19
trans-1,2-Dichloroethene	ND		2.9	0.72	ppb v/v			11/05/15 21:48	7.19
1,2-Dichloropropane	ND		2.9	1.7	ppb v/v			11/05/15 21:48	7.19
cis-1,3-Dichloropropene	ND		2.9	0.75	ppb v/v			11/05/15 21:48	7.19
trans-1,3-Dichloropropene	ND		2.9	0.63	ppb v/v			11/05/15 21:48	7.19
Ethylbenzene	ND		2.9	0.45	ppb v/v			11/05/15 21:48	7.19
4-Ethyltoluene	ND		2.9	1.3	ppb v/v			11/05/15 21:48	7.19
Hexachlorobutadiene	ND		14	3.1	ppb v/v			11/05/15 21:48	7.19
2-Hexanone	ND		2.9	0.63	ppb v/v			11/05/15 21:48	7.19
4-Methyl-2-pentanone (MIBK)	ND		2.9	0.97	ppb v/v			11/05/15 21:48	7.19
<b>Methylene Chloride</b>	<b>2.6</b>	<b>J</b>	2.9	0.52	ppb v/v			11/05/15 21:48	7.19
Styrene	ND		2.9	0.42	ppb v/v			11/05/15 21:48	7.19
1,1,2,2-Tetrachloroethane	ND		2.9	0.50	ppb v/v			11/05/15 21:48	7.19
<b>Tetrachloroethene</b>	<b>120</b>		2.9	0.37	ppb v/v			11/05/15 21:48	7.19
Toluene	ND		2.9	0.37	ppb v/v			11/05/15 21:48	7.19

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098340-001/MWL-SV05-200 (port 3)**

**Lab Sample ID: 320-15492-26**

**Date Collected: 10/08/15 11:35**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>130</b>		2.9	1.2	ppb v/v			11/05/15 21:48	7.19
1,2,4-Trichlorobenzene	ND		14	3.1	ppb v/v			11/05/15 21:48	7.19
<b>1,1,1-Trichloroethane</b>	<b>4.0</b>		2.2	0.47	ppb v/v			11/05/15 21:48	7.19
1,1,2-Trichloroethane	ND		2.9	0.48	ppb v/v			11/05/15 21:48	7.19
<b>Trichloroethene</b>	<b>200</b>		2.9	0.75	ppb v/v			11/05/15 21:48	7.19
<b>Trichlorofluoromethane</b>	<b>76</b>		2.9	1.4	ppb v/v			11/05/15 21:48	7.19
1,2,4-Trimethylbenzene	ND		5.8	1.2	ppb v/v			11/05/15 21:48	7.19
1,3,5-Trimethylbenzene	ND		2.9	0.90	ppb v/v			11/05/15 21:48	7.19
<b>Vinyl acetate</b>	<b>1.2 J</b>		5.8	1.0	ppb v/v			11/05/15 21:48	7.19
Vinyl chloride	ND		2.9	0.86	ppb v/v			11/05/15 21:48	7.19
m,p-Xylene	ND		5.8	0.72	ppb v/v			11/05/15 21:48	7.19
o-Xylene	ND		2.9	0.39	ppb v/v			11/05/15 21:48	7.19

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130		11/05/15 21:48	7.19
1,2-Dichloroethane-d4 (Surr)	109		70 - 130		11/05/15 21:48	7.19
Toluene-d8 (Surr)	101		70 - 130		11/05/15 21:48	7.19

**Client Sample ID: 098341-001/MWL-SV05-300 (port 4)**

**Lab Sample ID: 320-15492-27**

**Date Collected: 10/08/15 11:41**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>7.9 J</b>		20	0.71	ppb v/v			11/05/15 22:40	4.01
<b>Benzene</b>	<b>0.37 J</b>		1.6	0.32	ppb v/v			11/05/15 22:40	4.01
Benzyl chloride	ND		3.2	0.65	ppb v/v			11/05/15 22:40	4.01
Bromodichloromethane	ND		1.2	0.26	ppb v/v			11/05/15 22:40	4.01
Bromoform	ND		1.6	0.28	ppb v/v			11/05/15 22:40	4.01
Bromomethane	ND		3.2	1.3	ppb v/v			11/05/15 22:40	4.01
2-Butanone (MEK)	ND		3.2	0.80	ppb v/v			11/05/15 22:40	4.01
<b>Carbon disulfide</b>	<b>0.32 J</b>		3.2	0.31	ppb v/v			11/05/15 22:40	4.01
<b>Carbon tetrachloride</b>	<b>0.92 J</b>		3.2	0.26	ppb v/v			11/05/15 22:40	4.01
Chlorobenzene	ND		1.2	0.26	ppb v/v			11/05/15 22:40	4.01
Chloroethane	ND		3.2	1.2	ppb v/v			11/05/15 22:40	4.01
<b>Chloroform</b>	<b>0.69 J</b>		1.2	0.38	ppb v/v			11/05/15 22:40	4.01
Chloromethane	ND		3.2	0.79	ppb v/v			11/05/15 22:40	4.01
Dibromochloromethane	ND		1.6	0.32	ppb v/v			11/05/15 22:40	4.01
1,2-Dibromoethane (EDB)	ND		3.2	0.30	ppb v/v			11/05/15 22:40	4.01
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.6	0.62	ppb v/v			11/05/15 22:40	4.01
1,2-Dichlorobenzene	ND		1.6	0.52	ppb v/v			11/05/15 22:40	4.01
1,3-Dichlorobenzene	ND	*	1.6	0.44	ppb v/v			11/05/15 22:40	4.01
1,4-Dichlorobenzene	ND	*	1.6	0.60	ppb v/v			11/05/15 22:40	4.01
<b>Dichlorodifluoromethane</b>	<b>40</b>		1.6	0.58	ppb v/v			11/05/15 22:40	4.01
<b>1,1-Dichloroethane</b>	<b>1.8</b>		1.2	0.29	ppb v/v			11/05/15 22:40	4.01
1,2-Dichloroethane	ND		3.2	0.35	ppb v/v			11/05/15 22:40	4.01
<b>1,1-Dichloroethene</b>	<b>26</b>		3.2	0.52	ppb v/v			11/05/15 22:40	4.01

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# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098341-001/MWL-SV05-300 (port 4)**

**Lab Sample ID: 320-15492-27**

**Date Collected: 10/08/15 11:41**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>cis-1,2-Dichloroethene</b>	<b>0.75</b>	<b>J</b>	1.6	0.36	ppb v/v			11/05/15 22:40	4.01
trans-1,2-Dichloroethene	ND		1.6	0.40	ppb v/v			11/05/15 22:40	4.01
1,2-Dichloropropane	ND		1.6	0.96	ppb v/v			11/05/15 22:40	4.01
cis-1,3-Dichloropropene	ND		1.6	0.42	ppb v/v			11/05/15 22:40	4.01
trans-1,3-Dichloropropene	ND		1.6	0.35	ppb v/v			11/05/15 22:40	4.01
Ethylbenzene	ND		1.6	0.25	ppb v/v			11/05/15 22:40	4.01
4-Ethyltoluene	ND		1.6	0.75	ppb v/v			11/05/15 22:40	4.01
Hexachlorobutadiene	ND		8.0	1.7	ppb v/v			11/05/15 22:40	4.01
2-Hexanone	ND		1.6	0.35	ppb v/v			11/05/15 22:40	4.01
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.54	ppb v/v			11/05/15 22:40	4.01
<b>Methylene Chloride</b>	<b>0.98</b>	<b>J</b>	1.6	0.29	ppb v/v			11/05/15 22:40	4.01
Styrene	ND		1.6	0.24	ppb v/v			11/05/15 22:40	4.01
1,1,2,2-Tetrachloroethane	ND		1.6	0.28	ppb v/v			11/05/15 22:40	4.01
<b>Tetrachloroethene</b>	<b>110</b>		1.6	0.20	ppb v/v			11/05/15 22:40	4.01
<b>Toluene</b>	<b>0.43</b>	<b>J</b>	1.6	0.20	ppb v/v			11/05/15 22:40	4.01
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>97</b>		1.6	0.65	ppb v/v			11/05/15 22:40	4.01
1,2,4-Trichlorobenzene	ND		8.0	1.7	ppb v/v			11/05/15 22:40	4.01
<b>1,1,1-Trichloroethane</b>	<b>2.2</b>		1.2	0.26	ppb v/v			11/05/15 22:40	4.01
1,1,2-Trichloroethane	ND		1.6	0.27	ppb v/v			11/05/15 22:40	4.01
<b>Trichloroethene</b>	<b>120</b>		1.6	0.42	ppb v/v			11/05/15 22:40	4.01
<b>Trichlorofluoromethane</b>	<b>34</b>		1.6	0.79	ppb v/v			11/05/15 22:40	4.01
1,2,4-Trimethylbenzene	ND		3.2	0.65	ppb v/v			11/05/15 22:40	4.01
1,3,5-Trimethylbenzene	ND		1.6	0.50	ppb v/v			11/05/15 22:40	4.01
Vinyl acetate	ND		3.2	0.58	ppb v/v			11/05/15 22:40	4.01
Vinyl chloride	ND		1.6	0.48	ppb v/v			11/05/15 22:40	4.01
m,p-Xylene	ND		3.2	0.40	ppb v/v			11/05/15 22:40	4.01
o-Xylene	ND		1.6	0.22	ppb v/v			11/05/15 22:40	4.01
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130					11/05/15 22:40	4.01
1,2-Dichloroethane-d4 (Surr)	112		70 - 130					11/05/15 22:40	4.01
Toluene-d8 (Surr)	98		70 - 130					11/05/15 22:40	4.01

**Client Sample ID: 098342-001/MWL-SV05-400 (port 5)**

**Lab Sample ID: 320-15492-28**

**Date Collected: 10/08/15 11:48**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Acetone</b>	<b>5.5</b>	<b>J</b>	18	0.62	ppb v/v			11/05/15 23:31	3.5
<b>Benzene</b>	<b>0.43</b>	<b>J</b>	1.4	0.28	ppb v/v			11/05/15 23:31	3.5
Benzyl chloride	ND		2.8	0.57	ppb v/v			11/05/15 23:31	3.5
Bromodichloromethane	ND		1.1	0.23	ppb v/v			11/05/15 23:31	3.5
Bromoform	ND		1.4	0.25	ppb v/v			11/05/15 23:31	3.5
Bromomethane	ND		2.8	1.2	ppb v/v			11/05/15 23:31	3.5
2-Butanone (MEK)	ND		2.8	0.70	ppb v/v			11/05/15 23:31	3.5
Carbon disulfide	ND		2.8	0.27	ppb v/v			11/05/15 23:31	3.5

TestAmerica Sacramento

# Client Sample Results

Client: Sandia National Laboratories  
Project/Site: MWL GWM/SVM-616350,1,2,3,4

TestAmerica Job ID: 320-15492-1  
SDG: 616350

**Client Sample ID: 098342-001/MWL-SV05-400 (port 5)**

**Lab Sample ID: 320-15492-28**

**Date Collected: 10/08/15 11:48**

**Matrix: Air**

**Date Received: 10/15/15 10:30**

**Sample Container: Summa Canister 6L**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Carbon tetrachloride</b>	<b>0.56</b>	<b>J</b>	2.8	0.22	ppb v/v			11/05/15 23:31	3.5
Chlorobenzene	ND		1.1	0.22	ppb v/v			11/05/15 23:31	3.5
Chloroethane	ND		2.8	1.1	ppb v/v			11/05/15 23:31	3.5
<b>Chloroform</b>	<b>0.77</b>	<b>J</b>	1.1	0.33	ppb v/v			11/05/15 23:31	3.5
<b>Chloromethane</b>	<b>1.0</b>	<b>J</b>	2.8	0.69	ppb v/v			11/05/15 23:31	3.5
Dibromochloromethane	ND		1.4	0.28	ppb v/v			11/05/15 23:31	3.5
1,2-Dibromoethane (EDB)	ND		2.8	0.26	ppb v/v			11/05/15 23:31	3.5
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.54	ppb v/v			11/05/15 23:31	3.5
1,2-Dichlorobenzene	ND		1.4	0.46	ppb v/v			11/05/15 23:31	3.5
1,3-Dichlorobenzene	ND	*	1.4	0.39	ppb v/v			11/05/15 23:31	3.5
1,4-Dichlorobenzene	ND	*	1.4	0.52	ppb v/v			11/05/15 23:31	3.5
<b>Dichlorodifluoromethane</b>	<b>20</b>		1.4	0.51	ppb v/v			11/05/15 23:31	3.5
<b>1,1-Dichloroethane</b>	<b>1.6</b>		1.1	0.25	ppb v/v			11/05/15 23:31	3.5
1,2-Dichloroethane	ND		2.8	0.31	ppb v/v			11/05/15 23:31	3.5
<b>1,1-Dichloroethene</b>	<b>17</b>		2.8	0.45	ppb v/v			11/05/15 23:31	3.5
cis-1,2-Dichloroethene	ND		1.4	0.31	ppb v/v			11/05/15 23:31	3.5
trans-1,2-Dichloroethene	ND		1.4	0.35	ppb v/v			11/05/15 23:31	3.5
1,2-Dichloropropane	ND		1.4	0.84	ppb v/v			11/05/15 23:31	3.5
cis-1,3-Dichloropropene	ND		1.4	0.36	ppb v/v			11/05/15 23:31	3.5
trans-1,3-Dichloropropene	ND		1.4	0.31	ppb v/v			11/05/15 23:31	3.5
Ethylbenzene	ND		1.4	0.22	ppb v/v			11/05/15 23:31	3.5
4-Ethyltoluene	ND		1.4	0.65	ppb v/v			11/05/15 23:31	3.5
Hexachlorobutadiene	ND		7.0	1.5	ppb v/v			11/05/15 23:31	3.5
2-Hexanone	ND		1.4	0.30	ppb v/v			11/05/15 23:31	3.5
4-Methyl-2-pentanone (MIBK)	ND		1.4	0.47	ppb v/v			11/05/15 23:31	3.5
<b>Methylene Chloride</b>	<b>0.89</b>	<b>J</b>	1.4	0.25	ppb v/v			11/05/15 23:31	3.5
Styrene	ND		1.4	0.21	ppb v/v			11/05/15 23:31	3.5
1,1,2,2-Tetrachloroethane	ND		1.4	0.24	ppb v/v			11/05/15 23:31	3.5
<b>Tetrachloroethene</b>	<b>120</b>		1.4	0.18	ppb v/v			11/05/15 23:31	3.5
<b>Toluene</b>	<b>5.1</b>		1.4	0.18	ppb v/v			11/05/15 23:31	3.5
<b>1,1,2-Trichloro-1,2,2-trifluoroethane</b>	<b>74</b>		1.4	0.57	ppb v/v			11/05/15 23:31	3.5
1,2,4-Trichlorobenzene	ND		7.0	1.5	ppb v/v			11/05/15 23:31	3.5
<b>1,1,1-Trichloroethane</b>	<b>2.1</b>		1.1	0.23	ppb v/v			11/05/15 23:31	3.5
1,1,2-Trichloroethane	ND		1.4	0.23	ppb v/v			11/05/15 23:31	3.5
<b>Trichloroethene</b>	<b>120</b>		1.4	0.37	ppb v/v			11/05/15 23:31	3.5
<b>Trichlorofluoromethane</b>	<b>34</b>		1.4	0.69	ppb v/v			11/05/15 23:31	3.5
1,2,4-Trimethylbenzene	ND		2.8	0.57	ppb v/v			11/05/15 23:31	3.5
1,3,5-Trimethylbenzene	ND		1.4	0.44	ppb v/v			11/05/15 23:31	3.5
Vinyl acetate	ND		2.8	0.51	ppb v/v			11/05/15 23:31	3.5
Vinyl chloride	ND		1.4	0.42	ppb v/v			11/05/15 23:31	3.5
m,p-Xylene	ND		2.8	0.35	ppb v/v			11/05/15 23:31	3.5
o-Xylene	ND		1.4	0.19	ppb v/v			11/05/15 23:31	3.5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		70 - 130		11/05/15 23:31	3.5
1,2-Dichloroethane-d4 (Surr)	120		70 - 130		11/05/15 23:31	3.5
Toluene-d8 (Surr)	99		70 - 130		11/05/15 23:31	3.5

TestAmerica Sacramento

**ANNEX D**

**Mixed Waste Landfill  
Soil-Moisture Monitoring Forms**

**April 2015-March 2016**

**Field Forms and Tables**

**Tailgate Safety Meeting Form**

Dept: 4142 Facility: MWL Date: 4/23/15 Time: 1310

Activities: Soil moisture monitoring using CPN503DR Hydroprobe.

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

**Weather Conditions:**

Temp:      °F Wind Speed:      MPH Humidity:      % Wind Chill:      °F

<input checked="" type="checkbox"/> Wear safety boots	<input checked="" type="checkbox"/> Wear leather gloves
<input type="checkbox"/> Wear safety glasses	<input type="checkbox"/> Wear sun screen
<input checked="" type="checkbox"/> Be aware of biohazards (snakes, spiders, etc.)	<input checked="" type="checkbox"/> Wear communication device (cell phone, EOC pager)
<input checked="" type="checkbox"/> Be aware of slips, trips, and falls	<input checked="" type="checkbox"/> Using safe lifting practices were discussed.
<input checked="" type="checkbox"/> Be aware of pinch points on winch	<input checked="" type="checkbox"/> Be aware of environmental conditions (heat/cold stress)
Does anyone have any weight restrictions on lifting? Circle YES or NO. If answered YES explain.	
<input checked="" type="checkbox"/> Practice ALARA	<input checked="" type="checkbox"/> Notify RCT when using neutron probe

**ATTENDEES**

Robert Zuck  
Printed Name  
Danielle Nieb  
Printed Name  
\_\_\_\_\_  
Printed Name  
\_\_\_\_\_  
Printed Name  
\_\_\_\_\_  
Printed Name  
\_\_\_\_\_  
Printed Name

Robert Zuck  
Signature  
Danielle Nieb  
Signature  
\_\_\_\_\_  
Signature  
\_\_\_\_\_  
Signature  
\_\_\_\_\_  
Signature

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**Tailgate Safety Meeting Form**

Dept: 4142 Facility: MWL Date: 4/21/15 Time: 1232

Activities: Soil moisture monitoring using CPN503DR Hydroprobe.

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

**Weather Conditions:**

Temp: \_\_\_\_\_ °F Wind Speed: \_\_\_\_\_ MPH Humidity: \_\_\_\_\_ % Wind Chill: \_\_\_\_\_ °F

<input checked="" type="checkbox"/> Wear safety boots	<input checked="" type="checkbox"/> Wear leather gloves
<input type="checkbox"/> Wear safety glasses	<input type="checkbox"/> Wear sun screen
<input checked="" type="checkbox"/> Be aware of biohazards (snakes, spiders, etc.)	<input checked="" type="checkbox"/> Wear communication device (cell phone, EOC pager)
<input checked="" type="checkbox"/> Be aware of slips, trips, and falls	<input type="checkbox"/> Using safe lifting practices were discussed.
<input checked="" type="checkbox"/> Be aware of pinch points on winch	<input checked="" type="checkbox"/> Be aware of environmental conditions (heat/cold stress)
Does anyone have any weight restrictions on lifting? Circle <b>YES</b> or <b>NO</b> . If answered <b>YES</b> explain.	
<input checked="" type="checkbox"/> Practice ALARA	<input checked="" type="checkbox"/> Notify RCT when using neutron probe

**ATTENDEES**

<u>Robert Eick</u> Printed Name	<u>[Signature]</u> Signature
<u>Danielle Nieto</u> Printed Name	<u>[Signature]</u> Signature
_____ Printed Name	_____ Signature
_____ Printed Name	_____ Signature
_____ Printed Name	_____ Signature
_____ Printed Name	_____ Signature

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Mixed Waste Landfill Neutron Logging Data Field Form (page 1 of 2)

Date: 4/21/15 & 4/23/15				Standard Count: 6856 / 6643	
Start Time: 12:37 & 1316				Chi: 0.95 / 1.01	
Personnel: Robert Zook Danielle Vito				Previous Count: 6780 / 6856	
				Count Time: 30 seconds	
Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Winch Counter Reading (ft)	VZ-3 Counts (E Side) 4/21/15	VZ-2 Counts (SW Corner) 4/21/15	VZ-1 Counts (NW Corner) 4/23/15
0.0	0	0	363	1058	818
0.9	1	9999	2145	2067	2402
1.7	2	9998	2611	2290	2092
2.6	3	9997	2600	2341	1882
3.5	4	9996	2209	2397	1961
4.3	5	9995	1871	2337	2027
5.2	6	9994	2084	1977	1751
6.1	7	9993	1635	1733	1702
6.9	8	9992	1743	1710	1534
7.8	9	9991	1832	1716	1550
8.7	10	9990	1785	1674	1902
9.5	11	9989	1973	1921	2059
10.4	12	9988	1662	1923	1944
11.3	13	9987	1842	1813	1755
12.1	14	9986	1842	1745	1848
13.0	15	9985	1884	1688	2079
13.9	16	9984	1829	1737	2173
14.7	17	9983	1558	1825	1845
15.6	18	9982	1720	1764	1564
16.5	19	9981	1769	2266	1511
17.3	20	9980	1377	2137	1574
18.2	21	9979	1727	1834	1668
19.1	22	9978	1862	1837	2162
19.9	23	9977	1519	2123	2318
20.8	24	9976	1444	1782	2149
21.7	25	9975	1467	1601	1864

Date: 4/21/15 | 4/21/15 | 4/23/15

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Mixed Waste Landfill Neutron Logging Data Field Form (page 2 of 2)

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Winch Counter Reading (ft)	VZ-3 Counts (E Side) 4/21/15	VZ-2 Counts (SW Corner) 4/21/15	VZ-1 Counts (NW Corner) 4/23/15
26.0	30	9970	1860	1792	1789
30.3	35	9965	1690	1937	2087
34.6	40	9960	1882	1657	1776
39.0	45	9955	1645	1632	2203
43.3	50	9950	1950	1582	1765
47.6	55	9945	1836	2085	1770
52.0	60	9940	1754	1979	1937
56.3	65	9935	2250	2200	1952
60.6	70	9930	1337	2642	1736
65.0	75	9925	2431	2281	2194
69.3	80	9920	2275	1581	1969
73.6	85	9915	1920	1833	2217
77.9	90	9910	1456	2328	2044
82.3	95	9905	2109	2312	2164
86.6	100	9900	2196	2135	2737
90.9	105	9895	1991	2349	2360
95.3	110	9890	2308	1924	2021
99.6	115	9885	2158	1841	1951
103.9	120	9880	1623	1912	2015
108.3	125	9875	1706	2204	1578
112.6	130	9870	2410	2275	1925
116.9	135	9865	2423	2717	1694
121.2	140	9860	1767	1993	1468
125.6	145	9855	1540	2632	2471
129.9	150	9850	2550	2350	2082
134.2	155	9845	2041	2302	1726
138.6	160	9840	2654	2514	1866
142.9	165	9835	2646	2130	2159
147.2	170	9830	2418	1674	1610
151.6	175	9825	2481	2716	2984
155.9	180	9820	3287	2638	3012
160.2	185	9815	3166	2905	2285
164.5	190	9810	1738	1642	1963
168.9	195	9805	1881	2108	3378
173.2	200	9800	2107	3151	2686

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**Tailgate Safety Meeting Form**

Dept: 4142 Facility: MWL Date: 10/8/15 Time: 0900

Activities: Soil moisture monitoring using CPN503DR Hydroprobe.

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

**Weather Conditions:**

Temp: \_\_\_\_\_ °F Wind Speed: \_\_\_\_\_ MPH Humidity: \_\_\_\_\_ % Wind Chill: \_\_\_\_\_ °F

<input checked="" type="checkbox"/> Wear safety boots	<input checked="" type="checkbox"/> Wear leather gloves
<input checked="" type="checkbox"/> Wear safety glasses	<input type="checkbox"/> Wear sun screen
<input checked="" type="checkbox"/> Be aware of biohazards (snakes, spiders, etc.)	<input checked="" type="checkbox"/> Wear communication device (cell phone, EOC pager)
<input checked="" type="checkbox"/> Be aware of slips, trips, and falls	<input checked="" type="checkbox"/> Using safe lifting practices were discussed.
<input checked="" type="checkbox"/> Be aware of pinch points on winch	<input checked="" type="checkbox"/> Be aware of environmental conditions (heat/cold stress)
Does anyone have any weight restrictions on lifting? Circle <b>YES</b> or <b>NO</b> . If answered <b>YES</b> explain.	
<input checked="" type="checkbox"/> Practice ALARA	<input checked="" type="checkbox"/> Notify RCT when using neutron probe

**ATTENDEES**

<u>Don Watenpaugh</u> Printed Name	<u>[Signature]</u> Signature
<u>Robert Zick</u> Printed Name	<u>[Signature]</u> Signature
_____ Printed Name	_____ Signature
_____ Printed Name	_____ Signature
_____ Printed Name	_____ Signature
_____ Printed Name	_____ Signature

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**Mixed Waste Landfill Neutron Logging Data Field Form** (page 1 of 2)

Date: 10/18/15			Standard Count: 6748		
Start Time: 0900			Chi: 0.99		
Personnel: Don Watersbaugh Robert Z. Rock			Previous Count: 6643		
			Count Time: 30 seconds		
Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Winch Counter Reading (ft)	10/18/15 VZ-3 Counts (E Side) 0910 - 1000	10/18/15 VZ-2 Counts (SW Corner) 1007 - 1050	10/18/15 VZ-1 Counts (NW Corner) 1100 - 1155
0.0	0	0	741	309	934
0.9	1	9999	2062	1500	2067
1.7	2	9998	2476	2026	2020
2.6	3	9997	2526	2181	1862
3.5	4	9996	2183	2297	1944
4.3	5	9995	1916	2374	1934
5.2	6	9994	2072	2251	1680
6.1	7	9993	1611	1763	1647
6.9	8	9992	1760	1795	1518
7.8	9	9991	1836	1729	1532
8.7	10	9990	1835	1792	2003
9.5	11	9989	1975	1584	1959
10.4	12	9988	1597	1923	1828
11.3	13	9987	1847	1814	1826
12.1	14	9986	1835	1722	1906
13.0	15	9985	1869	1557	2014
13.9	16	9984	1845	1823	2220
14.7	17	9983	1536	1818	1765
15.6	18	9982	1771	1708	1460
16.5	19	9981	1818	2275	1498
17.3	20	9980	1346	2225	1454
18.2	21	9979	1796	1877	1634
19.1	22	9978	1778	1826	2326
19.9	23	9977	1554	2044	2256
20.8	24	9976	1417	1897	2076
21.7	25	9975	1409	1581	1816

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**Mixed Waste Landfill Neutron Logging Data Field Form (page 2 of 2)**

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)
26.0	30	9970	1808	1764	1795
30.3	35	9965	1715	1893	2195
34.6	40	9960	1808	1703	1786
39.0	45	9955	1713	1557	2236
43.3	50	9950	2075	1570	1685
47.6	55	9945	1820	2135	1788
52.0	60	9940	1761	1850	1940
56.3	65	9935	2206	2142	1978
60.6	70	9930	1325	2615	1739
65.0	75	9925	2460	2230	2086
69.3	80	9920	2213	1609	1914
73.6	85	9915	1944	1836	2057
77.9	90	9910	1451	2249	2011
82.3	95	9905	2208	2332	2292
86.6	100	9900	2166	2105	2731
90.9	105	9895	1912	2379	2489
95.3	110	9890	2350	1909	2084
99.6	115	9885	2163	1821	2064
103.9	120	9880	1600	1835	1967
108.3	125	9875	1819	2138	1628
112.6	130	9870	2147	2261	1983
116.9	135	9865	2396	2645	1754
121.2	140	9860	1705	1973	1510
125.6	145	9855	1518	2569	2296
129.9	150	9850	2567	2170	2110
134.2	155	9845	2168	2322	1707
138.6	160	9840	2693	2331	1606
142.9	165	9835	2674	2239	2304
147.2	170	9830	2544	1646	1557
151.6	175	9825	2499	2816	2956
155.9	180	9820	3330	2714	3025
160.2	185	9815	3302	2951	2423
164.5	190	9810	1713	1604	1934
168.9	195	9805	1859	2565	3368
173.2	200	9800	2147	3164	2708

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**MIXED WASTE LANDFILL**  
**SOIL MOISTURE MONITORING**

**Soil Moisture Monitoring Results Tables**

Table D-1  
VZ-1 Soil-Moisture Monitoring Results  
April and October 2015

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Collection Period		2015 Average	2015 Std Dev	Baseline Average (2004- 2006)	Difference between Baseline Average & 2015 Average	Soil-Moisture Trigger Level (% content by volume)
		2015						
		Apr	Oct					
		Soil-Moisture (% content by volume)		Soil-Moisture (% content by volume)				
3.5	4	3.2	3.7	3.5	0.4	2.9	0.6	NA
4.3	5	3.3	3.0	3.2	0.2	2.9	0.2	NA
5.2	6	2.6	3.4	3.0	0.6	2.9	0.1	NA
6.1	7	2.5	2.2	2.4	0.2	2.6	-0.2	NA
6.9	8	2.0	2.6	2.3	0.4	2.2	0.1	NA
7.8	9	2.1	2.8	2.5	0.5	1.9	0.5	NA
8.7	10	3.0	2.8	2.9	0.1	1.7	1.2	23
9.5	11	3.4	3.1	3.3	0.2	2.0	1.3	23
10.4	12	3.1	2.1	2.6	0.7	2.7	-0.1	23
11.3	13	2.6	2.8	2.7	0.1	3.1	-0.4	23
12.1	14	2.9	2.8	2.9	0.1	2.6	0.2	23
13.0	15	3.5	2.8	3.2	0.5	2.4	0.8	23
13.9	16	3.7	2.8	3.3	0.6	2.6	0.7	23
14.7	17	2.9	2.0	2.5	0.6	2.8	-0.3	23
15.6	18	2.1	2.6	2.4	0.4	2.9	-0.5	23
16.5	19	2.0	2.7	2.4	0.5	2.4	-0.1	23
17.3	20	2.1	1.5	1.8	0.4	2.0	-0.2	23
18.2	21	2.4	2.7	2.6	0.2	2.0	0.6	23
19.1	22	3.7	2.6	3.2	0.8	2.1	1.1	23
19.9	23	4.1	2.0	3.1	1.5	3.0	0.1	23
20.8	24	3.7	1.7	2.7	1.4	4.3	-1.6	23
21.7	25	2.9	1.6	2.3	0.9	4.0	-1.7	23
26.0	30	2.7	2.7	2.7	0.0	2.9	-0.2	23
30.3	35	3.5	2.4	3.0	0.8	2.7	0.3	23
34.6	40	2.7	2.7	2.7	0.0	2.3	0.4	23
39.0	45	3.8	2.4	3.1	1.0	3.0	0.1	23
43.3	50	2.6	3.4	3.0	0.6	2.9	0.1	23
47.6	55	2.7	2.7	2.7	0.0	2.8	-0.1	23
52.0	60	3.1	2.6	2.9	0.4	3.4	-0.6	23
56.3	65	3.1	3.7	3.4	0.4	2.9	0.5	23
60.6	70	2.6	1.4	2.0	0.8	2.1	-0.1	23
65.0	75	3.8	4.4	4.1	0.4	5.6	-1.5	23
69.3	80	2.5	3.8	3.2	0.9	2.8	0.3	23
73.6	85	3.9	3.0	3.5	0.6	3.1	0.3	23

Table D-1  
VZ-1 Soil-Moisture Monitoring Results  
April and October 2015

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Collection Period		2015 Average	2015 Std Dev	Baseline Average (2004- 2006)	Difference between Baseline Average & 2015 Average	Soil-Moisture Trigger Level (% content by volume)
		2015						
		Apr	Oct					
		Soil-Moisture (% content by volume)		Soil-Moisture (% content by volume)				
77.9	90	3.4	1.7	2.6	1.2	3.7	-1.2	23
82.3	95	3.7	3.7	3.7	0.0	3.7	0.0	23
86.6	100	5.2	3.6	4.4	1.1	5.4	-1.0	23
90.9	105	4.2	3.0	3.6	0.8	5.0	-1.4	NA
95.3	110	3.3	4.1	3.7	0.6	3.0	0.7	NA
99.6	115	3.1	3.6	3.4	0.4	3.6	-0.3	NA
103.9	120	3.3	2.1	2.7	0.8	2.2	0.5	NA
108.3	125	2.1	2.7	2.4	0.4	2.7	-0.3	NA
112.6	130	3.1	3.6	3.4	0.4	3.3	0.0	NA
116.9	135	2.5	4.2	3.4	1.2	3.1	0.2	NA
121.2	140	1.8	2.4	2.1	0.4	2.1	0.0	NA
125.6	145	4.5	1.9	3.2	1.8	3.8	-0.6	NA
129.9	150	3.5	4.7	4.1	0.8	3.2	0.9	NA
134.2	155	2.5	3.6	3.1	0.8	2.7	0.3	NA
138.6	160	2.9	5.0	4.0	1.5	2.1	1.9	NA
142.9	165	3.7	5.0	4.4	0.9	3.8	0.5	NA
147.2	170	2.2	4.6	3.4	1.7	2.0	1.4	NA
151.6	175	5.9	4.5	5.2	1.0	6.0	-0.8	NA
155.9	180	6.0	6.7	6.4	0.5	5.5	0.8	NA
160.2	185	4.0	6.6	5.3	1.8	4.4	0.9	NA
164.5	190	3.2	2.4	2.8	0.6	3.0	-0.2	NA
168.9	195	7.0	2.8	4.9	3.0	7.0	-2.1	NA
173.2	200	5.1	3.6	4.4	1.1	5.4	-1.0	NA
	Average	3.3	3.1	3.2	Average	3.2		

Note: Shaded area represents depths where 23-percent soil moisture trigger applies.

Std Dev = Standard deviation.

NA = Not applicable

Table D-2  
VZ-2 Soil-Moisture Monitoring Results  
April and October 2015

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Collection Period		2015 Average	2015 Std Dev	Baseline Average (2004-2006)	Difference between Baseline Average & 2015 Average	Soil-Moisture Trigger Level (% content by volume)
		2015						
		Apr	Oct					
		Soil-Moisture (% content by volume)		Soil-Moisture (% content by volume)				
3.5	4	4.1	4.0	4.1	0.1	2.7	1.4	NA
4.3	5	4.0	4.2	4.1	0.1	3.3	0.8	NA
5.2	6	3.0	3.9	3.5	0.6	3.6	-0.2	NA
6.1	7	2.4	2.6	2.5	0.1	3.6	-1.1	NA
6.9	8	2.4	2.5	2.5	0.1	3.5	-1.1	NA
7.8	9	2.4	2.5	2.5	0.1	3.1	-0.7	NA
8.7	10	2.3	2.6	2.5	0.2	2.4	0.1	23
9.5	11	2.9	2.1	2.5	0.6	2.2	0.3	23
10.4	12	2.9	3.0	3.0	0.1	2.2	0.8	23
11.3	13	2.6	2.7	2.7	0.1	2.1	0.6	23
12.1	14	2.4	2.5	2.5	0.1	2.5	0.0	23
13.0	15	2.3	2.0	2.2	0.2	3.0	-0.9	23
13.9	16	2.4	2.7	2.6	0.2	2.8	-0.3	23
14.7	17	2.7	2.7	2.7	0.0	2.4	0.3	23
15.6	18	2.5	2.4	2.5	0.1	2.6	-0.2	23
16.5	19	3.8	3.9	3.9	0.1	2.7	1.2	23
17.3	20	3.5	3.8	3.7	0.2	2.9	0.8	23
18.2	21	2.7	2.9	2.8	0.1	3.1	-0.3	23
19.1	22	2.7	2.7	2.7	0.0	3.6	-0.9	23
19.9	23	3.4	3.3	3.4	0.1	3.7	-0.4	23
20.8	24	2.5	2.9	2.7	0.3	3.1	-0.4	23
21.7	25	2.1	2.1	2.1	0.0	2.7	-0.6	23
26.0	30	2.6	2.6	2.6	0.0	2.4	0.2	23
30.3	35	2.9	2.9	2.9	0.0	2.9	0.0	23
34.6	40	2.2	2.4	2.3	0.1	2.7	-0.4	23
39.0	45	2.2	2.0	2.1	0.1	2.3	-0.2	23
43.3	50	2.0	2.1	2.1	0.1	2.1	-0.1	23
47.6	55	3.3	3.5	3.4	0.1	3.1	0.3	23
52.0	60	3.1	2.8	3.0	0.2	3.0	0.0	23
56.3	65	3.6	3.6	3.6	0.0	5.5	-1.9	23
60.6	70	4.8	4.8	4.8	0.0	4.8	0.0	23
65.0	75	3.8	3.8	3.8	0.0	5.1	-1.3	23
69.3	80	2.0	2.2	2.1	0.1	2.6	-0.5	23
73.6	85	2.7	2.8	2.8	0.1	2.6	0.2	23
77.9	90	4.0	3.8	3.9	0.1	3.1	0.8	23



Table D-2  
VZ-2 Soil-Moisture Monitoring Results  
April and October 2015

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Collection Period		2015 Average	2015 Std Dev	Baseline Average (2004-2006)	Difference between Baseline Average & 2015 Average	Soil-Moisture Trigger Level (% content by volume)
		2015						
		Apr	Oct					
		Soil-Moisture (% content by volume)		Soil-Moisture (% content by volume)				
82.3	95	3.9	4.1	4.0	0.1	3.6	0.4	23
86.6	100	3.5	3.5	3.5	0.0	4.7	-1.2	23
90.9	105	4.0	4.2	4.1	0.1	3.4	0.7	NA
95.3	110	2.9	3.0	3.0	0.1	3.1	-0.2	NA
99.6	115	2.7	2.7	2.7	0.0	3.6	-0.9	NA
103.9	120	2.9	2.8	2.9	0.1	2.0	0.9	NA
108.3	125	3.6	3.6	3.6	0.0	3.8	-0.2	NA
112.6	130	3.8	3.9	3.9	0.1	3.6	0.3	NA
116.9	135	5.0	4.9	5.0	0.1	3.4	1.6	NA
121.2	140	3.1	3.1	3.1	0.0	2.4	0.7	NA
125.6	145	4.7	4.7	4.7	0.0	5.9	-1.2	NA
129.9	150	4.0	3.6	3.8	0.3	7.0	-3.2	NA
134.2	155	3.9	4.0	4.0	0.1	3.6	0.4	NA
138.6	160	4.4	4.1	4.3	0.2	3.8	0.5	NA
142.9	165	3.4	3.8	3.6	0.3	3.0	0.6	NA
147.2	170	2.3	2.3	2.3	0.0	2.9	-0.6	NA
151.6	175	5.0	5.3	5.2	0.2	2.4	2.8	NA
155.9	180	4.8	5.1	5.0	0.2	5.4	-0.5	NA
160.2	185	5.5	5.7	5.6	0.1	5.4	0.2	NA
164.5	190	2.2	2.1	2.2	0.1	4.1	-2.0	NA
168.9	195	3.4	4.7	4.1	0.9	3.5	0.6	NA
173.2	200	6.1	6.3	6.2	0.1	6.3	-0.1	NA
	Average	3.3	3.3	3.3	Average	3.4		

Note: Shaded area represents depths where 23-percent soil moisture trigger applies.

Std Dev = Standard deviation.

NA = Not applicable

Table D-3  
VZ-3 Soil-Moisture Monitoring Results  
April and October 2015

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Collection Period		2015 Average	2015 Std Dev	Baseline Average (2004-2006)	Difference between Baseline Average & 2015 Average	Soil- Moisture Trigger Level (% content by volume)
		2015						
		Apr	Oct					
		Soil-Moisture (% content by volume)		Soil-Moisture (% content by volume)				
3.5	4	3.6	3.0	3.3	0.4	4.6	-1.3	NA
4.3	5	2.8	3.0	2.9	0.1	4.5	-1.6	NA
5.2	6	3.3	2.3	2.8	0.7	3.7	-0.9	NA
6.1	7	2.2	2.3	2.3	0.1	2.9	-0.7	NA
6.9	8	2.4	1.9	2.2	0.4	3.1	-1.0	NA
7.8	9	2.7	2.0	2.4	0.5	2.3	0.1	NA
8.7	10	2.6	3.2	2.9	0.4	2.4	0.5	23
9.5	11	3.0	3.1	3.1	0.1	2.6	0.5	23
10.4	12	2.2	2.7	2.5	0.4	2.7	-0.3	23
11.3	13	2.7	2.7	2.7	0.0	3.0	-0.3	23
12.1	14	2.7	2.9	2.8	0.1	2.6	0.2	23
13.0	15	2.8	3.2	3.0	0.3	2.8	0.2	23
13.9	16	2.8	3.8	3.3	0.7	2.9	0.4	23
14.7	17	2.0	2.6	2.3	0.4	3.1	-0.8	23
15.6	18	2.4	1.8	2.1	0.4	3.1	-1.0	23
16.5	19	2.5	1.9	2.2	0.4	2.3	-0.1	23
17.3	20	1.5	1.8	1.7	0.2	2.7	-1.1	23
18.2	21	2.4	2.2	2.3	0.1	2.7	-0.4	23
19.1	22	2.7	4.0	3.4	0.9	1.8	1.6	23
19.9	23	1.9	3.9	2.9	1.4	2.7	0.2	23
20.8	24	1.7	3.4	2.6	1.2	2.8	-0.3	23
21.7	25	1.7	2.7	2.2	0.7	2.1	0.1	23
26.0	30	2.7	2.7	2.7	0.0	2.5	0.2	23
30.3	35	2.3	3.7	3.0	1.0	2.8	0.2	23
34.6	40	2.8	2.6	2.7	0.1	2.1	0.6	23
39.0	45	2.2	3.8	3.0	1.1	2.7	0.3	23
43.3	50	3.0	2.4	2.7	0.4	2.9	-0.2	23
47.6	55	2.7	2.6	2.7	0.1	3.4	-0.8	23
52.0	60	2.5	3.0	2.8	0.4	2.9	-0.2	23
56.3	65	3.8	3.1	3.5	0.5	3.5	0.0	23
60.6	70	1.4	2.5	2.0	0.8	1.9	0.1	23
65.0	75	4.2	3.4	3.8	0.6	4.3	-0.5	23
69.3	80	3.8	3.1	3.5	0.5	4.5	-1.0	23

Table D-3  
VZ-3 Soil-Moisture Monitoring Results  
April and October 2015

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Collection Period		2015 Average	2015 Std Dev	Baseline Average (2004-2006)	Difference between Baseline Average & 2015 Average	Soil- Moisture Trigger Level (% content by volume)
		2015						
		Apr	Oct					
		Soil-Moisture (% content by volume)		Soil-Moisture (% content by volume)				
73.6	85	2.9	3.3	3.1	0.3	3.5	-0.4	23
77.9	90	1.7	3.2	2.5	1.1	1.9	0.6	23
82.3	95	3.4	4.0	3.7	0.4	3.3	0.4	23
86.6	100	3.6	5.1	4.4	1.1	3.4	1.0	23
90.9	105	3.1	4.5	3.8	1.0	3.3	0.5	NA
95.3	110	3.9	3.4	3.7	0.4	4.7	-1.1	NA
99.6	115	3.5	3.4	3.5	0.1	3.6	-0.2	NA
103.9	120	2.1	3.1	2.6	0.7	2.1	0.5	NA
108.3	125	2.3	2.2	2.3	0.1	1.8	0.5	NA
112.6	130	4.2	3.1	3.7	0.8	4.3	-0.6	NA
116.9	135	4.2	2.5	3.4	1.2	4.0	-0.7	NA
121.2	140	2.5	1.9	2.2	0.4	2.3	-0.1	NA
125.6	145	1.9	4.0	3.0	1.5	2.0	1.0	NA
129.9	150	4.5	3.5	4.0	0.7	4.4	-0.4	NA
134.2	155	3.2	2.4	2.8	0.6	3.6	-0.8	NA
138.6	160	4.8	2.2	3.5	1.8	4.4	-0.9	NA
142.9	165	4.8	4.0	4.4	0.6	5.2	-0.8	NA
147.2	170	4.2	2.0	3.1	1.6	4.1	-1.0	NA
151.6	175	4.4	5.7	5.1	0.9	4.3	0.8	NA
155.9	180	6.4	5.9	6.2	0.4	6.6	-0.4	NA
160.2	185	6.1	4.3	5.2	1.3	5.6	-0.4	NA
164.5	190	2.4	3.0	2.7	0.4	2.7	0.0	NA
168.9	195	2.8	6.8	4.8	2.8	3.1	1.7	NA
173.2	200	3.4	5.1	4.3	1.2	4.1	0.2	NA
	Average	2.9	3.2	3.1	Average	3.2		

Note: Shaded area represents depths where 23-percent soil moisture trigger applies.

Std Dev = Standard deviation.

NA = Not applicable

**ANNEX E**

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

**April 2015-March 2016**

**Field Forms**

**Data Validation Reports**

**Contract Verification Reviews**

**FIELD SAMPLING FORMS**

**MWL LONG-TERM MONITORING AND MAINTENANCE**

**GROUNDWATER MONITORING**

<b>Form Title</b>	<b>Corresponding Procedure</b>
Tailgate Safety Briefing	PLA 05-09
Groundwater Sample Collection Field Equipment Check Log	FOP 05-02
Portable Pump and Tubing/Water Level Indicator Decontamination Log Form	FOP 05-03
Field Measurement Log For Groundwater Sample Collection	FOP 05-01
Analysis Request and Chain of Custody*	LOP 94-03

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

**FIELD SAMPLING FORMS**  
**APRIL 2015 GROUNDWATER MONITORING**

# TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: MWL-BW2 Date: 04/06/15 Time: 0750

Activities: GROUND WATER MONITORING AND SAMPLING

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

Weather Conditions:

Temp: 69.8 °F Wind Speed: ~5 MPH Humidity: 9.1 %

Chemicals Used: \_\_\_\_\_

Other: \_\_\_\_\_

## Safety Topics Presented

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

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

## Attendees

Robert Lynch  
Printed Name

ALFRED SANTILLANES  
Printed Name

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

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

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

Robert Lynch  
Signature

Alfred Santillanes  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

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## TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: MWL - MW 7 Date: 04/07/15 Time: 0755Activities: GROUND WATER MONITORING AND SAMPLING

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

Weather Conditions:

Temp: 73.7 °F Wind Speed: 0 - 5 MPH Humidity: 75 %

Chemicals Used: \_\_\_\_\_

Other: \_\_\_\_\_

## Safety Topics Presented

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

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

## Attendees

Printed Name Robert LynchPrinted Name ALFRED SANTILLANESPrinted Name William Gibson

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

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

Signature Robert LynchSignature Alfred SantillanesSignature William Gibson

Signature \_\_\_\_\_

Signature \_\_\_\_\_

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## TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: MWL-MW9 Date: 04/08/15 Time: 0750

Activities: <sup>GW</sup> GROUND WATER MONITORING AND SAMPLING

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

Weather Conditions:

Temp: 71.9 °F Wind Speed: 10-25 MPH Humidity: 22.6 %

Chemicals Used: \_\_\_\_\_

Other: \_\_\_\_\_

## Safety Topics Presented

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

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

## Attendees

Robert Lynch  
Printed Name

William Gibson  
Printed Name

ALFRED SANTILLANES  
Printed Name

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

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

Robert Lynch  
Signature

William Gibson  
Signature

Alfred Santillanes  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

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## TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: MWL-MW8 Date: 4/13/15 Time: 0750

Activities: GROUND WATER MONITORING AND SAMPLING

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

Weather Conditions:

Temp: 57.9 °F Wind Speed: 5-15 MPH Humidity: 24.3 %

Chemicals Used: \_\_\_\_\_

Other: \_\_\_\_\_

## Safety Topics Presented

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

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

## Attendees

Robert Lynch  
Printed Name

[Signature]  
Signature

William Gibson  
Printed Name

[Signature]  
Signature

Robert L. Quintone  
Printed Name

[Signature]  
Signature

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

\_\_\_\_\_  
Signature

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

\_\_\_\_\_  
Signature

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## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: MWL	
Well I.D.: MWL-BW2	Date: 04/08/15
Method: Portable pump <input checked="" type="checkbox"/>	Dedicated pump <input type="checkbox"/> Pump depth: 496'

## PURGE MEASUREMENTS

[illegible]

Comments: ~1.5 gals purged from tubing 0814

## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: MWL	
Well I.D.: MWL-MW 7	Date: 04/07/15
Method: Portable pump <input checked="" type="checkbox"/> Dedicated pump <input type="checkbox"/> Pump depth: 496'	

## PURGE MEASUREMENTS

[illegible]

Comments: 1.5 GALS PURGED FROM TUBING 0833



## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: MWL		
Well I.D.: MWL-MW 8	Date: 04/13/15	
Method: Portable pump <input checked="" type="checkbox"/>	Dedicated pump <input type="checkbox"/>	Pump depth: 497'

## PURGE MEASUREMENTS

[illegible]

Comments: ~1.5 gals purged form tubing 0821

## 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>04/06/15</b>		
Make & Model: <b>EXO 1</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>14H101486</b>						
Other (S/N): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>7.00</b>				pH sloped to (std): <b>10.00</b>		
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time:	<b>0649</b>	<b>4.01</b>	<b>19.7</b>	<b>7.00</b>	<b>19.7</b>	<b>10.00</b>
2. Time:	<b>1118</b>	<b>4.02</b>	<b>19.9</b>	<b>7.00</b>	<b>19.9</b>	<b>10.00</b>
3. Time:						
4. Time:						
Standard lot no.:	4AE330		4AE635		4AD984	
Expiration date:	5/16		5/16		4/16	
<b>SC Calibration/Check</b>						
Reference Value: <b>1225 uS @ 25C</b>				Standard Lot No.: <b>4AE659</b>		
	Value	Temp	Expiration Date: <b>5/16</b>			
1. Time:	<b>0648</b>	<b>1224.9</b>	<b>19.7</b>			
2. Time:	<b>1117</b>	<b>1224.6</b>	<b>19.8</b>			
3. Time:						
4. Time:						
<b>ORP Calibration/Check</b>						
Reference Value: <b>220 mV</b>				Standard Lot No. <b>4AL183</b>		
	Value	Temp	Expiration Date: <b>9/15</b>			
1. Time:	<b>0651</b>	<b>220.1</b>	<b>19.7</b>			
2. Time:	<b>1120</b>	<b>219.9</b>	<b>19.8</b>			
3. Time:						
4. Time:						
<b>DO Calibration/Check</b>						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	<b>0647</b>	<b>82.0</b>	<b>24.59</b>			
2. Time:	<b>1116</b>	<b>81.9</b>	<b>24.58</b>			
3. Time:						
4. Time:						

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

SNL/NM Project Name: MWL				
Calibration done by: R Lynch			Date: 04/06/15	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 14060C033238	
Reference Value	.1	20	100	800
Standard Lot No.	A4164	A4211	A4195	A4193
1. Time 0755	.14	19.9	103	802
2. Time 1044	.16	19.7	104	798
3. Time				
4. Time				
Comments:				



## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: MWL						
Calibrations done by: R Lynch				Date: 04/07/15		
Make & Model: EXO 1						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 14H101486						
Other (S/N): NA						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): 7.00			pH sloped to (std): 10.00			
Reference value:	4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp
1. Time:	0639	4.00	18.9	7.00	18.9	9.99
2. Time:	1128	4.02	19.3	7.00	19.3	10.01
3. Time:						
4. Time:						
Standard lot no.:	4AE330		4AE635		4AD984	
Expiration date:	5/18		5/16		4/16	
<b>SC Calibration/Check</b>						
Reference Value: 1225 uS @ 25C			Standard Lot No.: 4AE659			
	Value	Temp	Expiration Date: 5/16			
1. Time:	0638	1224.7	18.9			
2. Time:	1127	1225.1	19.3			
3. Time:						
4. Time:						
<b>ORP Calibration/Check</b>						
Reference Value: 220 mV			Standard Lot No. 4AL183			
	Value	Temp	Expiration Date: 9/15			
1. Time:	0641	220.3	18.9			
2. Time:	1130	220.6	19.3			
3. Time:						
4. Time:						
<b>DO Calibration/Check</b>						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0637	81.9	24.66			
2. Time:	1126	81.9	24.69			
3. Time:						
4. Time:						

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

SNL/NM Project Name: <b>MWL</b>				
Calibration done by: <b>R Lynch</b>			Date: <b>04/07/15</b>	
<b>TURBIDIMETER</b>				
Make & Model: <b>HACH 2100Q</b>			Serial No. <b>S/N 14060C033238</b>	
Reference Value	<b>.1</b>	<b>20</b>	<b>100</b>	<b>800</b>
Standard Lot No.	<b>A4164</b>	<b>A4211</b>	<b>A4195</b>	<b>A4193</b>
1. Time	<b>0759</b>	<b>.12</b>	<b>19.8</b>	<b>104</b>
2. Time	<b>6044</b>	<b>.14</b>	<b>20.1</b>	<b>102</b>
3. Time				
4. Time				
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>04/08/15</b>		
Make & Model: <b>EXO 1</b>						
Sonde (S/N) with DO, Es, pH, ORP, and temperature probes: <b>14H101486</b>						
Other (S/N): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>7.00</b>				pH sloped to (std): <b>10.00</b>		
Reference value:		4.00		7.00		10.00
	Value	Temp	Value	Temp	Value	Temp
1. Time:	<b>0642</b>	<b>3.99</b>	<b>19.6</b>	<b>7.00</b>	<b>19.6</b>	<b>10.00</b>
2. Time:	<b>1239</b>	<b>3.99</b>	<b>19.8</b>	<b>7.00</b>	<b>19.8</b>	<b>16.00</b>
3. Time:						
4. Time:						
Standard lot no.:		4AE330		4AE635		4AD984
Expiration date:		5/16		5/16		4/16
<b>SC Calibration/Check</b>						
Reference Value: <b>1225 uS @ 25C</b>				Standard Lot No.: <b>4AE659</b>		
	Value	Temp	Expiration Date: <b>5/16</b>			
1. Time:	<b>0641</b>	<b>1224.6</b>	<b>19.6</b>			
2. Time:	<b>1238</b>	<b>1225.3</b>	<b>19.9</b>			
3. Time:						
4. Time:						
<b>ORP Calibration/Check</b>						
Reference Value: <b>220 mV</b>				Standard Lot No. <b>4AL183</b>		
	Value	Temp	Expiration Date: <b>9/15</b>			
1. Time:	<b>0644</b>	<b>219.8</b>	<b>19.6</b>			
2. Time:	<b>1241</b>	<b>220.4</b>	<b>19.9</b>			
3. Time:						
4. Time:						
<b>DO Calibration/Check</b>						
Calibration Value:		81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	<b>0640</b>	<b>81.9</b>	<b>24.55</b>			
2. Time:	<b>1237</b>	<b>81.8</b>	<b>24.52</b>			
3. Time:						
4. Time:						

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

SNL/NM Project Name: <b>MWL</b>				
Calibration done by: <b>R Lynch</b>			Date: <b>04/08/15</b>	
TURBIDIMETER				
Make & Model: <b>HACH 2100Q</b>			Serial No. S/N <b>14060C033238</b>	
Reference Value	<b>.1</b>	<b>20</b>	<b>100</b>	<b>800</b>
Standard Lot No.	<b>A4164</b>	<b>A4211</b>	<b>A4195</b>	<b>A4193</b>
1. Time <b>0755</b>	<b>.16</b>	<b>20.3</b>	<b>102</b>	<b>795</b>
2. Time <b>1014</b>	<b>.14</b>	<b>20.4</b>	<b>99.8</b>	<b>793</b>
3. Time				
4. Time				
Comments:				

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## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: <b>MWL</b>							
Calibrations done by: <b>R Lynch</b>				Date: <b>04/13/15</b>			
Make & Model: <b>EXO 1</b>							
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>14H101486</b>							
Other (S/N): <b>NA</b>							
<b>pH Calibration/Check</b>							
pH Calibrated to (std): <b>7.00</b>			pH sloped to (std): <b>10.00</b>				
Reference value:		4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp	
1. Time:	<b>0641</b>	<b>4.01</b>	<b>19.8</b>	<b>7.00</b>	<b>19.8</b>	<b>10.01</b>	<b>19.8</b>
2. Time:	<b>1152</b>	<b>4.00</b>	<b>19.9</b>	<b>7.00</b>	<b>19.9</b>	<b>10.02</b>	<b>19.9</b>
3. Time:							
4. Time:							
Standard lot no.:		4AE330		4AE635		4AD984	
Expiration date:		5/16		5/16		4/16	
<b>SC Calibration/Check</b>							
Reference Value: <b>1225 uS @ 25C</b>			Standard Lot No.: <b>4AE659</b>				
	Value	Temp	Expiration Date: <b>5/16</b>				
1. Time:	<b>0640</b>	<b>1224.6</b>	<b>19.8</b>				
2. Time:	<b>1151</b>	<b>1224.4</b>	<b>19.9</b>				
3. Time:							
4. Time:							
<b>ORP Calibration/Check</b>							
Reference Value: <b>220 mV</b>			Standard Lot No. <b>4AL183</b>				
	Value	Temp	Expiration Date: <b>9/15</b>				
1. Time:	<b>0643</b>	<b>220.3</b>	<b>19.8</b>				
2. Time:	<b>1154</b>	<b>220.7</b>	<b>20.0</b>				
3. Time:							
4. Time:							
<b>DO Calibration/Check</b>							
Calibration Value:		81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	<b>0639</b>	<b>82.0</b>	<b>24.76</b>				
2. Time:	<b>1150</b>	<b>81.9</b>	<b>24.77</b>				
3. Time:							
4. Time:							

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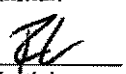
## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG (continued) Page 2 of 2

SNL/NM Project Name: <b>MWL</b>				
Calibration done by: <b>R Lynch</b>			Date: <b>04/13/15</b>	
TURBIDIMETER				
Make & Model: <b>HACH 2100Q</b>			Serial No. <b>S/N 14060C033238</b>	
Reference Value	<b>.1</b>	20	100	800
Standard Lot No.	<b>A4164</b>	<b>A4211</b>	<b>A4195</b>	<b>A4193</b>
1. Time <b>0755</b>	<b>.12</b>	<b>19.8</b>	<b>103</b>	<b>796</b>
2. Time <b>1019</b>	<b>.14</b>	<b>20.2</b>	<b>101</b>	<b>798</b>
3. Time				
4. Time				
Comments:				

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

<b>Project Name:</b> <u>MWL GWM</u>	<b>Monitoring Well ID #:</b> <u>MWL-BW2</u>	<b>Date:</b> <u>4/6/2015</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
<b>Pump and Tubing Bundle ID #:</b> <u>1806-814</u>	<b>Water Level Indicator ID #:</b> <u>210269</u>	
<b><u>Personnel Performing Decontamination:</u></b>		
<b>Alfred Santillanes</b>		
<b>Print Name:</b>		<b>Initial:</b>
<b>Robert Lynch</b>		
<b>Print Name:</b>		<b>Initial:</b>
<b>Condition of Equipment</b>		
<b>Pump:</b> <u>Good</u>	<b>Tubing Bundle:</b> <u>Good</u>	<b>Water Level Indicator:</b> <u>Good</u>
<b>List of Decontamination Materials</b>		
<b>Deionized Water</b>	<b>HNO<sub>3</sub></b>	
<b>Source:</b> <u>Culligan</u>	<b>Grade:</b> <u>Reagent</u>	
<b>Lot Number:</b> <u>32415</u>	<b>UN #:</b> <u>2031</u>	
	<b>Manufacturer:</b> <u>ACROC</u>	
	<b>Lot Number:</b> <u>A0316863</u>	

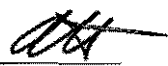

Portable Pump and Tubing / Water Level Indicator  
Decontamination Log Form

Project Name: <u>MWL-GWM</u>	Monitoring Well ID #: <u>MWL-MW7</u>	Date: <u>04-07-15</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-814</u>	Water Level Indicator ID #: <u>210269</u>	
<b>Personnel Performing Decontamination:</b>		
Robert Lynch	<u>RL</u>	Initial:
Print Name:		
William Gibson	<u>WJG</u>	Initial:
Print Name:		
Condition of Equipment		
Pump: <u>Excellent</u>	Tubing Bundle: <u>Excellent</u>	Water Level Indicator: <u>Good</u>
List of Decontamination Materials		
Deionized Water	HNO <sub>3</sub>	
Source: <u>Culligan</u>	Grade: <u>Reagent</u>	
Lot Number: <u>03/24/15</u>	UN #: <u>2031</u>	
	Manufacturer: <u>ACROS</u>	
	Lot Number: <u>A0316863</u>	

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Portable Pump and Tubing / Water Level Indicator  
Decontamination Log Form

Project Name: <u>MWL-GWM</u>	Monitoring Well ID #: <u>MWL-MW9</u>	Date: <u>04-08-15</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-814</u>	Water Level Indicator ID #: <u>210269</u>	
<b><u>Personnel Performing Decontamination:</u></b>		
Alfred Santillanes		
Print Name:		Initial:
Robert Lynch		
Print Name:		Initial:
<b>Condition of Equipment</b>		
Pump: <u>Excellent</u>	Tubing Bundle: <u>Excellent</u>	Water Level Indicator: <u>Good</u>
<b>List of Decontamination Materials</b>		
<b>Deionized Water</b>	<b>HNO<sub>3</sub></b>	
Source: <u>Culligan</u>	Grade: <u>Reagent</u>	
Lot Number: <u>03-24-15</u>	UN #: <u>2031</u>	
	Manufacturer: <u>ACROS</u>	
	Lot Number: <u>A0316863</u>	

Portable Pump and Tubing / Water Level Indicator  
Decontamination Log Form

Project Name: <u>MWL</u>	Monitoring Well ID #: <u>MWL-MW 8</u>	Date: <u>04/13/15</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-814</u>	Water Level Indicator ID #: <u>210269</u>	
<b><u>Personnel Performing Decontamination:</u></b>		
Robert Lynch	<u>RL</u>	Initial:
Print Name:		
William Gibson	<u>WJG</u>	Initial:
Print Name:		
Condition of Equipment		
Pump: <u>GOOD</u>	Tubing Bundle: <u>GOOD</u>	Water Level Indicator: <u>GOOD</u>
List of Decontamination Materials		
Deionized Water	HNO <sub>3</sub>	
Source: <u>Culligan</u>	Grade: <u>Reagent</u>	
Lot Number: <u>032415</u>	UN #: <u>2031</u>	
	Manufacturer: <u>ACROC</u>	
	Lot Number: <u>A0316863</u>	

**SUMMARY SHEET FOR**  
**APRIL 2015 GROUNDWATER SAMPLES**

### Sample Summary for April 2015 MWL Groundwater Monitoring

<i>Well ID</i>	<i>Sample Date</i>	<i>ARCOC</i>	<i>Sample Number</i>	<i>Sample Type</i>	<i>Associated Equipment Blank (ARCOC #/Sample #)</i>	<i>Associated Trip Blank (ARCOC # / Sample #)</i>	<i>Associated Field Blank (ARCOC # / Sample #)</i>	<i>Comments</i>
<b>GEL Analytical Data: Project Task # 146422.10.11.08, Service Order # CF01-15</b>								
MWL-BW2	6-Apr-15	616094	097578	Environmental	n/a	616094 / 097579	616094 / 097577	
MWL-MW7	7-Apr-15	616095	097581	Environmental	n/a	616095 / 097582	616095 / 097580	
MWL-MW8	13-Apr-15	616098	097591	Environmental	n/a	616098 / 097592	616098 / 097590	
MWL-MW9	8-Apr-15	616097	097587	Environmental	616096 / 097584	616097 / 097589	616097 / 097586	
MWL-MW9	8-Apr-15	616097	097588	Duplicate	616096 / 097584	616097 / 097589	616097 / 097586	
MWL-EB1	7-Apr-15	616096	097584	Equipment Blank	n/a	616096 / 097585	n/a	Equipment blank sample prior to MWL-MW9.
MWL-FB1	6-Apr-15	616094	097577	Field Blank	n/a	616094 / 097579	n/a	at MWL-BW2
MWL-FB2	7-Apr-15	616095	097580	Field Blank	n/a	616095 / 097582	n/a	at MWL-MW7
MWL-FB3	7-Apr-15	616096	097583	DIW QC	n/a	616096 / 097585	n/a	DIW - source water for EB1
MWL-FB4	8-Apr-15	616097	097586	Field Blank	n/a	616097 / 097589	n/a	at MWL-MW9
MWL-FB5	13-Apr-15	616098	097590	Field Blank	n/a	616098 / 097592	n/a	at MWL-MW8

**DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES**  
**GROUNDWATER MONITORING**  
**APRIL 2015**

**AR/COC NUMBERS 616094, 616095, 616096, 616097**

## Memorandum

Date: May 18, 2015  
To: File  
From: Mary Donovan  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: MWL GWM  
AR/COC: 616094, 616095, 616096 and 616097  
SDG: 370483  
Laboratory: GEL  
Project/Task: 146422.10.11.08  
Analysis: VOCs

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

### Summary

Thirteen 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 ICAL %RSD was  $>15\%$  but  $\leq 40\%$  and the ICV %D was  $>20\%$  but  $\leq 40\%$  with negative bias for acetone. The associated result for sample 370483017 was a detect and will be **qualified J-, I3, C3**. The remaining associated sample results were non-detects and will be **qualified UJ, I3, C3**.
2. The ICV and CCV %Ds were  $>20\%$  but  $\leq 40\%$  with positive bias for bromoform. The associated results for samples -001, -009 and -018 were detects and will be **qualified J+, C2**.
3. The ICV %D was  $>20\%$  but  $\leq 40\%$  with positive bias for dibromochloromethane. The associated results for samples -001, -009, -017, -018 and -025 were detects and will be **qualified J+, C2**.

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

### Holding Times

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

### Instrument Tune

All instrument tune requirements were met.

### **Calibration**

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows. The ICV and CCV %Ds were  $>20\%$  but  $\leq 40\%$  with positive bias for bromoform. The bromoform results for all samples *except* -001, -009 and -018 were non-detects and, since the positive CCV %D is not considered a second calibration infraction, will not be qualified.

The ICV %D was  $>20\%$  but  $\leq 40\%$  with positive bias for dibromochloromethane. The remaining associated sample results were non-detects and since no other calibration infractions occurred, will not be qualified.

The ICV %D or CCV %Ds were  $>20\%$  but  $\leq 40\%$  with positive bias for styrene, 2-butanone and 2-hexanone. All associated sample results were non-detects and will not be qualified.

### **Blanks**

No target analytes were detected in the blanks except as follows. Bromodichloromethane, chloroform and dibromochloromethane were detected at concentrations  $>$  the PQLs in the EB, sample -018, which was associated with samples -026 and -032; FB1, sample -001, which was associated with sample -002; FB2, sample -009, which was associated with sample -010; FB3, sample -017, which had no associated field samples; and FB4, sample -025, which was associated with samples -026 and -032. Bromoform was detected at  $<$  the PQL in the EB, sample -018, which was associated with samples -026 and -032; FB1, sample -001, which was associated with sample -002; and FB2, sample -009, which was associated with sample -010. Acetone was detected at  $<$  the PQL in FB3, sample -017, which had no associated field samples. The associated sample results were non-detects 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 acceptance criteria were met.

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

All LCS acceptance criteria were met.

### **Detection Limits/Dilutions**

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

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

TIC reports were not required.



### **Other QC**

Four TBs were submitted, one for each ARCOC. FBs were submitted with each ARCOC and were associated with the respective field samples in that ARCOC. The FB submitted with ARCOC 616096 had no associated field samples. An EB was submitted with ARCOC 616096 and was applied to the samples in ARCOC 616097. A field duplicate pair was also submitted with ARCOC 616097. 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:** Monica Dymerski

**Level I**

**Date:** 05/20/15

## Memorandum

Date: May 18, 2015  
To: File  
From: Mary Donovan  
Subject: Inorganic Data Review and Validation – SNL  
Site: MWL GWM  
AR/COC: 616094, 616095, 616096 and 616097  
SDG: 370483  
Laboratory: GEL  
Project/Task: 146422.10.11.08  
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 ER Project AOP 00-03 Rev 4.

### **Summary**

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

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

### **Holding Times and Preservation**

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

### **ICP-MS Instrument Tune**

The ICP-MS tunes met QC acceptance criteria.

### **Calibration**

All initial and continuing calibration criteria met QC acceptance criteria.

### **Reporting Limit Verification**

All CRI recoveries associated with the samples met QC acceptance criteria.

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

### **Blanks**

No target analytes were detected in the blanks except as follows. U was detected at concentrations < the PQL in the ICB and bracketing CCBs. The result for sample 370483019 was non-detect and the remaining associated sample results were detects > 5X the highest blank concentration concentration 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.

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

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

### **ICP Serial Dilution**

The serial dilutions met all QC acceptance criteria.

### **Other QC**

An EB was submitted with ARCO 616096 and was applied to the samples in ARCO 616097. A field duplicate pair was submitted with ARCO 616097. 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:** Monica Dymerski

**Level I**

**Date:** 05/21/15

## Memorandum

Date: May 19, 2015  
To: File  
From: Mary Donovan  
Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL GWM  
AR/COC: 616094, 616095, 616096 and 616097  
SDG: 370483  
Laboratory: GEL  
Project/Task: 146422.10.11.08  
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 ER Project AOP 00-03 Rev 4.

### Summary

Five samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec – short list), EPA 900.0 (gross alpha/beta), SM 7500 Rn B (Radon-222), and EPA 906.0 (Tritium). Problems were identified with the data package that resulted in the qualification of data.

#### Gammaspec, gross alpha/beta, Radon-222 and Tritium:

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

#### Gross alpha/beta and Radon-222:

1. All sample results which were > the MDA but  $\leq 3X$  the MDA will be **qualified J,FR7**.

### Holding Times and Preservation

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

### 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 > the MDA and 2-sigma TPU.

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

Tracer/carriers were not required.

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

The MS/MSD met all QC acceptance criteria.

#### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

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

All LCS recoveries met QC acceptance criteria.

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

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

#### **Other QC**

An EB was submitted with ARCO 616096 and was applied to the samples in ARCO 616097. A field duplicate pair was also submitted with ARCO 616097. 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:** Monica Dymerski

**Level I**

**Date:** 05/21/15



## Sample Findings Summary



AR/COC: 616094, 616095, 616096, 616097

Page 1 of 3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	097578-034/MWL-BW2	ALPHA (12587-46-1)	J, FR7
	097581-034/MWL-MW7	ALPHA (12587-46-1)	J, FR7
	097584-034/MWL-EB1	ALPHA (12587-46-1)	BD, FR3
	097584-034/MWL-EB1	BETA (12587-47-2)	BD, FR3
	097587-034/MWL-MW9	ALPHA (12587-46-1)	J, FR7
EPA 901.1			
	097578-033/MWL-BW2	Americium-241 (14596-10-2)	BD, FR3
	097578-033/MWL-BW2	Cesium-137 (10045-97-3)	BD, FR3
	097578-033/MWL-BW2	Cobalt-60 (10198-40-0)	BD, FR3
	097578-033/MWL-BW2	Potassium-40 (13966-00-2)	BD, FR3
	097581-033/MWL-MW7	Americium-241 (14596-10-2)	BD, FR3
	097581-033/MWL-MW7	Cesium-137 (10045-97-3)	BD, FR3
	097581-033/MWL-MW7	Cobalt-60 (10198-40-0)	BD, FR3
	097581-033/MWL-MW7	Potassium-40 (13966-00-2)	BD, FR3
	097584-033/MWL-EB1	Americium-241 (14596-10-2)	BD, FR3
	097584-033/MWL-EB1	Cesium-137 (10045-97-3)	BD, FR3
	097584-033/MWL-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	097584-033/MWL-EB1	Potassium-40 (13966-00-2)	BD, FR3
	097587-033/MWL-MW9	Americium-241 (14596-10-2)	BD, FR3
	097587-033/MWL-MW9	Cesium-137 (10045-97-3)	BD, FR3
	097587-033/MWL-MW9	Cobalt-60 (10198-40-0)	BD, FR3
	097587-033/MWL-MW9	Potassium-40 (13966-00-2)	BD, FR3
	097588-033/MWL-MW9	Americium-241 (14596-10-2)	BD, FR3
	097588-033/MWL-MW9	Cesium-137 (10045-97-3)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	097588-033/MWL-MW9	Cobalt-60 (10198-40-0)	BD, FR3
	097588-033/MWL-MW9	Potassium-40 (13966-00-2)	BD, FR3
<b>EPA 906.0 Modified</b>			
	097578-036/MWL-BW2	Tritium (10028-17-8)	BD, FR3
	097581-036/MWL-MW7	Tritium (10028-17-8)	BD, FR3
	097584-036/MWL-EB1	Tritium (10028-17-8)	BD, FR3
	097587-036/MWL-MW9	Tritium (10028-17-8)	BD, FR3
	097588-036/MWL-MW9	Tritium (10028-17-8)	BD, FR3
<b>SM 7500 Rn B</b>			
	097581-040/MWL-MW7	Radon-222 (14859-67-7)	J, FR7
	097584-040/MWL-EB1	Radon-222 (14859-67-7)	BD, FR3
<b>SW846 8260B DOE-AL</b>			
	097577-001/MWL-FB1	Acetone (67-64-1)	UJ, 13,C3
	097577-001/MWL-FB1	Bromoform (75-25-2)	J+, C2
	097577-001/MWL-FB1	Dibromochloromethane (124-48-1)	J+, C2
	097578-001/MWL-BW2	Acetone (67-64-1)	UJ, 13,C3
	097579-001/MWL-TB1	Acetone (67-64-1)	UJ, 13,C3
	097580-001/MWL-FB2	Acetone (67-64-1)	UJ, 13,C3
	097580-001/MWL-FB2	Bromoform (75-25-2)	J+, C2
	097580-001/MWL-FB2	Dibromochloromethane (124-48-1)	J+, C2
	097581-001/MWL-MW7	Acetone (67-64-1)	UJ, 13,C3
	097582-001/MWL-TB2	Acetone (67-64-1)	UJ, 13,C3
	097583-001/MWL-FB3	Acetone (67-64-1)	J-, 13,C3
	097583-001/MWL-FB3	Dibromochloromethane (124-48-1)	J+, C2
	097584-001/MWL-EB1	Acetone (67-64-1)	UJ, 13,C3
	097584-001/MWL-EB1	Bromoform (75-25-2)	J+, C2
	097584-001/MWL-EB1	Dibromochloromethane (124-48-1)	J+, C2
	097585-001/MWL-TB3	Acetone (67-64-1)	UJ, 13,C3
	097586-001/MWL-FB4	Acetone (67-64-1)	UJ, 13,C3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	097586-001/MWL-FB4	Dibromochloromethane (124-48-1)	J+, C2
	097587-001/MWL-MW9	Acetone (67-64-1)	UJ, 13,C3
	097588-001/MWL-MW9	Acetone (67-64-1)	UJ, 13,C3
	097589-001/MWL-TB4	Acetone (67-64-1)	UJ, 13,C3

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



## Data Validation Summary Worksheet

AR/COC #: 616094, 616095, 616096 and 616097

Site/Project: MWL GWM

Validation Date: 05/18/2015

SDG #: 370483

Laboratory: GEL Laboratories, LLC

Validator: Mary Donovan

Matrix: Aqueous

# of Samples: 38

CVR present: Yes

Analysis Type: X Organic X Metals

AR/COC(s) present: Yes

Sample Container Integrity: OK

X Rad

Gen Chem

Requested Analyses Not Reported						
Sample Number	Laboratory ID	organic	genchem	metals	rad	Comments
None						

Hold Time/Preservation Outliers								
Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT
None								

Comments: Samples collected 04/06-08/2015

Revised 7/2007

Validated By: Mary A. Donovan

# Organic Worksheet (GC/MS)

AR/COC #: 616094, 616095, 616096 and 616097

SDG #: 370483

Matrix: Aqueous

Laboratory Sample IDs: 370483001, -002, -008, -009, -010, -016, -017, -018, -024, -025, -026, -032 and -038

Method/Batch #s: 1471189

Tuning (pass/fail): pass

TICs Required? (yes/no) no

Analyte (outliers)	Calibration				Method Blank	5X (10X) Blank	LCS %R	MS %R	MSD %R	MS/ MSD RPD	EB -018	FB1 - 001 <sup>1</sup> FB2 - 009 <sup>2</sup> FB3 - 017 <sup>3</sup> FB4 - 025 <sup>4</sup>	TB1 -008 TB2 -016 TB3 -024 TB4 -038
	Int.	RF	RSD/R <sup>2</sup>	CCV (ICV) %D									
bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	2.62	3.63 <sup>1</sup> 3.44 <sup>2</sup> 2.20 <sup>3</sup> 2.24 <sup>4</sup>	✓
bromoform	NA	✓	✓	(25.2) 25.0* 21.4**	✓	NA	✓	✓	✓	✓	0.430J	0.460J <sup>1</sup> 0.550J <sup>2</sup>	✓
chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	1.66	1.90 <sup>1</sup> 1.91 <sup>2</sup> 1.75 <sup>3</sup> 1.68 <sup>4</sup>	✓
dibromochloromethane	NA	✓	✓	(23.1)	✓	NA	✓	✓	✓	✓	1.82	2.83 <sup>1</sup> 2.95 <sup>2</sup> 1.62 <sup>3</sup> 1.56 <sup>4</sup>	✓
acetone	NA	✓	33.4	(-22.4) -46.0***	✓	NA	✓	✓	✓	✓	✓	2.86J <sup>3</sup>	✓
styrene	NA	✓	✓	(20.7)	✓	NA	✓	✓	✓	✓	✓	✓	✓
2-butanone	✓	✓	✓	31.7* 33.1** -23.5***	✓	NA	✓	✓	✓	✓	✓	✓	✓
2-hexanone	✓	✓	✓	28.6* 25.7** -24.2***	✓	NA	✓	✓	✓	✓	✓	✓	✓
Surrogate Recovery Outliers													
Sample ID													
None													
IS Outliers													
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	RT
None													

Comments: HTs OK, ICAL VOA9.I 03/25/15, matrix QC on sample -002

\*associated with samples -001, -008, -009, -016 and -017 (04/14/15); \*\*associated with samples -002, -010, -018, -024, -025, -026, -032 and -038 (04/15/15); \*\*\*associated with MS/MSD (04/16/15).

# Inorganic Metals Worksheet

AR/COC #: 616094, 616095, 616096 and 616097

SDG #: 370483

Matrix: Aqueous

Laboratory Sample IDs: 370483003, -011, -019, -027 and -033 (UF-Cd, Cr, Ni and U)

Method/Batch #s: **3005A/6020** (ICP-MS): 1470523(prepare)/1470524

ICPMS Mass Cal (pass/fail) pass

ICPMS Resolution (pass/fail) pass

Analyte (outliers)	Calibration						Method Blank	5X Blank or 5X MDL	LCS %R	MS %R	Lab Rep. RPD	Serial Dil. %D	ICS AB %R	ICS A ± MDL	CRA/ CRI %R	EB -019	5X EB			
	Int.	R <sup>2</sup>	ICV	CCV	ICB	CCB														
U	✓	✓	✓	✓	0.00011	0.0001	✓	0.00055	✓	✓	✓	✓	✓	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. Matrix QC performed on sample -003.

# Radiochemistry Worksheet

AR/COC #: 616094, 616095, 616096 and 616097

SDG #: 370483

Matrix: Aqueous

Laboratory Sample IDs: 370483- See below

Method/Batch #s: EPA 901.1 (gamma spec): Batch 1470904 Samples -004, -012, -020, -028 and -034

Method/Batch #s: EPA 900.0 (Gross alpha/beta): Batch 1476049 Samples -005, -013, -021, -029 and -035

Method/Batch #s: SM 7500 Rn B (Radon-222): Batch 1469468 Sample -007; Batch 1470352 Samples -015, -023, -031 and -037

Method/Batch #s: EPA 906.0 (Tritium): Batch 1470768 Samples -006, -014, -022, -030 and -036

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	EB			
None													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	Sample ID		Tracer/Carrier	%R		
NA													

Comments: **Matrix QC: 901.1:** Performed on sample -004; **900.0:** Performed on sample -029; **SM 7500 Rn B:** Performed on samples -007 and -015; **906.0:** Performed on sample -006.

Gross alpha/beta samples were re-prepped due to high RPD/RER, re-analysis reported. Sample -021 was recounted due to a suspected false positive and the MS was recounted due to high alpha recovery, both recounts were reported.

Gross alpha/beta parent and DUP = 150 ml, MS/MSD=50 ml (3X dilution) –OK

Tritium MS was recounted due to low recovery, recount reported.

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. N/A

SMO Use

AR/COC **616094**

Project Name: MWL GWM	Date Samples Shipped: <u>4/6/15</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: Tim Jackson	Carrier/Waybill No. <u>231218</u>	SMO Contact Phone: <u>Lorraine Herrera/505-844-3199</u>	
Project/Task Number: 146422.10.11.08	Lab Contact: Edie Kent/803-556-8171	Send Report to SMO: Rita Kavanaugh/505-284-2553	
Service Order: CF01-15	Lab Destination: GEL		
Contract No.: PO 1303873			

Tech Area:	Building:	Room:	Operational Site:	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <u>370483</u>
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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
097577	-001	MWL-FB1	NA	4/6/15 10:36	DIW	G	3x40 ml	HCL	G	FB	VOC (LTMMMP List) (SW846-8260B)	001
097578	-001	MWL-BW2	496	4/6/15 10:36	GW	G	3x40 ml	HCL	G	SA	VOC (LTMMMP List) (SW846-8260B)	002
097578	-009	MWL-BW2	496	4/6/15 10:37	GW	P	500 ml	HNO3	G	SA	Metals (Cd,Cr,Ni,U)(SW846-6020)	003
097578	-033	MWL-BW2	496	4/6/15 10:38	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	004
097578	-034	MWL-BW2	496	4/6/15 10:39	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	005
097578	-036	MWL-BW2	496	4/6/15 10:40	GW	AG	250 ml	None	G	SA	Tritium (EPA 906.0)	006
097578	-040	MWL-BW2	496	4/6/15 10:41	GW	AG	2x40 ml	None	G	SA	Radon (SM 7500 Rn B)	007
097579	-001	MWL-TB1	NA	4/6/15 10:36	DIW	G	3x40 ml	HCL	G	TB	VOC (LTMMMP List) (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 <input type="checkbox"/> No		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: Send report to Tim Jackson/4142/MS 0729/284-2547 Report specific list of VOC's (LTMMMP list provided by SNL/NM SMO) Report short list isotopes for gamma spectroscopy		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Lab Use		
	Robert Lynch	<u>[Signature]</u>	<u>RL</u>	SNL/4142/505-844-4013/505-250-7090				
	Alfred Santillanes	<u>[Signature]</u>	<u>AS</u>	SNL/4142/505-284-6870/505-228-0710				

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>4/6/15</u> Time <u>1120</u>	3. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>4/6/15</u> Time <u>1120</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>4/6/15</u> Time <u>1130</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <u>[Signature]</u> Org. <u>GEL</u> Date <u>4-7-15</u> Time <u>0730</u>	4. Received by _____ Org. _____ Date _____ Time _____

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

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1Batch No. N/A

SMO Use

AR/COC **616095**

Project Name: <u>MWL GWM</u>	Date Samples Shipped: <u>4/7/15</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: <u>Tim Jackson</u>	Carrier/Waybill No. <u>231938</u>	SMO Contact Phone: <u>Lorraine Herrera/505-844-3199</u>	<input type="checkbox"/> RMMA
Project/Task Number: <u>146422.10.11.08</u>	Lab Contact: <u>Edie Kent/803-556-8171</u>	Send Report to SMO: <u>Rita Kavanaugh/505-284-2553</u>	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: <u>CF01-15</u>	Lab Destination: <u>GEL</u>		
	Contract No.: <u>PO 1303873</u>		

Tech Area:	Operational Site:	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <u>370483</u>
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					
097580	-001	MWL-FB2	NA	4/7/15 10:36	DIW	G	3x40 ml	HCL	G	FB	VOC (LTMMP List) (SW846-8260B)	009
097581	-001	MWL-MW7	496	4/7/15 10:36	GW	G	3x40 ml	HCL	G	SA	VOC (LTMMP List) (SW846-8260B)	010
097581	-009	MWL-MW7	496	4/7/15 10:39	GW	P	500 ml	HNO3	G	SA	Metals (Cd,Cr,Ni,U)(SW846-6020)	011
097581	-033	MWL-MW7	496	4/7/15 10:40	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	012
097581	-034	MWL-MW7	496	4/7/15 10:41	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	013
097581	-036	MWL-MW7	496	4/7/15 10:42	GW	AG	250 ml	None	G	SA	Tritium (EPA 906.0)	014
097581	-040	MWL-MW7	496	4/7/15 10:38	GW	AG	2x40 ml	None	G	SA	Radon (SM 7500 Rn B)	015
097582	-001	MWL-TB2	NA	4/7/15 10:36	DIW	G	3x40 ml	HCL	G	TB	VOC (LTMMP List) (SW846-8260B)	016

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 <input type="checkbox"/> No		
Background: <input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Confirmatory: <input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	Robert Lynch	<u>[Signature]</u>	RL	SNL/4142/505-844-4013/505-250-7090	Return Samples By:  Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 Report specific list of VOC's (LTMMP list provided by SNL/NM SMO) Report short list isotopes for gamma spectroscopy
	Alfred Santillanes	<u>[Signature]</u>	AS	SNL/4142/505-284-6870/505-228-0710	
	William Gibson	<u>[Signature]</u>	WG	SNL/4142/505-284-3307/505-239-7367	

1. Relinquished by <u>Alfred Santillanes</u> Org. <u>4142</u> Date <u>4/7/15</u> Time <u>1055</u>	3. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>4/7/15</u> Time <u>1130</u>
1. Received by <u>Tim Jackson</u> Org. <u>4142</u> Date <u>4/7/15</u> Time <u>1055</u>	3. Received by <u>[Signature]</u> Org. <u> </u> Date <u>04/08/15</u> Time <u>0850</u>
2. Relinquished by <u>Tim Jackson</u> Org. <u>4142</u> Date <u>4/7/15</u> Time <u>1111</u>	4. Relinquished by <u> </u> Org. <u> </u> Date <u> </u> Time <u> </u>
2. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>4/7/15</u> Time <u>1111</u>	4. Received by <u> </u> Org. <u> </u> Date <u> </u> Time <u> </u>

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

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1Batch No. MA

SMO Use

AR/COC **616096**

Project Name: <u>MWL GWM</u>	Date Samples Shipped: <u>4/8/15</u>	SMO Authorization: <u>[Signature]</u>	<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Project/Task Manager: <u>Tim Jackson</u>	Carrier/Waybill No. <u>232011</u>	SMO Contact Phone: <u>[Signature]</u>	
Project/Task Number: <u>146422.10.11.08</u>	Lab Contact: <u>Edie Kent/803-556-8171</u>	Lorraine Herrera/505-844-3199	
Service Order: <u>CF01-15</u>	Lab Destination: <u>GEL</u>	Send Report to SMO: <u>Rita Kavanaugh/505-284-2553</u>	
Contract No.: <u>PO 1303873</u>		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <u>370483</u>	

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					
097583	-001	MWL-FB3	NA	4/7/15 13:33	DIW	G	3x40 ml	HCL	G	FB	VOC (LTMMMP List) (SW846-8260B)	017
097584	-001	MWL-EB1	NA	4/7/15 13:33	DIW	G	3x40 ml	HCL	G	EB	VOC (LTMMMP List) (SW846-8260B)	018
097584	-009	MWL-EB1	NA	4/7/15 13:35	DIW	P	500 ml	HNO3	G	EB	Metals (Cd,Cr,Ni,U)(SW846-6020)	019
097584	-033	MWL-EB1	NA	4/7/15 13:36	DIW	P	1 L	HNO3	G	EB	Gamma Spectroscopy (EPA 901.0)	020
097584	-034	MWL-EB1	NA	4/7/15 13:37	DIW	P	1 L	HNO3	G	EB	Gross Alpha and Beta (EPA 900.0)	021
097584	-036	MWL-EB1	NA	4/7/15 13:38	DIW	AG	250 ml	None	G	EB	Tritium (EPA 906.0)	022
097584	-040	MWL-EB1	NA	4/7/15 13:34	DIW	AG	2x40 ml	None	G	EB	Radon (SM 7500 Rn B)	023
097585	-001	MWL-TB3	NA	4/7/15 13:33	DIW	G	3x40 ml	HCL	G	TB	VOC (LTMMMP List) (SW846-8260B)	024

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 <input type="checkbox"/> No	Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day		
Background: <input type="checkbox"/> Yes	Entered by:	Negotiated TAT <input type="checkbox"/>			
Confirmatory: <input type="checkbox"/> Yes	QC inits.:	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Return Samples By:
	Robert Lynch	<u>[Signature]</u>	<u>RL</u>	SNL/4142/505-844-4013/505-250-7090	
	Alfred Santillanes	<u>[Signature]</u>	<u>AS</u>	SNL/4142/505-284-6870/505-228-0710	
	William Gibson	<u>[Signature]</u>	<u>WG</u>	SNL/4142/505-284-3307/505-239-7367	
Comments: Send report to Tim Jackson/4142/MS 0729/284-2547 Report specific list of VOC's (LTMMMP list provided by SNL/NM SMO) Report short list isotopes for gamma spectroscopy					

1. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>4/8/15</u> Time <u>0831</u>	3. Relinquished by _____ Org. _____ Date _____ Time <u>0845</u>
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>4/8/15</u> Time <u>0831</u>	3. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>4/8/15</u> Time <u>1000</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <u>[Signature]</u> Org. _____ Date <u>4/9/15</u> Time _____	4. Received by _____ Org. _____ Date _____ Time _____

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

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 2

Batch No. <u>MA</u>		SMO Use <u>4/8/15</u>		AR/COC <b>616097</b>									
Project Name: <u>MWL GWM</u>		Date Samples Shipped: <u>4/8/15</u>		SMO Authorization: <u>[Signature]</u>									
Project/Task Manager: <u>Tim Jackson</u>		Carrier/Waybill No. <u>232011</u>		SMO Contact Phone: <u>[Signature]</u>									
Project/Task Number: <u>146422.10.11.08</u>		Lab Contact: <u>Edie Kent/803-556-8171</u>		Lorraine Herrera/505-844-3199									
Service Order: <u>CF01-15</u>		Lab Destination: <u>GEL</u>		Send Report to SMO: <u>Rita Kavanaugh/505-284-2553</u>									
Contract No.: <u>PO 1303873</u>													
Tech Area:		Operational Site:		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <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 <u>370483</u>									
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	
097586	-001	MWL-FB4	NA	4/8/15 9:57	DIW	G	3x40 ml	HCL	G	FB	VOC (LTMMMP List) (SW846-8260B)	025	
097587	-001	MWL-MW9	497	4/8/15 9:57	GW	G	3x40 ml	HCL	G	SA	VOC (LTMMMP List) (SW846-8260B)	026	
097587	-009	MWL-MW9	497	4/8/15 10:01	GW	P	500 ml	HNO3	G	SA	Metals (Cd,Cr,Ni,U)(SW846-6020)	027	
097587	-033	MWL-MW9	497	4/8/15 10:03	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	028	
097587	-034	MWL-MW9	497	4/8/15 10:05	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	029	
097587	-036	MWL-MW9	497	4/8/15 10:07	GW	AG	250 ml	None	G	SA	Tritium (EPA 906.0)	030	
097587	-040	MWL-MW9	497	4/8/15 9:59	GW	AG	2x40 ml	None	G	SA	Radon (SM 7500 Rn B)	031	
097588	-001	MWL-MW9	497	4/8/15 9:57	GW	G	3x40 ml	HCL	G	DU	VOC (LTMMMP List) (SW846-8260B)	032	
097588	-009	MWL-MW9	497	4/8/15 10:01	GW	P	500 ml	HNO3	G	DU	Metals (Cd,Cr,Ni,U)(SW846-6020)	033	
097588	-033	MWL-MW9	497	4/8/15 10:03	GW	P	1 L	HNO3	G	DU	Gamma Spectroscopy (EPA 901.0)	034	
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 <input type="checkbox"/> No			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			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: Send report to Tim Jackson/4142/MS 0729/284-2547				
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Report specific list of VOC's (LTMMMP list provided by SNL/NM SMO)							
	Robert Lynch	[Signature]	RL	SNL/4142/505-844-4013/505-250-7090		Report short list isotopes for gamma spectroscopy							
	Alfred Santillanes	[Signature]	AS	SNL/4142/505-284-6870/505-228-0710									
	William Gibson	[Signature]	WG	SNL/4142/505-284-3307/505-239-7367									
Lab Use													
1. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>4/8/15</u> Time <u>1046</u>			3. Relinquished by			Org.			Date			Time <u>0845</u>	
1. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>4/8/15</u> Time <u>1046</u>			3. Received by			Org.			Date			Time	
2. Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>4/8/15</u> Time <u>1100</u>			4. Relinquished by			Org.			Date			Time	
2. Received by <u>[Signature]</u> Org. <u>4142</u> Date <u>4/8/15</u> Time <u>0845</u>			4. Received by			Org.			Date			Time	

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



Page 2 of 2[illegible]

**AR/COC NUMBER 616098**

## Memorandum

Date: May 27, 2015  
To: File  
From: Linda Thal  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: MWL GWM  
AR/COC: 616098  
SDG: 370936  
Laboratory: GEL  
Project/Task: 146422.10.11.08  
Analysis: VOCs

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

### Summary

Four samples were prepared and analyzed 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 ICAL intercept was positive and  $>$  the MDL for bromoform. The bromoform result for sample 370936008 was a detect  $\leq 3X$  the value of the intercept and will be **qualified J+,I5**
2. The ICAL %RSD was  $>15\%$  but  $\leq 40\%$  and the ICV %D was  $>20\%$  but  $\leq 40\%$  with negative bias for acetone. The associated sample results were non-detects and will be **qualified UJ, I3,C3**.
3. The MS/MSD RPDs were  $>$  acceptance criteria for dibromochloromethane, 4-methyl-2-pentanone, tetrachloroethylene, styrene, toluene and trans-1,3-dichloropropylene. The dibromochloromethane result for sample -008 was a detect and will be **qualified J,MS5**. The remaining associated sample results were non-detects and will be **qualified UJ,MS5**.

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

### Holding Times

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

### Instrument Tune

All instrument tune requirements were met.

### **Calibration**

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows. The ICAL intercept was positive and > the MDL for bromoform. The associated results for samples -001 and -002 were non-detects and will not be qualified.

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

The CCV %Ds were > 20% with negative bias and no other calibration infractions occurred for methylene chloride, 2-butanone and 1,2-dichloroethane. The associated sample results were non-detects and will not be qualified.

### **Blanks**

No target analytes were detected in the blanks except as follows. Bromodichloromethane, chloroform, bromoform and dibromochloromethane were detected at concentrations > the PQLs in the FB, sample -008. The associated sample results were non-detects 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 acceptance criteria were met except as noted above in the Summary section.

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

All LCS acceptance criteria were met.

### **Detection Limits/Dilutions**

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

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

TIC reports were not required.

### **Other QC**

A TB and a FB were submitted with AR/COC 616098.

No other specific issues that affect data quality were identified.

**Reviewed by:** Monica Dymerski

**Level I**

**Date:** 05/28/15

---

## Memorandum

Date: May 27, 2015  
To: File  
From: Linda Thal  
Subject: Inorganic Data Review and Validation – SNL  
Site: MWL GWM  
AR/COC: 616098  
SDG: 370936  
Laboratory: GEL  
Project/Task: 146422.10.11.08  
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 ER Project AOP 00-03 Rev 4.

### Summary

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

1. The Ca, Mg and Al concentrations were not available for sample 370936003. Ni was detected in the ICS A at a negative value > 2X the MDL. The associated sample result was a detect <50X the absolute value of the ICS A result and will be **qualified J-,CK3**.

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

### Holding Times and Preservation

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

### ICP-MS Instrument Tune

The ICP-MS tunes met QC acceptance criteria.

### Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

### Reporting Limit Verification

All CRA/CRI recoveries associated with the samples met QC acceptance criteria.

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

### **Blanks**

No target analytes were detected in the blanks except as follows. U was detected at < the PQL in the ICB/CCB. The associated sample result was a detect >5X the highest blank concentration 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 evaluated because the sample concentrations of Ca, Mg and Al were not available. All QC acceptance criteria were met except as noted above in the Summary section.

### **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:** Monica Dymerski

**Level I**

**Date:** 05/28/15

## Memorandum

Date: May 27, 2015  
To: File  
From: Linda Thal  
Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL GWM  
AR/COC: 616098  
SDG: 370936  
Laboratory: GEL  
Project/Task: 146422.10.11.08  
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 ER Project AOP 00-03 Rev 4.

### Summary

One sample was prepared and analyzed with approved procedures using methods SM7500 Rn B (radon-222), EPA 906.0 (tritium), EPA 901.1 (gamma spec – short list) and EPA 900.0 (gross alpha/beta). Problems were identified with the data package that resulted in the qualification of data.

#### Gammascpec and Tritium:

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

#### Gross alpha/beta:

1. All sample results that were > the MDA but  $\leq 3X$  the MDA will be **qualified J,FR7**.

#### Radon-222:

1. The sample was prepared and analyzed beyond the method specified holding time but <2X the holding time. The sample result was < the associated MDA and will be **qualified BD,H1**.

### Holding Times and Preservation

The samples were prepared and analyzed within the prescribed holding times except as noted above in the Summary section.

### 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 > the MDA and 2-sigma TPU.

### **Tracer/Carrier Recovery**

Tracer/carriers were not required.

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

The MS and/or MSD met all QC acceptance criteria.

#### Gross alpha/beta:

It should be noted that the MS/MSD was performed on an SNL sample of similar matrix from another SDG. No sample data will be qualified as a result.

### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

#### Gross alpha/beta:

It should be noted that the laboratory replicate was performed on an SNL sample of similar matrix from another SDG. No sample data will be qualified as a result.

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

All LCS recoveries met QC acceptance criteria.

### **Detection Limits/Dilutions**

The sample was not diluted. All required detection limits were met.

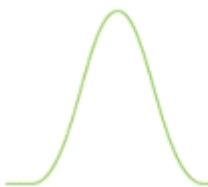
### **Other QC**

No other specific issues that affect data quality were identified.

**Reviewed by:** Monica Dymerski

**Level I**

**Date:** 05/28/15



## Sample Findings Summary



AR/COC: 616098

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	097591-034/MWL-MW8	ALPHA (12587-46-1)	J, FR7
EPA 901.1			
	097591-033/MWL-MW8	Americium-241 (14596-10-2)	BD, FR3
	097591-033/MWL-MW8	Cesium-137 (10045-97-3)	BD, FR3
	097591-033/MWL-MW8	Cobalt-60 (10198-40-0)	BD, FR3
	097591-033/MWL-MW8	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	097591-036/MWL-MW8	Tritium (10028-17-8)	BD, FR3
SM 7500 Rn B			
	097591-040/MWL-MW8	Radon-222 (14859-67-7)	BD, FR3,H1
SW846 3005/6020 DOE-AL			
	097591-009/MWL-MW8	Nickel (7440-02-0)	J-, CK3
SW846 8260B DOE-AL			
	097590-001/MWL-FB5	4-Methyl-2-pentanone (108-10-1)	UJ, MS5
	097590-001/MWL-FB5	Acetone (67-64-1)	UJ, I3,C3
	097590-001/MWL-FB5	Bromoform (75-25-2)	J+, I5
	097590-001/MWL-FB5	Dibromochloromethane (124-48-1)	J, MS5
	097590-001/MWL-FB5	Styrene (100-42-5)	UJ, MS5
	097590-001/MWL-FB5	Tetrachloroethylene (127-18-4)	UJ, MS5
	097590-001/MWL-FB5	Toluene (108-88-3)	UJ, MS5
	097590-001/MWL-FB5	trans-1,3-Dichloropropylene (10061-02-6)	UJ, MS5
	097591-001/MWL-MW8	4-Methyl-2-pentanone (108-10-1)	UJ, MS5
	097591-001/MWL-MW8	Acetone (67-64-1)	UJ, I3,C3
	097591-001/MWL-MW8	Dibromochloromethane (124-48-1)	UJ, MS5
	097591-001/MWL-MW8	Styrene (100-42-5)	UJ, MS5

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	097591-001/MWL-MW8	Tetrachloroethylene (127-18-4)	UJ, MS5
	097591-001/MWL-MW8	Toluene (108-88-3)	UJ, MS5
	097591-001/MWL-MW8	trans-1,3-Dichloropropylene (10061-02-6)	UJ, MS5
	097592-001/MWL-TB5	4-Methyl-2-pentanone (108-10-1)	UJ, MS5
	097592-001/MWL-TB5	Acetone (67-64-1)	UJ, I3,C3
	097592-001/MWL-TB5	Dibromochloromethane (124-48-1)	UJ, MS5
	097592-001/MWL-TB5	Styrene (100-42-5)	UJ, MS5
	097592-001/MWL-TB5	Tetrachloroethylene (127-18-4)	UJ, MS5
	097592-001/MWL-TB5	Toluene (108-88-3)	UJ, MS5
	097592-001/MWL-TB5	trans-1,3-Dichloropropylene (10061-02-6)	UJ, MS5

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

## Data Validation Summary Worksheet

AR/COC #: 616098

Site/Project: MWL GWM

Validation Date: 05/27/2015

SDG #: 370936

Laboratory: GEL

Validator: Linda Thal

Matrix: Aqueous

# of Samples: 8    CVR present: Yes

Analysis Type: ☒ Organic   ☒ Metals

AR/COC(s) present: Yes

Sample Container Integrity: OK

☒ Rad   ☐ Gen Chem

Requested Analyses Not Reported						
Sample Number	Laboratory ID	organic	genchem	metals	rad	Comments
None						

Hold Time/Preservation Outliers								
Sample Number	Laboratory ID	Analysis	Pres.	Coll. Date	Prep. Date	Anal. Date	Anal. within 2X HT	Anal. beyond 2X HT
097591-040	370936007	SM 7500 Rn B Radon-222	✓	04/13/2015 9:53	04/20/2015 19:54	04/20/2015 19:54	Yes	No

Comments: Sampled 04/13/2015.

Validated by:  Revised 7/2007

# Organic Worksheet (GC/MS)

AR/COC #: 616098

SDG #: 370936

Matrix: Aqueous

Laboratory Sample IDs: 370936001, -002, -008

Method/Batch #s: 8260B: 1473323

Tuning (pass/fail): Pass    TICs Required? (yes/no): No

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	MS %R	MSD %R	MS/ MSD RPD	TB -008	TB X5	FB -008	FB X5
	Int.	RF/ Slope	RSD/ R <sup>2</sup>	(ICV) CCV %D										
Bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	1.9	9.5
Chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	1.32	6.6
Dibromochloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	26.1	✓	NA	1.78	8.9
Bromoform	+0.80	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	1.15	5.75
4-Methyl-2-pentanone	NA	✓		✓	✓	NA	✓	✓	✓	26.9	✓	NA	✓	NA
Tetrachloroethylene	NA	✓	✓	✓	✓	NA	✓	✓	✓	20.8	✓	NA	✓	NA
Styrene	NA	✓	✓	✓	✓	NA	✓	✓	✓	34	✓	NA	✓	NA
Toluene	NA	✓	✓	✓	✓	NA	✓	✓	✓	30.1	✓	NA	✓	NA
trans-1,3-Dichloropropylene	NA	✓	✓	✓	✓	NA	✓	✓	✓	29	✓	NA	✓	NA
Acetone	NA	✓	19	(-22) -38	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
Dichlorodifluoromethane	NA	✓	✓	(+37)	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
Methylene chloride	NA	✓	✓	-22	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
2-Butanone	NA	✓	✓	-26	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
1,2-Dichloroethane	NA	✓	✓	-24	✓	NA	✓	✓	✓	✓	✓	NA	✓	NA
Surrogate Recovery Outliers														
Sample ID														
None														
IS Outliers														
Sample ID	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT	Area	RT
None														

Comments: HT OK; Shorter list of target analytes; MS/MSD performed on -002

VOA6.I 03/24/2015; Linear: Bromoform,

# Inorganic Metals Worksheet

AR/COC #: 616098

SDG #: 370936

Matrix: Aqueous

Laboratory Sample IDs: 370396003

Method/Batch #s: **3005A/6020:** 1472276/1472277

ICPMS Mass Cal (pass/fail): Pass

ICPMS Resolution (pass/fail): Pass

[illegible]

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

Comments: HTs OK; All matrix QC -003; No sample results available for Ca, Mg or Al

Rev 07/2007

# Radiochemistry Worksheet

AR/COC #: 616098

SDG #: 370936

Matrix: Aqueous

Laboratory Sample IDs: 370936-see below

Method/Batch#s: EPA 901.1 Gammaspec ; 1472672 -004

Method/Batch#s: EPA 900.0 Gross alpha/beta; 1476049 -005

Method/Batch#s: SM 7500 Rn B; 1472391 -007

Method/Batch#s: EPA 906.0 Tritium; 1475818 -006

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				
None													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	
NA													

Comments: HT: Rn 222 analyzed past method specified HT; Matrix -004 (GS); -007 (Rn); -006 (H3); matrix QC on SNL sample from another SDG for gross A/B

Gross A/B parent 150ml; DUP =150ml; MS/MSD = 50ml (3X dilution) –no qual

Data rejected due to peak not meeting identification criteria: None

No peaks identified for: None

Internal Lab

Page 1 of 1

Batch No. NA

### SMO Use

AR/COC	616098
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616098

Project Name: MWL GWM		Date Samples Shipped: 4/13/15		SMO Authorization: [Signature]		<input type="checkbox"/> Waste Characterization						
Project/Task Manager: Tim Jackson		Carrier/Waybill No. 231850		SMO Contact Phone: [Signature]		<input type="checkbox"/> RMMA						
Project/Task Number: 146422.10.11.08		Lab Contact: Edie Kent/803-556-8171		Lorraine Herrera/505-844-3199		<input type="checkbox"/> Released by COC No.						
Service Order: CF01-15		Lab Destination: GEL		Send Report to SMO: Rita Kavanaugh/505-284-2553		<input checked="" type="checkbox"/> 4° Celsius						
Contract No.: PO 1303873						Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154						
Tech Area:		Operational Site: T1/15				370936						
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
097590	-001	MWL-FB5	NA	4/13/15 9:49	DIW	G	3x40 ml	HCL	G	FB	VOC (LTMMMP List) (SW846-8260B)	001
097591	-001	MWL-MW8	497	3/13/15 9:49	GW	G	3x40 ml	HCL	G	SA	VOC (LTMMMP List) (SW846-8260B)	002
097591	-009	MWL-MW8	497	3/13/15 9:55	GW	P	500 ml	HNO3	G	SA	Metals (Cd,Cr,Ni,U)(SW846-6020)	003
097591	-033	MWL-MW8	497	3/13/15 9:58	GW	P	1 L	HNO3	G	SA	Gamma Spectroscopy (EPA 901.0)	004
097591	-034	MWL-MW8	497	3/13/15 10:02	GW	P	1 L	HNO3	G	SA	Gross Alpha and Beta (EPA 900.0)	005
097591	-036	MWL-MW8	497	3/13/15 10:05	GW	AG	250 ml	None	G	SA	Tritium (EPA 906.0)	006
097591	-040	MWL-MW8	497	3/13/15 9:53	GW	AG	2x40 ml	None	G	SA	Radon (SM 7500 Rn B)	007
097592	-001	MWL-TB5	NA	3/13/15 9:49	DIW	G	3x40 ml	HCL	G	TB	VOC (LTMMMP List) (SW846-8260B)	008
Last Chain: <input checked="" 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 <input type="checkbox"/> No Turnaround Time <input type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input checked="" type="checkbox"/> 30 Day						
QC inits.:			Negotiated TAT			Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab						
Return Samples By:			Comments:			Send report to Tim Jackson/4142/MS 0729/284-2547 Report specific list of VOC's (LTMMMP list provided by SNL/NM SMO) Report short list isotopes for gamma spectroscopy						
Sample Team Members		Name	Signature	Init.	Company/Organization/Phone/Cell			Lab Use				
		Robert Lynch	[Signature]	RL	SNL/4142/505-844-4013/505-250-7090							
		Gilbert Quintana	[Signature]	GQ	SNL/4143/505-844-2507/505-228-2606							
		William Gibson	[Signature]	WG	SNL/4142/505-284-3307/505-239-7367							
1. Relinquished by [Signature] Org. 4143 Date 4-13-15 Time 1012												
1. Received by [Signature] Org. 4142 Date 4-13-15 Time 1012												
2. Relinquished by [Signature] Org. 4142 Date 4-13-15 Time 1026												
2. Received by [Signature] Org. 4142 Date 4-13-15 Time 1026												
3. Relinquished by [Signature] Org. 4142 Date 4/13/15 Time 1045												
3. Received by [Signature] Org. [Signature] Date 4-14-15 Time 0755												
4. Relinquished by [Signature] Org. [Signature] Date [Signature] Time [Signature]												
4. Received by [Signature] Org. [Signature] Date [Signature] Time [Signature]												

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



**CONTRACT VERIFICATION REVIEW FORMS**  
**GROUNDWATER MONITORING**  
**APRIL 2015**

<b>AR/COC Number</b>	<b>Sample Type</b>
616094	Environmental*
616095	Environmental*
616096	Environmental*
616097	Environmental*
616098	Environmental*

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

## Contract Verification Form (CVR)

**Project Leader** Jackson

**Project Name** MWL GWM

**Project/Task No.** 146422\_10.11.08

**ARCOC No.** 616094, 616095, 616096, 616097

**Analytical Lab** GEL

**SDG No.** 370483

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

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

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

### 2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	No	
2.1	Data reviewed, signature	X		
2.2	Method reference number(s) complete and correct	X		
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X		
2.4	Matrix spike/matrix spike duplicate data provided	X		
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and Lc	X		
2.6	QC batch numbers provided	X		
2.7	Dilution factors provided and all dilution levels reported	X		
2.8	Data reported in appropriate units and using correct significant figures	X		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	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		
	b) Matrix spike duplicate RPD data reported and met for all organic samples		X	VOC PSD recovery failed for 1,1,1-Trichloroethane, 1,1-Dichloroethylene, Dichlorodifluoromethane (1203299230)
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Detected in FB1, FB2, EB1: Bromodichloromethane, Bromoform, Chloroform, Dibromochloromethane (097577-001, 097580-001, 097584-001). Detected in FB3: Acetone, Bromodichloromethane, Chloroform, Dibromochloromethane (097583-001). Detected in FB4: Bromodichloromethane, Chloroform, Dibromochloromethane (097586-001)
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) a) 12-hour tune check provided	X		

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

Line No.	Item	Yes	No	Comments
4.4	LC/MS/MS (6850) a) Initial calibration provided	N/A		
	b) Continuing calibration provided	N/A		
	c) CRI provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals) a) Initial calibration provided	X		
	b) Continuing calibration provided	X		
	c) ICP interference check sample data provided	X		
	d) ICP serial dilution provided	X		
	e) Instrument run logs provided	X		
4.6	Radiochemistry and General Chemistry a) Instrument run logs provided	X		

## 5.0 Data Anomaly Report

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

## 6.0 Problem Resolution

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

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

Were deficiencies unresolved? ☐ Yes ☒ No

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

Reviewed by: Lorraine R. Herrera Date: 05-13-2015 13:14:00

Closed by: Lorraine R. Herrera Date: 05-13-2015 13:14:00



## Contract Verification Form (CVR)

**Project Leader** Jackson

**Project Name** MWL GWM

**Project/Task No.** 146422\_10.11.08

**ARCOC No.** 616098

**Analytical Lab** GEL

**SDG No.** 370936

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

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

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

### 2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	No	
2.1	Data reviewed, signature	X		
2.2	Method reference number(s) complete and correct	X		
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X		
2.4	Matrix spike/matrix spike duplicate data provided	X		
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and Lc	X		
2.6	QC batch numbers provided	X		
2.7	Dilution factors provided and all dilution levels reported	X		
2.8	Data reported in appropriate units and using correct significant figures	X		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	X		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met		X	Radon-222 analyzed out of hold time due to lab error (097591-040)
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

### 3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	X		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	X		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	X		
	b) Matrix spike duplicate RPD data reported and met for all organic samples		X	VOC PSD failed for 4-Methyl-2-pentanone, Dibromochloromethane, Styrene, Tetrachloroethylene, Toluene, Xylenes (total), trans-1,3-Dichloropropylene (1203304773)
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Detected in FB5: Bromodichloromethane, Bromoform, Chloroform (097590-001)
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) a) 12-hour tune check provided	X		
	b) Initial calibration provided	X		
	c) Continuing calibration provided	X		

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

Line No.	Item	Yes	No	Comments
	c) CRI provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	X		
	a) Initial calibration provided			
	b) Continuing calibration provided	X		
	c) ICP interference check sample data provided	X		
	d) ICP serial dilution provided	X		
	e) Instrument run logs provided	X		
4.6	Radiochemistry and General Chemistry	X		
	a) Instrument run logs provided			

## 5.0 Data Anomaly Report

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

Line No.	Item	Yes	No	If no, explain
----------	------	-----	----	----------------

## 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: Lorraine R. Herrera Date: 05-26-2015 09:56:00

Closed by: Lorraine R. Herrera Date: 05-26-2015 09:56:00

**FIELD SAMPLING FORMS**  
**OCTOBER 2015 GROUNDWATER MONITORING**



## TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: MWL-BW2 Date: 10/12/15 Time: 0755

Activities: Groundwater monitoring and sampling

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

Weather Conditions:

Temp: 67.4°F Wind Speed: 0-10 MPH Humidity: 24.3%

Chemicals Used: Decon - detergent + HNO<sub>3</sub>, sample preservatives

Other: Be aware of possible UXO

## Safety Topics Presented

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

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

## Attendees

Robert Lynch  
Printed Name

William Gibson  
Printed Name

ALFRED SANTILLANES  
Printed Name

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

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

Robert Lynch  
Signature

William Gibson  
Signature

Alfred Santillanes  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

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

## TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: MWL-MW7Date: 10/13/15Time: 0755Activities: GROUND WATER MONITORING AND SAMPLING

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

Weather Conditions:

Temp: 79.1 °F Wind Speed: 0 MPHHumidity: 17.6 %Chemicals Used: sample preservatives, decon process (HNO<sub>3</sub>, detergent)Other: Be aware of possible UXO

## Safety Topics Presented

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

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

## Attendees

Robert Lynch  
Printed Name

ALFRED SANTILLANES  
Printed Name

William Gibson  
Printed Name

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

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

Robert Lynch  
Signature

Alfred Santillanes  
Signature

William Gibson  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

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## TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: MWL-MW9Date: 10/14/15Time: 0757Activities: GROUND WATER MONITORING AND SAMPLING

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

Weather Conditions:

Temp: 77.6 °F Wind Speed: 0-10 MPHHumidity: 20.4 %Chemicals Used: sample preservation, decon process (detergent, HNO<sub>3</sub>)Other: Be aware of possible UXO

## Safety Topics Presented

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

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

## Attendees

Robert Lynch  
Printed Name

ALFRED SANTILLANES  
Printed Name

William Gibson  
Printed Name

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

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

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## TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: MWL-MW8Date: 10/15/15Time: 0755Activities: GROUND WATER MONITORING AND SAMPLING

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

Weather Conditions:

Temp: 69.8 °F Wind Speed: 0-5 MPHHumidity: 24.7 %Chemicals Used: sample preservation, decon process (detergent, HNO<sub>3</sub>)Other: Be aware of possible UXO

## Safety Topics Presented

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

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

## Attendees

Robert Lynch  
Printed NameALFRED SANTILLANES  
Printed NameGilbert L. Quintana  
Printed NameWilliam Gibson  
Printed Name

Printed Name

Ratt Snell  
SignatureAlfred Santillanes  
SignatureGilbert L. Quintana  
SignatureWilliam Gibson  
Signature

Signature

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## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: MWL	
Well I.D.: MWL-BW2	Date: 10/12/15
Method: Portable pump <input checked="" type="checkbox"/>	Dedicated pump <input type="checkbox"/> Pump depth: 496'

## PURGE MEASUREMENTS

[illegible]

Comments: ~1.5 GALS PURGED FROM TUBING 0820

## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: MWL		
Well I.D.: MWL-MW7	Date: 10/13/15	
Method: Portable pump <input checked="" type="checkbox"/>	Dedicated pump <input type="checkbox"/>	Pump depth: 496'

## PURGE MEASUREMENTS

[illegible]

Comments: ~1.5 gals purged from tubing 0829

## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: MWL	
Well I.D.: MWL-MW9	Date: 10/14/15
Method: Portable pump <input checked="" type="checkbox"/> Dedicated pump <input type="checkbox"/> Pump depth: 497'	

## PURGE MEASUREMENTS

[illegible]

Comments: ~1.5 gals purged from tubing 0829

## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: MWL	
Well I.D.: MWL-MW8	Date: 10/15/15
Method: Portable pump <input checked="" type="checkbox"/> Dedicated pump <input type="checkbox"/> Pump depth: 497'	

## PURGE MEASUREMENTS

[illegible]

Comments: ~1.5 gals purged from tubing 0824



## 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>10/12/15</b>		
Make & Model: <b>EXO1</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>13C101167</b>						
Other (S/N): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>7.00</b>			pH sloped to (std): <b>10.00</b>			
Reference value:	<b>4.00</b>		<b>7.00</b>		<b>10.00</b>	
	Value	Temp	Value	Temp	Value	Temp
1. Time: <b>0640</b>	<b>4.01</b>	<b>22.2</b>	<b>7.00</b>	<b>22.2</b>	<b>10.00</b>	<b>22.2</b>
2. Time: <b>1116</b>	<b>4.02</b>	<b>22.0</b>	<b>7.00</b>	<b>22.0</b>	<b>10.00</b>	<b>22.0</b>
3. Time:						
4. Time:						
Standard lot no.:	<b>5GE740</b>		<b>5AD829</b>		<b>5GE556</b>	
Expiration date:	<b>5/17</b>		<b>4/17</b>		<b>5/17</b>	
<b>SC Calibration/Check</b>						
Reference Value: <b>1413 uS</b>			Standard Lot No.: <b>5AD820</b>			
	Value	Temp	Expiration Date: <b>5/16</b>			
1. Time: <b>0641</b>	<b>1412.8</b>	<b>22.2</b>				
2. Time: <b>1115</b>	<b>1413.3</b>	<b>22.0</b>				
3. Time:						
4. Time:						
<b>ORP Calibration/Check</b>						
Reference Value: <b>220 mV</b>			Standard Lot No. <b>5AD891</b>			
	Value	Temp	Expiration Date: <b>1/16</b>			
1. Time: <b>0642</b>	<b>220.0</b>	<b>22.2</b>				
2. Time: <b>1118</b>	<b>220.2</b>	<b>22.0</b>				
3. Time:						
4. Time:						
<b>DO Calibration/Check</b>						
Calibration Value:	<b>81% air saturation @ 5200 ft.</b>		<b>Atmospheric Pressure in Hg</b>			
1. Time: <b>0757</b>	<b>83.0</b>		<b>24.79</b>			
2. Time: <b>1114</b>	<b>82.9</b>		<b>24.79</b>			
3. Time:						
4. Time:						

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

SNL/NM Project Name: <b>MWL</b>				
Calibration done by: <b>R Lynch</b>			Date: <b>10/12/15</b>	
TURBIDIMETER				
Make & Model: <b>HACH 2100Q</b>			Serial No. S/N <b>14060C033238</b>	
Reference Value	<b>0.1</b>	<b>20</b>	<b>100</b>	<b>800</b>
Standard Lot No.	<b>A5162</b>	<b>A5247</b>	<b>A5251</b>	<b>A5246</b>
1. Time <b>0759</b>	<b>.12</b>	<b>20.2</b>	<b>103</b>	<b>798</b>
2. Time <b>1027</b>	<b>.11</b>	<b>20.1</b>	<b>102</b>	<b>796</b>
3. Time				
4. Time				
Comments:				

## GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: MWL							
Calibrations done by: R Lynch				Date: 10/13/15			
Make & Model: EXO1							
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 13C101167							
Other (S/N): NA							
pH Calibration/Check							
pH Calibrated to (std): 7.00				pH sloped to (std): 10.00			
Reference value:		4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp	
1. Time:	0633	4.03	21.7	7.00	21.7	10.01	21.7
2. Time:	1118	4.02	21.5	7.01	21.5	10.01	21.5
3. Time:							
4. Time:							
Standard lot no.:		5GE740		5AD829		5GE556	
Expiration date:		5/17		4/17		5/17	
SC Calibration/Check							
Reference Value: 1413 uS				Standard Lot No: 5AD820			
	Value	Temp	Expiration Date: 5/16				
1. Time:	0632	1412.8	21.7				
2. Time:	1117	1413.3	21.5				
3. Time:							
4. Time:							
ORP Calibration/Check							
Reference Value: 220 mV				Standard Lot No. 5AD891			
	Value	Temp	Expiration Date: 1/16				
1. Time:	0635	219.8	21.7				
2. Time:	1120	220.2	21.5				
3. Time:							
4. Time:							
DO Calibration/Check							
Calibration Value:		81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0631	82.1	24.81				
2. Time:	1116	82.2	24.79				
3. Time:							
4. Time:							

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

SNL/NM Project Name: MWL				
Calibration done by: R Lynch			Date: 10/13/15	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 14060C033238	
Reference Value	0.1	20	100	800
Standard Lot No.	A5162	A5247	A5251	A5246
1. Time 0758	.11	19.9	102	803
2. Time 1002	.13	20.1	104	798
3. Time				
4. Time				
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>10/14/15</b>			
Make & Model: <b>EXO1</b>							
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>13C101167</b>							
Other (S/N): <b>NA</b>							
pH Calibration/Check							
pH Calibrated to (std): <b>7.00</b>				pH sloped to (std): <b>10.00</b>			
Reference value:		4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp	
1. Time:	<b>0627</b>	<b>4.02</b>	<b>20.6</b>	<b>7.00</b>	<b>20.6</b>	<b>9.99</b>	<b>20.6</b>
2. Time:	<b>1118</b>	<b>4.03</b>	<b>20.9</b>	<b>7.01</b>	<b>20.9</b>	<b>10.01</b>	<b>20.9</b>
3. Time:							
4. Time:							
Standard lot no.:		<b>5GE740</b>		<b>5AD829</b>		<b>5GE556</b>	
Expiration date:		<b>5/17</b>		<b>4/17</b>		<b>5/17</b>	
SC Calibration/Check							
Reference Value: <b>1413 uS</b>				Standard Lot No.: <b>5AD820</b>			
	Value	Temp	Expiration Date: <b>5/16</b>				
1. Time:	<b>0626</b>	<b>1412.8</b>	<b>20.6</b>				
2. Time:	<b>1117</b>	<b>1413.7</b>	<b>20.9</b>				
3. Time:							
4. Time:							
ORP Calibration/Check							
Reference Value: <b>220 mV</b>				Standard Lot No. <b>5AD891</b>			
	Value	Temp	Expiration Date: <b>1/16</b>				
1. Time:	<b>0629</b>	<b>219.8</b>	<b>20.6</b>				
2. Time:	<b>1121</b>	<b>220.3</b>	<b>20.9</b>				
3. Time:							
4. Time:							
DO Calibration/Check							
Calibration Value:		<b>81% air saturation @ 5200 ft.</b>		Atmospheric Pressure in Hg			
1. Time:	<b>0625</b>	<b>82.1</b>	<b>24.86</b>				
2. Time:	<b>1116</b>	<b>82.2</b>	<b>24.88</b>				
3. Time:							
4. Time:							

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

SNL/NM Project Name: MWL				
Calibration done by: R Lynch			Date: 10/14/15	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 14060C033238	
Reference Value	0.1	20	100	800
Standard Lot No.	A5162	A5247	A5251	A5246
1. Time	0808 .13	19.8	102	797
2. Time	1038 .14	20.1	101	796
3. Time				
4. Time				
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>10/15/15</b>		
Make & Model: <b>EXO1</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>13C101167</b>						
Other (S/N): <b>NA</b>						
pH Calibration/Check						
pH Calibrated to (std): <b>7.00</b>				pH sloped to (std): <b>10.00</b>		
Reference value:		4.00		7.00		10.00
	Value	Temp	Value	Temp	Value	Temp
1. Time:	<b>0627</b>	<b>4.03</b>	<b>20.2</b>	<b>7.01</b>	<b>20.2</b>	<b>10.00</b>
2. Time:	<b>1054</b>	<b>4.02</b>	<b>20.6</b>	<b>7.00</b>	<b>20.6</b>	<b>10.01</b>
3. Time:						
4. Time:						
Standard lot no.:		<b>5GE740</b>		<b>5AD829</b>		<b>5GE556</b>
Expiration date:		<b>5/17</b>		<b>4/17</b>		<b>5/17</b>
SC Calibration/Check						
Reference Value: <b>1413 US</b>				Standard Lot No. <b>5AD820</b>		
	Value	Temp	Expiration Date: <b>5/16</b>			
1. Time:	<b>0626</b>	<b>1412.8</b>	<b>20.2</b>			
2. Time:	<b>1053</b>	<b>1413.2</b>	<b>20.7</b>			
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: <b>220 mV</b>				Standard Lot No. <b>5AD891</b>		
	Value	Temp	Expiration Date: <b>1/16</b>			
1. Time:	<b>0629</b>	<b>220.4</b>	<b>20.2</b>			
2. Time:	<b>1056</b>	<b>220.1</b>	<b>20.6</b>			
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value:		81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	<b>0625</b>	<b>82.0</b>	<b>24.81</b>			
2. Time:	<b>1052</b>	<b>82.1</b>	<b>24.80</b>			
3. Time:						
4. Time:						

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

SNL/NM Project Name: MWL				
Calibration done by: R Lynch			Date: 10/15/15	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 14060C033238	
Reference Value	0.1	20	100	800
Standard Lot No.	A5162	A5247	A5251	A5246
1. Time 0800	.13	20.1	99.8	796
2. Time 0950	.11	19.9	101	802
3. Time				
4. Time				
Comments:				

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Portable Pump and Tubing / Water Level Indicator  
Decontamination Log Form

Project Name: <u>MWL</u>	Monitoring Well ID #: <u>MWL-BW2</u>	Date: <u>10-12-15</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-814</u>	Water Level Indicator ID #: <u>210269</u>	
<b><u>Personnel Performing Decontamination:</u></b>		
Robert Lynch		<u>RL</u>
Print Name:		Initial:
Alfred Santillanes		<u>AS</u>
Print Name:		Initial:
Condition of Equipment		
Pump: <u>Good</u>	Tubing Bundle: <u>Good</u>	Water Level Indicator: <u>Good</u>
List of Decontamination Materials		
Deionized Water	HNO <sub>3</sub>	
Source: <u>Culligan</u>	Grade: <u>Reagent</u>	
Lot Number: <u>09-09-15</u>	UN #: <u>2031</u>	
	Manufacturer: <u>ACROS</u>	
	Lot Number: <u>A0316863</u>	


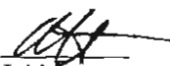
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Portable Pump and Tubing / Water Level Indicator  
Decontamination Log Form

Project Name: <u>MWL-GWM</u>	Monitoring Well ID #: <u>MWL-MW7</u>	Date: <u>10-13-15</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-814</u>	Water Level Indicator ID #: <u>210269</u>	
<b>Personnel Performing Decontamination:</b>		
William Gibson		<u>WJG</u>
Print Name:		Initial:
Robert Lynch		<u>RL</u>
Print Name:		Initial:
Condition of Equipment		
Pump: <u>Good</u>	Tubing Bundle: <u>Good</u>	Water Level Indicator: <u>Good</u>
List of Decontamination Materials		
Deionized Water	HNO <sub>3</sub>	
Source: <u>Culligan</u>	Grade: <u>Reagent</u>	
Lot Number: <u>09-09-15</u>	UN #: <u>2031</u>	
	Manufacturer: <u>ACROS</u>	
	Lot Number: <u>A0316863</u>	

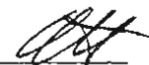
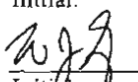
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Portable Pump and Tubing / Water Level Indicator  
Decontamination Log Form

Project Name: <u>MWL GWM</u>	Monitoring Well ID #: <u>MWL-MW9</u>	Date: <u>10/14/15</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-814</u>	Water Level Indicator ID #: <u>210269</u>	
<b><u>Personnel Performing Decontamination:</u></b>		
Robert Lynch		
Print Name:	Initial:	
Alfred Santillanes		
Print Name:	Initial:	
Condition of Equipment		
Pump: <u>Good</u>	Tubing Bundle: <u>Good</u>	Water Level Indicator: <u>Good</u>
List of Decontamination Materials		
Deionized Water	HNO <sub>3</sub>	
Source: <u>Culligan</u>	Grade: <u>Reagent</u>	
Lot Number: <u>100515</u>	UN #: <u>2031</u>	
	Manufacturer: <u>ACROC</u>	
	Lot Number: <u>A0316863</u>	

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Portable Pump and Tubing / Water Level Indicator  
Decontamination Log Form

Project Name: <u>MWL-GWM</u>	Monitoring Well ID #: <u>MWL-MW8</u>	Date: <u>10-15-15</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
Pump and Tubing Bundle ID #: <u>1806-814</u>	Water Level Indicator ID #: <u>210269</u>	
<b>Personnel Performing Decontamination:</b>		
Alfred Santillanes		
Print Name:		Initial:
William Gibson		
Print Name:		Initial:
Condition of Equipment		
Pump: <u>Good</u>	Tubing Bundle: <u>Good</u>	Water Level Indicator: <u>Good</u>
List of Decontamination Materials		
Deionized Water	HNO <sub>3</sub>	
Source: <u>Culligan</u>	Grade: <u>Reagent</u>	
Lot Number: <u>09-09-15</u>	UN #: <u>2031</u>	
	Manufacturer: <u>ACROS</u>	
	Lot Number: <u>A0316863</u>	

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

**SUMMARY SHEET FOR  
OCTOBER 2015 GROUNDWATER SAMPLES**

### Sample Summary for October 2016 MWL Groundwater Monitoring

<i>Well ID</i>	<i>Sample Date</i>	<i>ARCOC</i>	<i>Sample Number</i>	<i>Sample Type</i>	<i>Associated Equipment Blank (ARCOC #/Sample #)</i>	<i>Associated Trip Blank (ARCOC # / Sample #)</i>	<i>Associated Field Blank (ARCOC # / Sample #)</i>	<i>Comments</i>
<b>GEL Analytical Data: Project Task # 146422.10.11.08, Service Order # CF01-16</b>								
MWL-BW2	12-Oct-15	616355	098344	Environmental	n/a	616355 / 098345	616355 / 098343	
MWL-MW7	13-Oct-15	616356	098347	Environmental	n/a	616356 / 098348	616356 / 098346	
MWL-MW8	15-Oct-15	616359	098356	Environmental	616358 / 098353	616359 / 098358	616359 / 098355	
MWL-MW8	15-Oct-15	616359	098357	Duplicate	616358 / 098353	616359 / 098358	616359 / 098355	
MWL-MW9	14-Oct-15	616357	098350	Environmental	n/a	616357 / 098351	616357 / 098349	
MWL-EB1	14-Oct-15	616358	098353	Equipment Blank	n/a	616358 / 098354	n/a	Equipment blank sample prior to MWL-MW8.
MWL-FB1	12-Oct-15	616355	098343	Field Blank	n/a	616355 / 098345	n/a	at MWL-BW2
MWL-FB2	13-Oct-15	616356	098346	Field Blank	n/a	616356 / 098348	n/a	at MWL-MW7
MWL-FB3	14-Oct-15	616357	098349	Field Blank	n/a	616357 / 098351	n/a	at MWL-MW9
MWL-FB4	14-Oct-15	616358	098352	DIW QC	n/a	616358 / 098354	n/a	DIW - source water for EB1
MWL-FB5	15-Oct-15	616359	098355	Field Blank	n/a	616359 / 098358	n/a	at MWL-MW8

**DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES**  
**GROUNDWATER MONITORING**  
**OCTOBER 2015**

**AR/COC NUMBERS 616355, 616356, 616357, 616358, 616359**



## Memorandum

Date: November 19, 2015  
To: File  
From: Mary Donovan  
Subject: GC/MS Organic Data Review and Validation – SNL  
Site: MWL GWM  
AR/COC: 616355, 616356, 616357, 616358 and 616359  
SDG: 383129  
Laboratory: GEL  
Project/Task: 146422.10.11.08  
Analysis: VOCs

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

### Summary

Sixteen 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 ICAL %RSD was >15% but ≤40% for acetone. The associated results for samples 383129001, -009, -017, -025, -026 and -033 were detects and will be **qualified J,I3**.
2. Methylene chloride was detected at a concentration < the PQL in the MB associated with samples -001, -002 and -008. The associated sample results were detects < the PQL and ≤10X the MB concentration and will be **qualified 10U,B** 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

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

### Instrument Tune

All instrument tune requirements were met.

### Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows. The ICAL %RSD was >15% but ≤40% for acetone. The remaining associated sample results were non-detects and since no other calibration infractions 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. Methylene chloride was detected at concentrations < the PQL in FB1, sample -001, and TB1, sample -008, which were both associated with sample -002. The methylene chloride results for the FB and TB were qualified non-detect due to MB contamination and will not be applied to the field sample result.

Acetone was detected at concentrations < the PQL in FB1, sample -001, which was associated with sample -002; FB2, sample -009 which was associated with sample -010; FB3, sample -017, which was associated with sample -018; FB4, sample -025, which had no associated field samples; FB5, sample -033, which was associated with samples -034 and -040 and the EB, sample -026, which was associated with samples -034 and -040. The associated sample results were non-detects and will not be qualified.

2-Butanone was detected at concentrations < the PQL in FB1, sample -001, which was associated with sample -002 and FB3, sample -017, which was associated with sample -018. 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 acceptance criteria were met.

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

All LCS acceptance criteria were met.

### **Detection Limits/Dilutions**

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

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

TIC reports were not required.

### **Other QC**

Mass spectra were verified during data validation and met QC acceptance criteria.

Five TBs were submitted, one for each ARCOC. FBs were submitted with each ARCOC and were associated with the respective field samples in that ARCOC. The FB submitted with ARCOC 616358 had no associated field samples. An EB was submitted with ARCOC 616358 and was applied to the samples in ARCOC 616359. A field duplicate pair was also submitted with ARCOC 616359. 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:** 12/04/2015

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## Memorandum

Date: November 20, 2015  
To: File  
From: Mary Donovan  
Subject: Inorganic Data Review and Validation – SNL  
Site: MWL GWM  
AR/COC: 616355, 616356, 616357, 616358 and 616359  
SDG: 383129  
Laboratory: GEL  
Project/Task: 146422.10.11.08  
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 ER Project AOP 00-03 Rev 4.

### **Summary**

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

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

### **Holding Times and Preservation**

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

### **ICP-MS Instrument Tune**

The ICP-MS tunes met QC acceptance criteria.

### **Calibration**

All initial and continuing calibration criteria met QC acceptance criteria.

### **Reporting Limit Verification**

All CRI recoveries associated with the samples met QC acceptance criteria.

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

### **Blanks**

No target analytes were detected in the blanks except as follows. U was detected at concentrations < the PQL in the ICB and bracketing CCBs. The U result for sample 383129027 was non-detect and the remaining associated sample results were detects > 5X the highest blank concentration concentration 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.

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

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

### **ICP Serial Dilution**

The serial dilutions met all QC acceptance criteria.

### **Other QC**

An EB was submitted with ARCO 616358 and was applied to the samples in ARCO 616359. A field duplicate pair was submitted with ARCO 616359. 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:** 12/04/2015

## Memorandum

Date: November 20, 2015

To: File

From: Mary Donovan

Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL GWM  
AR/COC: 616355, 616356, 616357, 616358 and 616359  
SDG: 383129  
Laboratory: GEL  
Project/Task: 146422.10.11.08  
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 ER Project AOP 00-03 Rev 4.

### Summary

Six samples were prepared and analyzed with approved procedures using methods EPA 901.1 (gamma spec – short list), EPA 900.0 (gross alpha/beta), SM 7500 Rn B (Radon-222), and EPA 906.0 (Tritium). Problems were identified with the data package that resulted in the qualification of data.

#### Radon-222:

1. Samples 383129007 and -015 were analyzed beyond 2X the method specified holding time. The associated result for sample -007 was > the associated MDA and will be **qualified J,H3**. The associated result for sample -015 was < the associated MDA and will be **qualified R,H3**.
2. The remaining associated samples were analyzed beyond the method specified holding time but <2X the holding time. The associated result for sample -031 was < the associated MDA and will be **qualified BD,H1** and the remaining associated sample results were detects and will be **qualified J,H1**.

#### Gamma spec, gross alpha/beta, Radon-222 and Tritium:

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

#### Gamma spec, gross alpha/beta and Radon-222:

1. All sample results which were > the MDA but  $\leq 3X$  the MDA will be **qualified J,FR7**.

### **Holding Times and Preservation**

The samples were prepared and analyzed within the prescribed holding times except as noted above in the Summary section.

### **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 > the MDA and 2-sigma TPU.

### **Tracer/Carrier Recovery**

Tracer/carriers were not required.

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

The MS/MSD met all QC acceptance criteria.

### **Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

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

All LCS recoveries met QC acceptance criteria.

### **Detection Limits/Dilutions**

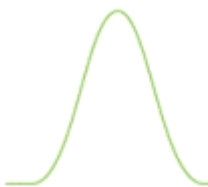
The samples were not diluted. All required detection limits were met.

### **Other QC**

An EB was submitted with ARCO 616358 and was applied to the samples in ARCO 616359. A field duplicate pair was also submitted with ARCO 616359. 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:** 12/04/2015



## Sample Findings Summary



AR/COC: 616355, 616356, 616357, 616358, 616359

Page 1 of 3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	098344-034/MWL-BW2	BETA (12587-47-2)	J, FR7
	098347-034/MWL-MW7	BETA (12587-47-2)	J, FR7
	098353-034/MWL-EB1	ALPHA (12587-46-1)	BD, FR3
	098353-034/MWL-EB1	BETA (12587-47-2)	BD, FR3
	098356-034/MWL-MW8	BETA (12587-47-2)	J, FR7
	098357-034/MWL-MW8	BETA (12587-47-2)	J, FR7
EPA 901.1			
	098344-033/MWL-BW2	Americium-241 (14596-10-2)	BD, FR3
	098344-033/MWL-BW2	Cesium-137 (10045-97-3)	BD, FR3
	098344-033/MWL-BW2	Cobalt-60 (10198-40-0)	BD, FR3
	098344-033/MWL-BW2	Potassium-40 (13966-00-2)	BD, FR3
	098347-033/MWL-MW7	Americium-241 (14596-10-2)	BD, FR3
	098347-033/MWL-MW7	Cesium-137 (10045-97-3)	BD, FR3
	098347-033/MWL-MW7	Cobalt-60 (10198-40-0)	BD, FR3
	098347-033/MWL-MW7	Potassium-40 (13966-00-2)	BD, FR3
	098350-033/MWL-MW9	Americium-241 (14596-10-2)	BD, FR3
	098350-033/MWL-MW9	Cesium-137 (10045-97-3)	BD, FR3
	098350-033/MWL-MW9	Cobalt-60 (10198-40-0)	BD, FR3
	098350-033/MWL-MW9	Potassium-40 (13966-00-2)	J, FR7
	098353-033/MWL-EB1	Americium-241 (14596-10-2)	BD, FR3
	098353-033/MWL-EB1	Cesium-137 (10045-97-3)	BD, FR3
	098353-033/MWL-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	098353-033/MWL-EB1	Potassium-40 (13966-00-2)	BD, FR3
	098356-033/MWL-MW8	Americium-241 (14596-10-2)	BD, FR3



Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	098356-033/MWL-MW8	Cesium-137 (10045-97-3)	BD, FR3
	098356-033/MWL-MW8	Cobalt-60 (10198-40-0)	BD, FR3
	098356-033/MWL-MW8	Potassium-40 (13966-00-2)	BD, FR3
	098357-033/MWL-MW8	Americium-241 (14596-10-2)	BD, FR3
	098357-033/MWL-MW8	Cesium-137 (10045-97-3)	BD, FR3
	098357-033/MWL-MW8	Cobalt-60 (10198-40-0)	BD, FR3
	098357-033/MWL-MW8	Potassium-40 (13966-00-2)	BD, FR3
<b>EPA 906.0 Modified</b>			
	098344-036/MWL-BW2	Tritium (10028-17-8)	BD, FR3
	098347-036/MWL-MW7	Tritium (10028-17-8)	BD, FR3
	098350-036/MWL-MW9	Tritium (10028-17-8)	BD, FR3
	098353-036/MWL-EB1	Tritium (10028-17-8)	BD, FR3
	098356-036/MWL-MW8	Tritium (10028-17-8)	BD, FR3
	098357-036/MWL-MW8	Tritium (10028-17-8)	BD, FR3
<b>SM 7500 Rn B</b>			
	098344-040/MWL-BW2	Radon-222 (14859-67-7)	J, H3,FR7
	098347-040/MWL-MW7	Radon-222 (14859-67-7)	R, H3
	098350-040/MWL-MW9	Radon-222 (14859-67-7)	J, H1
	098353-040/MWL-EB1	Radon-222 (14859-67-7)	BD, H1,FR3
	098356-040/MWL-MW8	Radon-222 (14859-67-7)	J, H1,FR7
	098357-040/MWL-MW8	Radon-222 (14859-67-7)	J, H1,FR7
<b>SW846 8260B DOE-AL</b>			
	098343-001/MWL-FB1	Acetone (67-64-1)	J, I3
	098343-001/MWL-FB1	Methylene chloride (75-09-2)	10U, B
	098344-001/MWL-BW2	Methylene chloride (75-09-2)	10U, B
	098345-001/MWL-TB1	Methylene chloride (75-09-2)	10U, B
	098346-001/MWL-FB2	Acetone (67-64-1)	J, I3
	098349-001/MWL-FB3	Acetone (67-64-1)	J, I3
	098352-001/MWL-FB4	Acetone (67-64-1)	J, I3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	098353-001/MWL-EB1	Acetone (67-64-1)	J, I3
	098355-001/MWL-FB5	Acetone (67-64-1)	J, I3

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

**CONTRACT VERIFICATION REVIEW FORMS**  
**GROUNDWATER MONITORING**  
**OCTOBER 2015**

<b>AR/COC Number</b>	<b>Sample Type</b>
616355	Environmental*
616356	Environmental*
616357	Environmental*
616358	Environmental*
616359	Environmental*

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

## Contract Verification Form (CVR)

**Project Leader** Jackson

**Project Name** MWL GWM **Project/Task No.** 146422\_10.11.08

**ARCOC No.** 616355, 616356, 616357, 616358 & 616359

**Analytical Lab** GEL

**SDG No.** 383129

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

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

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

### 2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	No	
2.1	Data reviewed, signature	X		
2.2	Method reference number(s) complete and correct	X		
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X		
2.4	Matrix spike/matrix spike duplicate data provided	X		
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and Lc	X		
2.6	QC batch numbers provided	X		
2.7	Dilution factors provided and all dilution levels reported	X		
2.8	Data reported in appropriate units and using correct significant figures	X		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	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		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	X		
3.5	Blank data a) Method or reagent blank data reported and met for all samples		X	Methylene chloride detected in method blank (QC1203417917)

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Acetone, 2-butanone and methylene chloride detected in MWL-FB1. Methylene chloride detected in MWL-TB1. Acetone detected in MWL-FB2, MWL-FB4, MWL-EB1 and MWL-FB5. Acetone and 2-butanone detected in MWL-FB3.
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) a) 12-hour tune check provided	X		
	b) Initial calibration provided	X		

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



Line No.	Item	Yes	No	Comments
	b) Continuing calibration provided	N/A		
	c) CRI provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	X		
	a) Initial calibration provided			
	b) Continuing calibration provided	X		
	c) ICP interference check sample data provided	X		
	d) ICP serial dilution provided	X		
	e) Instrument run logs provided	X		
4.6	Radiochemistry and General Chemistry	X		
	a) Instrument run logs provided			

## 5.0 Data Anomaly Report

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

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

## 6.0 Problem Resolution

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

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

Were deficiencies unresolved? ☐ Yes ☒ No

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

Reviewed by: Wendy Palencia Date: 11-19-2015 07:35:00

Closed by: Wendy Palencia Date: 11-19-2015 07:35:00

**FIELD SAMPLING FORMS**

**DECEMBER 2015 GROUNDWATER RE-SAMPLE MWL-MW7**

## TAILGATE SAFETY MEETING FORM

Dept: 4142 Well Location: MWL-MW7 Date: 12/14/15 Time: 0829

Activities: Ground water monitoring and sampling

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

Weather Conditions:

Temp: 32.1 °F Wind Speed: 0-5 MPH Humidity: 61.1 %

Chemicals Used: \_\_\_\_\_

Other: Be aware of possible UXO

## Safety Topics Presented

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

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

## Attendees

Robert Lynch  
Printed Name

William Gibson  
Printed Name

Alfred Santillanes  
Printed Name

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

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

Robert Lynch  
Signature

William Gibson  
Signature

Alfred Santillanes  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

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## FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: MWL	
Well I.D.: MWL-MW 7	Date: 12/14/15
Method: Portable pump <input checked="" type="checkbox"/>	Dedicated pump <input type="checkbox"/> Pump depth: 496'

## PURGE MEASUREMENTS

[illegible]

Comments: ~1.5 gals purged from tubing 0847

## 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>12/14/15</b>		
Make & Model: <b>EXO1</b>						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: <b>14H101486</b>						
Other (S/N): <b>NA</b>						
<b>pH Calibration/Check</b>						
pH Calibrated to (std): <b>7.00</b>			pH sloped to (std): <b>10.00</b>			
Reference value:	<b>4.00</b>		<b>7.00</b>		<b>10.00</b>	
	Value	Temp	Value	Temp	Value	Temp
1. Time: <b>0635</b>	<b>4.02</b>	<b>21.0</b>	<b>7.00</b>	<b>21.0</b>	<b>10.02</b>	<b>21.0</b>
2. Time: <b>1053</b>	<b>4.01</b>	<b>20.8</b>	<b>7.01</b>	<b>20.9</b>	<b>10.01</b>	<b>20.9</b>
3. Time:						
4. Time:						
Standard lot no.:	<b>5GE740</b>		<b>5AD829</b>		<b>5GE556</b>	
Expiration date:	<b>05/17</b>		<b>04/17</b>		<b>05/17</b>	
<b>SC Calibration/Check</b>						
Reference Value: <b>1413 uS</b>			Standard Lot No.: <b>5AD820</b>			
	Value	Temp	Expiration Date: <b>05/16</b>			
1. Time: <b>0634</b>	<b>1413.3</b>	<b>21.1</b>				
2. Time: <b>1052</b>	<b>1414.0</b>	<b>20.9</b>				
3. Time:						
4. Time:						
<b>ORP Calibration/Check</b>						
Reference Value: <b>220 mV</b>			Standard Lot No. <b>5AD891</b>			
	Value	Temp	Expiration Date: <b>01/16</b>			
1. Time: <b>0637</b>	<b>220.2</b>	<b>21.0</b>				
2. Time: <b>1055</b>	<b>220.3</b>	<b>20.8</b>				
3. Time:						
4. Time:						
<b>DO Calibration/Check</b>						
Calibration Value:	<b>81% air saturation @ 5200 ft.</b>		<b>Atmospheric Pressure in Hg</b>			
1. Time: <b>0633</b>	<b>81.7</b>	<b>24.42</b>				
2. Time: <b>1051</b>	<b>81.9</b>	<b>24.47</b>				
3. Time:						
4. Time:						


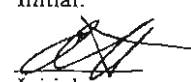
**IMPORTANT NOTICE:**

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

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

SNL/NM Project Name: <b>MWL</b>				
Calibration done by: <b>R Lynch</b>			Date: <b>12/14/15</b>	
TURBIDIMETER				
Make & Model: <b>HACH 2100Q</b>			Serial No. S/N <b>10060C003035</b>	
Reference Value	<b>0.1</b>	<b>20</b>	<b>100</b>	<b>800</b>
Standard Lot No.	<b>A5162</b>	<b>A5247</b>	<b>A5251</b>	<b>A5246</b>
1. Time <b>0831</b>	<b>.11</b>	<b>20.3</b>	<b>99.8</b>	<b>802</b>
2. Time <b>0946</b>	<b>.13</b>	<b>20.1</b>	<b>101</b>	<b>797</b>
3. Time				
4. Time				
Comments:				

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

<b>Project Name:</b> <u>MWL</u>	<b>Monitoring Well ID #:</b> <u>MWL-MW7</u>	<b>Date:</b> <u>12-14-15</u>
The following equipment was decontaminated at completion of sampling activities in accordance with FOP-05-03		
<b>Pump and Tubing Bundle ID #:</b> <u>1806-814</u>	<b>Water Level Indicator ID #:</b> <u>210269</u>	
<b><u>Personnel Performing Decontamination:</u></b>		
<b>Robert Lynch</b> Print Name:		 Initial:
<b>Alfred Santillanes</b> Print Name:		 Initial:
<b>Condition of Equipment</b>		
<b>Pump:</b> <u>Excellent</u>	<b>Tubing Bundle:</b> <u>Excellent</u>	<b>Water Level Indicator:</b> <u>Good</u>
<b>List of Decontamination Materials</b>		
<b>Deionized Water</b>	<b>HNO<sub>3</sub></b>	
<b>Source:</b> <u>Culligan</u>	<b>Grade:</b> <u>Reagent</u>	
<b>Lot Number:</b> <u>12-04-15</u>	<b>UN #:</b> <u>2031</u>	
	<b>Manufacturer:</b> <u>ACROS</u>	
	<b>Lot Number:</b> <u>A0316863</u>	

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



**DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES**  
**GROUNDWATER MONITORING**  
**DECEMBER 2015**

**AR/COC NUMBER 616458**

## Memorandum

Date: January 4, 2016  
To: File  
From: Mary Donovan  
Subject: Radiochemical Data Review and Validation – SNL  
Site: MWL GWM  
AR/COC: 616458  
SDG: 387477  
Laboratory: GEL  
Project/Task: 146422.10.11.08  
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 ER Project AOP 00-03 Rev 4.

### Summary

One sample was prepared and analyzed with the approved procedure using method SM 7500 Rn B (Radon-222). Problems were identified with the data package that resulted in the qualification of data.

#### Radon-222:

1. The sample was analyzed beyond the method specified holding time but <2X the holding time. The associated result for sample 387477001 was < the associated MDA and will be **qualified BD,H1**.
2. The associated sample result was < the associated MDA will be **qualified BD,FR3**.

### Holding Times and Preservation

The sample was prepared and analyzed within the prescribed holding time except as noted above in the Summary section.

### 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 > the MDA and 2-sigma TPU.

**Tracer/Carrier Recovery**

Tracer/carriers were not required.

**Matrix Spike (MS)**

The MS met all QC acceptance criteria.

**Laboratory Replicate**

All replicate error ratio acceptance criteria were met.

**Laboratory Control Sample (LCS)**

The LCS recovery met QC acceptance criteria.

**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:** 01/04/2016

## Sandia Data Validation Summary Worksheet

ARCOG#: 616458	Site/Project: MWL GWM	Validation Date: 01/04/16
SDG #: 387477	Laboratory: GEL Laboratories, Inc.	Validator: Mary Donovan
Matrix: Aqueous	# of Samples: 1	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 <2X HT	Analysis ≥2X HT
098664-040	387477001	SM 7500Rn B Radon-222	✓	12/14/15 09:37	12/15/15	12/21/15 15:52	Yes	No

Comments: Collected: 12/14/2015

Validated by:

*Mary A. Donovan*

# Sandia Radiochemistry Worksheet

ARCOC #(s): 616458	SDG #: 387477	Matrix: Aqueous
Laboratory Sample IDs:387477 – see below		
Method/Batch#s: <b>SM 7500 Rn B</b> (radon-222)/1531185 Sample -001		
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				
None													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	
NA													

Comments: Rn-222 – sample was received within method-specified HT, but counted >1X but ≤2X HT; Matrix QC -001

# CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No.		SMO Use		AR/COC <b>616458</b>	
Project Name: MWL GWM		Date Samples Shipped: 12/14/15		SMO Authorization: <i>[Signature]</i>	
Project/Task Manager: Tim Jackson		Carrier/Waybill No. 240748		SMO Contact Phone: Wendy Palencia/505-844-3132	
Project/Task Number: 146422.10.11.08		Lab Contact: Edie Kent/843-556-8171		Send Report to SMO: Stephanie Montano/505-284-2553	
Service Order: CF01-16		Lab Destination: GEL			
		Contract No.: PO 1303873			
Tech Area:		Operational Site:		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMMA <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		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
098664	-040	MWL-MW7	496	12/14/15 9:37	GW	AG	2x40 ml	None	G	SA	Radon (SM 7500 Rn B)	001

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 <input type="checkbox"/> No			
Background: <input type="checkbox"/> Yes		Entered by:		Turnaround Time		<input checked="" type="checkbox"/> 7 Day* <input type="checkbox"/> 15 Day* <input type="checkbox"/> 30 Day			
Confirmatory: <input type="checkbox"/> Yes		QC inits.:		Negotiated TAT		<input checked="" type="checkbox"/>			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal		Lab Use	
	Robert Lynch	<i>[Signature]</i>	RL	SNL/4142/505-844-4013/505-250-7090		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			
	Alfred Santillanes	<i>[Signature]</i>	AS	SNL/4142/505-284-6870/505-228-0710		Return Samples By:			
	William Gibson	<i>[Signature]</i>	WG	SNL/4142/505-284-3307/505-239-7367		Comments: Send report to Tim Jackson/4142/MS 0729/284-2547			
1. Relinquished by <i>[Signature]</i>		Org. 4142	Date 12/14/15	Time 10:21	3. Relinquished by		Org.	Date	Time
1. Received by <i>[Signature]</i>		Org. 4142	Date 12/14/15	Time 10:21	3. Received by		Org.	Date	Time
2. Relinquished by <i>[Signature]</i>		Org. 4142	Date 12/14/15	Time 11:00	4. Relinquished by		Org.	Date	Time
2. Received by <i>[Signature]</i>		Org.	Date 12/15/15	Time 11:45	4. Received by		Org.	Date	Time

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

**CONTRACT VERIFICATION REVIEW FORMS**  
**GROUNDWATER MONITORING**  
**DECEMBER 2015**

<b>AR/COC Number</b>	<b>Sample Type</b>
616458	Environmental*

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



## Contract Verification Form (CVR)

**Project Leader** Jackson

**Project Name** MWL GWM

**Project/Task No.** 146422\_10.11.08

**ARCOC No.** 616458

**Analytical Lab** GEL

**SDG No.** 387477

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

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

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

### 2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	No	
2.1	Data reviewed, signature	X		
2.2	Method reference number(s) complete and correct	X		
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X		
2.4	Matrix spike/matrix spike duplicate data provided	X		
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and Lc	X		
2.6	QC batch numbers provided	X		
2.7	Dilution factors provided and all dilution levels reported	X		
2.8	Data reported in appropriate units and using correct significant figures	X		
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	X		
2.10	Narrative provided	X		
2.11	TAT met	X		
2.12	Holding times met		X	Holding time exceeded
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		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	N/A		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met	N/A		

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

#### 4.0 Calibration and Validation Documentation

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

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

Line No.	Item	Yes	No	Comments
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) ICP interference check sample data provided	N/A		
	d) ICP serial dilution provided	N/A		
	e) Instrument run logs provided	N/A		
4.6	Radiochemistry and General Chemistry	X		
	a) Instrument run logs provided			

## 5.0 Data Anomaly Report

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

## 6.0 Problem Resolution

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

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

Were deficiencies unresolved? ☐ Yes ☒ No

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

Reviewed by: Wendy Palencia Date: 01-04-2016 13:43:00

Closed by: Wendy Palencia Date: 01-04-2016 13:43:00

## **ANNEX F**

### **Mixed Waste Landfill Inspection Forms**

**April 2015-March 2016**

**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 4-13-15
2. Time of Inspection 0745
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. 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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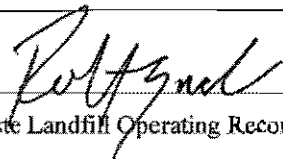
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Inspector's Signature \_\_\_\_\_



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 10/08/15
2. Time of Inspection 0800
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. 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**

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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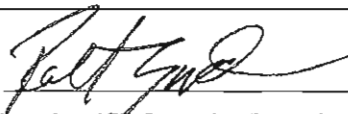
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Inspector's Signature



Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center

**Mixed Waste Landfill  
Soil-Moisture Monitoring Network Checklist/Form**

1. Date of Inspection 4/21/15 & 4/23/15
2. Time of Inspection 1237 & 1316
3. Name of Inspector Robert Ziock

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**

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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Inspector's Signature



Original to: Mixed Waste Landfill Operating Record

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**Mixed Waste Landfill  
Soil-Moisture Monitoring Network Checklist/Form**

1. Date of Inspection October 8, 2015
2. Time of Inspection 09:40
3. Name of Inspector Robert Zick

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	yes	1
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**

Note Number	Description
1	MWL VZ-3 has an animal burrow entrance on the north side of the concrete pad. The burrow goes under the concrete pad.

Action (Note Number) 1 assigned to Robert Zick Date action completed 11/4/2015  
 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:**

A downhole video inspection of the animal burrow was performed on November 4, 2015 by biologist Evan Fahy and Matt Baumann. The burrow was backfilled after it was determined that no animal was present in the burrow.

Inspector's Signature Robert Zick

Original to: Mixed Waste Landfill Operating Record

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**Mixed Waste Landfill  
Groundwater Monitoring Network Checklist/Form**

1. Date of Inspection 4-6-15  
 2. Time of Inspection 0745  
 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.	NO	NA	1
<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	

## NOTES

**Additional Comments:**

Inspector's Signature

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**Mixed Waste Landfill  
Groundwater Monitoring Network Checklist/Form**

1. Date of Inspection 10/12/15
2. Time of Inspection 0750
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.	NO	NA	1
<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	Baroball installed on 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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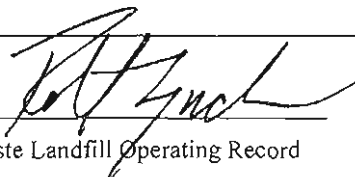


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Inspector's Signature \_\_\_\_\_



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**Mixed Waste Landfill  
Cover Inspection Checklist/Form**

1. Date of Inspection 5/21/15
2. Time of Inspection 0900
3. Name of Inspector Don Waterpaul

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	NA
B. Erosion of the soil cover in excess of 6 inches deep.	yes	No	NA
C. Evidence of water ponding on the MWL cover surface in excess of 100 square feet.	yes	No	NA
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	NA
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	NA
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	yes	1

<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	NA
B. Channel sediment accumulation in excess of 6 inches deep.	yes	No	NA
C. Debris that blocks more than 1/3 of the channel width.	yes	No	NA

**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	Z
B. Fence wires and posts in need of repair/maintenance.	yes	NO	NA
C. Gates in need of oiling/repair/maintenance.	yes	NO	NA
D. Locks in need of cleaning or replacement.	yes	NO	NA
E. Warning signs in need of repair or replacement.	yes	NO	NA
F. Survey monuments in vicinity of MWL visible.	yes	NO	NA
<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	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 Don Schofield Date action completed 7/8/15

Action (Note Number) 2 assigned to Don Waterman Date action completed 5/21/15

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 Weed removal will be scheduled within 60 days

#2 Wind blown plants were removed from west fence line  
at the time of the Cover Inspection.

#1 Sequoia Removed the weeds from site on July 6-8, 2015. *[Signature]*  
7/22/15

Inspector's Signature *Don Waterman*

Original to: Mixed Waste Landfill Operating Record

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## Mixed Waste Landfill Cover Inspection Checklist/Form

1. Date of Inspection 8/7/15
2. Time of Inspection 12:30
3. Name of Inspector Don m. Waterpaul

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	NA
B. Erosion of the soil cover in excess of 6 inches deep.	yes	NO	NA
C. Evidence of water ponding on the MWL cover surface in excess of 100 square feet.	yes	NO	NA
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	NA
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	NA
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	NA
<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	NA
B. Channel sediment accumulation in excess of 6 inches deep.	yes	NO	NA
C. Debris that blocks more than 1/3 of the channel width.	yes	NO	NA

**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	No	NA
B. Fence wires and posts in need of repair/maintenance.	yes	No	NA
C. Gates in need of oiling/repair/maintenance.	yes	No	NA
D. Locks in need of cleaning or replacement.	yes	yes	1
E. Warning signs in need of repair or replacement.	yes	No	NA
F. Survey monuments in vicinity of MWL visible.	yes	No	NA
<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	NA

**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

**NOTES**

Note Number	Description
1	South Gate Lock wouldn't lock after opening. Replaced lock mw-1

**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

Action (Note Number) 1 assigned to Don Waterhouse Date action completed 8/2/15

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 Replaced lock at time of inspection 8/2/15  
by Don Waterhouse

Inspector's Signature



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# **Mixed Waste Landfill Cover Inspection Checklist/Form**

1. Date of Inspection 11/4/15
2. Time of Inspection 0800
3. Name of Inspector Don Watenpaugh

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	1
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	NO	/
B. Fence wires and posts in need of repair/maintenance.	yes	NO	/
C. Gates in need of oiling/repair/maintenance.	yes	NO	/
D. Locks in need of cleaning or replacement.	yes	NO	/
E. Warning signs in need of repair or replacement.	yes	yes	2
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.	yes	NO	/

**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

**NOTES**

Note Number	Description
1	Erosion of Soil cover not in excess of 6" however, evidence of soil erosion observed along west and south cover slopes. Overall side slopes in good condition but will continue to monitor slopes for erosion and make repairs as necessary.
2	Several warning signs were separating and several were loose. These issues were repaired at the time of the inspection.



**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

Action (Note Number) 2 assigned to Don Waterpugh Date action completed 11/4/2015  
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:**

Two SNL Staff Biologists and two MWL project staff  
assisted in the inspection of the ET cover and  
surrounding vicinity for signs of animal intrusion.  
Burrows on the ET cover were not observed,  
but several areas of small burrows (4" in  
diameter) in the surrounding vicinity were observed,  
and inspected by the SNL Staff Biologists.  
Burrows around some of the perimeter monitoring  
wells were observed, but did not require follow-up

Inspector's Signature Don Waterpugh

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**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

Action (Note Number) \_\_\_\_\_ assigned to \_\_\_\_\_ Date action completed \_\_\_\_\_

**Additional Comments:** *Cont' from previous page.*

*actions. Inspection and repair (as best  
management practice) at the MWL-V2-3  
Soil moisture monitoring access tube was  
addressed on the Oct 8, 2015 Soil Moisture  
Monitoring Network Checklist/Form.*

Inspector's Signature *Donald [Signature]*

Original to: Mixed Waste Landfill Operating Record

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# Mixed Waste Landfill Cover Inspection Checklist/Form

1. Date of Inspection 2/17/16
2. Time of Inspection 1400
3. Name of Inspector Don Watenpaugh

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	NA
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	yes	1
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	NA
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	NA
<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	NA
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	NO	NA
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.	yes	NO	NA

**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

**NOTES**

Note Number	Description
1	2 Burrows in excess of 4" were observed outside of the Fenced landfill area.
	Burrows looked new and active. Located Northeast of the perimeter fence.
	Project Biologist observed these burrows.
	Continued observation of burrows will be performed during future Quarterly Inspections
	There were no animal burrows identified on the ET cover (including side slopes), only dormant anthills.
	The staff biologist supported my inspection of the ET cover and perimeter area, both inside and outside of the security fence, and documented our collective observations regarding ant hills and animal burrows.
	One animal burrow entrance $\approx 4.25"$ in diameter was present under the MWL-023 monitoring well concrete pad located to the east of the ET cover.
	Other animal burrows were identified in the perimeter area surrounding the ET cover.

Please refer to the supporting documentation attached to this inspection Form for a detailed summary of Biology Inspection requirements, associated repairs, best management practices actions, and staff biologist recommendations associated with this February ET cover / Surface inspection

**Mixed Waste Landfill  
Cover Inspection Checklist/Form (continued)**

Action (Note Number) 1 assigned to Tem. Ger Payne Date action completed 3/21/16 2/17/16 on

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:**

Project Biologist was present providing additional  
support during this Quarterly inspection.

No active burrows were found on the cover at  
the time of this inspection.

See attached MWL Biology Quarterly Inspection  
Action Item 1 completed during current Quarterly  
Inspection.

Inspector's Signature 

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**Mixed Waste Landfill – Long-Term Monitoring and Maintenance**  
**February 17, 2016 Quarterly ET Cover/Surface Inspection**  
**Documentation for Staff Biologist Support**

Mixed Waste Landfill (MWL) Final Cover System inspections address the Evapotranspirative (ET) Cover vegetation and the ET Cover surface. As documented in the August 2014 Biology Inspection, the ET Cover vegetation meets successful revegetation criteria (LTMMP, Section 4.1). Therefore the Biology Inspection has transitioned to an annual frequency and is performed by the SNL staff biologist during the New Mexico growing season in August or September. As a result, documentation of animal intrusion (burrows in excess of 4-inches in diameter) and contiguous areas lacking vegetation in excess of 200 square feet are noted on both the *Cover Inspection Checklist/Form* (these inspections are performed quarterly) and the *Biology Inspection Checklist/Form* (these inspections are performed annually). During the February 17, 2016 quarterly ET Cover/Surface Inspection, the SNL staff biologist inspected the ET Cover (i.e., cover surface and side slopes) for signs of animal intrusion (i.e., burrows in excess of 4-inches in diameter) and barren areas greater than 200 square feet. As a best management practice, the staff biologist also inspected the perimeter area beyond the toe of the ET Cover slope. The perimeter area inspected includes the following areas:

- area between the security fence and the perimeter road on the east and west sides of the ET Cover, and
- area between the toe of the ET Cover slope and the security fence on the north and south sides of the ET Cover.

LTMMP Biology Inspection requirements apply to the ET Cover. In addition, inspection and repair requirements associated with animal burrows also apply to all perimeter monitoring wells. Inspection, recommendations, and repairs addressing the ET Cover perimeter areas not associated with monitoring wells are performed as protective, best management practices to ensure early detection and repair of issues that could impact the Final Cover System in the future.

The following information compiled by the SNL staff biologist documents both Biology Inspection requirements and best management practice actions associated with the February 17, 2016 quarterly ET Cover/Surface Inspection performed by an SNL field technician. This information supplements the February 17, 2016 *Cover Inspection Checklist/Form* and is specific to ET Cover vegetation and animal burrows. The annual Biology Inspection performed in August 2015 is documented on a separate *Biology Inspection Checklist/Form*.

Vegetation

The vegetation on the MWL ET Cover appears to be in very good condition. The February inspection occurs during the dormant season so none of the native warm season grasses are photosynthesizing. Very few broad-leaf winter annuals were observed on the cover.

**Observations of the ET Cover vegetation are consistent with the August 2015 Biology Inspection. No follow-up actions are recommended.**

**Mixed Waste Landfill – Long-Term Monitoring and Maintenance**  
**February 17, 2016 Quarterly ET Cover/Surface Inspection**  
**Documentation for Staff Biologist Support**

*Burrows - Inside the MWL Fenceline*

No burrows were observed on the ET Cover. Ant hills were observed on the cover but none were active due to winter dormancy.

Small mammal burrows were observed on the flat areas surrounding the cover.

Inside the fence the only burrow entrances that were observed were those of kangaroo rats in the soil stockpile maintained for future maintenance at the northwest corner, north of the ET Cover. Numerous entrances were present in the mound, as is the normal burrow structure for kangaroo rats. This area will continue to be monitored during future inspections.

*Burrows - Outside the MWL Fenceline*

Many burrow entrances were observed within approximately a 50-foot perimeter beyond the fence surrounding the ET Cover, as described in more detail below.

*North of the MWL Fenceline*

A potentially abandoned kangaroo rat mound is located just inside the perimeter road curve, to the NW of the NW fence corner. To the east of this mound is another potentially abandoned kangaroo rat mound, located north of the 2<sup>nd</sup> T-post from the NW fence corner. Located further to the east (north of ER Site #76 sign) is a potentially active kangaroo rat mound. This represents normal activity and no follow-up action is recommended other than continued monitoring during routine inspections.

*East of the MWL Fenceline*

Approximately 136 feet to the south and 35 feet to the east of the NE fence corner, burrow entrances less than 4-inches in diameter are present. Approximately 16 feet south of these burrows, 35 and 16 feet east of the ET Cover and fence, there are two larger (approximately 10-inches in diameter) burrow entrances. One of these burrows was freshly dug; the other is older and does not show signs of recent activity. These are most likely badger burrows that may represent hunting activities; there was no sign of an animal present during the inspection (see photos below).

One burrow entrance approximately 4.25-inches in diameter is present under the MWL-VZ3 monitoring well concrete pad. Two additional burrows, approximately 2 inches and 3 inches in diameter, are also present under the MWL-VZ3 monitoring well concrete pad.

**Follow-up Action:** Continue to monitor the larger burrows near the NE corner of the fence. For the burrows in the immediate vicinity of the MWL-VZ3 monitoring well concrete pad, perform a follow-up inspection and backfill.

**Action Closeout:** The three burrows in the immediate vicinity of the MWL-VZ3 monitoring well concrete pad were re-inspected and enlarged on March 14, 2016 to allow for any animals to safely relocate, and backfilled on March 21, 2016 using gravel to prevent burrow reestablishment.

**Mixed Waste Landfill – Long-Term Monitoring and Maintenance  
February 17, 2016 Quarterly ET Cover/Surface Inspection  
Documentation for Staff Biologist Support**

*West of the MWL Fenceline*

A burrow entrance approximately 4-inches in diameter is located to the west of the SW fence corner, near a pink pinflag. A kangaroo rat mound is located to the south of monitoring well MWL-VZ1. One of the kangaroo rat entrances is located immediately south of monitoring well MWL-VZ1.

**Follow-up Action:** Continue to monitor the kangaroo rat mound and the general vicinity during future inspections. Inspect and backfill the burrow immediately south of monitoring well MWL-VZ1 as a best management practice.

**Action Closeout:** This burrow was inadvertently collapsed by foot traffic along the western fence between February 17 and March 14, and could not be re-inspected and backfilled.

**Conclusion**

No animal burrows were observed on the ET Cover (including side slopes), only dormant ant hills. Burrows observed in the ET Cover perimeter area, both inside and outside the perimeter security fence, represent normal ant and animal activity. The types and locations of the burrows do not represent an issue relative to ET Cover performance. Backfilling burrows in the immediate vicinity of perimeter monitoring wells, regardless of the diameter size, was requested by the Project Leader as a protective, best management practice. Planning is underway to establish a protective surface barrier around the perimeter monitoring well concrete pads to prevent burrowing in the future and to minimize long-term maintenance.



Figure 1. Recently dug ~10-inch diameter burrow (Burrow 1) located approximately 35 feet to the east of the MWL ET Cover.



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Figure 2. Burrow 1 looking west toward the perimeter fence and MWL ET Cover.



Figure 3. Older ~10-inch burrow entrance approximately 16 feet to the east of the MWL ET Cover, and approximately 12 feet to the SW of Burrow 1.

**Mixed Waste Landfill**  
**Biology Inspection Checklist/Form for the MWL Cover**

Approximate vegetative coverage (actively photosynthesizing\*): 54 %

Approximate percent native vegetation of the total vegetative cover: 100 %

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>40 %</u>
<u>Bouteloua gracilis</u>	<u>Blue grama</u>	<u>4 %</u>
<u>Sporobolus flexuosus</u>	<u>Mesa dropseed</u>	<u>6 %</u>
<u>Bouteloua eriopoda</u>	<u>Black grama</u>	<u>4 %</u>
<u>Xanthisma spinulosum</u>	<u>Spiny goldenweed</u>	<u>&lt; 0.5%**</u>
<u>Salsola tragus</u>	<u>Russian thistle</u>	<u>&lt; 0.5%</u>
<u>Sporobolus contractus</u>	<u>Spike dropseed</u>	<u>&lt; 0.5%</u>
<u>Gutierrezia sarothrae</u>	<u>Snakeweed</u>	<u>&lt; 0.5%</u>
<u>Sphaeralcea hastulata</u>	<u>Wrinkled globemallow</u>	<u>&lt; 0.5%</u>
<u>Bouteloua curtipendula</u>	<u>Side-oats grama</u>	<u>&lt; 0.5%</u>
<u>Solanum elaeagnifolium</u>	<u>Silverleaf nightshade</u>	<u>&lt; 0.5%</u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>

Note: <sup>1</sup> Percentage of total MWL Cover populated by actively-photosynthesizing plants of this species

\* Living plants per Section 4.1 of the MWL LTMMMP.

\*\* All species observed to be present at less than one-half of one-percent 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: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**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? No

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: No burrows were observed on the cover. A limited number of very small diameter (less than 1 inch) and shallow abandoned entrance diggings were observed, where the soil was excavated approximately 1.5 inches or less deep by a small animal and abandoned. Due to no burrows observed, no burrow sampling will occur in 2015.

Fourteen ant hills were observed, primarily occurring on the side-slopes of the cover. 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.

**Mixed Waste Landfill**  
**Biology Inspection Checklist/Form for the MWL Cover**  
**(continued)**

Notes (continued):

General Observations:

- Very few weeds present on the MWL cover. The limited number of Russian thistle were all observed to be small in size.
- The northwest corner of the cover was noted in previous surveys as having the lowest perennial grass density. The grass density in this area has increased and there is no longer a notable density difference between this area and any other areas of the ET cover.
- Many whiptail lizards were observed across the cover.
- Overall the MWL ET is in excellent biological condition. The species complexity, spacing, and appearance of the mature native perennial grasses increasingly mimics the surrounding vegetation. The native bunch grasses in the 2015 growing season are now a mix of old, brown vegetative growth from previous years and green, actively photosynthesizing blades of grass. This expected and normal mixture of grass blade ages gives the bunchgrasses a less green appearance than in 2014 when most of the above ground biomass was the 2014 green growth.
- The 2015 growing season has received above average precipitation, boosting growth of native plants throughout the area in 2015. During the prime growth months of May, June, and July, 4.95 inches of precipitation was recorded at nearby meteorological tower A36. This is more than half the average annual precipitation. A total of 6.65 inches of precipitation was recorded from January-July 2015.
- A two-person field crew was actively removing the final pieces of the temporary watering system during the survey. The workers and a few PVC pieces they were removing were captured in some of the photographs. The watering system was not used in 2015.

Biological Aspects Map -- [note: sketch map to locate specific features described above will be attached as appropriate]

Inspector's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center

**ANNEX G**

**Mixed Waste Landfill Biology Report**

**April 2015-March 2016**

# **2015-2016 Mixed Waste Landfill Biology Report**

## **1.0 Introduction**

As required by the Mixed Waste Landfill (MWL) Long-Term Monitoring and Maintenance Plan (LTMMP) (SNL/NM March 2012, Section 4.2.1), this summary report for the annual reporting period (April 1, 2015-March 31, 2016) 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 2015 growing season and reporting period, expand on the inspection results, if appropriate, and provide recommendations for future ET Cover vegetation monitoring and maintenance. Biology inspection of the ET Cover was conducted on August 3, 2015. 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.

A self-sustaining plant community is an important component of overall ET Cover performance. Vegetation minimizes erosion by stabilizing the ET Cover surface and moves soil moisture from the ET Cover Topsoil and Native Soil Layers to the atmosphere through transpiration. Vegetation species that are native to the area create the optimal, self-sustaining plant community because the species are specifically adapted to the local climate and soil conditions. The MWL is located at an elevation of 5,380 feet in a challenging, semi-arid climate that experiences high temperatures throughout the summer, cold temperatures in the winter, drying winds in the spring, and infrequent precipitation. Perennial native grass species 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 best 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 LTMMP, 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 LTMMP (SNL/NM March 2012). The MWL LTMMP documents all cover maintenance and supplemental watering activities from 2009 through 2011. ET Cover maintenance and supplemental watering activities performed since 2011 are documented in MWL Annual Long-Term Monitoring & Maintenance (LTMM) Reports.

ET Cover Biology Inspections were initiated in May 2013 prior to LTMMP approval, which occurred on January 8, 2014. The ET Cover has met the LTMMP criteria for successful revegetation as documented in all quarterly inspections. In accordance with the LTMMP, 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).

## **2015-2016 Mixed Waste Landfill Biology Report**

Percentage of cover of each species across the site 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 rate 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 2015 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 primarily been dominated by below average precipitation with temperature extremes across the seasons. During the time since seeding, 2013 and 2015 have been the only years to receive above average annual precipitation.

Vegetation during the growing season is directly affected by the summer meteorological conditions, and it is also strongly influenced by the conditions during the preceding autumn, winter and spring. Soil moisture during the dormant seasons can significantly stress or assist the root systems, which compose the bulk of each native plant. An extended period of very low soil moisture can severely injure root systems during the dormant season, whereas ample soil moisture during the dormant season can promote vigorous above ground growth during the growing season.

The winter and spring preceding the 2015 growing season experienced a few favorable precipitation months that provided good soil moisture and bolstered vegetation root health. December 2014 had above average precipitation and May 2015 received nearly nine times the average precipitation for May. This substantial spring rainfall in combination with below average winds in the spring and summer, and above average spring relative humidity, set the stage for healthy plant growth during the 2015 growing season.

Table 1 provides meteorological data for CY 2015. Table 2 provides meteorological data for the first 3-month period of CY 2016. The mean monthly meteorological data is expanded and updated from what was previously available for this MWL Biology Report. A 20-year data set (1995-2014) has replaced the previous 17-year data set. This change alters the monthly means, in some cases significantly, as the inclusion or exclusion of El Nino years affects local climate averages. The 1995-2014 data will be the reference mean data set until 2019, when a 25-year data set will be created for the 1994-2018 time period.

#### *Precipitation, Relative Humidity and Winds*

Drought has been the dominant meteorological trend in the MWL area since 2008. However total annual precipitation for 2015 was 11.17 inches, which exceeded the 20-year annual precipitation average by 2.45 inches(i.e., was 128% of normal). Precipitation in 2013 and 2014 was also greater than recent years and as of January 26, 2016 the area was no longer in drought status according to the U.S. Drought Monitor (U.S. Drought Monitor January 2016).

## 2015-2016 Mixed Waste Landfill Biology Report

**Table 1**  
**Summary of 2015 Meteorological Data at the Mixed Waste Landfill<sup>a</sup>**

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
<b>Temperature (°F)</b>													Annual <sup>b</sup>
Monthly Mean	37.0	43.7	52.2	56.4	60.0	75.9	73.3	76.3	71.9	59.7	44.6	35.9	57.3
20-year Temp Means	37.7	41.7	48.8	55.8	66.1	75.4	76.7	74.8	68.9	57.9	46.4	37.0	57.3
<b>Precipitation (Inches)</b>													Annual <sup>c</sup>
Monthly Total	0.64	0.35	0.29	0.43	2.29	0.35	2.30	0.49	0.74	1.29	0.84	1.16	11.17
20-year Precip Means	0.34	0.45	0.56	0.50	0.26	0.49	1.64	1.57	1.00	0.93	0.41	0.57	8.72
<b>Relative Humidity (%)</b>													Annual <sup>b</sup>
Monthly Mean	65.6	47.1	38.6	29.5	44.3	33.1	50.2	38.7	41.4	51.8	53.1	56.1	45.8
20-year RH Means	49.9	44.9	36.4	30.3	26.3	24.9	40.9	44.6	45.6	46.6	47.6	48.6	40.6
<b>Wind (Miles/hour)</b>													Annual <sup>b</sup>
Monthly Mean	6.8	8.0	7.8	9.3	9.6	8.1	6.6	7.8	7.7	8.1	8.2	6.8	7.9
20-year Wind Means	6.9	8.1	9.1	10.5	10.0	9.8	8.4	7.9	8.0	7.8	7.1	6.8	8.4

<sup>a</sup>Information Source: SNL/NM Meteorological Monitoring Network.

<sup>b</sup>Values provided are averages of the monthly data.

<sup>c</sup>Values provided are totals of the monthly data.



## 2015-2016 Mixed Waste Landfill Biology Report

**Table 2**  
**Summary of January-March 2015 Meteorological Data at the Mixed Waste Landfill<sup>a</sup>**

Month	January	February	March
<b>Temperature (°F)</b>			
Monthly Mean	35.5	44.5	51.1
20-year Temp Means	37.7	41.7	48.8
<b>Precipitation (Inches)</b>			
Monthly Total	0.45	0.06	0.01
20-year Precip Means	0.34	0.45	0.56
<b>Relative Humidity (%)</b>			
Monthly Mean	56.7	37.2	25.7
20-year RH Means	49.9	44.9	36.4
<b>Wind (Miles/hour)</b>			
Monthly Mean	6.6	7.3	9.7
20-year Wind Means	6.9	8.1	9.1

<sup>a</sup>Information Source: SNL/NM Meteorological Monitoring Network.

## **2015-2016 Mixed Waste Landfill Biology Report**

The MWL received 3.07 inches of precipitation during the second quarter of 2015, more than twice the average of 1.25 inches for these months. This was due to 2.29 inches of rain in May, just over two inches above the monthly average of 0.26 inches. During the 2015 monsoon season (July-September), there was a total of 3.53 inches of precipitation, below the monsoon season average of 4.21 inches. Most of the monsoon season moisture occurred in July, when the rainfall totaled 2.30 inches, 40% above the monthly mean. Precipitation in the fourth quarter of 2015 was 3.29 inches, 1.38 inches above the mean of 1.91 inches.

Average relative humidity at the MWL was 45.8% for the year, 5.2 percentage points above the mean of 40.6%. Four months (January, May, June, and July) experienced relative humidity that was 8 to 18 percentage points greater than the respective monthly mean humidity for those months.

In 2015 average wind speed was 7.9 miles per hour (mph) overall, slightly below the mean of 8.4 mph. Four months (March, April, June, and July) recorded average wind speeds that were 1.2 to 1.8 miles per hour lower than their respective monthly means.

### *Temperature*

In 2015 the MWL experienced 88 degrees of temperature variability, with a low of 13.3°F in December and a high of 101.7°F in June. The average temperature for the year was equal to the mean of 57.3°F.

## **4.0 August 2015 Inspection Results**

The August 2015 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). The approximate foliar coverage of living plants was 54%, with 100% of the foliar coverage comprised of native perennial species. There were no contiguous bare areas that exceeded 200 square feet.

Galleta grass was the dominant grass species, and along with other native grasses comprised nearly all of the MWL ET Cover vegetation (Figures 1 and 2). The vegetative community was observed to be very healthy overall, a combination of native species were spaced evenly across the cover. The overall appearance of the mature native grass community was observed to increasingly parallel the surrounding vegetation. The native bunch grasses in 2015 were green, actively-photosynthesizing blades of grass mixed with brown blades of grass from previous years. This expected and normal mixture of grass blade ages gives the bunch grasses a less green appearance than in 2014, when most of the above ground biomass consisted of the new 2014 green growth. Very few weeds were present on the MWL ET Cover, primarily a limited number of small Russian thistle seedlings.

The native grass coverage at the northwest corner of the ET Cover was noted in previous surveys as having lower perennial grass density. The grass density in this area has

## **2015-2016 Mixed Waste Landfill Biology Report**

increased and there is no longer a notable density difference between this area and any other areas of the ET cover.

The August 2015 MWL ET Cover Biology Inspection occurred during the New Mexico growing season (i.e., August), which typically comes to a close in mid-September as evening temperatures begin to fall. The growing season inspections allow the most accurate assessment of living plant coverage because the greatest amount of photosynthesis occurs during this time of the year.

No burrows were observed on the MWL ET Cover during the August 2015 inspection. A limited number of very small diameter (less than 1 inch) and shallow abandoned entrance diggings were observed, where the soil was excavated approximately 1.5 inches or less deep by a small animal and abandoned. Thirteen ant hills were observed, primarily occurring on the side-slopes of the cover.

Biota sampling locations were identified for anthills during the August 2015 Biology Inspection. Two anthills were marked in the field and surveyed. The anthill sampling locations were selected based on signs of current ant activity and to sample different areas of the ET Cover. No burrows or potentially deep-rooted plants were observed in 2015. Biota sampling activities and results are presented in Chapter 8 of this MWL Annual LTMM Report.

### **5.0 February ET Cover/Surface Inspection**

During the February 17, 2016 quarterly ET Cover/Surface Inspection, the SNL staff biologist inspected the ET Cover (i.e., cover surface and side slopes) for signs of insect and animal intrusion (i.e., ant hills and burrows) and barren areas greater than 200 square feet. As a best management practice, the staff biologist also inspected the perimeter area beyond the toe of the ET Cover slope, including areas inside and outside of the security fence. No animal burrows were observed on the ET Cover, only dormant ant hills. Burrows observed in the ET Cover perimeter area, both inside and outside the security fence, represent normal ant and animal activity. Three small animal burrows in the immediate vicinity of soil moisture access tube MWL-VZ3 were backfilled on March 21, 2016 using gravel to prevent burrow reestablishment. Backfilling burrows in the immediate vicinity of perimeter monitoring wells, regardless of the diameter size, was requested by the SNL Project Leader as a protective, best management practice. Burrows were identified in other perimeter areas and will continue to be monitored during future inspections. More detailed documentation is provided with the February 17, 2016 *Cover Inspection Checklist/Form* (Annex F).

### **6.0 Cover Maintenance and Supplemental Watering**

Maintenance activities performed on the MWL ET Cover during the 2015 – 2016 reporting period are summarized in Section 9.7 of this MWL Annual LTMM Report. The maintenance activities for this reporting period were minimal, with most of the effort focused on clearing the perimeter fence of windblown tumbleweeds.

## **2015-2016 Mixed Waste Landfill Biology Report**

No supplemental watering activities were performed on the MWL ET Cover during the 2015 – 2016 reporting period due to the mature condition of the native grasses and adequate natural precipitation. The temporary irrigation system installed on top of the ET Cover surface in 2011 was dismantled and removed from July 30 – August 3, 2015. The polyvinyl chloride pipe was deteriorating and there no longer appears to be the need for supplemental watering based on current ET Cover conditions. If supplemental watering is needed in the future, other options will be used to apply the water.

### **7.0 Recommendations**

The MWL ET Cover Biology Inspections will continue on an annual frequency and be conducted in August or September. As a best management practice, the SNL staff biologist will also participate in the quarterly site inspections and monitor biological aspects (e.g., vegetation and signs of insect and animal activity) on the ET Cover and perimeter area. Observations and repairs will be documented as part of the quarterly inspections.

Weed removal events will likely be needed during the 2016 – 2017 reporting period to clear the perimeter fence and remove tumbleweeds based on LTMMMP inspection requirements. Pre- and Post-emergent herbicides should be applied to the graveled staging areas to prevent weed growth in these areas. If present, other annual weedy species on the MWL ET Cover should also be removed during the growing season weed removal events. Fourwing saltbush and any other potentially deep-rooted plants will be pulled by hand, clipped at the ground surface, or removed for biota sampling.

Planning is underway to establish a protective surface barrier around the perimeter monitoring wells to prevent burrowing and to minimize long-term maintenance.

Supplemental watering could possibly be needed in the autumn of 2016 pending monsoon and previous 12-month precipitation totals. The mature native plant community documented in 2015 should be capable of surviving moderate drought conditions without supplemental water.

### **8.0 References**

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 (January 2016)

Accessed January 2016.

<http://droughtmonitor.unl.edu/>



## 2015-2016 Mixed Waste Landfill Biology Report



North portion of the cover from approximate center of ET cover



West portion of the cover from approximate center of ET cover



South portion of the cover from approximate center of ET cover



East portion of the cover from approximate center of ET cover

**Figure 1 August 3, 2015 MWL ET Cover Photographs – Main Cover Surface**



## 2015-2016 Mixed Waste Landfill Biology Report



North Slope: facing east from the western end



West Slope: facing north from southern end



South Slope: facing west from the eastern end



East Slope: facing south from the northernmost end

**Figure 2 August 3, 2015 MWL ET Cover Photographs – Cover Side Slopes**