

6-6-2017

Mixed Waste Landfill Annual Long-Term Monitoring & Maintenance Report, April 2016-March 2017 for Sandia National Laboratories/New Mexico, EPA ID Number NM5890110518 June 2017

Sandia National Laboratories/NM

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JUN 06 2017

Mr. John E. Kieling
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Subject: *Submittal of Mixed Waste Landfill Annual Long-Term Monitoring & Maintenance Report, April 2016-March 2017, Sandia National Laboratories, New Mexico, Dated June 2017, Environmental Protection Agency Identification Number NM5890110518*

Dear Mr. Kieling:

The Department of Energy, National Nuclear Security Administration and National Technology and Engineering Solutions of Sandia, LLC are submitting the enclosed Subject report to the New Mexico Environment Department (NMED).

This document is comprised of a main report and eight annexes that provide information documenting long-term monitoring, inspection, and maintenance activities conducted at the Mixed Waste Landfill (MWL) during the April 2016 through March 2017 reporting period in accordance with the requirements of Section 4.8.1 of the MWL Long-Term Monitoring and Maintenance Plan. As requested in the July 20, 2016, approval letter from NMED for last year's report, figures have been added to present graphical representations of specific soil-vapor and groundwater constituent results, as well as groundwater elevations for all MWL groundwater monitoring wells.

If you have questions, please contact me at (505) 845-6036 or David Rast of our staff at (505) 845-5349.

Sincerely,

James W. Todd
Assistant Manager for Engineering

Enclosure

cc: See Page 2

Mr. John E. Kieling

JUN 06 2017 2

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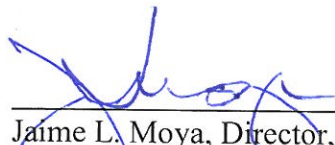
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**Submittal of Mixed Waste Landfill
Annual Long-Term Monitoring and Maintenance Report, April 2016-March 2017**

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

CERTIFICATION STATEMENT

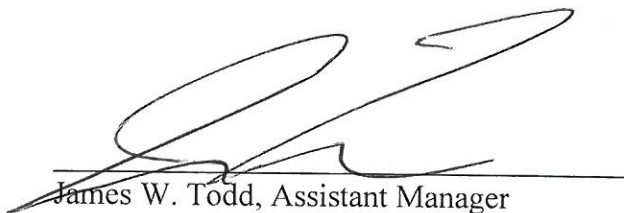
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Jaime L. Moya, Director, Environment, Safety, and Health
National Technology and Engineering Solutions
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Albuquerque, New Mexico
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5/25/17

Date Signed



James W. Todd, Assistant Manager
U.S. Department of Energy
National Nuclear Security Administration
Sandia Field Office
Owner

06 Jun 2017

Date Signed

Enclosure A

**Mixed Waste Landfill Long-Term Monitoring & Maintenance Report
April 2016-March 2017
Sandia National Laboratories, EPA ID No. NM5890110518**



**Sandia
National
Laboratories**

**MIXED WASTE LANDFILL
ANNUAL LONG-TERM MONITORING & MAINTENANCE REPORT
APRIL 2016 – MARCH 2017**

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

JUNE 2017



**U.S. DEPARTMENT OF
ENERGY**



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

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

**MIXED WASTE LANDFILL ANNUAL
LONG-TERM MONITORING & MAINTENANCE REPORT
APRIL 2016 – MARCH 2017**

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

Owner: United States Department of Energy
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EXECUTIVE SUMMARY

The Mixed Waste Landfill (MWL) at Sandia National Laboratories New Mexico (SNL/NM) is a solid waste management unit that underwent corrective action in accordance with Title 20, Chapter 4, Part 1 of the New Mexico Administrative Code (20.4.1.600 NMAC), incorporating Chapter 40, Code of Federal Regulations (CFR), Part 264.101 (40 CFR 264.101); regulatory criteria found in the 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); the Compliance Order on Consent (NMED April 2004); and the Resource Conservation and Recovery Act (RCRA) Facility Operating Permit for Sandia National Laboratories, EPA ID No. NM5890110518 (Permit) (NMED January 2015, with all approved modifications).

As of March 13, 2016, the February 2016 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) became effective, granting the Class 3 Permit Modification to reflect that the MWL is Corrective Action Complete with Controls. The MWL Long-Term Monitoring and Maintenance Plan (LTMMMP) (SNL/NM March 2012), which became effective on January 8, 2014 (Blaine January 2014), defines all monitoring, inspection, maintenance/repair, and reporting requirements for the MWL. This MWL Annual Long-Term Monitoring & Maintenance Report documents monitoring, inspection, maintenance, and repair activities conducted at the MWL during the April 1, 2016 through March 31, 2017 reporting period.

Sampling activities for this reporting period included two semiannual monitoring events each for groundwater, soil-vapor, and radon. Annual soil-moisture monitoring was conducted in April 2016, annual tritium surface soil sampling was conducted in August 2016, and annual biota sampling (metals and radionuclides) was conducted in September 2016. All monitoring activities were conducted in accordance with LTMMMP requirements and no monitoring results exceeded LTMMMP trigger levels. All monitoring results were consistent with historic MWL monitoring data.

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

The Evapotranspirative (ET) Cover continues to meet successful revegetation criteria and is in excellent condition with even coverage of mature, native perennial grasses. Maintenance was performed during the reporting period as a best management practice for ET Cover vegetation, and included a lower level of effort relative to previous years. The purpose of ongoing ET Cover maintenance efforts is to promote the growth and health of the desired native grass species by reducing competition with weedy species for limited moisture and nutrients.

Based on previous inspections, additional best management practice activities were conducted during this reporting period to improve the site and reduce long-term ET Cover and site maintenance. These activities included improvements to site access and drainage (i.e., improvements to the access and perimeter road) and the installation of erosion and burrow control measures at the ten perimeter monitoring well locations.

Regulatory activities during the reporting period included submittal of the Mixed Waste Landfill Annual Long-Term Monitoring & Maintenance Report, April 2015-March 2016 (SNL/NM June 2016) and two submittals of updated reference documents cited in the LTMMP. There were no LTMMP modifications in this reporting period.

All LTMMP requirements have been met for the April 2016 through March 2017 reporting period. Based upon monitoring, inspection, and maintenance results, the ET Cover and monitoring systems are functioning as designed and site conditions remain protective of human health and the environment.

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ACRONYMS AND ABBREVIATIONS

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 & Maintenance
LTMMMP	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
Permit	RCRA Facility Operating Permit for Sandia National Laboratories, EPA ID No. NM5890110518
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
SC	specific conductivity
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 multimission laboratory owned by the U.S. Department of Energy (DOE)/National Nuclear Security Administration. During the time period described in this report, SNL was managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation. On May 1, 2017, the name of the management and operating contractor of SNL transitioned to National Technology and Engineering Solutions of Sandia, LLC., a wholly owned subsidiary of Honeywell International, Inc. 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 low-level radioactive waste, hazardous waste, and mixed waste from SNL/NM research facilities and off-site DOE and U.S. Department of Defense generators 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, 2016 through March 31, 2017 reporting period. This MWL Annual Long-Term Monitoring & Maintenance (LTMM) Report documents all activities and results as required by Section 4.8.1 of the LTMMMP. Based upon monitoring, inspection, and maintenance results, the MWL Evapotranspirative (ET) Cover and all monitoring systems are functioning as designed, and site conditions remain protective of human health and the environment. No monitoring trigger levels were exceeded. Industrial land use is being maintained for the MWL consistent with LTMMMP requirements.

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

- New Mexico 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, with all approved modifications)

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).

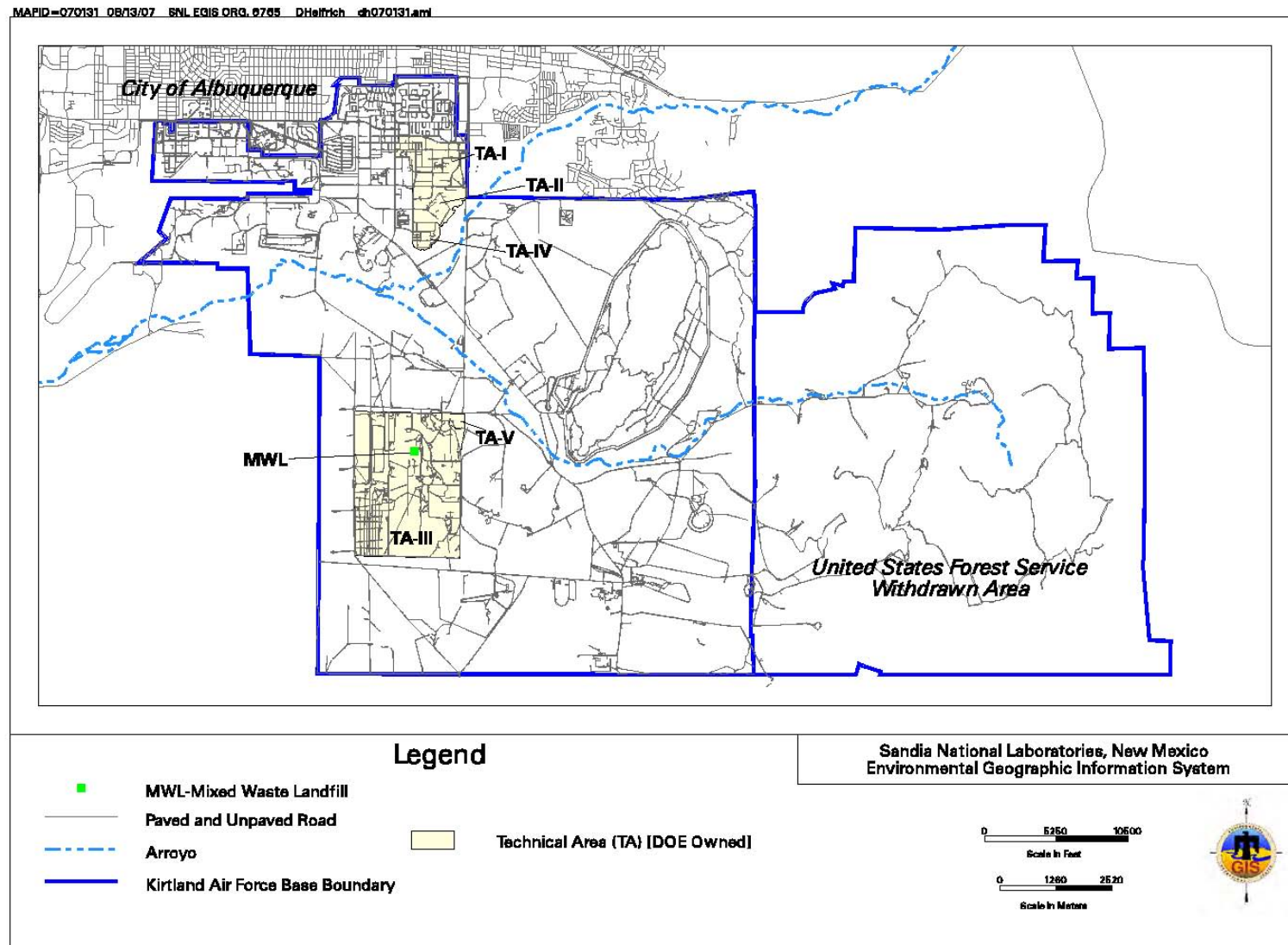


Figure 1-1
Location of the Mixed Waste Landfill with respect to Kirtland Air Force Base and the City of Albuquerque

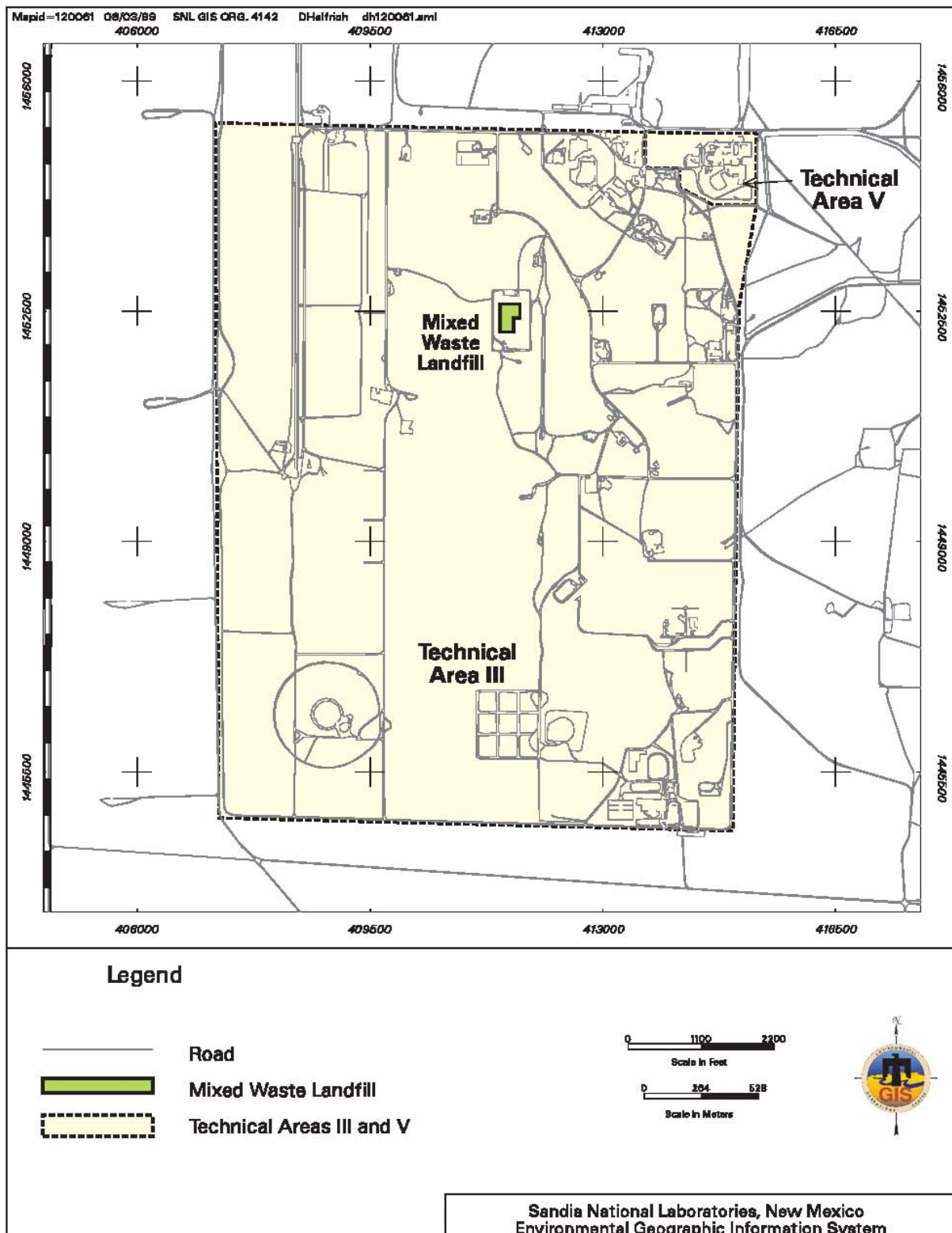


Figure 1-2
Location of the Mixed Waste Landfill within Technical Area III

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. 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 is 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.

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, 2016 through March 31, 2017 reporting period. The LTMMMP includes requirements for documenting 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 to this report 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
- Annex H – As-Built Drawings Mixed Waste Landfill Evapotranspirative Cover with Erosion Control

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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 resulting empirical data are evaluated to assess site conditions. Inspection requirements are described in Section 2.2 and include requirements to perform maintenance and/or repairs. 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, groundwater, and biota. The multi-media monitoring program is summarized in Table 2-1, which presents information for each monitoring activity including the sampling media, monitoring parameters, frequency, number of samples, locations, and monitoring methods.

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 during 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 ^a / Constituents of Concern	Monitoring Frequency ^a	Number of Samples Per Event	Monitoring Locations	Monitoring Method ^b	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 ^a / Constituents of Concern	Monitoring Frequency ^a	Number of Samples Per Event	Monitoring Locations	Monitoring Method ^b	Comments
Groundwater	VOCs, metals ^c , tritium, radon, gamma-emitting radionuclides ^d , 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 ^e and gamma-emitting radionuclides ^f	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:

^aMonitoring parameters and frequency will be reevaluated every five years in the Five-Year Reevaluation Report.

^bSampling and Analysis Plans and sampling requirements in appendices of the MWL LTMMMP (SNL/NM March 2012).

^cRequired metals analyses include cadmium, chromium, nickel, and uranium (SNL/NM March 2012).

^dRadionuclide results reported for groundwater include americium-241, cesium-137, and cobalt-60.

^eRequired metals analyses include RCRA metals plus copper, nickel, vanadium, zinc, cobalt, and beryllium (SNL/NM March 2012).

^fRadionuclide results reported for biota include cesium-137, cobalt-60, radium-226, thorium-232, uranium-235, and uranium-238.

bgs = Below ground surface.

ET = Evapotranspirative.

FLUTETM = Flexible Liner Underground Technologies, Ltd.TM

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 ^a
ET Cover Surface Biology Inspection (Cover vegetation and signs of animal activity)	Quarterly until vegetation is established, annually thereafter by a staff biologist ^b	Vegetation Inventory	Soil augmentations and/or reseeded	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 ²	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 ²		
		Animal intrusion burrows in excess of 4 inches in diameter		
		Contiguous areas of no vegetation >200 ft ² ^c	Revegetate barren areas that exceed prescribed limits ^c	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 [®] (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 ^a
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:

^aMaintenance/repairs will be performed as necessary, based upon the results of inspections.

^bThe 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).

^cBarren areas exceeding >200 ft² 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.

ft² = 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*.

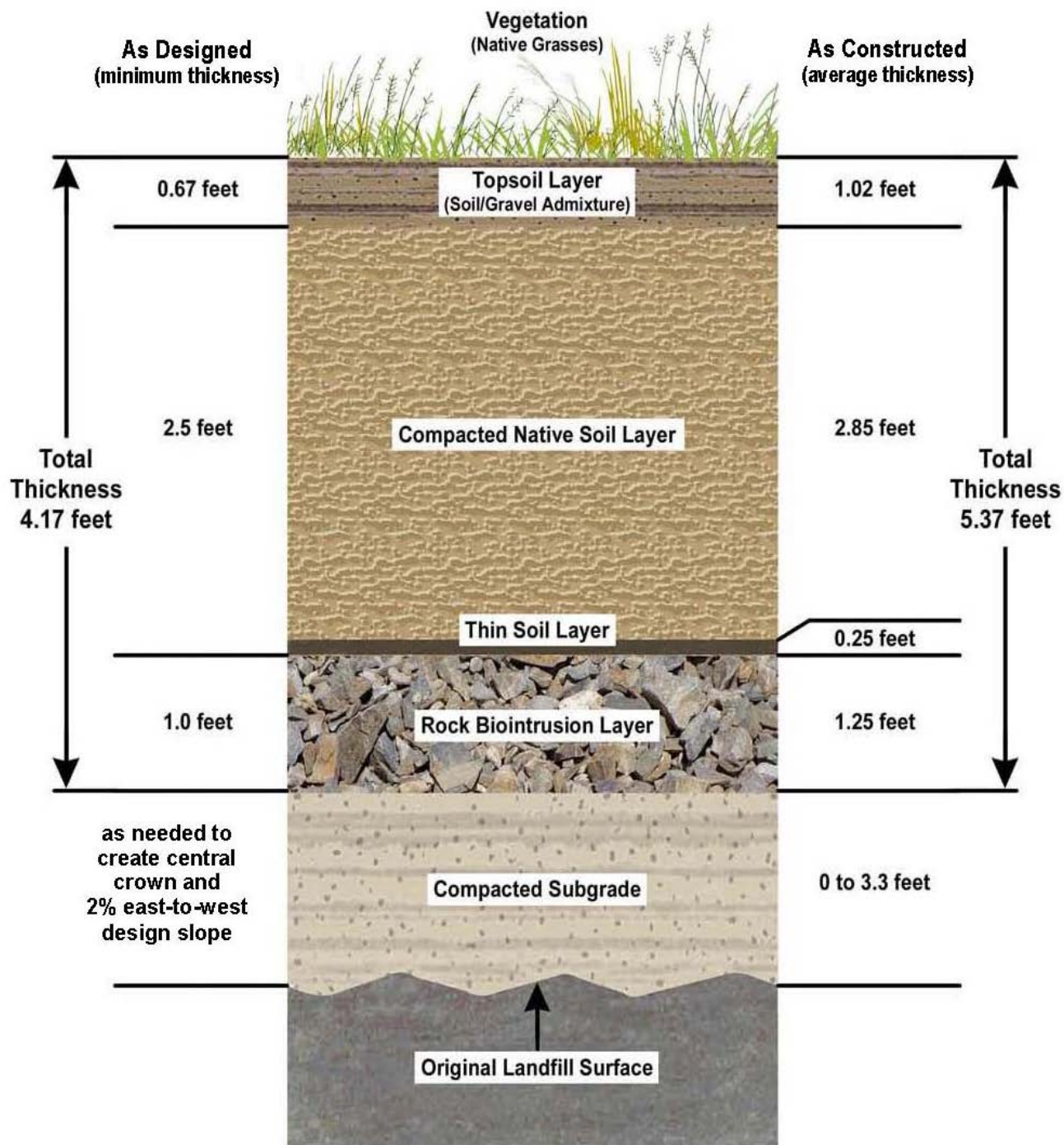


Figure 2-1
Schematic Profile of the Mixed Waste Landfill Evapotranspirative Cover Layers

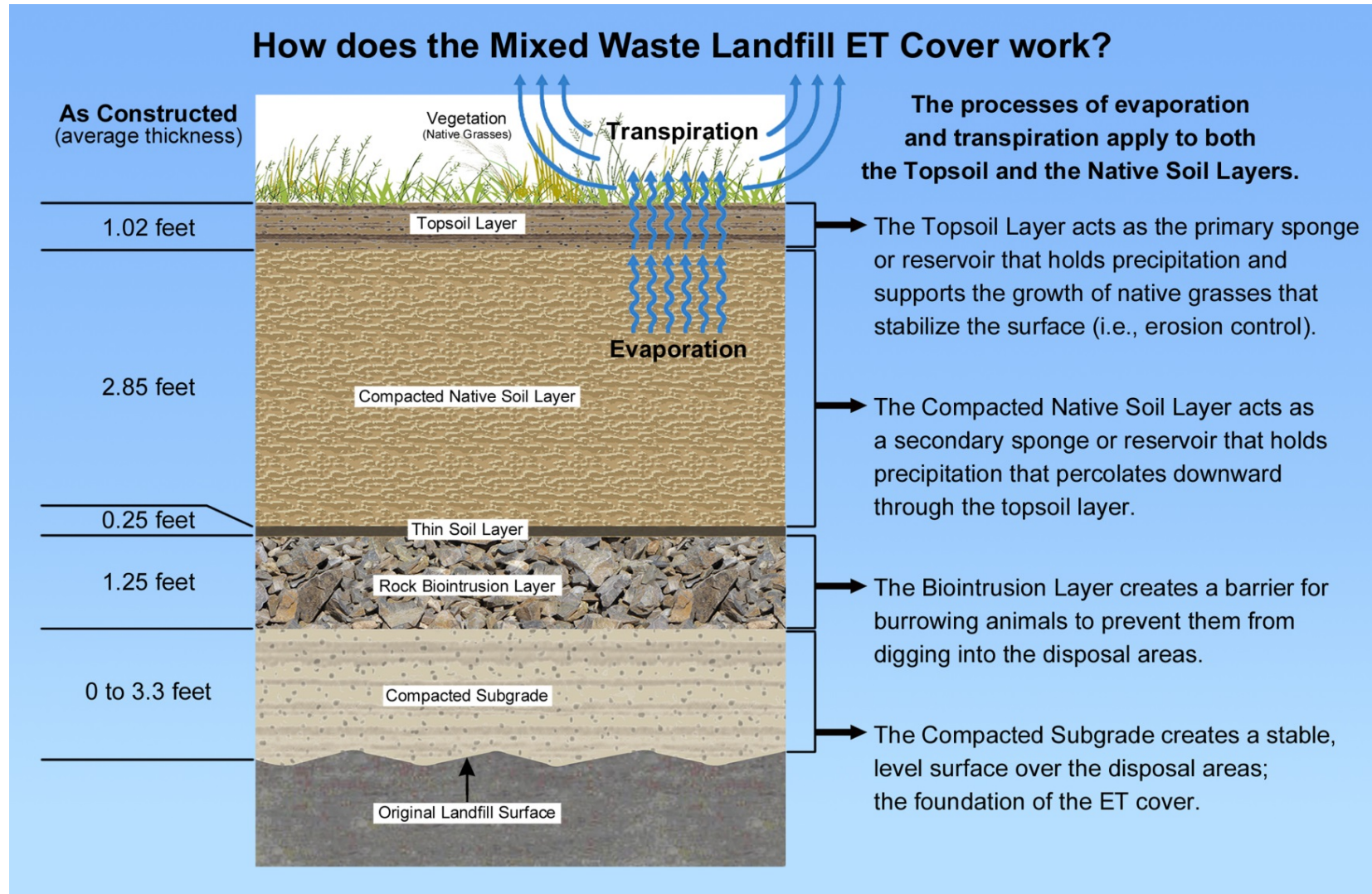


Figure 2-2
Schematic Profile of the Mixed Waste Landfill Evapotranspirative Cover and How it Works

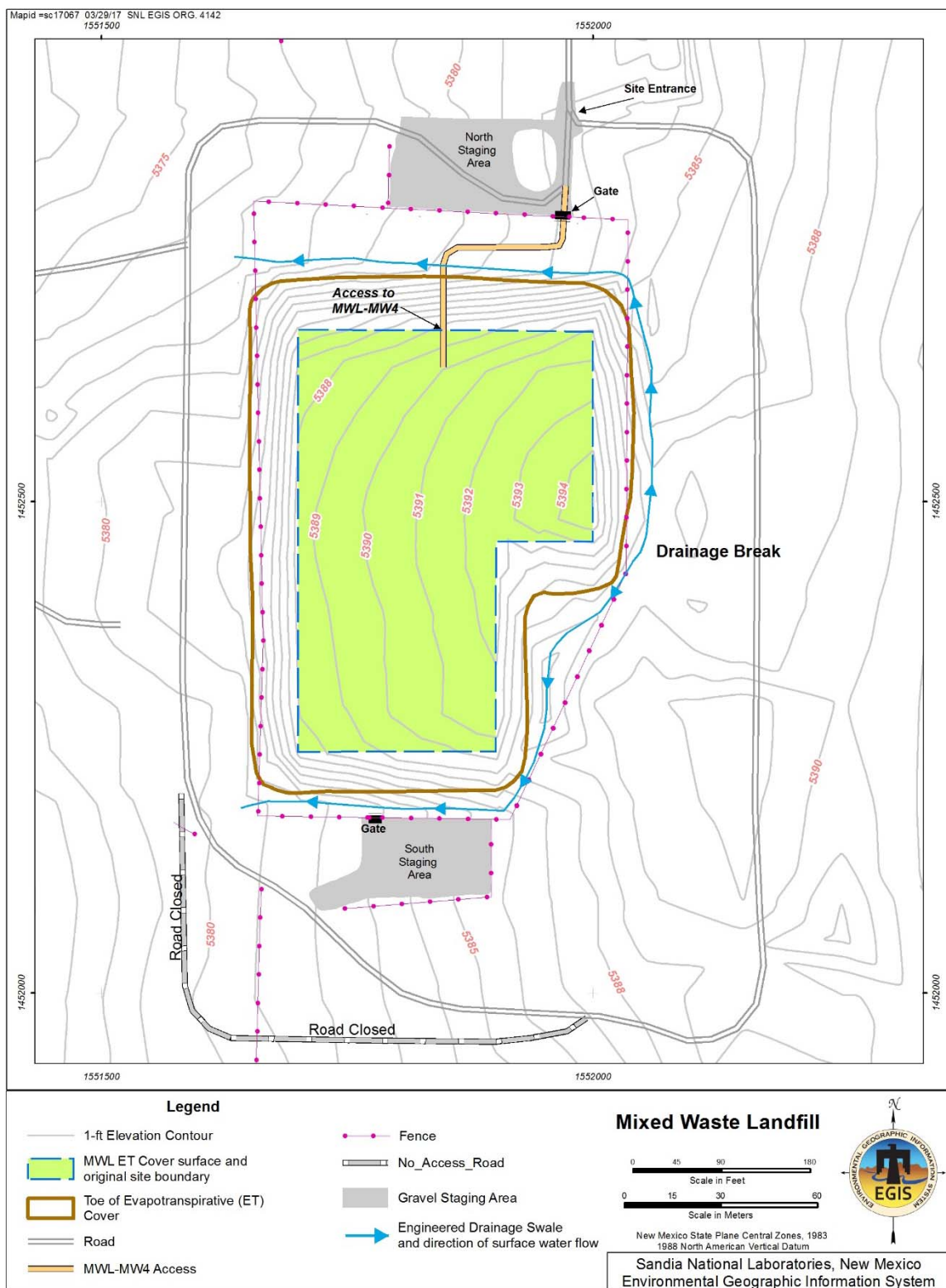


Figure 2-3
Mixed Waste Landfill Engineered Storm-Water Drainage Swale

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. The trigger level defined in LTMMP Section 5.2.1 apply only to results from the monitoring stations located along the perimeter security fence (locations RN1 through RN 10).

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.

The radon air measurements were obtained using alpha-track radon gas detectors manufactured by Landauer® Radon (i.e., Radtrak® and Radtrak2® detectors) designed to monitor radon exposure for three months to one year to obtain a long-term average activity over time. In accordance with Chapter 3 of the LTMMP, the radon monitoring frequency transitioned to semiannual after completing two years of quarterly radon monitoring.

Two monitoring events were conducted during calendar year (CY) 2016, fulfilling the LTMMP semiannual monitoring requirement. Radon monitoring presented for this April 1, 2016 through March 31, 2017 reporting period covers the CY 2016 period January 1, 2016 through December 31, 2016 due to the time required for laboratory analysis and data review after collection of the detectors in the field.

Radon sampling locations are designated as RN1 through RN17 and are shown in Figure 3-1. Locations RN1 through RN10 are located on the perimeter security fence and are the compliance locations to which the trigger level applies. Locations RN11 through RN15 are located on the ET Cover surface directly above pits and trenches with known sealed radium-226 sources. Radon is generated by the decay of radium-226, so results from these locations provide an early warning if sealed sources degrade. Locations RN16 and RN17 are background locations established away from the MWL, but in the general vicinity. Table 3-1 presents the dates of detector deployment and collection, location number, average radon air concentrations in picocuries per liter (pCi/L) for each six-month period, and the CY 2016 annual average radon air concentrations.

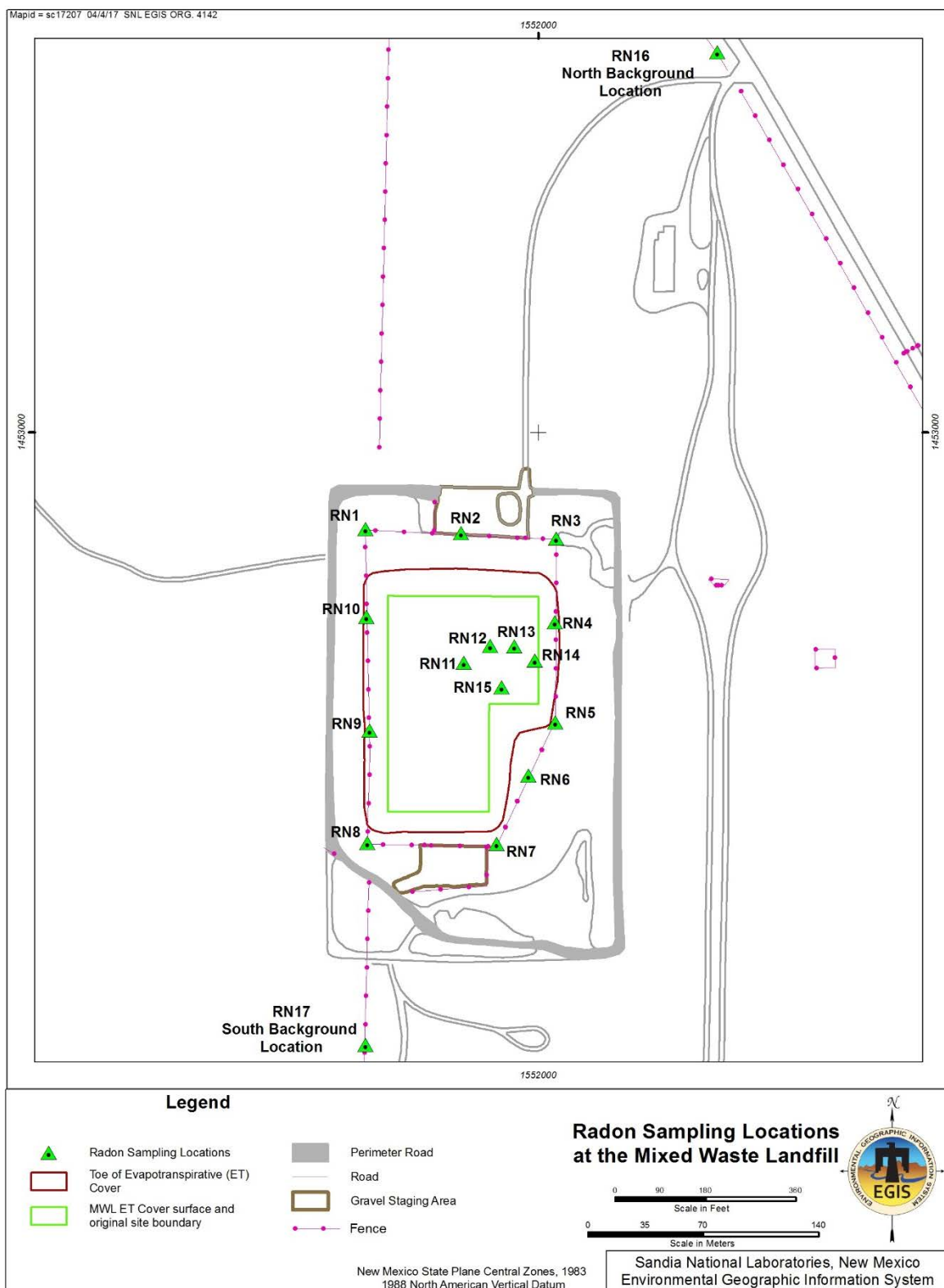


Figure 3-1
Mixed Waste Landfill Radon Detector Locations

Table 3-1
Summary of Radon Results
Mixed Waste Landfill Air Monitoring
Calendar Year 2016

Sample Location ^a	1 st Half CY 2016		2 nd Half CY 2016		CY 2016 Average Radon Air Concentration (pCi/L)	Trigger Level (pCi/L)
	Detector Deployment Date	Detector Collection Date	Detector Deployment Date	Detector Collection Date		
	1/7/2016	7/12/2016	7/12/2016	1/4/2017		
	Semiannual Time-Weighted Average Radon Air Concentration (pCi/L)					
RN1	0.8		0.2		0.5	4
RN2	0.7		0.2		0.5	4
RN3	0.8		0.2		0.5	4
RN4	0.6		0.2		0.4	4
RN5	0.5		0.2		0.4	4
RN6	0.6		0.2		0.4	4
RN7	0.7		0.2		0.5	4
RN8	0.7		0.3		0.5	4
RN9	0.8		0.2		0.5	4
RN10	0.7		<0.2 ^b		0.5 ^c	4
RN11	0.6		0.2		0.4	NA
RN12	0.6		0.2		0.4	NA
RN13	0.7		0.2		0.5	NA
RN14	0.4		0.2		0.3	NA
RN15	0.7		0.2		0.5	NA
RN16	0.8		0.2		0.5	NA
RN17	0.8		0.3		0.6	NA
RNTB	<0.2 ^b		<0.2 ^b		<0.2 ^b	NA

Notes:

^aBolded sample locations are the compliance locations where the trigger level applies.

^bNot detected, result is less than the minimum detectable activity.

^cLower limit of detection reported during 2nd half CY 2016 was used in calculating the CY 2016 average radon concentration.

CY = Calendar year.

NA = Not applicable.

pCi/L = Picocuries per liter.

RNTB = Trip blank.

Semiannual 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[®] (January-June 2016) and Radtrak2[®] (July-December 2016) radon detectors were deployed and collected at the 17 sampling locations as shown in Table 3-1 and Figure 3-1. As of July 2016 Landauer Incorporated phased out the Radtrak[®] detectors and introduced the Radtrak2[®] detectors. During the months in between deployment and collection, inspections were conducted to ensure the deployed detectors and associated protective housing were in

good condition. All detectors were found in good condition during the monitoring period at the times of collection. Minor maintenance to remove spider webs and maintain the protective housing was performed at the time of the inspections.

3.1.2 Field Quality Control

Field quality control (QC) measures associated with each 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.

3.2 Laboratory Results

This section summarizes radon air monitoring results for CY 2016. The detectors were submitted to Landauer® Nordic for analysis. Analytical laboratory reports, including the analytical method, dates of analyses, and contract verification reviews are filed in the SNL/NM Record Center.

3.2.1 Environmental Sample Results

The compiled semiannual 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 2016 average radon activity at locations RN1 through RN15 ranged from 0.3 to 0.5 pCi/L. The CY 2016 average radon activity at background locations RN16 and RN17 ranged from 0.5 to 0.6 pCi/L, respectively. The individual CY 2016 detected activity ranged from < 0.2 pCi/L (non-detection) at location RN10 (July-December 2016 results) to 0.8 pCi/L at locations RN1, RN3, RN9, RN16, and RN17 (January-June 2016 results).

Results obtained with the new Radtrak2® detectors during the July-December 2016 monitoring period were consistently lower than the activities measured during the January-June 2016 and previous monitoring periods (i.e., CY 2014 and 2015). The most likely cause of the lower activities in the July-December 2016 monitoring period is related to a change in the design of the newer Radtrak2® detectors. The Landauer® Nordic Laboratory Manager indicated the new Radtrak2® detectors have a longer diffusion time than the older Radtrak® detectors, and thus

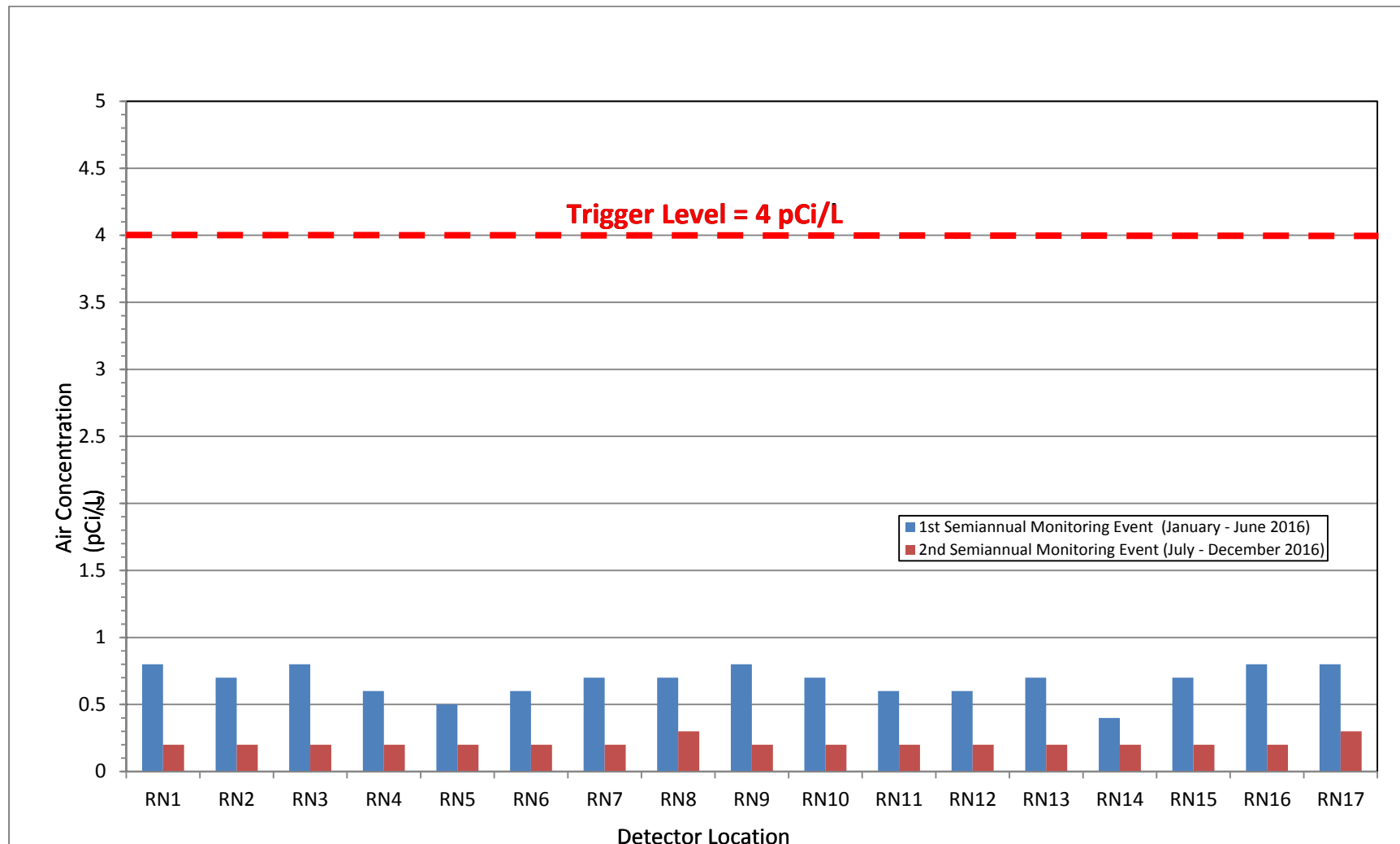


Figure 3-2
Mixed Waste Landfill
Calendar Year 2016 Semiannual Radon Air Monitoring Results

prevent thoron (Radon-220 with a half-life of just 56 seconds) from entering the detector and potentially causing a higher reading.

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 semiannual 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 semiannual event are compared to the semiannual 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 2016 radon monitoring. The radon results are acceptable and met the DQOs.

The difference in results between the Radtrak[®] (deployed January-June 2016 and during previous monitoring periods) and Radtrak2[®] detectors (deployed July-December 2016) was investigated. A re-analysis of the new Radtrak2[®] detectors was performed by Landauer[®] Nordic and the results were confirmed. The Landauer[®] Nordic Laboratory Manager further confirmed that appropriate quality control requirements were followed and quality control results were consistent with method requirements. No sampling or laboratory issues that may have caused the results to be lower were identified. The most likely explanation for the difference in the monitoring results is the new Radtrak2[®] detectors are designed to prevent thoron (Radon-220 with a half-life of just 56 seconds) from being measured by the detector. Additional actions will be taken in CY 2017 to further investigate the newer Radtrak2[®] detectors and confirm that thoron was the cause of the higher historic values.

3.2.4 Variances

There were no variances from the LTMMMP radon monitoring requirements.

3.3 Data Evaluation and Monitoring Trigger Level

The trigger level for radon in air is 4 pCi/L (time-weighted average), which applies to 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 pCi/L trigger level at any of the radon sampling locations during CY 2016.

4.0 TRITIUM SURFACE SOIL MONITORING RESULTS

This chapter presents monitoring field activities and results 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 the trigger level 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 2016 results are presented in the following sections.

Surface soil samples were collected at the four ET Cover corner monitoring locations on August 8, 2016 fulfilling the annual monitoring requirement (Figure 4-1). Samples were collected during the New Mexico monsoon season to ensure adequate soil moisture for analysis.

Monitoring results 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 8, 2016 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 2016 sampling event was collected at the northeast corner of the ET Cover, tritium monitoring location MWL TS-2NE (Figure 4-1).

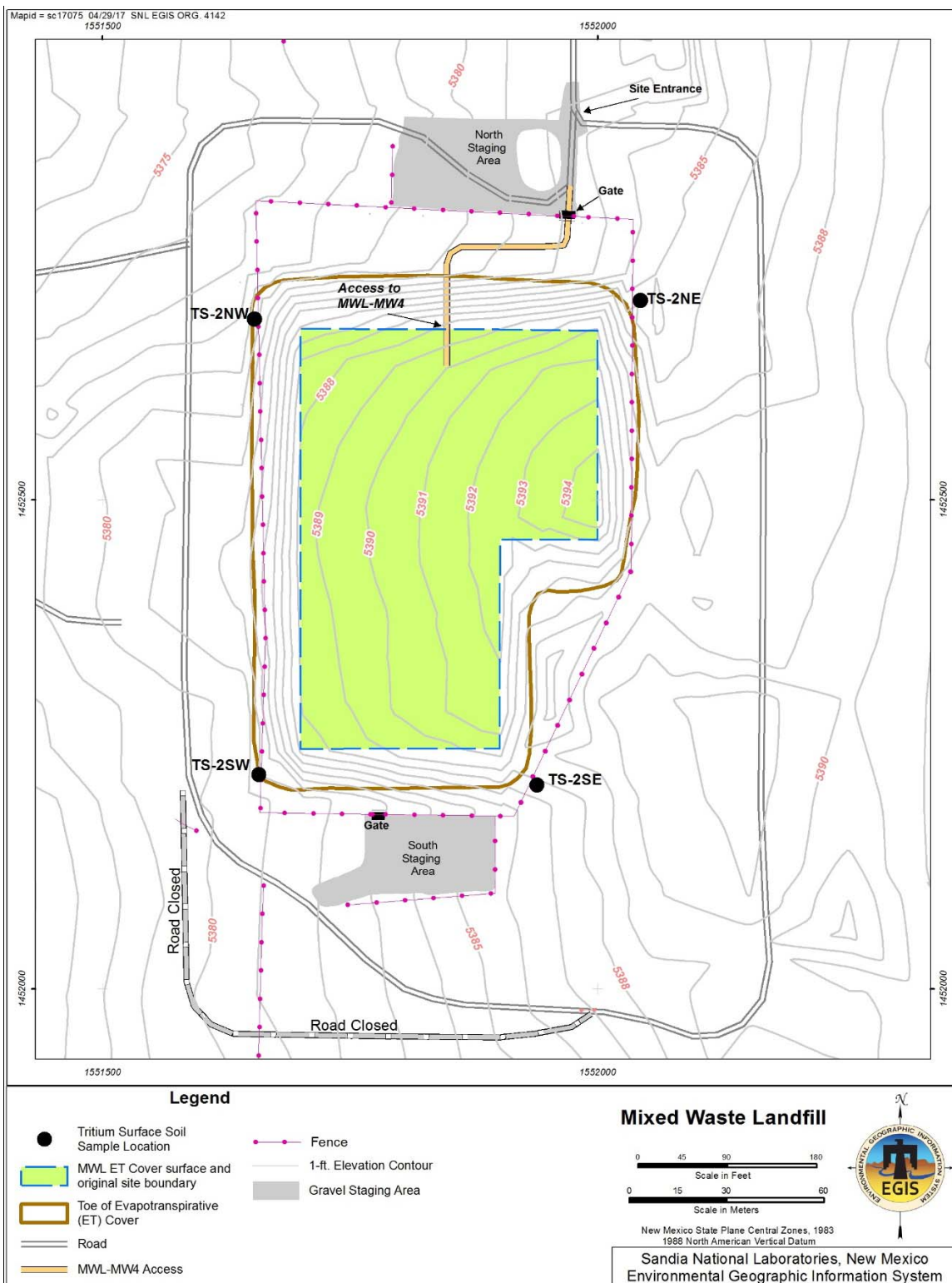


Figure 4-1
Mixed Waste Landfill Tritium Surface Soil Sampling Locations

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 measured in water extracted from the soil sample, so analytical results are sensitive to in-situ moisture content of the soil sample 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 2016 sampling event. Reported tritium activities for all samples were very low, below the MDA. All samples had good moisture content, ranging from 6 to 9 percent by mass, and the MDA ranged from 179 pCi/L (southwest ET Cover corner location, MWL TS-2SW sample) to 183 pCi/L (northwest ET Cover corner location, MWL TS-2NW). The August 2016 samples had higher moisture content than the August 2015 samples (2 to 3 percent by mass) resulting in a lower MDA and total propagated uncertainty (i.e., greater confidence in the August 2016 results). In general, the August 2016 results are consistent with historical results, which are characterized by low activity detections and non-detects. 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^a)
Mixed Waste Landfill Surface Soil Monitoring
August 2016

Sample Location	Result (pCi/L)	Percent Soil Moisture	MDA (pCi/L)	Laboratory Qualifier	Validation Qualifier	Trigger Level (pCi/L)
August 2016						
MWL TS-2NW	91.2 ± 109	6.25	183	U	BD,FR3	20,000
MWL TS-2SW	28.3 ± 101	8.00	179	U	BD,FR3	
MWL TS-2SE	151 ± 115	8.22	182	U	BD,FR3	
MWL TS-2NE	107 ± 110	8.32	182	U	BD,FR3	
MWL TS-2NE (Duplicate)	23.5 ± 102	9.09	182	U	BD,FR3	

Notes:

^aU.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition.

BD = Result that is not statistically different from zero.

EPA = U.S. Environmental Protection Agency.

FR3 = Result is less than the MDA/MDL or < the 2-sigma TPU.

MDA = Minimum detectable activity.

MDL = Method detection limit.

MWL = Mixed Waste Landfill.

pCi/L = Picocuries per liter.

TPU = Total propagated uncertainty.

U = Analyzed for but undetected.

Tritium was not detected above the MDA in the environmental-duplicate sample pair; therefore, an RPD value was not calculated.

4.2.3 Laboratory Quality Control and Data Quality

Internal laboratory QC samples were analyzed concurrently with all environmental samples in accordance with laboratory procedures and 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

There were no variances from the LTMMMP tritium monitoring requirements.

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 2016 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 2016 are consistent with the historical data and demonstrate consistent, tritium activity at very low levels that are close to or below 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 volatile organic compounds (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.

MWL-SV01 and MWL-SV02 are single-sampling-port wells installed through the ET Cover; each has one sampling port at depths 42.5 and 41.5 feet below ground surface (bgs), respectively. MWL-SV03, MWL-SV04, and MWL-SV05 are Flexible Liner Underground Technology, Ltd.TM (FLUTETM) 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, 2016 through March 31, 2017 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 27, 2016. 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-SV04 sampling ports (200 and 400-foot bgs).
- The second sampling event was conducted on October 13, 2016. Soil-vapor samples were collected from all monitoring wells and duplicate samples were collected from two MWL-SV05 sampling ports (100 and 300 feet bgs).

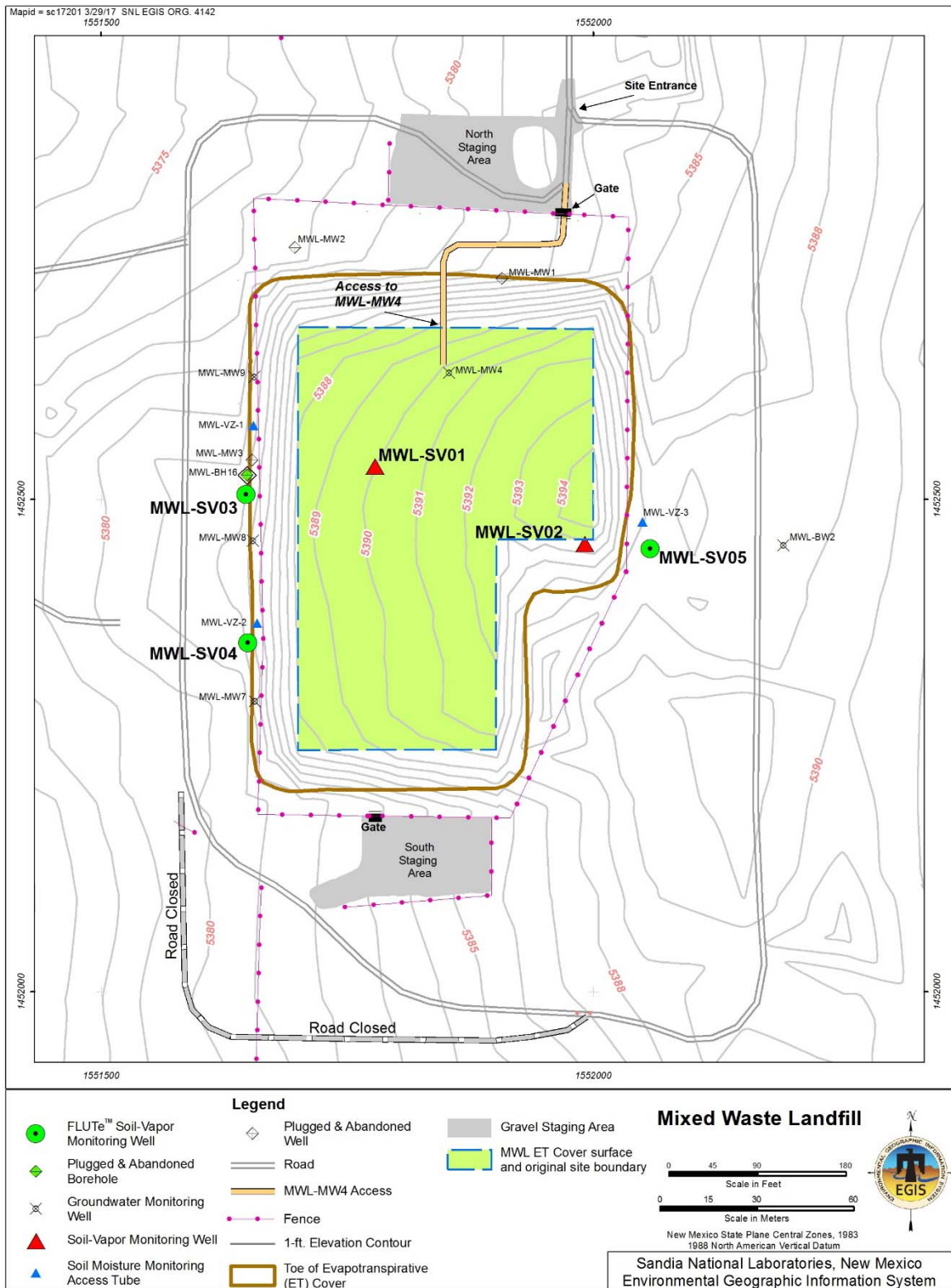


Figure 5-1
Mixed Waste Landfill Soil-Vapor Monitoring Well Locations

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 MWL vacuum pump. Real time continuous VOC screening was performed with a PID to determine stabilization during the purging process.

5.1.2 Field Quality Control

Field QC samples include 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 sampling port selected for the collection of duplicate samples. The environmental-duplicate sample pairs were collected simultaneously using a split stream sampling manifold system (i.e., the duplicate samples were collected at the same time) to reduce variability caused by time and/or sampling mechanics.

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

The field QC sampling protocol for the April and October 2016 sampling events included the collection of an environmental-duplicate sample pair from the sampling ports located at 200 feet bgs and 400 feet bgs at monitoring well MWL-SV04 in April, and the sampling ports located at 100 feet bgs and 300 feet bgs at monitoring well MWL-SV05 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 2016 sampling events.

5.1.3 Waste Management

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

5.2 Laboratory Results and Trigger Level Evaluation

Environmental and field QC soil-vapor samples were submitted to 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.

As defined in the LTMMMP Section 5.2.3.1 (SNL/NM March 2012), trigger levels for VOCs in soil vapor at the MWL are 20 parts per million by volume (ppmv) for tetrachloroethene (PCE), 20 ppmv for trichloroethene (TCE), and 25 ppmv for Total VOCs (i.e., the sum of validated detected VOCs concentrations). The trigger levels apply only to samples collected from the deepest sampling port (i.e., 400 feet bgs) in each of the three FLUTETM multi-port soil-vapor monitoring wells (MWL-SV03, MWL-SV04, and MWL-SV05).

All VOCs concentrations for the three deepest sampling ports are well below the trigger levels. PCE and TCE maximum concentrations were 0.440 ppmv and 0.320 ppmv, respectively, from the October MWL-SV03-400 sample. The maximum Total VOCs concentration was 0.8973 ppmv, also from the October MWL-SV03-400 sample.

5.2.1 Environmental Sample Results

This section summarizes soil-vapor monitoring results for the April 1, 2016 through March 31, 2017 reporting period. A summary of compounds detected in each semiannual event is provided below, and a summary of historic data (i.e., soil-vapor results collected since implementation of the LTMMMP in January 2014) is presented in Section 5.3.

First Sampling Event – April 27, 2016

A total of 18 compounds were detected above laboratory MDLs in April 2016 samples.

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

PCE and TCE are the primary VOCs of concern, exhibit the highest concentrations, and were reported at low concentrations in all environmental samples. PCE was detected at concentrations ranging from 0.060 ppmv (MWL-SV05-50) to 0.430 ppmv (MWL-SV03-400). TCE concentrations ranged from 0.058 (MWL-SV04-400, duplicate sample) to 0.300 ppmv (MWL-SV03-400). Total VOCs concentrations ranged from 0.26716 ppmv (MWL-SV04-400) to 0.9351 ppmv (MWL-SV01-42.5). Other VOCs detected in all samples, generally at lower concentrations, include dichlorodifluoromethane, 1,1-dichloroethane, 1,1-dichloroethene, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1,1-trichloroethane, and trichlorofluoromethane. The two highest VOC concentrations were both PCE results: 0.430 ppmv (MWL-SV03-400) and 0.410 ppmv (MWL-SV01-42.5).

For the April 2016 results from the three deepest sampling ports of MWL-SV03, MWL-SV04, and MWL-SV05, PCE concentrations ranged from 0.110 ppmv (MWL-SV05-400) to 0.430 ppmv (MWL-SV03-400). TCE concentrations ranged from 0.058 ppmv (MWL-SV04-400) to 0.300 ppmv (MWL-SV03-400). Total VOCs concentrations ranged from 0.26716 ppmv (MWL-SV04-400) to 0.8798 ppmv (MWL-SV03-400).

Second Sampling Event – October 13, 2016

A total of 21 compounds were detected above laboratory MDLs in October 2016 samples. Of the 21 detected VOCs, 2-Hexanone, 4-Methyl-2-pentanone, and o-Xylene were not detected in the April samples.

Acetone	2-Hexanone
Benzene	Methylene Chloride
2-Butanone	4-Methyl-2-pentanone
Carbon Disulfide	Tetrachloroethene
Carbon Tetrachloride	Toluene
Chloroform	Trichloroethene
Chloromethane	Trichlorofluoromethane
Dichlorodifluoromethane	1,1,1-Trichloroethane
1,1-Dichloroethane	1,1,2-Trichloro-1,2,2-trifluoroethane
1,1-Dichloroethene	o-Xylene
cis-1,2-Dichloroethene	

PCE and TCE exhibited the highest concentrations, and were reported in all environmental samples. PCE was detected at concentrations ranging from 0.045 ppmv (MWL-SV05-50) to 0.450 ppmv (MWL-SV01-42.5). TCE concentrations ranged from 0.058 ppmv (MWL-SV05-50) to 0.320 ppmv (MWL-SV03-400). Total VOCs concentrations ranged from 0.29728 ppmv (MWL-SV04-50) to 0.9757 ppmv (MWL-SV01-42.5). Other VOCs detected in all samples, generally at lower concentrations, included dichlorodifluoromethane, 1,1-dichloroethane, 1,1-dichloroethene, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1,1-trichloroethane, and trichlorofluoromethane. The two highest VOC concentrations were both PCE results: 0.450 ppmv (MWL-SV01-42.5) and 0.440 ppmv (MWL-SV03-400).

For the October 2016 results from the three deepest sampling ports of MWL-SV03, MWL-SV04, and MWL-SV05, PCE concentrations ranged from 0.110 ppmv (MWL-SV05-400) to 0.440 ppmv (MWL-SV03-400). TCE concentrations ranged from 0.091 ppmv (MWL-SV04-400) to 0.320 ppmv (MWL-SV03-400). Total VOCs concentrations ranged from 0.38251 ppmv (MWL-SV04-400) to 0.8973 ppmv (MWL-SV03-400).

Tables 5-1 and 5-2 (provided at the end of this chapter) summarize detected VOCs results for the April 2016 and October 2016 sampling events, respectively.

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 2016 sampling events included the collection and analysis of environmental-duplicate sample pairs and field blank samples. Field QC sample results met the sampling DQOs and validated the field sampling procedures and protocol. The analytical results for each field QC sample type are presented in this section.

Table 5-3 summarizes results of environmental-duplicate sample pair analyses and the calculated RPD values for the April and October 2016 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 environmental-duplicate sample pair results and QC field blank results are summarized below.

First Sampling Event – April 27, 2016

The two environmental-duplicate sample pairs collected during the April sampling event were analyzed for all analytical parameters. The calculated RPDs show good agreement for the April environmental-duplicate sample pairs. The RPD values ranged from <1 to 31, with only one RPD exceeding 20. An RPD of 50 or less demonstrates acceptable precision 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 2016 samples. VOCs detected in QC field blank samples included acetone (1 sample), carbon disulfide (1 sample), and toluene (1 sample). No corrective action was required for acetone and toluene (both common laboratory contaminants) since these two compounds were not detected in the associated environmental samples. Carbon disulfide was qualified as not detected during data validation for the environmental sample from MWL-SV05-400 since carbon disulfide was reported at a concentration less than five times the QC field blank sample concentration.

Second Sampling Event – October 13, 2016

The two environmental-duplicate sample pairs collected during the October sampling event were analyzed for all analytical parameters. The calculated RPDs show good agreement for the October environmental-duplicate sample pairs. The RPD values ranged from <1 to 9.

A total of five QC field blank samples were submitted for analysis with the October 2016 samples. VOCs detected in QC field blank samples include acetone (2 samples), carbon disulfide (1 sample), methylene chloride (2 samples), PCE (3 samples), toluene (1 sample), 1,1,1-trichloroethane (1 sample), TCE (1 sample), and trichlorofluoromethane (1 sample). No corrective action was required for carbon disulfide, PCE, 1,1,1-trichloroethane, TCE, and trichlorofluoromethane since these compounds were detected in associated environmental samples at concentrations greater than five times the field blank concentrations. Acetone, methylene chloride, and toluene (all common laboratory contaminants) were qualified as not detected during data validation for environmental samples from MWL-SV03 and MWL-SV05

Table 5-3
Summary of Duplicate Samples
Mixed Waste Landfill Soil-Vapor Monitoring
April and October 2016

Well ID/Parameter	Environmental Sample (R ₁)	Duplicate Sample (R ₂)	RPD ^a (%)
	(ppmv)		
April 2016 Environmental-Duplicate Sample Pair Results			
MWL-SV04-200			
Dichlorodifluoromethane	0.056	0.058	4
1,1-Dichloroethene	0.035	0.035	<1
Tetrachloroethene	0.180	0.180	<1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.170	0.180	6
Trichloroethene	0.210	0.220	5
Trichlorofluoromethane	0.036	0.036	<1
MWL-SV04-400			
Dichlorodifluoromethane	0.019	0.017	11
Tetrachloroethene	0.150	0.110	31
1,1,2-Trichloro-1,2,2-trifluoroethane	0.062	0.056	10
Trichloroethene	0.070	0.058	19
October 2016 Environmental-Duplicate Sample Pair Results			
MWL-SV05-100			
Dichlorodifluoromethane	0.077	0.077	<1
1,1-Dichloroethene	0.023	0.023	<1
Tetrachloroethene	0.092	0.095	3
1,1,2-Trichloro-1,2,2-trifluoroethane	0.093	0.093	<1
1,1,1-Trichloroethane	0.016	0.016	<1
Trichloroethene	0.120	0.130	8
Trichlorofluoromethane	0.160	0.170	6
MWL-SV05-300			
Dichlorodifluoromethane	0.039	0.041	5
1,1-Dichloroethene	0.026	0.027	4
Tetrachloroethene	0.110	0.110	<1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.110	0.120	9
Trichloroethene	0.120	0.120	<1
Trichlorofluoromethane	0.034	0.035	3

Notes:

^aRPD = Relative percent difference is calculated with the following equation and rounded to nearest whole number.

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

where: R₁ = Analysis result.
R₂ = Duplicate analysis result.
ppmv = Parts per million by volume basis.

since these compounds were reported at concentrations less than 10 times the QC field blank sample concentrations.

5.2.3 Laboratory Quality Control and Data Quality

Internal laboratory QC samples were analyzed concurrently with all environmental samples in accordance with laboratory procedures and EPA methods. These samples included laboratory control samples, method blanks, matrix spike and matrix spike duplicate samples, surrogate spikes samples, and replicate samples. The results were used to evaluate potential contamination associated with the laboratory analytical process and to determine the accuracy and precision of the analytical methods. All laboratory control sample results for both sampling events met the accuracy (i.e., % recovery) requirement of 50 to 130% for detected compounds (Section 2.2 of LTMMMP Appendix D). Minor issues associated with laboratory QC samples that were documented during the data validation process are summarized below.

For the April sampling event, methylene chloride (a common laboratory contaminant) was detected in the laboratory method blank samples associated with all samples. Eight environmental sample detections (including one duplicate sample detection) and four QC field blank detections were qualified as not detected during data validation since methylene chloride was detected at concentrations less than 10 times the associated laboratory method blank concentration.

For the October sampling event, the compound 1,2,4-trichlorobenzene was reported above recovery limits in two laboratory control samples and one laboratory control sample duplicate. No corrective action was required since this compound was not detected in the October environmental samples.

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

One variance from requirements in the LTMMMP was identified for the April and October 2016 soil-vapor monitoring activities. This variance is considered minor because it has no adverse impact on data quality. During the purging process, a PID with an 11.7 electron volts (eV) lamp was used instead of an 11.8 eV lamp as specified in Section 3.3 in Appendix D of the LTMMMP. 11.8 eV lamps are not currently available from the manufacturer or the distributors.

5.3 Historic Data Evaluation

Tables 5-4, 5-5, and 5-6 provide results for PCE, TCE, and Total VOCs (i.e., the sum of validated detected VOCs concentrations), respectively. Each table presents results for the six semiannual monitoring events conducted since implementation of the LTMMP in 2014. Key points from the evaluation of the 2014 through 2016 soil-vapor monitoring results are summarized below.

- Results for all monitoring well sampling ports are low concentrations (i.e., less than 0.600 ppmv) and stable (i.e., results for each sampling port show only minor variability).
- Concentrations throughout the 500-foot thick vadose zone are relatively consistent (i.e., shallow results do not vary considerably from deeper 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 VOCs concentrations in the vadose zone indicates the soil-vapor plume is stable with no new releases from the disposal area.
- 2014 through 2016 results for the shallow sampling depths closer to the disposal areas (i.e., sampling 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).
- Results for the three deepest sampling ports of MWL-SV03 through MWL-SV05 (400 feet bgs) are well below the trigger levels.

PCE, TCE, and Total VOCs concentrations over time for all soil-vapor monitoring wells and ports are presented in Figures 5-2 through 5-13. The variation in PCE and TCE concentrations over the six sampling events conducted from 2014 to 2016 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 MWL-SV01 (42.5 foot bgs sampling port) and the MWL-SV03 (400 foot bgs sampling port) locations have consistently shown the highest VOC concentrations (PCE ranging from 0.390 to 0.560 ppmv) and Total VOCs concentrations (0.8141 to 1.14010 ppmv). The 2016 data sets are very similar to the 2014 and 2015 data sets indicating stable VOCs concentrations throughout the 500-foot thick vadose zone.

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

Well ID & Sample Port Depth ^a	September 2014 ^b (ppmv)	October 2014 ^b (ppmv)	April 2015 ^b (ppmv)	October 2015 ^b (ppmv)	April 2016 ^b (ppmv)	October 2016 ^b (ppmv)
MWL-SV01-42.5	0.560	0.400	0.460	0.470	0.410	0.450
MWL-SV02-41.5	0.086	0.067	0.075	0.068	0.068	0.070
MWL-SV03-50	0.140	0.120	0.150	0.110	0.170	0.140
MWL-SV03-100	0.210	0.230	0.240	0.220	0.240	0.240
MWL-SV03-200	0.300	0.320	0.310	0.290	0.270	0.270
MWL-SV03-300	0.290	0.320	0.290	0.370	0.310	0.300
MWL-SV03-400	0.390	0.400	0.420	0.450	0.430	0.440
MWL-SV04-50	0.072	0.076	0.076	0.074	0.078	0.077
MWL-SV04-100	0.130	0.120	0.120	0.120	0.130	0.130
MWL-SV04-200	0.180	0.180	0.170	0.150	0.180	0.150
MWL-SV04-300	0.110	0.130	0.110	0.120	0.130	0.130
MWL-SV04-400	0.110	0.140	0.120	0.140	0.150	0.130
MWL-SV05-50	0.052	0.048	0.055	0.040	0.060	0.045
MWL-SV05-100	0.092	0.096	0.100	0.077	0.099	0.095
MWL-SV05-200	0.140	0.170	0.150	0.120	0.170	0.140
MWL-SV05-300	0.090	0.120	0.097	0.110	0.100	0.110
MWL-SV05-400	0.100	0.110	0.080	0.120	0.110	0.110

Notes:

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

^aPort depth is the last number in the Well ID, and is in feet below ground surface.

^bIf a duplicate sample was collected, then maximum concentration of the environmental-duplicate sample pair is shown.

PCE = Tetrachloroethene.

ppmv = Parts per million by volume.

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

Well ID & Sample Port Depth ^a	September 2014 ^b (ppmv)	October 2014 ^b (ppmv)	April 2015 ^b (ppmv)	October 2015 ^b (ppmv)	April 2016 ^b (ppmv)	October 2016 ^b (ppmv)
MWL-SV01-42.5	0.110	0.090	0.099	0.110	0.091	0.100
MWL-SV02-41.5	0.075	0.058	0.067	0.065	0.063	0.065
MWL-SV03-50	0.100	0.082	0.097	0.080	0.140	0.110
MWL-SV03-100	0.190	0.190	0.200	0.200	0.210	0.210
MWL-SV03-200	0.300	0.300	0.290	0.310	0.250	0.270
MWL-SV03-300	0.190	0.210	0.170	0.260	0.200	0.220
MWL-SV03-400	0.290	0.280	0.260	0.350	0.300	0.320
MWL-SV04-50	0.061	0.059	0.060	0.066	0.070	0.067
MWL-SV04-100	0.130	0.120	0.120	0.130	0.140	0.150
MWL-SV04-200	0.210	0.210	0.190	0.200	0.220	0.200
MWL-SV04-300	0.076	0.091	0.064	0.093	0.081	0.097
MWL-SV04-400	0.075	0.096	0.060	0.097	0.070	0.091
MWL-SV05-50	0.067	0.061	0.064	0.052	0.074	0.058
MWL-SV05-100	0.140	0.130	0.130	0.120	0.130	0.130
MWL-SV05-200	0.200	0.240	0.210	0.200	0.210	0.200
MWL-SV05-300	0.100	0.130	0.082	0.120	0.096	0.120
MWL-SV05-400	0.094	0.100	0.066	0.120	0.089	0.100

Notes:

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

^aPort depth is the last number in the Well ID, and is in feet below ground surface.

^bIf a duplicate sample was collected, then maximum concentration of the environmental-duplicate sample pair is shown.

ppmv = Parts per million by volume.

TCE = Trichloroethene.

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

Well ID & Sample Port Depth ^a	September 2014 ^b (ppmv)	October 2014 ^b (ppmv)	April 2015 ^b (ppmv)	October 2015 ^b (ppmv)	April 2016 ^b (ppmv)	October 2016 ^b (ppmv)
MWL-SV01-42.5	1.14010	1.0087	1.1167	1.0362	0.9351	0.9757
MWL-SV02-41.5	0.71822	0.6788	0.7647	0.6915	0.7103	0.7078
MWL-SV03-50	0.36957	0.3175	0.37076	0.30743	0.48016	0.42248
MWL-SV03-100	0.61151	0.6382	0.6949	0.7442	0.7327	0.73682
MWL-SV03-200	0.91906	0.94754	0.99016	0.9323	0.84151	0.8792
MWL-SV03-300	0.64917	0.67835	0.59506	0.8312	0.68678	0.7443
MWL-SV03-400	0.87270	0.8141	0.8595	0.9592	0.8798	0.8973
MWL-SV04-50	0.25949	0.26359	0.28424	0.28232	0.30064	0.29728
MWL-SV04-100	0.45631	0.42879	0.44346	0.46616	0.5093	0.53785
MWL-SV04-200	0.68361	0.66935	0.6434	0.6316	0.72689	0.66068
MWL-SV04-300	0.26624	0.32355	0.27345	0.34519	0.32831	0.37126
MWL-SV04-400	0.25031	0.3246	0.26702	0.35374	0.35148	0.38251
MWL-SV05-50	0.36547	0.31833	0.3399	0.30406	0.37770	0.35609
MWL-SV05-100	0.56578	0.54556	0.57169	0.53248	0.59430	0.61891
MWL-SV05-200	0.70237	0.82115	0.7368	0.6583	0.80567	0.7319
MWL-SV05-300	0.35628	0.42371	0.33576	0.44336	0.36421	0.46092
MWL-SV05-400	0.54096	0.39521	0.25075	0.45245	0.30765	0.40839

Notes:

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

^aIf a duplicate sample was collected, then maximum concentration of the environmental-duplicate sample pair is shown.

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

ppmv = Parts per million by volume.

VOCs = Volatile organic compounds.

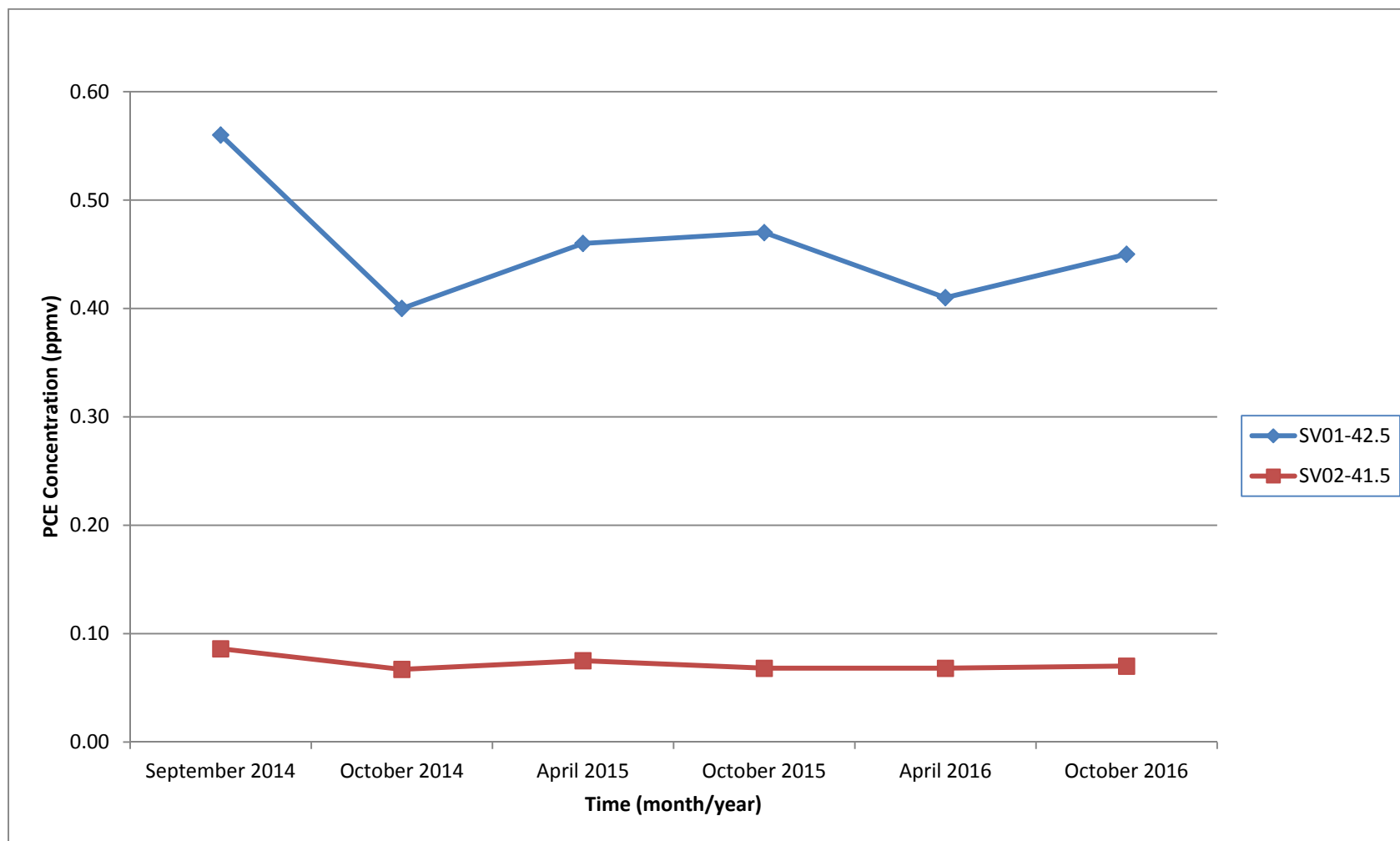


Figure 5-2
PCE Concentrations vs. Time
Mixed Waste Landfill Soil-Vapor Monitoring Wells SV01 and SV02 Ports

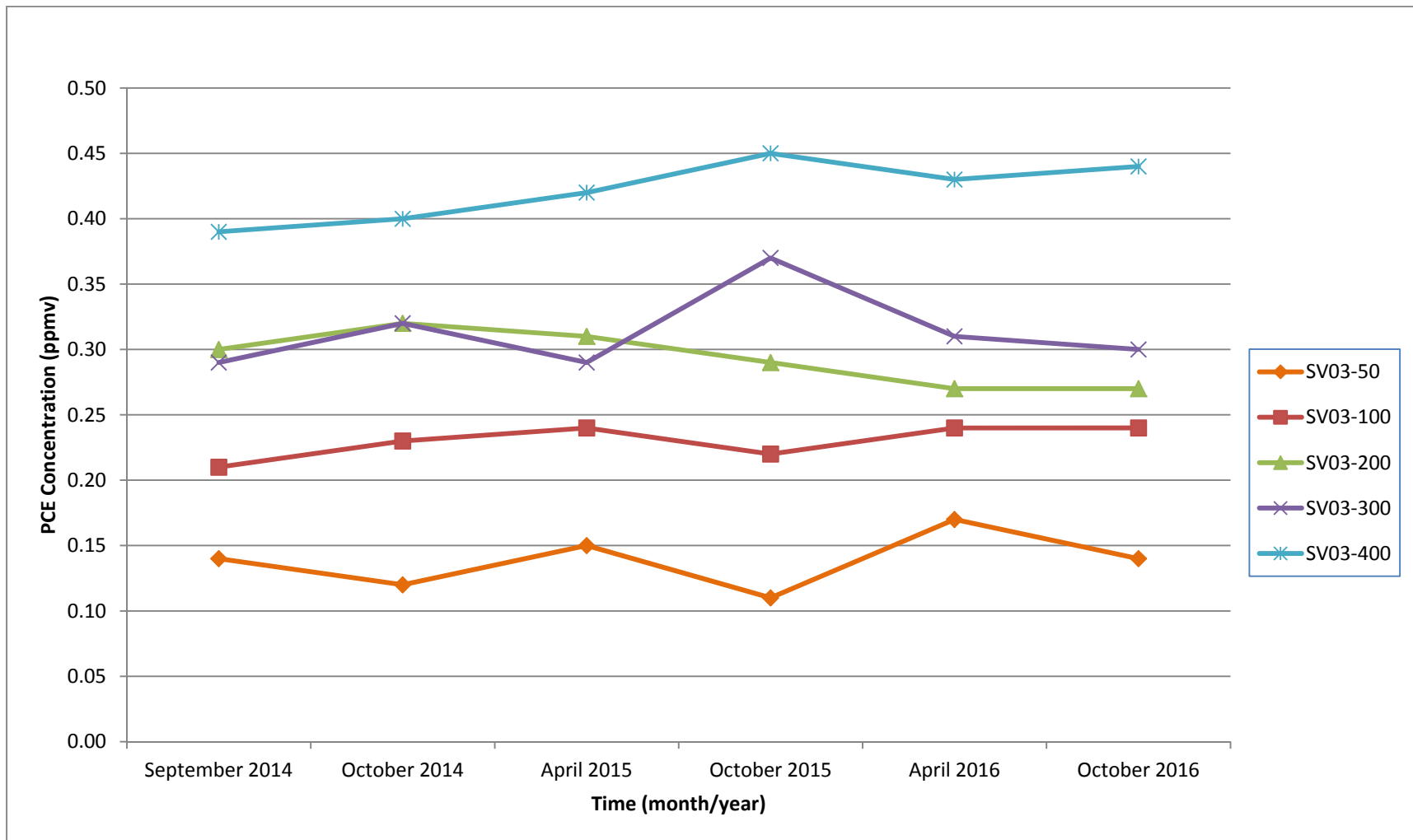


Figure 5-3
PCE Concentrations vs. Time
Mixed Waste Landfill Soil-Vapor Monitoring Well SV03 Ports

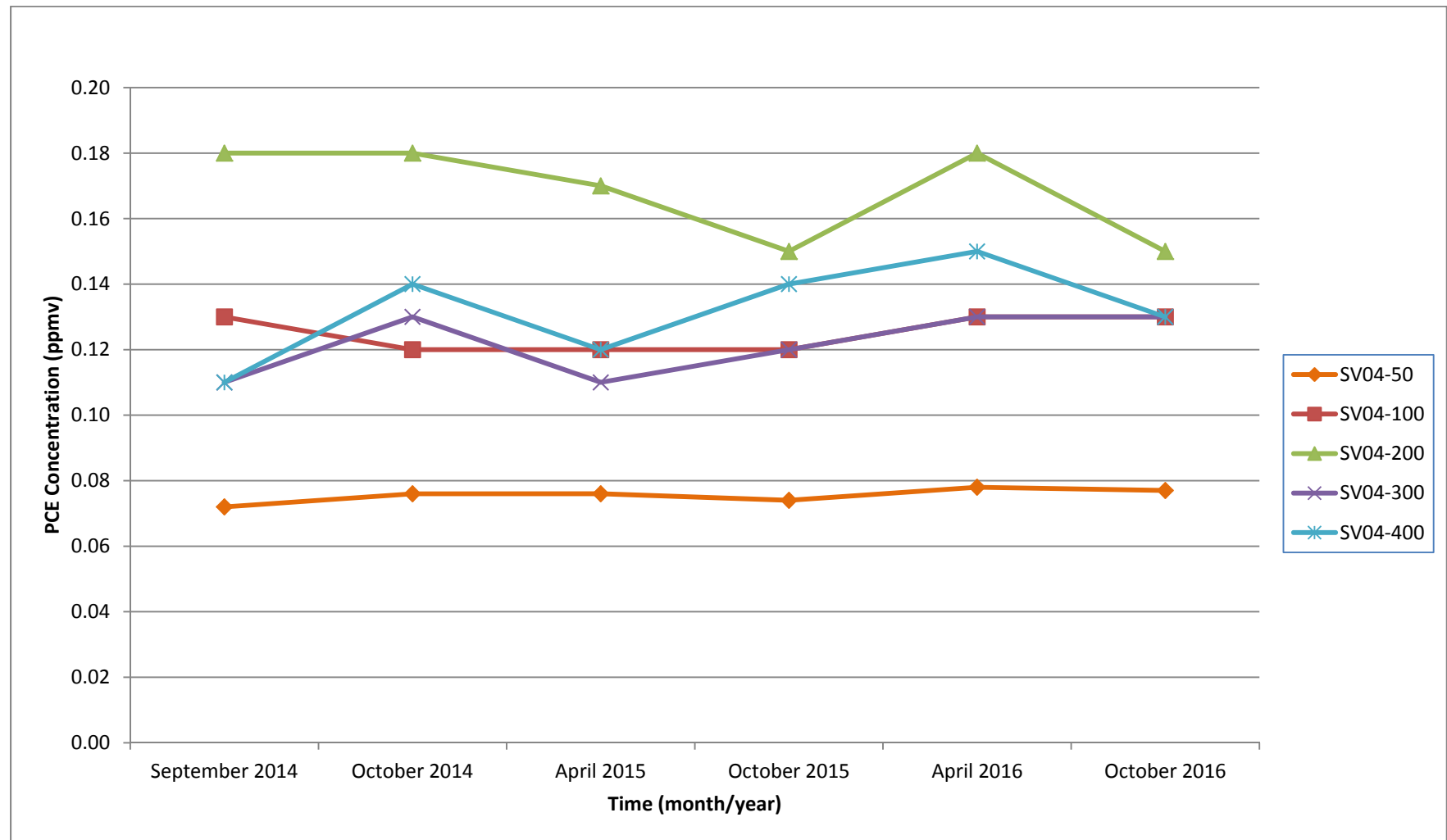


Figure 5-4
PCE Concentrations vs. Time
Mixed Waste Landfill Soil-Vapor Monitoring Well SV04 Ports

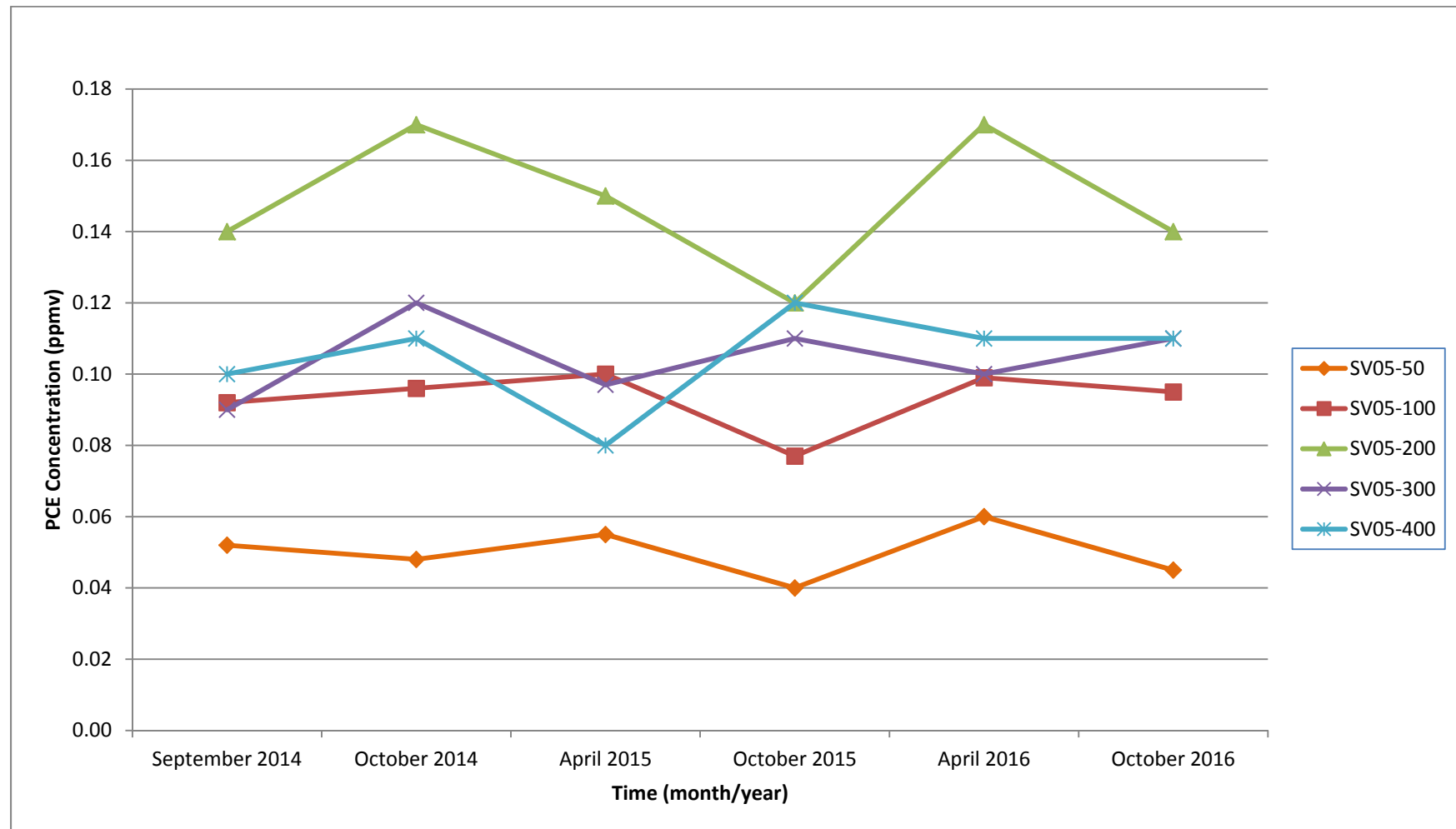


Figure 5-5
PCE Concentrations vs. Time
Mixed Waste Landfill Soil-Vapor Monitoring Well SV05 Ports

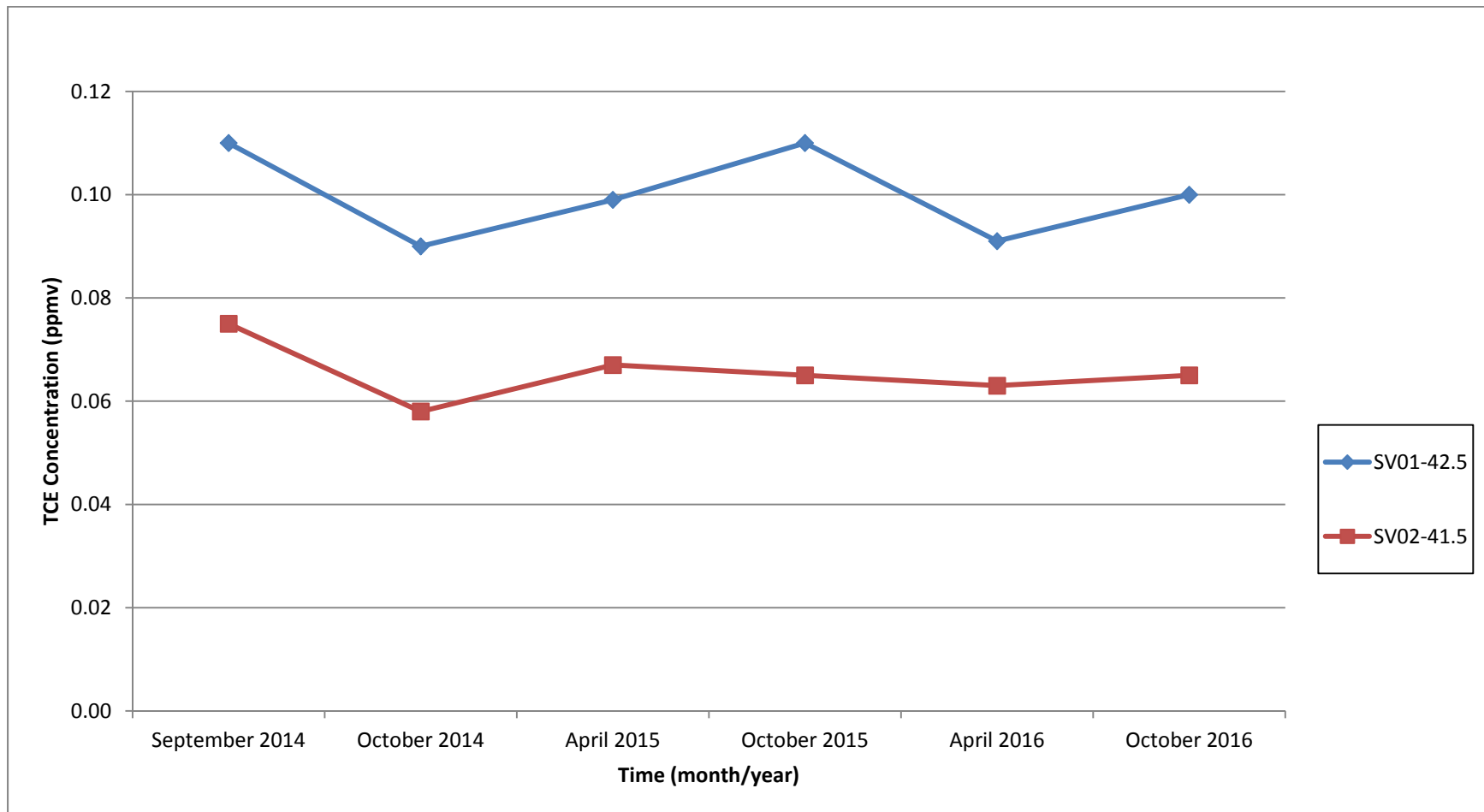


Figure 5-6
TCE Concentrations vs. Time
Mixed Waste Landfill Soil-Vapor Monitoring Wells SV01 and SV02 Ports

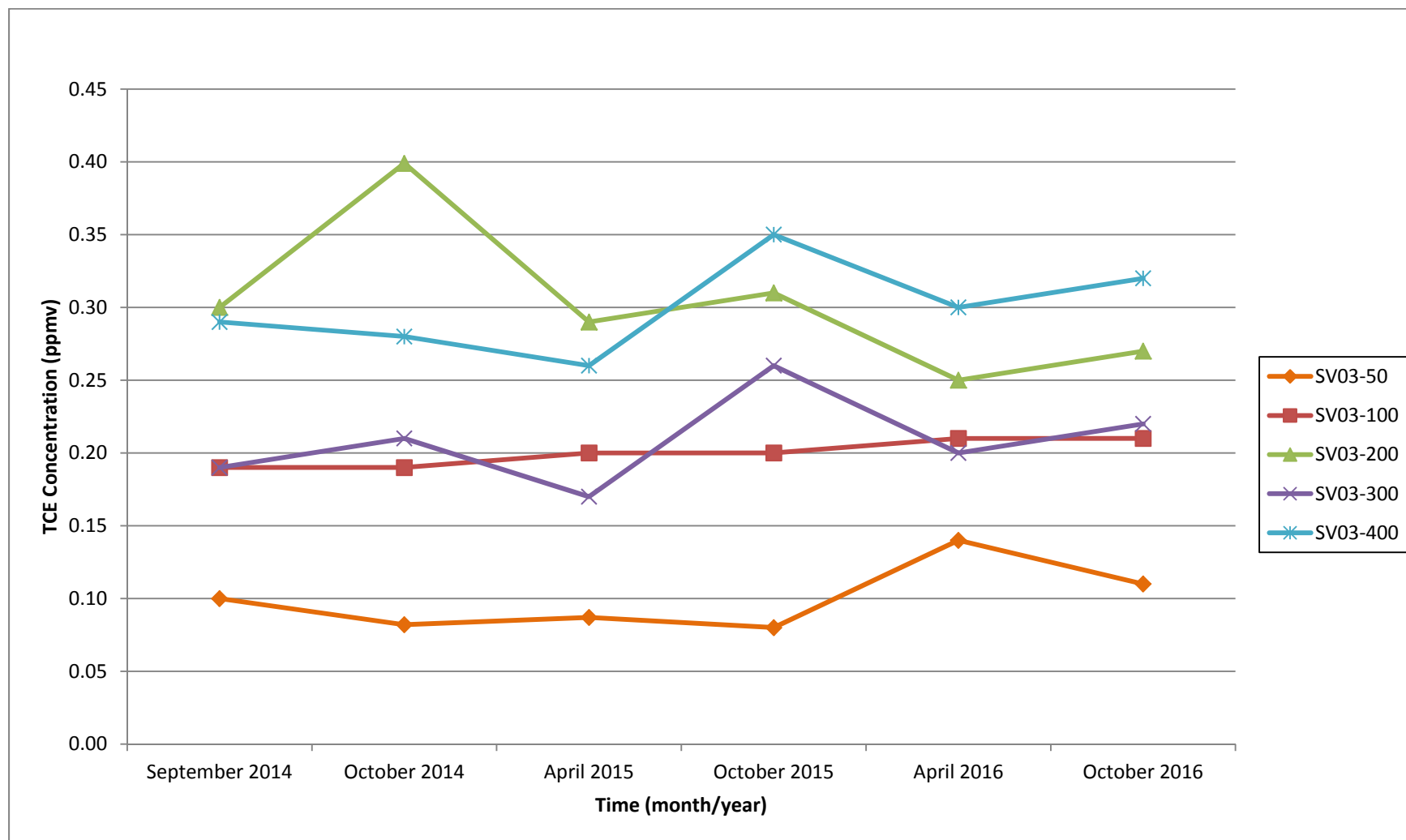


Figure 5-7
TCE Concentrations vs. Time
Mixed Waste Landfill Soil-Vapor Monitoring Well SV03 Ports

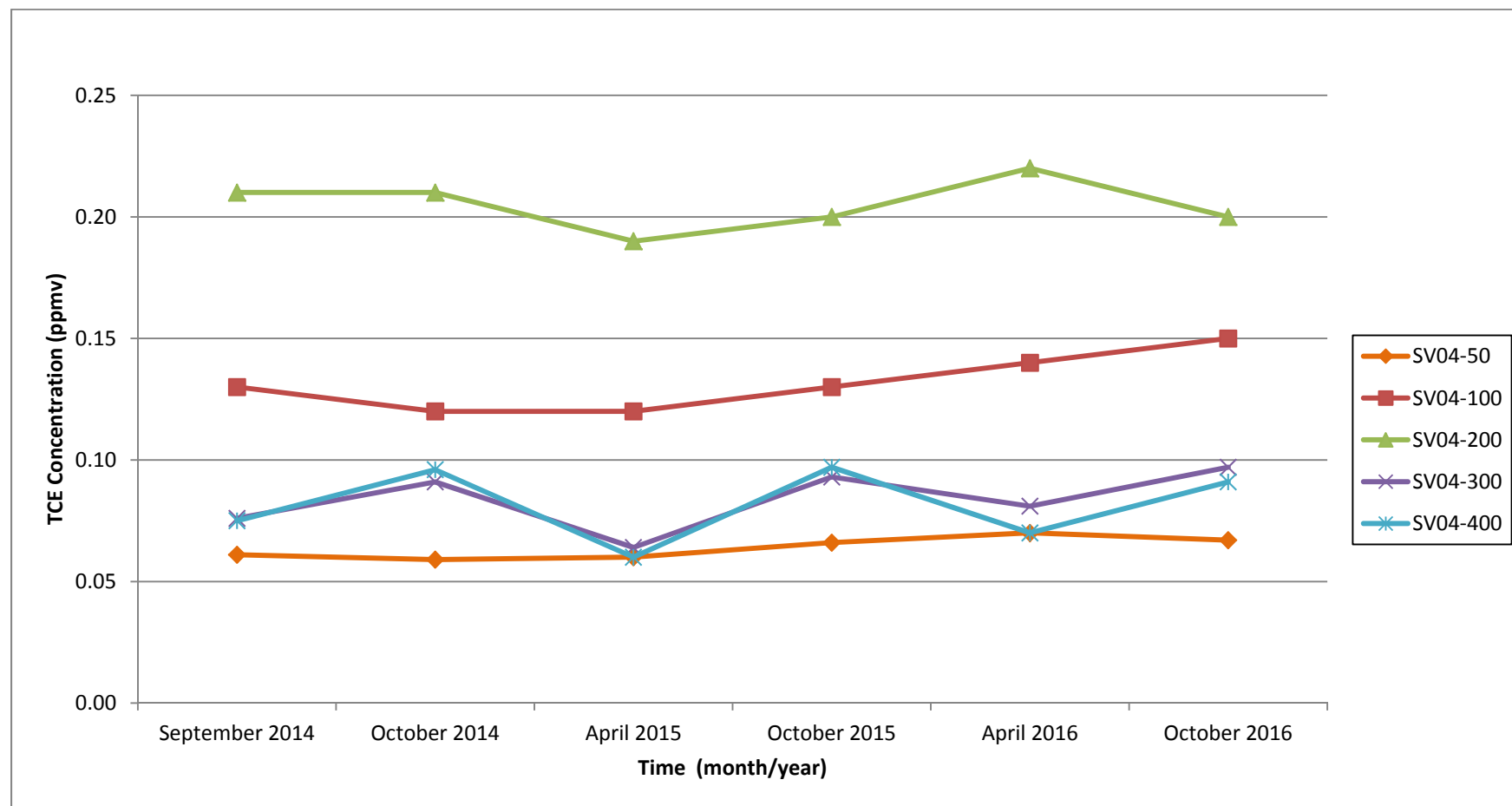


Figure 5-8
TCE Concentrations vs. Time
Mixed Waste Landfill Soil-Vapor Monitoring Well SV04 Ports

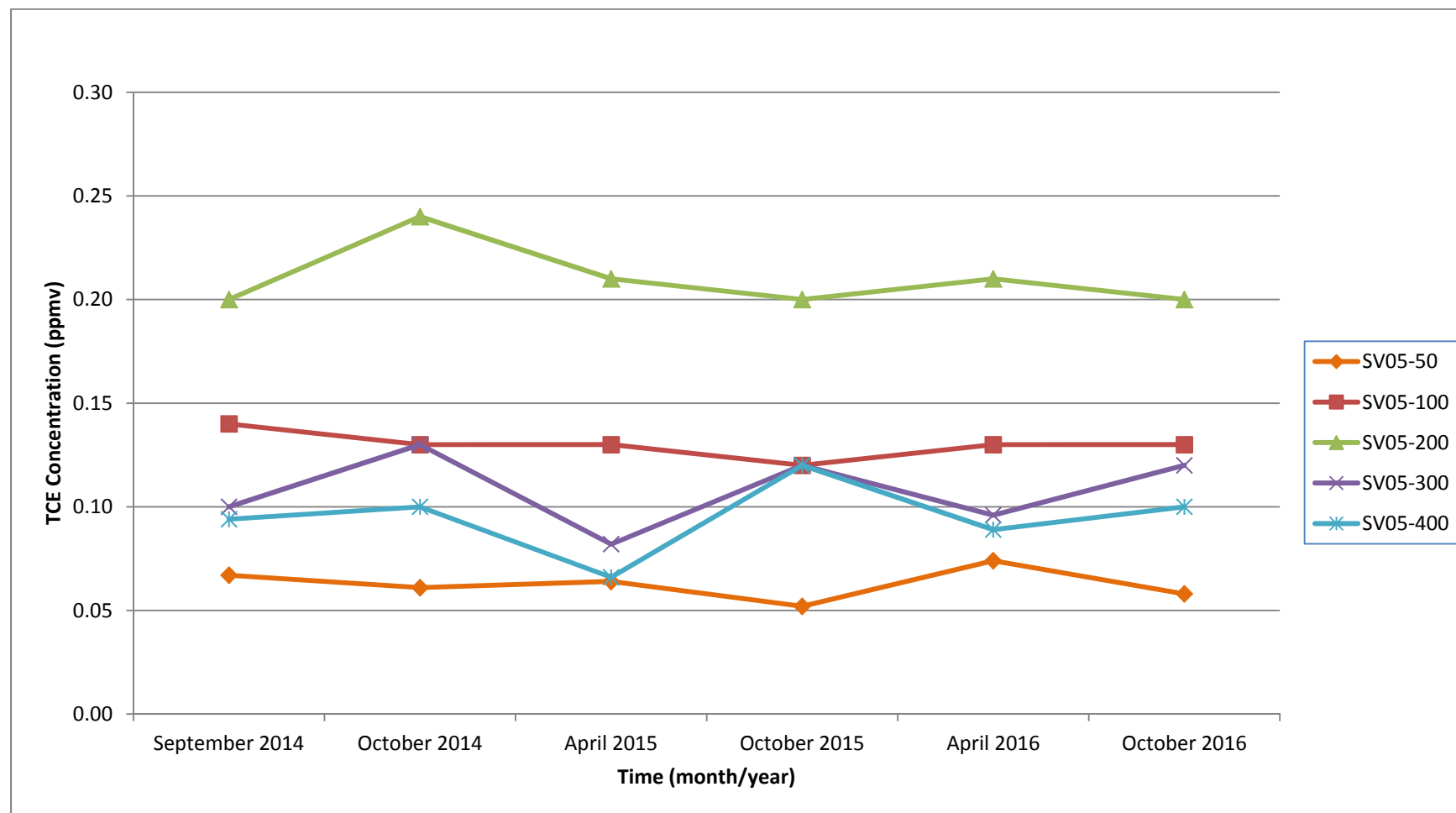


Figure 5-9
TCE Concentrations vs. Time
Mixed Waste Landfill Soil-Vapor Monitoring Well SV05 Ports

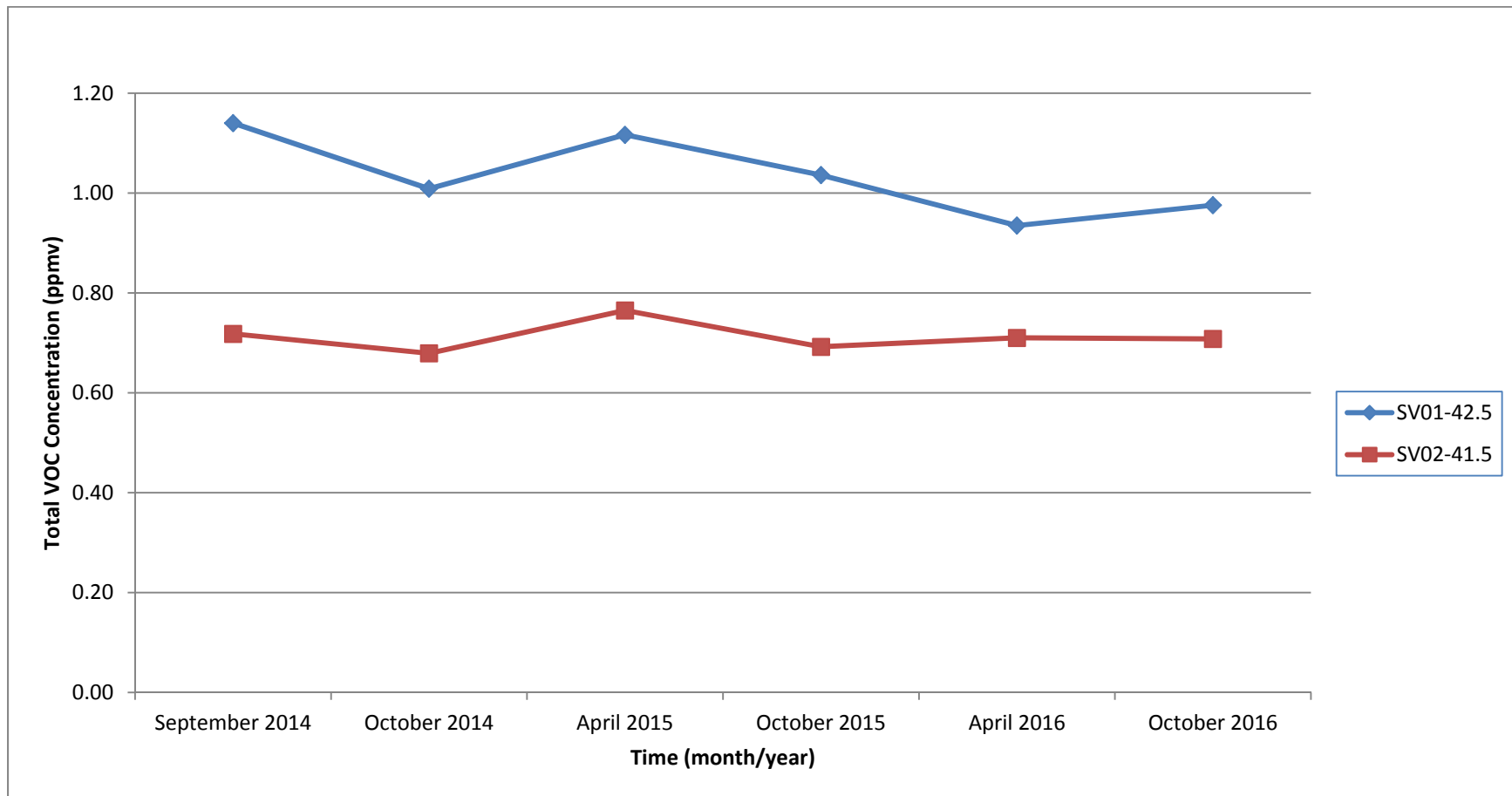


Figure 5-10
Total VOCs Concentrations vs. Time
Mixed Waste Landfill Soil-Vapor Monitoring Wells SV01 and SV02 Ports

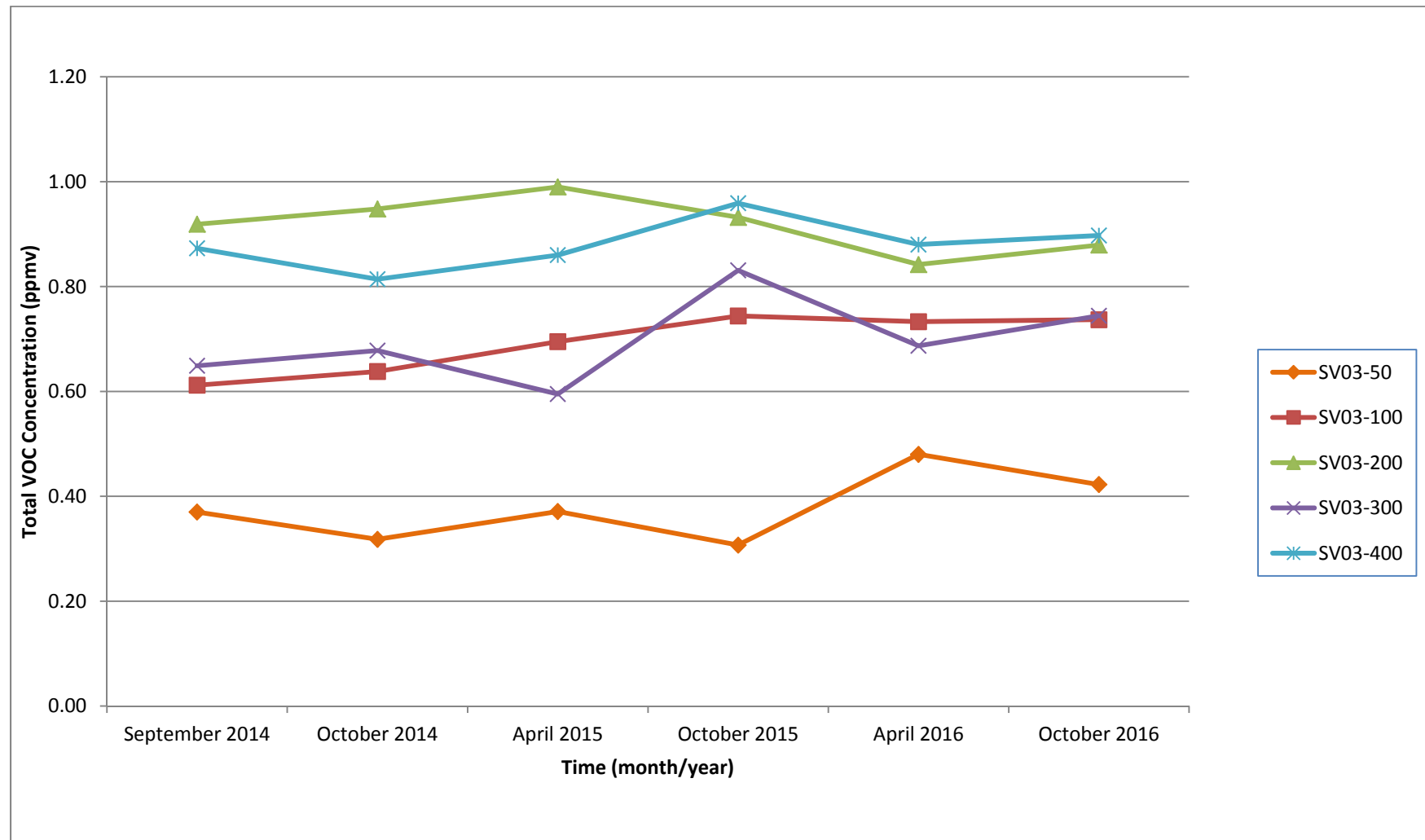


Figure 5-11
Total VOCs Concentrations vs. Time
Mixed Waste Landfill Soil-Vapor Monitoring Well SV03 Ports

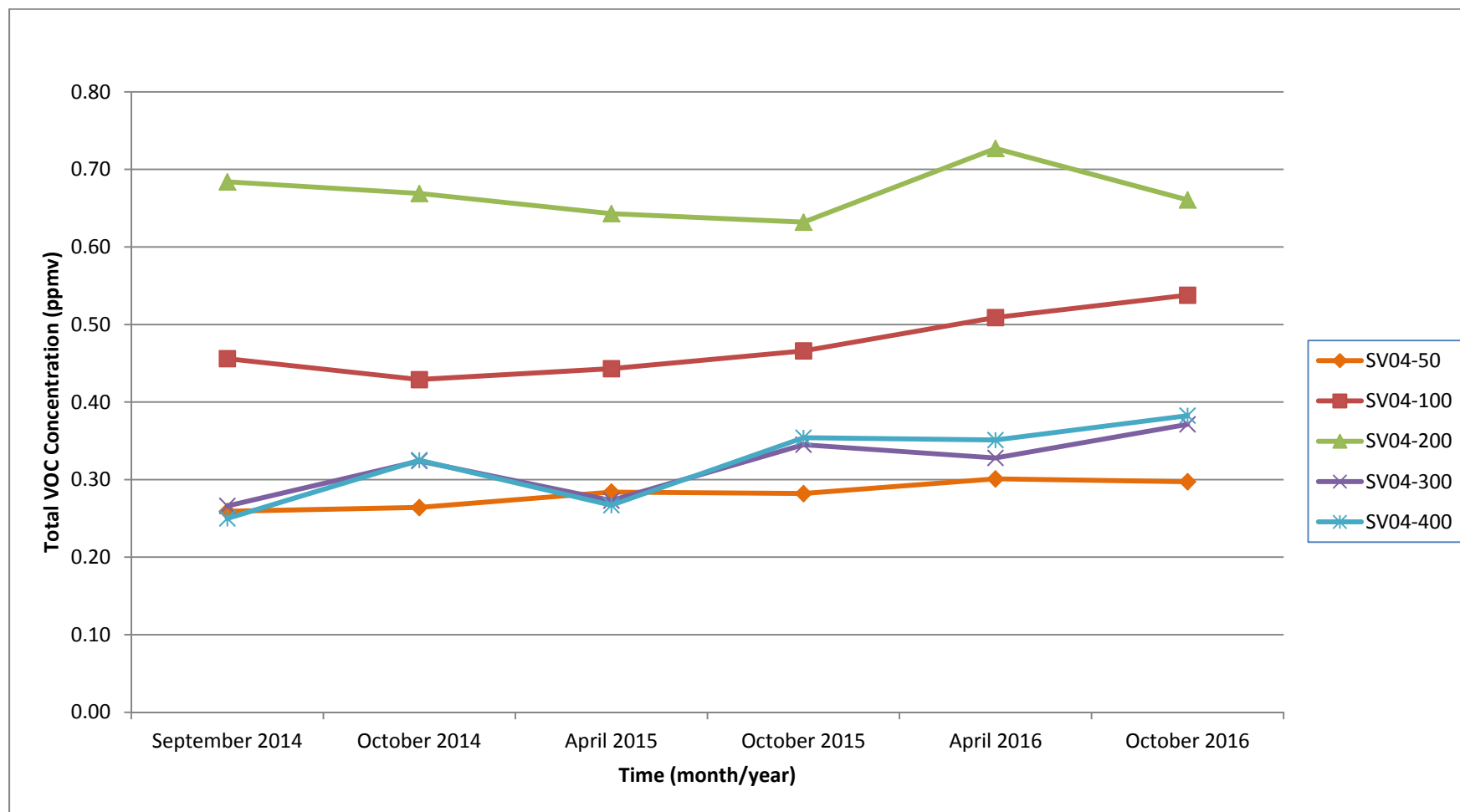


Figure 5-12
Total VOCs Concentrations vs. Time
Mixed Waste Landfill Soil-Vapor Monitoring Well SV04 Ports

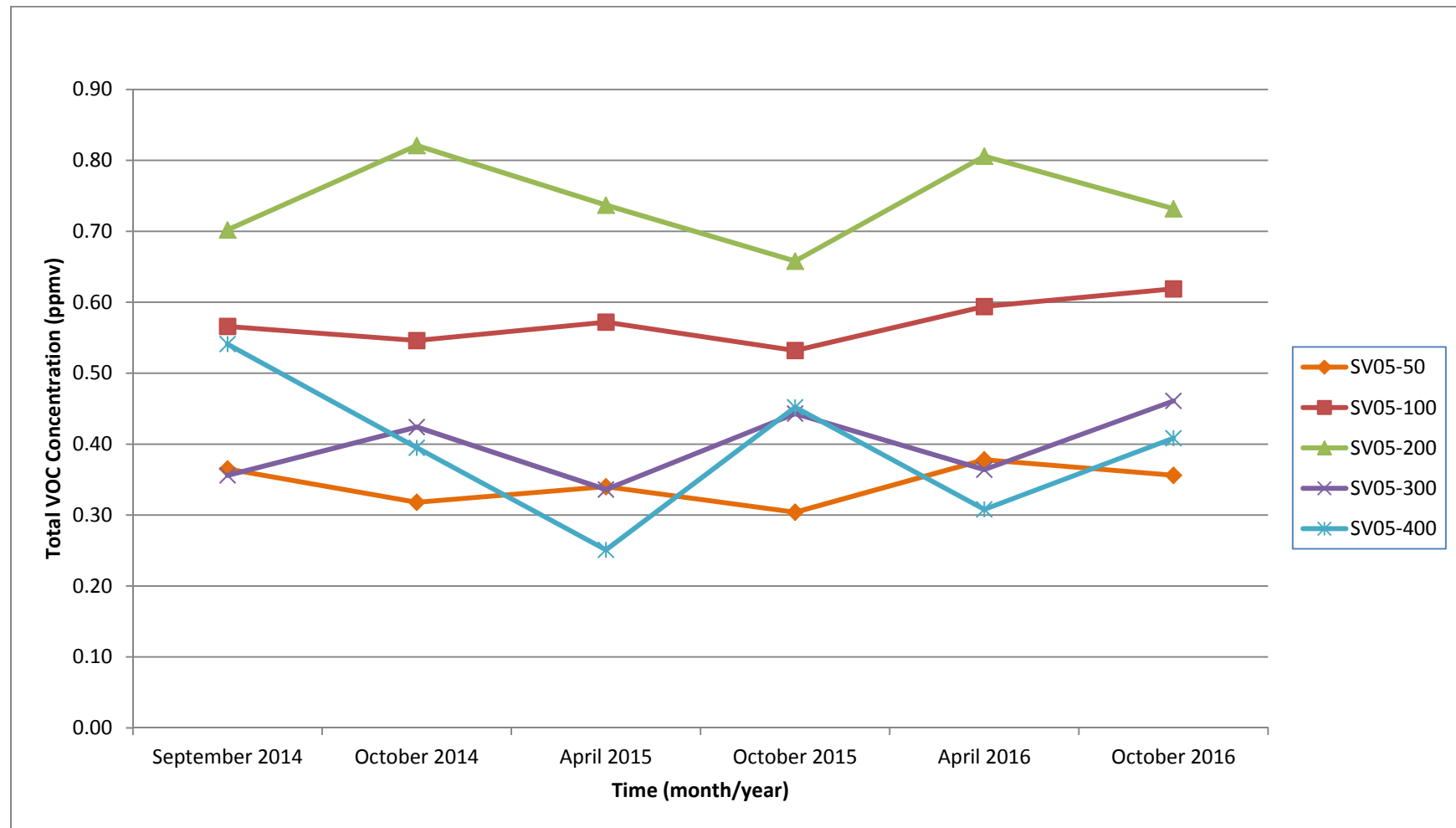


Figure 5-13
Total VOCs Concentrations vs. Time
Mixed Waste Landfill Soil-Vapor Monitoring Well SV05 Ports

Table 5-1
Summary of Detected VOCs – April 2016

Table 5-2
Summary of Detected VOCs – October 2016

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Table 5-1
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
April 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV01-42.5 27-Apr-16	Chloroform	0.014	1.7	5.3	--	--
	Dichlorodifluoromethane	0.099	2.6	7.1	--	--
	1,1-Dichloroethane	0.0027	1.3	5.3	J	--
	1,1-Dichloroethene	0.0079	2.3	14	J	--
	Methylene chloride	0.0030	1.3	7.1	B, J	--
	Tetrachloroethene	0.410	0.90	7.1	--	--
	Toluene	0.0015	0.90	7.1	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.084	2.9	7.1	--	--
	1,1,1-Trichloroethane	0.042	1.1	5.3	--	--
	Trichloroethene	0.091	1.9	7.1	--	--
	Trichlorofluoromethane	0.180	3.5	7.1	--	--
	Total Organics	0.9351	NA	NA	--	--
MWL-SV02-41.5 27-Apr-16	Chloroform	0.0030	1.1	3.4	J	--
	Dichlorodifluoromethane	0.100	1.7	4.6	--	--
	1,1-Dichloroethane	0.0024	0.82	3.4	J	--
	1,1-Dichloroethene	0.011	1.5	9.2	--	--
	Methylene chloride	0.0019	0.82	4.6	B, J	--
	Tetrachloroethene	0.068	0.58	4.6	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.054	1.9	4.6	--	--
	1,1,1-Trichloroethane	0.077	0.74	3.4	--	--
	Trichloroethene	0.063	1.2	4.6	--	--
	Trichlorofluoromethane	0.330	2.2	4.6	--	--
	Total Organics	0.7103	NA	NA	--	--

Refer to footnotes at end of table.

Table 5-1 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
April 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV03-50 27-Apr-16	Acetone	0.0036	1.3	37	J	--
	Benzene	0.00066	0.58	2.9	J	--
	Chloroform	0.0021	0.70	2.2	J	--
	Dichlorodifluoromethane	0.031	1.1	2.9	--	--
	1,1-Dichloroethane	0.0034	0.53	2.2	--	--
	1,1-Dichloroethene	0.013	0.95	5.9	--	--
	cis-1,2-Dichloroethene	0.0022	0.65	2.9	J	--
	Methylene chloride	0.0017	0.53	2.9	B, J	--
	Tetrachloroethene	0.170	0.37	2.9	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.078	1.2	2.9	--	--
	1,1,1-Trichloroethane	0.0055	0.48	2.2	--	--
	Trichloroethene	0.140	0.77	2.9	--	--
	Trichlorofluoromethane	0.029	1.4	2.9	--	--
	Total Organics	0.48016	NA	NA	NA	NA
MWL-SV03-100 27-Apr-16	Acetone	0.0054	2.0	56	J	--
	Carbon disulfide	0.0063	0.88	9.0	J	--
	Chloroform	0.0024	1.1	3.4	J	--
	Dichlorodifluoromethane	0.049	1.6	4.5	--	--
	1,1-Dichloroethane	0.0061	0.81	3.4	--	--
	1,1-Dichloroethene	0.025	1.5	9.0	--	--
	cis-1,2-Dichloroethene	0.0039	1.0	4.5	J	--
	Methylene chloride	0.0031	0.81	4.5	B, J	--
	Tetrachloroethene	0.240	0.58	4.5	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.140	1.8	4.5	--	--
	1,1,1-Trichloroethane	0.0055	0.73	3.4	--	--
	Trichloroethene	0.210	1.2	4.5	--	--
	Trichlorofluoromethane	0.036	2.2	4.5	--	--
	Total Organics	0.7327	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
April 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV03-200 27-Apr-16	Acetone	0.0023	2.0	57	J	--
	Chloroform	0.0021	1.1	3.4	J	--
	Dichlorodifluoromethane	0.057	1.6	4.5	--	--
	1,1-Dichloroethane	0.0077	0.82	3.4	--	--
	1,1-Dichloroethene	0.033	1.5	9.1	--	--
	cis-1,2-Dichloroethene	0.0048	1.0	4.5	--	--
	Tetrachloroethene	0.270	0.58	4.5	--	--
	Toluene	0.00071	0.58	4.5	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.180	1.8	4.5	--	--
	1,1,1-Trichloroethane	0.0029	0.74	3.4	J	--
	Trichloroethene	0.250	1.2	4.5	--	--
	Trichlorofluoromethane	0.031	2.2	4.5	--	--
	Total Organics	0.84151	NA	NA	NA	NA
MWL-SV03-300 27-Apr-16	Acetone	0.0036	2.3	66	J	--
	Dichlorodifluoromethane	0.033	1.9	5.3	--	--
	1,1-Dichloroethane	0.0025	0.95	4.0	J	--
	1,1-Dichloroethene	0.019	1.7	11	--	--
	cis-1,2-Dichloroethene	0.0020	1.2	5.3	J	--
	Methylene chloride	0.0030	0.95	5.3	B, J	--
	Tetrachloroethene	0.310	0.67	5.3	--	--
	Toluene	0.00074	0.67	5.3	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.100	2.2	5.3	--	--
	1,1,1-Trichloroethane	0.00094	0.86	4.0	J	--
	Trichloroethene	0.200	1.4	5.3	--	--
	Trichlorofluoromethane	0.012	2.6	5.3	--	--
	Total Organics	0.68678	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
April 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV03-400 27-Apr-16	Acetone	0.0041	3.3	93	J	--
	Dichlorodifluoromethane	0.025	2.7	7.4	--	--
	1,1-Dichloroethane	0.0033	1.3	5.6	J	--
	1,1-Dichloroethene	0.020	2.4	15	--	--
	cis-1,2-Dichloroethene	0.0025	1.7	7.4	J	--
	Methylene chloride	0.0035	1.3	7.4	B, J	--
	Tetrachloroethene	0.430	0.95	7.4	--	--
	Toluene	0.0012	0.95	7.4	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.078	3.0	7.4	--	--
	1,1,1-Trichloroethane	0.0012	1.2	5.6	J	--
	Trichloroethene	0.300	2.0	7.4	--	--
	Trichlorofluoromethane	0.011	3.6	7.4	--	--
	Total Organics	0.8798	NA	NA	NA	NA
MWL-SV04-50 27-Apr-16	Acetone	0.0025	0.52	15	J	--
	Benzene	0.00056	0.23	1.2	J	--
	2-Butanone	0.00059	0.58	2.3	J	--
	Carbon tetrachloride	0.00022	0.19	2.3	J	--
	Chloroform	0.0020	0.28	0.87	--	--
	Dichlorodifluoromethane	0.025	0.42	1.2	--	--
	1,1-Dichloroethane	0.0017	0.21	0.87	--	--
	1,1-Dichloroethene	0.0085	0.37	2.3	--	--
	cis-1,2-Dichloroethene	0.00079	0.26	1.2	J	--
	Methylene chloride	0.00055	0.21	1.2	B, J	1.2U
	Tetrachloroethene	0.078	0.15	1.2	--	--
	Toluene	0.00018	0.15	1.2	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.075	0.47	1.2	--	--
	1,1,1-Trichloroethane	0.0076	0.19	0.87	--	--
	Trichloroethene	0.070	0.30	1.2	--	--
	Trichlorofluoromethane	0.0280	0.57	1.2	--	--
	Total Organics ^d	0.30064	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
April 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV04-100 27-Apr-16	Acetone	0.0020	1.0	29	J	--
	Chloroform	0.0023	0.56	1.8	--	--
	Dichlorodifluoromethane	0.042	0.85	2.4	--	--
	1,1-Dichloroethane	0.0036	0.42	1.8	--	--
	1,1-Dichloroethene	0.020	0.76	4.7	--	--
	cis-1,2-Dichloroethene	0.0022	0.52	2.4	J	--
	Methylene chloride	0.00130	0.42	2.4	B, J	2.4U
	Tetrachloroethene	0.130	0.30	2.4	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.120	0.96	2.4	--	--
	1,1,1-Trichloroethane	0.0062	0.38	1.8	--	--
	Trichloroethene	0.140	0.62	2.4	--	--
	Trichlorofluoromethane	0.041	1.2	2.4	--	--
	Total Organics ^d	0.5093	NA	NA	NA	NA
MWL-SV04-200 27-Apr-16	Acetone	0.0052	1.5	41	J	--
	Chloroform	0.0014	0.78	2.5	J	--
	Dichlorodifluoromethane	0.056	1.2	3.3	--	--
	1,1-Dichloroethane	0.0053	0.59	2.5	--	--
	1,1-Dichloroethene	0.035	1.1	6.6	--	--
	cis-1,2-Dichloroethene	0.0033	0.73	3.3	--	--
	Methylene chloride	0.0023	0.59	3.3	B, J	--
	Tetrachloroethene	0.180	0.42	3.3	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.170	1.3	3.3	--	--
	1,1,1-Trichloroethane	0.00210	0.53	2.5	J	--
	Trichloroethene	0.210	0.86	3.3	--	--
	Trichlorofluoromethane	0.036	1.6	3.3	--	--
	Total Organics	0.7066	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
April 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV04-200 (Duplicate) 27-Apr-16	Acetone	0.0023	1.6	44	J	--
	Chloroform	0.0014	0.84	2.6	J	--
	Dichlorodifluoromethane	0.058	1.3	3.5	--	--
	1,1-Dichloroethane	0.0055	0.63	2.6	--	--
	1,1-Dichloroethene	0.035	1.1	7.0	--	--
	cis-1,2-Dichloroethene	0.0034	0.78	3.5	J	--
	Methylene chloride	0.0027	0.63	3.5	B, J	--
	Tetrachloroethene	0.180	0.45	3.5	--	--
	Toluene	0.00049	0.45	3.5	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.180	1.4	3.5	--	--
	1,1,1-Trichloroethane	0.0021	0.57	2.6	J	--
	Trichloroethene	0.220	0.92	3.5	--	--
	Trichlorofluoromethane	0.036	1.7	3.5	--	--
	Total Organics	0.72689	NA	NA	NA	NA
MWL-SV04-300 27-Apr-16	Acetone	0.0062	0.79	22	J	--
	Benzene	0.00039	0.35	1.8	J	--
	Dichlorodifluoromethane	0.020	0.64	1.8	--	--
	1,1-Dichloroethane	0.0014	0.32	1.3	--	--
	1,1-Dichloroethene	0.012	0.57	3.6	--	--
	cis-1,2-Dichloroethene	0.00085	0.40	1.8	J	--
	Methylene chloride	0.0014	0.32	1.8	B, J	1.8U
	Tetrachloroethene	0.130	0.23	1.8	--	--
	Toluene	0.00037	0.23	1.8	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.063	0.72	1.8	--	--
	1,1,1-Trichloroethane	0.0011	0.29	1.3	J	--
	Trichloroethene	0.081	0.47	1.8	--	--
	Trichlorofluoromethane	0.012	0.87	1.8	--	--
	Total Organics ^d	0.32831	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
April 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV04-400 27-Apr-16	Acetone	0.018	1.0	29	J	--
	Benzene	0.0032	0.47	2.4	--	--
	2-Butanone	0.0032	1.2	4.7	J	--
	Carbon disulfide	0.0040	0.46	4.7	J	--
	Chloromethane	0.0018	1.2	4.7	J	--
	Dichlorodifluoromethane	0.019	0.85	2.4	--	--
	1,1-Dichloroethane	0.00081	0.42	1.8	J	--
	1,1-Dichloroethene	0.0086	0.76	4.7	--	--
	cis-1,2-Dichloroethene	0.00053	0.52	2.4	J	--
	Methylene chloride	0.0016	0.42	2.4	B, J	2.4U
	Tetrachloroethene	0.150	0.30	2.4	--	--
	Toluene	0.00048	0.30	2.4	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.062	0.96	2.4	--	--
	1,1,1-Trichloroethane	0.00056	0.38	1.8	J	--
	Trichloroethene	0.070	0.62	2.4	--	--
	Trichlorofluoromethane	0.0093	1.2	2.4	--	--
	Total Organics ^d	0.35148	NA	NA	NA	NA
MWL-SV04-400 (Duplicate) 27-Apr-16	Acetone	0.0064	0.84	24	J	--
	Benzene	0.00067	0.37	1.9	J	--
	Carbon disulfide	0.00083	0.37	3.8	J	--
	Dichlorodifluoromethane	0.017	0.68	1.9	--	--
	1,1-Dichloroethane	0.00080	0.34	1.4	J	--
	1,1-Dichloroethene	0.0079	0.61	3.8	--	--
	cis-1,2-Dichloroethene	0.00052	0.42	1.9	J	--
	Methylene chloride	0.0013	0.34	1.9	B, J	1.9U
	Tetrachloroethene	0.110	0.24	1.9	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.056	0.77	1.9	--	--
	1,1,1-Trichloroethane	0.00054	0.31	1.4	J	--
	Trichloroethene	0.058	0.49	1.9	--	--
	Trichlorofluoromethane	0.0085	0.92	1.9	--	--
	Total Organics ^d	0.26716	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
April 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV05-50 27-Apr-16	Acetone	0.0027	0.40	11	J	--
	Benzene	0.00023	0.18	0.90	J	--
	Chloroform	0.0016	0.21	0.68	--	--
	Dichlorodifluoromethane	0.047	0.33	0.90	--	--
	1,1-Dichloroethane	0.0022	0.16	0.68	--	--
	1,1-Dichloroethene	0.013	0.29	1.8	--	--
	cis-1,2-Dichloroethene	0.00097	0.20	0.90	--	--
	Methylene chloride	0.00096	0.16	0.90	B	0.96U
	Tetrachloroethene	0.060	0.12	0.90	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.052	0.37	0.90	--	--
	1,1,1-Trichloroethane	0.014	0.15	0.68	--	--
	Trichloroethene	0.074	0.24	0.90	--	--
	Trichlorofluoromethane	0.110	0.44	0.90	--	--
	Total Organics ^d	0.37770	NA	NA	NA	NA
MWL-SV05-100 27-Apr-16	Acetone	0.0023	0.80	23	J	--
	Carbon tetrachloride	0.00060	0.29	3.6	J	--
	Chloroform	0.0023	0.43	1.4	--	--
	Dichlorodifluoromethane	0.073	0.65	1.8	--	--
	1,1-Dichloroethane	0.0042	0.32	1.4	--	--
	1,1-Dichloroethene	0.027	0.58	3.6	--	--
	cis-1,2-Dichloroethene	0.0019	0.40	1.8	--	--
	Tetrachloroethene	0.099	0.23	1.8	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.100	0.73	1.8	--	--
	1,1,1-Trichloroethane	0.014	0.29	1.4	--	--
	Trichloroethene	0.130	0.47	1.8	--	--
	Trichlorofluoromethane	0.140	0.88	1.8	--	--
	Total Organics	0.59430	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
April 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV05-200 27-Apr-16	Acetone	0.0033	0.99	28	J	--
	Carbon tetrachloride	0.0012	0.36	4.5	J	--
	Chloroform	0.0022	0.53	1.7	--	--
	Dichlorodifluoromethane	0.075	0.81	2.2	--	--
	1,1-Dichloroethane	0.0063	0.40	1.7	--	--
	1,1-Dichloroethene	0.050	0.72	4.5	--	--
	cis-1,2-Dichloroethene	0.0029	0.50	2.2	--	--
	Methylene chloride	0.0045	0.40	2.2	B	--
	Tetrachloroethene	0.170	0.28	2.2	--	--
	Toluene	0.00037	0.28	2.2	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.190	0.91	2.2	--	--
	1,1,1-Trichloroethane	0.0039	0.36	1.7	--	--
	Trichloroethene	0.210	0.58	2.2	--	--
	Trichlorofluoromethane	0.086	1.1	2.2	--	--
	Total Organics	0.80567	NA	NA	NA	NA
MWL-SV05-300 27-Apr-16	Acetone	0.0043	0.67	19	J	--
	Carbon tetrachloride	0.00075	0.24	3.0	J	--
	Chloroform	0.00078	0.36	1.1	J	--
	Dichlorodifluoromethane	0.028	0.54	1.5		--
	1,1-Dichloroethane	0.0018	0.27	1.1		--
	1,1-Dichloroethene	0.023	0.48	3.0		--
	cis-1,2-Dichloroethene	0.00089	0.33	1.5	J	--
	Methylene chloride	0.0017	0.27	1.5	B	1.7U
	Tetrachloroethene	0.100	0.19	1.5		--
	Toluene	0.00029	0.19	1.5	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.085	0.61	1.5		--
	1,1,1-Trichloroethane	0.0014	0.24	1.1		--
	Trichloroethene	0.096	0.39	1.5		--
	Trichlorofluoromethane	0.022	0.74	1.5		--
	Total Organics ^d	0.36421	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-1 (Concluded)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
April 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV05-400 27-Apr-16	Acetone	0.0076	0.50	14	J	--
	Benzene	0.00033	0.22	1.1	J	--
	2-Butanone	0.0013	0.56	2.2	J	--
	Carbon disulfide	0.00055	0.22	2.2	J	2.2U
	Carbon tetrachloride	0.00041	0.18	2.2	J	--
	Chloroform	0.00068	0.27	0.84	J	--
	Dichlorodifluoromethane	0.015	0.41	1.1	--	--
	1,1-Dichloroethane	0.0016	0.20	0.84	--	--
	1,1-Dichloroethene	0.015	0.36	2.2	--	--
	cis-1,2-Dichloroethene	0.00083	0.25	1.1	J	--
	Methylene chloride	0.0014	0.20	1.1	B	1.4U
	Tetrachloroethene	0.110	0.14	1.1	--	--
	Toluene	0.0074	0.14	1.1	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.040	0.46	1.1	--	--
	1,1,1-Trichloroethane	0.0015	0.18	0.84	--	--
	Trichloroethene	0.089	0.30	1.1	--	--
	Trichlorofluoromethane	0.017	0.55	1.1	--	--
	Total Organics ^d	0.30765	NA	NA	NA	NA

Notes:

^aU.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.

^bResults are reported in ppmv. MDL and RL are reported in ppbv.

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

B = Compound was found in method blank and sample.

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

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.

^dTotal 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 VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
October 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV01-42.5 13-Oct-16	Acetone	0.0036	2.5	69	J	--
	Chloroform	0.015	1.3	4.1	--	--
	Dichlorodifluoromethane	0.095	2.0	5.5	--	--
	1,1-Dichloroethane	0.0014	0.99	4.1	J	--
	1,1-Dichloroethene	0.0077	1.8	11	J	--
	Tetrachloroethene	0.450	0.70	5.5	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.082	2.2	5.5	--	--
	1,1,1-Trichloroethane	0.041	0.90	4.1	--	--
	Trichloroethene	0.100	1.4	5.5	--	--
	Trichlorofluoromethane	0.180	2.7	5.5	--	--
	Total Organics	0.9757	NA	NA	NA	NA
MWL-SV02-41.5 13-Oct-16	Acetone	0.0039	1.7	48	J	--
	2-Butanone	0.0033	1.9	7.7	J	--
	Chloroform	0.0031	0.91	2.9	--	--
	Dichlorodifluoromethane	0.097	1.4	3.8	--	--
	1,1-Dichloroethane	0.0025	0.69	2.9	J	--
	1,1-Dichloroethene	0.011	1.2	7.7	--	--
	Tetrachloroethene	0.070	0.49	3.8	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.053	1.6	3.8	--	--
	1,1,1-Trichloroethane	0.079	0.63	2.9	--	--
	Trichloroethene	0.065	1.0	3.8	--	--
	Trichlorofluoromethane	0.320	1.9	3.8	--	--
	Total Organics	0.7078	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
October 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV03-50 13-Oct-16	Acetone	0.0069	0.80	22	J	--
	Benzene	0.00079	0.35	1.8	J	--
	Carbon disulfide	0.0013	0.35	3.6	J	--
	Chloroform	0.0019	0.42	1.3	--	--
	Dichlorodifluoromethane	0.030	0.65	1.8	--	--
	1,1-Dichloroethane	0.0033	0.32	1.3	--	--
	1,1-Dichloroethene	0.012	0.58	3.6	--	--
	cis-1,2-Dichloroethene	0.0017	0.40	1.8	J	--
	Methylene chloride	0.00059	0.32	1.8	J	--
	Tetrachloroethene	0.140	0.23	1.8	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.078	0.73	1.8	--	--
	1,1,1-Trichloroethane	0.005	0.29	1.3	--	--
	Trichloroethene	0.110	0.47	1.8	--	--
	Trichlorofluoromethane	0.031	0.88	1.8	--	--
MWL-SV03-100 13-Oct-16	Total Organics	0.42248	NA	NA	NA	NA
	Acetone	0.0026	0.79	22	J	22U
	Carbon tetrachloride	0.00032	0.28	3.5	J	--
	Chloroform	0.0026	0.42	1.3	--	--
	Dichlorodifluoromethane	0.048	0.64	1.8	--	--
	1,1-Dichloroethane	0.0066	0.32	1.3	--	--
	1,1-Dichloroethene	0.026	0.57	3.5	--	--
	cis-1,2-Dichloroethene	0.0039	0.39	1.8	--	--
	Methylene chloride	0.0018	0.32	1.8	--	--
	Tetrachloroethene	0.240	0.23	1.8	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.150	0.72	1.8	--	--
	1,1,1-Trichloroethane	0.0056	0.29	1.3	--	--
	Trichloroethene	0.210	0.46	1.8	--	--
	Trichlorofluoromethane	0.042	0.87	1.8	--	--
	Total Organics ^d	0.73682	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
October 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV03-200 13-Oct-16	Acetone	0.0067	1.6	45	J	--
	Chloroform	0.0026	0.85	2.7	J	--
	Dichlorodifluoromethane	0.060	1.3	3.6	--	--
	1,1-Dichloroethane	0.0087	0.64	2.7	--	--
	1,1-Dichloroethene	0.034	1.2	7.1	--	--
	cis-1,2-Dichloroethene	0.0051	0.79	3.6	--	--
	Methylene chloride	0.0038	0.64	3.6	--	--
	Tetrachloroethene	0.270	0.45	3.6	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.180	1.5	3.6	--	--
	1,1,1-Trichloroethane	0.0033	0.58	2.7	--	--
	Trichloroethene	0.270	0.94	3.6	--	--
	Trichlorofluoromethane	0.035	1.7	3.6	--	--
	Total Organics	0.8792	NA	NA	NA	NA
MWL-SV03-300 13-Oct-16	Acetone	0.0069	2.0	57	J	--
	Carbon disulfide	0.013	0.89	9.1	--	--
	Chloroform	0.0014	1.1	3.4	J	--
	Dichlorodifluoromethane	0.039	1.7	4.6	--	--
	1,1-Dichloroethane	0.0034	0.82	3.4	--	--
	1,1-Dichloroethene	0.022	1.5	9.1	--	--
	cis-1,2-Dichloroethene	0.0023	1.0	4.6	J	--
	Tetrachloroethene	0.300	0.58	4.6	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.120	1.9	4.6	--	--
	1,1,1-Trichloroethane	0.0013	0.74	3.4	J	--
	Trichloroethene	0.220	1.2	4.6	--	--
	Trichlorofluoromethane	0.015	2.2	4.6	--	--
	Total Organics	0.7443	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
October 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV03-400 13-Oct-16	Acetone	0.0092	2.3	65	J	--
	Chloroform	0.0017	1.2	3.9	J	--
	Dichlorodifluoromethane	0.020	1.9	5.2	--	--
	1,1-Dichloroethane	0.0048	0.94	3.9	--	--
	1,1-Dichloroethene	0.021	1.7	10	--	--
	cis-1,2-Dichloroethene	0.0028	1.2	5.2	J	--
	Methylene chloride	0.0015	0.94	5.2	J	--
	Tetrachloroethene	0.440	0.66	5.2	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.062	2.1	5.2	--	--
	1,1,1-Trichloroethane	0.0023	0.85	3.9	J	--
	Trichloroethene	0.320	1.4	5.2	--	--
	Trichlorofluoromethane	0.012	2.5	5.2	--	--
	Total Organics	0.8973	NA	NA	NA	NA
MWL-SV04-50 13-Oct-16	Acetone	0.0036	0.48	13	J	--
	Benzene	0.00054	0.21	1.1	J	--
	Chloroform	0.0020	0.25	0.80	--	--
	Chloromethane	0.00073	0.53	2.1	J	--
	Dichlorodifluoromethane	0.021	0.39	1.1	--	--
	1,1-Dichloroethane	0.0016	0.19	0.80	--	--
	1,1-Dichloroethene	0.0077	0.34	2.1	--	--
	cis-1,2-Dichloroethene	0.00061	0.24	1.1	J	--
	Methylene chloride	0.00020	0.19	1.1	J	--
	Tetrachloroethene	0.077	0.14	1.1	--	--
	Toluene	0.0010	0.14	1.1	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.075	0.44	1.1	--	--
	1,1,1-Trichloroethane	0.0083	0.17	0.80	--	--
	Trichloroethene	0.067	0.28	1.1	--	--
	Trichlorofluoromethane	0.031	0.52	1.1	--	--
	Total Organics	0.29728	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
October 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV04-100 13-Oct-16	Acetone	0.0034	0.80	23	J	--
	Carbon tetrachloride	0.00036	0.29	3.6	J	--
	Chloroform	0.0022	0.43	1.4	--	--
	Dichlorodifluoromethane	0.042	0.65	1.8	--	--
	1,1-Dichloroethane	0.004	0.32	1.4	--	--
	1,1-Dichloroethene	0.021	0.58	3.6	--	--
	cis-1,2-Dichloroethene	0.0020	0.40	1.8	--	--
	Tetrachloroethene	0.130	0.23	1.8	--	--
	Toluene	0.00029	0.23	1.8	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.130	0.74	1.8	--	--
	1,1,1-Trichloroethane	0.0066	0.29	1.4	--	--
	Trichloroethene	0.150	0.47	1.8	--	--
	Trichlorofluoromethane	0.046	0.88	1.8	--	--
	Total Organics	0.53785	NA	NA	NA	NA
MWL-SV04-200 13-Oct-16	Acetone	0.011	0.85	24	J	--
	Carbon tetrachloride	0.00056	0.31	3.8	J	--
	Chloroform	0.0015	0.46	1.4	--	--
	Dichlorodifluoromethane	0.052	0.70	1.9	--	--
	1,1-Dichloroethane	0.0051	0.35	1.4	--	--
	1,1-Dichloroethene	0.033	0.62	3.8	--	--
	cis-1,2-Dichloroethene	0.0032	0.43	1.9	--	--
	Methylene chloride	0.0012	0.35	1.9	J	--
	Tetrachloroethene	0.150	0.24	1.9	--	--
	Toluene	0.00042	0.24	1.9	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.160	0.78	1.9	--	--
	1,1,1-Trichloroethane	0.0027	0.31	1.4	--	--
	Trichloroethene	0.200	0.50	1.9	--	--
	Trichlorofluoromethane	0.040	0.94	1.9	--	--
	Total Organics	0.66068	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
October 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV04-300 13-Oct-16	Acetone	0.0029	0.55	16	J	--
	Benzene	0.00033	0.24	1.2	J	--
	Carbon tetrachloride	0.00036	0.20	2.5	J	--
	Chloroform	0.00060	0.29	0.93	J	--
	Dichlorodifluoromethane	0.025	0.45	1.2	--	--
	1,1-Dichloroethane	0.0013	0.22	0.93	--	--
	1,1-Dichloroethene	0.014	0.40	2.5	--	--
	cis-1,2-Dichloroethene	0.00084	0.28	1.2	J	--
	Methylene chloride	0.00025	0.22	1.2	J	--
	Tetrachloroethene	0.130	0.16	1.2	--	--
	Toluene	0.00028	0.16	1.2	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.079	0.51	1.2	--	--
	1,1,1-Trichloroethane	0.0014	0.20	0.93	--	--
	Trichloroethene	0.097	0.33	1.2	--	--
	Trichlorofluoromethane	0.018	0.61	1.2	--	--
	Total Organics	0.37126	NA	NA	NA	NA
MWL-SV04-400 13-Oct-16	Acetone	0.0076	0.58	16	J	--
	Benzene	0.00072	0.26	1.3	J	--
	2-Butanone	0.0013	0.65	2.6	J	--
	Carbon disulfide	0.0012	0.25	2.6	J	--
	Carbon tetrachloride	0.00025	0.21	2.6	J	--
	Chloroform	0.00061	0.31	0.98	J	--
	Dichlorodifluoromethane	0.022	0.47	1.3	--	--
	1,1-Dichloroethane	0.0011	0.23	0.98	--	--
	1,1-Dichloroethene	0.010	0.42	2.6	--	--
	cis-1,2-Dichloroethene	0.00076	0.29	1.3	J	--
	2-Hexanone	0.012	0.28	1.3	--	--
	4-Methyl-2-pentanone	0.0098	0.44	1.3	--	--
	Methylene chloride	0.00029	0.23	1.3	J	--
	Tetrachloroethene	0.130	0.17	1.3	--	--
	Toluene	0.00028	0.17	1.3	J	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.075	0.53	1.3	--	--
	1,1,1-Trichloroethane	0.0014	0.21	0.98	--	--
	Trichloroethene	0.091	0.34	1.3	--	--
	Trichlorofluoromethane	0.017	0.64	1.3	--	--
	o-Xylene	0.00020	0.18	1.3	J	--
	Total Organics	0.38251	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
October 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV05-50 13-Oct-16	Acetone	0.0077	0.56	16	J	--
	2-Butanone	0.0013	0.62	2.5	J	--
	Carbon tetrachloride	0.00033	0.20	2.5	J	--
	Chloroform	0.0014	0.30	0.94	--	--
	Chloromethane	0.00092	0.62	2.5	J	--
	Dichlorodifluoromethane	0.049	0.46	1.3	--	--
	1,1-Dichloroethane	0.0017	0.23	0.94	--	--
	1,1-Dichloroethene	0.0099	0.41	2.5	--	--
	cis-1,2-Dichloroethene	0.00052	0.28	1.3	J	--
	2-Hexanone	0.00032	0.27	1.3	J	--
	Tetrachloroethene	0.045	0.16	1.3	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.044	0.51	1.3	--	--
	1,1,1-Trichloroethane	0.016	0.20	0.94	--	--
	Trichloroethene	0.058	0.33	1.3	--	--
	Trichlorofluoromethane	0.120	0.62	1.3	--	--
	Total Organics	0.35609	NA	NA	NA	NA
MWL-SV05-100 13-Oct-16	Acetone	0.011	0.74	21	J	--
	2-Butanone	0.0012	0.83	3.3	J	--
	Carbon tetrachloride	0.00050	0.27	3.3	J	--
	Chloroform	0.0022	0.39	1.2	--	--
	Dichlorodifluoromethane	0.077	0.60	1.7	--	--
	1,1-Dichloroethane	0.0035	0.30	1.2	--	--
	1,1-Dichloroethene	0.023	0.54	3.3	--	--
	cis-1,2-Dichloroethene	0.0017	0.37	1.7	--	--
	Methylene chloride	0.00075	0.30	1.7	J	1.7U
	Tetrachloroethene	0.092	0.21	1.7	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.093	0.68	1.7	--	--
	1,1,1-Trichloroethane	0.016	0.27	1.2	--	--
	Trichloroethene	0.120	0.44	1.7	--	--
	Trichlorofluoromethane	0.160	0.81	1.7	--	--
	Total Organics ^d	0.6011	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
October 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV05-100 (Duplicate) 13-Oct-16	Acetone	0.0068	0.78	22	J	--
	Carbon tetrachloride	0.00071	0.28	3.5	J	--
	Chloroform	0.0023	0.41	1.3	--	--
	Dichlorodifluoromethane	0.077	0.63	1.7	--	--
	1,1-Dichloroethane	0.0035	0.31	1.3	--	--
	1,1-Dichloroethene	0.023	0.56	3.5	--	--
	cis-1,2-Dichloroethene	0.0016	0.39	1.7	J	--
	Methylene chloride	0.00080	0.31	1.7	J	1.7U
	Tetrachloroethene	0.095	0.22	1.7	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.093	0.71	1.7	--	--
	1,1,1-Trichloroethane	0.016	0.28	1.3	--	--
	Trichloroethene	0.130	0.46	1.7	--	--
	Trichlorofluoromethane	0.170	0.85	1.7	--	--
	Total Organics ^d	0.61891	NA	NA	NA	NA
MWL-SV05-200 13-Oct-16	Acetone	0.0030	0.89	25	J	25U
	Carbon tetrachloride	0.0011	0.32	4.0	J	--
	Chloroform	0.0022	0.48	1.5	--	--
	Dichlorodifluoromethane	0.075	0.73	2.0	--	--
	1,1-Dichloroethane	0.0052	0.36	1.5	--	--
	1,1-Dichloroethene	0.041	0.65	4.0	--	--
	cis-1,2-Dichloroethene	0.0024	0.45	2.0	--	--
	Methylene chloride	0.0023	0.36	2.0	--	--
	Tetrachloroethene	0.140	0.26	2.0	--	--
	Toluene	0.00039	0.26	2.0	J	2.0U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.160	0.82	2.0	--	--
	1,1,1-Trichloroethane	0.0047	0.33	1.5	--	--
	Trichloroethene	0.200	0.53	2.0	--	--
	Trichlorofluoromethane	0.098	0.98	2.0	--	--
	Total Organics ^d	0.7319	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Continued)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
October 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV05-300 13-Oct-16	Acetone	0.014	0.65	18	J	--
	2-Butanone	0.0015	0.73	2.9	J	--
	Carbon tetrachloride	0.0011	0.23	2.9	J	--
	Chloroform	0.00089	0.35	1.1	J	--
	Dichlorodifluoromethane	0.039	0.53	1.5	--	--
	1,1-Dichloroethane	0.0017	0.26	1.1	--	--
	1,1-Dichloroethene	0.026	0.47	2.9	--	--
	cis-1,2-Dichloroethene	0.00093	0.32	1.5	J	--
	Methylene chloride	0.00082	0.26	1.5	J	1.5U
	Tetrachloroethene	0.110	0.19	1.5	--	--
	Toluene	0.0012	0.19	1.5	J	1.5U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.110	0.59	1.5	--	--
	1,1,1-Trichloroethane	0.0018	0.24	1.1	--	--
	Trichloroethene	0.120	0.38	1.5	--	--
	Trichlorofluoromethane	0.034	0.72	1.5	--	--
	Total Organics ^d	0.46092	NA	NA	NA	NA
MWL-SV05-300 (Duplicate) 13-Oct-16	Acetone	0.0054	0.61	17	J	17U
	Carbon tetrachloride	0.0011	0.22	2.7	J	--
	Chloroform	0.00089	0.32	1.0	J	--
	Dichlorodifluoromethane	0.041	0.49	1.4	--	--
	1,1-Dichloroethane	0.0018	0.25	1.0	--	--
	1,1-Dichloroethene	0.027	0.44	2.7	--	--
	cis-1,2-Dichloroethene	0.00093	0.30	1.4	J	--
	Methylene chloride	0.00086	0.25	1.4	J	1.4U
	Tetrachloroethene	0.110	0.17	1.4	--	--
	Toluene	0.00048	0.17	1.4	J	1.4U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.120	0.56	1.4	--	--
	1,1,1-Trichloroethane	0.0017	0.22	1.0	--	--
	Trichloroethene	0.120	0.36	1.4	--	--
	Trichlorofluoromethane	0.035	0.67	1.4	--	--
	Total Organics ^d	0.45942	NA	NA	NA	NA

Refer to footnotes at end of table.

Table 5-2 (Concluded)
Summary of Detected VOCs (EPA Method TO-15^a)
Mixed Waste Landfill Soil-Vapor Monitoring
October 2016

Well ID/Sample Port	Analyte	Result ^b (ppmv)	MDL ^b (ppbv)	RL ^b (ppbv)	Laboratory Qualifier ^c	Validation Qualifier ^c
MWL-SV05-400 13-Oct-16	Acetone	0.0078	0.46	13	J	--
	Benzene	0.00048	0.20	1.0	J	--
	2-Butanone	0.00087	0.51	2.0	J	--
	Carbon disulfide	0.0019	0.20	2.0	J	--
	Carbon tetrachloride	0.00086	0.16	2.0	J	--
	Chloroform	0.00085	0.24	0.77	--	--
	Chloromethane	0.00064	0.50	2.0	J	--
	Dichlorodifluoromethane	0.041	0.37	1.0	--	--
	1,1-Dichloroethane	0.0021	0.18	0.77	--	--
	1,1-Dichloroethene	0.020	0.33	2.0	--	--
	cis-1,2-Dichloroethene	0.00079	0.23	1.0	J	--
	Methylene chloride	0.00074	0.18	1.0	J	1.0U
	Tetrachloroethene	0.110	0.13	1.0	--	--
	Toluene	0.0017	0.13	1.0	--	1.7U
	1,1,2-Trichloro-1,2,2-trifluoroethane	0.071	0.42	1.0	--	--
	1,1,1-Trichloroethane	0.0031	0.17	0.77	--	--
	Trichloroethene	0.100	0.27	1.0	--	--
	Trichlorofluoromethane	0.047	0.50	1.0	--	--
	Total Organics	0.40839	NA	NA	NA	NA

Notes:

^aU.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.

^bResults are reported in ppmv. MDL and RL are reported in ppbv.

^cLaboratory/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.

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.

^dTotal 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.

6.0 SOIL-MOISTURE MONITORING RESULTS

This chapter presents soil-moisture monitoring activities (i.e., data collection and evaluation) 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

One annual soil-moisture monitoring event was conducted during the April 1, 2016 through March 31, 2017 reporting period fulfilling the LTMMMP annual monitoring requirement. The monitoring event was conducted on April 7, 2016. Figure 6-1 shows the soil-moisture monitoring locations MWL-VZ-1, MWL-VZ-2, and MWL-VZ-3, which are angled boreholes (60 degrees from the horizontal ground surface) that project beneath the MWL. Soil-moisture monitoring field forms and tables that compare soil-moisture content values to baseline values for the three access tubes are provided in Annex D.

Neutron count data collected in the field were correlated to percent soil-moisture content by volume as described in LTMMMP Section 3.4.2 and Appendix E (SNL/NM March 2012). 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 the day of the monitoring event prior to the moisture logging to ensure the instrument was functioning properly and to confirm measurement accuracy. The results of the standard counts are provided on the MWL neutron logging data field form provided in Annex D.

6.1.2 Waste Management

No wastes were generated from soil-moisture monitoring activities.

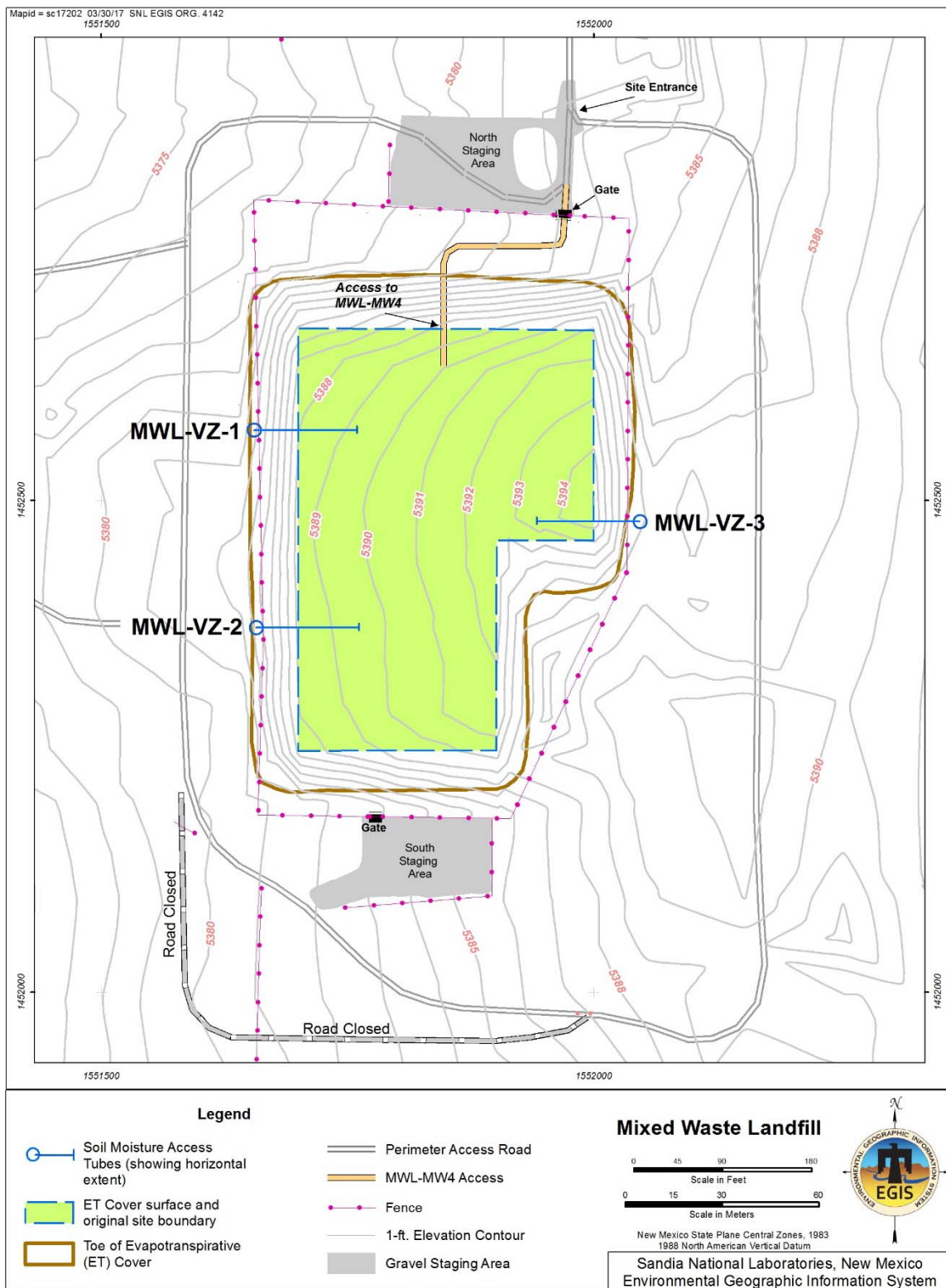


Figure 6-1
Mixed Waste Landfill Soil-Moisture Monitoring Locations

6.2 Monitoring Results

Soil-moisture monitoring data for this reporting period are presented in Figures 6-2, 6-3, and 6-4 for MWL-VZ-1, MWLVZ-2, and MWL-VZ-3, respectively. The results for the April 7, 2016 annual monitoring event 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 percent at depths below 80 feet bgs. The April data are consistent with the baseline data and indicate a dry vadose zone.

6.2.1 Variances

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

6.3 Data Evaluation and Monitoring Trigger Level

Soil-moisture data collected during the reporting period 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 1.8 to 5.1 percent, compared to 1.7 to 5.6 percent baseline. At MWL-VZ-2 the soil-moisture content ranged from 2.2 to 4.7 percent, compared to 2.1 to 5.5 percent baseline. At MWL-VZ-3 the soil-moisture content ranged from 1.4 to 4.5 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.

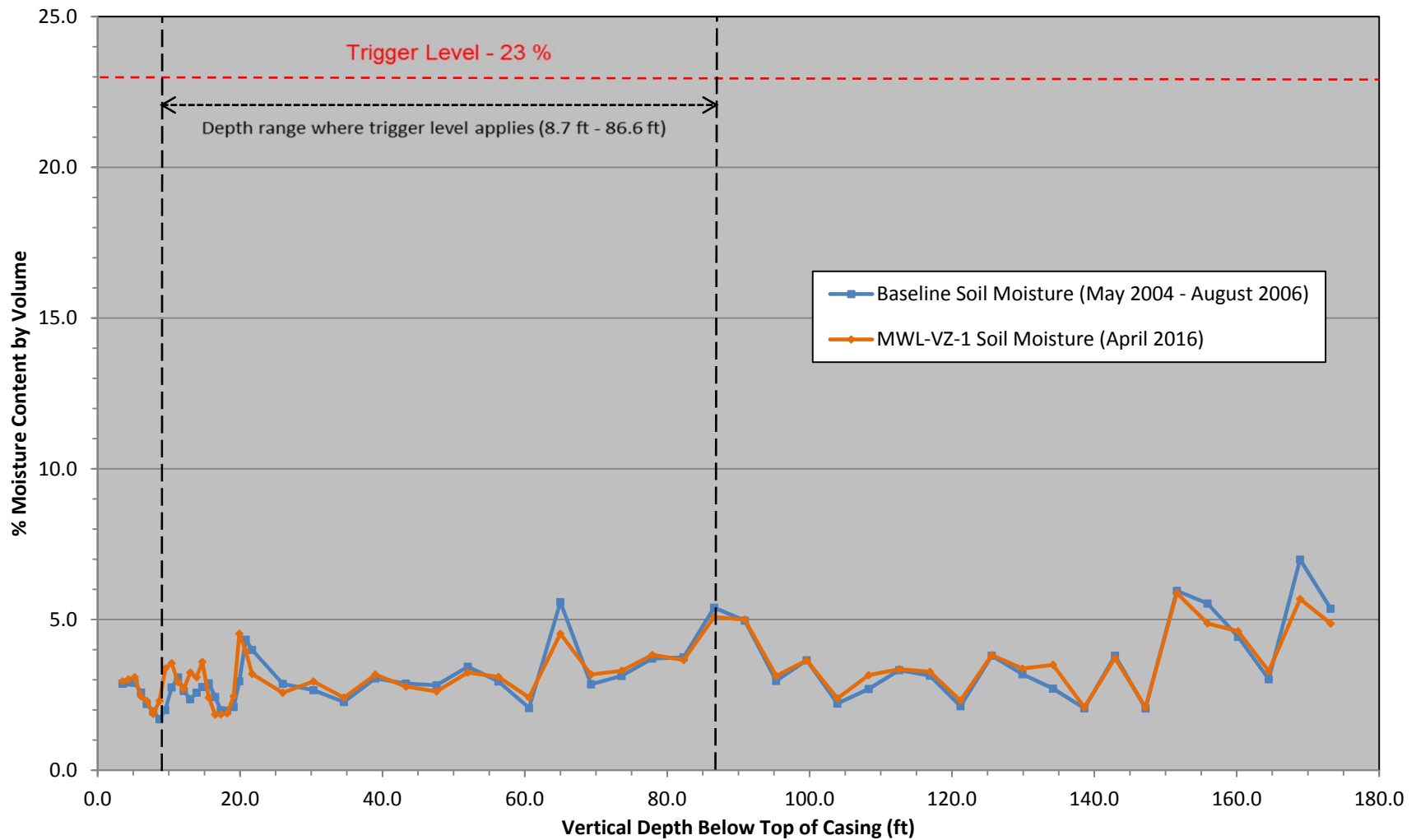


Figure 6-2
Mixed Waste Landfill MWL-VZ-1 Soil-Moisture Monitoring Results

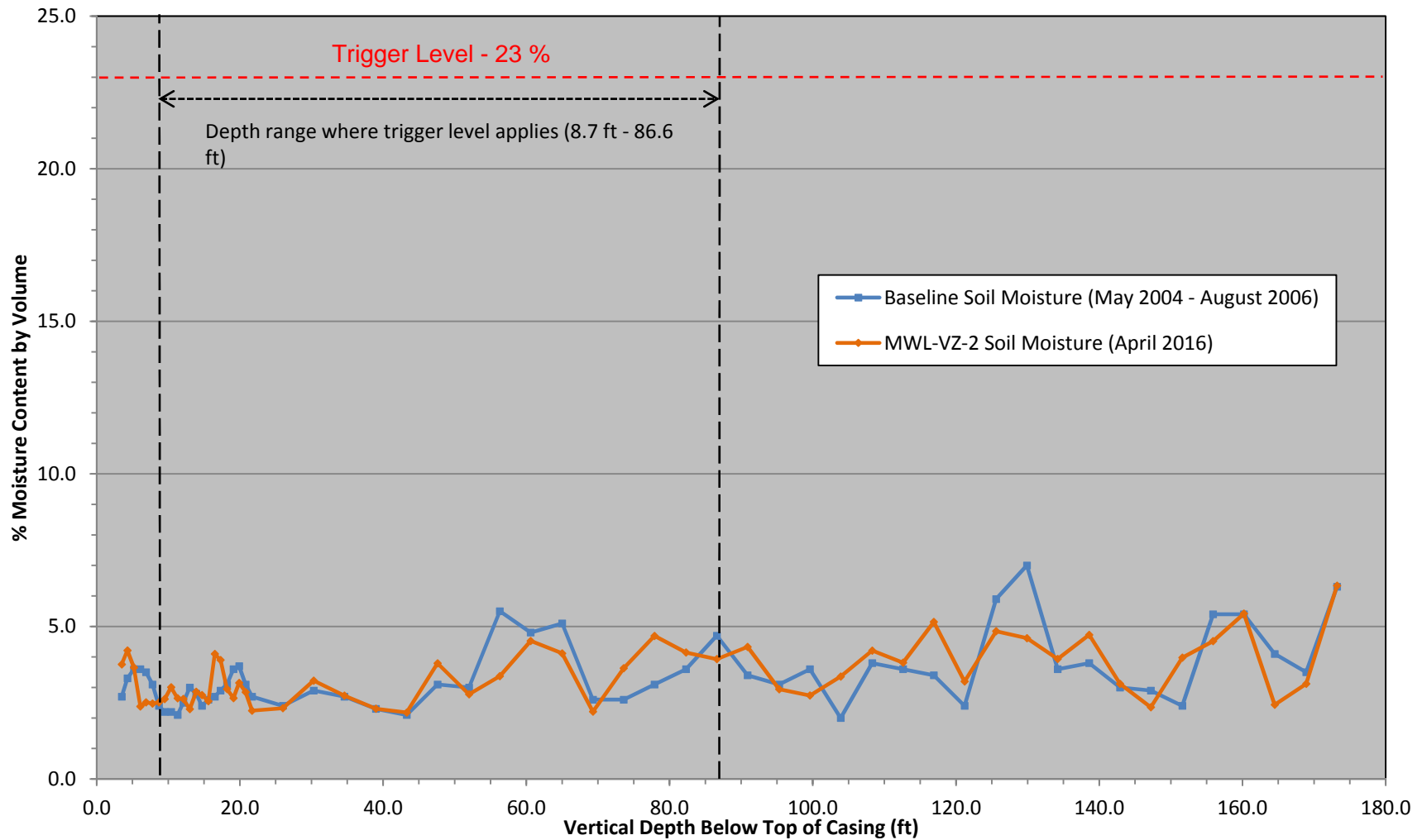


Figure 6-3
Mixed Waste Landfill MWL-VZ-2 Soil-Moisture Monitoring Results

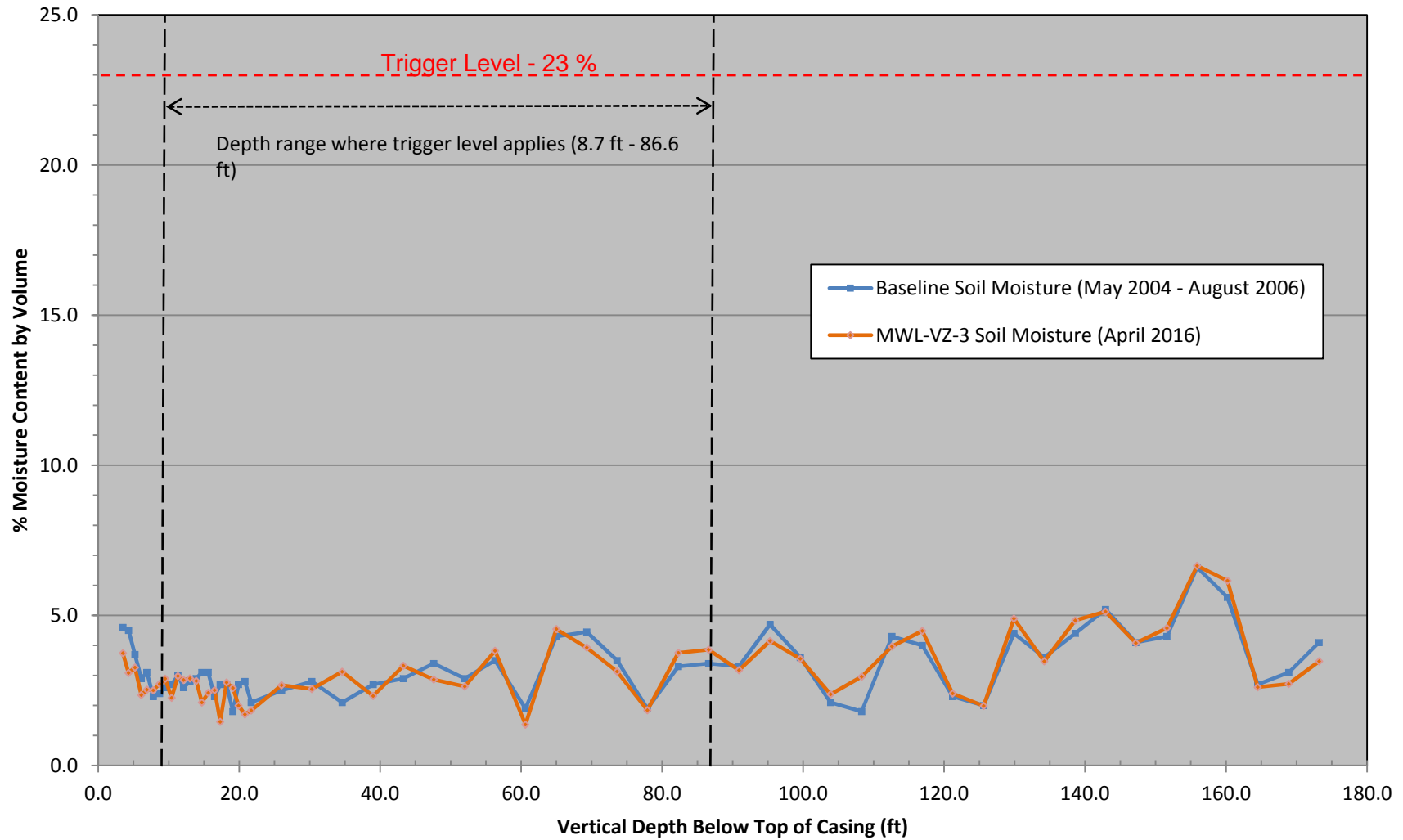


Figure 6-4
Mixed Waste Landfill MWL-VZ-3 Soil-Moisture Monitoring Results

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 obtain groundwater analytical results representative of 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 environmental sampling events were conducted during the April 1, 2016 through March 31, 2017 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 20 and 26, 2016. An environmental-duplicate sample pair was collected from MWL-BW2.

The second sampling event was conducted between October 25 and 28, 2016. An environmental-duplicate sample pair was collected from MWL-MW7.

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 beyond the minimum purge volume until four stable field measurements for temperature, specific conductivity (SC), potential of hydrogen (pH), and turbidity were obtained. Field measurements for water quality parameters were collected using a YSITM Model EXO1 Water Quality Meter, and a HACHTM Model 2100Q portable turbidity meter. Additional water quality measurements included oxidation-reduction potential (ORP) and dissolved oxygen (DO).

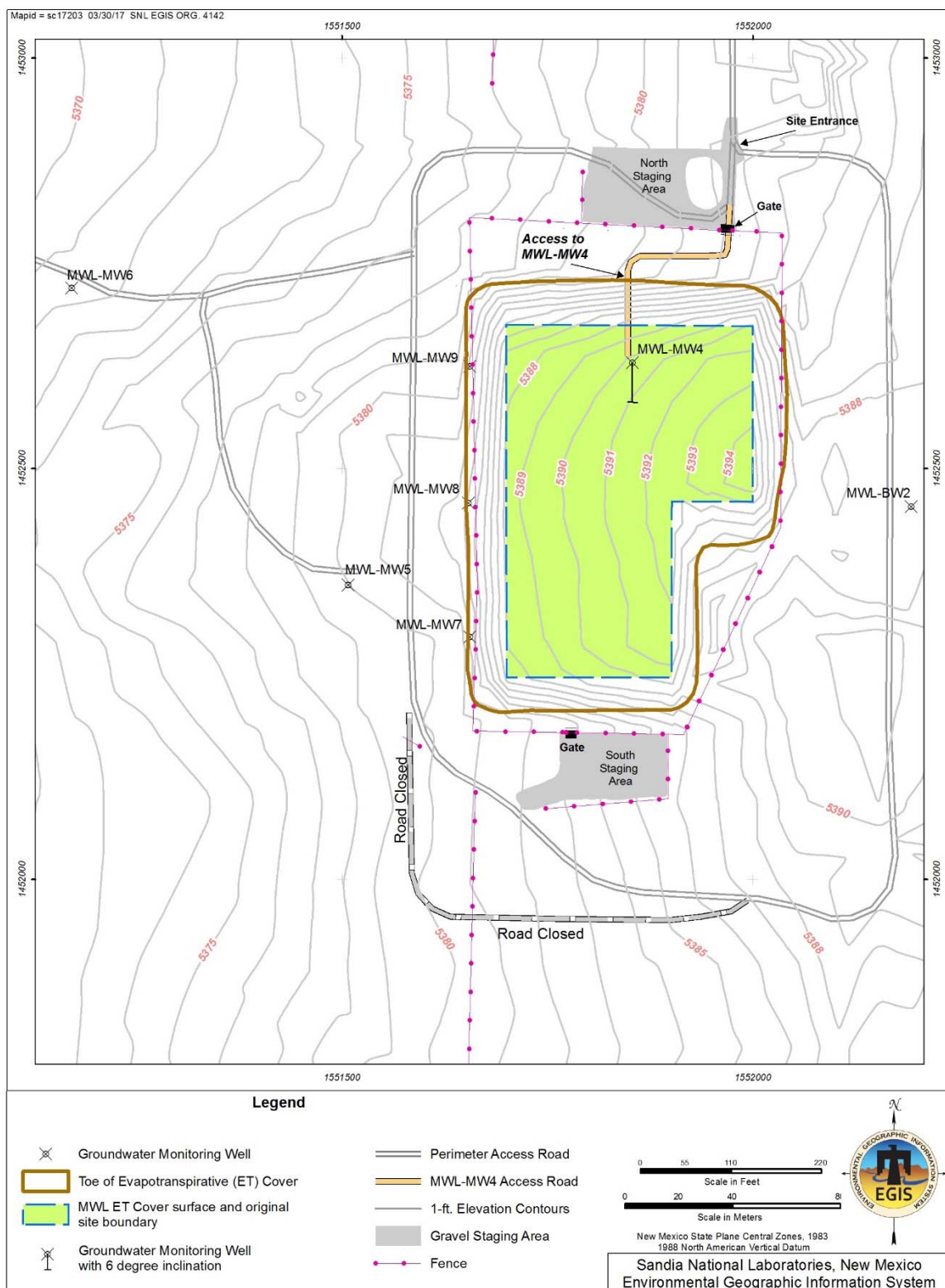


Figure 7-1
Mixed Waste Landfill Groundwater Monitoring Well Locations

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 0.13 gallons per minute (gpm) at MWL-MW9 to 0.31 gpm at MWL-BW2 for the April 2016 sampling event. The average flow rates ranged from 0.07 gpm at MWL-MW9 to 0.28 gpm at MWL-BW2 for the October 2016 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 effectiveness of 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.

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

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

First Sampling Event – April 20-26, 2016

One duplicate sample was collected at MWL-BW2. One equipment blank sample was collected prior to sampling monitoring well MWL-BW2. Five field blank samples were collected; one at ERFO and four at the site (one at each monitoring well). Five trip blank samples were also submitted with groundwater samples for analysis of VOCs.

Second Sampling Event – October 25-28, 2016

One duplicate sample was collected at MWL-MW7. One equipment blank sample was collected prior to sampling MWL-MW7. 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 with groundwater samples for analysis of VOCs.

7.1.3 Waste Management

Purge and decontamination wastewater generated from sampling activities was collected in 55-gallon containers and stored at the 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 226 gallons of wastewater were generated during the April 2016 groundwater sampling event and approximately 227 gallons were generated during the October 2016 sampling event.

PPE and other solid waste generated during April and October 2016 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. Based on historic data and sampling results from the two monitoring events, 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 2016 groundwater sampling events. Table 7-4 summarizes radionuclide, gross alpha, gross beta, tritium, and radon results for the April and October 2016 sampling events. Table 7-5 summarizes field water quality measurements taken prior to environmental groundwater sample collection for both 2016 sampling 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 by subtracting naturally occurring uranium in accordance with Title 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 activity per volume (pCi/L) measurement. For tritium, the approximate equivalent activity is 20,000 pCi/L, assuming an onsite resident using the groundwater underlying the MWL as their primary drinking water source.

Gross alpha and beta results are used as a broad radiological screening tool to look for other potential radionuclides besides tritium, radon, and the radionuclides already addressed by gamma spectroscopy analysis (i.e., the radionuclides of concern). The screening analyses do not provide radionuclide-specific identification necessary to calculate a dose. If the gross alpha trigger is exceeded, additional radiological analysis may be required to identify the specific radionuclide(s) that are contributing to the gross alpha result. Gross beta results are compared to the extensive SNL/NM groundwater monitoring data set to determine if there are indications of radiological anomalies (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. In summary, the screening and evaluation process ensures that if radiological contamination is present, it will be detected, evaluated, and appropriate follow-up actions will be taken.

Table 7-1
Summary of Detected VOCs (EPA Method 8260B^a)
Mixed Waste Landfill Groundwater Monitoring
April and October 2016

Well ID	Analyte	Result (µg/L)	MDL (µg/L)	PQL (µg/L)	Trigger Levels (µg/L)	Laboratory Qualifier ^b	Validation Qualifier ^b
April 2016 Sampling Event							
MWL-MW8 26-Apr-2016	Tetrachloroethene	0.310	0.300	1.00	2.50	J	--
October 2016 Sampling Event – No volatile organic compounds were detected in October 2016 groundwater samples							

Notes:

^aU.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition.

^bLaboratory/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.

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.

VOCs = Volatile organic compounds.

Table 7-2
Summary of Method Detection Limits for VOCs (EPA Method 8260B^a)
Mixed Waste Landfill Groundwater Monitoring
April and October 2016

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-Hexanone	1.50
4-methyl-, 2-Pentanone	1.50
Acetone	1.50
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
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:

^aU.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd 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.

VOCs = Volatile organic compounds.

Table 7-3
Summary of Cadmium, Chromium, Nickel, and Uranium Results (EPA Method 6020^a)
Mixed Waste Landfill Groundwater Monitoring
April and October 2016

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	Trigger Level (mg/L)	Laboratory Qualifier ^b	Validation Qualifier ^b
April 2016 Sampling Event							
MWL-BW2 20-Apr-16	Cadmium	ND	0.00011	0.001	0.0025	U	--
	Chromium	ND	0.002	0.010	0.043	U	--
	Nickel	0.00141	0.0005	0.002	0.050	J	--
	Uranium	0.0074	0.000067	0.0002	0.015	--	--
MWL-BW2 20-Apr-16 (Duplicate)	Cadmium	ND	0.00011	0.001	0.0025	U	--
	Chromium	ND	0.002	0.010	0.043	U	--
	Nickel	0.0013	0.0005	0.002	0.050	J	--
	Uranium	0.00764	0.000067	0.0002	0.015	--	--
MWL-MW7 21-Apr-16	Cadmium	ND	0.00011	0.001	0.0025	U	--
	Chromium	ND	0.002	0.010	0.043	U	--
	Nickel	0.00109	0.0005	0.002	0.050	J	--
	Uranium	0.00801	0.000067	0.0002	0.015	--	--
MWL-MW8 26-Apr-16	Cadmium	ND	0.00011	0.001	0.0025	U	--
	Chromium	0.00208	0.002	0.010	0.043	J	--
	Nickel	0.0007	0.0005	0.002	0.050	J	--
	Uranium	0.00803	0.000067	0.0002	0.015	--	--
MWL-MW9 25-Apr-16	Cadmium	ND	0.00011	0.001	0.0025	U	--
	Chromium	ND	0.002	0.010	0.043	U	--
	Nickel	0.000626	0.0005	0.002	0.050	J	--
	Uranium	0.00925	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^a)
Mixed Waste Landfill Groundwater Monitoring
April and October 2016

Well ID	Analyte	Result (mg/L)	MDL (mg/L)	PQL (mg/L)	Trigger Level (mg/L)	Laboratory Qualifier ^b	Validation Qualifier ^b
October 2016 Sampling Event							
MWL-BW2 25-Oct-16	Cadmium	ND	0.0003	0.001	0.0025	U	--
	Chromium	ND	0.003	0.010	0.043	U	--
	Nickel	ND	0.0005	0.002	0.050	U	--
	Uranium	0.00652	0.000067	0.0002	0.015	--	--
MWL-MW7 26-Oct-16	Cadmium	ND	0.0003	0.001	0.0025	U	--
	Chromium	ND	0.003	0.010	0.043	U	--
	Nickel	ND	0.0005	0.002	0.050	U	--
	Uranium	0.00728	0.000067	0.0002	0.015	--	--
MWL-MW7 26-Oct-16 (Duplicate)	Cadmium	ND	0.0003	0.001	0.0025	U	--
	Chromium	ND	0.003	0.010	0.043	U	--
	Nickel	ND	0.0005	0.002	0.050	U	--
	Uranium	0.00733	0.000067	0.0002	0.015	--	--
MWL-MW8 28-Oct-16	Cadmium	ND	0.0003	0.001	0.0025	U	--
	Chromium	ND	0.003	0.010	0.043	U	--
	Nickel	0.000858	0.0005	0.002	0.050	J	--
	Uranium	0.00811	0.000067	0.0002	0.015	--	--
MWL-MW9 27-Oct-16	Cadmium	ND	0.0003	0.001	0.0025	U	--
	Chromium	ND	0.003	0.010	0.043	U	--
	Nickel	0.000727	0.0005	0.002	0.050	J	--
	Uranium	0.00934	0.000067	0.0002	0.015	--	--

Notes:

^aU.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition.

^bLaboratory/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.

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 2016

Well ID	Analyte	Result ^a (pCi/L)	Trigger Level	Laboratory Qualifier ^b	Validation Qualifier ^b	Analytical Method ^c
April 2016 Sampling Event						
MWL-BW2 20-Apr-16	Americium-241	-6.53 ± 13.6	NE	U	BD	EPA 901.1
	Cesium-137	1.56 ± 2.71	NE	U	BD	EPA 901.1
	Cobalt-60	1.04 ± 2.19	NE	U	BD	EPA 901.1
	Gross Alpha	2.15	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^d	7.66 ± 1.99	4 mrem/yr	--	--	EPA 900.0
	Tritium ^e	-41.5 ± 79.3	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	454 ± 107	1000 pCi/L	--	--	SM7500 RnB
MWL-BW2 20-Apr-16 (Duplicate)	Americium-241	3.58 ± 8.14	NE	U	BD	EPA 901.1
	Cesium-137	-0.451 ± 3.29	NE	U	BD	EPA 901.1
	Cobalt-60	-3.96 ± 3.66	NE	U	BD	EPA 901.1
	Gross Alpha	2.73	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^d	7.00 ± 1.61	4 mrem/yr	--	--	EPA 900.0
	Tritium ^e	-58.3 ± 78.5	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	462 ± 109	1000 pCi/L	--	--	SM7500 RnB
MWL-MW7 21-Apr-16	Americium-241	-3.19 ± 6.76	NE	U	BD	EPA 901.1
	Cesium-137	0.244 ± 1.92	NE	U	BD	EPA 901.1
	Cobalt-60	-1.01 ± 2.20	NE	U	BD	EPA 901.1
	Gross Alpha	6.23	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^d	8.17 ± 1.75	4 mrem/yr	--	--	EPA 900.0
	Tritium ^e	0.455 ± 83.1	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	105 ± 34.5	1000 pCi/L	--	J	SM7500 RnB
MWL-MW8 26-Apr-16	Americium-241	-0.758 ± 19.0	NE	U	BD	EPA 901.1
	Cesium-137	1.39 ± 4.18	NE	U	BD	EPA 901.1
	Cobalt-60	2.09 ± 2.59	NE	U	BD	EPA 901.1
	Gross Alpha	0.97	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^d	6.94 ± 1.58	4 mrem/yr	--	--	EPA 900.0
	Tritium ^e	37.0 ± 86.5	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	188 ± 70.3	1000 pCi/L	--	J	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 2016

Well ID	Analyte	Result ^a (pCi/L)	Trigger Level	Laboratory Qualifier ^b	Validation Qualifier ^b	Analytical Method ^c
April 2016 Sampling Event (Continued)						
MWL-MW9 25-Apr-16	Americium-241	-7.16 ± 19.7	NE	U	BD	EPA 901.1
	Cesium-137	0.868 ± 2.23	NE	U	BD	EPA 901.1
	Cobalt-60	0.132 ± 3.63	NE	U	BD	EPA 901.1
	Gross Alpha	3.80	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^d	7.57 ± 1.58	4 mrem/yr	--	--	EPA 900.0
	Tritium ^e	-17 ± 82.7	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	366 ± 110	1000 pCi/L	H	J	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 2016

Well ID	Analyte	Result ^a (pCi/L)	Trigger Level	Laboratory Qualifier ^b	Validation Qualifier ^b	Analytical Method ^c
October 2016 Sampling Event						
MWL-BW2 25-Oct-16	Americium-241	6.65 ± 8.86	NE	U	BD	EPA 901.1
	Cesium-137	-1.87 ± 3.07	NE	U	BD	EPA 901.1
	Cobalt-60	0.812 ± 1.70	NE	U	BD	EPA 901.1
	Gross Alpha	4.32	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^d	6.91 ± 1.79	4 mrem/yr	--	--	EPA 900.0
	Tritium ^e	72.5 ± 96.6	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	448 ± 107	1000 pCi/L	--	--	SM7500 Rn B
MWL-MW7 26-Oct-16	Americium-241	4.68 ± 10.6	NE	U	BD	EPA 901.1
	Cesium-137	-0.143 ± 1.93	NE	U	BD	EPA 901.1
	Cobalt-60	-0.125 ± 1.73	NE	U	BD	EPA 901.1
	Gross Alpha	5.32	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^d	6.02 ± 1.34	4 mrem/yr	--	--	EPA 900.0
	Tritium ^e	59.7 ± 93.2	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	154 ± 45.1	1000 pCi/L	--	--	SM7500 Rn B
MWL-MW7 26-Oct-16 (Duplicate)	Americium-241	-3.23 ± 7.62	NE	U	BD	EPA 901.1
	Cesium-137	-0.495 ± 1.33	NE	U	BD	EPA 901.1
	Cobalt-60	1.03 ± 1.51	NE	U	BD	EPA 901.1
	Gross Alpha	1.50	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^d	5.48 ± 1.28	4 mrem/yr	--	--	EPA 900.0
	Tritium ^e	31.4 ± 91.6	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	141 ± 42.8	1000 pCi/L	--	--	SM7500 Rn B
MWL-MW8 28-Oct-16	Americium-241	6.10 ± 13.8	NE	U	BD	EPA 901.1
	Cesium-137	0.141 ± 1.87	NE	U	BD	EPA 901.1
	Cobalt-60	1.56 ± 1.81	NE	U	BD	EPA 901.1
	Gross Alpha	3.92	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^d	5.51 ± 1.26	4 mrem/yr	--	--	EPA 900.0
	Tritium ^e	40.7 ± 92.6	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	157 ± 48.8	1000 pCi/L	--	--	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 2016

Well ID	Analyte	Result ^a (pCi/L)	Trigger Level	Laboratory Qualifier ^b	Validation Qualifier ^b	Analytical Method ^c
October 2016 Sampling Event (Continued)						
MWL-MW9 27-Oct-16	Americium-241	-0.122 ± 5.64	NE	U	BD	EPA 901.1
	Cesium-137	-0.966 ± 4.12	NE	U	BD	EPA 901.1
	Cobalt-60	-0.581 ± 1.37	NE	U	BD	EPA 901.1
	Gross Alpha	3.04	15 pCi/L	NA	None	EPA 900.0
	Gross Beta ^d	5.76 ± 1.22	4 mrem/yr	--	--	EPA 900.0
	Tritium ^e	37.7 ± 90.4	4 mrem/yr	U	BD	EPA 906.0 M
	Radon-222	362 ± 91.9	1000 pCi/L	--	--	SM7500 Rn B

Notes:

^aGross alpha activity measurements were corrected by subtracting the total uranium activity from the total gross alpha result (Title 40 Code of Federal Regulations Parts 9, 141, and 142, Table I-4). Negative numbers indicate the sample count or result was less than the instrument background; result is below the minimum detectable activity.

^bLaboratory/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.

NA = Not applicable.

None = No data validation for corrected gross alpha activity.

U = Analyte was below detection limit.

^cAnalytical Methods EPA 900.0, EPA 901.1, and EPA 906.0 M:

- 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-Rn B:

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

^dRefer to Section 7.2.1 for an explanation of the gross beta trigger level.

^eThe 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^a
Mixed Waste Landfill Groundwater Monitoring
April and October 2016

Well ID/ Sample Date	Temperature (°C)	SC (µmhos/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (% Sat)	DO (mg/L)
April 2016 Sampling Event							
MWL-BW2	21.10	690.3	169.8	7.52	0.83	13.3	1.20
MWL-MW7	22.01	588.3	261.4	7.75	0.20	71.6	6.25
MWL-MW8	18.41	537.3	242.7	7.72	0.44	37.5	3.41
MWL-MW9	21.98	589.9	263.7	7.67	0.93	16.5	1.45
October 2016 Sampling Event							
MWL-BW2	19.56	630.3	137.9	7.34	7.35	37.1	3.45
MWL-MW7	20.04	534.3	193.0	7.56	0.63	72.8	6.54
MWL-MW8	20.97	565.7	177.0	7.51	0.45	30.8	2.67
MWL-MW9	23.87	590.1	149.1	7.47	0.57	23.9	1.99

Notes:

^aField 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 Conductivity.

First Sampling Event – April 20-26, 2016

VOCs were not detected in the environmental samples above MDLs, except for PCE. PCE was reported below the LTMMP trigger level of 2.50 µg/L in monitoring well MWL-MW8 at a concentration of 0.310 µg/L.

Cadmium was not detected above the associated MDL. Chromium was detected in the monitoring well MWL-MW8 sample at a concentration of 0.00208 milligrams per liter (mg/L). Nickel and uranium were detected above the associated MDLs and below LTMMP trigger levels in all groundwater samples. Nickel concentrations ranged from 0.000626 mg/L at MWL-MW9 to 0.00141 mg/L at MWL-BW2. Uranium concentrations ranged from 0.0074 mg/L at MWL-BW2 to 0.00925 mg/L at MWL-MW9. All results are consistent with historical MWL groundwater monitoring results and are below LTMMP 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 105 pCi/L at MWL-MW7 to 462 pCi/L at MWL-BW2 (duplicate sample). 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 LTMMP trigger levels.

Second Sampling Event – October 25-28, 2016

VOCs were not detected in the environmental samples above MDLs.

Cadmium and chromium were not detected above the associated MDLs. Nickel was detected in MWL-MW8 and MWL-MW9 samples at concentrations of 0.000858 mg/L and 0.000727 mg/L, respectively. Uranium was detected in all groundwater samples with concentrations ranging from 0.00652 mg/L at MWL-BW2 to 0.00934 mg/L at MWL-MW9. All results are consistent with historical MWL groundwater monitoring results and are below LTMMP 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 141 pCi/L at MWL-MW7 (duplicate sample) to 448 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 LTMMP trigger levels.

Nickel and Uranium Concentration and Gross Alpha Activity Plots

Concentrations and activities over time of nickel, uranium, and gross alpha are presented in Figures 7-2 through 7-4 for all groundwater monitoring events conducted since implementation of the LTMMP in 2014. Trigger levels are not shown on these plots, as the respective trigger levels are higher than the maximum concentration or activity depicted on the vertical axis of these figures. For non-detect results, the MDL or MDA was used and for environmental-duplicate sample pairs, the highest result was used.

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 2016 data sets. RPDs were calculated for constituents that exceeded the MDL in the sample pairs. Only the metals nickel and uranium were detected above the associated MDLs in the two sample pairs. Calculated RPDs for the detected metals constituents show good agreement (i.e., RPD values less than or equal to 35 for metals) for both sampling events, ranging from 1 to 8.

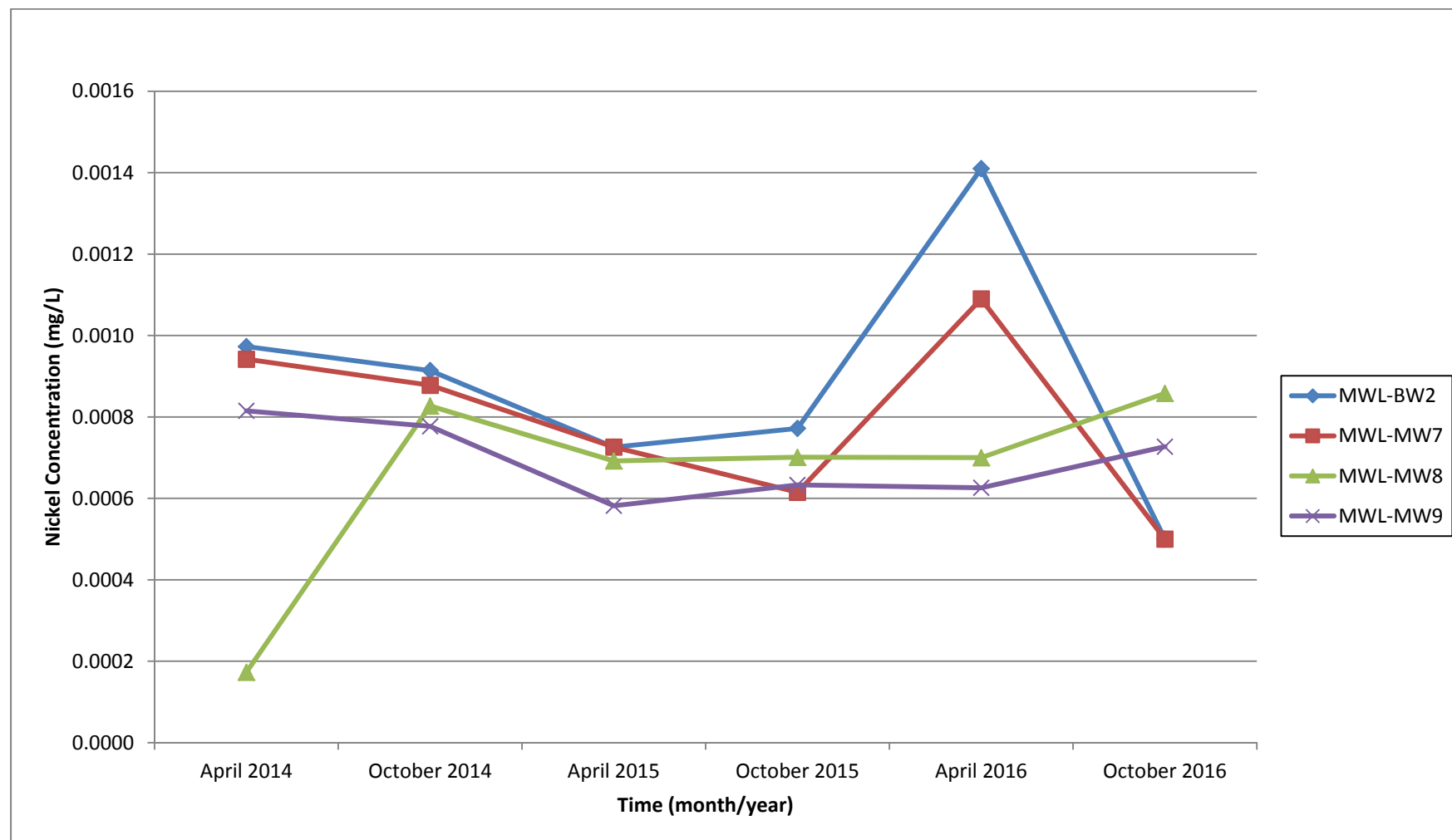


Figure 7-2
Nickel Concentrations vs. Time
Mixed Waste Landfill Groundwater Monitoring Wells

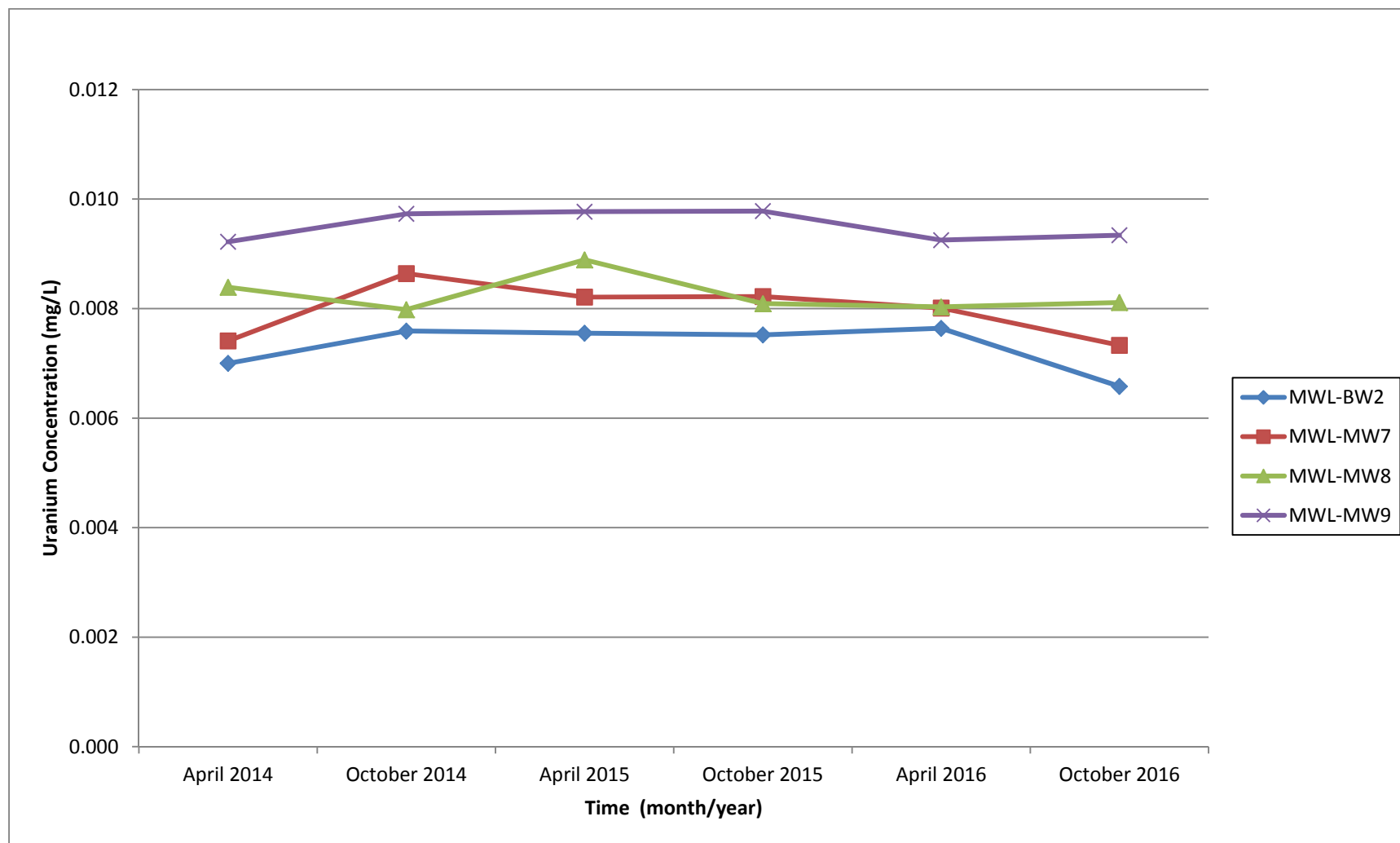


Figure 7-3
Uranium Concentrations vs. Time
Mixed Waste Landfill Groundwater Monitoring Wells

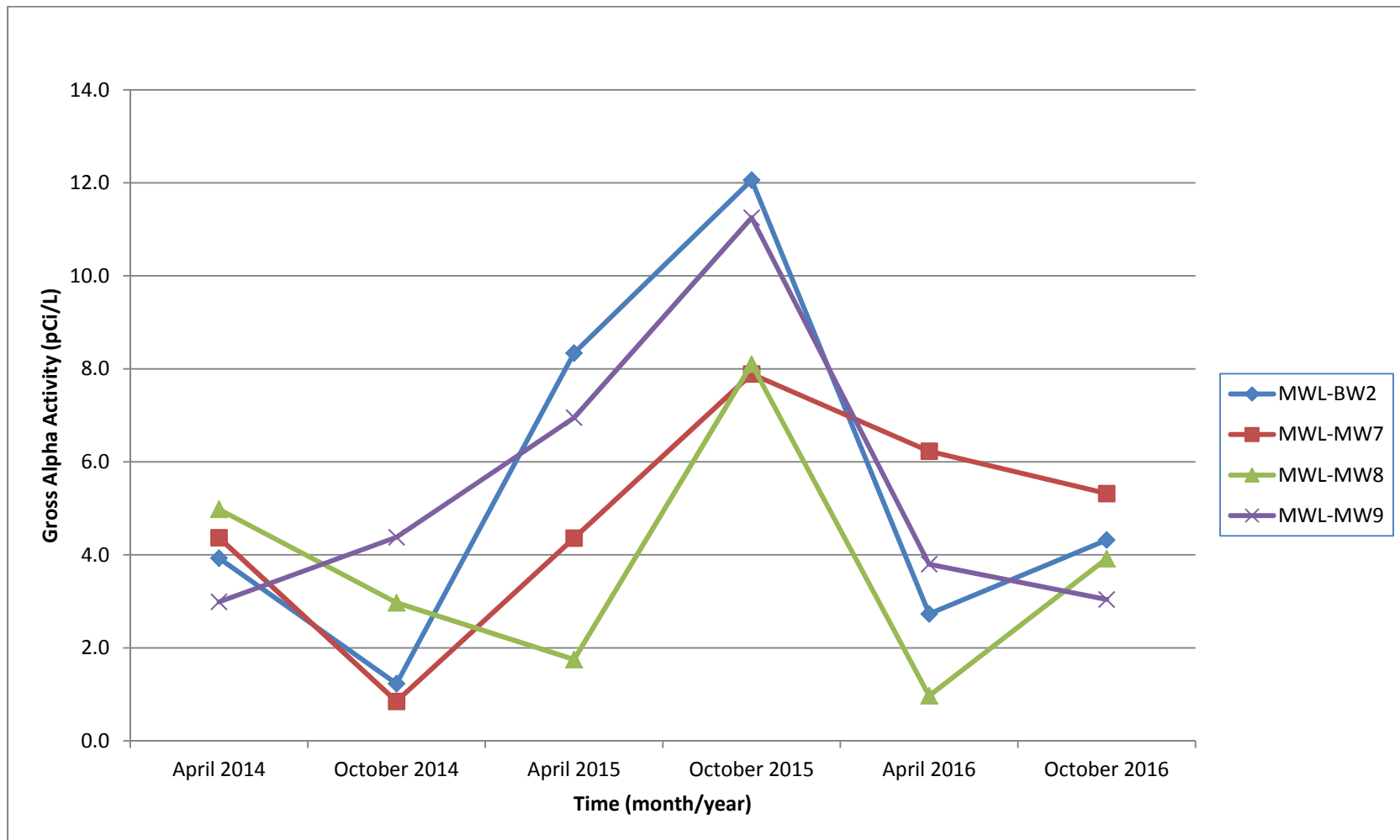


Figure 7-4
Gross Alpha Activity vs. Time
Mixed Waste Landfill Groundwater Monitoring Wells

Table 7-6
Summary of Duplicate Sample Results
Mixed Waste Landfill Groundwater Monitoring
April and October 2016

Well ID/Parameter	Environmental Sample (R ₁)	Duplicate Sample (R ₂)	RPD ^a
April Sampling Event			
MWL-MW9			
Nickel (mg/L)	0.00141	0.0013	8
Uranium (mg/L)	0.0074	0.00764	3
October Sampling Event			
MWL-MW7			
Uranium (mg/L)	0.00728	0.00733	1

Notes:

^aRPD = Relative percent difference is calculated with the following equation and rounded to the nearest whole number.

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

where: R₁ = Environmental sample result.
R₂ = Duplicate sample result.
mg/L = Milligram(s) per liter.

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

First Sampling Event – April 20-26, 2016

The equipment blank sample in April was analyzed for all constituents. Bromodichloromethane, chloroform, and dibromochloromethane were detected in the equipment blank sample, but no corrective action was necessary since these compounds were not detected in the associated MWL-BW2 samples.

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. Bromoform was detected in the field blank sample associated with MWL-MW8. No corrective action was required since these compounds were not detected in associated environmental samples.

VOCs were not detected in the five trip blank samples associated with the April sampling event.

Second Sampling Event – October 25-28, 2016

The equipment blank sample collected in October was analyzed for all constituents; there were no detections in this sample.

Of the five field blank samples collected in October, two showed detections of acetone. These two field blank samples were associated with MWL-BW2 and MWL-MW7. No corrective action was required since acetone was not detected in the associated environmental samples.

VOCs were not detected in the five trip blank samples 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.

All laboratory control sample results met the accuracy (i.e., % recovery) requirement of 50 to 130% for VOCs and 75 to 125% for metals (Section 2.1 of LTMMP Appendix F), except for acetone. The post spike and post spike duplicate recovery for acetone was 41% in the laboratory batch associated with the October equipment blank, MWL-BW2, and MWL-MW7 samples. No corrective action was required since acetone was not detected in any of the associated environmental samples.

All chemical data were reviewed and qualified in accordance with SNL/NM AOP 00-03, "Data Validation Procedure for Chemical and Radiochemical Data" (SNL/NM June 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

Variances and non-conformances are defined in the LTMMP Appendix F, Section 6 for groundwater monitoring. No variances or non-conformances from LTMMP requirements for groundwater monitoring were identified during the April and October 2016 sampling events. Project-specific information from the April and October sampling events are summarized below.

Bromodichloromethane, chloroform, dibromochloromethane were detected at very low concentrations in both the April equipment blank and field blank samples, and bromoform was detected in one field blank sample. 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 two October field blank samples but not in any environmental samples.

After the April 2016 groundwater sampling event, the DI water source was changed due to the historical low-level contaminants in the water obtained from an outside vendor. Starting in October 2016 the DI water used is a higher grade and purity and is being produced at SNL/NM.

7.3 Hydrogeologic Assessment

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

The upper surface of the Regional Aquifer at the MWL is contained within the interfingering, unconsolidated, fine-grained alluvial-fan deposits of the Santa Fe Group. The more transmissive, coarser-grained Ancestral Rio Grande sediments underlie the fine-grained alluvial deposits beneath the MWL. The depth to water is approximately 500 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 historically declined since monitoring began in 1990.

Figure 7-5 shows the rate of groundwater elevation decline at MWL groundwater monitoring wells for the time period 2000 through 2016. Since 2010, the rate of groundwater elevation decline in all wells 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. Over the past two years the rate of decline has significantly slowed, and between 2015 and 2016 all wells except MWL-BW2 showed a small increase ranging from 0.20 to 0.40 feet. From October 2015 to October 2016, the groundwater elevation declined in well MWL-BW2 only 0.17 feet, whereas for the same period between October 2014 and October 2015 the groundwater elevation decline was 0.51 feet. This water table rebound has been observed in wells located farther north on KAFB and is most likely related to a reduction in groundwater removal from the Regional Aquifer by the Albuquerque Bernalillo County Water Utility Authority. 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.

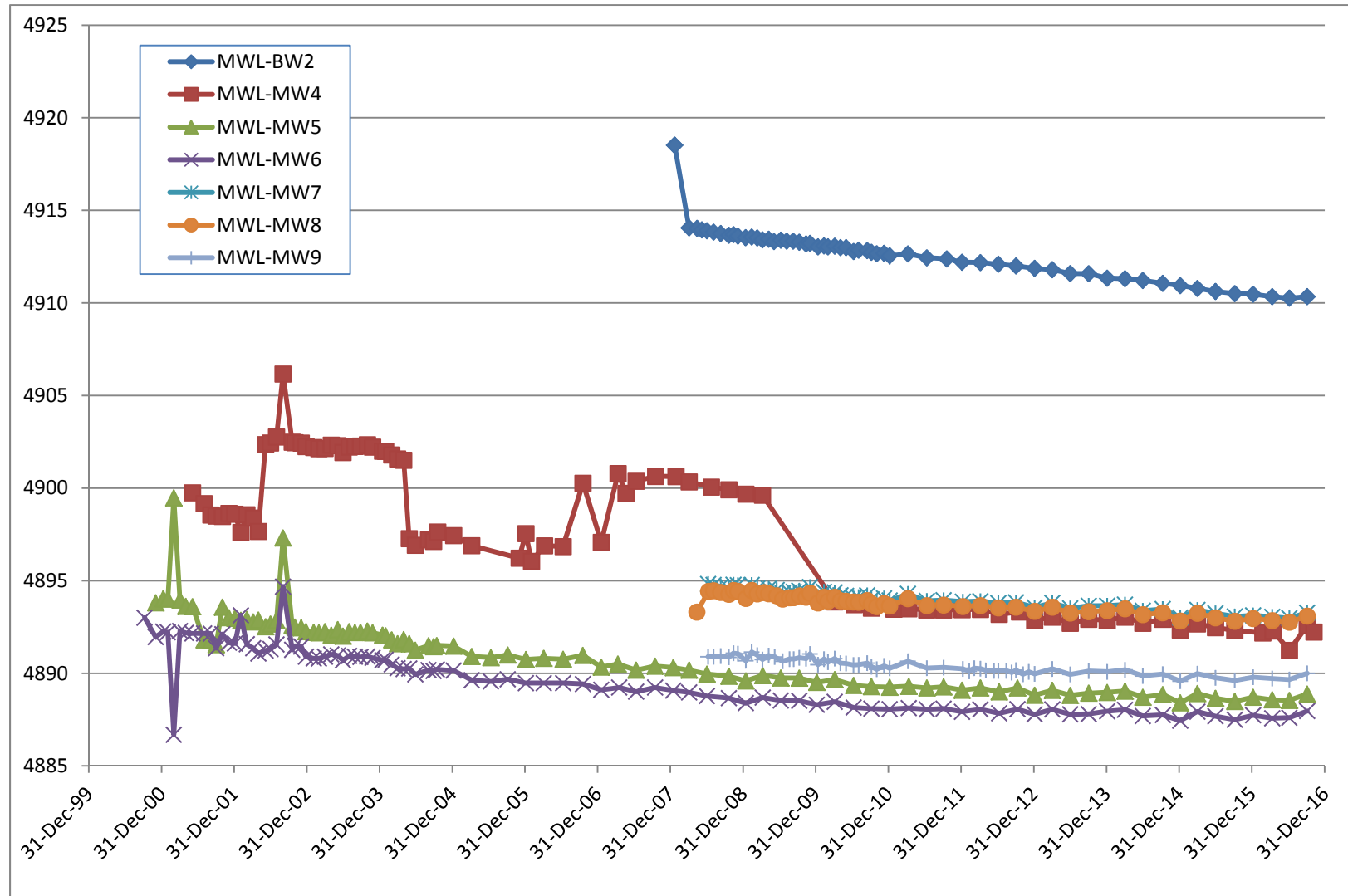


Figure 7-5
Groundwater Level Elevations at Mixed Waste Landfill Groundwater Monitoring Wells

Figure 7-6 shows the October 2016 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 2016 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 the four compliance monitoring wells, and an effective porosity of 25 percent. The calculated 2016 groundwater velocity ranges from 0.02 to 0.06 feet per day; the average is 0.04 feet per day. These very low values have not changed over the past three years and are consistent with previous estimates for horizontal groundwater flow at the water table in the MWL vicinity.

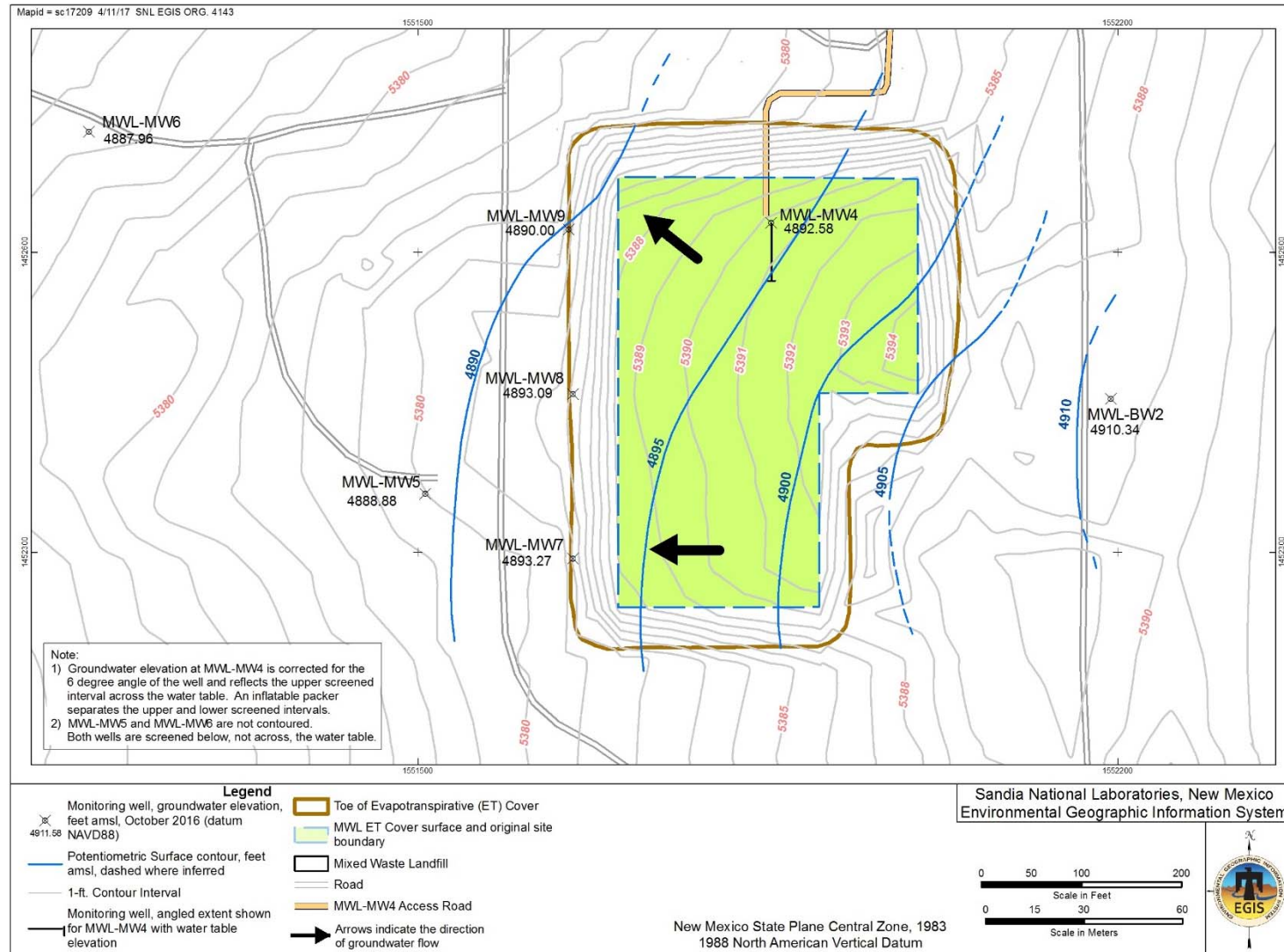


Figure 7-6
Localized Potentiometric Surface of the Regional Aquifer at the Mixed Waste Landfill, October 2016

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 biota sampling event was conducted during the April 1, 2016 through March 31, 2017 reporting period fulfilling the LTMMMP annual monitoring requirement. The biota sampling locations were identified during the annual ET Cover Biology Inspection performed on September 1, 2016. The sampling locations are shown in Figure 8-1 and consist of two ant hills (MWL AHSS-01-2016 and MWL AHSS-02-2016). There were no animal burrows or potentially deep-rooted plants identified on the ET Cover during the Biology Inspection. The two ant hill locations selected for surface soil sampling by the staff biologist were the largest and most active of the ant hills on the ET Cover. The locations were also selected to provide good spatial coverage. Surface soil samples were collected at these locations on September 9, 2016 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-02-2016.

8.1.2 Waste Management

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



Figure 8-1
Mixed Waste Landfill Biota Sampling Locations

8.2 Laboratory Results

Biota surface soil samples were submitted to GEL for analyses. Samples were analyzed in accordance with applicable EPA analytical methods. Results that are below the MDL (metals) or MDA (gamma spectroscopy) are qualified with a “U” and are designated as 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, and results of QC analyses, are filed in the SNL/NM Record Center.

8.2.1 Environmental Sample Results

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

All metals results were below the respective NMED-approved background concentrations and below trigger levels. All cadmium results were estimated concentrations above the MDL but below the RL. All selenium and silver results were non-detects or estimated concentrations below the RL. All vanadium results were estimated with a suspected positive bias.

All gamma spectroscopy radionuclide sample results were very low, activities below the respective NMED-approved background activities. Seven of the 18 results were non-detects, and one uranium-238 result (MWL-AHSS-01-2016) was determined by the laboratory to be invalid (see Section 8.2.3, i.e., false positive) 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 September 2016 biota data set. An RPD was calculated when metals concentrations were reported in both the environmental and duplicate sample at levels 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 3 to 27. As defined in Section 2.3, Appendix G of the LTMMP, 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^a)
Mixed Waste Landfill Biota Monitoring
September 2016

Sample Location	Parameter	NMED Background ^b (mg/kg)	Result (mg/kg)	Reporting Limit (mg/kg)	Trigger Level (mg/kg)	Laboratory Qualifier ^c	Validation Qualifier ^d
MWL AHSS-01-2016 21-Sep-16	Arsenic	5.6	2.72	0.952	17.7	--	--
	Barium	130	96.8	0.381	100,000	--	J, MS1
	Beryllium	0.65	0.389	0.0952	2,260	--	--
	Cadmium	<1	0.103	0.190	897	J	--
	Chromium	17.3	8.42	0.571	63.1	--	--
	Cobalt	5.2	3.11	0.190	20,500	--	--
	Copper	15.4	5.81	0.190	45,400	--	--
	Lead	21.4	3.32	0.943	800	--	--
	Mercury	<0.25	0.0142	0.0117	73.6	--	0.029U, B3
	Nickel	11.5	6.90	0.381	22,500	--	--
	Selenium	<1	ND	0.952	5,680	NU	--
	Silver	<1	ND	0.472	5,680	U	--
	Vanadium	20.4	15.8	0.952	5,680	N	J+, MS2
	Zinc	62	28.1	9.52	100,000	--	--
MWL AHSS-02-2016 21-Sep-16	Arsenic	5.6	2.87	0.951	17.7	--	--
	Barium	130	92.8	0.380	100,000	--	J, MS1
	Beryllium	0.65	0.425	0.0951	2,260	--	--
	Cadmium	<1	0.125	0.190	897	J	--
	Chromium	17.3	9.71	0.570	63.1	--	--
	Cobalt	5.2	3.23	0.190	20,500	--	--
	Copper	15.4	6.37	0.190	45,400	--	--
	Lead	21.4	3.82	0.940	800	--	--
	Mercury	<0.25	0.011	0.0108	73.6	--	0.029U, B3
	Nickel	11.5	6.93	0.380	22,500	--	--
	Selenium	<1	0.399	0.951	5,680	JN	--
	Silver	<1	ND	0.470	5,680	U	--
	Vanadium	20.4	16.4	0.951	5,680	N	J+, MS2
	Zinc	62	30.8	9.51	100,000	--	--

Refer to notes at end of table.

Table 8-1 (Concluded)
Summary of Metals Results (EPA Method 6020/7470^a)
Mixed Waste Landfill Biota Monitoring
September 2016

Sample Location	Parameter	NMED Background ^b (mg/kg)	Result (mg/kg)	Reporting Limit (mg/kg)	Trigger Level (mg/kg)	Laboratory Qualifier ^c	Validation Qualifier ^d
MWL AHSS-02-2016 21-Sep-16 (Duplicate)	Arsenic	5.6	2.18	0.973	17.7	--	--
	Barium	130	101	0.389	100,000	--	J, MS1
	Beryllium	0.65	0.380	0.0973	2,260	--	--
	Cadmium	<1	0.0903	0.195	897	J	--
	Chromium	17.3	7.90	0.584	63.1	--	--
	Cobalt	5.2	2.99	0.195	20,500	--	--
	Copper	15.4	5.69	0.195	45,400	--	--
	Lead	21.4	3.49	0.984	800	--	--
	Mercury	<0.25	0.00567	0.0111	73.6	J	0.029U, B3
	Nickel	11.5	6.50	0.389	22,500	--	--
	Selenium	<1	ND	0.973	5,680	NU	--
	Silver	<1	ND	0.492	5,680	U	--
	Vanadium	20.4	14.3	0.973	5,680	N	J+, MS2
	Zinc	62	28.1	9.73	100,000	--	--

Notes:

^aU.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition.

^bDinwiddie 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.

^cLaboratory 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 Method Detection Limit but less than the Reporting Limit.

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

U = Analyte was not detected.

^dValidation Qualifier:

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

B3 = Calibration blank contamination at concentration > Method Detection Limit.

J = Estimated value.

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

MS = Matrix spike.

MS1 = MS not analyzed or not applicable.

MS2 = MS analyte(s) recovery failed high.

U = The analyte was reported as a detection by the laboratory but was qualified during data validation review as not detected due to laboratory contamination. The associated numerical value is the revised sample quantitation limit, in accordance with the data validation process.

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^a)
Mixed Waste Landfill Biota Monitoring
September 2016

Sample Location	Parameter	NMED Background ^b (pCi/g)	Result (pCi/g)	MDA (pCi/g)	Laboratory Qualifier ^c	Validation Qualifier ^d
MWL AHSS-01-2016 21-Sep-16	Cesium-137	1.5	0.0886 ± 0.0246	0.0194	--	--
	Cobalt-60	NA	0.00603 ± 0.0144	0.0231	U	BD, FR3
	Radium-226	2.7	0.692 ± 0.0863	0.040	--	--
	Thorium-232 ^e	1.5	0.948 ± 0.0713	0.0333	--	--
	Uranium-235	0.18	0.0309 ± 0.133	0.118	U	BD, FR3
	Uranium-238	2.3	0.902 ± 0.878	0.778	X	R, Z2
MWL AHSS-02-2016 21-Sep-16	Cesium-137	1.5	0.0943 ± 0.0154	0.0144	--	--
	Cobalt-60	NA	-0.0034 ± 0.00793	0.0137	U	BD, FR3
	Radium-226	2.7	0.734 ± 0.0551	0.0268	--	--
	Thorium-232 ^e	1.5	0.904 ± 0.0601	0.0201	--	--
	Uranium-235	0.18	0.0731 ± 0.0951	0.0732	U	BD, FR3
	Uranium-238	2.3	0.566 ± 0.848	0.568	U	BD, FR3
MWL AHSS-02-2016 (Duplicate) 21-Sep-16	Cesium-137	1.5	0.0716 ± 0.0191	0.0179	--	--
	Cobalt-60	NA	0.0025 ± 0.0105	0.0186	U	BD, FR3
	Radium-226	2.7	0.716 ± 0.0792	0.0316	--	--
	Thorium-232 ^e	1.5	0.956 ± 0.0976	0.0222	--	--
	Uranium-235	0.18	0.0357 ± 0.0837	0.0792	U	BD, FR3
	Uranium-238	2.3	0.771 ± 0.397	0.244	--	--

Notes:

^aU.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition.

^bDinwiddie 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.

^cLaboratory 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.

^dValidation 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.

FR3 = Result is less than the MDA / MDL or < the 2-sigma TPU.

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

Z2 = Minimum peak criteria not met.

^eThorium-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.

MDL = Method detection limit.

NA = Not applicable.

NMED = New Mexico Environment Department.

pCi/g = Picocuries per gram.

TPU = Total propagated uncertainty.

Table 8-3
Summary of Duplicate Sample Results
Mixed Waste Landfill Biota Monitoring
September 2016

Sample Location	Environmental Sample (R ₁)	Duplicate Sample (R ₂)	RPD ^a
MWL AHSS-02-2016 – Metals (mg/kg)			
Arsenic	2.87	2.18	27
Barium	92.8	101	9
Beryllium	0.425	0.380	11
Chromium	9.71	7.90	21
Cobalt	3.23	2.99	8
Copper	6.37	5.69	11
Lead	3.82	3.49	9
Nickel	6.93	6.50	6
Vanadium	16.4	14.3	14
Zinc	30.8	28.1	9
MWL AHSS-02-2016 – Radionuclides (pCi/g)			
Cesium-137	0.0943	0.0716	27
Radium-226	0.734	0.716	3
Thorium-232	0.904	0.956	6

Notes:

^aRPD = Relative percent difference is calculated with the following equation and rounded to the nearest whole number.

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

where: R₁ = Environmental sample result.
R₂ = Duplicate sample result.

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 metals and gamma spectroscopy 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, one uranium-238 result (MWL-AHSS-01-2016) was determined by the laboratory to be invalid. The uranium-238 result was rejected due to peak identification uncertainty. This issue is related to the very low activity of the radionuclide in the sample, which makes it difficult to both accurately

identify the presence of the radionuclide and determine the activity. This is reflected in the 2-sigma error (the plus or minus value next to the result in Table 8-3) being very close to the result.

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.

8.2.4 Variances

There were no variances from the LTMMMP biota monitoring requirements.

8.3 Data Evaluation and Monitoring Trigger Level

Trigger levels for metals in 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.

These results indicate no contamination from the disposal areas is being mobilized to the surface by plant or animal activity.

9.0 INSPECTION, MAINTENANCE, AND REPAIR RESULTS

This chapter presents a summary of inspection, maintenance, and repair activities 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, 2016 through March 31, 2017 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 September 1, 2016 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 51 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 42 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 Biology Inspection. Additional information is provided on the September 1, 2016 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). The quarterly inspections were supported by the staff biologist. 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 2016 – March 2017 Reporting Period

Inspection Type	Frequency	Form/Checklist ^a	Date Performed
ET Cover Biology Inspection	Annual ^b	Biology Inspection Checklist/Form	September 1, 2016
ET Cover Surface Inspection	Quarterly	Cover Inspection Checklist/Form	June 2, 2016
			September 22, 2016
			December 2, 2016
			March 22, 2017
Storm-Water Diversion Structure Inspection ^c	Quarterly	Cover Inspection Checklist/Form	June 2, 2016
			September 22, 2016
			December 2, 2016
			March 22, 2017
Soil-Vapor Monitoring Network Inspection	Semiannually ^d	Soil-Vapor Monitoring Network Checklist/Form	April 27, 2016
Soil-Moisture Monitoring Network Inspection	Annually ^d	Soil-Moisture Monitoring Network Checklist/Form	October 13, 2016
Groundwater Monitoring Network Inspection	Semiannually ^d	Groundwater Monitoring Network Checklist/Form	April 7, 2016
			April 20, 2016
Security Fence Inspection ^c	Quarterly	Cover Inspection Checklist/Form	October 25, 2016
			June 2, 2016
			September 22, 2016
			December 2, 2016
			March 22, 2017

Notes:

^aAll reporting period inspection forms are provided in Annex F.

^bTransition 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.

^cThese inspections are conducted at the same time as the ET Cover Surface Inspection and documented on the same inspection form.

^dMonitoring network inspections are performed at the same frequency and at the same time as the associated monitoring.

ET = Evapotranspirative.

June 2, 2016 Inspection

No inspection items required maintenance or repairs.

September 22, 2016 Inspection

No inspection items required maintenance or repairs.

December 2, 2016 Inspection

During this inspection, small animal burrows (less than 4-inches in diameter) were observed in the perimeter area, approximately 50 feet beyond the fence surrounding the ET Cover. Maintenance or repairs were not required, but monitoring of the ET Cover and perimeter area for animal burrows will continue on a quarterly frequency.

March 22, 2017 Inspection

No inspection items required maintenance or repairs. Early growth of native grasses was observed along the western perimeter in the areas that were disturbed during the 2016 installation of erosion and burrow controls. This area is recovering without reseeding efforts. As a best management practice the staff biologist recommended removal of a small thorny shrub (Pale Wolfberry or *Lycium pallidum*) that is becoming more prevalent along the western and southwestern perimeter area just outside the fence. This shrub will be removed by the cover system landscaping/maintenance contractor by May 19, 2017.

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 LTMMP 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.

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 LTMMP inspection requirement (Table 9-1). No inspection items required follow-up actions.

9.4 Soil-Moisture Monitoring Network Inspection

One inspection of the soil-moisture monitoring network was performed as part of the annual monitoring event conducted during the reporting period, fulfilling the LTMMP inspection requirement (Table 9-1). No inspection items required maintenance or repairs.

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 LTMMP 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 LTMMP inspection requirement (Table 9-1). The inspections addressed the security fence, access controls (gates, locks, signs), and survey monuments, and were documented on the same Cover Inspection Checklist/Form. Results of the quarterly inspections are provided below.

June 2, 2016 Inspection

No inspection items required maintenance or repairs.

September 22, 2016 Inspection

No inspection items required maintenance or repairs.

December 2, 2016 Inspection

Accumulation of dead, dry wind-blown tumbleweeds were identified along the east perimeter fence. The plant debris was removed by the cover system landscaping/maintenance contractor on December 21, 2016.

March 22, 2017 Inspection

Accumulation of dead, dry wind-blown tumbleweeds were identified along the perimeter fence. The plant debris will be removed by the cover system landscaping/maintenance contractor by May 8, 2017.

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. Supplemental watering was not conducted during this reporting period and only minimal ET Cover maintenance was needed as a best management practice.

Two routine weed control events were conducted as a best management practice from April 27-29, 2016 and July 28-August 4, 2016. A third event will be conducted in May 2017. The first two events included removal of approximately 30 cubic yards of dead, windblown tumbleweeds from the ET Cover surface, perimeter fence, and drainage swale as well as the application of a pre-emergent herbicide to North and South Staging Areas. The third event will include the same activities; in addition, the Pale Wolfberry shrubs will also be removed from the western and southwestern perimeter area outside the security fence as recommended by the staff biologist. The weed control activities help the desired native grasses by reducing the availability of weed seeds and competition from the future growth of invasive plants.

Additional best management practice activities were conducted during this reporting period to improve the site and reduce long-term ET Cover and site maintenance. These improvement activities were based on inspection observations made since completion of ET Cover construction in 2009, and are summarized in the following sections.

9.7.1 Site Access and Drainage Control

From November 2016 to February 2017, improvements were made to the MWL site access and perimeter road. The entire road surface was built up approximately six inches and side drainages (i.e., road ditches) were established. Culverts were installed in two areas along the access road (north of the MWL) and at two locations along the perimeter road (near northwest and southwest corners) to allow storm water to drain off the road and away from the MWL. The two culverts on the perimeter road eliminate areas that temporarily held water prior to the improvements. Figure 9-1 shows the road and drainage improvements.

9.7.2 Erosion and Animal Burrowing Control

During CY 2016, erosion and burrow control alternatives were evaluated for five locations where the ET Cover western side slope steepens near the toe adjacent to perimeter monitoring wells. During construction of the ET Cover in 2009, small mounds were created in these locations to divert surface water flowing off the ET Cover surface around the monitoring wells. These localized areas were more prone to surface erosion during larger storm events due to the steeper slope in the immediate vicinity of the monitoring wells. Small mammal burrows under other perimeter monitoring well concrete pads were also observed and repaired during previous inspections, especially MWL-VZ-1 (west side) and MWL-VZ-3 (east side).

A detailed design for the installation of erosion and burrow control measures at all 10 perimeter monitoring well locations was developed in early 2016. Rock-filled Gabion baskets and Reno mattresses were selected and installed at the MWL during the period September through November 2016. The Gabion baskets were installed only at the upslope end of the five western side slope locations; they anchor the Reno mattresses on the side slope and provide additional erosion control at these locations. The Reno mattresses were installed with their upper surface essentially at grade at all 10 perimeter monitoring wells to provide both erosion and burrow protection. The five western side slope locations that required a Gabion basket and Reno mattress included three groundwater monitoring wells (MWL-MW7, MWL-MW8, MWL-MW9), and two angled soil-moisture access tubes (MWL-VZ-1, MWL-VZ-2). The five wells located farther from the ET Cover toe that only required a Reno mattress included MWL-SV05 (soil-vapor monitoring well), MWL-BW2 (groundwater monitoring well), and MWL-VZ-3 (angled soil-moisture access tube) on the east side of the MWL, and MWL-SV03 and MWL-SV04 (both soil-vapor monitoring wells) located on the west side of the MWL. An example of each type of installation (with and without Gabion basket) is shown in Figure 9-2.

To install the control measures, soil around the ten monitoring wells was excavated and taken to the Bulk Waste Storage Area in southern TA-III and stored for later use. Previously screened and tested native soil from the ET Cover soil stockpile at the north end of the site was processed (i.e., turned with an excavator and moisturized for optimum compaction) and compacted to create a solid foundation beneath areas where the Reno mattresses were installed. These areas were over-excavated to a depth of 15 to 18 inches bgs. Then processed



View to the north of the site access road and new drainage culverts located north of the MWL.
The culverts allow surface water to move to the west (to the left).



View to the south of the perimeter road and new drainage culverts at the northwest corner of the perimeter road.
The culverts allow surface water to move to the west (to the right), away from the road and MWL.

Figure 9-1
Photographs of the Mixed Waste Landfill Site Access Road and Drainage Improvements



View of soil-vapor monitoring well MWL-SV03 prior to and after installation of erosion and burrow control. Location is not immediately adjacent to the ET Cover toe; therefore, a Gabion basket anchor is not needed.



View of groundwater monitoring well MWL-MWV7 prior to and after installation of erosion and burrow control. Gabion basket anchor required for this location immediately adjacent to the ET Cover toe.

Figure 9-2
Photographs of the Mixed Waste Landfill Erosion and
Burrow Control Measures Prior to and After Installation

native soil was added, graded, and compacted in 3- to 4-inch lifts until the desired grade of 9 inches bgs was achieved. At the five slope locations where Gabion baskets were installed, the area accommodating each basket was excavated to 30 inches bgs. Soil density-moisture tests were performed in accordance with the ASTM D6938 standard. Excavation areas were tested at one location per excavation floor with a Troxler 3440-a[®] nuclear density gauge by a certified professional. Soil density results were required to meet the same compaction rating used for the Native Soil Layer of the ET Cover (i.e., 95% modified proctor +/- 2% optimum moisture content).

Geotextile was installed in the completed excavations prior to placement of the Gabion baskets and Reno mattresses to prevent soil migration into the erosion controls. Reno mattresses and Gabion baskets were assembled in the excavation; filled with clean, crushed, angular stone to approximately 1 inch above ground surface; and then completed by installing the wire mesh lids over the surface. Rock fragments ranged from 4 to 8 inches for Gabion baskets and 3 to 5 inches for Reno mattresses. The Reno mattresses were filled to 1 inch above ground surface and then compacted to surface grade using a plate compactor to create a smoother surface and facilitate an interlocking texture.

A perimeter boundary was placed around the erosion and burrowing controls to serve as a transition area between the ground surface and the rock-filled wire baskets. This eliminates rill erosion at the boundary of the Reno mattresses or Gabion basket and the natural soil that was observed after a major rainfall event during the installation project due to the sharp contrast between the rock and soil. The perimeters were excavated 14 inches wide to a depth of 6 inches, and filled with 0.75-inch angular crushed stone. The filled perimeter boundaries were then compacted to grade to further increase the longevity of the controls and to minimize future maintenance.

A topographic survey was completed to record the as-built conditions of the MWL perimeter erosion control measures. The survey included the topography of the entire ET Cover, the erosion control measures, all monitoring well locations, and the surrounding perimeter. The revised as-built drawings for the MWL ET Cover are presented in Annex H and include detailed plan and cross-sectional views of the erosion and burrow controls at each perimeter well location. A detailed report documenting the installation effort is filed in the SNL/NM Records Center.

The completed Gabion basket and Reno mattress installations are shown in Figure 9-3. These robust controls reestablish the smooth western side slope design of the ET Cover (i.e., eliminate the small steeply-sloped mounds installed next to the five monitoring wells immediately adjacent to the western side slope toe), provide long-term protection of all perimeter monitoring wells from both erosion and small animal burrows, and minimize long-term maintenance.



View to the south-southeast of the west side of the MWL after completion of erosion and burrow controls at perimeter monitoring wells.



View to the southwest of the east side of the MWL after the completion of erosion and burrow controls at MWL-SV05 (left) and MWL-VZ-3 (right).

Figure 9-3
Photographs of the Mixed Waste Landfill
Erosion and Burrow Control Measures After Installation

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10.0 REGULATORY ACTIVITIES

On January 8, 2014, the NMED approved the MWL LTMMP (Blaine January 2014). All MWL regulatory submittals since full implementation of the LTMMP are summarized in Section 10.1, along with submittals that occurred during this April 1, 2016 through March 31, 2017 reporting period.

Post-LTMMP implementation submittals, including submittals associated with the April 2016 through March 2017 reporting period, are summarized in this Section. There were no LTMMP modification requests during the reporting period.

10.1 MWL Regulatory Submittals

Regulatory submittals during this reporting period include the MWL Annual LTMM Report, April 2015 – March 2016 (SNL/NM June 2016). This third Annual LTMM Report was approved by NMED in July 2016 (Kieling July 2016).

MWL post-LTMMP implementation regulatory submittals are summarized in Table 10-1, including submittals that occurred during this reporting period. A summary of regulatory submittals associated with full implementation of the LTMMP is presented 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 ^a	LTMMMP Requirement	Description of Submittal
January 15, 2014	Section 3.4.1	Installation Work Plan for Three Soil-Vapor Monitoring Wells at the Mixed Waste Landfill <ul style="list-style-type: none"> Approved in February 2014
September, 2014	Section 3.4.1	Installation Report for Three Soil-Vapor Monitoring Wells at the Mixed Waste Landfill <ul style="list-style-type: none"> Approved in September 2014
March 6, 2014	Appendices C through G	Procedures, plans, and documents cited in the LTMMMP used by SNL/NM personnel for air, surface soil, soil vapor, soil moisture, biota, and groundwater monitoring.
June 18, 2014	Section 4.8.1	MWL Annual LTMM Report, January – March 2014. <ul style="list-style-type: none"> Approved in August 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. <ul style="list-style-type: none"> Approved in October 2015
April 2016 through March 2017 Reporting Period Submittals		
May 20, 2016	Appendices C, D, E, F, and G	Updates to three documents used by SNL/NM personnel to perform monitoring activities at the MWL.
June 23, 2016	Section 4.8.1	MWL Annual LTMM Report, April 2015 – March 2016. <ul style="list-style-type: none"> Approved in July 2016
November 9, 2016	Appendices C, D, F, and G	Updates to four documents used by SNL/NM personnel to perform monitoring activities at the MWL.

Notes:

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

DOE = U.S. Department of Energy.

LTMM = Long-Term Monitoring and Maintenance.

LTMMMP = Long-Term Monitoring and Maintenance Plan.

MWL = Mixed Waste Landfill.

SNL/NM = Sandia National Laboratories/New Mexico.

11.0 SUMMARY AND CONCLUSIONS

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

11.1 Monitoring Activities

All monitoring activities for the April 1, 2016 through March 31, 2017 reporting period were completed in accordance with LTMMP requirements. The results for each monitoring activity are summarized as follows.

Radon Monitoring

The radon air monitoring frequency is semiannual. The annual average radon concentration for monitoring locations RN1 through RN15 ranged from 0.3 to 0.5 pCi/L, and the annual average background radon concentration at locations RN16 and RN17 ranged from 0.5 to 0.6 pCi/L. The results for locations RN1 through RN10 were all below the trigger level of 4.0 pCi/L.

Tritium Surface Soil Monitoring

The tritium surface soil monitoring frequency is annual. Soil samples were collected on August 8, 2016. Reported tritium activities were all below the MDA, consistent with historical data, and below the trigger level of 20,000 pCi/L.

Soil-Vapor Monitoring

The vadose zone soil-vapor monitoring frequency is semiannual. A total of 18 compounds were detected above laboratory MDLs during the April 2016 sampling events and a total of 21 compounds were detected above laboratory MDLs during the October 2016 sampling event. Results for PCE, TCE, and Total VOCs from the deepest sampling port of wells MWL-SV03, MWL-SV04, and MWL-SV05 (400 feet bgs) were below the 20 ppmv trigger level for PCE and TCE, and the 25 ppmv trigger level for Total VOCs. The maximum concentrations detected for PCE and TCE at the 400 feet bgs sampling ports were 0.440 ppmv and 0.320 ppmv, respectively. The maximum concentration for Total VOCs at the 400 feet bgs sampling ports was 0.8973 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 annual. 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 1.8 to 5.1 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 on September 1, 2016 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; no issues were identified requiring maintenance or repairs beyond that performed during the inspections.

Inspections of the engineered storm-water drainage swale, soil-vapor monitoring network, soil-moisture monitoring network, and groundwater monitoring network were performed at required frequencies with 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 within 60 days of the December 2016 and March 2017 inspections to remove wind-blown plant debris from the fence. There were no other issues identified.

Two routine weed control events were conducted as a best management practice from April 27-29, 2016 and July 28-August 4, 2016. These events included removal of dead, windblown tumbleweeds from the ET Cover surface, perimeter fence, and drainage swale as well as the application of a pre-emergent herbicide to North and South Staging Areas. A third

event will be conducted in May 2017 and will include the same activities. This event will also include removal of the Pale Wolfberry shrubs identified during the March 22, 2017 inspection from the western and southwestern perimeter area outside the security fence. The weed control activities help promote the growth and health of the desired native grass species by reducing competition with weedy species for limited moisture and nutrients.

Based on previous inspections, additional best management practice activities were conducted during the April 2016 – March 2017 reporting period to improve the site and reduce long-term ET Cover and site maintenance. These activities included improvements to site access and drainage (i.e., improvements to the access and perimeter road) and the installation of erosion and burrow control measures at the ten perimeter monitoring well locations.

11.3 Regulatory Activities

Regulatory activities during the April 2016 – March 2017 reporting period included submittal of the third MWL Annual LTMM Report, April 2015 – March 2016, in June 2016. NMED approved the report in July 2016.

Updates to documents used by SNL/NM personnel to perform monitoring activities at the MWL were submitted to NMED in May and November, 2016.

11.4 Conclusions

All required MWL LTMM monitoring, inspection, and maintenance/repair activities for the April 1, 2016 through March 31, 2017 reporting period were performed and documented in this fourth Annual LTMM Report, which meets the requirements of the MWL LTMM, Section 4.8.1.

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

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ANNEX A

**Mixed Waste Landfill
Radon Monitoring**

January-December 2016

Data Evaluation Memos

Field Forms

Inspection Forms

Contract Verification Reviews

MIXED WASTE LANDFILL

RADON MONITORING

January-June 2016 Monitoring Period



Sandia National Laboratories

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

Albuquerque, New Mexico 87185-

date: August 18, 2016

to: Mike Mitchell (6234), Robert Ziock (4141), Bonnie Little (4131) and Annemarie Rader (4141)

from: Kelly Green (41283) *Kelly Green*

subject: Review of MWL Radon-in-Air Data – 1st Semiannual Event – January through June 2016

The purpose of this memo is to document my review of the radon-in-air monitoring data results for the 1st semiannual monitoring event of calendar year (CY) 2016, January through June 2016, 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 June 2016 were obtained using Radtrak2® radon detectors that were submitted to Landauer® Incorporated for analysis on Analysis Request/Chain of Custody (AR/COC) #617135. On January 7, 2016, 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 6 months and were collected on July 12, 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 semiannual monitoring event will be presented in the next MWL Annual LTMM Report that will be submitted to NMED in June 2017 (reporting period is April 1, 2017 through March 31, 2017).

Attachments:

Analysis Request/Chain of Custody #617135

Landauer Radon Monitoring Report (analytical laboratory results)

Figure 1. Location of the Radtrak2® Detectors at the MWL

SMO 2012-ARCOC (4-2012)

**CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY**

AOP 95-16

Internal Lab

Page 1 of 2

Batch No. *n/a*

SMO Use

ARCOC **617135**

Project Name: MWL Radon Monitoring	Date Samples Shipped: <i>7/15/16</i>	SMO Authorization: <i>[Signature]</i>	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Kelly Green	Carrier/Waybill No: <i>251415</i>	SMO Contact Phone: <i>[Signature]</i>	<input type="checkbox"/> RMMA
Project/Task Number: <i>146422/10-11-08</i>	Lab Contact: Landauer 800.528.8327	Kelly Green/505.845.0787	<input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius
Service Order: CFO 378-16	Lab Destination: Landauer, INC	Send Report to SMO: Stephanie Montano /505.284.2553	
	Contract No.: Apcl # 0410548		

Tech Area: TAS MWL
Building: Room: Operational Site: TAS MWL
Bill to: Sandia National Laboratories (Accounts Payable),
P.O. Box 5800, MS-0154,
Albuquerque, NM 87165-0154

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
100022	--001	RN1/4991883	N/A	7/12/16 1510	F	N/A	N/A	NONE	Collection	Sample	Radon	
100023	--001	RN2/4991884	N/A	7/12/16 1500	F	N/A	N/A	NONE	Collection	Sample	Radon	
100024	--001	RN3/4991916	N/A	7/12/16 1701	F	N/A	N/A	NONE	Collection	Sample	Radon	
100025	--001	RN4/4991920	N/A	7/12/16 1657	F	N/A	N/A	NONE	Collection	Sample	Radon	
100026	--001	RN5/4991921	N/A	7/12/16 1649	F	N/A	N/A	NONE	Collection	Sample	Radon	
100027	--001	RN6/4991922	N/A	7/12/16 1644	F	N/A	N/A	NONE	Collection	Sample	Radon	
100028	--001	RN7/4991923	N/A	7/12/16 1638	F	N/A	N/A	NONE	Collection	Sample	Radon	
100029	--001	RN8/4991882	N/A	7/12/16 1622	F	N/A	N/A	NONE	Collection	Sample	Radon	
100030	--001	RN9/4991880	N/A	7/12/16 1529	F	N/A	N/A	NONE	Collection	Sample	Radon	
100031	--001	RN10/4991885	N/A	7/12/16 1520	F	N/A	N/A	NONE	Collection	Sample	Radon	

Last Chain: <input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/IOC Requirements:	Conditions on Receipt		
Validation Req'd: <input 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 Inits:	Return Samples By:	Comments:			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell	Samples deployed on 01/07/2016 and collected on 07/12/2016	Lab Use
	Annamarie Rader	<i>[Signature]</i>	<i>[Init]</i>	SNL/4141/505.844.2640		

1. Relinquished by <i>[Signature]</i>	Org. 4141	Date 7-13-2016	Time 1700	3. Relinquished by	Org.	Date	Time
1. Received by <i>[Signature]</i>	Org. 4131	Date 7-13-2016	Time 1700	3. Received by	Org.	Date	Time
2. Relinquished by <i>[Signature]</i>	Org. 4131	Date 7-14-16	Time 1500	4. Relinquished by	Org.	Date	Time
2. Received by	Org.	Date	Time	4. Received by	Org.	Date	Time

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

Analysis Request and Chain of Custody for the 1st Semiannual Monitoring Event of CY 2016 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

PROGRAM NAME: MWL

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	
4991879	DRNF	07-JAN-16	12-JUL-16	RN17	142.4 ±10.2	0.8 ±0.05	
4991880	DRNF	07-JAN-16	12-JUL-16	RN9	155.5 ±10.8	0.8 ±0.06	
4991882	DRNF	07-JAN-16	12-JUL-16	RN8	133.1 ±9.8	0.7 ±0.05	
4991883	DRNF	07-JAN-16	12-JUL-16	RN1	158.3 ±10.9	0.8 ±0.06	
4991884	DRNF	07-JAN-16	12-JUL-16	RN2	133.1 ±9.8	0.7 ±0.05	
4991885	DRNF	07-JAN-16	12-JUL-16	RN10	132.1 ±9.7	0.7 ±0.05	
4991916	DRNF	07-JAN-16	12-JUL-16	RN3	153.6 ±10.7	0.8 ±0.06	
4991919	DRNF	07-JAN-16	12-JUL-16	RN11	106.0 ±8.5	0.6 ±0.05	
4991920	DRNF	07-JAN-16	12-JUL-16	RN4	111.6 ±8.8	0.6 ±0.05	
4991921	DRNF	07-JAN-16	12-JUL-16	RN5	87.5 ±7.50	0.5 ±0.04	

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	A23491	03-AUG-16	19-JUL-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

PROGRAM NAME: MWL

Detector Number	Detector Type	Starting Date	Ending Date	Field Data / Comments	Exposure pCi/l-days	Avg. Radon Conc. pCi/l	
4991922	DRNF	07-JAN-16	12-JUL-16	RN6	110.7 ±8.7	0.6 ±0.05	
4991923	DRNF	07-JAN-16	12-JUL-16	RN7	125.6 ±9.4	0.7 ±0.05	
4991939	DRNF	07-JAN-16	12-JUL-16	RN14	75.4 ±6.80	0.4 ±0.04	
4991940	DRNF	07-JAN-16	12-JUL-16	RN16	145.2 ±10.3	0.8 ±0.06	
4991941	DRNF	07-JAN-16	12-JUL-16	RN15	128.4 ±9.6	0.7 ±0.05	
4991942	DRNF	07-JAN-16	12-JUL-16	RN12	110.7 ±8.7	0.6 ±0.05	
4991944	DRNF	07-JAN-16	12-JUL-16	RN13	125.6 ±9.4	0.7 ±0.05	
4991964	DRNF	07-JAN-16	12-JUL-16	* - LESS THAN INDICATED VALUE NO GOLD SEAL RNTR	* 30.0	* 0.2 ±0.02	

① ② ③ ④
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	A23491	03-AUG-16	19-JUL-16

⑤ ⑥ ⑦ ⑧
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

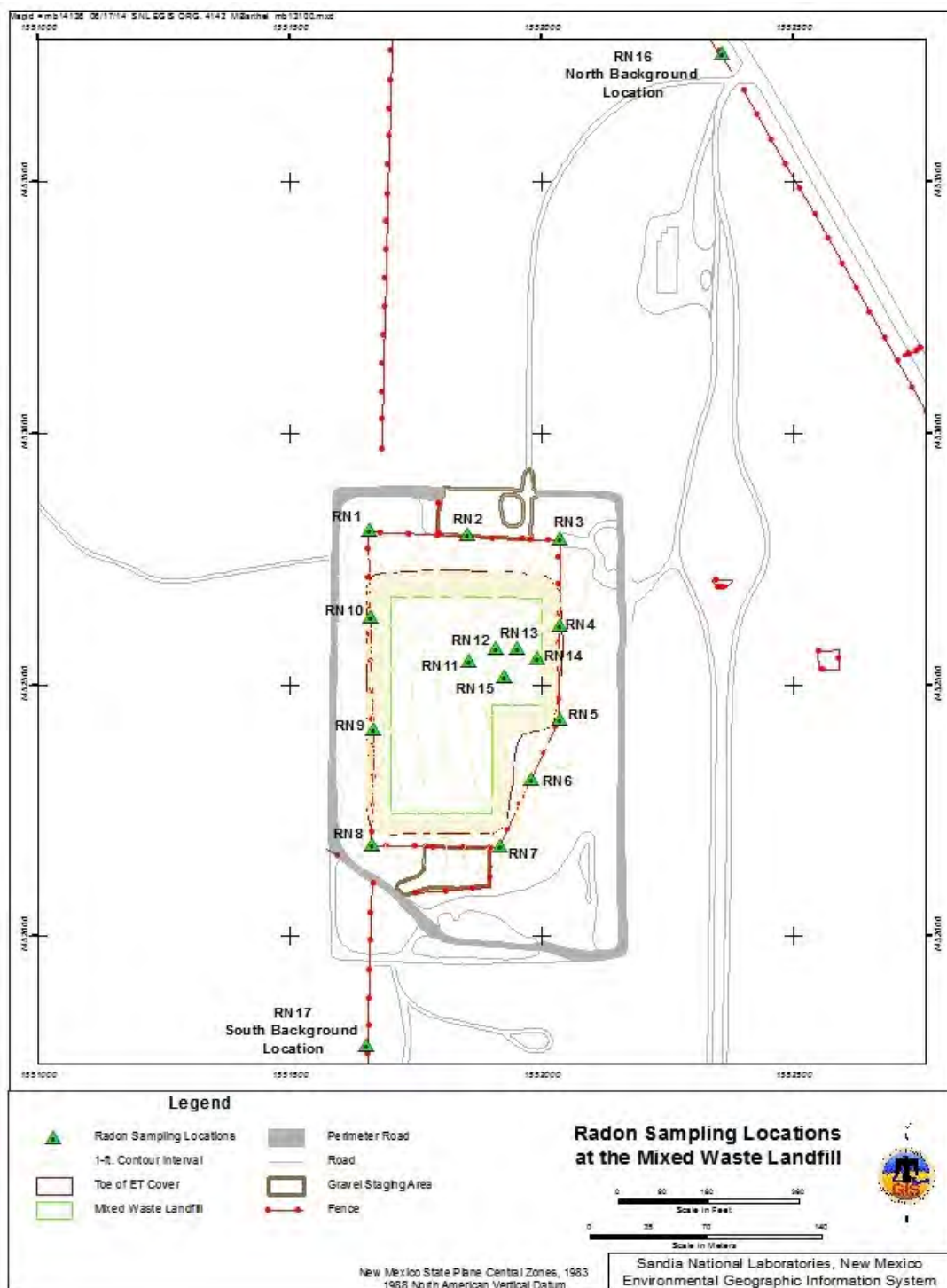


Figure 1. Location of the Radtrak2® Detectors at the MWL

LANDAUER®



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
MS1198
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: 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 for all info

Landauer Use Only: Processed By: _____ Date: _____

Page _____ of _____

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

COC # 617135

Detector Serial Number	Sample Number	Sampling Location	Deployment Date	Collection Date	Time	Comments
4991883	100022-001	RN1	01/07/2016	07/12/2016	1510	
4991884	100023-001	RN2	01/07/2016	07/12/2016	1500	
4991916	100024-001	RN3	01/07/2016	07/12/2016	1701	
4991920	100025-001	RN4	01/07/2016	07/12/2016	1657	
4991921	100026-001	RN5	01/07/2016	07/12/2016	1649	
4991922	100027-001	RN6	01/07/2016	07/12/2016	1644	
4991923	100028-001	RN7	01/07/2016	07/12/2016	1638	
4991882	100029-001	RN8	01/07/2016	07/12/2016	1622	
4991880	100030-001	RN9	01/07/2016	07/12/2016	1529	
4991885	100031-001	RN10	01/07/2016	07/12/2016	1520	
4991919	100032-001	RN11	01/07/2016	07/12/2016	1541	
4991942	100033-001	RN12	01/07/2016	07/12/2016	1547	
4991944	100034-001	RN13	01/07/2016	07/12/2016	1554	
4991939	100035-001	RN14	01/07/2016	07/12/2016	1603	
4991941	100036-001	RN15	01/07/2016	07/12/2016	1611	
4991940	100037-001	RN16	01/07/2016	07/12/2016	1714	
4991879	100038-001	RN17	01/07/2016	07/12/2016	1627	
4991964	100039-001	RNTB	01/07/2016	07/12/2016	1733	

Contract Verification Form (CVR)

Project Leader Green

Project Name MWL Radon Monitoring

Project/Task No. 195122_10.11.08

ARCOC No. 617135

Analytical Lab LAND

SDG No. A23491

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	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: 08-25-2016 07:46:00


Closed by: Wendy Palencia Date: 08-25-2016 07:46:00

Mixed Waste Landfill Radon Monitoring Location Supplemental Inspection FormName 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[®], Radtrak[®] 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

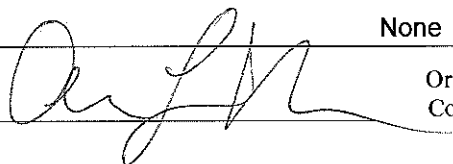
IMPORTANT NOTICE: A printed copy of this document may not be the document currently in effect. The official version is located on the Sandia Restricted Network (SRN), 4100 Controlled Documents home page.

Mixed Waste Landfill Radon Monitoring Location Supplemental Inspection FormName of Inspector Annemarie RaderDate of Inspection 02/26/2016

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[®], Radtrak[®] 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


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Mixed Waste Landfill Radon Monitoring Location Supplemental Inspection FormName of Inspector Annemarie RaderDate of Inspection 03/24/2016

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[®], Radtrak[®] detector).

Location	Action Required (Note any action required and date resolved, otherwise note "None")
RN1	None
RN2	None
RN3	Tumble weeds around base of monitor, removed tumble weeds, 3/24/2016.
RN4	None
RN5	None
RN6	None
RN7	Tumble weeds around base of monitor, removed tumble weeds, 3/24/2016
RN8	None
RN9	None
RN10	None
RN11	None
RN12	None
RN13	None
RN14	None
RN15	None
RN16	Tumble weeds around base of monitor, removed tumble weeds, 3/24/2016
RN17	None

Inspector's Signature



Original to: Mixed Waste Landfill Operating Record

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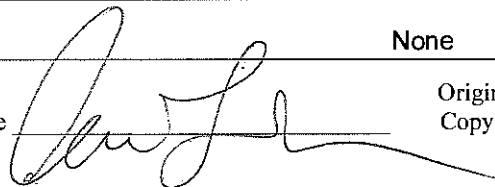
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Mixed Waste Landfill Radon Monitoring Location Supplemental Inspection FormName of Inspector Annemarie RaderDate of Inspection 4/28/2016

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[®], Radtrak[®] 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 Supplemental Inspection FormName of Inspector Annemarie RaderDate of Inspection 5-20-2016

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[®], Radtrak[®] 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



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Mixed Waste Landfill Radon Monitoring Location Supplemental Inspection FormName of Inspector Annemarie RaderDate of Inspection 06/06/2016

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[®], Radtrak[®] detector).

Location	Action Required (Note any action required and date resolved, otherwise note "None")
RN1	None
RN2	None
RN3	None
RN4	None
RN5	Numbers fading. Reapplied numbers 06/06/2016
RN6	None
RN7	None
RN8	None
RN9	None
RN10	None
RN11	None
RN12	None
RN13	None
RN14	None
RN15	Numbers fading. Reapplied numbers. 06/06/2016
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**

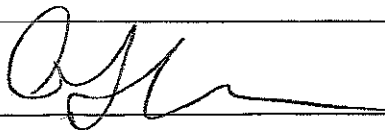
Name of Inspector Annemarie RaderCollection Date 07/12/2016Deployment Date 01/07/2016Radon Monitoring Frequency: ~ Quarterly ☒ Semiannually ~ Annually

<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**

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

July-December 2016 Monitoring Period



date: April 12, 2017

to: Mike Mitchell (6234), Robert Ziock (4141), Bonnie Little (4131) and Annemarie Rader (4141)

from: Kelly Green (41283) *Kelly Green*

subject: Review of MWL Radon-in-Air Data – 2nd Semiannual Event – July through December 2016

The purpose of this memo is to document my review of the radon-in-air monitoring data results for the 2nd semiannual monitoring event of calendar year (CY) 2016, July through December 2016, 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 December 2016 were obtained using Radtrak2[®] radon detectors that were submitted to Landauer[®] Radon, Incorporated for analysis on Analysis Request/Chain of Custody (AR/COC) #617563. On July 12, 2016, 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 6 months and were collected on January 4, 2017. 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 results were all lower than previous results and the trigger level was not exceeded by any of the individual sample results (note: the trigger level only applies to the results from the perimeter locations RN1 through RN10, Figure 1). The results from this semiannual monitoring event will be presented in the next MWL Annual LTMM Report that will be submitted to NMED in June 2017 (reporting period is April 1, 2016 through March 31, 2017).

It should be noted that there were two changes to the MWL radon monitoring program during this semiannual monitoring period. First, Landauer[®] Incorporated phased out the Radtrak[®] detector used previously and introduced a newer detector, the Radtrak2[®]. Second, due to corporate changes, the laboratory performing the analysis of the detectors changed from Landauer[®] Incorporated (now Landauer[®] Radon) to Landauer[®] Nordic.

The July through December 2016 results are all lower than previous results, and the reason for this is uncertain. A re-analysis of the detectors was requested through our Sample Management Office and performed by Landauer®. The re-analysis confirmed the original results. Through correspondence with the Landauer® Nordic Laboratory Manager, we verified appropriate quality control requirements were being followed and quality control results were consistent with method requirements.

Additional actions are being taken in CY 2017 to further investigate the newer Radtrak2® detectors. Radtrak2® detectors initially deployed for the 1st half of CY 2017 were collected after the 1st quarter (i.e., 3-month period) so we could initiate an investigation. Landauer® first suggested we try the more sensitive RapiDOS® detector for the MWL monitoring application, considering the generally low (i.e., equivalent to background) concentrations measured at the site during previous quarterly and semiannual monitoring events. The design of the RapiDOS® detector is also better suited to outdoor deployment, although the Radtrak2® is also suitable for the outdoors. We did not select the RapiDOS® detector previously because it can only be deployed a maximum of 3 months, and we had already transitioned to semiannual (i.e., 6-month) monitoring. To allow for thorough investigation of the detectors, we transitioned back to quarterly monitoring and deployed both the Radtrak2® and RapiDOS® detectors at all locations on April 3, 2017. This side-by-side deployment strategy should allow us to determine if the lower results obtained in the July through December 2016 monitoring period are related to the lower sensitivity of the Radtrak2® detector compared to Radtrak® detectors used prior to the July 2016 deployment.

The Landauer® Nordic Laboratory Manager followed up with correspondence on April 10, 2017 (after the dual deployment of detectors was initiated) that indicated the new Radtrak2® detectors are designed to have a longer diffusion time than the older Radtrak® detectors, preventing thoron (Radon-220 with a half-life of just 56 seconds) from entering the detector. Based upon the Landauer® recommendation, dual deployment of detectors that will measure thoron as well as radon (Radtrak2® detectors modified with holes and paper filters) with Radtrak2® detectors (which measure only radon), will help determine the impact thoron may have had on the higher values measured previously using the older Radtrak® detectors. This dual deployment is scheduled for the 3rd quarter of CY 2017. Evaluation of the 2nd and 3rd quarter data sets will be used to make a final decision on future radon monitoring.

Attachments:

Analysis Request/Chain of Custody #617563

Landauer Radon Monitoring Report (analytical laboratory results)

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

Page 1 of 2

SMO Use

AR/COC 617563



Project Name:	MWL RADON MONITORIN	Date Samples Shipped:	1-12-11	SMO Authorization:	Thomas Goodman	<input type="checkbox"/> Waste Characterization
Project/Task Manager:	Robert Ziock	Carrier/Waybill No.:	259361	SMO Contact Phone:		<input type="checkbox"/> RMA
Project/Task Number:	195122.10.11.08	Lab Contact:	Amy Kruszynski / 1-800-528-8327	Wendy Palencia/505-844-3132		<input type="checkbox"/> Released by COC No.
Service Order:	CF378-17	Lab Destination:	LAND	Send Report to SMO:		<input checked="" type="checkbox"/> 4° Celsius
		Contract No.:	1495047	Stephanie Montaño/505.284.2553		Bill to: Sandia National Laboratories (Accounts Payable).

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					
101413	001		RN1/ 652659-4 ✓	NA	1/4/17 15:30	AF	N	0 NA	NONE	Collection	Sample	RADON	
101414	001		RN2/ 506760-8 ✓	NA	1/4/17 15:15	AF	N	0 NA	NONE	Collection	Sample	RADON	
101415	001		RN3/ 721256-6 ✓	NA	1/4/17 15:10	AF	N	0 NA	NONE	Collection	Sample	RADON	
101416	001		RN4/ 743579-5 ✓	NA	1/4/17 16:07	AF	N	0 NA	NONE	Collection	Sample	RADON	
101417	001		RN5/ 358311-9 ✓	NA	1/4/17 16:45	AF	N	0 NA	NONE	Collection	Sample	RADON	
101418	001		RN6/ 167881-2 ✓	NA	1/4/17 16:40	AF	N	0 NA	NONE	Collection	Sample	RADON	
101419	001		RN7/ 514372-2 ✓	NA	1/4/17 16:36	AF	N	0 NA	NONE	Collection	Sample	RADON	
101420	001		RN8/ 767038-3 ✓	NA	1/4/17 16:20	AF	N	0 NA	NONE	Collection	Sample	RADON	
101421	001		RN9/ 188408-9 ✓	NA	1/4/17 16:16	AF	N	0 NA	NONE	Collection	Sample	RADON	
101422	001		RN10/ 173616-4 ✓	NA	1/4/17 16:10	AF	N	0 NA	NONE	Collection	Sample	RADON	

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD <input checked="" type="checkbox"/> Yes				
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
	Annemarie Rader			SNL/04141/505-844-2640/505-382-9197		Return Samples By:		
						Comments: Samples deployed on 07/12/2016 and collected on 01/04/2017.		

Relinquished by <i>A. K. V.</i>	Org. 4141	Date 01-09-2017	Time 1553	Relinquished by	Org.	Date	Time
Received by <i>T. J. S.</i>	Org. 4131	Date 01-04-2017	Time 1553	Received by	Org.	Date	Time
Relinquished by <i>T. J. S.</i>	Org. 4131	Date 1-12-17	Time 0830	Relinquished by	Org.	Date	Time
Received by <i>A. K. V.</i>	Org.	Date 1-12-17	Time	Received by	Org.	Date	Time

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



Doug Perry
1515 Eubank SE
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RADON MONITORING REPORT

Issued by an Accredited Laboratory



107831-AL, 107830-RT

REPORT NUMBER
4644294:2

REPORT PAGE 1(6)

REPORT DATE
03/29/2017

PRINT DATE
03/29/2017

MEASUREMENT PERFORMED FOR
Doug Perry
1515 Eubank SE
Bldg 957
Albuquerque NM 87123

REPORT RECEIVER(S)
Doug Perry

The analysis results are located on page 2 of this document.

Description of the measurement

The measurement was performed with a closed alpha-track detector (Radtrak2) following the quality guidance in EPA 402-R-95-012.

The detector(s) arrived to Landauer Nordic 01/13/2017. They were measured 01/18/2017.

Property data and address

Building Id: 6

1515 Eubank SE
Bldg 957
Albuquerque NM 87123

Type of building:
Building year:
HVAC:
Foundation type:
Purpose of test:

Measurement method: closed alpha-track detector

The radon measurement was performed with a closed alpha-track detector following the quality assurance guidance given in EPA 402-R-95-012. The detector container is manufactured from electrically conducting plastic. Through a small slit (filter), radon gas enters the detector. The track-detecting material (film) inside the detector is hit by alpha particles generated by the radon entering the container and the decay products formed from it. On the film, the alpha particles make small tracks which are enlarged through chemical etching and later counted in a microscope in order to determine the radon exposure. LANDAUER NORDIC AB (P.O. Box 6522, SE-751 28 Uppsala, Sweden is accredited (no. 1489) by SWEDAC to conduct radon-gas measurements using the closed alpha-track detector method. The analysis equipment is checked daily and the detectors are calibrated at regular intervals.

NRPP Licenses: 107831 AL, 107830 RT

Measured radon concentrations

For each detector, the measured value of the radon concentration is given. For each value an uncertainty associated with the measurement to a 95% confidence level is also given. For example a measurement result of 4.0 ± 0.5 pCi/l means that the radon concentration is most likely contained in the range 3.5-4.5 pCi/l. If the start or end date of the measurement has not been provided, the radon concentration cannot be calculated. In such cases, the total exposure in pCi⁴days/l will be reported. The reported measured values are related to the detectors as received by Landauer Nordic. Detector deployment is not performed by Landauer Nordic. Measurement information such as monitoring period (dates) and placement location is provided to Landauer Nordic by the end user.

Radon measurements in Multifamily Buildings, Schools and Large Buildings

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

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

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

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

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

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

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

Signature on the report

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

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Review of MWL Radon-in-Air Data
2nd Semiannual CY 2016 (July - December 2016)
April 12, 2017



RADON MONITORING REPORT
Issued by an Accredited Laboratory



REPORT NUMBER
4644294:2

REPORT PAGE 2 ()

REPORT DATE
03/29/2017

PRINT DATE
03/29/2017

Test results

Detector	Start date	Stop date	Location	Detector comment	Floor level	Avg Radon Conc. pCi/l	Total Radon Exp pCi-days/l
652659-4	07/12/2016	01/04/2017	RN1			0.2 +/- 0.1	41 +/- 11
506760-8	07/12/2016	01/04/2017	RN2			0.2 +/- 0.1	39 +/- 11
721256-6	07/12/2016	01/04/2017	RN3			0.2 +/- 0.1	45 +/- 11
743579-5	07/12/2016	01/04/2017	RN4			0.2 +/- 0.1	43 +/- 11
358311-9	07/12/2016	01/04/2017	RN5			0.2 +/- 0.1	38 +/- 14
167881-2	07/12/2016	01/04/2017	RN6			0.2 +/- 0.1	39 +/- 14
514372-2	07/12/2016	01/04/2017	RN7			0.2 +/- 0.1	42 +/- 11
767038-3	07/12/2016	01/04/2017	RN8			0.3 +/- 0.1	51 +/- 11

Comment to the results

This report replaces 4644294:1. Reason: new calculation of LLD.

Trygve Rönqvist (Electronically signed)

Signature Landauer Nordic Laboratory Measurement Specialist

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Telephone: 331.814.2200 E-mail: help@landauerradon.com

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RADON MONITORING REPORT

Issued by an Accredited Laboratory



107831-AL, 107830-RT

REPORT NUMBER
4644294:2

REPORT PAGE 3(6)

REPORT DATE
03/29/2017

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03/29/2017

MEASUREMENT PERFORMED FOR
Doug Perry
1515 Eubank SE
Bldg 957
Albuquerque NM 87123

REPORT RECEIVER(S)
Doug Perry

The analysis results are located on page 2 of this document.

Description of the measurement

The measurement was performed with a closed alpha-track detector (Radtrak2) following the quality guidance in EPA 402-R-95-012.

The detector(s) arrived to Landauer Nordic 01/13/2017. They were measured 01/18/2017.

Property data and address

Building Id: 6

1515 Eubank SE
Bldg 957
Albuquerque NM 87123

Type of building:
Building year:
HVAC:
Foundation type:
Purpose of test:

Measurement method: closed alpha-track detector

The radon measurement was performed with a closed alpha-track detector following the quality assurance guidance given in EPA 402-R-95-012.

The detector container is manufactured from electrically conducting plastic. Through a small slit (filter), radon gas enters the detector. The track-detecting material (film) inside the detector is hit by alpha particles generated by the radon entering the container and the decay products formed from it. On the film, the alpha particles make small tracks which are enlarged through chemical etching and later counted in a microscope in order to determine the radon exposure. LANDAUER NORDIC AB (P.O. Box 6522, SE-751 28 Uppsala, Sweden) is accredited (no. 1489) by SWEDAC to conduct radon-gas measurements using the closed alpha-track detector method. The analysis equipment is checked daily and the detectors are calibrated at regular intervals.

NRPP Licenses: 107831 AL, 107830 RT

Measured radon concentrations

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

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- EPA Radon Measurements in Schools, EPA 402-R-92-014, July 1993.

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

Signature on the report

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

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87123-107831-AL-107830-RT

Review of MWL Radon-in-Air Data
2nd Semiannual CY 2016 (July - December 2016)
April 12, 2017



RADON MONITORING REPORT Issued by an Accredited Laboratory



REPORT NUMBER
4644294-2

REPORT PAGE 4 ()

REPORT DATE
03/29/2017

PRINT DATE
03/29/2017

Test results

Detector	Start date	Stop date	Location	Detector comment	Floor level	Avg Radon Conc. pCi/l	Total Radon Exp pCi-days/l
188408-9	07/12/2016	01/04/2017	RN9			0.2 +/- 0.1	36 +/- 11
173616-4	07/12/2016	01/04/2017	RN10			< 0.2	< 33
606322-6	07/12/2016	01/04/2017	RN11			0.2 +/- 0.0	32 +/- 9
431826-7	07/12/2016	01/04/2017	RN12			0.2 +/- 0.1	33 +/- 11
377101-1	07/12/2016	01/04/2017	RN13			0.2 +/- 0.1	38 +/- 11
463642-9	07/12/2016	01/04/2017	RN14			0.2 +/- 0.1	35 +/- 14
120577-2	07/12/2016	01/04/2017	RN15			0.2 +/- 0.1	41 +/- 11
414179-2	07/12/2016	01/04/2017	RN16			0.2 +/- 0.1	41 +/- 11

Comment to the results

This report replaces 4644294:1. Reason: new calculation of LLD.

Trygve Rönqvist (Electronically signed)

Signature Landauer Nordic Laboratory Measurement Specialist

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RADON MONITORING REPORT

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107831-AL, 107830-RT

REPORT NUMBER
4644294-2

REPORT PAGE 5(6)

REPORT DATE
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03/29/2017

MEASUREMENT PERFORMED FOR
Doug Perry
1515 Eubank SE
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Albuquerque NM 87123

REPORT RECEIVER(S)
Doug Perry

The analysis results are located on page 2 of this document.

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1515 Eubank SE
Bldg 957
Albuquerque NM 87123

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Building year:
HVAC:
Foundation type:
Purpose of test:

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

Signature on the report

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87123-1 (2/10/16) 107831-AL, 107830-RT

Review of MWL Radon-in-Air Data
 2nd Semiannual CY 2016 (July - December 2016)
 April 12, 2017



RADON MONITORING REPORT
 Issued by an Accredited Laboratory



REPORT NUMBER
 4644294-2

REPORT PAGE 6 ()

REPORT DATE
 03/29/2017

PRINT DATE
 03/29/2017

Test results

Detector	Start date	Stop date	Location	Detector comment	Floor level	Avg Radon Conc. pCi/l	Total Radon Exp pCi-days/l
770115-4	07/12/2016	01/04/2017	BN17			0.3 +/- 0.1	47 +/- 11
727649-6	07/12/2016	01/04/2017	RNTB			< 0.2	< 33

RT002.M.VI.26/2016.04-21.01/LB

Comment to the results

This report replaces 4644294:1. Reason: new calculation of LLD.

Tryggve Rönnqvist (Electronically signed)

Signature Landauer Nordic Laboratory Measurement Specialist

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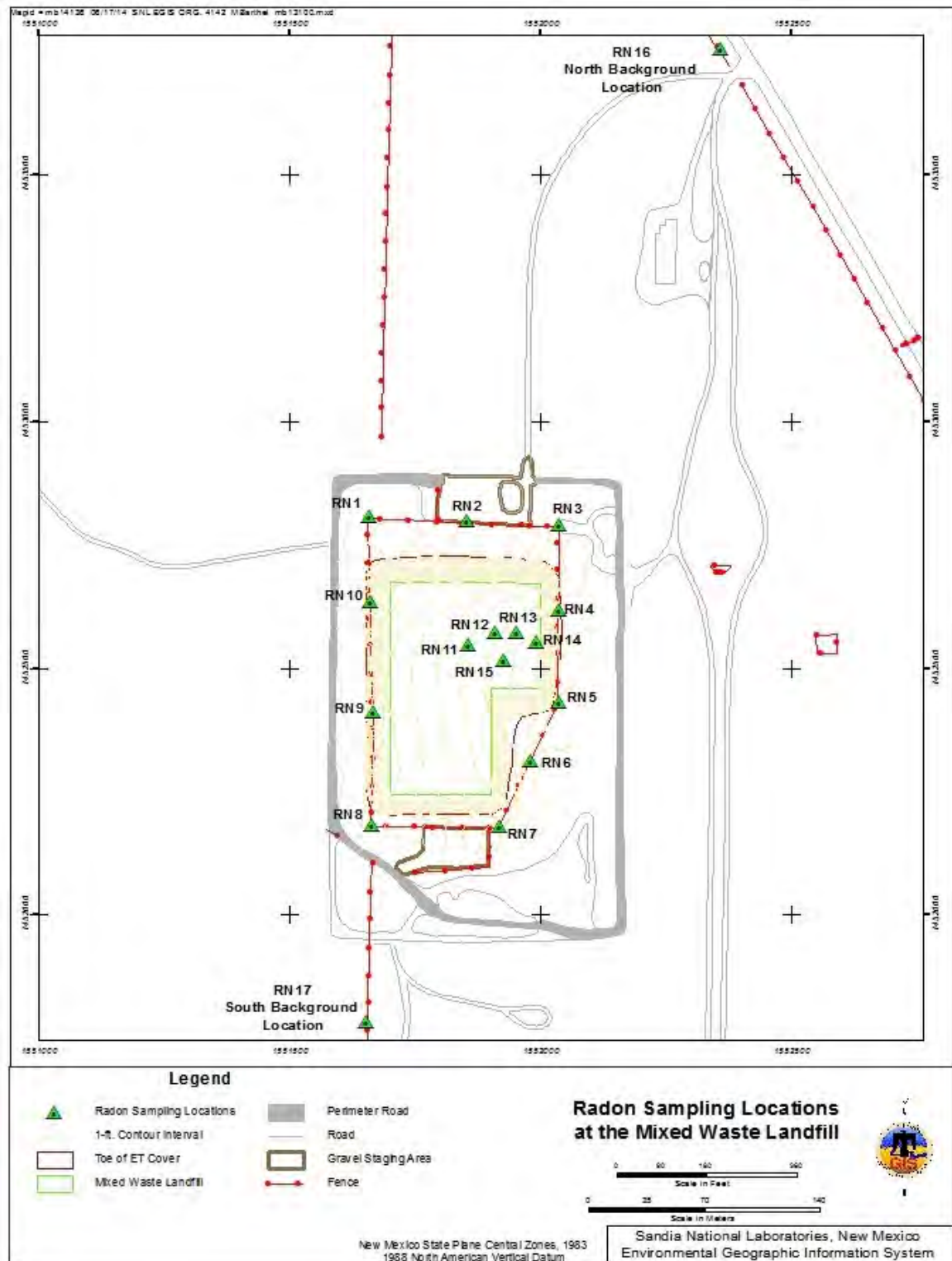


Figure 1. Location of the Alpha Track Detectors at the MWL

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

Name: Annemarie RaderSignature:  1/4/2017ARCOC #: 617563

Detector Serial Number	Sample Number	Sampling Location	Deployment Date	Collection Date	Collection Time	Comments
652659-4	101413-001	RN1	7-12-2016	1-4-2017	1530	
506760-8	101414-001	RN2	7-12-2016	1-4-2017	1515	
721256-6	101415-001	RN3	7-12-2016	1-4-2017	1510	
743579-5	101416-001	RN4	7-12-2016	1-4-2017	1607	
358311-9	101417-001	RN5	7-12-2016	1-4-2017	1645	
167881-2	101418-001	RN6	7-12-2016	1-4-2017	1640	
514372-2	101419-001	RN7	7-12-2016	1-4-2017	1636	
767038-3	101420-001	RN8	7-12-2016	1-4-2017	1620	
188408-9	101421-001	RN9	7-12-2016	1-4-2017	1616	
173616-4	101422-001	RN10	7-12-2016	1-4-2017	1610	
606322-6	101423-001	RN11	7-12-2016	1-4-2017	1540	
431826-7	101424-001	RN12	7-12-2016	1-4-2017	1545	
377101-1	101425-001	RN13	7-12-2016	1-4-2017	1550	
463642-9	101426-001	RN14	7-12-2016	1-4-2017	1555	
120577-2	101427-001	RN15	7-12-2016	1-4-2017	1600	
414179-2	101428-001	RN16	7-12-2016	1-4-2017	1525	
770115-4	101429-001	RN17	7-12-2016	1-4-2017	1630	
727649-6	101430-001	RNTB	7-12-2016	1-4-2017	NA	

Additional Comments: _____

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

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Contract Verification Form (CVR)

Project Leader Ziock

Project Name MWL Radon Monitoring

Project/Task No. 195122_10.11.08

ARCOC No. 617563

Analytical Lab LAND

SDG No. 4644294-1

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	Signed COC not returned by lab
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	X		
1.7	Date samples received	X		
1.8	Condition upon receipt information provided	X		

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain
		Yes	No	
2.1	Data reviewed, signature	X		
2.2	Method reference number(s) complete and correct	X		
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	N/A		
2.4	Matrix spike/matrix spike duplicate data provided	N/A		
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and Lc	X		
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: 02-01-2017 13:51:00

Closed by: Wendy Palencia Date: 02-01-2017 13:51:00

Mixed Waste Landfill Radon Monitoring Location Supplemental Inspection FormName of Inspector Annemarie RaderDate of Inspection 09/01/2016

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®, Radtrak® detector). *du*

9-1-16 zip ties *9-1-16* *Radtrak* *3-23-17*

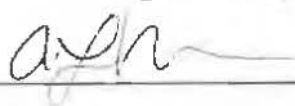
plastic assembly parts 9-1-16

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 Supplemental Inspection FormName Angela E. RaderSignature Date of Inspection 11-4-2016

Inspection parameters: Identification labeling; mounting post; mounting bracket and stainless steel clamp; radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic assembly parts, zip ties, ~~Rapidos~~^{Radtrak} detector); ~~3-23-17~~

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

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Copy to: SNL/NM Records Center

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Mixed Waste Landfill Radon Monitoring Location Supplemental Inspection FormName Anne Marie RaderSignature Date of Inspection 12-5-2016

Inspection parameters: Identification labeling; mounting post; mounting bracket and stainless steel clamp; radon monitoring apparatus components (outer metal housing, 2 wing nuts, plastic assembly parts, zip ties,

~~Rapidos® detector~~
Radtrak 3-25-17

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

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center

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

Name Annemarie RaderSignature Collection Date 01/04/2017Deployment Date 07/12/2016Radon 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 assembly parts).	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 zip ties to inside of plastic housing.	Yes	No	
<i>Radon Monitoring Detectors Inspection Parameters</i>			
A. Condition of Rapidos ^{Radtrak} detector at time of collection. ₃₋₂₃₋₁₇	Yes	No	
B. Condition of Rapidos ^{Radtrak} detector at time of deployment. ₃₋₂₃₋₁₇	Yes	No	

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

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

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

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ANNEX B

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

April 2016-March 2017

Data Evaluation Memo

Data Validation Reports

Contract Verification Reviews

Mixed Waste Landfill
Surface Soil Tritium Monitoring
August 2016 Sampling Event



date: September 23, 2016

to: Mike Mitchell (6234), Robert Ziock (4141), and Bonnie Little (4131)

from: Kelly Green (41283) *Kelly Green*

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

The purpose of this memo is to document my review of the tritium-in-soil monitoring data results for the 8/08/16 sample event.

Summary of Tritium Results (EPA Method 906.0^a)
Mixed Waste Landfill Surface Soil Monitoring
August 8, 2016

Sample Location	Result (pCi/L)	Percent Soil Moisture	Laboratory Qualifier	Validation Qualifier	Trigger Level (pCi/L)
MWL TS-2NW	91.2 ± 109	6.25	U	BD, FR3	20,000
MWL TS-2SW	28.3 ± 101	8.00	U	BD, FR3	
MWL TS-2SE	151 ± 115	8.22	U	BD, FR3	
MWL TS-2NE	107 ± 110	8.32	U	BD, FR3	
MWL TS-2NE (Duplicate)	23.5 ± 102	9.09	U	BD, FR3	

Notes:

^aU.S. Environmental Protection Agency, 1986 (and updates), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, 3rd edition.

BD = Result is below the MDA.

EPA = U.S. Environmental Protection Agency.

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

MDA = Minimum detectable activity.

MDL = Method detection limit.

MWL = Mixed Waste Landfill.

pCi/L = Picocuries per liter.

TPU = Total Propagated Uncertainty.

U = Analyzed for but undetected.

These results are below the August 2015 monitoring data (MWL Annual LTMM Report, June 2016) which ranged from 269 pCi/L to 719 pCi/L and are far below the Mixed Waste Landfill (MWL) Long-Term Monitoring and Maintenance Plan (LTMMP) 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 LTMMP 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

Memorandum

Date: September 14, 2016
To: File
From: Mary Donovan
Subject: Radiochemical Data Review and Validation – SNL
Site: MWL Surface Soil Monitoring
ARCO: 617201
SDG: 403466
Laboratory: GEL
Project/Task: 195122.10.11.08
Analysis: RAD

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

Summary

Five soil samples were prepared and analyzed with approved procedures using method GL-RAD-A-002 (LSC, tritium vacuum, solid). Problems were identified with the data package that resulted in the qualification of data.

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

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 properly preserved and prepared and analyzed within the prescribed holding time.

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 or carriers were not required for this method.

Matrix Spike (MS)

The MS recovery met 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 was submitted with the ARCO. There are no “required” review criteria for field triplicate 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:** 09/14/2016



Sample Findings Summary



AR/COC: 617201

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
GL-RAD-A-002			
	100229-001/MWL TS-2NW	Tritium (10028-17-8)	BD, FR3
	100229-002/MWL TS-2SW	Tritium (10028-17-8)	BD, FR3
	100229-003/MWL TS-2SE	Tritium (10028-17-8)	BD, FR3
	100229-004/MWL TS-2NE	Tritium (10028-17-8)	BD, FR3
	100229-005/MWL TS-2NE	Tritium (10028-17-8)	BD, FR3

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

Sandia Data Validation Summary Worksheet

ARCOC#: 617201	Site/Project: MWL Surface Soil Monitoring	Validation Date: 09/14/16
SDG #: 403466	Laboratory: GEL Laboratories, LLC	Validator: Mary Donovan
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: Collected: 08/08/2016

Validated by:

Mary A. Donovan

Sandia Radiochemistry Worksheet

ARCOC #(s): 617201	SDG #: 403466	Matrix: Soil
Laboratory Sample IDs: see below		
Method/Batch#s: ASTM D 2216 (% Moisture)/GL-RAD-A-002 (LSC, Tritium Vacuum, Solid) 1589764(prepare)/1593387 Samples -001 through -005		
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	
NA													

Comments: HTs OK; Dup and MS on sample -001

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. <u>N/A</u>		SMO Use		AR/COC 617201	
Project Name: MWL SURFACE SOIL MON		Date Samples Shipped: <u>8/9/16</u>		SMO Authorization: <u>[Signature]</u>	
Project/Task Manager: Robert Zlock		Carrier/Waybill No. <u>252148</u>		SMO Contact Phone: <u>Wendy Palencia/505-844-3132</u>	
Project/Task Number: 195122.10.11.08		Lab Contact: Edie Kent/843-769-7385		Send Report to SMO: <u>Stephanie Montaño/505.284.2553</u>	
Service Order: CF426-16		Lab Destination: GEL		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius	
Contract No.: 1303873		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <u>463466</u>			
Tech Area:		Operational Site:			
Building:		Room:			

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
100229	001	MWL TS-2NW	N/A	<u>8-8-16/11:19</u>	SOIL	P	2x1 L	None	G	SA	TRITIUM (EPA 906)	<u>001</u>
100229	-002	MWL TS-2SW	N/A	<u>8-8-16/11:11</u>	SOIL	P	2x1 L	None	G	SA	TRITIUM (EPA 906)	<u>002</u>
100229	-003	MWL TS-2SE	N/A	<u>8-8-16/11:03</u>	SOIL	P	2x1 L	None	G	SA	TRITIUM (EPA 906)	<u>003</u>
100229	-004	MWL TS-2NE	N/A	<u>8-8-16/10:53</u>	SOIL	P	2x1 L	None	G	SA	TRITIUM (EPA 906)	<u>004</u>
100229	-005	MWL TS-2NE	N/A	<u>8-8-16/10:53</u>	SOIL	P	2x1 L	None	G	DU	TRITIUM (EPA 906)	<u>005</u>

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD		<input checked="" type="checkbox"/> Yes		
Background: <input type="checkbox"/> Yes		Entered by:		Turnaround Time		<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day		
Confirmatory: <input type="checkbox"/> Yes		QC inits.:		Negotiated TAT		<input type="checkbox"/>		
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal		Lab Use
	Michael Mitchell	<u>[Signature]</u>	<u>RM</u>	SNL/06234/505-845-8045		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		
	Robert Zlock	<u>[Signature]</u>	<u>RZ</u>	SNL/4141/845-0485		Return Samples By:		
						Comments:		

Relinquished by <u>[Signature]</u> Org. <u>4142</u> Date <u>8/8/16</u> Time <u>1135</u>	Relinquished by	Org.	Date	Time
Received by <u>[Signature]</u> Org. <u>4131</u> Date <u>8/8/16</u> Time <u>1135</u>	Received by	Org.	Date	Time
Relinquished by <u>[Signature]</u> Org. <u>4131</u> Date <u>8/9/16</u> Time <u>0745</u>	Relinquished by	Org.	Date	Time
Received by <u>[Signature]</u> Org. <u>601</u> Date <u>8-10-16</u> Time <u>0745</u>	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 Surface Soil Monitoring

Project/Task No. 195122 / 10.11.08

ARCOC No. 617201

Analytical Lab GEL

SDG No. 403466

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		Matrix spike run. Sample replicate run for precision measurement.
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	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: Mark L Lyon Date: 09-13-2016 14:16:00

Closed by: Mark L Lyon Date: 09-13-2016 14:16:00

Mixed Waste Landfill
Biota Monitoring
September 2016 Sampling Event

Memorandum

Date: November 11, 2016

To: File

From: Mary Donovan

Subject: Inorganic Data Review and Validation – SNL
Site: MWL Biota Monitoring
ARCO: 617371
SDG: 406613
Laboratory: GEL
Project/Task: 195122.10.11.08
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

Summary

Three soil samples were prepared and analyzed with approved procedures using methods EPA 6020 (ICP-MS), EPA 6010B (ICP-AES) and EPA 7471A (CVAA mercury). Data were reported for all required analytes. Problems were identified with the data package that resulted in the qualification of data.

ICP-MS:

1. The MS %R was >125% for V. All associated sample results were detects and will be **qualified J+,MS2**.
2. The parent sample concentration for Ba was >4X the spike amount, and the MS %R was outside acceptance criteria. Therefore, the MS %R was not used to evaluate field sample data. All associated sample results were detects and will be **qualified J,MS1** due to lack of matrix-specific accuracy data.

CVAA:

1. Hg was detected at < the PQL in the ICB/CCBs. The associated results for all samples were detects ≤5X the highest blank value and will be **qualified 0.029U,B3** at 5X the highest blank value.

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.

Calibration

All initial and continuing calibration met QC acceptance criteria.

Reporting Limit Verification

The CRI and CRA recoveries met QC acceptance criteria.

It should be noted that the CRI and CRA were 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 noted above in the Summary section.

Matrix Spike(MS)

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

Laboratory Replicate

The laboratory replicate analyses met all QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. The samples were initially diluted the standard 2X for ICP-MS analysis. In addition, all samples were diluted 10X for Zn due to over-range analyte concentrations. Reporting limits were adjusted accordingly.

ICP Interference Check Sample (ICS A and AB)

Results of the ICS A and AB analyses were not evaluated because the concentrations of Ca, Al, Fe and Mg in the samples were < those in the ICS solution. No data will be qualified as a result.

ICP Serial Dilution

The serial dilution met all QC acceptance criteria.

Other QC

A field duplicate pair was submitted with the ARCO. There are no “required” review criteria for field triplicate 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: 11/14/2016

Memorandum

Date: October 25, 2016
To: File
From: Mary Donovan
Subject: Radiochemical Data Review and Validation – SNL
Site: MWL Biota Monitoring
ARCOG: 617371
SDG: 406613
Laboratory: GEL
Project/Task: 195122.10.11.08
Analysis: RAD

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

Summary

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

1. All sample results which were either < the associated 2-sigma TPU or < the associated MDA will be **qualified BD,FR3**.
2. All sample results that were > the MDA but $\leq 3X$ the MDA will be **qualified J,FR7**.
3. The Th-234 and U-238 results for sample 406613002 were rejected by the laboratory due to the peaks not meeting identification criteria and will be **qualified R,Z2**.

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 properly preserved and prepared and analyzed within the prescribed holding time.

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 or carriers were not required for this method.

Matrix Spike (MS)

MS analysis was not required for this method.

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 the ARCOG. There are no “required” review criteria for field triplicate 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:** 11/14/2016



Sample Findings Summary



AR/COC: 617371

Page 1 of 3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
DOE HASL 300, 4.5.2.3/Ga-			
	100656-002/MWL AHSS-01-2016	Americium-241 (14596-10-2)	BD, FR3
	100656-002/MWL AHSS-01-2016	Beryllium-7 (13966-02-4)	BD, FR3
	100656-002/MWL AHSS-01-2016	Bismuth-212 (14913-49-6)	J, FR7
	100656-002/MWL AHSS-01-2016	Cobalt-60 (10198-40-0)	BD, FR3
	100656-002/MWL AHSS-01-2016	Neptunium-237 (13994-20-2)	BD, FR3
	100656-002/MWL AHSS-01-2016	Radium-223 (15623-45-7)	BD, FR3
	100656-002/MWL AHSS-01-2016	Radium-224 (13233-32-4)	J, FR7
	100656-002/MWL AHSS-01-2016	Sodium-22 (13966-32-0)	BD, FR3
	100656-002/MWL AHSS-01-2016	Thorium-227 (15623-47-9)	BD, FR3
	100656-002/MWL AHSS-01-2016	Thorium-231 (14932-40-2)	BD, FR3
	100656-002/MWL AHSS-01-2016	Thorium-234 (15065-10-8)	R, Z2
	100656-002/MWL AHSS-01-2016	Uranium-235 (15117-96-1)	BD, FR3
	100656-002/MWL AHSS-01-2016	Uranium-238 (7440-61-1)	R, Z2
	100657-002/MWL AHSS-02-2016	Americium-241 (14596-10-2)	BD, FR3
	100657-002/MWL AHSS-02-2016	Beryllium-7 (13966-02-4)	J, FR7

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	100657-002/MWL AHSS-02-2016	Cobalt-60 (10198-40-0)	BD, FR3
	100657-002/MWL AHSS-02-2016	Neptunium-237 (13994-20-2)	BD, FR3
	100657-002/MWL AHSS-02-2016	Radium-223 (15623-45-7)	BD, FR3
	100657-002/MWL AHSS-02-2016	Sodium-22 (13966-32-0)	BD, FR3
	100657-002/MWL AHSS-02-2016	Thorium-227 (15623-47-9)	BD, FR3
	100657-002/MWL AHSS-02-2016	Thorium-231 (14932-40-2)	BD, FR3
	100657-002/MWL AHSS-02-2016	Thorium-234 (15065-10-8)	BD, FR3
	100657-002/MWL AHSS-02-2016	Uranium-235 (15117-96-1)	BD, FR3
	100657-002/MWL AHSS-02-2016	Uranium-238 (7440-61-1)	BD, FR3
	100658-002/MWL AHSS-02-2016	Americium-241 (14596-10-2)	BD, FR3
	100658-002/MWL AHSS-02-2016	Beryllium-7 (13966-02-4)	J, FR7
	100658-002/MWL AHSS-02-2016	Cobalt-60 (10198-40-0)	BD, FR3
	100658-002/MWL AHSS-02-2016	Neptunium-237 (13994-20-2)	BD, FR3
	100658-002/MWL AHSS-02-2016	Radium-223 (15623-45-7)	BD, FR3
	100658-002/MWL AHSS-02-2016	Sodium-22 (13966-32-0)	BD, FR3
	100658-002/MWL AHSS-02-2016	Thorium-227 (15623-47-9)	BD, FR3
	100658-002/MWL AHSS-02-2016	Thorium-231 (14932-40-2)	BD, FR3
	100658-002/MWL AHSS-02-2016	Uranium-235 (15117-96-1)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SW846 3050B/6020			
	100656-001/MWL AHSS-01-2016	Barium (7440-39-3)	J, MS1
	100656-001/MWL AHSS-01-2016	Vanadium (7440-62-2)	J+, MS2
	100657-001/MWL AHSS-02-2016	Barium (7440-39-3)	J, MS1
	100657-001/MWL AHSS-02-2016	Vanadium (7440-62-2)	J+, MS2
	100658-001/MWL AHSS-02-2016	Barium (7440-39-3)	J, MS1
	100658-001/MWL AHSS-02-2016	Vanadium (7440-62-2)	J+, MS2
SW846 7471A			
	100656-001/MWL AHSS-01-2016	Mercury (7439-97-6)	0.029U, B3
	100657-001/MWL AHSS-02-2016	Mercury (7439-97-6)	0.029U, B3
	100658-001/MWL AHSS-02-2016	Mercury (7439-97-6)	0.029U, B3

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

Sandia Data Validation Summary Worksheet

ARCOC#: 617371	Site/Project: MWL Biota Monitoring	Validation Date: 10/25/16
SDG #: 406613	Laboratory: GEL Laboratories, LLC	Validator: Mary Donovan
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: Collected: 09/21/2016

Validated by:

Mary A. Donovan

Sandia Inorganic Metals Worksheet

ARCO #s: 617371	SDG #(s): 406613	Matrix: Soil
Laboratory Sample IDs: 406613001, -003, -005		
Method/Batch #s: 3050B/6010B 1601741/1601742 3050B/6020 1601750/1601752 7471A 1606711(prepare)/1606715		

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

Analyte (outliers)	Calibration						MB mg/kg	5X Blank (5X MDL) mg/kg	LCS %R	MS %R	Lab Rep RPD	Serial Dil. %D	ICS AB %R	ICS A ±MDL ug/L (x50)	CRI/CRA %R				
	Int. mg/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L													
ICP-MS																			
Ba	NA	✓	✓	✓	✓	✓	✓	NA	✓	384*	✓	✓	NA	NA	✓				
V	NA	✓	✓	✓	✓	✓	✓	NA	✓	138	✓	✓	NA	NA	✓				
CVAA																			
Hg	✓	✓	✓	✓	0.097J	0.095J	✓	0.029	✓	✓	✓	NA	NA	NA	✓				

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

Comments: HTs OK; Matrix QC performed on sample -001; * MS parent sample concentration >4X spike concentration
 The Se MS recovery was incorrectly calculated using a parent sample value that was < the MDL, %R was acceptable when calculated correctly
 Al, Ca, Fe and Mg < ICSA conc. in all samples
 Dilutions: The samples were initially diluted the standard 2X for ICP-MS analysis and all sample were additionally diluted 10X for Zn
 Calibration blank outliers normalized to mg/kg using 0.5g

Sandia Radiochemistry Worksheet

ARCOC #(s): 617371	SDG #: 406613	Matrix: Soil
Laboratory Sample IDs: see below		
Method/Batch#s: DOE HASL 300, 4.5.2.3/Ga-01-R (Gamma spec) 1601691 (prep)/1601935 Samples 406613002, -004 and -006		
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	
NA													

Comments: HTs OK; Dup on sample -002

Data rejected by the lab due to peaks not meeting identification criteria: -002 (Th-234 and U-238)

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. **TF**AR/COC **617371**

Project Name: MWL Biota Monitoring	Date Samples Shipped: 9/22/16	SMO Authorization: [Signature]	<input type="checkbox"/> Waste Characterization
Project/Task Manager: Robert Ziock	Carrier/Waybill No: 254767	SMO Contact Phone: Wendy Palencia/505-844-3132	<input type="checkbox"/> RMA
Project/Task Number: 195122.10.11.08	Lab Contact: Edie Kent/843-769-7385	Send Report to SMO:	<input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius
Service Order: CF426-17	Lab Destination: GEL	Stephanie Montaño/505.284.2553	
	Contract No.: 1303873		

Tech Area:	Operational Site:	Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 406618
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					
100656	001	MWL AHSS-01-2016	NA	9/21/16 1324	SOIL	P	250 ml	None	G	SA	METALS, RCRA (SW846-6020/7470): Cu, Ni, V, Zn, Co, Be	001
100656	002	MWL AHSS-01-2016	NA	9/21/16 1324	SOIL	P	250 ml	None	G	SA	GAMMA SPEC (EPA 901)*	002
100657	001	MWL AHSS-02-2016	NA	9/21/16 1328	SOIL	P	250 ml	None	G	SA	METALS, RCRA (SW846-6020/7470): Cu, Ni, V, Zn, Co, Be	003
100657	002	MWL AHSS-02-2016	NA	9/21/16 1328	SOIL	P	250 ml	None	G	SA	GAMMA SPEC (EPA 901)*	004
100658	001	MWL AHSS-02-2016	NA	9/21/16 1328	SOIL	P	250 ml	None	G	DU	METALS, RCRA (SW846-6020/7470): Cu, Ni, V, Zn, Co, Be	005
100658	002	MWL AHSS-02-2016	NA	9/21/16 1328	SOIL	P	250 ml	None	G	DU	GAMMA SPEC (EPA 901)*	006

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD <input checked="" type="checkbox"/> Yes		Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day			
Background: <input type="checkbox"/> Yes		Entered by:		Negotiated TAT <input type="checkbox"/>		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			
Confirmatory: <input type="checkbox"/> Yes		QC Inits.:		Return Samples By:		Comments: *Use Pb-212 to determine Th-232			
Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cell				Lab Use	
	Robert Ziock	<i>[Signature]</i>		SNL/4141/505-845-0485/					
	Danielle Nieto	<i>[Signature]</i>		SNL/4141/505-845-7706					
Relinquished by <i>[Signature]</i>		Org. 4141	Date 9/21/16	Time 1425	Relinquished by		Org.	Date	Time
Received by <i>[Signature]</i>		Org. 4131	Date 9/21/16	Time 1425	Received by		Org.	Date	Time
Relinquished by <i>[Signature]</i>		Org. 4131	Date 9/22/16	Time 1045	Relinquished by		Org.	Date	Time
Received by <i>[Signature]</i>		Org. 62	Date 9-23-16	Time 0730	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 Monitoring

Project/Task No. 195122 / 10.11.08

ARCOC No. 617371

Analytical Lab GEL

SDG No. 406613

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	100656-001 MS, EPA 6020
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)	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
100656-001 MS	EPA 6020, Selenium, Vanadium	Recoveries for Selenium (73.2%) and Vanadium (138%) are outside acceptance criteria (75%-125%). Post-digestion spikes were performed and recovered within the acceptance range. Sample non-homogeneity and/or matrix interference are possible causes.

Were deficiencies unresolved? ☐ Yes ☒ No

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

Reviewed by: Mark L Lyon Date: 10-25-2016 08:24:00

Closed by: Mark L Lyon Date: 10-25-2016 08:24:00

ANNEX C

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

April 2016-March 2017

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

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

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

FIELD SAMPLING FORMS
APRIL 2016 SOIL-VAPOR MONITORING

TAILGATE SAFETY MEETING FORM

Dept: 4141 Well Location: MWL Date: 04/27/16 Time: 0750

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: 53 °F Wind Speed: 10 MPH Humidity: 40 %

Chemicals Used: NA

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

Roder Thynch
Printed Name

ALFRED SANTILLANES
Printed Name

Wendy Palencia
Printed Name

Tim Jackson
Printed Name

William Gibson
Printed Name

[Signature]
Signature

[Signature]
Signature

Wendy Palencia
Signature

[Signature]
Signature

William Gibson
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.

[illegible]

Tim Jackson
Printed Name

Signature T = JMS -

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

Background 0.0 - 0.3 ppm

[illegible]

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[illegible]

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

[illegible]

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Soil Vapor Sampling Log

Location	Date	Time	Canister #	PID (ppm)	Starting Vacuum (in. Hg)	Ending Vacuum (in. Hg)	Location Comments
MWL-5004-F13	4/27/10	1014	34001200	n/a	-26	-8	
MWL-5004-50		1021	n/a	0.0	n/a	n/a	
		↓	↓	↓	↓	↓	
		1022	↓	↓	↓	↓	
		1024	34002020	n/a	-25	-8	
MWL-5004-100		1026	n/a	0.0	n/a	n/a	
		↓	↓	↓	↓	↓	
		1027	↓	↓	↓	↓	
		1028	34001799	n/a	-25	-8	
MWL-5004-200		1030	n/a	0.0	n/a	n/a	
		↓	↓	↓	↓	↓	
		1032	↓	↓	↓	↓	
		1037	34002091	n/a	-25	-8	SA
		1037	34002027	↓	-25	-8	DU
MWL-5004-300		1039	n/a	0.0	n/a	n/a	
		↓	↓	↓	↓	↓	
		1040	↓	↓	↓	↓	
		1042	8452	n/a	-25	-8	
MWL-5004-400		1049	n/a	0.0	n/a	n/a	
		↓	↓	↓	↓	↓	
		1051	↓	↓	↓	↓	
		1054	34001284	n/a	-25	-8	SA
		1054	34000779	↓	-25	-8	

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SUMMARY SHEET FOR
APRIL 2016 SOIL-VAPOR SAMPLES

Sample Summary Sheet for April 2016 MWL Soil Vapor Monitoring

Well ID	Sample Date	Sample ID / Port	SUMMA Number	ARCOC	Sample Number	Sample Type	Associated Field Blank (ARCOC #/Sample #)	Comments
Mixed Waste Landfill Soil Vapor Monitoring: Project Task Number 146422.10.11.08 / Service Order Number CF 01-16								
MWL-SV01	27-Apr-16	MWL-SV01-42.5	8430	616973	099464	Environmental	616973 /099463	
		MWL-SV-FB1	34001460		099463	Field QC	n/a	Ultra Pure N2
MWL-SV02	27-Apr-16	MWL-SV02-41.5	34000713	616974	099466	Environmental	616974 / 099465	
		MWL-SV-FB2	34001082		099465	Field QC	n/a	Ultra Pure N2
MWL-SV03	27-Apr-16	MWL-SV03-50	34001555	616975	099468	Environmental	616975 / 099467	
		MWL-SV03-100	34000563		099469	Environmental		
		MWL-SV03-200	8337		099470	Environmental		
		MWL-SV03-300	34001357		099471	Environmental		
		MWL-SV03-400	34001487		099472	Environmental		
		MWL-SV-FB3	34000248		099467	Field QC	n/a	Ultra Pure N2
MWL-SV04	27-Apr-16	MWL-SV04-50	34000020	616976	099474	Environmental	616976 / 099473	
		MWL-SV04-100	34001799		099475	Environmental		
		MWL-SV04-200	34000291		099476	Environmental		
		MWL-SV04-200	34002027		099477	Duplicate		collected with manifold
		MWL-SV04-300	8457		099478	Environmental		
		MWL-SV04-400	34001284		099479	Environmental		
		MWL-SV04-400	34000779		099480	Duplicate		collected with manifold
		MWL-SV-FB4	34001200		099473	Field QC	n/a	Ultra Pure N2
MWL-SV05	27-Apr-16	MWL-SV05-50	34000491	616977	099482	Environmental	616977 / 099481	
		MWL-SV05-100	34000095		099483	Environmental		
		MWL-SV05-200	34001275		099484	Environmental		
		MWL-SV05-300	34000205		099485	Environmental		
		MWL-SV05-400	34000425		099486	Environmental		
		MWL-SV-FB5	34001519		099481	Field QC	n/a	Ultra Pure N2

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

SOIL-VAPOR MONITORING

APRIL 2016

AR/COC NUMBER 616973, 616974, 616975, 616976, 616977

Memorandum

Date: May 23, 2016
To: File
From: Mary Donovan
Subject: GC/MS Organic Data Review and Validation - SNL
Site: MWL SVM
AR/COC: 616973, 616974, 616975, 616976 and 616977
SDG: 616973
Laboratory: TestAmerica Laboratories, Inc. - West Sacramento
Project/Task: 195122.10.11.08
Analysis: VOCs by method TO-15

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

Summary

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

1. Methylene chloride was detected at concentrations < the PQL in the method blanks associated with all samples. The associated results for sample 320-18657-1, -3, -11, -12, -13, -16, -17, -18 and -19 were detects < the PQL and <10X the MB value and will be **qualified U,B** at the PQL. Samples -20, -23 and -24 were detects > the PQL but ≤10X the MB concentration and will be **qualified U,B**, at the reported concentration.
2. Carbon disulfide was detected at < the PQL in I'B5, sample -19, associated with samples -20 through -24. The associated result for sample -24 was a detect <5X the I'B value and will be **qualified 2.2U,B2** 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.

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 < the PQL in the MBs associated with all samples. The remaining associated sample results were either detects >10X the applicable MB result or non-detects and will not be qualified.

Methylene chloride was detected at < the PQL in the FB1, sample -1, associated with sample -2; FB2, sample -3, associated with sample -4; FB4, sample -11, associated with samples -12 through -18; and FB5, sample -19, associated with sample -20 through -24. The FB sample results were qualified non-detect due to MB contamination and will not be applied to the associated field sample results.

Acetone and toluene were detected at < the PQLs in FB2, sample -3, associated with sample -4. The associated sample results were non-detect and will not be qualified.

Carbon disulfide was detected at < the PQL in FB5, sample -19, associated with samples -20 through -24. The remaining associated sample results were non-detect and will not be qualified.

Surrogates

All surrogate acceptance criteria were met.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

An MS/MSD was not performed.

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

The LCS/LCSD met all QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported and correctly adjusted for dilutions. The samples were not diluted except as follows.

Sample -2 was diluted 17.68X, sample -4 was diluted 11.44X, sample -6 was diluted 7.34X, sample -7 was diluted 11.28X, sample -8 was diluted 11.33X, sample -9 was diluted 13.2X, sample -10 was diluted 18.6X, sample -12 was diluted 2.9X, sample -13 was diluted 5.89X, sample -14 was diluted 8.21X, sample -15 was diluted 8.79X, sample -16 was diluted 4.44X, sample -17 was diluted 5.89X, sample -18 was diluted 4.71X,

sample -20 was diluted 2.26X, sample -21 was diluted 4.5X, sample -22 was diluted 5.57X, sample -23 was diluted 3.75X and sample -24 was diluted 2.81X 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 ARCOC. Two field duplicate pairs were submitted with ARCOC 616976. 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:** 05/26/2016



Sample Findings Summary



AR/COC: 616973, 616974, 616975, 616976, 616977

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
TO15	099463-001/MWL-SV-FB1	METHYLENE CHLORIDE (75-09-2)	0.4U, B
	099465-001/MWL-SV-FB2	METHYLENE CHLORIDE (75-09-2)	0.4U, B
	099473-001/MWL-SV-FB4	METHYLENE CHLORIDE (75-09-2)	0.4U, B
	099474-001/MWL-SV04-50	METHYLENE CHLORIDE (75-09-2)	1.2U, B
	099475-001/MWL-SV04-100	METHYLENE CHLORIDE (75-09-2)	2.4U, B
	099478-001/MWL-SV04-300	METHYLENE CHLORIDE (75-09-2)	1.8U, B
	099479-001/MWL-SV04-400	METHYLENE CHLORIDE (75-09-2)	2.4U, B
	099480-001/MWL-SV04-400	METHYLENE CHLORIDE (75-09-2)	1.9U, B
	099481-001/MWL-SV-FB5	METHYLENE CHLORIDE (75-09-2)	0.4U, B
	099482-001/MWL-SV05-50	METHYLENE CHLORIDE (75-09-2)	0.96U, B
	099485-001/MWL-SV05-300	METHYLENE CHLORIDE (75-09-2)	1.7U, B
	099486-001/MWL-SV05-400	CARBON DISULFIDE (75-15-0)	2.2U, B2
	099486-001/MWL-SV05-400	METHYLENE CHLORIDE (75-09-2)	1.4U, B

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

Sandia Data Validation Summary Worksheet

ARCOC#: 616973, 616974, 616975, 616976 and 616977	Site/Project: MWL SVM	Validation Date: 05/23/16
SDG #: 616973	Laboratory: TestAmerica – West Sacramento	Validator: Mary Donovan
Matrix: Air	# of Samples: 24	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: 04/27/16

“Received By” signature from laboratory is missing on all COCs

Validated by:

Mary A. Donovan

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #: 616973, 616974, 616975, 616976 and 616977	SDG: 616973	Matrix: Air
Laboratory Sample IDs: 320-18657-1 through -24		
Method/Batch #s: TO-15 /109514 ¹ (samples 1-15); 109517 ² (samples 16-24)	Tuning (pass/fail):pass	TICs Required? (yes/no):no

[illegible][illegible][illegible]

Comments: HTs OK. ICAL ATMS2 04/24/16¹. ICAL ATMS9 03/12/16².

Mass spectra validated. MDLs and RLS reported. Canister Certifications were provided in the data package.

^A associated with sample -2, ^B associated with sample -4, ^C associated with samples -12 through -18, ^D associated with samples -20 through -24, ^E associated with samples -6 through -10

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


Batch No.

Batch No. 114

SMO Use

AR/COC

616974

Project Name:	MWL GWM / SVM	Date Samples Shipped:	4/28/16	SMO Authorization:		<input type="checkbox"/> Waste Characterization
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.	247442	SMO Contact Phone:		<input type="checkbox"/> RMA
Project/Task Number:	195122.10.11.08	Lab Contact:	Beth Riley/	Wendy Palencia/505-844-3132		<input type="checkbox"/> Released by COC No.
Service Order:	CF01-16	Lab Destination:	TAL-WS	Send Report to SMO:		<input type="checkbox"/> 4° Celsius
		Contract No.:	1636780	Stephanie Montaña/505.284.2553		Bill to: Sandia National Laboratories (Accounts Payable)

Tech Area:

Building:

Room:

Operational Site:

[illegible]

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: 4/29/16				EDD <input checked="" type="checkbox"/> Yes		Receipt	
Background: <input type="checkbox"/> Yes		Entered by: SM				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.: KAL				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:			
	Timmie Jackson	Timmie Jackson	TJ	SNL/04131/50/-284-2547/505-263-6639		Comments: New p/t number = 195122.10.11.08. Elevation and ambient pressure information on attached forms.			
	William Gibson	William Gibson	WG	SNL/04141/505-239-7367/505-239-7367					
	Robert Lynch	Robert Lynch	RL	SNL/04141/505-844-4013/505-250-7090					
Alfred Santillanes	Alfred Santillanes	AS	SNL/04141/505-284-6870/505-228-0710						
Relinquished by	Org.	Date	Time	Relinquished by	Org.	Date	Time	Lab Use	
Received by	Org.	Date	Time	Received by	Org.	Date	Time		
Relinquished by	Org.	Date	Time	Relinquished by	Org.	Date	Time		
Received by	Org.	Date	Time	Received by	Org.	Date	Time		

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. <i>N/A</i>		SMO Use		AR/COC 616975	
Project Name: MWL GWM / SVM		Date Samples Shipped: <i>4/28/16</i>		SMO Authorization: <i>[Signature]</i>	
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>24742</i>		SMO Contact Phone: <i>505</i>	
Project/Task Number: 195122.10.11.08		Lab Contact: Beth Riley/		Wendy Palencia/505-844-3132	
Service Order: CF01-16		Lab Destination: TAL-WS		Send Report to SMO: Stephanie Montaño/505.284.2553	
Contract No.: 1636780				<input type="checkbox"/> Waste Characterization	
				<input type="checkbox"/> RMA	
				<input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius	
Tech Area:				Bill to: Sandia National Laboratories (Accounts Payable),	
Building:		Room:		P.O. Box 5800, MS-0154	
		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					
099467	001	MWL-SV-FB3		4/27/16 08:52	UPN	S	6 L	None	G	FB	VOC (TO-15)	
099468	001	MWL-SV03-50		4/27/16 09:07	SG	S	6 L	None	G	SA	VOC (TO-15)	
099469	001	MWL-SV03-100		4/27/16 09:10	SG	S	6 L	None	G	SA	VOC (TO-15)	
099470	001	MWL-SV03-200		4/27/16 09:13	SG	S	6 L	None	G	SA	VOC (TO-15)	
099471	001	MWL-SV03-300		4/27/16 09:19	SG	S	6 L	None	G	SA	VOC (TO-15)	
099472	001	MWL-SV03-400		4/27/16 09:45	SG	S	6 L	None	G	SA	VOC (TO-15)	

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered: <i>4/29/16</i>				EDD <input checked="" type="checkbox"/> Yes		
Background: <input type="checkbox"/> Yes		Entered by: <i>SM</i>				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: <i>KAL</i>				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
	Timmie Jackson	<i>[Signature]</i>	<i>TJ</i>	SNL/04131/505-284-2547/505-263-6639		Return Samples By:		
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/04141/505-239-7367/505-239-7367		Comments: New p/t number = 195122.10.11.08. Elevation and ambient pressure information on attached forms.		
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/04141/505-844-4013/505-250-7090				
	Alfred Santillanes	<i>[Signature]</i>	<i>AS</i>	SNL/04141/505-284-6870/505-228-0710				

Relinquished by <i>[Signature]</i>	Org. <i>4141</i>	Date <i>4/27/16</i>	Time <i>1350</i>	Relinquished by	Org.	Date	Time
Received by <i>[Signature]</i>	Org. <i>4131</i>	Date <i>4/27/16</i>	Time <i>1350</i>	Received by	Org.	Date	Time
Relinquished by <i>[Signature]</i>	Org. <i>4131</i>	Date <i>4/28/16</i>	Time <i>0930</i>	Relinquished by	Org.	Date	Time
Received by	Org.	Date	Time	Received by	Org.	Date	Time

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. <i>N/A</i>		SMO Use		AR/COC 616976								
Project Name: MWL GWM / SVM		Date Samples Shipped: <i>4/28/16</i>		SMO Authorization: <i>[Signature]</i>								
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>247912</i>		SMO Contact Phone: <i>910</i>								
Project/Task Number: 195122.10.11.08		Lab Contact: Beth Riley/		Wendy Palencia/505-844-3132								
Service Order: CF01-16		Lab Destination: TAL-WS		Send Report to SMO:								
		Contract No.: 1636780		Stephanie Montaño/505.284.2553								
Tech Area:				<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius								
Building:		Room:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque NM 87185-0154								
Operational Site:												
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
099473	001	MWL-SV-FB4		4/27/16 10:14	UPN	S	6 L	None	G	FB	VOC (TO-15)	
099474	001	MWL-SV04-50		4/27/16 10:24	SG	S	6 L	None	G	SA	VOC (TO-15)	
099475	001	MWL-SV04-100		4/27/16 10:28	SG	S	6 L	None	G	SA	VOC (TO-15)	
099476	001	MWL-SV04-200		4/27/16 10:37	SG	S	6 L	None	G	SA	VOC (TO-15)	
099477	001	MWL-SV04-200		4/27/16 10:37	SG	S	6 L	None	G	DU	VOC (TO-15)	
099478	001	MWL-SV04-300		4/27/16 10:42	SG	S	6 L	None	G	SA	VOC (TO-15)	
099479	001	MWL-SV04-400		4/27/16 10:54	SG	S	6 L	None	G	SA	VOC (TO-15)	
099480	001	MWL-SV04-400		4/27/16 10:54	SG	S	6 L	None	G	DU	VOC (TO-15)	
Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered: <i>4/29/16</i>				EDD <input checked="" type="checkbox"/> Yes						
Background: <input type="checkbox"/> Yes		Entered by: <i>[Signature]</i>				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: <i>KAL</i>				Negotiated TAT <input type="checkbox"/>						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal		Return to Client <input type="checkbox"/> Disposal by Lab <input checked="" type="checkbox"/>		Return Samples By:		
	Timmie Jackson	<i>[Signature]</i>	<i>TJ</i>	SNL/04131/505-284-2547/505-263-6639								
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/04141/505-239-7367/505-239-7367								
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/04141/505-844-4013/505-250-7090								
	Alfred Santillanes	<i>[Signature]</i>	<i>AS</i>	SNL/04141/505-284-6870/505-228-0710								
Comments: New p/t number = 195122.10.11.08. Elevation and ambient pressure information on attached forms.												
Relinquished by <i>[Signature]</i>	Org. <i>4141</i>	Date <i>4/27/16</i>	Time <i>1350</i>	Relinquished by		Org.	Date	Time				
Received by <i>[Signature]</i>	Org. <i>4131</i>	Date <i>4/27/16</i>	Time <i>1350</i>	Received by		Org.	Date	Time				
Relinquished by <i>[Signature]</i>	Org. <i>4131</i>	Date <i>4/28/16</i>	Time <i>1430</i>	Relinquished by		Org.	Date	Time				
Received by <i>[Signature]</i>	Org.	Date	Time	Received by		Org.	Date	Time				


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

Page 1 of 1

Batch No. 21A

SMO Use

AR/COC 616977

Project Name:	MWL GWM / SVM	Date Samples Shipped:	4/23/16	SMO Authorization:		<input type="checkbox"/> Waste Characterization
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.	247992	SMO Contact Phone:		<input type="checkbox"/> RMA
Project/Task Number:	195122.10.11.08	Lab Contact:	Beth Riley/		Wendy Palencia/505-844-3132	<input type="checkbox"/> Released by COC No.
Service Order:	CF01-16	Lab Destination:	TAL-WS	Send Report to SMO:		<input type="checkbox"/> 4° Celsius
		Contract No.:	1636780		Stephanie Montaña/505.284.2553	Bill to: Sandia National Laboratories (Accounts Payable)

Tech Area:

Building:

Room:

Operational Site:

[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: 4/29/16				EDD <input checked="" type="checkbox"/> Yes									
Background:		<input type="checkbox"/> Yes		Entered by: [Signature]				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.: KAZ				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:								
	Timmie Jackson		[Signature]		TJ		SNL/04131/505-284-2547/505-263-6639		Comments: New p/t number = 195122 10.11.08. Elevation and ambient pressure information on attached forms.								
	William Gibson		[Signature]		WG		SNL/04141/505-239-7367/505-239-7367										
	Robert Lynch		[Signature]		RL		SNL/04141/505-844-4013/505-250-7090										
Alfred Santillanes		[Signature]		AS		SNL/04141/505-284-6870/505-228-0710											
Relinquished by		[Signature]		Org. 4141		Date 4/29/16		Time 1350		Relinquished by		Org.		Date		Time	
Received by		[Signature]		Org. 4131		Date 4/27/16		Time 1350		Received by		Org.		Date		Time	
Relinquished by		[Signature]		Org. 4131		Date 4/28/16		Time 0930		Relinquished by		Org.		Date		Time	
Received by		[Signature]		Org.		Date		Time		Received by		Org.		Date		Time	

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

CONTRACT VERIFICATION REVIEW FORMS

SOIL-VAPOR MONITORING

APRIL 2016

AR/COC Number	Sample Type
616973	Environmental*
616974	Environmental*
616975	Environmental*
616976	Environmental*
616977	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.** 195122_10.11.08

ARCOC No. 616973, 616974, 616975, 616976 & 616977

Analytical Lab TAL-WS

SDG No. 320-18657-1

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	Missing "received by" signature from laboratory on all COCs
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	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	Methylene chloride detected in method blank (320-109514/6 and 320-109517/6)

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	Methylene chloride detected in MWL-SV-FB1 and MWL-SV-FB4. Acetone, methylene chloride and toluene detected in MWL-SV-FB2. Carbon disulfide and methylene chloride detected in MWL-SV-F5
3.6	Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits	X		
3.7	Narrative addresses planchet flaming for gross alpha/beta	N/A		
3.8	Narrative included, correct, and complete	X		
3.9	Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151.	N/A		

4.0 Calibration and Validation Documentation

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

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

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

5.0 Data Anomaly Report

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

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

6.0 Problem Resolution

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

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

Were deficiencies unresolved? ☐ Yes ☒ No

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

Reviewed by: Wendy Palencia Date: 05-20-2016 09:01:00

Closed by: Wendy Palencia Date: 05-20-2016 09:01:00

FIELD SAMPLING FORMS
OCTOBER 2016 SOIL-VAPOR MONITORING

TAILGATE SAFETY MEETING FORM

Dept: 4141 Well Location: MWLDate: 10/13/16Time: 0815Activities: 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: 60 °F Wind Speed: 45 MPHHumidity: 53 %

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

Robert T Lynch
Printed Name

Tim Jackson
Printed Name

Robert L. Quistana
Printed Name

William Gibson
Printed Name

Chris Armijo
Printed Name

Robert T Lynch
Signature

Tim Jackson
Signature

Robert L. Quistana
Signature

William Gibson
Signature

Chris Armijo
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
34001053	10/7/16	10/13/16	-25	10/13/16	-8	10/13/16
2734	↓	↓	-25	↓	-8	↓
4332	↓	↓	-25	↓	-8	↓
34000343	↓	↓	-25	↓	-8	↓
8243	missing parts		-not used			
34000173	10/7/16	10/13/16	-25	10/13/16	-8	
34000147			-25		-8	
10477	↓	↓	-26	↓	-8	
34000067			-25		-8	
34001192			-25		-8	
34000804			-25		-8	
34001304			-26		-8	
7898			-26		-8	
7856	↓	↓	-25	↓	-8	
7860		No Vacuum Pressure				
8315	10/7/16	10/13/16	-26	10/13/16	-8	
34001256	↓	↓	-25	↓	-8	
34000380	↓	↓	-25	↓	-8	
4328	↓	↓	-25	↓	-8	
34000853	↓	↓	-25	↓	-8	
34000447	↓	↓	-26	↓	-8	
34000570	↓	↓	-26	↓	-8	
8069	↓	↓	-25	↓	-8	
34000917	↓	↓	-25	↓	-8	
7808	↓	↓	-26	↓	-8	
7837	↓	↓	-25	↓	-8	↓

SUMMA® Canister Log completed by:

Tim Jackson
Printed Name

T. Jackson
Signature

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Soil Vapor Sampling Log

[illegible]

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Background - 0.0 ppm

[illegible]

19

Soil Vapor Sampling Log

[illegible]

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P10 A 17222

[illegible]

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Soil Vapor Sampling Log

[illegible]

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SUMMARY SHEET FOR
October 2016 SOIL-VAPOR SAMPLES

**Sample Summary for MWL Soil-Vapor Monitoring
October 2016**

Well ID	Sample Date	Sample ID / Port	SUMMA Number	ARCOC	Sample Number	Sample Type	Associated Field Blank (ARCOC #/Sample #)	Comments
Mixed Waste Landfill Soil Vapor Monitoring: Project Task Number 146422.10.11.08 / Service Order Number CF 01-16								
MWL-SV01	13-Oct-16	MWL-SV01-42.5	7837	617410	100736	Environmental	617410 / 100737	
		MWL-FB1	34000917		100737	Field QC	n/a	Ultra Pure N2
MWL-SV02	13-Oct-16	MWL-SV02-41.5	7808	617411	100738	Environmental	617411 / 100739	
		MWL-FB2	8069		100739	Field QC	n/a	Ultra Pure N2
MWL-SV03	13-Oct-16	MWL-SV03-50	34000067	617412	100740	Environmental	617412 / 100745	
		MWL-SV03-100	34001192		100741	Environmental		
		MWL-SV03-200	34000004		100742	Environmental		
		MWL-SV03-300	34001304		100743	Environmental		
		MWL-SV03-400	7898		100744	Environmental		
		MWL-FB3	10477		100745	Field QC	n/a	Ultra Pure N2
MWL-SV04	13-Oct-16	MWL-SV04-50	2734	617413	100746	Environmental	617413 / 100751	
		MWL-SV04-100	4332		100747	Environmental		
		MWL-SV04-200	34000343		100748	Environmental		
		MWL-SV04-300	34000147		100749	Environmental		
		MWL-SV04-400	34000173		100750	Environmental		
		MWL-FB4	34001083		100751	Field QC	n/a	Ultra Pure N2
MWL-SV05	13-Oct-16	MWL-SV05-50	34000540	617414	100752	Environmental	617414 / 100759	
		MWL-SV05-100	34001256		100753	Environmental		
		MWL-SV05-100	34000380		100754	Duplicate		
		MWL-SV05-200	8315		100755	Environmental		
		MWL-SV05-300	4328		100756	Environmental		
		MWL-SV05-300	34000853		100757	Duplicate		
		MWL-SV05-400	34000447		100758	Environmental		
		MWL-FB5	7856		100759	Field QC	n/a	Ultra Pure N2

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES

SOIL-VAPOR MONITORING

OCTOBER 2016

AR/COC NUMBER 616410, 616411, 616412, 616413, 616414

Memorandum

Date: November 9, 2016

To: File

From: Linda Thal

Subject: GC/MS Organic Data Review and Validation – SNL
Site: MWL SVM
AR/COC: 617410, 617411, 617412, 617413 and 617414
SDG: 320-22820
Laboratory: TestAmerica Laboratories, Inc. -West Sacramento
Project/Task: 195122.10.11.08
Analysis: VOCs by method TO-15

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

Summary

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

1. Acetone was detected at < the PQL in FB3, sample 320-22820-10, associated with samples -5 through -9. The associated result for sample -6 was a detect < the PQL and <10X the FB value and will be **qualified 22U,B2** at the PQL.
2. Acetone was detected at < the PQL in FB5, sample -24, associated with samples -17 through -23. The associated results for samples -20 and -22 were detects < the PQL and <10X the FB value and will be **qualified 25U,B2 and 17U,B2** respectively at the PQL.
3. Methylene chloride was detected at < the PQL in FB5, sample -24, associated with samples -17 through -23. The associated result for samples -18, -19, -21, -22 and -23 were detects < the PQL and <10X the FB value and will be **qualified 1.7U,B2; 1.7U,B2; 1.5U,B2; 1.4U,B2 and 1.0U,B2** respectively at the PQL.
4. Toluene was detected at < the PQL in FB5, sample -24, associated with samples -17 through -23. The associated result for samples -20, -21 and -22 were detects < the PQL and <10X the FB value and will be **qualified 2.0U,B2; 1.5U,B2 and 1.4U,B2** respectively at the PQL. The associated result for sample -23 was a detect > the PQL but <10X the FB value and will be **qualified 1.7U,B2** at the reported value.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as follows. The 4-ethyltoluene and 1,2,4-trimethylbenzene %Ds were >30% but ≤45% with negative bias for the ICV associated with samples -1 through -12. The associated sample results were non-detects and since no other calibration infraction occurred, will not be qualified.

Blanks

No target analytes were detected in the blanks except as noted above in the Summary section and as follows. Tetrachloroethene and methylene chloride were detected at < the PQL in FB1, sample -2, associated with sample 1. The associated sample result for tetrachloroethene was a detect 5X > the FB concentration and will not be qualified. The sample result for methylene chloride was non-detect and will not be qualified.

Tetrachloroethene and 1,1,1-trichloroethane were detected at < the PQL and trichlorofluoromethane was detected at > the PQL in FB2, sample -4, associated with sample -3. The associated sample results were detects 5X > the FB concentration and will not be qualified.

Acetone was detected at < the PQL and tetrachloroethene and trichloroethene were detected at > the PQL in FB3, sample -10, associated with samples -5 through -9. The associated sample results, *except* the acetone result for sample -6, were detects 5/10X > the FB concentration and will not be qualified.

Carbon disulfide was detected at < the PQL in FB4, sample -16, associated with samples -11 through -15. The associated sample results were either non-detect or a detect > 5X the FB concentration and will not be qualified.

Acetone, toluene and methylene chloride were detected at < the PQL in FB5, sample -24, associated with samples -17 through -23. The remaining associated sample results were either non-detect or detects >10X the FB concentration 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.

Detection Limits/Dilutions

All detection limits were properly reported and correctly adjusted for dilutions. The samples were not diluted except as follows.

Sample -1 (13.8X), sample -3 (9.62X); sample 5 (4.47X); sample -6 (4.42X); sample -7 (8.92X); sample -8 (11.4X); sample -9 (13X); sample -11 (2.67X); sample -12 (4.51X); sample -13 (4.8X); sample -14 (3.1X); sample -15 (3.26X); sample -17 (3.14X); sample -18 (4.15X); sample -19 (4.36X); sample -20 (5.0X); sample -21 (3.65X); sample -22 (3.41X) and sample -23 (2.56X).

Tentatively Identified Compounds (TICs)

TIC reports were not required.

Other QC

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

FBs were submitted, one with each ARCO. Two field duplicate pairs were submitted with ARCO 617414. 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: 11/09/16



Sample Findings Summary



AR/COC: 617410, 617411, 617412, 617413, 617414

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
TO15	100741-001/MWL-SV03-100	ACETONE (67-64-1)	22U, B2
	100753-001/MWL-SV05-100	METHYLENE CHLORIDE (75-09-2)	1.7U, B2
	100754-001/MWL-SV05-100	METHYLENE CHLORIDE (75-09-2)	1.7U, B2
	100755-001/MWL-SV05-200	ACETONE (67-64-1)	25U, B2
	100755-001/MWL-SV05-200	TOLUENE (108-88-3)	2.0U, B2
	100756-001/MWL-SV05-300	METHYLENE CHLORIDE (75-09-2)	1.5U, B2
	100756-001/MWL-SV05-300	TOLUENE (108-88-3)	1.5U, B2
	100757-001/MWL-SV05-300	ACETONE (67-64-1)	17U, B2
	100757-001/MWL-SV05-300	METHYLENE CHLORIDE (75-09-2)	1.4U, B2
	100757-001/MWL-SV05-300	TOLUENE (108-88-3)	1.4U, B2
	100758-001/MWL-SV05-400	METHYLENE CHLORIDE (75-09-2)	1.0U, B2
	100758-001/MWL-SV05-400	TOLUENE (108-88-3)	1.7U, B2

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

Sandia Data Validation Summary Worksheet

ARCOC#: 617410, 617411, 617412, 617413 and 617414	Site/Project: MWL SVM	Validation Date: 11/08/2016
SDG #:320-22820	Laboratory: TA Laboratories Inc. - West Sacramento, CA	Validator: Linda Thal
Matrix: Air	# of Samples: 24	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 10/13/2016

Canister 34000853, used for sample 100757/001-MWL-SV05-300 (FD) (320-22820-22) was not individually certified.

Validated by: 

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #:617410, 617411, 617412, 617413 and 617414	SDG:320-22820	Matrix: Air
Laboratory Sample IDs:320-22820-1 through -24		
Method/Batch #s:TO-15/135221 (samples -1 thru -12);135239 (samples -13 thru -23) and 135470 (sample -24)	Tuning (pass/fail):	TICs Required? (yes/no):

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	LCSD %R	LCS/ LCSD RPD		FB1 -2	FB2 -4	FB3 -10	
	Int.	RF/ Slope	RSD/r ²	(ICV)/ CCV %D										
ATMS 7 10/14/2016														
batch 135221 -1 thru -12														
Methylene chloride	NA	✓	✓	✓	✓	NA	✓	✓	✓		0.14J	✓	✓	
Tetrachloroethene	NA	✓	✓	✓	✓	NA	✓	✓	✓		0.35J	0.13J	0.9	
1,1,1-Trichloroethane	NA	✓	✓	✓	✓	NA	✓	✓	✓		✓	0.13J	✓	
Trichlorofluoromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓		✓	0.49	✓	
Acetone	NA	✓	✓	✓	✓	NA	✓	✓	✓		✓	✓	.55J	
Trichloroethene	NA	✓	✓	✓	✓	NA	✓	✓	✓		✓	✓	0.6	
4-Ethyltoluene	NA	✓	✓	(-36)	✓	NA	✓	✓	✓		✓	✓	✓	
1,2,4-Trimethylbenzene	NA	✓	✓	(-32)	✓	NA	✓	✓	✓		✓	✓	✓	

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

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

Comments: HTs OK

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #:617410, 617411, 617412, 617413 and 617414	SDG:320-22820-1	Matrix:Air
Laboratory Sample IDs:320-22820-1 through -24		
Method/Batch #s: TO-15/135221 (samples -1 thru -12);135239 (samples -13 thru -23) and 135470 (sample -24)	Tuning (pass/fail):	TICs Required? (yes/no):

Analyte (outliers)	Calibration				MB	5X (10X) MB	LCS %R	LCSD %R	LCS/ LCSD RPD		FB4 -16	X5 (X10)		
	Int.	RF/ Slope	RSD/r ²	(ICV)/ CCV %D										
ATMS 9 10/14/2016														
batch 135239 -13 thru -23														
Carbon disulfide	NA	✓	✓	✓	✓	NA	✓	✓	✓		0.19J	0.95		
batch 135470 -24											FB5 -24			
Acetone	NA	✓	✓	✓	✓	NA	✓	✓	✓		0.58J	(5.8)		
Methylene chloride	NA	✓	✓	✓	✓	NA	✓	✓	✓		0.1J	(1.0)		
Toluene	NA	✓	✓	✓	✓	NA	✓	✓	✓		0.27J	(2.7)		
Surrogate Recovery Outliers														
Sample ID	1,2-DCA-d4 %R	Toluene-d8 %R	BFB %R		Sample ID	1,2-DCA-d4 %R	Toluene-d8 %R	BFB %R						
none														
IS Outliers														
	FBZ		Chl-d5		1,4-DCB-d4									
Sample ID	Area	RT	Area	RT	Area	RT								
none														

Comments: HTs OK

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AR/COC | 617410

☐ Waste Characterization
☐ RMA
☐ Released by COC No.

Tech Area:		Operational Site:
Building:	Room:	



Last Chain:		<input type="checkbox"/> Yes	Sample Tracking		SMO Use		Special Instructions/QC Requirements:			Conditions on Receipt
Validation Req'd:		<input checked="" type="checkbox"/> Yes	Date Entered:				EDD <input checked="" type="checkbox"/> Yes			
Background:		<input type="checkbox"/> Yes	Entered by:				Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day			
Confirmatory:		<input type="checkbox"/> Yes	QC inits:				Negotiated TAT <input type="checkbox"/>			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab				
	William Gibson	<i>William Gibson</i>	WG	SNL/04141/505-239-7367/505-239-7367		Return Samples By:				
	Tim Jackson	<i>T-J Jackson</i>	TJ	SNL/04143/505-284-2547/505-263-6639		Comments: Elevation and ambient pressure information provided on attached forms.				
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/04141/505-844-4013/505-250-7090						
	Gilbert Quintana	<i>Gilbert Quintana</i>	GQ	SNL/04141/505-844-2507/505-228-2606						
Lab Use										

Relinquished by <u>T-114-</u>	Org. <u>4131</u>	Date <u>10/13/16</u>	Time <u>1416</u>	Relinquished by	Org.	Date	Time
Received by <u>TOE</u>	Org. <u>4131</u>	Date <u>10/13/16</u>	Time <u>1418</u>	Received by	Org.	Date	Time
Relinquished by <u>TOE</u>	Org. <u>4131</u>	Date <u>10/14/16</u>	Time <u>0801</u>	Relinquished by	Org.	Date	Time
Received by <u>TOE</u>	Org. <u>4131</u>	Date <u>10/14/16</u>	Time <u>0925</u>	Received by	Org.	Date	Time

1130
CMT
12/14/10

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AR/COC 617411

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

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

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1130
LME
10/19/16

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

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617412

1730
10/19/16

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No.

SMO Use

AR/COC **617413**

Project Name: MWL GWM / SVM		Date Samples Shipped: 10/14/16		SMO Authorization: [Signature]		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. 2558321		SMO Contact Phone: Wendy Palencia/505-844-3132		
Project/Task Number: 195122.10.11.08		Lab Contact: Beth Riley/		Send Report to SMO: Stephanie Montaño/505.284.2553		
Service Order: CF01-17		Lab Destination: TAL-WS				
Tech Area:		Contract No.: 1636780				Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154
Building:		Room:		Operational Site:		

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container		Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
						Type	Volume					
100746	001	MWL-SV04-50	50	10/13/16 08:42	SG	S	6 L	None	G	SA	VOC (TO-15)	
100747	001	MWL-SV04-100	100	10/13/16 08:46	SG	S	6 L	None	G	SA	VOC (TO-15)	
100748	001	MWL-SV04-200	200	10/13/16 08:50	SG	S	6 L	None	G	SA	VOC (TO-15)	
100749	001	MWL-SV04-300	300	10/13/16 08:55	SG	S	6 L	None	G	SA	VOC (TO-15)	
100750	001	MWL-SV04-400	400	10/13/16 09:04	SG	S	6 L	None	G	SA	VOC (TO-15)	
100751	001	MWL-FB4	NA	10/13/16 08:35	UPN	S	6 L	None	G	FB	VOC (TO-15)	

Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:		Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD <input checked="" type="checkbox"/> Yes		Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day			
Background: <input type="checkbox"/> Yes		Entered by:		Negotiated TAT <input type="checkbox"/>		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			
Confirmatory: <input type="checkbox"/> Yes		QC inits:		Return Samples By:		Comments: Elevation and ambient pressure information provided on attached forms.			
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell					
	William Gibson	[Signature]	WG	SNL/04141/505-239-7367/505-239-7367					
	Tim Jackson	[Signature]	TJ	SNL/04131/505-284-2547/505-263-6639					
	Robert Lynch	[Signature]	RL	SNL/04141/505-844-4013/505-250-7090					
	Gilbert Quintana	[Signature]	GQ	SNL/04141/505-844-2507/505-228-2606					
Relinquished by [Signature]		Org. 4131	Date 10/13/16	Time 14:15	Relinquished by		Org.	Date	Time
Received by [Signature]		Org. 4131	Date 10/13/16	Time 14:16	Received by		Org.	Date	Time
Relinquished by [Signature]		Org. 4131	Date 10/14/16	Time 08:00	Relinquished by		Org.	Date	Time
Received by [Signature]		Org. 4131	Date 10/14/16	Time 08:35	Received by		Org.	Date	Time

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

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10/19/16

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CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No.		SMO Use		AR/COC		617414						
Project Name: MWL GWM / SVM		Date Samples Shipped: 10-14-16		SMO Authorization: T. Amy Gooding		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input type="checkbox"/> 4° Celsius						
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. 255839		SMO Contact Phone: Wendy Palencia/505-844-3132								
Project/Task Number: 195122.10.11.08		Lab Contact: Beth Riley/		Send Report to SMO: Stephanie Montaño/505.284.2553								
Service Order: CF01-17		Lab Destination: TAL-WS										
		Contract No.: 1636780										
Tech Area:						Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154						
Building:		Room:		Operational Site:								
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
100752	001	MWL-SV05-50	50	10/13/16 11:10	SG	S	6 L	None	G	SA	VOC (TO-15)	
100753	001	MWL-SV05-100	100	10/13/16 11:15	SG	S	6 L	None	G	SA	VOC (TO-15)	
100754	001	MWL-SV05-100	100	10/13/16 11:15	SG	S	6 L	None	G	DU	VOC (TO-15)	
100755	001	MWL-SV05-200	200	10/13/16 11:18	SG	S	6 L	None	G	SA	VOC (TO-15)	
100756	001	MWL-SV05-300	300	10/13/16 11:23	SG	S	6 L	None	G	SA	VOC (TO-15)	
100757	001	MWL-SV05-300	300	10/13/16 11:23	SG	S	6 L	None	G	DU	VOC (TO-15)	
100758	001	MWL-SV05-400	400	10/13/16 11:29	SG	S	6 L	None	G	SA	VOC (TO-15)	
100759	001	MWL-FB5	NA	10/13/16 10:59	UPN	S	6 L	None	G	FB	VOC (TO-15)	
<div> <div> Last Chain: <input type="checkbox"/> Yes Validation Req'd: <input checked="" type="checkbox"/> Yes Background: <input type="checkbox"/> Yes Confirmatory: <input type="checkbox"/> Yes </div> <div> Sample Tracking Date Entered: Entered by: QC inits.: </div> <div> SMO Use Special Instructions/QC Requirements: EDD <input checked="" type="checkbox"/> Yes Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day Negotiated TAT <input type="checkbox"/> Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab </div> <div> Conditions on Receipt Lab Use </div> </div>												
Sample Team Members		Name		Signature		Init.		Company/Organization/Phone/Cell		Return Samples By:		
		William Gibson		<i>William Gibson</i>		WG		SNL/04141/505-239-7367/505-239-7367		Comments: Elevation and ambient pressure information provided on attached forms.		
		Tim Jackson		<i>Tim Jackson</i>		TJ		SNL/04131/505-284-2547/505-263-6639				
		Robert Lynch		<i>Robert Lynch</i>		RL		SNL/04141/505-844-4013/505-250-7090				
		Gilbert Quintana		<i>Gilbert Quintana</i>		GQ		SNL/04141/505-844-2507/505-228-2606				
Relinquished by		T-9-16-		Org. 4131		Date 10/13/16		Time 1418		Relinquished by		
Received by		<i>[Signature]</i>		Org. 4131		Date 10/13/16		Time 1418		Received by		
Relinquished by		<i>[Signature]</i>		Org. 4131		Date 10/14/16		Time 0800		Relinquished by		
Received by		<i>[Signature]</i>		Org. 4131		Date 10/14/16		Time 0800		Received by		

Prior confirmation with SMO required for 7 and 15 day TAT

 1130
 CMZ
 10/14/16

CONTRACT VERIFICATION REVIEW FORMS

SOIL-VAPOR MONITORING

OCTOBER 2016

AR/COC Number	Sample Type
617410	Environmental*
617411	Environmental*
617412	Environmental*
617413	Environmental*
617414	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. 195122_10.11.08

ARCOC No. 617410, 617411, 617412, 617413 & 617414

Analytical Lab Test America - WS

SDG No. 320-22820-1

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	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	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		

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	Methylene chloride and tetrachloroethene detected in MWL-FB1. Tetrachloroethene, 1,1,1-trichloroethane and trichlorofluoromethane detected in MWL-FB2. Acetone, tetrachloroethene and trichloroethene detected in MWL-FB3. Carbon disulfide detected in MWL-FB4. Acetone, methylene chloride and toluene detected in MWL-FB5.
3.6	Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits	X		
3.7	Narrative addresses planchet flaming for gross alpha/beta	N/A		
3.8	Narrative included, correct, and complete	X		
3.9	Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151.	N/A		

4.0 Calibration and Validation Documentation

Line No.	Item	Yes	No	Comments
4.1	GC/MS (8260 and 8270) 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	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 a) Instrument run logs provided	N/A		

5.0 Data Anomaly Report

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

6.0 Problem Resolution

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

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

Were deficiencies unresolved? ☐ Yes ☒ No

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

Reviewed by: Wendy Palencia Date: 11-11-2016 12:07:00

Closed by: Wendy Palencia Date: 11-11-2016 12:07:00

SOIL-VAPOR SAMPLING RESULTS

CERTIFICATES OF ANALYSIS

Mixed Waste Landfill

April 2016-March 2017 Reporting Period

Note: Certificates of Analysis are provided on compact disc only, for printed copies of this report.

APRIL 2016 SOIL-VAPOR SAMPLING RESULTS
CERTIFICATES OF ANALYSIS

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099463-001/MWL-SV-FB1

Lab Sample ID: 320-18657-1

Date Collected: 04/27/16 08:12

Matrix: Air

Date Received: 05/04/16 09:30

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			05/11/16 15:25	1
Benzene	ND		0.40	0.079	ppb v/v			05/11/16 15:25	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			05/11/16 15:25	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			05/11/16 15:25	1
Bromoform	ND		0.40	0.070	ppb v/v			05/11/16 15:25	1
Bromomethane	ND		0.80	0.34	ppb v/v			05/11/16 15:25	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			05/11/16 15:25	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			05/11/16 15:25	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			05/11/16 15:25	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			05/11/16 15:25	1
Chloroethane	ND		0.80	0.31	ppb v/v			05/11/16 15:25	1
Chloroform	ND		0.30	0.095	ppb v/v			05/11/16 15:25	1
Chloromethane	ND		0.80	0.20	ppb v/v			05/11/16 15:25	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			05/11/16 15:25	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			05/11/16 15:25	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			05/11/16 15:25	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			05/11/16 15:25	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			05/11/16 15:25	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			05/11/16 15:25	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			05/11/16 15:25	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			05/11/16 15:25	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			05/11/16 15:25	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			05/11/16 15:25	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			05/11/16 15:25	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			05/11/16 15:25	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			05/11/16 15:25	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			05/11/16 15:25	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			05/11/16 15:25	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			05/11/16 15:25	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			05/11/16 15:25	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			05/11/16 15:25	1
2-Hexanone	ND		0.40	0.087	ppb v/v			05/11/16 15:25	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			05/11/16 15:25	1
Methylene Chloride	0.16	J B	0.40	0.072	ppb v/v			05/11/16 15:25	1
Styrene	ND		0.40	0.059	ppb v/v			05/11/16 15:25	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			05/11/16 15:25	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			05/11/16 15:25	1
Toluene	ND		0.40	0.051	ppb v/v			05/11/16 15:25	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			05/11/16 15:25	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			05/11/16 15:25	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			05/11/16 15:25	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			05/11/16 15:25	1
Trichloroethene	ND		0.40	0.11	ppb v/v			05/11/16 15:25	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			05/11/16 15:25	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			05/11/16 15:25	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			05/11/16 15:25	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			05/11/16 15:25	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			05/11/16 15:25	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099463-001/MWL-SV-FB1

Lab Sample ID: 320-18657-1

Date Collected: 04/27/16 08:12

Matrix: Air

Date Received: 05/04/16 09:30

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			05/11/16 15:25	1
o-Xylene	ND		0.40	0.054	ppb v/v			05/11/16 15:25	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130					05/11/16 15:25	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 130					05/11/16 15:25	1
Toluene-d8 (Surr)	98		70 - 130					05/11/16 15:25	1

Client Sample ID: 099464-001/MWL-SV01-42.5

Lab Sample ID: 320-18657-2

Date Collected: 04/27/16 08:25

Matrix: Air

Date Received: 05/04/16 09:30

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		88	3.1	ppb v/v			05/11/16 16:10	17.68
Benzene	ND		7.1	1.4	ppb v/v			05/11/16 16:10	17.68
Benzyl chloride	ND		14	2.9	ppb v/v			05/11/16 16:10	17.68
Bromodichloromethane	ND		5.3	1.2	ppb v/v			05/11/16 16:10	17.68
Bromoform	ND		7.1	1.2	ppb v/v			05/11/16 16:10	17.68
Bromomethane	ND		14	5.9	ppb v/v			05/11/16 16:10	17.68
2-Butanone (MEK)	ND		14	3.5	ppb v/v			05/11/16 16:10	17.68
Carbon disulfide	ND		14	1.4	ppb v/v			05/11/16 16:10	17.68
Carbon tetrachloride	ND		14	1.1	ppb v/v			05/11/16 16:10	17.68
Chlorobenzene	ND		5.3	1.1	ppb v/v			05/11/16 16:10	17.68
Chloroethane	ND		14	5.4	ppb v/v			05/11/16 16:10	17.68
Chloroform	14		5.3	1.7	ppb v/v			05/11/16 16:10	17.68
Chloromethane	ND		14	3.5	ppb v/v			05/11/16 16:10	17.68
Dibromochloromethane	ND		7.1	1.4	ppb v/v			05/11/16 16:10	17.68
1,2-Dibromoethane (EDB)	ND		14	1.3	ppb v/v			05/11/16 16:10	17.68
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		7.1	2.7	ppb v/v			05/11/16 16:10	17.68
1,2-Dichlorobenzene	ND		7.1	2.3	ppb v/v			05/11/16 16:10	17.68
1,3-Dichlorobenzene	ND		7.1	1.9	ppb v/v			05/11/16 16:10	17.68
1,4-Dichlorobenzene	ND		7.1	2.6	ppb v/v			05/11/16 16:10	17.68
Dichlorodifluoromethane	99		7.1	2.6	ppb v/v			05/11/16 16:10	17.68
1,1-Dichloroethane	2.7 J		5.3	1.3	ppb v/v			05/11/16 16:10	17.68
1,2-Dichloroethane	ND		14	1.6	ppb v/v			05/11/16 16:10	17.68
1,1-Dichloroethene	7.9 J		14	2.3	ppb v/v			05/11/16 16:10	17.68
cis-1,2-Dichloroethene	ND		7.1	1.6	ppb v/v			05/11/16 16:10	17.68
trans-1,2-Dichloroethene	ND		7.1	1.8	ppb v/v			05/11/16 16:10	17.68
1,2-Dichloropropane	ND		7.1	4.2	ppb v/v			05/11/16 16:10	17.68
cis-1,3-Dichloropropene	ND		7.1	1.8	ppb v/v			05/11/16 16:10	17.68
trans-1,3-Dichloropropene	ND		7.1	1.6	ppb v/v			05/11/16 16:10	17.68
Ethylbenzene	ND		7.1	1.1	ppb v/v			05/11/16 16:10	17.68
4-Ethyltoluene	ND		7.1	3.3	ppb v/v			05/11/16 16:10	17.68
Hexachlorobutadiene	ND		35	7.6	ppb v/v			05/11/16 16:10	17.68
2-Hexanone	ND		7.1	1.5	ppb v/v			05/11/16 16:10	17.68
4-Methyl-2-pentanone (MIBK)	ND		7.1	2.4	ppb v/v			05/11/16 16:10	17.68
Methylene Chloride	3.0 J B		7.1	1.3	ppb v/v			05/11/16 16:10	17.68

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099464-001/MWL-SV01-42.5

Lab Sample ID: 320-18657-2

Date Collected: 04/27/16 08:25

Matrix: Air

Date Received: 05/04/16 09:30

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		7.1	1.0	ppb v/v			05/11/16 16:10	17.68
1,1,2,2-Tetrachloroethane	ND		7.1	1.2	ppb v/v			05/11/16 16:10	17.68
Tetrachloroethene	410		7.1	0.90	ppb v/v			05/11/16 16:10	17.68
Toluene	1.5 J		7.1	0.90	ppb v/v			05/11/16 16:10	17.68
1,1,2-Trichloro-1,2,2-trifluoroethane	84		7.1	2.9	ppb v/v			05/11/16 16:10	17.68
1,2,4-Trichlorobenzene	ND		35	7.7	ppb v/v			05/11/16 16:10	17.68
1,1,1-Trichloroethane	42		5.3	1.1	ppb v/v			05/11/16 16:10	17.68
1,1,2-Trichloroethane	ND		7.1	1.2	ppb v/v			05/11/16 16:10	17.68
Trichloroethene	91		7.1	1.9	ppb v/v			05/11/16 16:10	17.68
Trichlorofluoromethane	180		7.1	3.5	ppb v/v			05/11/16 16:10	17.68
1,2,4-Trimethylbenzene	ND		14	2.9	ppb v/v			05/11/16 16:10	17.68
1,3,5-Trimethylbenzene	ND		7.1	2.2	ppb v/v			05/11/16 16:10	17.68
Vinyl acetate	ND		14	2.6	ppb v/v			05/11/16 16:10	17.68
Vinyl chloride	ND		7.1	2.1	ppb v/v			05/11/16 16:10	17.68
m,p-Xylene	ND		14	1.8	ppb v/v			05/11/16 16:10	17.68
o-Xylene	ND		7.1	0.95	ppb v/v			05/11/16 16:10	17.68
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130					05/11/16 16:10	17.68
1,2-Dichloroethane-d4 (Surr)	95		70 - 130					05/11/16 16:10	17.68
Toluene-d8 (Surr)	100		70 - 130					05/11/16 16:10	17.68

Client Sample ID: 099465-001/MWL-SV-FB2

Lab Sample ID: 320-18657-3

Date Collected: 04/27/16 08:14

Matrix: Air

Date Received: 05/04/16 09:30

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	0.41 J		5.0	0.18	ppb v/v			05/11/16 17:01	1
Benzene	ND		0.40	0.079	ppb v/v			05/11/16 17:01	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			05/11/16 17:01	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			05/11/16 17:01	1
Bromoform	ND		0.40	0.070	ppb v/v			05/11/16 17:01	1
Bromomethane	ND		0.80	0.34	ppb v/v			05/11/16 17:01	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			05/11/16 17:01	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			05/11/16 17:01	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			05/11/16 17:01	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			05/11/16 17:01	1
Chloroethane	ND		0.80	0.31	ppb v/v			05/11/16 17:01	1
Chloroform	ND		0.30	0.095	ppb v/v			05/11/16 17:01	1
Chloromethane	ND		0.80	0.20	ppb v/v			05/11/16 17:01	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			05/11/16 17:01	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			05/11/16 17:01	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			05/11/16 17:01	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			05/11/16 17:01	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			05/11/16 17:01	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			05/11/16 17:01	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099465-001/MWL-SV-FB2

Lab Sample ID: 320-18657-3

Date Collected: 04/27/16 08:14

Matrix: Air

Date Received: 05/04/16 09:30

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			05/11/16 17:01	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			05/11/16 17:01	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			05/11/16 17:01	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			05/11/16 17:01	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			05/11/16 17:01	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			05/11/16 17:01	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			05/11/16 17:01	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			05/11/16 17:01	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			05/11/16 17:01	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			05/11/16 17:01	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			05/11/16 17:01	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			05/11/16 17:01	1
2-Hexanone	ND		0.40	0.087	ppb v/v			05/11/16 17:01	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			05/11/16 17:01	1
Methylene Chloride	0.17	J B	0.40	0.072	ppb v/v			05/11/16 17:01	1
Styrene	ND		0.40	0.059	ppb v/v			05/11/16 17:01	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			05/11/16 17:01	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			05/11/16 17:01	1
Toluene	0.14	J	0.40	0.051	ppb v/v			05/11/16 17:01	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			05/11/16 17:01	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			05/11/16 17:01	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			05/11/16 17:01	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			05/11/16 17:01	1
Trichloroethene	ND		0.40	0.11	ppb v/v			05/11/16 17:01	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			05/11/16 17:01	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			05/11/16 17:01	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			05/11/16 17:01	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			05/11/16 17:01	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			05/11/16 17:01	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			05/11/16 17:01	1
o-Xylene	ND		0.40	0.054	ppb v/v			05/11/16 17:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		70 - 130		05/11/16 17:01	1
1,2-Dichloroethane-d4 (Surr)	97		70 - 130		05/11/16 17:01	1
Toluene-d8 (Surr)	99		70 - 130		05/11/16 17:01	1

Client Sample ID: 099466-001/MWL-SV02-41.5

Lab Sample ID: 320-18657-4

Date Collected: 04/27/16 08:36

Matrix: Air

Date Received: 05/04/16 09:30

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		57	2.0	ppb v/v			05/11/16 17:46	11.44
Benzene	ND		4.6	0.90	ppb v/v			05/11/16 17:46	11.44
Benzyl chloride	ND		9.2	1.9	ppb v/v			05/11/16 17:46	11.44
Bromodichloromethane	ND		3.4	0.76	ppb v/v			05/11/16 17:46	11.44
Bromoform	ND		4.6	0.80	ppb v/v			05/11/16 17:46	11.44

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099466-001/MWL-SV02-41.5

Lab Sample ID: 320-18657-4

Date Collected: 04/27/16 08:36

Matrix: Air

Date Received: 05/04/16 09:30

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		9.2	3.8	ppb v/v			05/11/16 17:46	11.44
2-Butanone (MEK)	ND		9.2	2.3	ppb v/v			05/11/16 17:46	11.44
Carbon disulfide	ND		9.2	0.89	ppb v/v			05/11/16 17:46	11.44
Carbon tetrachloride	ND		9.2	0.73	ppb v/v			05/11/16 17:46	11.44
Chlorobenzene	ND		3.4	0.73	ppb v/v			05/11/16 17:46	11.44
Chloroethane	ND		9.2	3.5	ppb v/v			05/11/16 17:46	11.44
Chloroform	3.0	J	3.4	1.1	ppb v/v			05/11/16 17:46	11.44
Chloromethane	ND		9.2	2.3	ppb v/v			05/11/16 17:46	11.44
Dibromochloromethane	ND		4.6	0.90	ppb v/v			05/11/16 17:46	11.44
1,2-Dibromoethane (EDB)	ND		9.2	0.86	ppb v/v			05/11/16 17:46	11.44
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.6	1.8	ppb v/v			05/11/16 17:46	11.44
1,2-Dichlorobenzene	ND		4.6	1.5	ppb v/v			05/11/16 17:46	11.44
1,3-Dichlorobenzene	ND		4.6	1.3	ppb v/v			05/11/16 17:46	11.44
1,4-Dichlorobenzene	ND		4.6	1.7	ppb v/v			05/11/16 17:46	11.44
Dichlorodifluoromethane	100		4.6	1.7	ppb v/v			05/11/16 17:46	11.44
1,1-Dichloroethane	2.4	J	3.4	0.82	ppb v/v			05/11/16 17:46	11.44
1,2-Dichloroethane	ND		9.2	1.0	ppb v/v			05/11/16 17:46	11.44
1,1-Dichloroethene	11		9.2	1.5	ppb v/v			05/11/16 17:46	11.44
cis-1,2-Dichloroethene	ND		4.6	1.0	ppb v/v			05/11/16 17:46	11.44
trans-1,2-Dichloroethene	ND		4.6	1.1	ppb v/v			05/11/16 17:46	11.44
1,2-Dichloropropane	ND		4.6	2.7	ppb v/v			05/11/16 17:46	11.44
cis-1,3-Dichloropropene	ND		4.6	1.2	ppb v/v			05/11/16 17:46	11.44
trans-1,3-Dichloropropene	ND		4.6	1.0	ppb v/v			05/11/16 17:46	11.44
Ethylbenzene	ND		4.6	0.72	ppb v/v			05/11/16 17:46	11.44
4-Ethyltoluene	ND		4.6	2.1	ppb v/v			05/11/16 17:46	11.44
Hexachlorobutadiene	ND		23	4.9	ppb v/v			05/11/16 17:46	11.44
2-Hexanone	ND		4.6	1.0	ppb v/v			05/11/16 17:46	11.44
4-Methyl-2-pentanone (MIBK)	ND		4.6	1.5	ppb v/v			05/11/16 17:46	11.44
Methylene Chloride	1.9	J B	4.6	0.82	ppb v/v			05/11/16 17:46	11.44
Styrene	ND		4.6	0.67	ppb v/v			05/11/16 17:46	11.44
1,1,2,2-Tetrachloroethane	ND		4.6	0.79	ppb v/v			05/11/16 17:46	11.44
Tetrachloroethene	68		4.6	0.58	ppb v/v			05/11/16 17:46	11.44
Toluene	ND		4.6	0.58	ppb v/v			05/11/16 17:46	11.44
1,1,2-Trichloro-1,2,2-trifluoroethane	54		4.6	1.9	ppb v/v			05/11/16 17:46	11.44
1,2,4-Trichlorobenzene	ND		23	5.0	ppb v/v			05/11/16 17:46	11.44
1,1,1-Trichloroethane	77		3.4	0.74	ppb v/v			05/11/16 17:46	11.44
1,1,2-Trichloroethane	ND		4.6	0.77	ppb v/v			05/11/16 17:46	11.44
Trichloroethene	63		4.6	1.2	ppb v/v			05/11/16 17:46	11.44
Trichlorofluoromethane	330		4.6	2.2	ppb v/v			05/11/16 17:46	11.44
1,2,4-Trimethylbenzene	ND		9.2	1.9	ppb v/v			05/11/16 17:46	11.44
1,3,5-Trimethylbenzene	ND		4.6	1.4	ppb v/v			05/11/16 17:46	11.44
Vinyl acetate	ND		9.2	1.7	ppb v/v			05/11/16 17:46	11.44
Vinyl chloride	ND		4.6	1.4	ppb v/v			05/11/16 17:46	11.44
m,p-Xylene	ND		9.2	1.1	ppb v/v			05/11/16 17:46	11.44
o-Xylene	ND		4.6	0.62	ppb v/v			05/11/16 17:46	11.44

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130		05/11/16 17:46	11.44

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099466-001/MWL-SV02-41.5

Lab Sample ID: 320-18657-4

Date Collected: 04/27/16 08:36

Matrix: Air

Date Received: 05/04/16 09:30

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)	97		70 - 130		05/11/16 17:46	11.44
Toluene-d8 (Surr)	100		70 - 130		05/11/16 17:46	11.44

Client Sample ID: 099467-001/MWL-SV-FB3

Lab Sample ID: 320-18657-5

Date Collected: 04/27/16 08:52

Matrix: Air

Date Received: 05/04/16 09:30

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			05/11/16 18:38	1
Benzene	ND		0.40	0.079	ppb v/v			05/11/16 18:38	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			05/11/16 18:38	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			05/11/16 18:38	1
Bromoform	ND		0.40	0.070	ppb v/v			05/11/16 18:38	1
Bromomethane	ND		0.80	0.34	ppb v/v			05/11/16 18:38	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			05/11/16 18:38	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			05/11/16 18:38	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			05/11/16 18:38	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			05/11/16 18:38	1
Chloroethane	ND		0.80	0.31	ppb v/v			05/11/16 18:38	1
Chloroform	ND		0.30	0.095	ppb v/v			05/11/16 18:38	1
Chloromethane	ND		0.80	0.20	ppb v/v			05/11/16 18:38	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			05/11/16 18:38	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			05/11/16 18:38	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			05/11/16 18:38	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			05/11/16 18:38	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			05/11/16 18:38	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			05/11/16 18:38	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			05/11/16 18:38	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			05/11/16 18:38	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			05/11/16 18:38	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			05/11/16 18:38	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			05/11/16 18:38	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			05/11/16 18:38	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			05/11/16 18:38	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			05/11/16 18:38	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			05/11/16 18:38	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			05/11/16 18:38	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			05/11/16 18:38	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			05/11/16 18:38	1
2-Hexanone	ND		0.40	0.087	ppb v/v			05/11/16 18:38	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			05/11/16 18:38	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			05/11/16 18:38	1
Styrene	ND		0.40	0.059	ppb v/v			05/11/16 18:38	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			05/11/16 18:38	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			05/11/16 18:38	1
Toluene	ND		0.40	0.051	ppb v/v			05/11/16 18:38	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099467-001/MWL-SV-FB3

Lab Sample ID: 320-18657-5

Date Collected: 04/27/16 08:52

Matrix: Air

Date Received: 05/04/16 09:30

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
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			05/11/16 18:38	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			05/11/16 18:38	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			05/11/16 18:38	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			05/11/16 18:38	1
Trichloroethene	ND		0.40	0.11	ppb v/v			05/11/16 18:38	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			05/11/16 18:38	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			05/11/16 18:38	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			05/11/16 18:38	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			05/11/16 18:38	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			05/11/16 18:38	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			05/11/16 18:38	1
o-Xylene	ND		0.40	0.054	ppb v/v			05/11/16 18:38	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		70 - 130		05/11/16 18:38	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 130		05/11/16 18:38	1
Toluene-d8 (Surr)	100		70 - 130		05/11/16 18:38	1

Client Sample ID: 099468-001/MWL-SV03-50

Lab Sample ID: 320-18657-6

Date Collected: 04/27/16 09:07

Matrix: Air

Date Received: 05/04/16 09:30

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	37	1.3	ppb v/v			05/11/16 19:23	7.34
Benzene	0.66	J	2.9	0.58	ppb v/v			05/11/16 19:23	7.34
Benzyl chloride	ND		5.9	1.2	ppb v/v			05/11/16 19:23	7.34
Bromodichloromethane	ND		2.2	0.48	ppb v/v			05/11/16 19:23	7.34
Bromoform	ND		2.9	0.51	ppb v/v			05/11/16 19:23	7.34
Bromomethane	ND		5.9	2.5	ppb v/v			05/11/16 19:23	7.34
2-Butanone (MEK)	ND		5.9	1.5	ppb v/v			05/11/16 19:23	7.34
Carbon disulfide	ND		5.9	0.57	ppb v/v			05/11/16 19:23	7.34
Carbon tetrachloride	ND		5.9	0.47	ppb v/v			05/11/16 19:23	7.34
Chlorobenzene	ND		2.2	0.47	ppb v/v			05/11/16 19:23	7.34
Chloroethane	ND		5.9	2.3	ppb v/v			05/11/16 19:23	7.34
Chloroform	2.1	J	2.2	0.70	ppb v/v			05/11/16 19:23	7.34
Chloromethane	ND		5.9	1.4	ppb v/v			05/11/16 19:23	7.34
Dibromochloromethane	ND		2.9	0.58	ppb v/v			05/11/16 19:23	7.34
1,2-Dibromoethane (EDB)	ND		5.9	0.55	ppb v/v			05/11/16 19:23	7.34
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.9	1.1	ppb v/v			05/11/16 19:23	7.34
1,2-Dichlorobenzene	ND		2.9	0.95	ppb v/v			05/11/16 19:23	7.34
1,3-Dichlorobenzene	ND		2.9	0.81	ppb v/v			05/11/16 19:23	7.34
1,4-Dichlorobenzene	ND		2.9	1.1	ppb v/v			05/11/16 19:23	7.34
Dichlorodifluoromethane	31		2.9	1.1	ppb v/v			05/11/16 19:23	7.34
1,1-Dichloroethane	3.4		2.2	0.53	ppb v/v			05/11/16 19:23	7.34
1,2-Dichloroethane	ND		5.9	0.65	ppb v/v			05/11/16 19:23	7.34
1,1-Dichloroethene	13		5.9	0.95	ppb v/v			05/11/16 19:23	7.34
cis-1,2-Dichloroethene	2.2	J	2.9	0.65	ppb v/v			05/11/16 19:23	7.34

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099468-001/MWL-SV03-50

Lab Sample ID: 320-18657-6

Date Collected: 04/27/16 09:07

Matrix: Air

Date Received: 05/04/16 09:30

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
trans-1,2-Dichloroethene	ND		2.9	0.73	ppb v/v			05/11/16 19:23	7.34
1,2-Dichloropropane	ND		2.9	1.8	ppb v/v			05/11/16 19:23	7.34
cis-1,3-Dichloropropene	ND		2.9	0.76	ppb v/v			05/11/16 19:23	7.34
trans-1,3-Dichloropropene	ND		2.9	0.65	ppb v/v			05/11/16 19:23	7.34
Ethylbenzene	ND		2.9	0.46	ppb v/v			05/11/16 19:23	7.34
4-Ethyltoluene	ND		2.9	1.4	ppb v/v			05/11/16 19:23	7.34
Hexachlorobutadiene	ND		15	3.2	ppb v/v			05/11/16 19:23	7.34
2-Hexanone	ND		2.9	0.64	ppb v/v			05/11/16 19:23	7.34
4-Methyl-2-pentanone (MIBK)	ND		2.9	0.99	ppb v/v			05/11/16 19:23	7.34
Methylene Chloride	1.7	J B	2.9	0.53	ppb v/v			05/11/16 19:23	7.34
Styrene	ND		2.9	0.43	ppb v/v			05/11/16 19:23	7.34
1,1,2,2-Tetrachloroethane	ND		2.9	0.51	ppb v/v			05/11/16 19:23	7.34
Tetrachloroethene	170		2.9	0.37	ppb v/v			05/11/16 19:23	7.34
Toluene	ND		2.9	0.37	ppb v/v			05/11/16 19:23	7.34
1,1,2-Trichloro-1,2,2-trifluoroethane	78		2.9	1.2	ppb v/v			05/11/16 19:23	7.34
1,2,4-Trichlorobenzene	ND		15	3.2	ppb v/v			05/11/16 19:23	7.34
1,1,1-Trichloroethane	5.5		2.2	0.48	ppb v/v			05/11/16 19:23	7.34
1,1,2-Trichloroethane	ND		2.9	0.49	ppb v/v			05/11/16 19:23	7.34
Trichloroethene	140		2.9	0.77	ppb v/v			05/11/16 19:23	7.34
Trichlorofluoromethane	29		2.9	1.4	ppb v/v			05/11/16 19:23	7.34
1,2,4-Trimethylbenzene	ND		5.9	1.2	ppb v/v			05/11/16 19:23	7.34
1,3,5-Trimethylbenzene	ND		2.9	0.92	ppb v/v			05/11/16 19:23	7.34
Vinyl acetate	ND		5.9	1.1	ppb v/v			05/11/16 19:23	7.34
Vinyl chloride	ND		2.9	0.88	ppb v/v			05/11/16 19:23	7.34
m,p-Xylene	ND		5.9	0.73	ppb v/v			05/11/16 19:23	7.34
o-Xylene	ND		2.9	0.40	ppb v/v			05/11/16 19:23	7.34
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130					05/11/16 19:23	7.34
1,2-Dichloroethane-d4 (Surr)	97		70 - 130					05/11/16 19:23	7.34
Toluene-d8 (Surr)	99		70 - 130					05/11/16 19:23	7.34

Client Sample ID: 099469-001/MWL-SV03-100

Lab Sample ID: 320-18657-7

Date Collected: 04/27/16 09:10

Matrix: Air

Date Received: 05/04/16 09:30

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	5.4	J	56	2.0	ppb v/v			05/11/16 20:09	11.28
Benzene	ND		4.5	0.89	ppb v/v			05/11/16 20:09	11.28
Benzyl chloride	ND		9.0	1.8	ppb v/v			05/11/16 20:09	11.28
Bromodichloromethane	ND		3.4	0.74	ppb v/v			05/11/16 20:09	11.28
Bromoform	ND		4.5	0.79	ppb v/v			05/11/16 20:09	11.28
Bromomethane	ND		9.0	3.8	ppb v/v			05/11/16 20:09	11.28
2-Butanone (MEK)	ND		9.0	2.2	ppb v/v			05/11/16 20:09	11.28
Carbon disulfide	6.3	J	9.0	0.88	ppb v/v			05/11/16 20:09	11.28
Carbon tetrachloride	ND		9.0	0.72	ppb v/v			05/11/16 20:09	11.28

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099469-001/MWL-SV03-100

Lab Sample ID: 320-18657-7

Date Collected: 04/27/16 09:10

Matrix: Air

Date Received: 05/04/16 09:30

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		3.4	0.72	ppb v/v			05/11/16 20:09	11.28
Chloroethane	ND		9.0	3.5	ppb v/v			05/11/16 20:09	11.28
Chloroform	2.4	J	3.4	1.1	ppb v/v			05/11/16 20:09	11.28
Chloromethane	ND		9.0	2.2	ppb v/v			05/11/16 20:09	11.28
Dibromochloromethane	ND		4.5	0.89	ppb v/v			05/11/16 20:09	11.28
1,2-Dibromoethane (EDB)	ND		9.0	0.85	ppb v/v			05/11/16 20:09	11.28
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.5	1.7	ppb v/v			05/11/16 20:09	11.28
1,2-Dichlorobenzene	ND		4.5	1.5	ppb v/v			05/11/16 20:09	11.28
1,3-Dichlorobenzene	ND		4.5	1.2	ppb v/v			05/11/16 20:09	11.28
1,4-Dichlorobenzene	ND		4.5	1.7	ppb v/v			05/11/16 20:09	11.28
Dichlorodifluoromethane	49		4.5	1.6	ppb v/v			05/11/16 20:09	11.28
1,1-Dichloroethane	6.1		3.4	0.81	ppb v/v			05/11/16 20:09	11.28
1,2-Dichloroethane	ND		9.0	0.99	ppb v/v			05/11/16 20:09	11.28
1,1-Dichloroethene	25		9.0	1.5	ppb v/v			05/11/16 20:09	11.28
cis-1,2-Dichloroethene	3.9	J	4.5	1.0	ppb v/v			05/11/16 20:09	11.28
trans-1,2-Dichloroethene	ND		4.5	1.1	ppb v/v			05/11/16 20:09	11.28
1,2-Dichloropropane	ND		4.5	2.7	ppb v/v			05/11/16 20:09	11.28
cis-1,3-Dichloropropene	ND		4.5	1.2	ppb v/v			05/11/16 20:09	11.28
trans-1,3-Dichloropropene	ND		4.5	0.99	ppb v/v			05/11/16 20:09	11.28
Ethylbenzene	ND		4.5	0.71	ppb v/v			05/11/16 20:09	11.28
4-Ethyltoluene	ND		4.5	2.1	ppb v/v			05/11/16 20:09	11.28
Hexachlorobutadiene	ND		23	4.9	ppb v/v			05/11/16 20:09	11.28
2-Hexanone	ND		4.5	0.98	ppb v/v			05/11/16 20:09	11.28
4-Methyl-2-pentanone (MIBK)	ND		4.5	1.5	ppb v/v			05/11/16 20:09	11.28
Methylene Chloride	3.1	J B	4.5	0.81	ppb v/v			05/11/16 20:09	11.28
Styrene	ND		4.5	0.67	ppb v/v			05/11/16 20:09	11.28
1,1,2,2-Tetrachloroethane	ND		4.5	0.78	ppb v/v			05/11/16 20:09	11.28
Tetrachloroethene	240		4.5	0.58	ppb v/v			05/11/16 20:09	11.28
Toluene	ND		4.5	0.58	ppb v/v			05/11/16 20:09	11.28
1,1,2-Trichloro-1,2,2-trifluoroethane	140		4.5	1.8	ppb v/v			05/11/16 20:09	11.28
1,2,4-Trichlorobenzene	ND		23	4.9	ppb v/v			05/11/16 20:09	11.28
1,1,1-Trichloroethane	5.5		3.4	0.73	ppb v/v			05/11/16 20:09	11.28
1,1,2-Trichloroethane	ND		4.5	0.76	ppb v/v			05/11/16 20:09	11.28
Trichloroethene	210		4.5	1.2	ppb v/v			05/11/16 20:09	11.28
Trichlorofluoromethane	36		4.5	2.2	ppb v/v			05/11/16 20:09	11.28
1,2,4-Trimethylbenzene	ND		9.0	1.8	ppb v/v			05/11/16 20:09	11.28
1,3,5-Trimethylbenzene	ND		4.5	1.4	ppb v/v			05/11/16 20:09	11.28
Vinyl acetate	ND		9.0	1.6	ppb v/v			05/11/16 20:09	11.28
Vinyl chloride	ND		4.5	1.4	ppb v/v			05/11/16 20:09	11.28
m,p-Xylene	ND		9.0	1.1	ppb v/v			05/11/16 20:09	11.28
o-Xylene	ND		4.5	0.61	ppb v/v			05/11/16 20:09	11.28
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130					05/11/16 20:09	11.28
1,2-Dichloroethane-d4 (Surr)	97		70 - 130					05/11/16 20:09	11.28
Toluene-d8 (Surr)	100		70 - 130					05/11/16 20:09	11.28

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099470-001/MWL-SV03-200

Lab Sample ID: 320-18657-8

Date Collected: 04/27/16 09:13

Matrix: Air

Date Received: 05/04/16 09:30

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	2.3	J	57	2.0	ppb v/v			05/11/16 20:54	11.33
Benzene	ND		4.5	0.90	ppb v/v			05/11/16 20:54	11.33
Benzyl chloride	ND		9.1	1.8	ppb v/v			05/11/16 20:54	11.33
Bromodichloromethane	ND		3.4	0.75	ppb v/v			05/11/16 20:54	11.33
Bromoform	ND		4.5	0.79	ppb v/v			05/11/16 20:54	11.33
Bromomethane	ND		9.1	3.8	ppb v/v			05/11/16 20:54	11.33
2-Butanone (MEK)	ND		9.1	2.3	ppb v/v			05/11/16 20:54	11.33
Carbon disulfide	ND		9.1	0.88	ppb v/v			05/11/16 20:54	11.33
Carbon tetrachloride	ND		9.1	0.73	ppb v/v			05/11/16 20:54	11.33
Chlorobenzene	ND		3.4	0.73	ppb v/v			05/11/16 20:54	11.33
Chloroethane	ND		9.1	3.5	ppb v/v			05/11/16 20:54	11.33
Chloroform	2.1	J	3.4	1.1	ppb v/v			05/11/16 20:54	11.33
Chloromethane	ND		9.1	2.2	ppb v/v			05/11/16 20:54	11.33
Dibromochloromethane	ND		4.5	0.90	ppb v/v			05/11/16 20:54	11.33
1,2-Dibromoethane (EDB)	ND		9.1	0.85	ppb v/v			05/11/16 20:54	11.33
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.5	1.8	ppb v/v			05/11/16 20:54	11.33
1,2-Dichlorobenzene	ND		4.5	1.5	ppb v/v			05/11/16 20:54	11.33
1,3-Dichlorobenzene	ND		4.5	1.2	ppb v/v			05/11/16 20:54	11.33
1,4-Dichlorobenzene	ND		4.5	1.7	ppb v/v			05/11/16 20:54	11.33
Dichlorodifluoromethane	57		4.5	1.6	ppb v/v			05/11/16 20:54	11.33
1,1-Dichloroethane	7.7		3.4	0.82	ppb v/v			05/11/16 20:54	11.33
1,2-Dichloroethane	ND		9.1	1.0	ppb v/v			05/11/16 20:54	11.33
1,1-Dichloroethene	33		9.1	1.5	ppb v/v			05/11/16 20:54	11.33
cis-1,2-Dichloroethene	4.8		4.5	1.0	ppb v/v			05/11/16 20:54	11.33
trans-1,2-Dichloroethene	ND		4.5	1.1	ppb v/v			05/11/16 20:54	11.33
1,2-Dichloropropane	ND		4.5	2.7	ppb v/v			05/11/16 20:54	11.33
cis-1,3-Dichloropropene	ND		4.5	1.2	ppb v/v			05/11/16 20:54	11.33
trans-1,3-Dichloropropene	ND		4.5	1.0	ppb v/v			05/11/16 20:54	11.33
Ethylbenzene	ND		4.5	0.71	ppb v/v			05/11/16 20:54	11.33
4-Ethyltoluene	ND		4.5	2.1	ppb v/v			05/11/16 20:54	11.33
Hexachlorobutadiene	ND		23	4.9	ppb v/v			05/11/16 20:54	11.33
2-Hexanone	ND		4.5	0.99	ppb v/v			05/11/16 20:54	11.33
4-Methyl-2-pentanone (MIBK)	ND		4.5	1.5	ppb v/v			05/11/16 20:54	11.33
Methylene Chloride	ND		4.5	0.82	ppb v/v			05/11/16 20:54	11.33
Styrene	ND		4.5	0.67	ppb v/v			05/11/16 20:54	11.33
1,1,2,2-Tetrachloroethane	ND		4.5	0.78	ppb v/v			05/11/16 20:54	11.33
Tetrachloroethene	270		4.5	0.58	ppb v/v			05/11/16 20:54	11.33
Toluene	0.71	J	4.5	0.58	ppb v/v			05/11/16 20:54	11.33
1,1,2-Trichloro-1,2,2-trifluoroethane	180		4.5	1.8	ppb v/v			05/11/16 20:54	11.33
1,2,4-Trichlorobenzene	ND		23	4.9	ppb v/v			05/11/16 20:54	11.33
1,1,1-Trichloroethane	2.9	J	3.4	0.74	ppb v/v			05/11/16 20:54	11.33
1,1,2-Trichloroethane	ND		4.5	0.76	ppb v/v			05/11/16 20:54	11.33
Trichloroethene	250		4.5	1.2	ppb v/v			05/11/16 20:54	11.33
Trichlorofluoromethane	31		4.5	2.2	ppb v/v			05/11/16 20:54	11.33
1,2,4-Trimethylbenzene	ND		9.1	1.8	ppb v/v			05/11/16 20:54	11.33
1,3,5-Trimethylbenzene	ND		4.5	1.4	ppb v/v			05/11/16 20:54	11.33
Vinyl acetate	ND		9.1	1.6	ppb v/v			05/11/16 20:54	11.33
Vinyl chloride	ND		4.5	1.4	ppb v/v			05/11/16 20:54	11.33

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099470-001/MWL-SV03-200

Lab Sample ID: 320-18657-8

Date Collected: 04/27/16 09:13

Matrix: Air

Date Received: 05/04/16 09:30

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		9.1	1.1	ppb v/v			05/11/16 20:54	11.33
o-Xylene	ND		4.5	0.61	ppb v/v			05/11/16 20:54	11.33
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130					05/11/16 20:54	11.33
1,2-Dichloroethane-d4 (Surr)	96		70 - 130					05/11/16 20:54	11.33
Toluene-d8 (Surr)	99		70 - 130					05/11/16 20:54	11.33

Client Sample ID: 099471-001/MWL-SV03-300

Lab Sample ID: 320-18657-9

Date Collected: 04/27/16 09:19

Matrix: Air

Date Received: 05/04/16 09:30

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	66	2.3	ppb v/v			05/11/16 21:39	13.2
Benzene	ND		5.3	1.0	ppb v/v			05/11/16 21:39	13.2
Benzyl chloride	ND		11	2.2	ppb v/v			05/11/16 21:39	13.2
Bromodichloromethane	ND		4.0	0.87	ppb v/v			05/11/16 21:39	13.2
Bromoform	ND		5.3	0.92	ppb v/v			05/11/16 21:39	13.2
Bromomethane	ND		11	4.4	ppb v/v			05/11/16 21:39	13.2
2-Butanone (MEK)	ND		11	2.6	ppb v/v			05/11/16 21:39	13.2
Carbon disulfide	ND		11	1.0	ppb v/v			05/11/16 21:39	13.2
Carbon tetrachloride	ND		11	0.84	ppb v/v			05/11/16 21:39	13.2
Chlorobenzene	ND		4.0	0.84	ppb v/v			05/11/16 21:39	13.2
Chloroethane	ND		11	4.1	ppb v/v			05/11/16 21:39	13.2
Chloroform	ND		4.0	1.3	ppb v/v			05/11/16 21:39	13.2
Chloromethane	ND		11	2.6	ppb v/v			05/11/16 21:39	13.2
Dibromochloromethane	ND		5.3	1.0	ppb v/v			05/11/16 21:39	13.2
1,2-Dibromoethane (EDB)	ND		11	0.99	ppb v/v			05/11/16 21:39	13.2
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		5.3	2.0	ppb v/v			05/11/16 21:39	13.2
1,2-Dichlorobenzene	ND		5.3	1.7	ppb v/v			05/11/16 21:39	13.2
1,3-Dichlorobenzene	ND		5.3	1.5	ppb v/v			05/11/16 21:39	13.2
1,4-Dichlorobenzene	ND		5.3	2.0	ppb v/v			05/11/16 21:39	13.2
Dichlorodifluoromethane	33		5.3	1.9	ppb v/v			05/11/16 21:39	13.2
1,1-Dichloroethane	2.5	J	4.0	0.95	ppb v/v			05/11/16 21:39	13.2
1,2-Dichloroethane	ND		11	1.2	ppb v/v			05/11/16 21:39	13.2
1,1-Dichloroethene	19		11	1.7	ppb v/v			05/11/16 21:39	13.2
cis-1,2-Dichloroethene	2.0	J	5.3	1.2	ppb v/v			05/11/16 21:39	13.2
trans-1,2-Dichloroethene	ND		5.3	1.3	ppb v/v			05/11/16 21:39	13.2
1,2-Dichloropropane	ND		5.3	3.2	ppb v/v			05/11/16 21:39	13.2
cis-1,3-Dichloropropene	ND		5.3	1.4	ppb v/v			05/11/16 21:39	13.2
trans-1,3-Dichloropropene	ND		5.3	1.2	ppb v/v			05/11/16 21:39	13.2
Ethylbenzene	ND		5.3	0.83	ppb v/v			05/11/16 21:39	13.2
4-Ethyltoluene	ND		5.3	2.5	ppb v/v			05/11/16 21:39	13.2
Hexachlorobutadiene	ND		26	5.7	ppb v/v			05/11/16 21:39	13.2
2-Hexanone	ND		5.3	1.1	ppb v/v			05/11/16 21:39	13.2
4-Methyl-2-pentanone (MIBK)	ND		5.3	1.8	ppb v/v			05/11/16 21:39	13.2
Methylene Chloride	3.0	J B	5.3	0.95	ppb v/v			05/11/16 21:39	13.2

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099471-001/MWL-SV03-300

Lab Sample ID: 320-18657-9

Date Collected: 04/27/16 09:19

Matrix: Air

Date Received: 05/04/16 09:30

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		5.3	0.78	ppb v/v			05/11/16 21:39	13.2
1,1,2,2-Tetrachloroethane	ND		5.3	0.91	ppb v/v			05/11/16 21:39	13.2
Tetrachloroethene	310		5.3	0.67	ppb v/v			05/11/16 21:39	13.2
Toluene	0.74	J	5.3	0.67	ppb v/v			05/11/16 21:39	13.2
1,1,2-Trichloro-1,2,2-trifluoroethane	100		5.3	2.2	ppb v/v			05/11/16 21:39	13.2
1,2,4-Trichlorobenzene	ND		26	5.7	ppb v/v			05/11/16 21:39	13.2
1,1,1-Trichloroethane	0.94	J	4.0	0.86	ppb v/v			05/11/16 21:39	13.2
1,1,2-Trichloroethane	ND		5.3	0.88	ppb v/v			05/11/16 21:39	13.2
Trichloroethene	200		5.3	1.4	ppb v/v			05/11/16 21:39	13.2
Trichlorofluoromethane	12		5.3	2.6	ppb v/v			05/11/16 21:39	13.2
1,2,4-Trimethylbenzene	ND		11	2.1	ppb v/v			05/11/16 21:39	13.2
1,3,5-Trimethylbenzene	ND		5.3	1.7	ppb v/v			05/11/16 21:39	13.2
Vinyl acetate	ND		11	1.9	ppb v/v			05/11/16 21:39	13.2
Vinyl chloride	ND		5.3	1.6	ppb v/v			05/11/16 21:39	13.2
m,p-Xylene	ND		11	1.3	ppb v/v			05/11/16 21:39	13.2
o-Xylene	ND		5.3	0.71	ppb v/v			05/11/16 21:39	13.2
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130					05/11/16 21:39	13.2
1,2-Dichloroethane-d4 (Surr)	98		70 - 130					05/11/16 21:39	13.2
Toluene-d8 (Surr)	99		70 - 130					05/11/16 21:39	13.2

Client Sample ID: 099472-001/MWL-SV03-400

Lab Sample ID: 320-18657-10

Date Collected: 04/27/16 09:45

Matrix: Air

Date Received: 05/04/16 09:30

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	4.1	J	93	3.3	ppb v/v			05/11/16 22:24	18.6
Benzene	ND		7.4	1.5	ppb v/v			05/11/16 22:24	18.6
Benzyl chloride	ND		15	3.0	ppb v/v			05/11/16 22:24	18.6
Bromodichloromethane	ND		5.6	1.2	ppb v/v			05/11/16 22:24	18.6
Bromoform	ND		7.4	1.3	ppb v/v			05/11/16 22:24	18.6
Bromomethane	ND		15	6.2	ppb v/v			05/11/16 22:24	18.6
2-Butanone (MEK)	ND		15	3.7	ppb v/v			05/11/16 22:24	18.6
Carbon disulfide	ND		15	1.5	ppb v/v			05/11/16 22:24	18.6
Carbon tetrachloride	ND		15	1.2	ppb v/v			05/11/16 22:24	18.6
Chlorobenzene	ND		5.6	1.2	ppb v/v			05/11/16 22:24	18.6
Chloroethane	ND		15	5.7	ppb v/v			05/11/16 22:24	18.6
Chloroform	ND		5.6	1.8	ppb v/v			05/11/16 22:24	18.6
Chloromethane	ND		15	3.7	ppb v/v			05/11/16 22:24	18.6
Dibromochloromethane	ND		7.4	1.5	ppb v/v			05/11/16 22:24	18.6
1,2-Dibromoethane (EDB)	ND		15	1.4	ppb v/v			05/11/16 22:24	18.6
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		7.4	2.9	ppb v/v			05/11/16 22:24	18.6
1,2-Dichlorobenzene	ND		7.4	2.4	ppb v/v			05/11/16 22:24	18.6
1,3-Dichlorobenzene	ND		7.4	2.0	ppb v/v			05/11/16 22:24	18.6
1,4-Dichlorobenzene	ND		7.4	2.8	ppb v/v			05/11/16 22:24	18.6

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099472-001/MWL-SV03-400

Lab Sample ID: 320-18657-10

Date Collected: 04/27/16 09:45

Matrix: Air

Date Received: 05/04/16 09:30

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	25		7.4	2.7	ppb v/v			05/11/16 22:24	18.6
1,1-Dichloroethane	3.3	J	5.6	1.3	ppb v/v			05/11/16 22:24	18.6
1,2-Dichloroethane	ND		15	1.6	ppb v/v			05/11/16 22:24	18.6
1,1-Dichloroethene	20		15	2.4	ppb v/v			05/11/16 22:24	18.6
cis-1,2-Dichloroethene	2.5	J	7.4	1.7	ppb v/v			05/11/16 22:24	18.6
trans-1,2-Dichloroethene	ND		7.4	1.9	ppb v/v			05/11/16 22:24	18.6
1,2-Dichloropropane	ND		7.4	4.5	ppb v/v			05/11/16 22:24	18.6
cis-1,3-Dichloropropene	ND		7.4	1.9	ppb v/v			05/11/16 22:24	18.6
trans-1,3-Dichloropropene	ND		7.4	1.6	ppb v/v			05/11/16 22:24	18.6
Ethylbenzene	ND		7.4	1.2	ppb v/v			05/11/16 22:24	18.6
4-Ethyltoluene	ND		7.4	3.5	ppb v/v			05/11/16 22:24	18.6
Hexachlorobutadiene	ND		37	8.0	ppb v/v			05/11/16 22:24	18.6
2-Hexanone	ND		7.4	1.6	ppb v/v			05/11/16 22:24	18.6
4-Methyl-2-pentanone (MIBK)	ND		7.4	2.5	ppb v/v			05/11/16 22:24	18.6
Methylene Chloride	3.5	J B	7.4	1.3	ppb v/v			05/11/16 22:24	18.6
Styrene	ND		7.4	1.1	ppb v/v			05/11/16 22:24	18.6
1,1,2,2-Tetrachloroethane	ND		7.4	1.3	ppb v/v			05/11/16 22:24	18.6
Tetrachloroethene	430		7.4	0.95	ppb v/v			05/11/16 22:24	18.6
Toluene	1.2	J	7.4	0.95	ppb v/v			05/11/16 22:24	18.6
1,1,2-Trichloro-1,2,2-trifluoroethane	78		7.4	3.0	ppb v/v			05/11/16 22:24	18.6
1,2,4-Trichlorobenzene	ND		37	8.1	ppb v/v			05/11/16 22:24	18.6
1,1,1-Trichloroethane	1.2	J	5.6	1.2	ppb v/v			05/11/16 22:24	18.6
1,1,2-Trichloroethane	ND		7.4	1.2	ppb v/v			05/11/16 22:24	18.6
Trichloroethene	300		7.4	2.0	ppb v/v			05/11/16 22:24	18.6
Trichlorofluoromethane	11		7.4	3.6	ppb v/v			05/11/16 22:24	18.6
1,2,4-Trimethylbenzene	ND		15	3.0	ppb v/v			05/11/16 22:24	18.6
1,3,5-Trimethylbenzene	ND		7.4	2.3	ppb v/v			05/11/16 22:24	18.6
Vinyl acetate	ND		15	2.7	ppb v/v			05/11/16 22:24	18.6
Vinyl chloride	ND		7.4	2.2	ppb v/v			05/11/16 22:24	18.6
m,p-Xylene	ND		15	1.9	ppb v/v			05/11/16 22:24	18.6
o-Xylene	ND		7.4	1.0	ppb v/v			05/11/16 22:24	18.6

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130		05/11/16 22:24	18.6
1,2-Dichloroethane-d4 (Surr)	96		70 - 130		05/11/16 22:24	18.6
Toluene-d8 (Surr)	100		70 - 130		05/11/16 22:24	18.6

Client Sample ID: 099473-001/MWL-SV-FB4

Lab Sample ID: 320-18657-11

Date Collected: 04/27/16 10:14

Matrix: Air

Date Received: 05/04/16 09:30

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			05/11/16 23:15	1
Benzene	ND		0.40	0.079	ppb v/v			05/11/16 23:15	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			05/11/16 23:15	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			05/11/16 23:15	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099473-001/MWL-SV-FB4

Lab Sample ID: 320-18657-11

Date Collected: 04/27/16 10:14

Matrix: Air

Date Received: 05/04/16 09:30

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			05/11/16 23:15	1
Bromomethane	ND		0.80	0.34	ppb v/v			05/11/16 23:15	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			05/11/16 23:15	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			05/11/16 23:15	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			05/11/16 23:15	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			05/11/16 23:15	1
Chloroethane	ND		0.80	0.31	ppb v/v			05/11/16 23:15	1
Chloroform	ND		0.30	0.095	ppb v/v			05/11/16 23:15	1
Chloromethane	ND		0.80	0.20	ppb v/v			05/11/16 23:15	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			05/11/16 23:15	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			05/11/16 23:15	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			05/11/16 23:15	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			05/11/16 23:15	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			05/11/16 23:15	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			05/11/16 23:15	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			05/11/16 23:15	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			05/11/16 23:15	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			05/11/16 23:15	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			05/11/16 23:15	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			05/11/16 23:15	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			05/11/16 23:15	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			05/11/16 23:15	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			05/11/16 23:15	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			05/11/16 23:15	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			05/11/16 23:15	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			05/11/16 23:15	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			05/11/16 23:15	1
2-Hexanone	ND		0.40	0.087	ppb v/v			05/11/16 23:15	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			05/11/16 23:15	1
Methylene Chloride	0.14	J B	0.40	0.072	ppb v/v			05/11/16 23:15	1
Styrene	ND		0.40	0.059	ppb v/v			05/11/16 23:15	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			05/11/16 23:15	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			05/11/16 23:15	1
Toluene	ND		0.40	0.051	ppb v/v			05/11/16 23:15	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			05/11/16 23:15	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			05/11/16 23:15	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			05/11/16 23:15	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			05/11/16 23:15	1
Trichloroethene	ND		0.40	0.11	ppb v/v			05/11/16 23:15	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			05/11/16 23:15	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			05/11/16 23:15	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			05/11/16 23:15	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			05/11/16 23:15	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			05/11/16 23:15	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			05/11/16 23:15	1
o-Xylene	ND		0.40	0.054	ppb v/v			05/11/16 23:15	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		70 - 130		05/11/16 23:15	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099473-001/MWL-SV-FB4

Lab Sample ID: 320-18657-11

Date Collected: 04/27/16 10:14

Matrix: Air

Date Received: 05/04/16 09:30

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)	95		70 - 130		05/11/16 23:15	1
Toluene-d8 (Surr)	98		70 - 130		05/11/16 23:15	1

Client Sample ID: 099474-001/MWL-SV04-50

Lab Sample ID: 320-18657-12

Date Collected: 04/27/16 10:24

Matrix: Air

Date Received: 05/04/16 09:30

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	2.5	J	15	0.52	ppb v/v			05/12/16 00:02	2.9
Benzene	0.56	J	1.2	0.23	ppb v/v			05/12/16 00:02	2.9
Benzyl chloride	ND		2.3	0.47	ppb v/v			05/12/16 00:02	2.9
Bromodichloromethane	ND		0.87	0.19	ppb v/v			05/12/16 00:02	2.9
Bromoform	ND		1.2	0.20	ppb v/v			05/12/16 00:02	2.9
Bromomethane	ND		2.3	0.97	ppb v/v			05/12/16 00:02	2.9
2-Butanone (MEK)	0.59	J	2.3	0.58	ppb v/v			05/12/16 00:02	2.9
Carbon disulfide	ND		2.3	0.23	ppb v/v			05/12/16 00:02	2.9
Carbon tetrachloride	0.22	J	2.3	0.19	ppb v/v			05/12/16 00:02	2.9
Chlorobenzene	ND		0.87	0.19	ppb v/v			05/12/16 00:02	2.9
Chloroethane	ND		2.3	0.89	ppb v/v			05/12/16 00:02	2.9
Chloroform	2.0		0.87	0.28	ppb v/v			05/12/16 00:02	2.9
Chloromethane	ND		2.3	0.57	ppb v/v			05/12/16 00:02	2.9
Dibromochloromethane	ND		1.2	0.23	ppb v/v			05/12/16 00:02	2.9
1,2-Dibromoethane (EDB)	ND		2.3	0.22	ppb v/v			05/12/16 00:02	2.9
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.2	0.45	ppb v/v			05/12/16 00:02	2.9
1,2-Dichlorobenzene	ND		1.2	0.38	ppb v/v			05/12/16 00:02	2.9
1,3-Dichlorobenzene	ND		1.2	0.32	ppb v/v			05/12/16 00:02	2.9
1,4-Dichlorobenzene	ND		1.2	0.43	ppb v/v			05/12/16 00:02	2.9
Dichlorodifluoromethane	25		1.2	0.42	ppb v/v			05/12/16 00:02	2.9
1,1-Dichloroethane	1.7		0.87	0.21	ppb v/v			05/12/16 00:02	2.9
1,2-Dichloroethane	ND		2.3	0.26	ppb v/v			05/12/16 00:02	2.9
1,1-Dichloroethene	8.5		2.3	0.37	ppb v/v			05/12/16 00:02	2.9
cis-1,2-Dichloroethene	0.79	J	1.2	0.26	ppb v/v			05/12/16 00:02	2.9
trans-1,2-Dichloroethene	ND		1.2	0.29	ppb v/v			05/12/16 00:02	2.9
1,2-Dichloropropane	ND		1.2	0.70	ppb v/v			05/12/16 00:02	2.9
cis-1,3-Dichloropropene	ND		1.2	0.30	ppb v/v			05/12/16 00:02	2.9
trans-1,3-Dichloropropene	ND		1.2	0.26	ppb v/v			05/12/16 00:02	2.9
Ethylbenzene	ND		1.2	0.18	ppb v/v			05/12/16 00:02	2.9
4-Ethyltoluene	ND		1.2	0.54	ppb v/v			05/12/16 00:02	2.9
Hexachlorobutadiene	ND		5.8	1.3	ppb v/v			05/12/16 00:02	2.9
2-Hexanone	ND		1.2	0.25	ppb v/v			05/12/16 00:02	2.9
4-Methyl-2-pentanone (MIBK)	ND		1.2	0.39	ppb v/v			05/12/16 00:02	2.9
Methylene Chloride	0.55	J B	1.2	0.21	ppb v/v			05/12/16 00:02	2.9
Styrene	ND		1.2	0.17	ppb v/v			05/12/16 00:02	2.9
1,1,2,2-Tetrachloroethane	ND		1.2	0.20	ppb v/v			05/12/16 00:02	2.9
Tetrachloroethene	78		1.2	0.15	ppb v/v			05/12/16 00:02	2.9
Toluene	0.18	J	1.2	0.15	ppb v/v			05/12/16 00:02	2.9

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099474-001/MWL-SV04-50

Lab Sample ID: 320-18657-12

Date Collected: 04/27/16 10:24

Matrix: Air

Date Received: 05/04/16 09:30

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
1,1,2-Trichloro-1,2,2-trifluoroethane	75		1.2	0.47	ppb v/v			05/12/16 00:02	2.9
1,2,4-Trichlorobenzene	ND		5.8	1.3	ppb v/v			05/12/16 00:02	2.9
1,1,1-Trichloroethane	7.6		0.87	0.19	ppb v/v			05/12/16 00:02	2.9
1,1,2-Trichloroethane	ND		1.2	0.19	ppb v/v			05/12/16 00:02	2.9
Trichloroethene	70		1.2	0.30	ppb v/v			05/12/16 00:02	2.9
Trichlorofluoromethane	28		1.2	0.57	ppb v/v			05/12/16 00:02	2.9
1,2,4-Trimethylbenzene	ND		2.3	0.47	ppb v/v			05/12/16 00:02	2.9
1,3,5-Trimethylbenzene	ND		1.2	0.36	ppb v/v			05/12/16 00:02	2.9
Vinyl acetate	ND		2.3	0.42	ppb v/v			05/12/16 00:02	2.9
Vinyl chloride	ND		1.2	0.35	ppb v/v			05/12/16 00:02	2.9
m,p-Xylene	ND		2.3	0.29	ppb v/v			05/12/16 00:02	2.9
o-Xylene	ND		1.2	0.16	ppb v/v			05/12/16 00:02	2.9

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130		05/12/16 00:02	2.9
1,2-Dichloroethane-d4 (Surr)	98		70 - 130		05/12/16 00:02	2.9
Toluene-d8 (Surr)	99		70 - 130		05/12/16 00:02	2.9

Client Sample ID: 099475-001/MWL-SV04-100

Lab Sample ID: 320-18657-13

Date Collected: 04/27/16 10:28

Matrix: Air

Date Received: 05/04/16 09:30

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	2.0	J	29	1.0	ppb v/v			05/12/16 00:48	5.89
Benzene	ND		2.4	0.47	ppb v/v			05/12/16 00:48	5.89
Benzyl chloride	ND		4.7	0.96	ppb v/v			05/12/16 00:48	5.89
Bromodichloromethane	ND		1.8	0.39	ppb v/v			05/12/16 00:48	5.89
Bromoform	ND		2.4	0.41	ppb v/v			05/12/16 00:48	5.89
Bromomethane	ND		4.7	2.0	ppb v/v			05/12/16 00:48	5.89
2-Butanone (MEK)	ND		4.7	1.2	ppb v/v			05/12/16 00:48	5.89
Carbon disulfide	ND		4.7	0.46	ppb v/v			05/12/16 00:48	5.89
Carbon tetrachloride	ND		4.7	0.38	ppb v/v			05/12/16 00:48	5.89
Chlorobenzene	ND		1.8	0.38	ppb v/v			05/12/16 00:48	5.89
Chloroethane	ND		4.7	1.8	ppb v/v			05/12/16 00:48	5.89
Chloroform	2.3		1.8	0.56	ppb v/v			05/12/16 00:48	5.89
Chloromethane	ND		4.7	1.2	ppb v/v			05/12/16 00:48	5.89
Dibromochloromethane	ND		2.4	0.47	ppb v/v			05/12/16 00:48	5.89
1,2-Dibromoethane (EDB)	ND		4.7	0.44	ppb v/v			05/12/16 00:48	5.89
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.4	0.91	ppb v/v			05/12/16 00:48	5.89
1,2-Dichlorobenzene	ND		2.4	0.77	ppb v/v			05/12/16 00:48	5.89
1,3-Dichlorobenzene	ND		2.4	0.65	ppb v/v			05/12/16 00:48	5.89
1,4-Dichlorobenzene	ND		2.4	0.88	ppb v/v			05/12/16 00:48	5.89
Dichlorodifluoromethane	42		2.4	0.85	ppb v/v			05/12/16 00:48	5.89
1,1-Dichloroethane	3.6		1.8	0.42	ppb v/v			05/12/16 00:48	5.89
1,2-Dichloroethane	ND		4.7	0.52	ppb v/v			05/12/16 00:48	5.89
1,1-Dichloroethene	20		4.7	0.76	ppb v/v			05/12/16 00:48	5.89

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099475-001/MWL-SV04-100

Lab Sample ID: 320-18657-13

Date Collected: 04/27/16 10:28

Matrix: Air

Date Received: 05/04/16 09:30

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	2.2	J	2.4	0.52	ppb v/v			05/12/16 00:48	5.89
trans-1,2-Dichloroethene	ND		2.4	0.59	ppb v/v			05/12/16 00:48	5.89
1,2-Dichloropropane	ND		2.4	1.4	ppb v/v			05/12/16 00:48	5.89
cis-1,3-Dichloropropene	ND		2.4	0.61	ppb v/v			05/12/16 00:48	5.89
trans-1,3-Dichloropropene	ND		2.4	0.52	ppb v/v			05/12/16 00:48	5.89
Ethylbenzene	ND		2.4	0.37	ppb v/v			05/12/16 00:48	5.89
4-Ethyltoluene	ND		2.4	1.1	ppb v/v			05/12/16 00:48	5.89
Hexachlorobutadiene	ND		12	2.5	ppb v/v			05/12/16 00:48	5.89
2-Hexanone	ND		2.4	0.51	ppb v/v			05/12/16 00:48	5.89
4-Methyl-2-pentanone (MIBK)	ND		2.4	0.80	ppb v/v			05/12/16 00:48	5.89
Methylene Chloride	1.3	J B	2.4	0.42	ppb v/v			05/12/16 00:48	5.89
Styrene	ND		2.4	0.35	ppb v/v			05/12/16 00:48	5.89
1,1,2,2-Tetrachloroethane	ND		2.4	0.41	ppb v/v			05/12/16 00:48	5.89
Tetrachloroethene	130		2.4	0.30	ppb v/v			05/12/16 00:48	5.89
Toluene	ND		2.4	0.30	ppb v/v			05/12/16 00:48	5.89
1,1,2-Trichloro-1,2,2-trifluoroethane	120		2.4	0.96	ppb v/v			05/12/16 00:48	5.89
1,2,4-Trichlorobenzene	ND		12	2.6	ppb v/v			05/12/16 00:48	5.89
1,1,1-Trichloroethane	6.2		1.8	0.38	ppb v/v			05/12/16 00:48	5.89
1,1,2-Trichloroethane	ND		2.4	0.39	ppb v/v			05/12/16 00:48	5.89
Trichloroethene	140		2.4	0.62	ppb v/v			05/12/16 00:48	5.89
Trichlorofluoromethane	41		2.4	1.2	ppb v/v			05/12/16 00:48	5.89
1,2,4-Trimethylbenzene	ND		4.7	0.95	ppb v/v			05/12/16 00:48	5.89
1,3,5-Trimethylbenzene	ND		2.4	0.74	ppb v/v			05/12/16 00:48	5.89
Vinyl acetate	ND		4.7	0.85	ppb v/v			05/12/16 00:48	5.89
Vinyl chloride	ND		2.4	0.71	ppb v/v			05/12/16 00:48	5.89
m,p-Xylene	ND		4.7	0.59	ppb v/v			05/12/16 00:48	5.89
o-Xylene	ND		2.4	0.32	ppb v/v			05/12/16 00:48	5.89
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130					05/12/16 00:48	5.89
1,2-Dichloroethane-d4 (Surr)	97		70 - 130					05/12/16 00:48	5.89
Toluene-d8 (Surr)	98		70 - 130					05/12/16 00:48	5.89

Client Sample ID: 099476-001/MWL-SV04-200

Lab Sample ID: 320-18657-14

Date Collected: 04/27/16 10:37

Matrix: Air

Date Received: 05/04/16 09:30

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	5.2	J	41	1.5	ppb v/v			05/12/16 01:33	8.21
Benzene	ND		3.3	0.65	ppb v/v			05/12/16 01:33	8.21
Benzyl chloride	ND		6.6	1.3	ppb v/v			05/12/16 01:33	8.21
Bromodichloromethane	ND		2.5	0.54	ppb v/v			05/12/16 01:33	8.21
Bromoform	ND		3.3	0.57	ppb v/v			05/12/16 01:33	8.21
Bromomethane	ND		6.6	2.8	ppb v/v			05/12/16 01:33	8.21
2-Butanone (MEK)	ND		6.6	1.6	ppb v/v			05/12/16 01:33	8.21
Carbon disulfide	ND		6.6	0.64	ppb v/v			05/12/16 01:33	8.21

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099476-001/MWL-SV04-200

Lab Sample ID: 320-18657-14

Date Collected: 04/27/16 10:37

Matrix: Air

Date Received: 05/04/16 09:30

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		6.6	0.53	ppb v/v			05/12/16 01:33	8.21
Chlorobenzene	ND		2.5	0.53	ppb v/v			05/12/16 01:33	8.21
Chloroethane	ND		6.6	2.5	ppb v/v			05/12/16 01:33	8.21
Chloroform	1.4	J	2.5	0.78	ppb v/v			05/12/16 01:33	8.21
Chloromethane	ND		6.6	1.6	ppb v/v			05/12/16 01:33	8.21
Dibromochloromethane	ND		3.3	0.65	ppb v/v			05/12/16 01:33	8.21
1,2-Dibromoethane (EDB)	ND		6.6	0.62	ppb v/v			05/12/16 01:33	8.21
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.3	1.3	ppb v/v			05/12/16 01:33	8.21
1,2-Dichlorobenzene	ND		3.3	1.1	ppb v/v			05/12/16 01:33	8.21
1,3-Dichlorobenzene	ND		3.3	0.90	ppb v/v			05/12/16 01:33	8.21
1,4-Dichlorobenzene	ND		3.3	1.2	ppb v/v			05/12/16 01:33	8.21
Dichlorodifluoromethane	56		3.3	1.2	ppb v/v			05/12/16 01:33	8.21
1,1-Dichloroethane	5.3		2.5	0.59	ppb v/v			05/12/16 01:33	8.21
1,2-Dichloroethane	ND		6.6	0.72	ppb v/v			05/12/16 01:33	8.21
1,1-Dichloroethene	35		6.6	1.1	ppb v/v			05/12/16 01:33	8.21
cis-1,2-Dichloroethene	3.3		3.3	0.73	ppb v/v			05/12/16 01:33	8.21
trans-1,2-Dichloroethene	ND		3.3	0.82	ppb v/v			05/12/16 01:33	8.21
1,2-Dichloropropane	ND		3.3	2.0	ppb v/v			05/12/16 01:33	8.21
cis-1,3-Dichloropropene	ND		3.3	0.85	ppb v/v			05/12/16 01:33	8.21
trans-1,3-Dichloropropene	ND		3.3	0.72	ppb v/v			05/12/16 01:33	8.21
Ethylbenzene	ND		3.3	0.52	ppb v/v			05/12/16 01:33	8.21
4-Ethyltoluene	ND		3.3	1.5	ppb v/v			05/12/16 01:33	8.21
Hexachlorobutadiene	ND		16	3.5	ppb v/v			05/12/16 01:33	8.21
2-Hexanone	ND		3.3	0.71	ppb v/v			05/12/16 01:33	8.21
4-Methyl-2-pentanone (MIBK)	ND		3.3	1.1	ppb v/v			05/12/16 01:33	8.21
Methylene Chloride	2.3	J B	3.3	0.59	ppb v/v			05/12/16 01:33	8.21
Styrene	ND		3.3	0.48	ppb v/v			05/12/16 01:33	8.21
1,1,2,2-Tetrachloroethane	ND		3.3	0.57	ppb v/v			05/12/16 01:33	8.21
Tetrachloroethene	180		3.3	0.42	ppb v/v			05/12/16 01:33	8.21
Toluene	ND		3.3	0.42	ppb v/v			05/12/16 01:33	8.21
1,1,2-Trichloro-1,2,2-trifluoroethane	170		3.3	1.3	ppb v/v			05/12/16 01:33	8.21
1,2,4-Trichlorobenzene	ND		16	3.6	ppb v/v			05/12/16 01:33	8.21
1,1,1-Trichloroethane	2.1	J	2.5	0.53	ppb v/v			05/12/16 01:33	8.21
1,1,2-Trichloroethane	ND		3.3	0.55	ppb v/v			05/12/16 01:33	8.21
Trichloroethene	210		3.3	0.86	ppb v/v			05/12/16 01:33	8.21
Trichlorofluoromethane	36		3.3	1.6	ppb v/v			05/12/16 01:33	8.21
1,2,4-Trimethylbenzene	ND		6.6	1.3	ppb v/v			05/12/16 01:33	8.21
1,3,5-Trimethylbenzene	ND		3.3	1.0	ppb v/v			05/12/16 01:33	8.21
Vinyl acetate	ND		6.6	1.2	ppb v/v			05/12/16 01:33	8.21
Vinyl chloride	ND		3.3	0.99	ppb v/v			05/12/16 01:33	8.21
m,p-Xylene	ND		6.6	0.82	ppb v/v			05/12/16 01:33	8.21
o-Xylene	ND		3.3	0.44	ppb v/v			05/12/16 01:33	8.21

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130		05/12/16 01:33	8.21
1,2-Dichloroethane-d4 (Surr)	96		70 - 130		05/12/16 01:33	8.21
Toluene-d8 (Surr)	100		70 - 130		05/12/16 01:33	8.21

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099477-001/MWL-SV04-200

Lab Sample ID: 320-18657-15

Date Collected: 04/27/16 10:37

Matrix: Air

Date Received: 05/04/16 09:30

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	2.3	J	44	1.6	ppb v/v			05/12/16 02:18	8.79
Benzene	ND		3.5	0.69	ppb v/v			05/12/16 02:18	8.79
Benzyl chloride	ND		7.0	1.4	ppb v/v			05/12/16 02:18	8.79
Bromodichloromethane	ND		2.6	0.58	ppb v/v			05/12/16 02:18	8.79
Bromoform	ND		3.5	0.62	ppb v/v			05/12/16 02:18	8.79
Bromomethane	ND		7.0	2.9	ppb v/v			05/12/16 02:18	8.79
2-Butanone (MEK)	ND		7.0	1.7	ppb v/v			05/12/16 02:18	8.79
Carbon disulfide	ND		7.0	0.69	ppb v/v			05/12/16 02:18	8.79
Carbon tetrachloride	ND		7.0	0.56	ppb v/v			05/12/16 02:18	8.79
Chlorobenzene	ND		2.6	0.56	ppb v/v			05/12/16 02:18	8.79
Chloroethane	ND		7.0	2.7	ppb v/v			05/12/16 02:18	8.79
Chloroform	1.4	J	2.6	0.84	ppb v/v			05/12/16 02:18	8.79
Chloromethane	ND		7.0	1.7	ppb v/v			05/12/16 02:18	8.79
Dibromochloromethane	ND		3.5	0.69	ppb v/v			05/12/16 02:18	8.79
1,2-Dibromoethane (EDB)	ND		7.0	0.66	ppb v/v			05/12/16 02:18	8.79
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.5	1.4	ppb v/v			05/12/16 02:18	8.79
1,2-Dichlorobenzene	ND		3.5	1.1	ppb v/v			05/12/16 02:18	8.79
1,3-Dichlorobenzene	ND		3.5	0.97	ppb v/v			05/12/16 02:18	8.79
1,4-Dichlorobenzene	ND		3.5	1.3	ppb v/v			05/12/16 02:18	8.79
Dichlorodifluoromethane	58		3.5	1.3	ppb v/v			05/12/16 02:18	8.79
1,1-Dichloroethane	5.5		2.6	0.63	ppb v/v			05/12/16 02:18	8.79
1,2-Dichloroethane	ND		7.0	0.77	ppb v/v			05/12/16 02:18	8.79
1,1-Dichloroethene	35		7.0	1.1	ppb v/v			05/12/16 02:18	8.79
cis-1,2-Dichloroethene	3.4	J	3.5	0.78	ppb v/v			05/12/16 02:18	8.79
trans-1,2-Dichloroethene	ND		3.5	0.88	ppb v/v			05/12/16 02:18	8.79
1,2-Dichloropropane	ND		3.5	2.1	ppb v/v			05/12/16 02:18	8.79
cis-1,3-Dichloropropene	ND		3.5	0.91	ppb v/v			05/12/16 02:18	8.79
trans-1,3-Dichloropropene	ND		3.5	0.77	ppb v/v			05/12/16 02:18	8.79
Ethylbenzene	ND		3.5	0.55	ppb v/v			05/12/16 02:18	8.79
4-Ethyltoluene	ND		3.5	1.6	ppb v/v			05/12/16 02:18	8.79
Hexachlorobutadiene	ND		18	3.8	ppb v/v			05/12/16 02:18	8.79
2-Hexanone	ND		3.5	0.76	ppb v/v			05/12/16 02:18	8.79
4-Methyl-2-pentanone (MIBK)	ND		3.5	1.2	ppb v/v			05/12/16 02:18	8.79
Methylene Chloride	2.7	J B	3.5	0.63	ppb v/v			05/12/16 02:18	8.79
Styrene	ND		3.5	0.52	ppb v/v			05/12/16 02:18	8.79
1,1,2,2-Tetrachloroethane	ND		3.5	0.61	ppb v/v			05/12/16 02:18	8.79
Tetrachloroethene	180		3.5	0.45	ppb v/v			05/12/16 02:18	8.79
Toluene	0.49	J	3.5	0.45	ppb v/v			05/12/16 02:18	8.79
1,1,2-Trichloro-1,2,2-trifluoroethane	180		3.5	1.4	ppb v/v			05/12/16 02:18	8.79
1,2,4-Trichlorobenzene	ND		18	3.8	ppb v/v			05/12/16 02:18	8.79
1,1,1-Trichloroethane	2.1	J	2.6	0.57	ppb v/v			05/12/16 02:18	8.79
1,1,2-Trichloroethane	ND		3.5	0.59	ppb v/v			05/12/16 02:18	8.79
Trichloroethene	220		3.5	0.92	ppb v/v			05/12/16 02:18	8.79
Trichlorofluoromethane	36		3.5	1.7	ppb v/v			05/12/16 02:18	8.79
1,2,4-Trimethylbenzene	ND		7.0	1.4	ppb v/v			05/12/16 02:18	8.79
1,3,5-Trimethylbenzene	ND		3.5	1.1	ppb v/v			05/12/16 02:18	8.79
Vinyl acetate	ND		7.0	1.3	ppb v/v			05/12/16 02:18	8.79
Vinyl chloride	ND		3.5	1.1	ppb v/v			05/12/16 02:18	8.79

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099477-001/MWL-SV04-200

Lab Sample ID: 320-18657-15

Date Collected: 04/27/16 10:37

Matrix: Air

Date Received: 05/04/16 09:30

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		7.0	0.88	ppb v/v			05/12/16 02:18	8.79
o-Xylene	ND		3.5	0.47	ppb v/v			05/12/16 02:18	8.79

Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130					05/12/16 02:18	8.79
1,2-Dichloroethane-d4 (Surr)	96		70 - 130					05/12/16 02:18	8.79
Toluene-d8 (Surr)	99		70 - 130					05/12/16 02:18	8.79

Client Sample ID: 099478-001/MWL-SV04-300

Lab Sample ID: 320-18657-16

Date Collected: 04/27/16 10:42

Matrix: Air

Date Received: 05/04/16 09:30

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	6.2	J	22	0.79	ppb v/v			05/11/16 16:25	4.44
Benzene	0.39	J	1.8	0.35	ppb v/v			05/11/16 16:25	4.44
Benzyl chloride	ND		3.6	0.72	ppb v/v			05/11/16 16:25	4.44
Bromodichloromethane	ND		1.3	0.29	ppb v/v			05/11/16 16:25	4.44
Bromoform	ND		1.8	0.31	ppb v/v			05/11/16 16:25	4.44
Bromomethane	ND		3.6	1.5	ppb v/v			05/11/16 16:25	4.44
2-Butanone (MEK)	ND		3.6	0.88	ppb v/v			05/11/16 16:25	4.44
Carbon disulfide	ND		3.6	0.35	ppb v/v			05/11/16 16:25	4.44
Carbon tetrachloride	ND		3.6	0.28	ppb v/v			05/11/16 16:25	4.44
Chlorobenzene	ND		1.3	0.28	ppb v/v			05/11/16 16:25	4.44
Chloroethane	ND		3.6	1.4	ppb v/v			05/11/16 16:25	4.44
Chloroform	ND		1.3	0.42	ppb v/v			05/11/16 16:25	4.44
Chloromethane	ND		3.6	0.87	ppb v/v			05/11/16 16:25	4.44
Dibromochloromethane	ND		1.8	0.35	ppb v/v			05/11/16 16:25	4.44
1,2-Dibromoethane (EDB)	ND		3.6	0.33	ppb v/v			05/11/16 16:25	4.44
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.8	0.69	ppb v/v			05/11/16 16:25	4.44
1,2-Dichlorobenzene	ND		1.8	0.58	ppb v/v			05/11/16 16:25	4.44
1,3-Dichlorobenzene	ND		1.8	0.49	ppb v/v			05/11/16 16:25	4.44
1,4-Dichlorobenzene	ND		1.8	0.66	ppb v/v			05/11/16 16:25	4.44
Dichlorodifluoromethane	20		1.8	0.64	ppb v/v			05/11/16 16:25	4.44
1,1-Dichloroethane	1.4		1.3	0.32	ppb v/v			05/11/16 16:25	4.44
1,2-Dichloroethane	ND		3.6	0.39	ppb v/v			05/11/16 16:25	4.44
1,1-Dichloroethene	12		3.6	0.57	ppb v/v			05/11/16 16:25	4.44
cis-1,2-Dichloroethene	0.85	J	1.8	0.40	ppb v/v			05/11/16 16:25	4.44
trans-1,2-Dichloroethene	ND		1.8	0.44	ppb v/v			05/11/16 16:25	4.44
1,2-Dichloropropane	ND		1.8	1.1	ppb v/v			05/11/16 16:25	4.44
cis-1,3-Dichloropropene	ND		1.8	0.46	ppb v/v			05/11/16 16:25	4.44
trans-1,3-Dichloropropene	ND		1.8	0.39	ppb v/v			05/11/16 16:25	4.44
Ethylbenzene	ND		1.8	0.28	ppb v/v			05/11/16 16:25	4.44
4-Ethyltoluene	ND		1.8	0.83	ppb v/v			05/11/16 16:25	4.44
Hexachlorobutadiene	ND		8.9	1.9	ppb v/v			05/11/16 16:25	4.44
2-Hexanone	ND		1.8	0.39	ppb v/v			05/11/16 16:25	4.44
4-Methyl-2-pentanone (MIBK)	ND		1.8	0.60	ppb v/v			05/11/16 16:25	4.44
Methylene Chloride	1.4	J B	1.8	0.32	ppb v/v			05/11/16 16:25	4.44

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099478-001/MWL-SV04-300

Lab Sample ID: 320-18657-16

Date Collected: 04/27/16 10:42

Matrix: Air

Date Received: 05/04/16 09:30

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		1.8	0.26	ppb v/v			05/11/16 16:25	4.44
1,1,2,2-Tetrachloroethane	ND		1.8	0.31	ppb v/v			05/11/16 16:25	4.44
Tetrachloroethene	130		1.8	0.23	ppb v/v			05/11/16 16:25	4.44
Toluene	0.37 J		1.8	0.23	ppb v/v			05/11/16 16:25	4.44
1,1,2-Trichloro-1,2,2-trifluoroethane	63		1.8	0.72	ppb v/v			05/11/16 16:25	4.44
1,2,4-Trichlorobenzene	ND		8.9	1.9	ppb v/v			05/11/16 16:25	4.44
1,1,1-Trichloroethane	1.1 J		1.3	0.29	ppb v/v			05/11/16 16:25	4.44
1,1,2-Trichloroethane	ND		1.8	0.30	ppb v/v			05/11/16 16:25	4.44
Trichloroethene	81		1.8	0.47	ppb v/v			05/11/16 16:25	4.44
Trichlorofluoromethane	12		1.8	0.87	ppb v/v			05/11/16 16:25	4.44
1,2,4-Trimethylbenzene	ND		3.6	0.72	ppb v/v			05/11/16 16:25	4.44
1,3,5-Trimethylbenzene	ND		1.8	0.56	ppb v/v			05/11/16 16:25	4.44
Vinyl acetate	ND		3.6	0.64	ppb v/v			05/11/16 16:25	4.44
Vinyl chloride	ND		1.8	0.53	ppb v/v			05/11/16 16:25	4.44
m,p-Xylene	ND		3.6	0.44	ppb v/v			05/11/16 16:25	4.44
o-Xylene	ND		1.8	0.24	ppb v/v			05/11/16 16:25	4.44
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130					05/11/16 16:25	4.44
1,2-Dichloroethane-d4 (Surr)	84		70 - 130					05/11/16 16:25	4.44
Toluene-d8 (Surr)	83		70 - 130					05/11/16 16:25	4.44

Client Sample ID: 099479-001/MWL-SV04-400

Lab Sample ID: 320-18657-17

Date Collected: 04/27/16 10:54

Matrix: Air

Date Received: 05/04/16 09:30

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	18 J		29	1.0	ppb v/v			05/11/16 17:15	5.89
Benzene	3.2		2.4	0.47	ppb v/v			05/11/16 17:15	5.89
Benzyl chloride	ND		4.7	0.96	ppb v/v			05/11/16 17:15	5.89
Bromodichloromethane	ND		1.8	0.39	ppb v/v			05/11/16 17:15	5.89
Bromoform	ND		2.4	0.41	ppb v/v			05/11/16 17:15	5.89
Bromomethane	ND		4.7	2.0	ppb v/v			05/11/16 17:15	5.89
2-Butanone (MEK)	3.2 J		4.7	1.2	ppb v/v			05/11/16 17:15	5.89
Carbon disulfide	4.0 J		4.7	0.46	ppb v/v			05/11/16 17:15	5.89
Carbon tetrachloride	ND		4.7	0.38	ppb v/v			05/11/16 17:15	5.89
Chlorobenzene	ND		1.8	0.38	ppb v/v			05/11/16 17:15	5.89
Chloroethane	ND		4.7	1.8	ppb v/v			05/11/16 17:15	5.89
Chloroform	ND		1.8	0.56	ppb v/v			05/11/16 17:15	5.89
Chloromethane	1.8 J		4.7	1.2	ppb v/v			05/11/16 17:15	5.89
Dibromochloromethane	ND		2.4	0.47	ppb v/v			05/11/16 17:15	5.89
1,2-Dibromoethane (EDB)	ND		4.7	0.44	ppb v/v			05/11/16 17:15	5.89
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.4	0.91	ppb v/v			05/11/16 17:15	5.89
1,2-Dichlorobenzene	ND		2.4	0.77	ppb v/v			05/11/16 17:15	5.89
1,3-Dichlorobenzene	ND		2.4	0.65	ppb v/v			05/11/16 17:15	5.89
1,4-Dichlorobenzene	ND		2.4	0.88	ppb v/v			05/11/16 17:15	5.89

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099479-001/MWL-SV04-400

Lab Sample ID: 320-18657-17

Date Collected: 04/27/16 10:54

Matrix: Air

Date Received: 05/04/16 09:30

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	19		2.4	0.85	ppb v/v			05/11/16 17:15	5.89
1,1-Dichloroethane	0.81	J	1.8	0.42	ppb v/v			05/11/16 17:15	5.89
1,2-Dichloroethane	ND		4.7	0.52	ppb v/v			05/11/16 17:15	5.89
1,1-Dichloroethene	8.6		4.7	0.76	ppb v/v			05/11/16 17:15	5.89
cis-1,2-Dichloroethene	0.53	J	2.4	0.52	ppb v/v			05/11/16 17:15	5.89
trans-1,2-Dichloroethene	ND		2.4	0.59	ppb v/v			05/11/16 17:15	5.89
1,2-Dichloropropane	ND		2.4	1.4	ppb v/v			05/11/16 17:15	5.89
cis-1,3-Dichloropropene	ND		2.4	0.61	ppb v/v			05/11/16 17:15	5.89
trans-1,3-Dichloropropene	ND		2.4	0.52	ppb v/v			05/11/16 17:15	5.89
Ethylbenzene	ND		2.4	0.37	ppb v/v			05/11/16 17:15	5.89
4-Ethyltoluene	ND		2.4	1.1	ppb v/v			05/11/16 17:15	5.89
Hexachlorobutadiene	ND		12	2.5	ppb v/v			05/11/16 17:15	5.89
2-Hexanone	ND		2.4	0.51	ppb v/v			05/11/16 17:15	5.89
4-Methyl-2-pentanone (MIBK)	ND		2.4	0.80	ppb v/v			05/11/16 17:15	5.89
Methylene Chloride	1.6	J B	2.4	0.42	ppb v/v			05/11/16 17:15	5.89
Styrene	ND		2.4	0.35	ppb v/v			05/11/16 17:15	5.89
1,1,2,2-Tetrachloroethane	ND		2.4	0.41	ppb v/v			05/11/16 17:15	5.89
Tetrachloroethene	150		2.4	0.30	ppb v/v			05/11/16 17:15	5.89
Toluene	0.48	J	2.4	0.30	ppb v/v			05/11/16 17:15	5.89
1,1,2-Trichloro-1,2,2-trifluoroethane	62		2.4	0.96	ppb v/v			05/11/16 17:15	5.89
1,2,4-Trichlorobenzene	ND		12	2.6	ppb v/v			05/11/16 17:15	5.89
1,1,1-Trichloroethane	0.56	J	1.8	0.38	ppb v/v			05/11/16 17:15	5.89
1,1,2-Trichloroethane	ND		2.4	0.39	ppb v/v			05/11/16 17:15	5.89
Trichloroethene	70		2.4	0.62	ppb v/v			05/11/16 17:15	5.89
Trichlorofluoromethane	9.3		2.4	1.2	ppb v/v			05/11/16 17:15	5.89
1,2,4-Trimethylbenzene	ND		4.7	0.95	ppb v/v			05/11/16 17:15	5.89
1,3,5-Trimethylbenzene	ND		2.4	0.74	ppb v/v			05/11/16 17:15	5.89
Vinyl acetate	ND		4.7	0.85	ppb v/v			05/11/16 17:15	5.89
Vinyl chloride	ND		2.4	0.71	ppb v/v			05/11/16 17:15	5.89
m,p-Xylene	ND		4.7	0.59	ppb v/v			05/11/16 17:15	5.89
o-Xylene	ND		2.4	0.32	ppb v/v			05/11/16 17:15	5.89

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	110		70 - 130		05/11/16 17:15	5.89
1,2-Dichloroethane-d4 (Surr)	79		70 - 130		05/11/16 17:15	5.89
Toluene-d8 (Surr)	71		70 - 130		05/11/16 17:15	5.89

Client Sample ID: 099480-001/MWL-SV04-400

Lab Sample ID: 320-18657-18

Date Collected: 04/27/16 10:54

Matrix: Air

Date Received: 05/04/16 09:30

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	6.4	J	24	0.84	ppb v/v			05/11/16 18:05	4.71
Benzene	0.67	J	1.9	0.37	ppb v/v			05/11/16 18:05	4.71
Benzyl chloride	ND		3.8	0.77	ppb v/v			05/11/16 18:05	4.71
Bromodichloromethane	ND		1.4	0.31	ppb v/v			05/11/16 18:05	4.71

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099480-001/MWL-SV04-400

Lab Sample ID: 320-18657-18

Date Collected: 04/27/16 10:54

Matrix: Air

Date Received: 05/04/16 09:30

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		1.9	0.33	ppb v/v			05/11/16 18:05	4.71
Bromomethane	ND		3.8	1.6	ppb v/v			05/11/16 18:05	4.71
2-Butanone (MEK)	ND		3.8	0.94	ppb v/v			05/11/16 18:05	4.71
Carbon disulfide	0.83	J	3.8	0.37	ppb v/v			05/11/16 18:05	4.71
Carbon tetrachloride	ND		3.8	0.30	ppb v/v			05/11/16 18:05	4.71
Chlorobenzene	ND		1.4	0.30	ppb v/v			05/11/16 18:05	4.71
Chloroethane	ND		3.8	1.5	ppb v/v			05/11/16 18:05	4.71
Chloroform	ND		1.4	0.45	ppb v/v			05/11/16 18:05	4.71
Chloromethane	ND		3.8	0.93	ppb v/v			05/11/16 18:05	4.71
Dibromochloromethane	ND		1.9	0.37	ppb v/v			05/11/16 18:05	4.71
1,2-Dibromoethane (EDB)	ND		3.8	0.35	ppb v/v			05/11/16 18:05	4.71
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.9	0.73	ppb v/v			05/11/16 18:05	4.71
1,2-Dichlorobenzene	ND		1.9	0.61	ppb v/v			05/11/16 18:05	4.71
1,3-Dichlorobenzene	ND		1.9	0.52	ppb v/v			05/11/16 18:05	4.71
1,4-Dichlorobenzene	ND		1.9	0.70	ppb v/v			05/11/16 18:05	4.71
Dichlorodifluoromethane	17		1.9	0.68	ppb v/v			05/11/16 18:05	4.71
1,1-Dichloroethane	0.80	J	1.4	0.34	ppb v/v			05/11/16 18:05	4.71
1,2-Dichloroethane	ND		3.8	0.41	ppb v/v			05/11/16 18:05	4.71
1,1-Dichloroethene	7.9		3.8	0.61	ppb v/v			05/11/16 18:05	4.71
cis-1,2-Dichloroethene	0.52	J	1.9	0.42	ppb v/v			05/11/16 18:05	4.71
trans-1,2-Dichloroethene	ND		1.9	0.47	ppb v/v			05/11/16 18:05	4.71
1,2-Dichloropropane	ND		1.9	1.1	ppb v/v			05/11/16 18:05	4.71
cis-1,3-Dichloropropene	ND		1.9	0.49	ppb v/v			05/11/16 18:05	4.71
trans-1,3-Dichloropropene	ND		1.9	0.41	ppb v/v			05/11/16 18:05	4.71
Ethylbenzene	ND		1.9	0.30	ppb v/v			05/11/16 18:05	4.71
4-Ethyltoluene	ND		1.9	0.88	ppb v/v			05/11/16 18:05	4.71
Hexachlorobutadiene	ND		9.4	2.0	ppb v/v			05/11/16 18:05	4.71
2-Hexanone	ND		1.9	0.41	ppb v/v			05/11/16 18:05	4.71
4-Methyl-2-pentanone (MIBK)	ND		1.9	0.64	ppb v/v			05/11/16 18:05	4.71
Methylene Chloride	1.3	J B	1.9	0.34	ppb v/v			05/11/16 18:05	4.71
Styrene	ND		1.9	0.28	ppb v/v			05/11/16 18:05	4.71
1,1,2,2-Tetrachloroethane	ND		1.9	0.32	ppb v/v			05/11/16 18:05	4.71
Tetrachloroethene	110		1.9	0.24	ppb v/v			05/11/16 18:05	4.71
Toluene	ND		1.9	0.24	ppb v/v			05/11/16 18:05	4.71
1,1,2-Trichloro-1,2,2-trifluoroethane	56		1.9	0.77	ppb v/v			05/11/16 18:05	4.71
1,2,4-Trichlorobenzene	ND		9.4	2.0	ppb v/v			05/11/16 18:05	4.71
1,1,1-Trichloroethane	0.54	J	1.4	0.31	ppb v/v			05/11/16 18:05	4.71
1,1,2-Trichloroethane	ND		1.9	0.32	ppb v/v			05/11/16 18:05	4.71
Trichloroethene	58		1.9	0.49	ppb v/v			05/11/16 18:05	4.71
Trichlorofluoromethane	8.5		1.9	0.92	ppb v/v			05/11/16 18:05	4.71
1,2,4-Trimethylbenzene	ND		3.8	0.76	ppb v/v			05/11/16 18:05	4.71
1,3,5-Trimethylbenzene	ND		1.9	0.59	ppb v/v			05/11/16 18:05	4.71
Vinyl acetate	ND		3.8	0.68	ppb v/v			05/11/16 18:05	4.71
Vinyl chloride	ND		1.9	0.57	ppb v/v			05/11/16 18:05	4.71
m,p-Xylene	ND		3.8	0.47	ppb v/v			05/11/16 18:05	4.71
o-Xylene	ND		1.9	0.25	ppb v/v			05/11/16 18:05	4.71

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099480-001/MWL-SV04-400

Lab Sample ID: 320-18657-18

Date Collected: 04/27/16 10:54

Matrix: Air

Date Received: 05/04/16 09:30

Sample Container: Summa Canister 6L

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130		05/11/16 18:05	4.71
1,2-Dichloroethane-d4 (Surr)	85		70 - 130		05/11/16 18:05	4.71
Toluene-d8 (Surr)	84		70 - 130		05/11/16 18:05	4.71

Client Sample ID: 099481-001/MWL-SV-FB5

Lab Sample ID: 320-18657-19

Date Collected: 04/27/16 11:17

Matrix: Air

Date Received: 05/04/16 09:30

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			05/11/16 19:01	1
Benzene	ND		0.40	0.079	ppb v/v			05/11/16 19:01	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			05/11/16 19:01	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			05/11/16 19:01	1
Bromoform	ND		0.40	0.070	ppb v/v			05/11/16 19:01	1
Bromomethane	ND		0.80	0.34	ppb v/v			05/11/16 19:01	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			05/11/16 19:01	1
Carbon disulfide	0.18	J	0.80	0.078	ppb v/v			05/11/16 19:01	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			05/11/16 19:01	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			05/11/16 19:01	1
Chloroethane	ND		0.80	0.31	ppb v/v			05/11/16 19:01	1
Chloroform	ND		0.30	0.095	ppb v/v			05/11/16 19:01	1
Chloromethane	ND		0.80	0.20	ppb v/v			05/11/16 19:01	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			05/11/16 19:01	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			05/11/16 19:01	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			05/11/16 19:01	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			05/11/16 19:01	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			05/11/16 19:01	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			05/11/16 19:01	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			05/11/16 19:01	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			05/11/16 19:01	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			05/11/16 19:01	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			05/11/16 19:01	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			05/11/16 19:01	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			05/11/16 19:01	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			05/11/16 19:01	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			05/11/16 19:01	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			05/11/16 19:01	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			05/11/16 19:01	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			05/11/16 19:01	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			05/11/16 19:01	1
2-Hexanone	ND		0.40	0.087	ppb v/v			05/11/16 19:01	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			05/11/16 19:01	1
Methylene Chloride	0.24	J B	0.40	0.072	ppb v/v			05/11/16 19:01	1
Styrene	ND		0.40	0.059	ppb v/v			05/11/16 19:01	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			05/11/16 19:01	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			05/11/16 19:01	1
Toluene	ND		0.40	0.051	ppb v/v			05/11/16 19:01	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099481-001/MWL-SV-FB5

Lab Sample ID: 320-18657-19

Date Collected: 04/27/16 11:17

Matrix: Air

Date Received: 05/04/16 09:30

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
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			05/11/16 19:01	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			05/11/16 19:01	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			05/11/16 19:01	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			05/11/16 19:01	1
Trichloroethene	ND		0.40	0.11	ppb v/v			05/11/16 19:01	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			05/11/16 19:01	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			05/11/16 19:01	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			05/11/16 19:01	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			05/11/16 19:01	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			05/11/16 19:01	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			05/11/16 19:01	1
o-Xylene	ND		0.40	0.054	ppb v/v			05/11/16 19:01	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		70 - 130					05/11/16 19:01	1
1,2-Dichloroethane-d4 (Surr)	82		70 - 130					05/11/16 19:01	1
Toluene-d8 (Surr)	86		70 - 130					05/11/16 19:01	1

Client Sample ID: 099482-001/MWL-SV05-50

Lab Sample ID: 320-18657-20

Date Collected: 04/27/16 11:22

Matrix: Air

Date Received: 05/04/16 09:30

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	11	0.40	ppb v/v			05/11/16 19:53	2.26
Benzene	0.23	J	0.90	0.18	ppb v/v			05/11/16 19:53	2.26
Benzyl chloride	ND		1.8	0.37	ppb v/v			05/11/16 19:53	2.26
Bromodichloromethane	ND		0.68	0.15	ppb v/v			05/11/16 19:53	2.26
Bromoform	ND		0.90	0.16	ppb v/v			05/11/16 19:53	2.26
Bromomethane	ND		1.8	0.76	ppb v/v			05/11/16 19:53	2.26
2-Butanone (MEK)	ND		1.8	0.45	ppb v/v			05/11/16 19:53	2.26
Carbon disulfide	ND		1.8	0.18	ppb v/v			05/11/16 19:53	2.26
Carbon tetrachloride	ND		1.8	0.14	ppb v/v			05/11/16 19:53	2.26
Chlorobenzene	ND		0.68	0.14	ppb v/v			05/11/16 19:53	2.26
Chloroethane	ND		1.8	0.70	ppb v/v			05/11/16 19:53	2.26
Chloroform	1.6		0.68	0.21	ppb v/v			05/11/16 19:53	2.26
Chloromethane	ND		1.8	0.45	ppb v/v			05/11/16 19:53	2.26
Dibromochloromethane	ND		0.90	0.18	ppb v/v			05/11/16 19:53	2.26
1,2-Dibromoethane (EDB)	ND		1.8	0.17	ppb v/v			05/11/16 19:53	2.26
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.90	0.35	ppb v/v			05/11/16 19:53	2.26
1,2-Dichlorobenzene	ND		0.90	0.29	ppb v/v			05/11/16 19:53	2.26
1,3-Dichlorobenzene	ND		0.90	0.25	ppb v/v			05/11/16 19:53	2.26
1,4-Dichlorobenzene	ND		0.90	0.34	ppb v/v			05/11/16 19:53	2.26
Dichlorodifluoromethane	47		0.90	0.33	ppb v/v			05/11/16 19:53	2.26
1,1-Dichloroethane	2.2		0.68	0.16	ppb v/v			05/11/16 19:53	2.26
1,2-Dichloroethane	ND		1.8	0.20	ppb v/v			05/11/16 19:53	2.26
1,1-Dichloroethene	13		1.8	0.29	ppb v/v			05/11/16 19:53	2.26
cis-1,2-Dichloroethene	0.97		0.90	0.20	ppb v/v			05/11/16 19:53	2.26

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099482-001/MWL-SV05-50

Lab Sample ID: 320-18657-20

Date Collected: 04/27/16 11:22

Matrix: Air

Date Received: 05/04/16 09:30

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
trans-1,2-Dichloroethene	ND		0.90	0.23	ppb v/v			05/11/16 19:53	2.26
1,2-Dichloropropane	ND		0.90	0.54	ppb v/v			05/11/16 19:53	2.26
cis-1,3-Dichloropropene	ND		0.90	0.24	ppb v/v			05/11/16 19:53	2.26
trans-1,3-Dichloropropene	ND		0.90	0.20	ppb v/v			05/11/16 19:53	2.26
Ethylbenzene	ND		0.90	0.14	ppb v/v			05/11/16 19:53	2.26
4-Ethyltoluene	ND		0.90	0.42	ppb v/v			05/11/16 19:53	2.26
Hexachlorobutadiene	ND		4.5	0.98	ppb v/v			05/11/16 19:53	2.26
2-Hexanone	ND		0.90	0.20	ppb v/v			05/11/16 19:53	2.26
4-Methyl-2-pentanone (MIBK)	ND		0.90	0.31	ppb v/v			05/11/16 19:53	2.26
Methylene Chloride	0.96	B	0.90	0.16	ppb v/v			05/11/16 19:53	2.26
Styrene	ND		0.90	0.13	ppb v/v			05/11/16 19:53	2.26
1,1,2,2-Tetrachloroethane	ND		0.90	0.16	ppb v/v			05/11/16 19:53	2.26
Tetrachloroethene	60		0.90	0.12	ppb v/v			05/11/16 19:53	2.26
Toluene	ND		0.90	0.12	ppb v/v			05/11/16 19:53	2.26
1,1,2-Trichloro-1,2,2-trifluoroethane	52		0.90	0.37	ppb v/v			05/11/16 19:53	2.26
1,2,4-Trichlorobenzene	ND		4.5	0.98	ppb v/v			05/11/16 19:53	2.26
1,1,1-Trichloroethane	14		0.68	0.15	ppb v/v			05/11/16 19:53	2.26
1,1,2-Trichloroethane	ND		0.90	0.15	ppb v/v			05/11/16 19:53	2.26
Trichloroethene	74		0.90	0.24	ppb v/v			05/11/16 19:53	2.26
Trichlorofluoromethane	110		0.90	0.44	ppb v/v			05/11/16 19:53	2.26
1,2,4-Trimethylbenzene	ND		1.8	0.37	ppb v/v			05/11/16 19:53	2.26
1,3,5-Trimethylbenzene	ND		0.90	0.28	ppb v/v			05/11/16 19:53	2.26
Vinyl acetate	ND		1.8	0.33	ppb v/v			05/11/16 19:53	2.26
Vinyl chloride	ND		0.90	0.27	ppb v/v			05/11/16 19:53	2.26
m,p-Xylene	ND		1.8	0.23	ppb v/v			05/11/16 19:53	2.26
o-Xylene	ND		0.90	0.12	ppb v/v			05/11/16 19:53	2.26
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					05/11/16 19:53	2.26
1,2-Dichloroethane-d4 (Surr)	82		70 - 130					05/11/16 19:53	2.26
Toluene-d8 (Surr)	85		70 - 130					05/11/16 19:53	2.26

Client Sample ID: 099483-001/MWL-SV05-100

Lab Sample ID: 320-18657-21

Date Collected: 04/27/16 11:25

Matrix: Air

Date Received: 05/04/16 09:30

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	2.3	J	23	0.80	ppb v/v			05/11/16 20:43	4.5
Benzene	ND		1.8	0.36	ppb v/v			05/11/16 20:43	4.5
Benzyl chloride	ND		3.6	0.73	ppb v/v			05/11/16 20:43	4.5
Bromodichloromethane	ND		1.4	0.30	ppb v/v			05/11/16 20:43	4.5
Bromoform	ND		1.8	0.32	ppb v/v			05/11/16 20:43	4.5
Bromomethane	ND		3.6	1.5	ppb v/v			05/11/16 20:43	4.5
2-Butanone (MEK)	ND		3.6	0.90	ppb v/v			05/11/16 20:43	4.5
Carbon disulfide	ND		3.6	0.35	ppb v/v			05/11/16 20:43	4.5
Carbon tetrachloride	0.60	J	3.6	0.29	ppb v/v			05/11/16 20:43	4.5

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099483-001/MWL-SV05-100

Lab Sample ID: 320-18657-21

Date Collected: 04/27/16 11:25

Matrix: Air

Date Received: 05/04/16 09:30

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		1.4	0.29	ppb v/v			05/11/16 20:43	4.5
Chloroethane	ND		3.6	1.4	ppb v/v			05/11/16 20:43	4.5
Chloroform	2.3		1.4	0.43	ppb v/v			05/11/16 20:43	4.5
Chloromethane	ND		3.6	0.89	ppb v/v			05/11/16 20:43	4.5
Dibromochloromethane	ND		1.8	0.36	ppb v/v			05/11/16 20:43	4.5
1,2-Dibromoethane (EDB)	ND		3.6	0.34	ppb v/v			05/11/16 20:43	4.5
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.8	0.70	ppb v/v			05/11/16 20:43	4.5
1,2-Dichlorobenzene	ND		1.8	0.59	ppb v/v			05/11/16 20:43	4.5
1,3-Dichlorobenzene	ND		1.8	0.50	ppb v/v			05/11/16 20:43	4.5
1,4-Dichlorobenzene	ND		1.8	0.67	ppb v/v			05/11/16 20:43	4.5
Dichlorodifluoromethane	73		1.8	0.65	ppb v/v			05/11/16 20:43	4.5
1,1-Dichloroethane	4.2		1.4	0.32	ppb v/v			05/11/16 20:43	4.5
1,2-Dichloroethane	ND		3.6	0.40	ppb v/v			05/11/16 20:43	4.5
1,1-Dichloroethene	27		3.6	0.58	ppb v/v			05/11/16 20:43	4.5
cis-1,2-Dichloroethene	1.9		1.8	0.40	ppb v/v			05/11/16 20:43	4.5
trans-1,2-Dichloroethene	ND		1.8	0.45	ppb v/v			05/11/16 20:43	4.5
1,2-Dichloropropane	ND		1.8	1.1	ppb v/v			05/11/16 20:43	4.5
cis-1,3-Dichloropropene	ND		1.8	0.47	ppb v/v			05/11/16 20:43	4.5
trans-1,3-Dichloropropene	ND		1.8	0.40	ppb v/v			05/11/16 20:43	4.5
Ethylbenzene	ND		1.8	0.28	ppb v/v			05/11/16 20:43	4.5
4-Ethyltoluene	ND		1.8	0.84	ppb v/v			05/11/16 20:43	4.5
Hexachlorobutadiene	ND		9.0	1.9	ppb v/v			05/11/16 20:43	4.5
2-Hexanone	ND		1.8	0.39	ppb v/v			05/11/16 20:43	4.5
4-Methyl-2-pentanone (MIBK)	ND		1.8	0.61	ppb v/v			05/11/16 20:43	4.5
Methylene Chloride	ND		1.8	0.32	ppb v/v			05/11/16 20:43	4.5
Styrene	ND		1.8	0.27	ppb v/v			05/11/16 20:43	4.5
1,1,2,2-Tetrachloroethane	ND		1.8	0.31	ppb v/v			05/11/16 20:43	4.5
Tetrachloroethene	99		1.8	0.23	ppb v/v			05/11/16 20:43	4.5
Toluene	ND		1.8	0.23	ppb v/v			05/11/16 20:43	4.5
1,1,2-Trichloro-1,2,2-trifluoroethane	100		1.8	0.73	ppb v/v			05/11/16 20:43	4.5
1,2,4-Trichlorobenzene	ND		9.0	1.9	ppb v/v			05/11/16 20:43	4.5
1,1,1-Trichloroethane	14		1.4	0.29	ppb v/v			05/11/16 20:43	4.5
1,1,2-Trichloroethane	ND		1.8	0.30	ppb v/v			05/11/16 20:43	4.5
Trichloroethene	130		1.8	0.47	ppb v/v			05/11/16 20:43	4.5
Trichlorofluoromethane	140		1.8	0.88	ppb v/v			05/11/16 20:43	4.5
1,2,4-Trimethylbenzene	ND		3.6	0.73	ppb v/v			05/11/16 20:43	4.5
1,3,5-Trimethylbenzene	ND		1.8	0.56	ppb v/v			05/11/16 20:43	4.5
Vinyl acetate	ND		3.6	0.65	ppb v/v			05/11/16 20:43	4.5
Vinyl chloride	ND		1.8	0.54	ppb v/v			05/11/16 20:43	4.5
m,p-Xylene	ND		3.6	0.45	ppb v/v			05/11/16 20:43	4.5
o-Xylene	ND		1.8	0.24	ppb v/v			05/11/16 20:43	4.5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					05/11/16 20:43	4.5
1,2-Dichloroethane-d4 (Surr)	84		70 - 130					05/11/16 20:43	4.5
Toluene-d8 (Surr)	84		70 - 130					05/11/16 20:43	4.5

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099484-001/MWL-SV05-200

Lab Sample ID: 320-18657-22

Date Collected: 04/27/16 11:29

Matrix: Air

Date Received: 05/04/16 09:30

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	3.3	J	28	0.99	ppb v/v			05/11/16 21:33	5.57
Benzene	ND		2.2	0.44	ppb v/v			05/11/16 21:33	5.57
Benzyl chloride	ND		4.5	0.91	ppb v/v			05/11/16 21:33	5.57
Bromodichloromethane	ND		1.7	0.37	ppb v/v			05/11/16 21:33	5.57
Bromoform	ND		2.2	0.39	ppb v/v			05/11/16 21:33	5.57
Bromomethane	ND		4.5	1.9	ppb v/v			05/11/16 21:33	5.57
2-Butanone (MEK)	ND		4.5	1.1	ppb v/v			05/11/16 21:33	5.57
Carbon disulfide	ND		4.5	0.43	ppb v/v			05/11/16 21:33	5.57
Carbon tetrachloride	1.2	J	4.5	0.36	ppb v/v			05/11/16 21:33	5.57
Chlorobenzene	ND		1.7	0.36	ppb v/v			05/11/16 21:33	5.57
Chloroethane	ND		4.5	1.7	ppb v/v			05/11/16 21:33	5.57
Chloroform	2.2		1.7	0.53	ppb v/v			05/11/16 21:33	5.57
Chloromethane	ND		4.5	1.1	ppb v/v			05/11/16 21:33	5.57
Dibromochloromethane	ND		2.2	0.44	ppb v/v			05/11/16 21:33	5.57
1,2-Dibromoethane (EDB)	ND		4.5	0.42	ppb v/v			05/11/16 21:33	5.57
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.2	0.86	ppb v/v			05/11/16 21:33	5.57
1,2-Dichlorobenzene	ND		2.2	0.72	ppb v/v			05/11/16 21:33	5.57
1,3-Dichlorobenzene	ND		2.2	0.61	ppb v/v			05/11/16 21:33	5.57
1,4-Dichlorobenzene	ND		2.2	0.83	ppb v/v			05/11/16 21:33	5.57
Dichlorodifluoromethane	75		2.2	0.81	ppb v/v			05/11/16 21:33	5.57
1,1-Dichloroethane	6.3		1.7	0.40	ppb v/v			05/11/16 21:33	5.57
1,2-Dichloroethane	ND		4.5	0.49	ppb v/v			05/11/16 21:33	5.57
1,1-Dichloroethene	50		4.5	0.72	ppb v/v			05/11/16 21:33	5.57
cis-1,2-Dichloroethene	2.9		2.2	0.50	ppb v/v			05/11/16 21:33	5.57
trans-1,2-Dichloroethene	ND		2.2	0.56	ppb v/v			05/11/16 21:33	5.57
1,2-Dichloropropane	ND		2.2	1.3	ppb v/v			05/11/16 21:33	5.57
cis-1,3-Dichloropropene	ND		2.2	0.58	ppb v/v			05/11/16 21:33	5.57
trans-1,3-Dichloropropene	ND		2.2	0.49	ppb v/v			05/11/16 21:33	5.57
Ethylbenzene	ND		2.2	0.35	ppb v/v			05/11/16 21:33	5.57
4-Ethyltoluene	ND		2.2	1.0	ppb v/v			05/11/16 21:33	5.57
Hexachlorobutadiene	ND		11	2.4	ppb v/v			05/11/16 21:33	5.57
2-Hexanone	ND		2.2	0.48	ppb v/v			05/11/16 21:33	5.57
4-Methyl-2-pentanone (MIBK)	ND		2.2	0.75	ppb v/v			05/11/16 21:33	5.57
Methylene Chloride	4.5	B	2.2	0.40	ppb v/v			05/11/16 21:33	5.57
Styrene	ND		2.2	0.33	ppb v/v			05/11/16 21:33	5.57
1,1,2,2-Tetrachloroethane	ND		2.2	0.38	ppb v/v			05/11/16 21:33	5.57
Tetrachloroethene	170		2.2	0.28	ppb v/v			05/11/16 21:33	5.57
Toluene	0.37	J	2.2	0.28	ppb v/v			05/11/16 21:33	5.57
1,1,2-Trichloro-1,2,2-trifluoroethane	190		2.2	0.91	ppb v/v			05/11/16 21:33	5.57
1,2,4-Trichlorobenzene	ND		11	2.4	ppb v/v			05/11/16 21:33	5.57
1,1,1-Trichloroethane	3.9		1.7	0.36	ppb v/v			05/11/16 21:33	5.57
1,1,2-Trichloroethane	ND		2.2	0.37	ppb v/v			05/11/16 21:33	5.57
Trichloroethene	210		2.2	0.58	ppb v/v			05/11/16 21:33	5.57
Trichlorofluoromethane	86		2.2	1.1	ppb v/v			05/11/16 21:33	5.57
1,2,4-Trimethylbenzene	ND		4.5	0.90	ppb v/v			05/11/16 21:33	5.57
1,3,5-Trimethylbenzene	ND		2.2	0.70	ppb v/v			05/11/16 21:33	5.57
Vinyl acetate	ND		4.5	0.81	ppb v/v			05/11/16 21:33	5.57
Vinyl chloride	ND		2.2	0.67	ppb v/v			05/11/16 21:33	5.57

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099484-001/MWL-SV05-200

Lab Sample ID: 320-18657-22

Date Collected: 04/27/16 11:29

Matrix: Air

Date Received: 05/04/16 09:30

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		4.5	0.56	ppb v/v			05/11/16 21:33	5.57
o-Xylene	ND		2.2	0.30	ppb v/v			05/11/16 21:33	5.57
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	111		70 - 130					05/11/16 21:33	5.57
1,2-Dichloroethane-d4 (Surr)	78		70 - 130					05/11/16 21:33	5.57
Toluene-d8 (Surr)	71		70 - 130					05/11/16 21:33	5.57

Client Sample ID: 099485-001/MWL-SV05-300

Lab Sample ID: 320-18657-23

Date Collected: 04/27/16 11:33

Matrix: Air

Date Received: 05/04/16 09:30

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	4.3	J	19	0.67	ppb v/v			05/11/16 22:24	3.75
Benzene	ND		1.5	0.30	ppb v/v			05/11/16 22:24	3.75
Benzyl chloride	ND		3.0	0.61	ppb v/v			05/11/16 22:24	3.75
Bromodichloromethane	ND		1.1	0.25	ppb v/v			05/11/16 22:24	3.75
Bromoform	ND		1.5	0.26	ppb v/v			05/11/16 22:24	3.75
Bromomethane	ND		3.0	1.3	ppb v/v			05/11/16 22:24	3.75
2-Butanone (MEK)	ND		3.0	0.75	ppb v/v			05/11/16 22:24	3.75
Carbon disulfide	ND		3.0	0.29	ppb v/v			05/11/16 22:24	3.75
Carbon tetrachloride	0.75	J	3.0	0.24	ppb v/v			05/11/16 22:24	3.75
Chlorobenzene	ND		1.1	0.24	ppb v/v			05/11/16 22:24	3.75
Chloroethane	ND		3.0	1.2	ppb v/v			05/11/16 22:24	3.75
Chloroform	0.78	J	1.1	0.36	ppb v/v			05/11/16 22:24	3.75
Chloromethane	ND		3.0	0.74	ppb v/v			05/11/16 22:24	3.75
Dibromochloromethane	ND		1.5	0.30	ppb v/v			05/11/16 22:24	3.75
1,2-Dibromoethane (EDB)	ND		3.0	0.28	ppb v/v			05/11/16 22:24	3.75
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.5	0.58	ppb v/v			05/11/16 22:24	3.75
1,2-Dichlorobenzene	ND		1.5	0.49	ppb v/v			05/11/16 22:24	3.75
1,3-Dichlorobenzene	ND		1.5	0.41	ppb v/v			05/11/16 22:24	3.75
1,4-Dichlorobenzene	ND		1.5	0.56	ppb v/v			05/11/16 22:24	3.75
Dichlorodifluoromethane	28		1.5	0.54	ppb v/v			05/11/16 22:24	3.75
1,1-Dichloroethane	1.8		1.1	0.27	ppb v/v			05/11/16 22:24	3.75
1,2-Dichloroethane	ND		3.0	0.33	ppb v/v			05/11/16 22:24	3.75
1,1-Dichloroethene	23		3.0	0.48	ppb v/v			05/11/16 22:24	3.75
cis-1,2-Dichloroethene	0.89	J	1.5	0.33	ppb v/v			05/11/16 22:24	3.75
trans-1,2-Dichloroethene	ND		1.5	0.38	ppb v/v			05/11/16 22:24	3.75
1,2-Dichloropropane	ND		1.5	0.90	ppb v/v			05/11/16 22:24	3.75
cis-1,3-Dichloropropene	ND		1.5	0.39	ppb v/v			05/11/16 22:24	3.75
trans-1,3-Dichloropropene	ND		1.5	0.33	ppb v/v			05/11/16 22:24	3.75
Ethylbenzene	ND		1.5	0.24	ppb v/v			05/11/16 22:24	3.75
4-Ethyltoluene	ND		1.5	0.70	ppb v/v			05/11/16 22:24	3.75
Hexachlorobutadiene	ND		7.5	1.6	ppb v/v			05/11/16 22:24	3.75
2-Hexanone	ND		1.5	0.33	ppb v/v			05/11/16 22:24	3.75
4-Methyl-2-pentanone (MIBK)	ND		1.5	0.51	ppb v/v			05/11/16 22:24	3.75
Methylene Chloride	1.7	B	1.5	0.27	ppb v/v			05/11/16 22:24	3.75

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099485-001/MWL-SV05-300

Lab Sample ID: 320-18657-23

Date Collected: 04/27/16 11:33

Matrix: Air

Date Received: 05/04/16 09:30

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		1.5	0.22	ppb v/v			05/11/16 22:24	3.75
1,1,2,2-Tetrachloroethane	ND		1.5	0.26	ppb v/v			05/11/16 22:24	3.75
Tetrachloroethene	100		1.5	0.19	ppb v/v			05/11/16 22:24	3.75
Toluene	0.29 J		1.5	0.19	ppb v/v			05/11/16 22:24	3.75
1,1,2-Trichloro-1,2,2-trifluoroethane	85		1.5	0.61	ppb v/v			05/11/16 22:24	3.75
1,2,4-Trichlorobenzene	ND		7.5	1.6	ppb v/v			05/11/16 22:24	3.75
1,1,1-Trichloroethane	1.4		1.1	0.24	ppb v/v			05/11/16 22:24	3.75
1,1,2-Trichloroethane	ND		1.5	0.25	ppb v/v			05/11/16 22:24	3.75
Trichloroethene	96		1.5	0.39	ppb v/v			05/11/16 22:24	3.75
Trichlorofluoromethane	22		1.5	0.74	ppb v/v			05/11/16 22:24	3.75
1,2,4-Trimethylbenzene	ND		3.0	0.61	ppb v/v			05/11/16 22:24	3.75
1,3,5-Trimethylbenzene	ND		1.5	0.47	ppb v/v			05/11/16 22:24	3.75
Vinyl acetate	ND		3.0	0.54	ppb v/v			05/11/16 22:24	3.75
Vinyl chloride	ND		1.5	0.45	ppb v/v			05/11/16 22:24	3.75
m,p-Xylene	ND		3.0	0.38	ppb v/v			05/11/16 22:24	3.75
o-Xylene	ND		1.5	0.20	ppb v/v			05/11/16 22:24	3.75
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130					05/11/16 22:24	3.75
1,2-Dichloroethane-d4 (Surr)	83		70 - 130					05/11/16 22:24	3.75
Toluene-d8 (Surr)	84		70 - 130					05/11/16 22:24	3.75

Client Sample ID: 099486-001/MWL-SV05-400

Lab Sample ID: 320-18657-24

Date Collected: 04/27/16 11:39

Matrix: Air

Date Received: 05/04/16 09:30

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	7.6 J		14	0.50	ppb v/v			05/11/16 23:15	2.81
Benzene	0.33 J		1.1	0.22	ppb v/v			05/11/16 23:15	2.81
Benzyl chloride	ND		2.2	0.46	ppb v/v			05/11/16 23:15	2.81
Bromodichloromethane	ND		0.84	0.19	ppb v/v			05/11/16 23:15	2.81
Bromoform	ND		1.1	0.20	ppb v/v			05/11/16 23:15	2.81
Bromomethane	ND		2.2	0.94	ppb v/v			05/11/16 23:15	2.81
2-Butanone (MEK)	1.3 J		2.2	0.56	ppb v/v			05/11/16 23:15	2.81
Carbon disulfide	0.55 J		2.2	0.22	ppb v/v			05/11/16 23:15	2.81
Carbon tetrachloride	0.41 J		2.2	0.18	ppb v/v			05/11/16 23:15	2.81
Chlorobenzene	ND		0.84	0.18	ppb v/v			05/11/16 23:15	2.81
Chloroethane	ND		2.2	0.87	ppb v/v			05/11/16 23:15	2.81
Chloroform	0.68 J		0.84	0.27	ppb v/v			05/11/16 23:15	2.81
Chloromethane	ND		2.2	0.55	ppb v/v			05/11/16 23:15	2.81
Dibromochloromethane	ND		1.1	0.22	ppb v/v			05/11/16 23:15	2.81
1,2-Dibromoethane (EDB)	ND		2.2	0.21	ppb v/v			05/11/16 23:15	2.81
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.1	0.44	ppb v/v			05/11/16 23:15	2.81
1,2-Dichlorobenzene	ND		1.1	0.37	ppb v/v			05/11/16 23:15	2.81
1,3-Dichlorobenzene	ND		1.1	0.31	ppb v/v			05/11/16 23:15	2.81
1,4-Dichlorobenzene	ND		1.1	0.42	ppb v/v			05/11/16 23:15	2.81

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM-616973,4,5,6,7

TestAmerica Job ID: 320-18657-1
SDG: 616973

Client Sample ID: 099486-001/MWL-SV05-400

Lab Sample ID: 320-18657-24

Date Collected: 04/27/16 11:39

Matrix: Air

Date Received: 05/04/16 09:30

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	15		1.1	0.41	ppb v/v			05/11/16 23:15	2.81
1,1-Dichloroethane	1.6		0.84	0.20	ppb v/v			05/11/16 23:15	2.81
1,2-Dichloroethane	ND		2.2	0.25	ppb v/v			05/11/16 23:15	2.81
1,1-Dichloroethene	15		2.2	0.36	ppb v/v			05/11/16 23:15	2.81
cis-1,2-Dichloroethene	0.83	J	1.1	0.25	ppb v/v			05/11/16 23:15	2.81
trans-1,2-Dichloroethene	ND		1.1	0.28	ppb v/v			05/11/16 23:15	2.81
1,2-Dichloropropane	ND		1.1	0.67	ppb v/v			05/11/16 23:15	2.81
cis-1,3-Dichloropropene	ND		1.1	0.29	ppb v/v			05/11/16 23:15	2.81
trans-1,3-Dichloropropene	ND		1.1	0.25	ppb v/v			05/11/16 23:15	2.81
Ethylbenzene	ND		1.1	0.18	ppb v/v			05/11/16 23:15	2.81
4-Ethyltoluene	ND		1.1	0.53	ppb v/v			05/11/16 23:15	2.81
Hexachlorobutadiene	ND		5.6	1.2	ppb v/v			05/11/16 23:15	2.81
2-Hexanone	ND		1.1	0.24	ppb v/v			05/11/16 23:15	2.81
4-Methyl-2-pentanone (MIBK)	ND		1.1	0.38	ppb v/v			05/11/16 23:15	2.81
Methylene Chloride	1.4	B	1.1	0.20	ppb v/v			05/11/16 23:15	2.81
Styrene	ND		1.1	0.17	ppb v/v			05/11/16 23:15	2.81
1,1,2,2-Tetrachloroethane	ND		1.1	0.19	ppb v/v			05/11/16 23:15	2.81
Tetrachloroethene	110		1.1	0.14	ppb v/v			05/11/16 23:15	2.81
Toluene	7.4		1.1	0.14	ppb v/v			05/11/16 23:15	2.81
1,1,2-Trichloro-1,2,2-trifluoroethane	40		1.1	0.46	ppb v/v			05/11/16 23:15	2.81
1,2,4-Trichlorobenzene	ND		5.6	1.2	ppb v/v			05/11/16 23:15	2.81
1,1,1-Trichloroethane	1.5		0.84	0.18	ppb v/v			05/11/16 23:15	2.81
1,1,2-Trichloroethane	ND		1.1	0.19	ppb v/v			05/11/16 23:15	2.81
Trichloroethene	89		1.1	0.30	ppb v/v			05/11/16 23:15	2.81
Trichlorofluoromethane	17		1.1	0.55	ppb v/v			05/11/16 23:15	2.81
1,2,4-Trimethylbenzene	ND		2.2	0.46	ppb v/v			05/11/16 23:15	2.81
1,3,5-Trimethylbenzene	ND		1.1	0.35	ppb v/v			05/11/16 23:15	2.81
Vinyl acetate	ND		2.2	0.41	ppb v/v			05/11/16 23:15	2.81
Vinyl chloride	ND		1.1	0.34	ppb v/v			05/11/16 23:15	2.81
m,p-Xylene	ND		2.2	0.28	ppb v/v			05/11/16 23:15	2.81
o-Xylene	ND		1.1	0.15	ppb v/v			05/11/16 23:15	2.81
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130					05/11/16 23:15	2.81
1,2-Dichloroethane-d4 (Surr)	84		70 - 130					05/11/16 23:15	2.81
Toluene-d8 (Surr)	84		70 - 130					05/11/16 23:15	2.81

OCTOBER 2016 SOIL-VAPOR SAMPLING RESULTS
CERTIFICATES OF ANALYSIS

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100736-001/MWL-SV01-42.5

Lab Sample ID: 320-22820-1

Date Collected: 10/13/16 12:17

Matrix: Air

Date Received: 10/19/16 14:10

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	3.6	J	69	2.5	ppb v/v			10/31/16 20:51	13.8
Benzene	ND		5.5	1.1	ppb v/v			10/31/16 20:51	13.8
Benzyl chloride	ND		11	2.2	ppb v/v			10/31/16 20:51	13.8
Bromodichloromethane	ND		4.1	0.91	ppb v/v			10/31/16 20:51	13.8
Bromoform	ND		5.5	0.97	ppb v/v			10/31/16 20:51	13.8
Bromomethane	ND		11	4.6	ppb v/v			10/31/16 20:51	13.8
2-Butanone (MEK)	ND		11	2.7	ppb v/v			10/31/16 20:51	13.8
Carbon disulfide	ND		11	1.1	ppb v/v			10/31/16 20:51	13.8
Carbon tetrachloride	ND		11	0.88	ppb v/v			10/31/16 20:51	13.8
Chlorobenzene	ND		4.1	0.88	ppb v/v			10/31/16 20:51	13.8
Chloroethane	ND		11	4.3	ppb v/v			10/31/16 20:51	13.8
Chloroform	15		4.1	1.3	ppb v/v			10/31/16 20:51	13.8
Chloromethane	ND		11	2.7	ppb v/v			10/31/16 20:51	13.8
Dibromochloromethane	ND		5.5	1.1	ppb v/v			10/31/16 20:51	13.8
1,2-Dibromoethane (EDB)	ND		11	1.0	ppb v/v			10/31/16 20:51	13.8
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		5.5	2.1	ppb v/v			10/31/16 20:51	13.8
1,2-Dichlorobenzene	ND		5.5	1.8	ppb v/v			10/31/16 20:51	13.8
1,3-Dichlorobenzene	ND		5.5	1.5	ppb v/v			10/31/16 20:51	13.8
1,4-Dichlorobenzene	ND		5.5	2.1	ppb v/v			10/31/16 20:51	13.8
Dichlorodifluoromethane	95		5.5	2.0	ppb v/v			10/31/16 20:51	13.8
1,1-Dichloroethane	1.4	J	4.1	0.99	ppb v/v			10/31/16 20:51	13.8
1,2-Dichloroethane	ND		11	1.2	ppb v/v			10/31/16 20:51	13.8
1,1-Dichloroethene	7.7	J	11	1.8	ppb v/v			10/31/16 20:51	13.8
cis-1,2-Dichloroethene	ND		5.5	1.2	ppb v/v			10/31/16 20:51	13.8
trans-1,2-Dichloroethene	ND		5.5	1.4	ppb v/v			10/31/16 20:51	13.8
1,2-Dichloropropane	ND		5.5	3.3	ppb v/v			10/31/16 20:51	13.8
cis-1,3-Dichloropropene	ND		5.5	1.4	ppb v/v			10/31/16 20:51	13.8
trans-1,3-Dichloropropene	ND		5.5	1.2	ppb v/v			10/31/16 20:51	13.8
Ethylbenzene	ND		5.5	0.87	ppb v/v			10/31/16 20:51	13.8
4-Ethyltoluene	ND		5.5	2.6	ppb v/v			10/31/16 20:51	13.8
Hexachlorobutadiene	ND		28	6.0	ppb v/v			10/31/16 20:51	13.8
2-Hexanone	ND		5.5	1.2	ppb v/v			10/31/16 20:51	13.8
4-Methyl-2-pentanone (MIBK)	ND		5.5	1.9	ppb v/v			10/31/16 20:51	13.8
Methylene Chloride	ND		5.5	0.99	ppb v/v			10/31/16 20:51	13.8
Styrene	ND		5.5	0.81	ppb v/v			10/31/16 20:51	13.8
1,1,2,2-Tetrachloroethane	ND		5.5	0.95	ppb v/v			10/31/16 20:51	13.8
Tetrachloroethene	450		5.5	0.70	ppb v/v			10/31/16 20:51	13.8
Toluene	ND		5.5	0.70	ppb v/v			10/31/16 20:51	13.8
1,1,2-Trichloro-1,2,2-trifluoroethane	82		5.5	2.2	ppb v/v			10/31/16 20:51	13.8
1,2,4-Trichlorobenzene	ND		28	6.0	ppb v/v			10/31/16 20:51	13.8
1,1,1-Trichloroethane	41		4.1	0.90	ppb v/v			10/31/16 20:51	13.8
1,1,2-Trichloroethane	ND		5.5	0.92	ppb v/v			10/31/16 20:51	13.8
Trichloroethene	100		5.5	1.4	ppb v/v			10/31/16 20:51	13.8
Trichlorofluoromethane	180		5.5	2.7	ppb v/v			10/31/16 20:51	13.8
1,2,4-Trimethylbenzene	ND		11	2.2	ppb v/v			10/31/16 20:51	13.8
1,3,5-Trimethylbenzene	ND		5.5	1.7	ppb v/v			10/31/16 20:51	13.8
Vinyl acetate	ND		11	2.0	ppb v/v			10/31/16 20:51	13.8

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100736-001/MWL-SV01-42.5

Lab Sample ID: 320-22820-1

Date Collected: 10/13/16 12:17

Matrix: Air

Date Received: 10/19/16 14:10

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		5.5	1.7	ppb v/v			10/31/16 20:51	13.8
m,p-Xylene	ND		11	1.4	ppb v/v			10/31/16 20:51	13.8
o-Xylene	ND		5.5	0.75	ppb v/v			10/31/16 20:51	13.8

Surrogate	%Recovery	Qualifier	Limits		Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		70 - 130			10/31/16 20:51	13.8
1,2-Dichloroethane-d4 (Surr)	96		70 - 130			10/31/16 20:51	13.8
Toluene-d8 (Surr)	94		70 - 130			10/31/16 20:51	13.8

Client Sample ID: 100737-001/MWL-FB1

Lab Sample ID: 320-22820-2

Date Collected: 10/13/16 12:04

Matrix: Air

Date Received: 10/19/16 14:10

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			10/31/16 21:49	1
Benzene	ND		0.40	0.079	ppb v/v			10/31/16 21:49	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			10/31/16 21:49	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			10/31/16 21:49	1
Bromoform	ND		0.40	0.070	ppb v/v			10/31/16 21:49	1
Bromomethane	ND		0.80	0.34	ppb v/v			10/31/16 21:49	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			10/31/16 21:49	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			10/31/16 21:49	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			10/31/16 21:49	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			10/31/16 21:49	1
Chloroethane	ND		0.80	0.31	ppb v/v			10/31/16 21:49	1
Chloroform	ND		0.30	0.095	ppb v/v			10/31/16 21:49	1
Chloromethane	ND		0.80	0.20	ppb v/v			10/31/16 21:49	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			10/31/16 21:49	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			10/31/16 21:49	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			10/31/16 21:49	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			10/31/16 21:49	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			10/31/16 21:49	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			10/31/16 21:49	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			10/31/16 21:49	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			10/31/16 21:49	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			10/31/16 21:49	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			10/31/16 21:49	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			10/31/16 21:49	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			10/31/16 21:49	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			10/31/16 21:49	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			10/31/16 21:49	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			10/31/16 21:49	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			10/31/16 21:49	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			10/31/16 21:49	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			10/31/16 21:49	1
2-Hexanone	ND		0.40	0.087	ppb v/v			10/31/16 21:49	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			10/31/16 21:49	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100737-001/MWL-FB1

Lab Sample ID: 320-22820-2

Date Collected: 10/13/16 12:04

Matrix: Air

Date Received: 10/19/16 14:10

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	0.14	J	0.40	0.072	ppb v/v			10/31/16 21:49	1
Styrene	ND		0.40	0.059	ppb v/v			10/31/16 21:49	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			10/31/16 21:49	1
Tetrachloroethene	0.35	J	0.40	0.051	ppb v/v			10/31/16 21:49	1
Toluene	ND		0.40	0.051	ppb v/v			10/31/16 21:49	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			10/31/16 21:49	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			10/31/16 21:49	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			10/31/16 21:49	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			10/31/16 21:49	1
Trichloroethene	ND		0.40	0.11	ppb v/v			10/31/16 21:49	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			10/31/16 21:49	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			10/31/16 21:49	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			10/31/16 21:49	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			10/31/16 21:49	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			10/31/16 21:49	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			10/31/16 21:49	1
o-Xylene	ND		0.40	0.054	ppb v/v			10/31/16 21:49	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130		10/31/16 21:49	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 130		10/31/16 21:49	1
Toluene-d8 (Surr)	95		70 - 130		10/31/16 21:49	1

Client Sample ID: 100738-001/MWL-SV02-41.5

Lab Sample ID: 320-22820-3

Date Collected: 10/13/16 12:11

Matrix: Air

Date Received: 10/19/16 14:10

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	3.9	J	48	1.7	ppb v/v			10/31/16 22:41	9.62
Benzene	ND		3.8	0.76	ppb v/v			10/31/16 22:41	9.62
Benzyl chloride	ND		7.7	1.6	ppb v/v			10/31/16 22:41	9.62
Bromodichloromethane	ND		2.9	0.63	ppb v/v			10/31/16 22:41	9.62
Bromoform	ND		3.8	0.67	ppb v/v			10/31/16 22:41	9.62
Bromomethane	ND		7.7	3.2	ppb v/v			10/31/16 22:41	9.62
2-Butanone (MEK)	3.3	J	7.7	1.9	ppb v/v			10/31/16 22:41	9.62
Carbon disulfide	ND		7.7	0.75	ppb v/v			10/31/16 22:41	9.62
Carbon tetrachloride	ND		7.7	0.62	ppb v/v			10/31/16 22:41	9.62
Chlorobenzene	ND		2.9	0.62	ppb v/v			10/31/16 22:41	9.62
Chloroethane	ND		7.7	3.0	ppb v/v			10/31/16 22:41	9.62
Chloroform	3.1		2.9	0.91	ppb v/v			10/31/16 22:41	9.62
Chloromethane	ND		7.7	1.9	ppb v/v			10/31/16 22:41	9.62
Dibromochloromethane	ND		3.8	0.76	ppb v/v			10/31/16 22:41	9.62
1,2-Dibromoethane (EDB)	ND		7.7	0.72	ppb v/v			10/31/16 22:41	9.62
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.8	1.5	ppb v/v			10/31/16 22:41	9.62
1,2-Dichlorobenzene	ND		3.8	1.3	ppb v/v			10/31/16 22:41	9.62
1,3-Dichlorobenzene	ND		3.8	1.1	ppb v/v			10/31/16 22:41	9.62
1,4-Dichlorobenzene	ND		3.8	1.4	ppb v/v			10/31/16 22:41	9.62

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100738-001/MWL-SV02-41.5

Lab Sample ID: 320-22820-3

Date Collected: 10/13/16 12:11

Matrix: Air

Date Received: 10/19/16 14:10

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
Dichlorodifluoromethane	97		3.8	1.4	ppb v/v			10/31/16 22:41	9.62
1,1-Dichloroethane	2.5	J	2.9	0.69	ppb v/v			10/31/16 22:41	9.62
1,2-Dichloroethane	ND		7.7	0.85	ppb v/v			10/31/16 22:41	9.62
1,1-Dichloroethene	11		7.7	1.2	ppb v/v			10/31/16 22:41	9.62
cis-1,2-Dichloroethene	ND		3.8	0.86	ppb v/v			10/31/16 22:41	9.62
trans-1,2-Dichloroethene	ND		3.8	0.96	ppb v/v			10/31/16 22:41	9.62
1,2-Dichloropropane	ND		3.8	2.3	ppb v/v			10/31/16 22:41	9.62
cis-1,3-Dichloropropene	ND		3.8	1.0	ppb v/v			10/31/16 22:41	9.62
trans-1,3-Dichloropropene	ND		3.8	0.85	ppb v/v			10/31/16 22:41	9.62
Ethylbenzene	ND		3.8	0.61	ppb v/v			10/31/16 22:41	9.62
4-Ethyltoluene	ND		3.8	1.8	ppb v/v			10/31/16 22:41	9.62
Hexachlorobutadiene	ND		19	4.2	ppb v/v			10/31/16 22:41	9.62
2-Hexanone	ND		3.8	0.84	ppb v/v			10/31/16 22:41	9.62
4-Methyl-2-pentanone (MIBK)	ND		3.8	1.3	ppb v/v			10/31/16 22:41	9.62
Methylene Chloride	ND		3.8	0.69	ppb v/v			10/31/16 22:41	9.62
Styrene	ND		3.8	0.57	ppb v/v			10/31/16 22:41	9.62
1,1,2,2-Tetrachloroethane	ND		3.8	0.66	ppb v/v			10/31/16 22:41	9.62
Tetrachloroethene	70		3.8	0.49	ppb v/v			10/31/16 22:41	9.62
Toluene	ND		3.8	0.49	ppb v/v			10/31/16 22:41	9.62
1,1,2-Trichloro-1,2,2-trifluoroethane	53		3.8	1.6	ppb v/v			10/31/16 22:41	9.62
1,2,4-Trichlorobenzene	ND		19	4.2	ppb v/v			10/31/16 22:41	9.62
1,1,1-Trichloroethane	79		2.9	0.63	ppb v/v			10/31/16 22:41	9.62
1,1,2-Trichloroethane	ND		3.8	0.64	ppb v/v			10/31/16 22:41	9.62
Trichloroethene	65		3.8	1.0	ppb v/v			10/31/16 22:41	9.62
Trichlorofluoromethane	320		3.8	1.9	ppb v/v			10/31/16 22:41	9.62
1,2,4-Trimethylbenzene	ND		7.7	1.6	ppb v/v			10/31/16 22:41	9.62
1,3,5-Trimethylbenzene	ND		3.8	1.2	ppb v/v			10/31/16 22:41	9.62
Vinyl acetate	ND		7.7	1.4	ppb v/v			10/31/16 22:41	9.62
Vinyl chloride	ND		3.8	1.2	ppb v/v			10/31/16 22:41	9.62
m,p-Xylene	ND		7.7	0.96	ppb v/v			10/31/16 22:41	9.62
o-Xylene	ND		3.8	0.52	ppb v/v			10/31/16 22:41	9.62

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130		10/31/16 22:41	9.62
1,2-Dichloroethane-d4 (Surr)	98		70 - 130		10/31/16 22:41	9.62
Toluene-d8 (Surr)	98		70 - 130		10/31/16 22:41	9.62

Client Sample ID: 100739-001/MWL-FB2

Lab Sample ID: 320-22820-4

Date Collected: 10/13/16 12:01

Matrix: Air

Date Received: 10/19/16 14:10

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			10/31/16 23:40	1
Benzene	ND		0.40	0.079	ppb v/v			10/31/16 23:40	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			10/31/16 23:40	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			10/31/16 23:40	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100739-001/MWL-FB2

Lab Sample ID: 320-22820-4

Date Collected: 10/13/16 12:01

Matrix: Air

Date Received: 10/19/16 14:10

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
Bromoform	ND		0.40	0.070	ppb v/v			10/31/16 23:40	1
Bromomethane	ND		0.80	0.34	ppb v/v			10/31/16 23:40	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			10/31/16 23:40	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			10/31/16 23:40	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			10/31/16 23:40	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			10/31/16 23:40	1
Chloroethane	ND		0.80	0.31	ppb v/v			10/31/16 23:40	1
Chloroform	ND		0.30	0.095	ppb v/v			10/31/16 23:40	1
Chloromethane	ND		0.80	0.20	ppb v/v			10/31/16 23:40	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			10/31/16 23:40	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			10/31/16 23:40	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			10/31/16 23:40	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			10/31/16 23:40	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			10/31/16 23:40	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			10/31/16 23:40	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			10/31/16 23:40	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			10/31/16 23:40	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			10/31/16 23:40	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			10/31/16 23:40	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			10/31/16 23:40	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			10/31/16 23:40	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			10/31/16 23:40	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			10/31/16 23:40	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			10/31/16 23:40	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			10/31/16 23:40	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			10/31/16 23:40	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			10/31/16 23:40	1
2-Hexanone	ND		0.40	0.087	ppb v/v			10/31/16 23:40	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			10/31/16 23:40	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			10/31/16 23:40	1
Styrene	ND		0.40	0.059	ppb v/v			10/31/16 23:40	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			10/31/16 23:40	1
Tetrachloroethene	0.13	J	0.40	0.051	ppb v/v			10/31/16 23:40	1
Toluene	ND		0.40	0.051	ppb v/v			10/31/16 23:40	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			10/31/16 23:40	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			10/31/16 23:40	1
1,1,1-Trichloroethane	0.13	J	0.30	0.065	ppb v/v			10/31/16 23:40	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			10/31/16 23:40	1
Trichloroethene	ND		0.40	0.11	ppb v/v			10/31/16 23:40	1
Trichlorofluoromethane	0.49		0.40	0.20	ppb v/v			10/31/16 23:40	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			10/31/16 23:40	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			10/31/16 23:40	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			10/31/16 23:40	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			10/31/16 23:40	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			10/31/16 23:40	1
o-Xylene	ND		0.40	0.054	ppb v/v			10/31/16 23:40	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130		10/31/16 23:40	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100739-001/MWL-FB2

Date Collected: 10/13/16 12:01

Date Received: 10/19/16 14:10

Sample Container: Summa Canister 6L

Lab Sample ID: 320-22820-4

Matrix: Air

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	96		70 - 130		10/31/16 23:40	1
Toluene-d8 (Surr)	98		70 - 130		10/31/16 23:40	1

Client Sample ID: 100740-001/MWL-SV03-50

Date Collected: 10/13/16 09:41

Date Received: 10/19/16 14:10

Sample Container: Summa Canister 6L

Lab Sample ID: 320-22820-5

Matrix: Air

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	6.9	J	22	0.80	ppb v/v			11/01/16 00:33	4.47
Benzene	0.79	J	1.8	0.35	ppb v/v			11/01/16 00:33	4.47
Benzyl chloride	ND		3.6	0.73	ppb v/v			11/01/16 00:33	4.47
Bromodichloromethane	ND		1.3	0.30	ppb v/v			11/01/16 00:33	4.47
Bromoform	ND		1.8	0.31	ppb v/v			11/01/16 00:33	4.47
Bromomethane	ND		3.6	1.5	ppb v/v			11/01/16 00:33	4.47
2-Butanone (MEK)	ND		3.6	0.89	ppb v/v			11/01/16 00:33	4.47
Carbon disulfide	1.3	J	3.6	0.35	ppb v/v			11/01/16 00:33	4.47
Carbon tetrachloride	ND		3.6	0.29	ppb v/v			11/01/16 00:33	4.47
Chlorobenzene	ND		1.3	0.29	ppb v/v			11/01/16 00:33	4.47
Chloroethane	ND		3.6	1.4	ppb v/v			11/01/16 00:33	4.47
Chloroform	1.9		1.3	0.42	ppb v/v			11/01/16 00:33	4.47
Chloromethane	ND		3.6	0.88	ppb v/v			11/01/16 00:33	4.47
Dibromochloromethane	ND		1.8	0.35	ppb v/v			11/01/16 00:33	4.47
1,2-Dibromoethane (EDB)	ND		3.6	0.34	ppb v/v			11/01/16 00:33	4.47
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.8	0.69	ppb v/v			11/01/16 00:33	4.47
1,2-Dichlorobenzene	ND		1.8	0.58	ppb v/v			11/01/16 00:33	4.47
1,3-Dichlorobenzene	ND		1.8	0.49	ppb v/v			11/01/16 00:33	4.47
1,4-Dichlorobenzene	ND		1.8	0.67	ppb v/v			11/01/16 00:33	4.47
Dichlorodifluoromethane	30		1.8	0.65	ppb v/v			11/01/16 00:33	4.47
1,1-Dichloroethane	3.3		1.3	0.32	ppb v/v			11/01/16 00:33	4.47
1,2-Dichloroethane	ND		3.6	0.39	ppb v/v			11/01/16 00:33	4.47
1,1-Dichloroethene	12		3.6	0.58	ppb v/v			11/01/16 00:33	4.47
cis-1,2-Dichloroethene	1.7	J	1.8	0.40	ppb v/v			11/01/16 00:33	4.47
trans-1,2-Dichloroethene	ND		1.8	0.45	ppb v/v			11/01/16 00:33	4.47
1,2-Dichloropropane	ND		1.8	1.1	ppb v/v			11/01/16 00:33	4.47
cis-1,3-Dichloropropene	ND		1.8	0.46	ppb v/v			11/01/16 00:33	4.47
trans-1,3-Dichloropropene	ND		1.8	0.39	ppb v/v			11/01/16 00:33	4.47
Ethylbenzene	ND		1.8	0.28	ppb v/v			11/01/16 00:33	4.47
4-Ethyltoluene	ND		1.8	0.84	ppb v/v			11/01/16 00:33	4.47
Hexachlorobutadiene	ND		8.9	1.9	ppb v/v			11/01/16 00:33	4.47
2-Hexanone	ND		1.8	0.39	ppb v/v			11/01/16 00:33	4.47
4-Methyl-2-pentanone (MIBK)	ND		1.8	0.60	ppb v/v			11/01/16 00:33	4.47
Methylene Chloride	0.59	J	1.8	0.32	ppb v/v			11/01/16 00:33	4.47
Styrene	ND		1.8	0.26	ppb v/v			11/01/16 00:33	4.47
1,1,2,2-Tetrachloroethane	ND		1.8	0.31	ppb v/v			11/01/16 00:33	4.47
Tetrachloroethene	140		1.8	0.23	ppb v/v			11/01/16 00:33	4.47
Toluene	ND		1.8	0.23	ppb v/v			11/01/16 00:33	4.47

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100740-001/MWL-SV03-50

Lab Sample ID: 320-22820-5

Date Collected: 10/13/16 09:41

Matrix: Air

Date Received: 10/19/16 14:10

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
1,1,2-Trichloro-1,2,2-trifluoroethane	78		1.8	0.73	ppb v/v			11/01/16 00:33	4.47
1,2,4-Trichlorobenzene	ND		8.9	1.9	ppb v/v			11/01/16 00:33	4.47
1,1,1-Trichloroethane	5.0		1.3	0.29	ppb v/v			11/01/16 00:33	4.47
1,1,2-Trichloroethane	ND		1.8	0.30	ppb v/v			11/01/16 00:33	4.47
Trichloroethene	110		1.8	0.47	ppb v/v			11/01/16 00:33	4.47
Trichlorofluoromethane	31		1.8	0.88	ppb v/v			11/01/16 00:33	4.47
1,2,4-Trimethylbenzene	ND		3.6	0.72	ppb v/v			11/01/16 00:33	4.47
1,3,5-Trimethylbenzene	ND		1.8	0.56	ppb v/v			11/01/16 00:33	4.47
Vinyl acetate	ND		3.6	0.65	ppb v/v			11/01/16 00:33	4.47
Vinyl chloride	ND		1.8	0.54	ppb v/v			11/01/16 00:33	4.47
m,p-Xylene	ND		3.6	0.45	ppb v/v			11/01/16 00:33	4.47
o-Xylene	ND		1.8	0.24	ppb v/v			11/01/16 00:33	4.47

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130		11/01/16 00:33	4.47
1,2-Dichloroethane-d4 (Surr)	100		70 - 130		11/01/16 00:33	4.47
Toluene-d8 (Surr)	96		70 - 130		11/01/16 00:33	4.47

Client Sample ID: 100741-001/MWL-SV03-100

Lab Sample ID: 320-22820-6

Date Collected: 10/13/16 09:44

Matrix: Air

Date Received: 10/19/16 14:10

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	2.6	J	22	0.79	ppb v/v			11/01/16 01:26	4.42
Benzene	ND		1.8	0.35	ppb v/v			11/01/16 01:26	4.42
Benzyl chloride	ND		3.5	0.72	ppb v/v			11/01/16 01:26	4.42
Bromodichloromethane	ND		1.3	0.29	ppb v/v			11/01/16 01:26	4.42
Bromoform	ND		1.8	0.31	ppb v/v			11/01/16 01:26	4.42
Bromomethane	ND		3.5	1.5	ppb v/v			11/01/16 01:26	4.42
2-Butanone (MEK)	ND		3.5	0.88	ppb v/v			11/01/16 01:26	4.42
Carbon disulfide	ND		3.5	0.34	ppb v/v			11/01/16 01:26	4.42
Carbon tetrachloride	0.32	J	3.5	0.28	ppb v/v			11/01/16 01:26	4.42
Chlorobenzene	ND		1.3	0.28	ppb v/v			11/01/16 01:26	4.42
Chloroethane	ND		3.5	1.4	ppb v/v			11/01/16 01:26	4.42
Chloroform	2.6		1.3	0.42	ppb v/v			11/01/16 01:26	4.42
Chloromethane	ND		3.5	0.87	ppb v/v			11/01/16 01:26	4.42
Dibromochloromethane	ND		1.8	0.35	ppb v/v			11/01/16 01:26	4.42
1,2-Dibromoethane (EDB)	ND		3.5	0.33	ppb v/v			11/01/16 01:26	4.42
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.8	0.69	ppb v/v			11/01/16 01:26	4.42
1,2-Dichlorobenzene	ND		1.8	0.57	ppb v/v			11/01/16 01:26	4.42
1,3-Dichlorobenzene	ND		1.8	0.49	ppb v/v			11/01/16 01:26	4.42
1,4-Dichlorobenzene	ND		1.8	0.66	ppb v/v			11/01/16 01:26	4.42
Dichlorodifluoromethane	48		1.8	0.64	ppb v/v			11/01/16 01:26	4.42
1,1-Dichloroethane	6.6		1.3	0.32	ppb v/v			11/01/16 01:26	4.42
1,2-Dichloroethane	ND		3.5	0.39	ppb v/v			11/01/16 01:26	4.42
1,1-Dichloroethene	26		3.5	0.57	ppb v/v			11/01/16 01:26	4.42

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100741-001/MWL-SV03-100

Lab Sample ID: 320-22820-6

Date Collected: 10/13/16 09:44

Matrix: Air

Date Received: 10/19/16 14:10

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
cis-1,2-Dichloroethene	3.9		1.8	0.39	ppb v/v			11/01/16 01:26	4.42
trans-1,2-Dichloroethene	ND		1.8	0.44	ppb v/v			11/01/16 01:26	4.42
1,2-Dichloropropane	ND		1.8	1.1	ppb v/v			11/01/16 01:26	4.42
cis-1,3-Dichloropropene	ND		1.8	0.46	ppb v/v			11/01/16 01:26	4.42
trans-1,3-Dichloropropene	ND		1.8	0.39	ppb v/v			11/01/16 01:26	4.42
Ethylbenzene	ND		1.8	0.28	ppb v/v			11/01/16 01:26	4.42
4-Ethyltoluene	ND		1.8	0.83	ppb v/v			11/01/16 01:26	4.42
Hexachlorobutadiene	ND		8.8	1.9	ppb v/v			11/01/16 01:26	4.42
2-Hexanone	ND		1.8	0.38	ppb v/v			11/01/16 01:26	4.42
4-Methyl-2-pentanone (MIBK)	ND		1.8	0.60	ppb v/v			11/01/16 01:26	4.42
Methylene Chloride	1.8		1.8	0.32	ppb v/v			11/01/16 01:26	4.42
Styrene	ND		1.8	0.26	ppb v/v			11/01/16 01:26	4.42
1,1,2,2-Tetrachloroethane	ND		1.8	0.30	ppb v/v			11/01/16 01:26	4.42
Tetrachloroethene	240		1.8	0.23	ppb v/v			11/01/16 01:26	4.42
Toluene	ND		1.8	0.23	ppb v/v			11/01/16 01:26	4.42
1,1,2-Trichloro-1,2,2-trifluoroethane	150		1.8	0.72	ppb v/v			11/01/16 01:26	4.42
1,2,4-Trichlorobenzene	ND		8.8	1.9	ppb v/v			11/01/16 01:26	4.42
1,1,1-Trichloroethane	5.6		1.3	0.29	ppb v/v			11/01/16 01:26	4.42
1,1,2-Trichloroethane	ND		1.8	0.30	ppb v/v			11/01/16 01:26	4.42
Trichloroethene	210		1.8	0.46	ppb v/v			11/01/16 01:26	4.42
Trichlorofluoromethane	42		1.8	0.87	ppb v/v			11/01/16 01:26	4.42
1,2,4-Trimethylbenzene	ND		3.5	0.72	ppb v/v			11/01/16 01:26	4.42
1,3,5-Trimethylbenzene	ND		1.8	0.55	ppb v/v			11/01/16 01:26	4.42
Vinyl acetate	ND		3.5	0.64	ppb v/v			11/01/16 01:26	4.42
Vinyl chloride	ND		1.8	0.53	ppb v/v			11/01/16 01:26	4.42
m,p-Xylene	ND		3.5	0.44	ppb v/v			11/01/16 01:26	4.42
o-Xylene	ND		1.8	0.24	ppb v/v			11/01/16 01:26	4.42
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					11/01/16 01:26	4.42
1,2-Dichloroethane-d4 (Surr)	100		70 - 130					11/01/16 01:26	4.42
Toluene-d8 (Surr)	96		70 - 130					11/01/16 01:26	4.42

Client Sample ID: 100742-001/MWL-SV03-200

Lab Sample ID: 320-22820-7

Date Collected: 10/13/16 09:48

Matrix: Air

Date Received: 10/19/16 14:10

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	6.7	J	45	1.6	ppb v/v			11/01/16 02:18	8.92
Benzene	ND		3.6	0.70	ppb v/v			11/01/16 02:18	8.92
Benzyl chloride	ND		7.1	1.5	ppb v/v			11/01/16 02:18	8.92
Bromodichloromethane	ND		2.7	0.59	ppb v/v			11/01/16 02:18	8.92
Bromoform	ND		3.6	0.62	ppb v/v			11/01/16 02:18	8.92
Bromomethane	ND		7.1	3.0	ppb v/v			11/01/16 02:18	8.92
2-Butanone (MEK)	ND		7.1	1.8	ppb v/v			11/01/16 02:18	8.92
Carbon disulfide	ND		7.1	0.70	ppb v/v			11/01/16 02:18	8.92

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100742-001/MWL-SV03-200

Lab Sample ID: 320-22820-7

Date Collected: 10/13/16 09:48

Matrix: Air

Date Received: 10/19/16 14:10

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
Carbon tetrachloride	ND		7.1	0.57	ppb v/v			11/01/16 02:18	8.92
Chlorobenzene	ND		2.7	0.57	ppb v/v			11/01/16 02:18	8.92
Chloroethane	ND		7.1	2.7	ppb v/v			11/01/16 02:18	8.92
Chloroform	2.6	J	2.7	0.85	ppb v/v			11/01/16 02:18	8.92
Chloromethane	ND		7.1	1.8	ppb v/v			11/01/16 02:18	8.92
Dibromochloromethane	ND		3.6	0.70	ppb v/v			11/01/16 02:18	8.92
1,2-Dibromoethane (EDB)	ND		7.1	0.67	ppb v/v			11/01/16 02:18	8.92
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.6	1.4	ppb v/v			11/01/16 02:18	8.92
1,2-Dichlorobenzene	ND		3.6	1.2	ppb v/v			11/01/16 02:18	8.92
1,3-Dichlorobenzene	ND		3.6	0.98	ppb v/v			11/01/16 02:18	8.92
1,4-Dichlorobenzene	ND		3.6	1.3	ppb v/v			11/01/16 02:18	8.92
Dichlorodifluoromethane	60		3.6	1.3	ppb v/v			11/01/16 02:18	8.92
1,1-Dichloroethane	8.7		2.7	0.64	ppb v/v			11/01/16 02:18	8.92
1,2-Dichloroethane	ND		7.1	0.78	ppb v/v			11/01/16 02:18	8.92
1,1-Dichloroethene	34		7.1	1.2	ppb v/v			11/01/16 02:18	8.92
cis-1,2-Dichloroethene	5.1		3.6	0.79	ppb v/v			11/01/16 02:18	8.92
trans-1,2-Dichloroethene	ND		3.6	0.89	ppb v/v			11/01/16 02:18	8.92
1,2-Dichloropropane	ND		3.6	2.1	ppb v/v			11/01/16 02:18	8.92
cis-1,3-Dichloropropene	ND		3.6	0.93	ppb v/v			11/01/16 02:18	8.92
trans-1,3-Dichloropropene	ND		3.6	0.78	ppb v/v			11/01/16 02:18	8.92
Ethylbenzene	ND		3.6	0.56	ppb v/v			11/01/16 02:18	8.92
4-Ethyltoluene	ND		3.6	1.7	ppb v/v			11/01/16 02:18	8.92
Hexachlorobutadiene	ND		18	3.9	ppb v/v			11/01/16 02:18	8.92
2-Hexanone	ND		3.6	0.78	ppb v/v			11/01/16 02:18	8.92
4-Methyl-2-pentanone (MIBK)	ND		3.6	1.2	ppb v/v			11/01/16 02:18	8.92
Methylene Chloride	3.8		3.6	0.64	ppb v/v			11/01/16 02:18	8.92
Styrene	ND		3.6	0.53	ppb v/v			11/01/16 02:18	8.92
1,1,2,2-Tetrachloroethane	ND		3.6	0.62	ppb v/v			11/01/16 02:18	8.92
Tetrachloroethene	270		3.6	0.45	ppb v/v			11/01/16 02:18	8.92
Toluene	ND		3.6	0.45	ppb v/v			11/01/16 02:18	8.92
1,1,2-Trichloro-1,2,2-trifluoroethane	180		3.6	1.5	ppb v/v			11/01/16 02:18	8.92
1,2,4-Trichlorobenzene	ND		18	3.9	ppb v/v			11/01/16 02:18	8.92
1,1,1-Trichloroethane	3.3		2.7	0.58	ppb v/v			11/01/16 02:18	8.92
1,1,2-Trichloroethane	ND		3.6	0.60	ppb v/v			11/01/16 02:18	8.92
Trichloroethene	270		3.6	0.94	ppb v/v			11/01/16 02:18	8.92
Trichlorofluoromethane	35		3.6	1.7	ppb v/v			11/01/16 02:18	8.92
1,2,4-Trimethylbenzene	ND		7.1	1.4	ppb v/v			11/01/16 02:18	8.92
1,3,5-Trimethylbenzene	ND		3.6	1.1	ppb v/v			11/01/16 02:18	8.92
Vinyl acetate	ND		7.1	1.3	ppb v/v			11/01/16 02:18	8.92
Vinyl chloride	ND		3.6	1.1	ppb v/v			11/01/16 02:18	8.92
m,p-Xylene	ND		7.1	0.89	ppb v/v			11/01/16 02:18	8.92
o-Xylene	ND		3.6	0.48	ppb v/v			11/01/16 02:18	8.92

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130		11/01/16 02:18	8.92
1,2-Dichloroethane-d4 (Surr)	101		70 - 130		11/01/16 02:18	8.92
Toluene-d8 (Surr)	95		70 - 130		11/01/16 02:18	8.92

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100743-001/MWL-SV03-300

Lab Sample ID: 320-22820-8

Date Collected: 10/13/16 09:54

Matrix: Air

Date Received: 10/19/16 14:10

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	6.9	J	57	2.0	ppb v/v			11/01/16 03:10	11.4
Benzene	ND		4.6	0.90	ppb v/v			11/01/16 03:10	11.4
Benzyl chloride	ND		9.1	1.9	ppb v/v			11/01/16 03:10	11.4
Bromodichloromethane	ND		3.4	0.75	ppb v/v			11/01/16 03:10	11.4
Bromoform	ND		4.6	0.80	ppb v/v			11/01/16 03:10	11.4
Bromomethane	ND		9.1	3.8	ppb v/v			11/01/16 03:10	11.4
2-Butanone (MEK)	ND		9.1	2.3	ppb v/v			11/01/16 03:10	11.4
Carbon disulfide	13		9.1	0.89	ppb v/v			11/01/16 03:10	11.4
Carbon tetrachloride	ND		9.1	0.73	ppb v/v			11/01/16 03:10	11.4
Chlorobenzene	ND		3.4	0.73	ppb v/v			11/01/16 03:10	11.4
Chloroethane	ND		9.1	3.5	ppb v/v			11/01/16 03:10	11.4
Chloroform	1.4	J	3.4	1.1	ppb v/v			11/01/16 03:10	11.4
Chloromethane	ND		9.1	2.2	ppb v/v			11/01/16 03:10	11.4
Dibromochloromethane	ND		4.6	0.90	ppb v/v			11/01/16 03:10	11.4
1,2-Dibromoethane (EDB)	ND		9.1	0.86	ppb v/v			11/01/16 03:10	11.4
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.6	1.8	ppb v/v			11/01/16 03:10	11.4
1,2-Dichlorobenzene	ND		4.6	1.5	ppb v/v			11/01/16 03:10	11.4
1,3-Dichlorobenzene	ND		4.6	1.3	ppb v/v			11/01/16 03:10	11.4
1,4-Dichlorobenzene	ND		4.6	1.7	ppb v/v			11/01/16 03:10	11.4
Dichlorodifluoromethane	39		4.6	1.7	ppb v/v			11/01/16 03:10	11.4
1,1-Dichloroethane	3.4		3.4	0.82	ppb v/v			11/01/16 03:10	11.4
1,2-Dichloroethane	ND		9.1	1.0	ppb v/v			11/01/16 03:10	11.4
1,1-Dichloroethene	22		9.1	1.5	ppb v/v			11/01/16 03:10	11.4
cis-1,2-Dichloroethene	2.3	J	4.6	1.0	ppb v/v			11/01/16 03:10	11.4
trans-1,2-Dichloroethene	ND		4.6	1.1	ppb v/v			11/01/16 03:10	11.4
1,2-Dichloropropane	ND		4.6	2.7	ppb v/v			11/01/16 03:10	11.4
cis-1,3-Dichloropropene	ND		4.6	1.2	ppb v/v			11/01/16 03:10	11.4
trans-1,3-Dichloropropene	ND		4.6	1.0	ppb v/v			11/01/16 03:10	11.4
Ethylbenzene	ND		4.6	0.72	ppb v/v			11/01/16 03:10	11.4
4-Ethyltoluene	ND		4.6	2.1	ppb v/v			11/01/16 03:10	11.4
Hexachlorobutadiene	ND		23	4.9	ppb v/v			11/01/16 03:10	11.4
2-Hexanone	ND		4.6	0.99	ppb v/v			11/01/16 03:10	11.4
4-Methyl-2-pentanone (MIBK)	ND		4.6	1.5	ppb v/v			11/01/16 03:10	11.4
Methylene Chloride	ND		4.6	0.82	ppb v/v			11/01/16 03:10	11.4
Styrene	ND		4.6	0.67	ppb v/v			11/01/16 03:10	11.4
1,1,2,2-Tetrachloroethane	ND		4.6	0.79	ppb v/v			11/01/16 03:10	11.4
Tetrachloroethene	300		4.6	0.58	ppb v/v			11/01/16 03:10	11.4
Toluene	ND		4.6	0.58	ppb v/v			11/01/16 03:10	11.4
1,1,2-Trichloro-1,2,2-trifluoroethane	120		4.6	1.9	ppb v/v			11/01/16 03:10	11.4
1,2,4-Trichlorobenzene	ND		23	4.9	ppb v/v			11/01/16 03:10	11.4
1,1,1-Trichloroethane	1.3	J	3.4	0.74	ppb v/v			11/01/16 03:10	11.4
1,1,2-Trichloroethane	ND		4.6	0.76	ppb v/v			11/01/16 03:10	11.4
Trichloroethene	220		4.6	1.2	ppb v/v			11/01/16 03:10	11.4
Trichlorofluoromethane	15		4.6	2.2	ppb v/v			11/01/16 03:10	11.4
1,2,4-Trimethylbenzene	ND		9.1	1.8	ppb v/v			11/01/16 03:10	11.4
1,3,5-Trimethylbenzene	ND		4.6	1.4	ppb v/v			11/01/16 03:10	11.4
Vinyl acetate	ND		9.1	1.7	ppb v/v			11/01/16 03:10	11.4
Vinyl chloride	ND		4.6	1.4	ppb v/v			11/01/16 03:10	11.4

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100736-001/MWL-SV01-42.5

Lab Sample ID: 320-22820-1

Date Collected: 10/13/16 12:17

Matrix: Air

Date Received: 10/19/16 14:10

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	3.6	J	69	2.5	ppb v/v			10/31/16 20:51	13.8
Benzene	ND		5.5	1.1	ppb v/v			10/31/16 20:51	13.8
Benzyl chloride	ND		11	2.2	ppb v/v			10/31/16 20:51	13.8
Bromodichloromethane	ND		4.1	0.91	ppb v/v			10/31/16 20:51	13.8
Bromoform	ND		5.5	0.97	ppb v/v			10/31/16 20:51	13.8
Bromomethane	ND		11	4.6	ppb v/v			10/31/16 20:51	13.8
2-Butanone (MEK)	ND		11	2.7	ppb v/v			10/31/16 20:51	13.8
Carbon disulfide	ND		11	1.1	ppb v/v			10/31/16 20:51	13.8
Carbon tetrachloride	ND		11	0.88	ppb v/v			10/31/16 20:51	13.8
Chlorobenzene	ND		4.1	0.88	ppb v/v			10/31/16 20:51	13.8
Chloroethane	ND		11	4.3	ppb v/v			10/31/16 20:51	13.8
Chloroform	15		4.1	1.3	ppb v/v			10/31/16 20:51	13.8
Chloromethane	ND		11	2.7	ppb v/v			10/31/16 20:51	13.8
Dibromochloromethane	ND		5.5	1.1	ppb v/v			10/31/16 20:51	13.8
1,2-Dibromoethane (EDB)	ND		11	1.0	ppb v/v			10/31/16 20:51	13.8
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		5.5	2.1	ppb v/v			10/31/16 20:51	13.8
1,2-Dichlorobenzene	ND		5.5	1.8	ppb v/v			10/31/16 20:51	13.8
1,3-Dichlorobenzene	ND		5.5	1.5	ppb v/v			10/31/16 20:51	13.8
1,4-Dichlorobenzene	ND		5.5	2.1	ppb v/v			10/31/16 20:51	13.8
Dichlorodifluoromethane	95		5.5	2.0	ppb v/v			10/31/16 20:51	13.8
1,1-Dichloroethane	1.4	J	4.1	0.99	ppb v/v			10/31/16 20:51	13.8
1,2-Dichloroethane	ND		11	1.2	ppb v/v			10/31/16 20:51	13.8
1,1-Dichloroethene	7.7	J	11	1.8	ppb v/v			10/31/16 20:51	13.8
cis-1,2-Dichloroethene	ND		5.5	1.2	ppb v/v			10/31/16 20:51	13.8
trans-1,2-Dichloroethene	ND		5.5	1.4	ppb v/v			10/31/16 20:51	13.8
1,2-Dichloropropane	ND		5.5	3.3	ppb v/v			10/31/16 20:51	13.8
cis-1,3-Dichloropropene	ND		5.5	1.4	ppb v/v			10/31/16 20:51	13.8
trans-1,3-Dichloropropene	ND		5.5	1.2	ppb v/v			10/31/16 20:51	13.8
Ethylbenzene	ND		5.5	0.87	ppb v/v			10/31/16 20:51	13.8
4-Ethyltoluene	ND		5.5	2.6	ppb v/v			10/31/16 20:51	13.8
Hexachlorobutadiene	ND		28	6.0	ppb v/v			10/31/16 20:51	13.8
2-Hexanone	ND		5.5	1.2	ppb v/v			10/31/16 20:51	13.8
4-Methyl-2-pentanone (MIBK)	ND		5.5	1.9	ppb v/v			10/31/16 20:51	13.8
Methylene Chloride	ND		5.5	0.99	ppb v/v			10/31/16 20:51	13.8
Styrene	ND		5.5	0.81	ppb v/v			10/31/16 20:51	13.8
1,1,2,2-Tetrachloroethane	ND		5.5	0.95	ppb v/v			10/31/16 20:51	13.8
Tetrachloroethene	450		5.5	0.70	ppb v/v			10/31/16 20:51	13.8
Toluene	ND		5.5	0.70	ppb v/v			10/31/16 20:51	13.8
1,1,2-Trichloro-1,2,2-trifluoroethane	82		5.5	2.2	ppb v/v			10/31/16 20:51	13.8
1,2,4-Trichlorobenzene	ND		28	6.0	ppb v/v			10/31/16 20:51	13.8
1,1,1-Trichloroethane	41		4.1	0.90	ppb v/v			10/31/16 20:51	13.8
1,1,2-Trichloroethane	ND		5.5	0.92	ppb v/v			10/31/16 20:51	13.8
Trichloroethene	100		5.5	1.4	ppb v/v			10/31/16 20:51	13.8
Trichlorofluoromethane	180		5.5	2.7	ppb v/v			10/31/16 20:51	13.8
1,2,4-Trimethylbenzene	ND		11	2.2	ppb v/v			10/31/16 20:51	13.8
1,3,5-Trimethylbenzene	ND		5.5	1.7	ppb v/v			10/31/16 20:51	13.8
Vinyl acetate	ND		11	2.0	ppb v/v			10/31/16 20:51	13.8

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100736-001/MWL-SV01-42.5

Lab Sample ID: 320-22820-1

Date Collected: 10/13/16 12:17

Matrix: Air

Date Received: 10/19/16 14:10

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		5.5	1.7	ppb v/v			10/31/16 20:51	13.8
m,p-Xylene	ND		11	1.4	ppb v/v			10/31/16 20:51	13.8
o-Xylene	ND		5.5	0.75	ppb v/v			10/31/16 20:51	13.8

Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		70 - 130					10/31/16 20:51	13.8
1,2-Dichloroethane-d4 (Surr)	96		70 - 130					10/31/16 20:51	13.8
Toluene-d8 (Surr)	94		70 - 130					10/31/16 20:51	13.8

Client Sample ID: 100737-001/MWL-FB1

Lab Sample ID: 320-22820-2

Date Collected: 10/13/16 12:04

Matrix: Air

Date Received: 10/19/16 14:10

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			10/31/16 21:49	1
Benzene	ND		0.40	0.079	ppb v/v			10/31/16 21:49	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			10/31/16 21:49	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			10/31/16 21:49	1
Bromoform	ND		0.40	0.070	ppb v/v			10/31/16 21:49	1
Bromomethane	ND		0.80	0.34	ppb v/v			10/31/16 21:49	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			10/31/16 21:49	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			10/31/16 21:49	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			10/31/16 21:49	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			10/31/16 21:49	1
Chloroethane	ND		0.80	0.31	ppb v/v			10/31/16 21:49	1
Chloroform	ND		0.30	0.095	ppb v/v			10/31/16 21:49	1
Chloromethane	ND		0.80	0.20	ppb v/v			10/31/16 21:49	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			10/31/16 21:49	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			10/31/16 21:49	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			10/31/16 21:49	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			10/31/16 21:49	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			10/31/16 21:49	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			10/31/16 21:49	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			10/31/16 21:49	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			10/31/16 21:49	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			10/31/16 21:49	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			10/31/16 21:49	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			10/31/16 21:49	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			10/31/16 21:49	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			10/31/16 21:49	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			10/31/16 21:49	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			10/31/16 21:49	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			10/31/16 21:49	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			10/31/16 21:49	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			10/31/16 21:49	1
2-Hexanone	ND		0.40	0.087	ppb v/v			10/31/16 21:49	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			10/31/16 21:49	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100737-001/MWL-FB1

Lab Sample ID: 320-22820-2

Date Collected: 10/13/16 12:04

Matrix: Air

Date Received: 10/19/16 14:10

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	0.14	J	0.40	0.072	ppb v/v			10/31/16 21:49	1
Styrene	ND		0.40	0.059	ppb v/v			10/31/16 21:49	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			10/31/16 21:49	1
Tetrachloroethene	0.35	J	0.40	0.051	ppb v/v			10/31/16 21:49	1
Toluene	ND		0.40	0.051	ppb v/v			10/31/16 21:49	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			10/31/16 21:49	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			10/31/16 21:49	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			10/31/16 21:49	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			10/31/16 21:49	1
Trichloroethene	ND		0.40	0.11	ppb v/v			10/31/16 21:49	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			10/31/16 21:49	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			10/31/16 21:49	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			10/31/16 21:49	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			10/31/16 21:49	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			10/31/16 21:49	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			10/31/16 21:49	1
o-Xylene	ND		0.40	0.054	ppb v/v			10/31/16 21:49	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130		10/31/16 21:49	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 130		10/31/16 21:49	1
Toluene-d8 (Surr)	95		70 - 130		10/31/16 21:49	1

Client Sample ID: 100738-001/MWL-SV02-41.5

Lab Sample ID: 320-22820-3

Date Collected: 10/13/16 12:11

Matrix: Air

Date Received: 10/19/16 14:10

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	3.9	J	48	1.7	ppb v/v			10/31/16 22:41	9.62
Benzene	ND		3.8	0.76	ppb v/v			10/31/16 22:41	9.62
Benzyl chloride	ND		7.7	1.6	ppb v/v			10/31/16 22:41	9.62
Bromodichloromethane	ND		2.9	0.63	ppb v/v			10/31/16 22:41	9.62
Bromoform	ND		3.8	0.67	ppb v/v			10/31/16 22:41	9.62
Bromomethane	ND		7.7	3.2	ppb v/v			10/31/16 22:41	9.62
2-Butanone (MEK)	3.3	J	7.7	1.9	ppb v/v			10/31/16 22:41	9.62
Carbon disulfide	ND		7.7	0.75	ppb v/v			10/31/16 22:41	9.62
Carbon tetrachloride	ND		7.7	0.62	ppb v/v			10/31/16 22:41	9.62
Chlorobenzene	ND		2.9	0.62	ppb v/v			10/31/16 22:41	9.62
Chloroethane	ND		7.7	3.0	ppb v/v			10/31/16 22:41	9.62
Chloroform	3.1		2.9	0.91	ppb v/v			10/31/16 22:41	9.62
Chloromethane	ND		7.7	1.9	ppb v/v			10/31/16 22:41	9.62
Dibromochloromethane	ND		3.8	0.76	ppb v/v			10/31/16 22:41	9.62
1,2-Dibromoethane (EDB)	ND		7.7	0.72	ppb v/v			10/31/16 22:41	9.62
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.8	1.5	ppb v/v			10/31/16 22:41	9.62
1,2-Dichlorobenzene	ND		3.8	1.3	ppb v/v			10/31/16 22:41	9.62
1,3-Dichlorobenzene	ND		3.8	1.1	ppb v/v			10/31/16 22:41	9.62
1,4-Dichlorobenzene	ND		3.8	1.4	ppb v/v			10/31/16 22:41	9.62

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100738-001/MWL-SV02-41.5

Lab Sample ID: 320-22820-3

Date Collected: 10/13/16 12:11

Matrix: Air

Date Received: 10/19/16 14:10

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
Dichlorodifluoromethane	97		3.8	1.4	ppb v/v			10/31/16 22:41	9.62
1,1-Dichloroethane	2.5	J	2.9	0.69	ppb v/v			10/31/16 22:41	9.62
1,2-Dichloroethane	ND		7.7	0.85	ppb v/v			10/31/16 22:41	9.62
1,1-Dichloroethene	11		7.7	1.2	ppb v/v			10/31/16 22:41	9.62
cis-1,2-Dichloroethene	ND		3.8	0.86	ppb v/v			10/31/16 22:41	9.62
trans-1,2-Dichloroethene	ND		3.8	0.96	ppb v/v			10/31/16 22:41	9.62
1,2-Dichloropropane	ND		3.8	2.3	ppb v/v			10/31/16 22:41	9.62
cis-1,3-Dichloropropene	ND		3.8	1.0	ppb v/v			10/31/16 22:41	9.62
trans-1,3-Dichloropropene	ND		3.8	0.85	ppb v/v			10/31/16 22:41	9.62
Ethylbenzene	ND		3.8	0.61	ppb v/v			10/31/16 22:41	9.62
4-Ethyltoluene	ND		3.8	1.8	ppb v/v			10/31/16 22:41	9.62
Hexachlorobutadiene	ND		19	4.2	ppb v/v			10/31/16 22:41	9.62
2-Hexanone	ND		3.8	0.84	ppb v/v			10/31/16 22:41	9.62
4-Methyl-2-pentanone (MIBK)	ND		3.8	1.3	ppb v/v			10/31/16 22:41	9.62
Methylene Chloride	ND		3.8	0.69	ppb v/v			10/31/16 22:41	9.62
Styrene	ND		3.8	0.57	ppb v/v			10/31/16 22:41	9.62
1,1,2,2-Tetrachloroethane	ND		3.8	0.66	ppb v/v			10/31/16 22:41	9.62
Tetrachloroethene	70		3.8	0.49	ppb v/v			10/31/16 22:41	9.62
Toluene	ND		3.8	0.49	ppb v/v			10/31/16 22:41	9.62
1,1,2-Trichloro-1,2,2-trifluoroethane	53		3.8	1.6	ppb v/v			10/31/16 22:41	9.62
1,2,4-Trichlorobenzene	ND		19	4.2	ppb v/v			10/31/16 22:41	9.62
1,1,1-Trichloroethane	79		2.9	0.63	ppb v/v			10/31/16 22:41	9.62
1,1,2-Trichloroethane	ND		3.8	0.64	ppb v/v			10/31/16 22:41	9.62
Trichloroethene	65		3.8	1.0	ppb v/v			10/31/16 22:41	9.62
Trichlorofluoromethane	320		3.8	1.9	ppb v/v			10/31/16 22:41	9.62
1,2,4-Trimethylbenzene	ND		7.7	1.6	ppb v/v			10/31/16 22:41	9.62
1,3,5-Trimethylbenzene	ND		3.8	1.2	ppb v/v			10/31/16 22:41	9.62
Vinyl acetate	ND		7.7	1.4	ppb v/v			10/31/16 22:41	9.62
Vinyl chloride	ND		3.8	1.2	ppb v/v			10/31/16 22:41	9.62
m,p-Xylene	ND		7.7	0.96	ppb v/v			10/31/16 22:41	9.62
o-Xylene	ND		3.8	0.52	ppb v/v			10/31/16 22:41	9.62

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130		10/31/16 22:41	9.62
1,2-Dichloroethane-d4 (Surr)	98		70 - 130		10/31/16 22:41	9.62
Toluene-d8 (Surr)	98		70 - 130		10/31/16 22:41	9.62

Client Sample ID: 100739-001/MWL-FB2

Lab Sample ID: 320-22820-4

Date Collected: 10/13/16 12:01

Matrix: Air

Date Received: 10/19/16 14:10

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			10/31/16 23:40	1
Benzene	ND		0.40	0.079	ppb v/v			10/31/16 23:40	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			10/31/16 23:40	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			10/31/16 23:40	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100739-001/MWL-FB2

Lab Sample ID: 320-22820-4

Date Collected: 10/13/16 12:01

Matrix: Air

Date Received: 10/19/16 14:10

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
Bromoform	ND		0.40	0.070	ppb v/v			10/31/16 23:40	1
Bromomethane	ND		0.80	0.34	ppb v/v			10/31/16 23:40	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			10/31/16 23:40	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			10/31/16 23:40	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			10/31/16 23:40	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			10/31/16 23:40	1
Chloroethane	ND		0.80	0.31	ppb v/v			10/31/16 23:40	1
Chloroform	ND		0.30	0.095	ppb v/v			10/31/16 23:40	1
Chloromethane	ND		0.80	0.20	ppb v/v			10/31/16 23:40	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			10/31/16 23:40	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			10/31/16 23:40	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			10/31/16 23:40	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			10/31/16 23:40	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			10/31/16 23:40	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			10/31/16 23:40	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			10/31/16 23:40	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			10/31/16 23:40	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			10/31/16 23:40	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			10/31/16 23:40	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			10/31/16 23:40	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			10/31/16 23:40	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			10/31/16 23:40	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			10/31/16 23:40	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			10/31/16 23:40	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			10/31/16 23:40	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			10/31/16 23:40	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			10/31/16 23:40	1
2-Hexanone	ND		0.40	0.087	ppb v/v			10/31/16 23:40	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			10/31/16 23:40	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			10/31/16 23:40	1
Styrene	ND		0.40	0.059	ppb v/v			10/31/16 23:40	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			10/31/16 23:40	1
Tetrachloroethene	0.13	J	0.40	0.051	ppb v/v			10/31/16 23:40	1
Toluene	ND		0.40	0.051	ppb v/v			10/31/16 23:40	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			10/31/16 23:40	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			10/31/16 23:40	1
1,1,1-Trichloroethane	0.13	J	0.30	0.065	ppb v/v			10/31/16 23:40	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			10/31/16 23:40	1
Trichloroethene	ND		0.40	0.11	ppb v/v			10/31/16 23:40	1
Trichlorofluoromethane	0.49		0.40	0.20	ppb v/v			10/31/16 23:40	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			10/31/16 23:40	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			10/31/16 23:40	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			10/31/16 23:40	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			10/31/16 23:40	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			10/31/16 23:40	1
o-Xylene	ND		0.40	0.054	ppb v/v			10/31/16 23:40	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130		10/31/16 23:40	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100739-001/MWL-FB2

Date Collected: 10/13/16 12:01

Date Received: 10/19/16 14:10

Sample Container: Summa Canister 6L

Lab Sample ID: 320-22820-4

Matrix: Air

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	96		70 - 130		10/31/16 23:40	1
Toluene-d8 (Surr)	98		70 - 130		10/31/16 23:40	1

Client Sample ID: 100740-001/MWL-SV03-50

Date Collected: 10/13/16 09:41

Date Received: 10/19/16 14:10

Sample Container: Summa Canister 6L

Lab Sample ID: 320-22820-5

Matrix: Air

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	6.9	J	22	0.80	ppb v/v			11/01/16 00:33	4.47
Benzene	0.79	J	1.8	0.35	ppb v/v			11/01/16 00:33	4.47
Benzyl chloride	ND		3.6	0.73	ppb v/v			11/01/16 00:33	4.47
Bromodichloromethane	ND		1.3	0.30	ppb v/v			11/01/16 00:33	4.47
Bromoform	ND		1.8	0.31	ppb v/v			11/01/16 00:33	4.47
Bromomethane	ND		3.6	1.5	ppb v/v			11/01/16 00:33	4.47
2-Butanone (MEK)	ND		3.6	0.89	ppb v/v			11/01/16 00:33	4.47
Carbon disulfide	1.3	J	3.6	0.35	ppb v/v			11/01/16 00:33	4.47
Carbon tetrachloride	ND		3.6	0.29	ppb v/v			11/01/16 00:33	4.47
Chlorobenzene	ND		1.3	0.29	ppb v/v			11/01/16 00:33	4.47
Chloroethane	ND		3.6	1.4	ppb v/v			11/01/16 00:33	4.47
Chloroform	1.9		1.3	0.42	ppb v/v			11/01/16 00:33	4.47
Chloromethane	ND		3.6	0.88	ppb v/v			11/01/16 00:33	4.47
Dibromochloromethane	ND		1.8	0.35	ppb v/v			11/01/16 00:33	4.47
1,2-Dibromoethane (EDB)	ND		3.6	0.34	ppb v/v			11/01/16 00:33	4.47
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.8	0.69	ppb v/v			11/01/16 00:33	4.47
1,2-Dichlorobenzene	ND		1.8	0.58	ppb v/v			11/01/16 00:33	4.47
1,3-Dichlorobenzene	ND		1.8	0.49	ppb v/v			11/01/16 00:33	4.47
1,4-Dichlorobenzene	ND		1.8	0.67	ppb v/v			11/01/16 00:33	4.47
Dichlorodifluoromethane	30		1.8	0.65	ppb v/v			11/01/16 00:33	4.47
1,1-Dichloroethane	3.3		1.3	0.32	ppb v/v			11/01/16 00:33	4.47
1,2-Dichloroethane	ND		3.6	0.39	ppb v/v			11/01/16 00:33	4.47
1,1-Dichloroethene	12		3.6	0.58	ppb v/v			11/01/16 00:33	4.47
cis-1,2-Dichloroethene	1.7	J	1.8	0.40	ppb v/v			11/01/16 00:33	4.47
trans-1,2-Dichloroethene	ND		1.8	0.45	ppb v/v			11/01/16 00:33	4.47
1,2-Dichloropropane	ND		1.8	1.1	ppb v/v			11/01/16 00:33	4.47
cis-1,3-Dichloropropene	ND		1.8	0.46	ppb v/v			11/01/16 00:33	4.47
trans-1,3-Dichloropropene	ND		1.8	0.39	ppb v/v			11/01/16 00:33	4.47
Ethylbenzene	ND		1.8	0.28	ppb v/v			11/01/16 00:33	4.47
4-Ethyltoluene	ND		1.8	0.84	ppb v/v			11/01/16 00:33	4.47
Hexachlorobutadiene	ND		8.9	1.9	ppb v/v			11/01/16 00:33	4.47
2-Hexanone	ND		1.8	0.39	ppb v/v			11/01/16 00:33	4.47
4-Methyl-2-pentanone (MIBK)	ND		1.8	0.60	ppb v/v			11/01/16 00:33	4.47
Methylene Chloride	0.59	J	1.8	0.32	ppb v/v			11/01/16 00:33	4.47
Styrene	ND		1.8	0.26	ppb v/v			11/01/16 00:33	4.47
1,1,2,2-Tetrachloroethane	ND		1.8	0.31	ppb v/v			11/01/16 00:33	4.47
Tetrachloroethene	140		1.8	0.23	ppb v/v			11/01/16 00:33	4.47
Toluene	ND		1.8	0.23	ppb v/v			11/01/16 00:33	4.47

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100740-001/MWL-SV03-50

Lab Sample ID: 320-22820-5

Date Collected: 10/13/16 09:41

Matrix: Air

Date Received: 10/19/16 14:10

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
1,1,2-Trichloro-1,2,2-trifluoroethane	78		1.8	0.73	ppb v/v			11/01/16 00:33	4.47
1,2,4-Trichlorobenzene	ND		8.9	1.9	ppb v/v			11/01/16 00:33	4.47
1,1,1-Trichloroethane	5.0		1.3	0.29	ppb v/v			11/01/16 00:33	4.47
1,1,2-Trichloroethane	ND		1.8	0.30	ppb v/v			11/01/16 00:33	4.47
Trichloroethene	110		1.8	0.47	ppb v/v			11/01/16 00:33	4.47
Trichlorofluoromethane	31		1.8	0.88	ppb v/v			11/01/16 00:33	4.47
1,2,4-Trimethylbenzene	ND		3.6	0.72	ppb v/v			11/01/16 00:33	4.47
1,3,5-Trimethylbenzene	ND		1.8	0.56	ppb v/v			11/01/16 00:33	4.47
Vinyl acetate	ND		3.6	0.65	ppb v/v			11/01/16 00:33	4.47
Vinyl chloride	ND		1.8	0.54	ppb v/v			11/01/16 00:33	4.47
m,p-Xylene	ND		3.6	0.45	ppb v/v			11/01/16 00:33	4.47
o-Xylene	ND		1.8	0.24	ppb v/v			11/01/16 00:33	4.47

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130		11/01/16 00:33	4.47
1,2-Dichloroethane-d4 (Surr)	100		70 - 130		11/01/16 00:33	4.47
Toluene-d8 (Surr)	96		70 - 130		11/01/16 00:33	4.47

Client Sample ID: 100741-001/MWL-SV03-100

Lab Sample ID: 320-22820-6

Date Collected: 10/13/16 09:44

Matrix: Air

Date Received: 10/19/16 14:10

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	2.6	J	22	0.79	ppb v/v			11/01/16 01:26	4.42
Benzene	ND		1.8	0.35	ppb v/v			11/01/16 01:26	4.42
Benzyl chloride	ND		3.5	0.72	ppb v/v			11/01/16 01:26	4.42
Bromodichloromethane	ND		1.3	0.29	ppb v/v			11/01/16 01:26	4.42
Bromoform	ND		1.8	0.31	ppb v/v			11/01/16 01:26	4.42
Bromomethane	ND		3.5	1.5	ppb v/v			11/01/16 01:26	4.42
2-Butanone (MEK)	ND		3.5	0.88	ppb v/v			11/01/16 01:26	4.42
Carbon disulfide	ND		3.5	0.34	ppb v/v			11/01/16 01:26	4.42
Carbon tetrachloride	0.32	J	3.5	0.28	ppb v/v			11/01/16 01:26	4.42
Chlorobenzene	ND		1.3	0.28	ppb v/v			11/01/16 01:26	4.42
Chloroethane	ND		3.5	1.4	ppb v/v			11/01/16 01:26	4.42
Chloroform	2.6		1.3	0.42	ppb v/v			11/01/16 01:26	4.42
Chloromethane	ND		3.5	0.87	ppb v/v			11/01/16 01:26	4.42
Dibromochloromethane	ND		1.8	0.35	ppb v/v			11/01/16 01:26	4.42
1,2-Dibromoethane (EDB)	ND		3.5	0.33	ppb v/v			11/01/16 01:26	4.42
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.8	0.69	ppb v/v			11/01/16 01:26	4.42
1,2-Dichlorobenzene	ND		1.8	0.57	ppb v/v			11/01/16 01:26	4.42
1,3-Dichlorobenzene	ND		1.8	0.49	ppb v/v			11/01/16 01:26	4.42
1,4-Dichlorobenzene	ND		1.8	0.66	ppb v/v			11/01/16 01:26	4.42
Dichlorodifluoromethane	48		1.8	0.64	ppb v/v			11/01/16 01:26	4.42
1,1-Dichloroethane	6.6		1.3	0.32	ppb v/v			11/01/16 01:26	4.42
1,2-Dichloroethane	ND		3.5	0.39	ppb v/v			11/01/16 01:26	4.42
1,1-Dichloroethene	26		3.5	0.57	ppb v/v			11/01/16 01:26	4.42

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100741-001/MWL-SV03-100

Lab Sample ID: 320-22820-6

Date Collected: 10/13/16 09:44

Matrix: Air

Date Received: 10/19/16 14:10

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
cis-1,2-Dichloroethene	3.9		1.8	0.39	ppb v/v			11/01/16 01:26	4.42
trans-1,2-Dichloroethene	ND		1.8	0.44	ppb v/v			11/01/16 01:26	4.42
1,2-Dichloropropane	ND		1.8	1.1	ppb v/v			11/01/16 01:26	4.42
cis-1,3-Dichloropropene	ND		1.8	0.46	ppb v/v			11/01/16 01:26	4.42
trans-1,3-Dichloropropene	ND		1.8	0.39	ppb v/v			11/01/16 01:26	4.42
Ethylbenzene	ND		1.8	0.28	ppb v/v			11/01/16 01:26	4.42
4-Ethyltoluene	ND		1.8	0.83	ppb v/v			11/01/16 01:26	4.42
Hexachlorobutadiene	ND		8.8	1.9	ppb v/v			11/01/16 01:26	4.42
2-Hexanone	ND		1.8	0.38	ppb v/v			11/01/16 01:26	4.42
4-Methyl-2-pentanone (MIBK)	ND		1.8	0.60	ppb v/v			11/01/16 01:26	4.42
Methylene Chloride	1.8		1.8	0.32	ppb v/v			11/01/16 01:26	4.42
Styrene	ND		1.8	0.26	ppb v/v			11/01/16 01:26	4.42
1,1,2,2-Tetrachloroethane	ND		1.8	0.30	ppb v/v			11/01/16 01:26	4.42
Tetrachloroethene	240		1.8	0.23	ppb v/v			11/01/16 01:26	4.42
Toluene	ND		1.8	0.23	ppb v/v			11/01/16 01:26	4.42
1,1,2-Trichloro-1,2,2-trifluoroethane	150		1.8	0.72	ppb v/v			11/01/16 01:26	4.42
1,2,4-Trichlorobenzene	ND		8.8	1.9	ppb v/v			11/01/16 01:26	4.42
1,1,1-Trichloroethane	5.6		1.3	0.29	ppb v/v			11/01/16 01:26	4.42
1,1,2-Trichloroethane	ND		1.8	0.30	ppb v/v			11/01/16 01:26	4.42
Trichloroethene	210		1.8	0.46	ppb v/v			11/01/16 01:26	4.42
Trichlorofluoromethane	42		1.8	0.87	ppb v/v			11/01/16 01:26	4.42
1,2,4-Trimethylbenzene	ND		3.5	0.72	ppb v/v			11/01/16 01:26	4.42
1,3,5-Trimethylbenzene	ND		1.8	0.55	ppb v/v			11/01/16 01:26	4.42
Vinyl acetate	ND		3.5	0.64	ppb v/v			11/01/16 01:26	4.42
Vinyl chloride	ND		1.8	0.53	ppb v/v			11/01/16 01:26	4.42
m,p-Xylene	ND		3.5	0.44	ppb v/v			11/01/16 01:26	4.42
o-Xylene	ND		1.8	0.24	ppb v/v			11/01/16 01:26	4.42
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					11/01/16 01:26	4.42
1,2-Dichloroethane-d4 (Surr)	100		70 - 130					11/01/16 01:26	4.42
Toluene-d8 (Surr)	96		70 - 130					11/01/16 01:26	4.42

Client Sample ID: 100742-001/MWL-SV03-200

Lab Sample ID: 320-22820-7

Date Collected: 10/13/16 09:48

Matrix: Air

Date Received: 10/19/16 14:10

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	6.7	J	45	1.6	ppb v/v			11/01/16 02:18	8.92
Benzene	ND		3.6	0.70	ppb v/v			11/01/16 02:18	8.92
Benzyl chloride	ND		7.1	1.5	ppb v/v			11/01/16 02:18	8.92
Bromodichloromethane	ND		2.7	0.59	ppb v/v			11/01/16 02:18	8.92
Bromoform	ND		3.6	0.62	ppb v/v			11/01/16 02:18	8.92
Bromomethane	ND		7.1	3.0	ppb v/v			11/01/16 02:18	8.92
2-Butanone (MEK)	ND		7.1	1.8	ppb v/v			11/01/16 02:18	8.92
Carbon disulfide	ND		7.1	0.70	ppb v/v			11/01/16 02:18	8.92

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100742-001/MWL-SV03-200

Lab Sample ID: 320-22820-7

Date Collected: 10/13/16 09:48

Matrix: Air

Date Received: 10/19/16 14:10

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
Carbon tetrachloride	ND		7.1	0.57	ppb v/v			11/01/16 02:18	8.92
Chlorobenzene	ND		2.7	0.57	ppb v/v			11/01/16 02:18	8.92
Chloroethane	ND		7.1	2.7	ppb v/v			11/01/16 02:18	8.92
Chloroform	2.6	J	2.7	0.85	ppb v/v			11/01/16 02:18	8.92
Chloromethane	ND		7.1	1.8	ppb v/v			11/01/16 02:18	8.92
Dibromochloromethane	ND		3.6	0.70	ppb v/v			11/01/16 02:18	8.92
1,2-Dibromoethane (EDB)	ND		7.1	0.67	ppb v/v			11/01/16 02:18	8.92
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.6	1.4	ppb v/v			11/01/16 02:18	8.92
1,2-Dichlorobenzene	ND		3.6	1.2	ppb v/v			11/01/16 02:18	8.92
1,3-Dichlorobenzene	ND		3.6	0.98	ppb v/v			11/01/16 02:18	8.92
1,4-Dichlorobenzene	ND		3.6	1.3	ppb v/v			11/01/16 02:18	8.92
Dichlorodifluoromethane	60		3.6	1.3	ppb v/v			11/01/16 02:18	8.92
1,1-Dichloroethane	8.7		2.7	0.64	ppb v/v			11/01/16 02:18	8.92
1,2-Dichloroethane	ND		7.1	0.78	ppb v/v			11/01/16 02:18	8.92
1,1-Dichloroethene	34		7.1	1.2	ppb v/v			11/01/16 02:18	8.92
cis-1,2-Dichloroethene	5.1		3.6	0.79	ppb v/v			11/01/16 02:18	8.92
trans-1,2-Dichloroethene	ND		3.6	0.89	ppb v/v			11/01/16 02:18	8.92
1,2-Dichloropropane	ND		3.6	2.1	ppb v/v			11/01/16 02:18	8.92
cis-1,3-Dichloropropene	ND		3.6	0.93	ppb v/v			11/01/16 02:18	8.92
trans-1,3-Dichloropropene	ND		3.6	0.78	ppb v/v			11/01/16 02:18	8.92
Ethylbenzene	ND		3.6	0.56	ppb v/v			11/01/16 02:18	8.92
4-Ethyltoluene	ND		3.6	1.7	ppb v/v			11/01/16 02:18	8.92
Hexachlorobutadiene	ND		18	3.9	ppb v/v			11/01/16 02:18	8.92
2-Hexanone	ND		3.6	0.78	ppb v/v			11/01/16 02:18	8.92
4-Methyl-2-pentanone (MIBK)	ND		3.6	1.2	ppb v/v			11/01/16 02:18	8.92
Methylene Chloride	3.8		3.6	0.64	ppb v/v			11/01/16 02:18	8.92
Styrene	ND		3.6	0.53	ppb v/v			11/01/16 02:18	8.92
1,1,2,2-Tetrachloroethane	ND		3.6	0.62	ppb v/v			11/01/16 02:18	8.92
Tetrachloroethene	270		3.6	0.45	ppb v/v			11/01/16 02:18	8.92
Toluene	ND		3.6	0.45	ppb v/v			11/01/16 02:18	8.92
1,1,2-Trichloro-1,2,2-trifluoroethane	180		3.6	1.5	ppb v/v			11/01/16 02:18	8.92
1,2,4-Trichlorobenzene	ND		18	3.9	ppb v/v			11/01/16 02:18	8.92
1,1,1-Trichloroethane	3.3		2.7	0.58	ppb v/v			11/01/16 02:18	8.92
1,1,2-Trichloroethane	ND		3.6	0.60	ppb v/v			11/01/16 02:18	8.92
Trichloroethene	270		3.6	0.94	ppb v/v			11/01/16 02:18	8.92
Trichlorofluoromethane	35		3.6	1.7	ppb v/v			11/01/16 02:18	8.92
1,2,4-Trimethylbenzene	ND		7.1	1.4	ppb v/v			11/01/16 02:18	8.92
1,3,5-Trimethylbenzene	ND		3.6	1.1	ppb v/v			11/01/16 02:18	8.92
Vinyl acetate	ND		7.1	1.3	ppb v/v			11/01/16 02:18	8.92
Vinyl chloride	ND		3.6	1.1	ppb v/v			11/01/16 02:18	8.92
m,p-Xylene	ND		7.1	0.89	ppb v/v			11/01/16 02:18	8.92
o-Xylene	ND		3.6	0.48	ppb v/v			11/01/16 02:18	8.92

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130		11/01/16 02:18	8.92
1,2-Dichloroethane-d4 (Surr)	101		70 - 130		11/01/16 02:18	8.92
Toluene-d8 (Surr)	95		70 - 130		11/01/16 02:18	8.92

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100743-001/MWL-SV03-300

Lab Sample ID: 320-22820-8

Date Collected: 10/13/16 09:54

Matrix: Air

Date Received: 10/19/16 14:10

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	6.9	J	57	2.0	ppb v/v			11/01/16 03:10	11.4
Benzene	ND		4.6	0.90	ppb v/v			11/01/16 03:10	11.4
Benzyl chloride	ND		9.1	1.9	ppb v/v			11/01/16 03:10	11.4
Bromodichloromethane	ND		3.4	0.75	ppb v/v			11/01/16 03:10	11.4
Bromoform	ND		4.6	0.80	ppb v/v			11/01/16 03:10	11.4
Bromomethane	ND		9.1	3.8	ppb v/v			11/01/16 03:10	11.4
2-Butanone (MEK)	ND		9.1	2.3	ppb v/v			11/01/16 03:10	11.4
Carbon disulfide	13		9.1	0.89	ppb v/v			11/01/16 03:10	11.4
Carbon tetrachloride	ND		9.1	0.73	ppb v/v			11/01/16 03:10	11.4
Chlorobenzene	ND		3.4	0.73	ppb v/v			11/01/16 03:10	11.4
Chloroethane	ND		9.1	3.5	ppb v/v			11/01/16 03:10	11.4
Chloroform	1.4	J	3.4	1.1	ppb v/v			11/01/16 03:10	11.4
Chloromethane	ND		9.1	2.2	ppb v/v			11/01/16 03:10	11.4
Dibromochloromethane	ND		4.6	0.90	ppb v/v			11/01/16 03:10	11.4
1,2-Dibromoethane (EDB)	ND		9.1	0.86	ppb v/v			11/01/16 03:10	11.4
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.6	1.8	ppb v/v			11/01/16 03:10	11.4
1,2-Dichlorobenzene	ND		4.6	1.5	ppb v/v			11/01/16 03:10	11.4
1,3-Dichlorobenzene	ND		4.6	1.3	ppb v/v			11/01/16 03:10	11.4
1,4-Dichlorobenzene	ND		4.6	1.7	ppb v/v			11/01/16 03:10	11.4
Dichlorodifluoromethane	39		4.6	1.7	ppb v/v			11/01/16 03:10	11.4
1,1-Dichloroethane	3.4		3.4	0.82	ppb v/v			11/01/16 03:10	11.4
1,2-Dichloroethane	ND		9.1	1.0	ppb v/v			11/01/16 03:10	11.4
1,1-Dichloroethene	22		9.1	1.5	ppb v/v			11/01/16 03:10	11.4
cis-1,2-Dichloroethene	2.3	J	4.6	1.0	ppb v/v			11/01/16 03:10	11.4
trans-1,2-Dichloroethene	ND		4.6	1.1	ppb v/v			11/01/16 03:10	11.4
1,2-Dichloropropane	ND		4.6	2.7	ppb v/v			11/01/16 03:10	11.4
cis-1,3-Dichloropropene	ND		4.6	1.2	ppb v/v			11/01/16 03:10	11.4
trans-1,3-Dichloropropene	ND		4.6	1.0	ppb v/v			11/01/16 03:10	11.4
Ethylbenzene	ND		4.6	0.72	ppb v/v			11/01/16 03:10	11.4
4-Ethyltoluene	ND		4.6	2.1	ppb v/v			11/01/16 03:10	11.4
Hexachlorobutadiene	ND		23	4.9	ppb v/v			11/01/16 03:10	11.4
2-Hexanone	ND		4.6	0.99	ppb v/v			11/01/16 03:10	11.4
4-Methyl-2-pentanone (MIBK)	ND		4.6	1.5	ppb v/v			11/01/16 03:10	11.4
Methylene Chloride	ND		4.6	0.82	ppb v/v			11/01/16 03:10	11.4
Styrene	ND		4.6	0.67	ppb v/v			11/01/16 03:10	11.4
1,1,2,2-Tetrachloroethane	ND		4.6	0.79	ppb v/v			11/01/16 03:10	11.4
Tetrachloroethene	300		4.6	0.58	ppb v/v			11/01/16 03:10	11.4
Toluene	ND		4.6	0.58	ppb v/v			11/01/16 03:10	11.4
1,1,2-Trichloro-1,2,2-trifluoroethane	120		4.6	1.9	ppb v/v			11/01/16 03:10	11.4
1,2,4-Trichlorobenzene	ND		23	4.9	ppb v/v			11/01/16 03:10	11.4
1,1,1-Trichloroethane	1.3	J	3.4	0.74	ppb v/v			11/01/16 03:10	11.4
1,1,2-Trichloroethane	ND		4.6	0.76	ppb v/v			11/01/16 03:10	11.4
Trichloroethene	220		4.6	1.2	ppb v/v			11/01/16 03:10	11.4
Trichlorofluoromethane	15		4.6	2.2	ppb v/v			11/01/16 03:10	11.4
1,2,4-Trimethylbenzene	ND		9.1	1.8	ppb v/v			11/01/16 03:10	11.4
1,3,5-Trimethylbenzene	ND		4.6	1.4	ppb v/v			11/01/16 03:10	11.4
Vinyl acetate	ND		9.1	1.7	ppb v/v			11/01/16 03:10	11.4
Vinyl chloride	ND		4.6	1.4	ppb v/v			11/01/16 03:10	11.4

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100743-001/MWL-SV03-300

Lab Sample ID: 320-22820-8

Date Collected: 10/13/16 09:54

Matrix: Air

Date Received: 10/19/16 14:10

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
m,p-Xylene	ND		9.1	1.1	ppb v/v			11/01/16 03:10	11.4
o-Xylene	ND		4.6	0.62	ppb v/v			11/01/16 03:10	11.4
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130					11/01/16 03:10	11.4
1,2-Dichloroethane-d4 (Surr)	100		70 - 130					11/01/16 03:10	11.4
Toluene-d8 (Surr)	96		70 - 130					11/01/16 03:10	11.4

Client Sample ID: 100744-001/MWL-SV03-400

Lab Sample ID: 320-22820-9

Date Collected: 10/13/16 10:14

Matrix: Air

Date Received: 10/19/16 14:10

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	9.2	J	65	2.3	ppb v/v			11/01/16 04:02	13
Benzene	ND		5.2	1.0	ppb v/v			11/01/16 04:02	13
Benzyl chloride	ND		10	2.1	ppb v/v			11/01/16 04:02	13
Bromodichloromethane	ND		3.9	0.86	ppb v/v			11/01/16 04:02	13
Bromoform	ND		5.2	0.91	ppb v/v			11/01/16 04:02	13
Bromomethane	ND		10	4.4	ppb v/v			11/01/16 04:02	13
2-Butanone (MEK)	ND		10	2.6	ppb v/v			11/01/16 04:02	13
Carbon disulfide	ND		10	1.0	ppb v/v			11/01/16 04:02	13
Carbon tetrachloride	ND		10	0.83	ppb v/v			11/01/16 04:02	13
Chlorobenzene	ND		3.9	0.83	ppb v/v			11/01/16 04:02	13
Chloroethane	ND		10	4.0	ppb v/v			11/01/16 04:02	13
Chloroform	1.7	J	3.9	1.2	ppb v/v			11/01/16 04:02	13
Chloromethane	ND		10	2.6	ppb v/v			11/01/16 04:02	13
Dibromochloromethane	ND		5.2	1.0	ppb v/v			11/01/16 04:02	13
1,2-Dibromoethane (EDB)	ND		10	0.98	ppb v/v			11/01/16 04:02	13
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		5.2	2.0	ppb v/v			11/01/16 04:02	13
1,2-Dichlorobenzene	ND		5.2	1.7	ppb v/v			11/01/16 04:02	13
1,3-Dichlorobenzene	ND		5.2	1.4	ppb v/v			11/01/16 04:02	13
1,4-Dichlorobenzene	ND		5.2	1.9	ppb v/v			11/01/16 04:02	13
Dichlorodifluoromethane	20		5.2	1.9	ppb v/v			11/01/16 04:02	13
1,1-Dichloroethane	4.8		3.9	0.94	ppb v/v			11/01/16 04:02	13
1,2-Dichloroethane	ND		10	1.1	ppb v/v			11/01/16 04:02	13
1,1-Dichloroethene	21		10	1.7	ppb v/v			11/01/16 04:02	13
cis-1,2-Dichloroethene	2.8	J	5.2	1.2	ppb v/v			11/01/16 04:02	13
trans-1,2-Dichloroethene	ND		5.2	1.3	ppb v/v			11/01/16 04:02	13
1,2-Dichloropropane	ND		5.2	3.1	ppb v/v			11/01/16 04:02	13
cis-1,3-Dichloropropene	ND		5.2	1.4	ppb v/v			11/01/16 04:02	13
trans-1,3-Dichloropropene	ND		5.2	1.1	ppb v/v			11/01/16 04:02	13
Ethylbenzene	ND		5.2	0.82	ppb v/v			11/01/16 04:02	13
4-Ethyltoluene	ND		5.2	2.4	ppb v/v			11/01/16 04:02	13
Hexachlorobutadiene	ND		26	5.6	ppb v/v			11/01/16 04:02	13
2-Hexanone	ND		5.2	1.1	ppb v/v			11/01/16 04:02	13
4-Methyl-2-pentanone (MIBK)	ND		5.2	1.8	ppb v/v			11/01/16 04:02	13
Methylene Chloride	1.5	J	5.2	0.94	ppb v/v			11/01/16 04:02	13

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100743-001/MWL-SV03-300

Lab Sample ID: 320-22820-8

Date Collected: 10/13/16 09:54

Matrix: Air

Date Received: 10/19/16 14:10

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
m,p-Xylene	ND		9.1	1.1	ppb v/v			11/01/16 03:10	11.4
o-Xylene	ND		4.6	0.62	ppb v/v			11/01/16 03:10	11.4
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130					11/01/16 03:10	11.4
1,2-Dichloroethane-d4 (Surr)	100		70 - 130					11/01/16 03:10	11.4
Toluene-d8 (Surr)	96		70 - 130					11/01/16 03:10	11.4

Client Sample ID: 100744-001/MWL-SV03-400

Lab Sample ID: 320-22820-9

Date Collected: 10/13/16 10:14

Matrix: Air

Date Received: 10/19/16 14:10

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	9.2	J	65	2.3	ppb v/v			11/01/16 04:02	13
Benzene	ND		5.2	1.0	ppb v/v			11/01/16 04:02	13
Benzyl chloride	ND		10	2.1	ppb v/v			11/01/16 04:02	13
Bromodichloromethane	ND		3.9	0.86	ppb v/v			11/01/16 04:02	13
Bromoform	ND		5.2	0.91	ppb v/v			11/01/16 04:02	13
Bromomethane	ND		10	4.4	ppb v/v			11/01/16 04:02	13
2-Butanone (MEK)	ND		10	2.6	ppb v/v			11/01/16 04:02	13
Carbon disulfide	ND		10	1.0	ppb v/v			11/01/16 04:02	13
Carbon tetrachloride	ND		10	0.83	ppb v/v			11/01/16 04:02	13
Chlorobenzene	ND		3.9	0.83	ppb v/v			11/01/16 04:02	13
Chloroethane	ND		10	4.0	ppb v/v			11/01/16 04:02	13
Chloroform	1.7	J	3.9	1.2	ppb v/v			11/01/16 04:02	13
Chloromethane	ND		10	2.6	ppb v/v			11/01/16 04:02	13
Dibromochloromethane	ND		5.2	1.0	ppb v/v			11/01/16 04:02	13
1,2-Dibromoethane (EDB)	ND		10	0.98	ppb v/v			11/01/16 04:02	13
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		5.2	2.0	ppb v/v			11/01/16 04:02	13
1,2-Dichlorobenzene	ND		5.2	1.7	ppb v/v			11/01/16 04:02	13
1,3-Dichlorobenzene	ND		5.2	1.4	ppb v/v			11/01/16 04:02	13
1,4-Dichlorobenzene	ND		5.2	1.9	ppb v/v			11/01/16 04:02	13
Dichlorodifluoromethane	20		5.2	1.9	ppb v/v			11/01/16 04:02	13
1,1-Dichloroethane	4.8		3.9	0.94	ppb v/v			11/01/16 04:02	13
1,2-Dichloroethane	ND		10	1.1	ppb v/v			11/01/16 04:02	13
1,1-Dichloroethene	21		10	1.7	ppb v/v			11/01/16 04:02	13
cis-1,2-Dichloroethene	2.8	J	5.2	1.2	ppb v/v			11/01/16 04:02	13
trans-1,2-Dichloroethene	ND		5.2	1.3	ppb v/v			11/01/16 04:02	13
1,2-Dichloropropane	ND		5.2	3.1	ppb v/v			11/01/16 04:02	13
cis-1,3-Dichloropropene	ND		5.2	1.4	ppb v/v			11/01/16 04:02	13
trans-1,3-Dichloropropene	ND		5.2	1.1	ppb v/v			11/01/16 04:02	13
Ethylbenzene	ND		5.2	0.82	ppb v/v			11/01/16 04:02	13
4-Ethyltoluene	ND		5.2	2.4	ppb v/v			11/01/16 04:02	13
Hexachlorobutadiene	ND		26	5.6	ppb v/v			11/01/16 04:02	13
2-Hexanone	ND		5.2	1.1	ppb v/v			11/01/16 04:02	13
4-Methyl-2-pentanone (MIBK)	ND		5.2	1.8	ppb v/v			11/01/16 04:02	13
Methylene Chloride	1.5	J	5.2	0.94	ppb v/v			11/01/16 04:02	13

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100744-001/MWL-SV03-400

Lab Sample ID: 320-22820-9

Date Collected: 10/13/16 10:14

Matrix: Air

Date Received: 10/19/16 14:10

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
Styrene	ND		5.2	0.77	ppb v/v			11/01/16 04:02	13
1,1,2,2-Tetrachloroethane	ND		5.2	0.90	ppb v/v			11/01/16 04:02	13
Tetrachloroethene	440		5.2	0.66	ppb v/v			11/01/16 04:02	13
Toluene	ND		5.2	0.66	ppb v/v			11/01/16 04:02	13
1,1,2-Trichloro-1,2,2-trifluoroethane	62		5.2	2.1	ppb v/v			11/01/16 04:02	13
1,2,4-Trichlorobenzene	ND		26	5.6	ppb v/v			11/01/16 04:02	13
1,1,1-Trichloroethane	2.3	J	3.9	0.85	ppb v/v			11/01/16 04:02	13
1,1,2-Trichloroethane	ND		5.2	0.87	ppb v/v			11/01/16 04:02	13
Trichloroethene	320		5.2	1.4	ppb v/v			11/01/16 04:02	13
Trichlorofluoromethane	12		5.2	2.5	ppb v/v			11/01/16 04:02	13
1,2,4-Trimethylbenzene	ND		10	2.1	ppb v/v			11/01/16 04:02	13
1,3,5-Trimethylbenzene	ND		5.2	1.6	ppb v/v			11/01/16 04:02	13
Vinyl acetate	ND		10	1.9	ppb v/v			11/01/16 04:02	13
Vinyl chloride	ND		5.2	1.6	ppb v/v			11/01/16 04:02	13
m,p-Xylene	ND		10	1.3	ppb v/v			11/01/16 04:02	13
o-Xylene	ND		5.2	0.70	ppb v/v			11/01/16 04:02	13

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		70 - 130		11/01/16 04:02	13
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		11/01/16 04:02	13
Toluene-d8 (Surr)	96		70 - 130		11/01/16 04:02	13

Client Sample ID: 100745-001/MWL-FB3

Lab Sample ID: 320-22820-10

Date Collected: 10/13/16 09:28

Matrix: Air

Date Received: 10/19/16 14:10

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	0.55	J	5.0	0.18	ppb v/v			11/01/16 05:01	1
Benzene	ND		0.40	0.079	ppb v/v			11/01/16 05:01	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			11/01/16 05:01	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			11/01/16 05:01	1
Bromoform	ND		0.40	0.070	ppb v/v			11/01/16 05:01	1
Bromomethane	ND		0.80	0.34	ppb v/v			11/01/16 05:01	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			11/01/16 05:01	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			11/01/16 05:01	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			11/01/16 05:01	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			11/01/16 05:01	1
Chloroethane	ND		0.80	0.31	ppb v/v			11/01/16 05:01	1
Chloroform	ND		0.30	0.095	ppb v/v			11/01/16 05:01	1
Chloromethane	ND		0.80	0.20	ppb v/v			11/01/16 05:01	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			11/01/16 05:01	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			11/01/16 05:01	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			11/01/16 05:01	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			11/01/16 05:01	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			11/01/16 05:01	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			11/01/16 05:01	1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100745-001/MWL-FB3

Lab Sample ID: 320-22820-10

Date Collected: 10/13/16 09:28

Matrix: Air

Date Received: 10/19/16 14:10

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
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			11/01/16 05:01	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			11/01/16 05:01	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			11/01/16 05:01	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			11/01/16 05:01	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			11/01/16 05:01	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			11/01/16 05:01	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			11/01/16 05:01	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			11/01/16 05:01	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			11/01/16 05:01	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			11/01/16 05:01	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			11/01/16 05:01	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			11/01/16 05:01	1
2-Hexanone	ND		0.40	0.087	ppb v/v			11/01/16 05:01	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			11/01/16 05:01	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			11/01/16 05:01	1
Styrene	ND		0.40	0.059	ppb v/v			11/01/16 05:01	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			11/01/16 05:01	1
Tetrachloroethene	0.90		0.40	0.051	ppb v/v			11/01/16 05:01	1
Toluene	ND		0.40	0.051	ppb v/v			11/01/16 05:01	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			11/01/16 05:01	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			11/01/16 05:01	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			11/01/16 05:01	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			11/01/16 05:01	1
Trichloroethene	0.60		0.40	0.11	ppb v/v			11/01/16 05:01	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			11/01/16 05:01	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			11/01/16 05:01	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			11/01/16 05:01	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			11/01/16 05:01	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			11/01/16 05:01	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			11/01/16 05:01	1
o-Xylene	ND		0.40	0.054	ppb v/v			11/01/16 05:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130		11/01/16 05:01	1
1,2-Dichloroethane-d4 (Surr)	100		70 - 130		11/01/16 05:01	1
Toluene-d8 (Surr)	98		70 - 130		11/01/16 05:01	1

Client Sample ID: 100746-001/MWL-SV04-50

Lab Sample ID: 320-22820-11

Date Collected: 10/13/16 08:42

Matrix: Air

Date Received: 10/19/16 14:10

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	3.6	J	13	0.48	ppb v/v			11/01/16 05:54	2.67
Benzene	0.54	J	1.1	0.21	ppb v/v			11/01/16 05:54	2.67
Benzyl chloride	ND		2.1	0.44	ppb v/v			11/01/16 05:54	2.67
Bromodichloromethane	ND		0.80	0.18	ppb v/v			11/01/16 05:54	2.67
Bromoform	ND		1.1	0.19	ppb v/v			11/01/16 05:54	2.67

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100746-001/MWL-SV04-50

Lab Sample ID: 320-22820-11

Date Collected: 10/13/16 08:42

Matrix: Air

Date Received: 10/19/16 14:10

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
Bromomethane	ND		2.1	0.89	ppb v/v			11/01/16 05:54	2.67
2-Butanone (MEK)	ND		2.1	0.53	ppb v/v			11/01/16 05:54	2.67
Carbon disulfide	ND		2.1	0.21	ppb v/v			11/01/16 05:54	2.67
Carbon tetrachloride	ND		2.1	0.17	ppb v/v			11/01/16 05:54	2.67
Chlorobenzene	ND		0.80	0.17	ppb v/v			11/01/16 05:54	2.67
Chloroethane	ND		2.1	0.82	ppb v/v			11/01/16 05:54	2.67
Chloroform	2.0		0.80	0.25	ppb v/v			11/01/16 05:54	2.67
Chloromethane	0.73	J	2.1	0.53	ppb v/v			11/01/16 05:54	2.67
Dibromochloromethane	ND		1.1	0.21	ppb v/v			11/01/16 05:54	2.67
1,2-Dibromoethane (EDB)	ND		2.1	0.20	ppb v/v			11/01/16 05:54	2.67
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.1	0.41	ppb v/v			11/01/16 05:54	2.67
1,2-Dichlorobenzene	ND		1.1	0.35	ppb v/v			11/01/16 05:54	2.67
1,3-Dichlorobenzene	ND		1.1	0.29	ppb v/v			11/01/16 05:54	2.67
1,4-Dichlorobenzene	ND		1.1	0.40	ppb v/v			11/01/16 05:54	2.67
Dichlorodifluoromethane	21		1.1	0.39	ppb v/v			11/01/16 05:54	2.67
1,1-Dichloroethane	1.6		0.80	0.19	ppb v/v			11/01/16 05:54	2.67
1,2-Dichloroethane	ND		2.1	0.23	ppb v/v			11/01/16 05:54	2.67
1,1-Dichloroethene	7.7		2.1	0.34	ppb v/v			11/01/16 05:54	2.67
cis-1,2-Dichloroethene	0.61	J	1.1	0.24	ppb v/v			11/01/16 05:54	2.67
trans-1,2-Dichloroethene	ND		1.1	0.27	ppb v/v			11/01/16 05:54	2.67
1,2-Dichloropropane	ND		1.1	0.64	ppb v/v			11/01/16 05:54	2.67
cis-1,3-Dichloropropene	ND		1.1	0.28	ppb v/v			11/01/16 05:54	2.67
trans-1,3-Dichloropropene	ND		1.1	0.23	ppb v/v			11/01/16 05:54	2.67
Ethylbenzene	ND		1.1	0.17	ppb v/v			11/01/16 05:54	2.67
4-Ethyltoluene	ND		1.1	0.50	ppb v/v			11/01/16 05:54	2.67
Hexachlorobutadiene	ND		5.3	1.2	ppb v/v			11/01/16 05:54	2.67
2-Hexanone	ND		1.1	0.23	ppb v/v			11/01/16 05:54	2.67
4-Methyl-2-pentanone (MIBK)	ND		1.1	0.36	ppb v/v			11/01/16 05:54	2.67
Methylene Chloride	0.20	J	1.1	0.19	ppb v/v			11/01/16 05:54	2.67
Styrene	ND		1.1	0.16	ppb v/v			11/01/16 05:54	2.67
1,1,2,2-Tetrachloroethane	ND		1.1	0.18	ppb v/v			11/01/16 05:54	2.67
Tetrachloroethene	77		1.1	0.14	ppb v/v			11/01/16 05:54	2.67
Toluene	1.0	J	1.1	0.14	ppb v/v			11/01/16 05:54	2.67
1,1,2-Trichloro-1,2,2-trifluoroethane	75		1.1	0.44	ppb v/v			11/01/16 05:54	2.67
1,2,4-Trichlorobenzene	ND		5.3	1.2	ppb v/v			11/01/16 05:54	2.67
1,1,1-Trichloroethane	8.3		0.80	0.17	ppb v/v			11/01/16 05:54	2.67
1,1,2-Trichloroethane	ND		1.1	0.18	ppb v/v			11/01/16 05:54	2.67
Trichloroethene	67		1.1	0.28	ppb v/v			11/01/16 05:54	2.67
Trichlorofluoromethane	31		1.1	0.52	ppb v/v			11/01/16 05:54	2.67
1,2,4-Trimethylbenzene	ND		2.1	0.43	ppb v/v			11/01/16 05:54	2.67
1,3,5-Trimethylbenzene	ND		1.1	0.33	ppb v/v			11/01/16 05:54	2.67
Vinyl acetate	ND		2.1	0.39	ppb v/v			11/01/16 05:54	2.67
Vinyl chloride	ND		1.1	0.32	ppb v/v			11/01/16 05:54	2.67
m,p-Xylene	ND		2.1	0.27	ppb v/v			11/01/16 05:54	2.67
o-Xylene	ND		1.1	0.14	ppb v/v			11/01/16 05:54	2.67

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130		11/01/16 05:54	2.67

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100746-001/MWL-SV04-50

Lab Sample ID: 320-22820-11

Date Collected: 10/13/16 08:42

Matrix: Air

Date Received: 10/19/16 14:10

Sample Container: Summa Canister 6L

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	102		70 - 130		11/01/16 05:54	2.67
Toluene-d8 (Surr)	98		70 - 130		11/01/16 05:54	2.67

Client Sample ID: 100747-001/MWL-SV04-100

Lab Sample ID: 320-22820-12

Date Collected: 10/13/16 08:46

Matrix: Air

Date Received: 10/19/16 14:10

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	3.4	J	23	0.80	ppb v/v			11/01/16 06:47	4.51
Benzene	ND		1.8	0.36	ppb v/v			11/01/16 06:47	4.51
Benzyl chloride	ND		3.6	0.74	ppb v/v			11/01/16 06:47	4.51
Bromodichloromethane	ND		1.4	0.30	ppb v/v			11/01/16 06:47	4.51
Bromoform	ND		1.8	0.32	ppb v/v			11/01/16 06:47	4.51
Bromomethane	ND		3.6	1.5	ppb v/v			11/01/16 06:47	4.51
2-Butanone (MEK)	ND		3.6	0.90	ppb v/v			11/01/16 06:47	4.51
Carbon disulfide	ND		3.6	0.35	ppb v/v			11/01/16 06:47	4.51
Carbon tetrachloride	0.36	J	3.6	0.29	ppb v/v			11/01/16 06:47	4.51
Chlorobenzene	ND		1.4	0.29	ppb v/v			11/01/16 06:47	4.51
Chloroethane	ND		3.6	1.4	ppb v/v			11/01/16 06:47	4.51
Chloroform	2.2		1.4	0.43	ppb v/v			11/01/16 06:47	4.51
Chloromethane	ND		3.6	0.89	ppb v/v			11/01/16 06:47	4.51
Dibromochloromethane	ND		1.8	0.36	ppb v/v			11/01/16 06:47	4.51
1,2-Dibromoethane (EDB)	ND		3.6	0.34	ppb v/v			11/01/16 06:47	4.51
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.8	0.70	ppb v/v			11/01/16 06:47	4.51
1,2-Dichlorobenzene	ND		1.8	0.59	ppb v/v			11/01/16 06:47	4.51
1,3-Dichlorobenzene	ND		1.8	0.50	ppb v/v			11/01/16 06:47	4.51
1,4-Dichlorobenzene	ND		1.8	0.67	ppb v/v			11/01/16 06:47	4.51
Dichlorodifluoromethane	42		1.8	0.65	ppb v/v			11/01/16 06:47	4.51
1,1-Dichloroethane	4.0		1.4	0.32	ppb v/v			11/01/16 06:47	4.51
1,2-Dichloroethane	ND		3.6	0.40	ppb v/v			11/01/16 06:47	4.51
1,1-Dichloroethene	21		3.6	0.58	ppb v/v			11/01/16 06:47	4.51
cis-1,2-Dichloroethene	2.0		1.8	0.40	ppb v/v			11/01/16 06:47	4.51
trans-1,2-Dichloroethene	ND		1.8	0.45	ppb v/v			11/01/16 06:47	4.51
1,2-Dichloropropane	ND		1.8	1.1	ppb v/v			11/01/16 06:47	4.51
cis-1,3-Dichloropropene	ND		1.8	0.47	ppb v/v			11/01/16 06:47	4.51
trans-1,3-Dichloropropene	ND		1.8	0.40	ppb v/v			11/01/16 06:47	4.51
Ethylbenzene	ND		1.8	0.28	ppb v/v			11/01/16 06:47	4.51
4-Ethyltoluene	ND		1.8	0.84	ppb v/v			11/01/16 06:47	4.51
Hexachlorobutadiene	ND		9.0	1.9	ppb v/v			11/01/16 06:47	4.51
2-Hexanone	ND		1.8	0.39	ppb v/v			11/01/16 06:47	4.51
4-Methyl-2-pentanone (MIBK)	ND		1.8	0.61	ppb v/v			11/01/16 06:47	4.51
Methylene Chloride	ND		1.8	0.32	ppb v/v			11/01/16 06:47	4.51
Styrene	ND		1.8	0.27	ppb v/v			11/01/16 06:47	4.51
1,1,2,2-Tetrachloroethane	ND		1.8	0.31	ppb v/v			11/01/16 06:47	4.51
Tetrachloroethene	130		1.8	0.23	ppb v/v			11/01/16 06:47	4.51
Toluene	0.29	J	1.8	0.23	ppb v/v			11/01/16 06:47	4.51

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100747-001/MWL-SV04-100

Lab Sample ID: 320-22820-12

Date Collected: 10/13/16 08:46

Matrix: Air

Date Received: 10/19/16 14:10

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
1,1,2-Trichloro-1,2,2-trifluoroethane	130		1.8	0.74	ppb v/v			11/01/16 06:47	4.51
1,2,4-Trichlorobenzene	ND		9.0	2.0	ppb v/v			11/01/16 06:47	4.51
1,1,1-Trichloroethane	6.6		1.4	0.29	ppb v/v			11/01/16 06:47	4.51
1,1,2-Trichloroethane	ND		1.8	0.30	ppb v/v			11/01/16 06:47	4.51
Trichloroethene	150		1.8	0.47	ppb v/v			11/01/16 06:47	4.51
Trichlorofluoromethane	46		1.8	0.88	ppb v/v			11/01/16 06:47	4.51
1,2,4-Trimethylbenzene	ND		3.6	0.73	ppb v/v			11/01/16 06:47	4.51
1,3,5-Trimethylbenzene	ND		1.8	0.56	ppb v/v			11/01/16 06:47	4.51
Vinyl acetate	ND		3.6	0.65	ppb v/v			11/01/16 06:47	4.51
Vinyl chloride	ND		1.8	0.54	ppb v/v			11/01/16 06:47	4.51
m,p-Xylene	ND		3.6	0.45	ppb v/v			11/01/16 06:47	4.51
o-Xylene	ND		1.8	0.24	ppb v/v			11/01/16 06:47	4.51

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130		11/01/16 06:47	4.51
1,2-Dichloroethane-d4 (Surr)	104		70 - 130		11/01/16 06:47	4.51
Toluene-d8 (Surr)	95		70 - 130		11/01/16 06:47	4.51

Client Sample ID: 100748-001/MWL-SV04-200

Lab Sample ID: 320-22820-13

Date Collected: 10/13/16 08:50

Matrix: Air

Date Received: 10/19/16 14:10

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	11	J	24	0.85	ppb v/v			10/31/16 22:01	4.8
Benzene	ND		1.9	0.38	ppb v/v			10/31/16 22:01	4.8
Benzyl chloride	ND		3.8	0.78	ppb v/v			10/31/16 22:01	4.8
Bromodichloromethane	ND		1.4	0.32	ppb v/v			10/31/16 22:01	4.8
Bromoform	ND		1.9	0.34	ppb v/v			10/31/16 22:01	4.8
Bromomethane	ND		3.8	1.6	ppb v/v			10/31/16 22:01	4.8
2-Butanone (MEK)	ND		3.8	0.96	ppb v/v			10/31/16 22:01	4.8
Carbon disulfide	ND		3.8	0.37	ppb v/v			10/31/16 22:01	4.8
Carbon tetrachloride	0.56	J	3.8	0.31	ppb v/v			10/31/16 22:01	4.8
Chlorobenzene	ND		1.4	0.31	ppb v/v			10/31/16 22:01	4.8
Chloroethane	ND		3.8	1.5	ppb v/v			10/31/16 22:01	4.8
Chloroform	1.5		1.4	0.46	ppb v/v			10/31/16 22:01	4.8
Chloromethane	ND		3.8	0.95	ppb v/v			10/31/16 22:01	4.8
Dibromochloromethane	ND		1.9	0.38	ppb v/v			10/31/16 22:01	4.8
1,2-Dibromoethane (EDB)	ND		3.8	0.36	ppb v/v			10/31/16 22:01	4.8
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.9	0.74	ppb v/v			10/31/16 22:01	4.8
1,2-Dichlorobenzene	ND		1.9	0.62	ppb v/v			10/31/16 22:01	4.8
1,3-Dichlorobenzene	ND		1.9	0.53	ppb v/v			10/31/16 22:01	4.8
1,4-Dichlorobenzene	ND		1.9	0.72	ppb v/v			10/31/16 22:01	4.8
Dichlorodifluoromethane	52		1.9	0.70	ppb v/v			10/31/16 22:01	4.8
1,1-Dichloroethane	5.1		1.4	0.35	ppb v/v			10/31/16 22:01	4.8
1,2-Dichloroethane	ND		3.8	0.42	ppb v/v			10/31/16 22:01	4.8
1,1-Dichloroethene	33		3.8	0.62	ppb v/v			10/31/16 22:01	4.8

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100748-001/MWL-SV04-200

Lab Sample ID: 320-22820-13

Date Collected: 10/13/16 08:50

Matrix: Air

Date Received: 10/19/16 14:10

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
cis-1,2-Dichloroethene	3.2		1.9	0.43	ppb v/v			10/31/16 22:01	4.8
trans-1,2-Dichloroethene	ND		1.9	0.48	ppb v/v			10/31/16 22:01	4.8
1,2-Dichloropropane	ND		1.9	1.2	ppb v/v			10/31/16 22:01	4.8
cis-1,3-Dichloropropene	ND		1.9	0.50	ppb v/v			10/31/16 22:01	4.8
trans-1,3-Dichloropropene	ND		1.9	0.42	ppb v/v			10/31/16 22:01	4.8
Ethylbenzene	ND		1.9	0.30	ppb v/v			10/31/16 22:01	4.8
4-Ethyltoluene	ND		1.9	0.90	ppb v/v			10/31/16 22:01	4.8
Hexachlorobutadiene	ND		9.6	2.1	ppb v/v			10/31/16 22:01	4.8
2-Hexanone	ND		1.9	0.42	ppb v/v			10/31/16 22:01	4.8
4-Methyl-2-pentanone (MIBK)	ND		1.9	0.65	ppb v/v			10/31/16 22:01	4.8
Methylene Chloride	1.2	J	1.9	0.35	ppb v/v			10/31/16 22:01	4.8
Styrene	ND		1.9	0.28	ppb v/v			10/31/16 22:01	4.8
1,1,2,2-Tetrachloroethane	ND		1.9	0.33	ppb v/v			10/31/16 22:01	4.8
Tetrachloroethene	150		1.9	0.24	ppb v/v			10/31/16 22:01	4.8
Toluene	0.42	J	1.9	0.24	ppb v/v			10/31/16 22:01	4.8
1,1,2-Trichloro-1,2,2-trifluoroethane	160		1.9	0.78	ppb v/v			10/31/16 22:01	4.8
1,2,4-Trichlorobenzene	ND		9.6	2.1	ppb v/v			10/31/16 22:01	4.8
1,1,1-Trichloroethane	2.7		1.4	0.31	ppb v/v			10/31/16 22:01	4.8
1,1,2-Trichloroethane	ND		1.9	0.32	ppb v/v			10/31/16 22:01	4.8
Trichloroethene	200		1.9	0.50	ppb v/v			10/31/16 22:01	4.8
Trichlorofluoromethane	40		1.9	0.94	ppb v/v			10/31/16 22:01	4.8
1,2,4-Trimethylbenzene	ND		3.8	0.78	ppb v/v			10/31/16 22:01	4.8
1,3,5-Trimethylbenzene	ND		1.9	0.60	ppb v/v			10/31/16 22:01	4.8
Vinyl acetate	ND		3.8	0.70	ppb v/v			10/31/16 22:01	4.8
Vinyl chloride	ND		1.9	0.58	ppb v/v			10/31/16 22:01	4.8
m,p-Xylene	ND		3.8	0.48	ppb v/v			10/31/16 22:01	4.8
o-Xylene	ND		1.9	0.26	ppb v/v			10/31/16 22:01	4.8
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130					10/31/16 22:01	4.8
1,2-Dichloroethane-d4 (Surr)	110		70 - 130					10/31/16 22:01	4.8
Toluene-d8 (Surr)	99		70 - 130					10/31/16 22:01	4.8

Client Sample ID: 100749-001/MWL-SV04-300

Lab Sample ID: 320-22820-14

Date Collected: 10/13/16 08:55

Matrix: Air

Date Received: 10/19/16 14:10

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	2.9	J	16	0.55	ppb v/v			10/31/16 22:53	3.1
Benzene	0.33	J	1.2	0.24	ppb v/v			10/31/16 22:53	3.1
Benzyl chloride	ND		2.5	0.51	ppb v/v			10/31/16 22:53	3.1
Bromodichloromethane	ND		0.93	0.20	ppb v/v			10/31/16 22:53	3.1
Bromoform	ND		1.2	0.22	ppb v/v			10/31/16 22:53	3.1
Bromomethane	ND		2.5	1.0	ppb v/v			10/31/16 22:53	3.1
2-Butanone (MEK)	ND		2.5	0.62	ppb v/v			10/31/16 22:53	3.1
Carbon disulfide	ND		2.5	0.24	ppb v/v			10/31/16 22:53	3.1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100749-001/MWL-SV04-300

Lab Sample ID: 320-22820-14

Date Collected: 10/13/16 08:55

Matrix: Air

Date Received: 10/19/16 14:10

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
Carbon tetrachloride	0.36	J	2.5	0.20	ppb v/v			10/31/16 22:53	3.1
Chlorobenzene	ND		0.93	0.20	ppb v/v			10/31/16 22:53	3.1
Chloroethane	ND		2.5	0.95	ppb v/v			10/31/16 22:53	3.1
Chloroform	0.60	J	0.93	0.29	ppb v/v			10/31/16 22:53	3.1
Chloromethane	ND		2.5	0.61	ppb v/v			10/31/16 22:53	3.1
Dibromochloromethane	ND		1.2	0.24	ppb v/v			10/31/16 22:53	3.1
1,2-Dibromoethane (EDB)	ND		2.5	0.23	ppb v/v			10/31/16 22:53	3.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.2	0.48	ppb v/v			10/31/16 22:53	3.1
1,2-Dichlorobenzene	ND		1.2	0.40	ppb v/v			10/31/16 22:53	3.1
1,3-Dichlorobenzene	ND		1.2	0.34	ppb v/v			10/31/16 22:53	3.1
1,4-Dichlorobenzene	ND		1.2	0.46	ppb v/v			10/31/16 22:53	3.1
Dichlorodifluoromethane	25		1.2	0.45	ppb v/v			10/31/16 22:53	3.1
1,1-Dichloroethane	1.3		0.93	0.22	ppb v/v			10/31/16 22:53	3.1
1,2-Dichloroethane	ND		2.5	0.27	ppb v/v			10/31/16 22:53	3.1
1,1-Dichloroethene	14		2.5	0.40	ppb v/v			10/31/16 22:53	3.1
cis-1,2-Dichloroethene	0.84	J	1.2	0.28	ppb v/v			10/31/16 22:53	3.1
trans-1,2-Dichloroethene	ND		1.2	0.31	ppb v/v			10/31/16 22:53	3.1
1,2-Dichloropropane	ND		1.2	0.74	ppb v/v			10/31/16 22:53	3.1
cis-1,3-Dichloropropene	ND		1.2	0.32	ppb v/v			10/31/16 22:53	3.1
trans-1,3-Dichloropropene	ND		1.2	0.27	ppb v/v			10/31/16 22:53	3.1
Ethylbenzene	ND		1.2	0.20	ppb v/v			10/31/16 22:53	3.1
4-Ethyltoluene	ND		1.2	0.58	ppb v/v			10/31/16 22:53	3.1
Hexachlorobutadiene	ND		6.2	1.3	ppb v/v			10/31/16 22:53	3.1
2-Hexanone	ND		1.2	0.27	ppb v/v			10/31/16 22:53	3.1
4-Methyl-2-pentanone (MIBK)	ND		1.2	0.42	ppb v/v			10/31/16 22:53	3.1
Methylene Chloride	0.25	J	1.2	0.22	ppb v/v			10/31/16 22:53	3.1
Styrene	ND		1.2	0.18	ppb v/v			10/31/16 22:53	3.1
1,1,2,2-Tetrachloroethane	ND		1.2	0.21	ppb v/v			10/31/16 22:53	3.1
Tetrachloroethene	130		1.2	0.16	ppb v/v			10/31/16 22:53	3.1
Toluene	0.28	J	1.2	0.16	ppb v/v			10/31/16 22:53	3.1
1,1,2-Trichloro-1,2,2-trifluoroethane	79		1.2	0.51	ppb v/v			10/31/16 22:53	3.1
1,2,4-Trichlorobenzene	ND		6.2	1.3	ppb v/v			10/31/16 22:53	3.1
1,1,1-Trichloroethane	1.4		0.93	0.20	ppb v/v			10/31/16 22:53	3.1
1,1,2-Trichloroethane	ND		1.2	0.21	ppb v/v			10/31/16 22:53	3.1
Trichloroethene	97		1.2	0.33	ppb v/v			10/31/16 22:53	3.1
Trichlorofluoromethane	18		1.2	0.61	ppb v/v			10/31/16 22:53	3.1
1,2,4-Trimethylbenzene	ND		2.5	0.50	ppb v/v			10/31/16 22:53	3.1
1,3,5-Trimethylbenzene	ND		1.2	0.39	ppb v/v			10/31/16 22:53	3.1
Vinyl acetate	ND		2.5	0.45	ppb v/v			10/31/16 22:53	3.1
Vinyl chloride	ND		1.2	0.37	ppb v/v			10/31/16 22:53	3.1
m,p-Xylene	ND		2.5	0.31	ppb v/v			10/31/16 22:53	3.1
o-Xylene	ND		1.2	0.17	ppb v/v			10/31/16 22:53	3.1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	107		70 - 130		10/31/16 22:53	3.1
1,2-Dichloroethane-d4 (Surr)	110		70 - 130		10/31/16 22:53	3.1
Toluene-d8 (Surr)	98		70 - 130		10/31/16 22:53	3.1

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100750-001/MWL-SV04-400

Lab Sample ID: 320-22820-15

Date Collected: 10/13/16 09:04

Matrix: Air

Date Received: 10/19/16 14:10

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	7.6	J	16	0.58	ppb v/v			10/31/16 23:44	3.26
Benzene	0.72	J	1.3	0.26	ppb v/v			10/31/16 23:44	3.26
Benzyl chloride	ND		2.6	0.53	ppb v/v			10/31/16 23:44	3.26
Bromodichloromethane	ND		0.98	0.22	ppb v/v			10/31/16 23:44	3.26
Bromoform	ND		1.3	0.23	ppb v/v			10/31/16 23:44	3.26
Bromomethane	ND		2.6	1.1	ppb v/v			10/31/16 23:44	3.26
2-Butanone (MEK)	1.3	J	2.6	0.65	ppb v/v			10/31/16 23:44	3.26
Carbon disulfide	1.2	J	2.6	0.25	ppb v/v			10/31/16 23:44	3.26
Carbon tetrachloride	0.25	J	2.6	0.21	ppb v/v			10/31/16 23:44	3.26
Chlorobenzene	ND		0.98	0.21	ppb v/v			10/31/16 23:44	3.26
Chloroethane	ND		2.6	1.0	ppb v/v			10/31/16 23:44	3.26
Chloroform	0.61	J	0.98	0.31	ppb v/v			10/31/16 23:44	3.26
Chloromethane	ND		2.6	0.64	ppb v/v			10/31/16 23:44	3.26
Dibromochloromethane	ND		1.3	0.26	ppb v/v			10/31/16 23:44	3.26
1,2-Dibromoethane (EDB)	ND		2.6	0.24	ppb v/v			10/31/16 23:44	3.26
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.3	0.51	ppb v/v			10/31/16 23:44	3.26
1,2-Dichlorobenzene	ND		1.3	0.42	ppb v/v			10/31/16 23:44	3.26
1,3-Dichlorobenzene	ND		1.3	0.36	ppb v/v			10/31/16 23:44	3.26
1,4-Dichlorobenzene	ND		1.3	0.49	ppb v/v			10/31/16 23:44	3.26
Dichlorodifluoromethane	22		1.3	0.47	ppb v/v			10/31/16 23:44	3.26
1,1-Dichloroethane	1.1		0.98	0.23	ppb v/v			10/31/16 23:44	3.26
1,2-Dichloroethane	ND		2.6	0.29	ppb v/v			10/31/16 23:44	3.26
1,1-Dichloroethene	10		2.6	0.42	ppb v/v			10/31/16 23:44	3.26
cis-1,2-Dichloroethene	0.76	J	1.3	0.29	ppb v/v			10/31/16 23:44	3.26
trans-1,2-Dichloroethene	ND		1.3	0.33	ppb v/v			10/31/16 23:44	3.26
1,2-Dichloropropane	ND		1.3	0.78	ppb v/v			10/31/16 23:44	3.26
cis-1,3-Dichloropropene	ND		1.3	0.34	ppb v/v			10/31/16 23:44	3.26
trans-1,3-Dichloropropene	ND		1.3	0.29	ppb v/v			10/31/16 23:44	3.26
Ethylbenzene	ND		1.3	0.21	ppb v/v			10/31/16 23:44	3.26
4-Ethyltoluene	ND		1.3	0.61	ppb v/v			10/31/16 23:44	3.26
Hexachlorobutadiene	ND		6.5	1.4	ppb v/v			10/31/16 23:44	3.26
2-Hexanone	12		1.3	0.28	ppb v/v			10/31/16 23:44	3.26
4-Methyl-2-pentanone (MIBK)	9.8		1.3	0.44	ppb v/v			10/31/16 23:44	3.26
Methylene Chloride	0.29	J	1.3	0.23	ppb v/v			10/31/16 23:44	3.26
Styrene	ND		1.3	0.19	ppb v/v			10/31/16 23:44	3.26
1,1,2,2-Tetrachloroethane	ND		1.3	0.22	ppb v/v			10/31/16 23:44	3.26
Tetrachloroethene	130		1.3	0.17	ppb v/v			10/31/16 23:44	3.26
Toluene	0.28	J	1.3	0.17	ppb v/v			10/31/16 23:44	3.26
1,1,2-Trichloro-1,2,2-trifluoroethane	75		1.3	0.53	ppb v/v			10/31/16 23:44	3.26
1,2,4-Trichlorobenzene	ND		6.5	1.4	ppb v/v			10/31/16 23:44	3.26
1,1,1-Trichloroethane	1.4		0.98	0.21	ppb v/v			10/31/16 23:44	3.26
1,1,2-Trichloroethane	ND		1.3	0.22	ppb v/v			10/31/16 23:44	3.26
Trichloroethene	91		1.3	0.34	ppb v/v			10/31/16 23:44	3.26
Trichlorofluoromethane	17		1.3	0.64	ppb v/v			10/31/16 23:44	3.26
1,2,4-Trimethylbenzene	ND		2.6	0.53	ppb v/v			10/31/16 23:44	3.26
1,3,5-Trimethylbenzene	ND		1.3	0.41	ppb v/v			10/31/16 23:44	3.26
Vinyl acetate	ND		2.6	0.47	ppb v/v			10/31/16 23:44	3.26
Vinyl chloride	ND		1.3	0.39	ppb v/v			10/31/16 23:44	3.26

TestAmerica Sacramento

Client Sample Results

Client: Sandia National Laboratories
Project/Site: MWL GWM/SVM(617410,411,412,413,414)

TestAmerica Job ID: 320-22820-1

Client Sample ID: 100750-001/MWL-SV04-400

Lab Sample ID: 320-22820-15

Date Collected: 10/13/16 09:04

Matrix: Air

Date Received: 10/19/16 14:10

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
m,p-Xylene	ND		2.6	0.33	ppb v/v			10/31/16 23:44	3.26
o-Xylene	0.20	J	1.3	0.18	ppb v/v			10/31/16 23:44	3.26
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	109		70 - 130					10/31/16 23:44	3.26
1,2-Dichloroethane-d4 (Surr)	112		70 - 130					10/31/16 23:44	3.26
Toluene-d8 (Surr)	99		70 - 130					10/31/16 23:44	3.26

Client Sample ID: 100751-001/MWL-FB4

Lab Sample ID: 320-22820-16

Date Collected: 10/13/16 08:35

Matrix: Air

Date Received: 10/19/16 14:10

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			11/01/16 00:42	1
Benzene	ND		0.40	0.079	ppb v/v			11/01/16 00:42	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			11/01/16 00:42	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			11/01/16 00:42	1
Bromoform	ND		0.40	0.070	ppb v/v			11/01/16 00:42	1
Bromomethane	ND		0.80	0.34	ppb v/v			11/01/16 00:42	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			11/01/16 00:42	1
Carbon disulfide	0.19	J	0.80	0.078	ppb v/v			11/01/16 00:42	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			11/01/16 00:42	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			11/01/16 00:42	1
Chloroethane	ND		0.80	0.31	ppb v/v			11/01/16 00:42	1
Chloroform	ND		0.30	0.095	ppb v/v			11/01/16 00:42	1
Chloromethane	ND		0.80	0.20	ppb v/v			11/01/16 00:42	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			11/01/16 00:42	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			11/01/16 00:42	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			11/01/16 00:42	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			11/01/16 00:42	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			11/01/16 00:42	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			11/01/16 00:42	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			11/01/16 00:42	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			11/01/16 00:42	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			11/01/16 00:42	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			11/01/16 00:42	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			11/01/16 00:42	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			11/01/16 00:42	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			11/01/16 00:42	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			11/01/16 00:42	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			11/01/16 00:42	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			11/01/16 00:42	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			11/01/16 00:42	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			11/01/16 00:42	1
2-Hexanone	ND		0.40	0.087	ppb v/v			11/01/16 00:42	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			11/01/16 00:42	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			11/01/16 00:42	1

TestAmerica Sacramento

ANNEX D

Mixed Waste Landfill Soil-Moisture Monitoring Forms

April 2016-March 2017

Field Forms and Tables

HEALTH & SAFETY MEETING FORM

 Dept: 4131, 414 Facility: Mush Date: 4/7/16 Time: 0930

 Activities: Mush neutron logging
 (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: _____ % Wind Chill: _____ °F

 Chemicals Used: ☒ None ☐ Preservatives in sample bottles ☐ Other: _____

Hospital/Clinic: Sandia Medial Clinic Bldg. 831

Phone: 911 on LAN; 844-0911 on mobile

Safety Topics Presented

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

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

Daniel E Nieto
 Printed Name
Robert Zick
 Printed Name

 Printed Name

 Printed Name

 Printed Name

 Printed Name

Attendees

Daniel E Nieto
 Signature
Robert Zick
 Signature

 Signature

 Signature

 Signature

Notes

Mixed Waste Landfill Neutron Logging Data Field Form

Name: <i>Robert Brock</i>	Standard Count: <i>6650</i>	Chi: <i>0.97</i>
Name: <i>Danielle Nieto</i>	Previous Count: <i>6929</i>	Count Time: 30 seconds
Notes:		

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Winch Counter Reading (ft)	VZ-3 Counts (E Side)	VZ-2 Counts (SW Corner)	VZ-1 Counts (NW Corner)
			Date/Time <i>4-7-16/0950</i>	Date/Time <i>4-7-16 1320</i>	Date/Time <i>4-7-16 1420</i>
0.0	0	0	<i>729</i>	<i>928</i>	<i>138</i>
0.9	1	9999	<i>2995</i>	<i>2350</i>	<i>2339</i>
1.7	2	9998	<i>3538</i>	<i>2382</i>	<i>2639</i>
2.6	3	9997	<i>3011</i>	<i>2321</i>	<i>2429</i>
3.5	4	9996	<i>2477</i>	<i>2183</i>	<i>1879</i>
4.3	5	9995	<i>1931</i>	<i>2353</i>	<i>1903</i>
5.2	6	9994	<i>1998</i>	<i>2144</i>	<i>1931</i>
6.1	7	9993	<i>1655</i>	<i>1667</i>	<i>1694</i>
6.9	8	9992	<i>1722</i>	<i>1718</i>	<i>1637</i>
7.8	9	9991	<i>1715</i>	<i>1703</i>	<i>1478</i>
8.7	10	9990	<i>1795</i>	<i>1719</i>	<i>1637</i>
9.5	11	9989	<i>1859</i>	<i>1758</i>	<i>2041</i>
10.4	12	9988	<i>1621</i>	<i>1903</i>	<i>2104</i>
11.3	13	9987	<i>1892</i>	<i>1767</i>	<i>1873</i>
12.1	14	9986	<i>1843</i>	<i>1759</i>	<i>1785</i>
13.0	15	9985	<i>1862</i>	<i>1635</i>	<i>1989</i>
13.9	16	9984	<i>1831</i>	<i>1847</i>	<i>1931</i>
14.7	17	9983	<i>1563</i>	<i>1807</i>	<i>2123</i>
15.6	18	9982	<i>1684</i>	<i>1732</i>	<i>1680</i>
16.5	19	9981	<i>1716</i>	<i>2310</i>	<i>1467</i>
17.3	20	9980	<i>1322</i>	<i>2237</i>	<i>1471</i>
18.2	21	9979	<i>1812</i>	<i>1882</i>	<i>1484</i>
19.1	22	9978	<i>1744</i>	<i>1770</i>	<i>1695</i>
19.9	23	9977	<i>1524</i>	<i>1956</i>	<i>2472</i>
20.8	24	9976	<i>1415</i>	<i>1843</i>	<i>2256</i>
21.7	25	9975	<i>1463</i>	<i>1616</i>	<i>1973</i>

Mixed Waste Landfill Neutron Logging Data Field Form

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Winch Counter Reading (ft)	VZ-3 Counts (E Side)	VZ-2 Counts (SW Corner)	VZ-1 Counts (NW Corner)
26.0	30	9970	1778	1646 21618	1738
30.3	35	9965	1731	1644 21934	1879
34.6	40	9960	1946	1800	1678
39.0	45	9955	1645	1639	1964
43.3	50	9950	2020	1593	1815
47.6	55	9945	1849	2196	1755
52.0	60	9940	1762	1816	1990
56.3	65	9935	2206	2038	1935
60.6	70	9930	1288	2470	1680
65.0	75	9925	2477	2318	2470
69.3	80	9920	2247	1604	1965
73.6	85	9915	1949	2135	2012
77.9	90	9910	1467	2532	2209
82.3	95	9905	2182	2328	2146
86.6	100	9900	2220	2247	2680
90.9	105	9895	1965	2397	2645
95.3	110	9890	2329	1878	1948
99.6	115	9885	2107	1801	2142
103.9	120	9880	1665	2034	1669
108.3	125	9875	1884	2352	1958
112.6	130	9870	2261	2203	2031
116.9	135	9865	2455	2703	2000
121.2	140	9860	1676	1973	1643
125.6	145	9855	1520	2589	2206
129.9	150	9850	2607	2504	2039
134.2	155	9845	2076	2249	2085
138.6	160	9840	2585	2545	1558
142.9	165	9835	2694	1944	2168
147.2	170	9830	2303	1657	1558
151.6	175	9825	2489	2265	2975
155.9	180	9820	3265	2468	2599
160.2	185	9815	3080	2805	2502
164.5	190	9810	1754	1688	2006
168.9	195	9805	1795	1944	2901
173.2	200	9800	2076	3147	2598

MIXED WASTE LANDFILL
SOIL MOISTURE MONITORING

Soil Moisture Monitoring Results Tables

Table D-1
VZ-1 Soil-Moisture Monitoring Results
April 2016

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Collection Period	Baseline Average (2004-2006)	Difference between Baseline Average &	Soil Moisture Trigger Level (% content by volume)
		April 2016		Baseline Average & April 2016	
		Soil Moisture (% content by volume)			
3.5	4	2.9	2.9	0.0	NA
4.3	5	3.0	2.9	0.1	NA
5.2	6	3.1	2.9	0.2	NA
6.1	7	2.5	2.6	-0.1	NA
6.9	8	2.3	2.2	0.1	NA
7.8	9	1.9	1.9	0.0	NA
8.7	10	2.3	1.7	0.6	23
9.5	11	3.4	2.0	1.4	23
10.4	12	3.5	2.7	0.8	23
11.3	13	2.9	3.1	-0.2	23
12.1	14	2.7	2.6	0.1	23
13.0	15	3.2	2.4	0.8	23
13.9	16	3.1	2.6	0.5	23
14.7	17	3.6	2.8	0.8	23
15.6	18	2.4	2.9	-0.5	23
16.5	19	1.8	2.4	-0.6	23
17.3	20	1.9	2.0	-0.1	23
18.2	21	1.9	2.0	-0.1	23
19.1	22	2.5	2.1	0.4	23
19.9	23	4.5	3.0	1.5	23
20.8	24	4.0	4.3	-0.3	23
21.7	25	3.2	4.0	-0.8	23
26.0	30	2.6	2.9	-0.3	23
30.3	35	2.9	2.7	0.2	23
34.6	40	2.4	2.3	0.1	23
39.0	45	3.2	3.0	0.2	23
43.3	50	2.8	2.9	-0.1	23
47.6	55	2.6	2.8	-0.2	23
52.0	60	3.2	3.4	-0.2	23
56.3	65	3.1	2.9	0.2	23
60.6	70	2.4	2.1	0.3	23
65.0	75	4.5	5.6	-1.1	23
69.3	80	3.2	2.8	0.4	23
73.6	85	3.3	3.1	0.2	23

Table D-1
VZ-1 Soil-Moisture Monitoring Results
April 2016

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Collection Period	Baseline Average (2004-2006)	Difference between Baseline Average & April 2016	Soil Moisture Trigger Level (% content by volume)
		April 2016			
		Soil Moisture (% content by volume)			
77.9	90	3.8	3.7	0.1	23
82.3	95	3.7	3.7	0.0	23
86.6	100	5.1	5.4	-0.3	23
90.9	105	5.0	5.0	0.0	NA
95.3	110	3.1	3.0	0.1	NA
99.6	115	3.6	3.6	0.0	NA
103.9	120	2.4	2.2	0.2	NA
108.3	125	3.2	2.7	0.5	NA
112.6	130	3.4	3.3	0.1	NA
116.9	135	3.3	3.1	0.2	NA
121.2	140	2.3	2.1	0.2	NA
125.6	145	3.8	3.8	0.0	NA
129.9	150	3.4	3.2	0.2	NA
134.2	155	3.5	2.7	0.8	NA
138.6	160	2.1	2.1	0.0	NA
142.9	165	3.7	3.8	-0.1	NA
147.2	170	2.1	2.0	0.0	NA
151.6	175	5.9	6.0	-0.1	NA
155.9	180	4.9	5.5	-0.6	NA
160.2	185	4.6	4.4	0.2	NA
164.5	190	3.3	3.0	0.3	NA
168.9	195	5.7	7.0	-1.3	NA
173.2	200	4.9	5.4	-0.5	NA
	Average	3.3	3.2		

Note: Shaded area represents depths where 23-percent soil moisture trigger applies.

NA = Not applicable

Table D-2
VZ-2 Soil-Moisture Monitoring Results
April 2016

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Collection Period	Baseline Average (2004-2006)	Difference between Baseline Average & April 2016	Soil Moisture Trigger Level (% content by volume)
		April 2016			
		Soil Moisture (% content by volume)			
3.5	4	3.8	2.7	1.1	NA
4.3	5	4.2	3.3	0.9	NA
5.2	6	3.7	3.6	0.1	NA
6.1	7	2.4	3.6	-1.2	NA
6.9	8	2.5	3.5	0.0	NA
7.8	9	2.5	3.1	-0.6	NA
8.7	10	2.5	2.4	0.1	23
9.5	11	2.6	2.2	0.4	23
10.4	12	3.0	2.2	0.8	23
11.3	13	2.6	2.1	0.5	23
12.1	14	2.6	2.5	0.1	23
13.0	15	2.3	3.0	-0.7	23
13.9	16	2.9	2.8	0.1	23
14.7	17	2.8	2.4	0.4	23
15.6	18	2.6	2.6	0.0	23
16.5	19	4.1	2.7	1.4	23
17.3	20	3.9	2.9	1.0	23
18.2	21	3.0	3.1	-0.1	23
19.1	22	2.7	3.6	-0.9	23
19.9	23	3.2	3.7	-0.5	23
20.8	24	2.8	3.1	-0.3	23
21.7	25	2.2	2.7	-0.5	23
26.0	30	2.3	2.4	-0.1	23
30.3	35	3.2	2.9	0.3	23
34.6	40	2.7	2.7	0.0	23
39.0	45	2.3	2.3	0.0	23
43.3	50	2.2	2.1	0.1	23
47.6	55	3.8	3.1	0.7	23
52.0	60	2.8	3.0	-0.2	23
56.3	65	3.4	5.5	-2.1	23
60.6	70	4.5	4.8	-0.3	23
65.0	75	4.1	5.1	-1.0	23
69.3	80	2.2	2.6	-0.4	23
73.6	85	3.6	2.6	1.0	23

Table D-2
VZ-2 Soil-Moisture Monitoring Results
April 2016

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Collection Period	Baseline Average (2004-2006)	Difference between Baseline Average & April 2016	Soil Moisture Trigger Level (% content by volume)
		April 2016			
		Soil Moisture (% content by volume)			
77.9	90	4.7	3.1	1.6	23
82.3	95	4.1	3.6	0.5	23
86.6	100	3.9	4.7	-0.8	23
90.9	105	4.3	3.4	0.9	NA
95.3	110	2.9	3.1	-0.2	NA
99.6	115	2.7	3.6	-0.9	NA
103.9	120	3.4	2.0	1.4	NA
108.3	125	4.2	3.8	0.4	NA
112.6	130	3.8	3.6	0.2	NA
116.9	135	5.1	3.4	1.7	NA
121.2	140	3.2	2.4	0.8	NA
125.6	145	4.8	5.9	-1.1	NA
129.9	150	4.6	7.0	-2.4	NA
134.2	155	3.9	3.6	0.3	NA
138.6	160	4.7	3.8	0.9	NA
142.9	165	3.1	3.0	0.1	NA
147.2	170	2.4	2.9	-0.5	NA
151.6	175	4.0	2.4	1.6	NA
155.9	180	4.5	5.4	-0.9	NA
160.2	185	5.4	5.4	0.0	NA
164.5	190	2.4	4.1	-1.7	NA
168.9	195	3.1	3.5	-0.4	NA
173.2	200	6.3	6.3	0.0	NA
	Average	3.4	3.4		

Note: Shaded area represents depths where 23-percent soil moisture trigger applies.

NA = Not applicable

Table D-3
VZ-3 Soil-Moisture Monitoring Results
April 2016

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Collection Period	Baseline Average (2004-2006)	Difference between Baseline Average & April 2016	Soil Moisture Trigger Level (% content by volume)
		April 2016			
		Soil Moisture (% content by volume)			
3.5	4	3.7	4.6	-0.9	NA
4.3	5	3.1	4.5	-1.4	NA
5.2	6	3.3	3.7	-0.4	NA
6.1	7	2.3	2.9	-0.6	NA
6.9	8	2.5	3.1	-0.6	NA
7.8	9	2.5	2.3	0.2	NA
8.7	10	2.7	2.4	0.3	23
9.5	11	2.9	2.6	0.3	23
10.4	12	2.3	2.7	-0.4	23
11.3	13	3.0	3.0	0.0	23
12.1	14	2.8	2.6	0.2	23
13.0	15	2.9	2.8	0.1	23
13.9	16	2.8	2.9	-0.1	23
14.7	17	2.1	3.1	-1.0	23
15.6	18	2.4	3.1	-0.7	23
16.5	19	2.5	2.3	0.2	23
17.3	20	1.5	2.7	-1.2	23
18.2	21	2.8	2.7	0.1	23
19.1	22	2.6	1.8	0.8	23
19.9	23	2.0	2.7	-0.7	23
20.8	24	1.7	2.8	-1.1	23
21.7	25	1.8	2.1	-0.3	23
26.0	30	2.7	2.5	0.2	23
30.3	35	2.5	2.8	-0.3	23
34.6	40	3.1	2.1	1.0	23
39.0	45	2.3	2.7	-0.4	23
43.3	50	3.3	2.9	0.4	23
47.6	55	2.9	3.4	-0.5	23
52.0	60	2.6	2.9	-0.3	23
56.3	65	3.8	3.5	0.3	23
60.6	70	1.4	1.9	-0.5	23
65.0	75	4.5	4.3	0.2	23
69.3	80	3.9	4.5	-0.6	23
73.6	85	3.1	3.5	-0.4	23

Table D-3
VZ-3 Soil-Moisture Monitoring Results
April 2016

Vertical Depth Below Top of Casing (ft)	Linear Depth Along Casing (ft)	Collection Period	Baseline Average (2004-2006)	Difference between Baseline Average & April 2016	Soil Moisture Trigger Level (% content by volume)
		April 2016			
		Soil Moisture (% content by volume)			
77.9	90	1.8	1.9	-0.1	23
82.3	95	3.8	3.3	0.5	23
86.6	100	3.9	3.4	0.5	23
90.9	105	3.2	3.3	-0.1	NA
95.3	110	4.1	4.7	-0.6	NA
99.6	115	3.6	3.6	0.0	NA
103.9	120	2.4	2.1	0.3	NA
108.3	125	3.0	1.8	1.2	NA
112.6	130	4.0	4.3	-0.3	NA
116.9	135	4.5	4.0	0.5	NA
121.2	140	2.4	2.3	0.1	NA
125.6	145	2.0	2.0	0.0	NA
129.9	150	4.9	4.4	0.5	NA
134.2	155	3.5	3.6	-0.1	NA
138.6	160	4.8	4.4	0.4	NA
142.9	165	5.1	5.2	-0.1	NA
147.2	170	4.1	4.1	0.0	NA
151.6	175	4.6	4.3	0.3	NA
155.9	180	6.7	6.6	0.1	NA
160.2	185	6.2	5.6	0.6	NA
164.5	190	2.6	2.7	-0.1	NA
168.9	195	2.7	3.1	-0.4	NA
173.2	200	3.5	4.1	-0.6	NA
	Average	3.2	3.2		

Note: Shaded area represents depths where 23-percent soil moisture trigger applies.

NA = Not applicable

ANNEX E

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

April 2016-March 2017

Field Forms

Data Validation Reports

Contract Verification Reviews

FIELD SAMPLING FORMS

MWL LONG-TERM MONITORING AND MAINTENANCE

GROUNDWATER MONITORING

Form Title	Corresponding Procedure
Tailgate Safety Briefing	PLA 05-09
Groundwater Sample Collection Field Equipment Check Log	FOP 05-02
Portable Pump and Tubing/Water Level Indicator Decontamination Log Form	FOP 05-03
Field Measurement Log For Groundwater Sample Collection	FOP 05-01
Analysis Request and Chain of Custody*	LOP 94-03

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

FIELD SAMPLING FORMS
APRIL 2016 GROUNDWATER MONITORING

white truck

TAILGATE SAFETY MEETING FORM

Dept: 4141 Well Location: MWL-BW2 Date: 04/20/16 Time: 0803

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: 68.7 F Wind Speed: 0-5 MPH Humidity: 24 %

Chemicals Used: Preservatives in sample bottles

Other: Be aware of possible UXO's

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 Thynck
Printed Name

ALFRED SANTILLANES
Printed Name

William Gibson
Printed Name

Printed Name

Printed Name

Signature

Signature

Signature

Signature

Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4141 Well Location: MWL- MW 7 Date: 04/21/16 Time: 0800Activities: Groundwater monitoring and Sampling

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

Weather Conditions:

Temp: 74.6 °F Wind Speed: 0-5 MPH Humidity: 27.2 %Chemicals Used: Preservatives in sample bottlesOther: Be aware of possible UXO's

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

Adriana Wolman
Printed Name

Tin Jackson
Printed Name

William Gibson
Printed Name

ALFRED SANTILLANES
Printed Name

Robert Lynch
Signature

Adriana Wolman
Signature

Tin Jackson
Signature

William Gibson
Signature

Alfred Santillanes
Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4141 Well Location: MWL-MW9 Date: 04/25/16 Time: 0759Activities: 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: 75.2°F Wind Speed: 5-20 MPH Humidity: 20.7 %Chemicals Used: Preservatives in sample bottlesOther: Be aware of possible UXO's

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 Thynck
Printed Name

ALFRED SANTILLANOS
Printed Name

William Gibson
Printed Name

Printed Name

Printed Name

Robert Thynck
Signature

Alfred Santillanos
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William Gibson
Signature

Signature

Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4141 Well Location: MWL-mw 8 Date: 4/26/16 Time: 0802Activities: 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: 63.5 °F Wind Speed: 0-10 MPH Humidity: 20.6%Chemicals Used: Preservatives in sample bottlesOther: Be aware of possible UXO's

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

Printed Name Robert ThynchSignature Robert ThynchPrinted Name ALFRED SANTILLANESSignature Alfred SantillanesPrinted Name William GibsonSignature William Gibson

Printed Name _____

Signature _____

Printed Name _____

Signature _____

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: MWL	
Well I.D.: MWL-MW 8	Date: 04/26/16
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 0834

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: MWL		
Well I.D.: MWL-MW 9	Date: 04/25/16	
Method: Portable pump <u>X</u> Dedicated pump _____ Pump depth: 497'		

PURGE MEASUREMENTS

Depth to Water (ft)	Time 24 hr	Vol. (L/gal)	Temp (°C)	SC (µS/cm)	ORP (mV)	pH	Turbidity (NTU)	DO (%)	DO (mg/L)
491.98	0813	Start							
494.30	0838	2	22.00	582.1	299.4	7.70	0.26	28.8	2.51
494.74	0845	3	21.93	580.2	292.7	7.69	0.31	30.1	2.62
495.18	0852	4	21.95	580.5	284.1	7.69	0.81	29.1	2.54
495.55	0859	5	21.69	579.0	278.0	7.69	0.71	28.0	2.45
495.85	0907	6	21.91	585.1	271.5	7.68	0.60	25.8	2.26
496.11	0915	7	22.02	590.0	264.1	7.67	0.85	21.8	2.00
496.18	0925	8	22.02	591.0	264.0	7.67	1.07	18.9	1.65
496.39	0935	9	22.01	590.8	263.8	7.67	1.25	17.2	1.50
496.42	0945	10	21.98	589.9	263.7	7.67	0.93	16.5	1.45
	0946	Sampling							

Comments: ~1.5 gals purged from tubing 0826

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: MWL						
Calibrations done by: R Lynch				Date: 04/20/16		
Make & Model: EXO 1						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 14H101486						
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:	0622	4.02	19.4	7.00	19.4	10.00
2. Time:	1121	4.03	19.4	7.01	19.4	9.99
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: 4/17			
1. Time:	0621	1412.8	19.4			
2. Time:	1120	1413.3	19.4			
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV				Standard Lot No. 5GH380		
	Value	Temp	Expiration Date: 5/16			
1. Time:	0624	220.2	19.4			
2. Time:	1123	220.6	19.4			
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value:		81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0620	81.9	24.69			
2. Time:	1119	82.0	24.71			
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: 04/20/16	
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	.12	20.1	102	796
2. Time 1050	.09	20.3	99.8	801
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: 04/21/16			
Make & Model: EXO 1							
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 14H101486							
Other (S/N): NA							
pH Calibration/Check							
pH Calibrated to (std): 7.00				pH sloped to (std): 10.00			
Reference value:		4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp	
1. Time:	0642	4.02	19.6	7.01	19.6	10.00	19.6
2. Time:	1154	4.03	19.7	7.02	19.7	10.01	19.7
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: 4/17				
1. Time:	0641	1412.7	19.7				
2. Time:	1153	1413.6	19.8				
3. Time:							
4. Time:							
ORP Calibration/Check							
Reference Value: 220 mV				Standard Lot No. 5GH380			
	Value	Temp	Expiration Date: 5/16				
1. Time:	0644	220.2	19.7				
2. Time:	1156	219.9	19.7				
3. Time:							
4. Time:							
DO Calibration/Check							
Calibration Value:		81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0640	82.1		24.74			
2. Time:	1152	82.0		24.75			
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: 04/21/16	
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 0803	0.08	19.9	103	797
2. Time 1002	0.12	20.3	101	799
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: 04/25/16			
Make & Model: EXO 1							
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 14H101486							
Other (S/N): NA							
pH Calibration/Check							
pH Calibrated to (std): 7.00				pH sloped to (std): 10.00			
Reference value:		4.00		7.00		10.00	
	Value	Temp	Value	Temp	Value	Temp	
1. Time:	0617	4.01	19.2	6.99	19.2	10.00	19.2
2. Time:	1110	4.02	19.5	7.01	19.5	10.01	19.3
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: 4/17				
1. Time:	0616	1411.9	19.2				
2. Time:	1109	1412.6	19.4				
3. Time:							
4. Time:							
ORP Calibration/Check							
Reference Value: 220 mV				Standard Lot No.: 5GH380			
	Value	Temp	Expiration Date: 5/16				
1. Time:	0626	220.4	19.2				
2. Time:	1112	221.0	19.5				
3. Time:							
4. Time:							
DO Calibration/Check							
Calibration Value:		81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0615	82.0	24.60				
2. Time:	1108	82.2	24.71				
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: 04/25/16	
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 0803	.11	19.8	101	797
2. Time 1003	.09	19.9	104	795
3. Time				
4. Time				
Comments:				

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: MWL						
Calibrations done by: R Lynch				Date: 04/26/16		
Make & Model: EXO 1						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 14H101486						
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:	0622	4.03	19.6	7.01	19.6	10.01
2. Time:	1117	4.02	19.8	7.00	19.8	10.02
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: 4/17			
1. Time:	0621	1412.7	19.6			
2. Time:	1116	1413.3	19.8			
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV				Standard Lot No. 5GH380		
	Value	Temp	Expiration Date: 5/16			
1. Time:	0624	220.3	19.6			
2. Time:	1119	219.9	19.8			
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value:		81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0620	81.9		24.52		
2. Time:	1115	82.1		24.58		
3. Time:						
4. Time:						

IMPORTANT NOTICE:

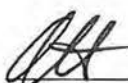
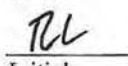
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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG (continued) Page 2 of 2


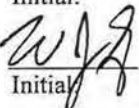
SNL/NM Project Name: MWL				
Calibration done by: R Lynch			Date: 04/26/16	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 14060C033238	
Reference Value	0.1	20	100	800
Standard Lot No.	A5162	A5247	A5251	A5246
1. Time 0805	108	19.8	104	802
2. Time 1012	110	19.6	101	798
3. Time				
4. Time				
Comments:				

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
Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>MWL-GWM</u>	Monitoring Well ID #: <u>N/A</u>	Date: <u>04-19-16</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>N/A</u>	
Personnel Performing Decontamination:		
Alfred Santillanes		
Print Name:		Initial:
Robert Lynch		
Print Name:		Initial:
Condition of Equipment		
Pump: <u>Excellent</u>	Tubing Bundle: <u>Excellent</u>	Water Level Indicator: <u>N/A</u>
List of Decontamination Materials		
Deionized Water	HNO_3	
Source: <u>Culligan</u>	Grade: <u>Reagent</u>	
Lot Number: <u>04-11-16</u>	UN #: <u>2031</u>	
	Manufacturer: <u>ACROS</u>	
	Lot Number: <u>A0316863</u>	

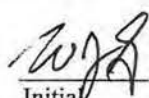
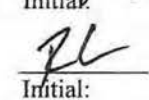
Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>MWL</u>	Monitoring Well ID #: <u>MWL-BW2</u>	Date: <u>04-20-16</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>62187</u>	
Personnel Performing Decontamination: <u>Alfred Santillanes</u> Print Name: <u>William Gibson</u> Print Name:		
<div style="text-align: center;"> Initial:  Initial:</div>		
Condition of Equipment Pump: <u>Excellent</u> Tubing Bundle: <u>Excellent</u> Water Level Indicator: <u>Good</u>		
List of Decontamination Materials		
Deionized Water Source: <u>Culligan</u> Lot Number: <u>04-01-16</u>	HNO₃ Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>ACROS</u> Lot Number: <u>A0316863</u>	

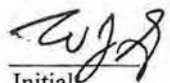
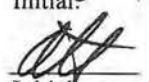
Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>MWL-GWM</u>	Monitoring Well ID #: <u>MWL-MW7</u>	Date: <u>04-21-16</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>62187</u>	
Personnel Performing Decontamination:		
Alfred Santillanes		
Print Name:		Initial:
Robert Lynch		
Print Name:		Initial:
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 ₃	
Source: <u>Culligan</u>	Grade: <u>Reagent</u>	
Lot Number: <u>04-11-16</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-MW9</u>	Date: <u>04/25/16</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>62187</u>	
Personnel Performing Decontamination:		
William Gibson		
Print Name:		Initial:
Robert Lynch		
Print Name:		Initial:
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 ₃
Source: <u>Culligan</u>	Grade: <u>Reagent</u>	
Lot Number: <u>04/14/16</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-MW8</u>	Date: <u>04/26/16</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>62187</u>	
<u>Personnel Performing Decontamination:</u> William Gibson Print Name: _____ Alfred Santillanes Print Name: _____ <div style="text-align: right;"> Initial: _____  Initial: _____</div>		
Condition of Equipment Pump: <u>Excellent</u> Tubing Bundle: <u>Excellent</u> Water Level Indicator: <u>Good</u>		
List of Decontamination Materials		
Deionized Water Source: <u>Culligan</u> Lot Number: <u>04-14-16</u>	HNO_3 Grade: <u>Reagent</u> UN #: <u>2031</u> Manufacturer: <u>ACROS</u> Lot Number: <u>A0316863</u>	

SUMMARY SHEET FOR
APRIL 2016 GROUNDWATER SAMPLES

Sample Summary for April 2016 MWL Groundwater Monitoring

Well ID	Sample Date	ARCOG	Sample Number	Sample Type	Associated Equipment Blank (ARCOG #/Sample #)	Associated Trip Blank (ARCOG # / Sample #)	Associated Field Blank (ARCOG # / Sample #)	Comments
GEL Analytical Data: Project Task # 195122.10.11.08, Service Order # CF01-16								
MWL-BW2	20-Apr-16	616956	099408	Environmental	616955 / 099405	616956 / 099410	616956 / 099407	
MWL-BW2	20-Apr-16	616956	099409	Duplicate	616955 / 099405	616956 / 099410	616956 / 099407	
MWL-MW7	21-Apr-16	616957	099412	Environmental	n/a	616957 / 099413	616957 / 099411	
MWL-MW8	26-Apr-16	616959	099418	Environmental	n/a	616959 / 099419	616959 / 099417	
MWL-MW9	25-Apr-16	616958	099415	Environmental	n/a	616958 / 099416	616958 / 099414	
MWL-EB1	19-Apr-16	616955	099405	Equipment Blank	n/a	616955 / 099406	n/a	Equipment blank sample prior to MWL-BW2.
MWL DIW/QC	19-Apr-16	616955	099404	DIW QC	n/a	616955 / 099406	n/a	DIW - source water for EB1
MWL-FB2	20-Apr-16	616956	099407	Field Blank	n/a	616956 / 099410	n/a	at MWL-BW2
MWL-FB3	21-Apr-16	616957	099411	Field Blank	n/a	616957 / 099413	n/a	at MWL-MW7
MWL-FB4	25-Apr-16	616958	099414	Field Blank	n/a	616958 / 099416	n/a	at MWL-MW9
MWL-FB5	26-Apr-16	616959	099417	Field Blank	n/a	616959 / 099419	n/a	at MWL-MW8

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES
GROUNDWATER MONITORING
APRIL 2016

AR/COC NUMBERS 616955, 616956, 616957

Memorandum

Date: May 25, 2016
To: File
From: Mary Donovan
Subject: GC/MS Organic Data Review and Validation – SNL
Site: MWL GWM
AR/COC: 616955, 616956 and 616957
SDG: 395664
Laboratory: GEL
Project/Task: 195122.10.11.08
Analysis: VOCs

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

Summary

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

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as follows. The ICV %D was >20% with positive bias for chloroethane and the ICV %D and the %D for dichlorodifluoromethane in the CCV associated with samples 395664001, -002, -008, -009, -010, -016, -022 and -023 was >20% with positive bias. The associated sample results were non-detect and will not be qualified.

For the CCVs associated with samples -001, -002, -008, -009, -010, -016, -022 and -023, the %Ds were >20% but ≤40% with negative bias for 4-methyl-2-pentanone and methylene chloride. For the CCVs associated with samples -024 and -030, the %Ds were >20% but ≤40% with negative bias for 1,1,2,2-tetrachloroethane, 2-butanone, 2-hexanone, 4-methyl-2-pentanone and acetone. The associated sample results were non-detect and since no other calibration infraction occurred will not be qualified.

Blanks

No target analytes were detected in the blanks except as follows. Bromodichloromethane, chloroform and dibromochloromethane were detected at concentrations > the PQL in EB1, sample -002, and FB2, sample -009, both associated with samples -010 and -016; and FB3, sample -023, associated with sample -024. The associated sample results were non-detect and will not be qualified.

Bromodichloromethane, chloroform and dibromochloromethane were detected at concentrations > the PQL in DIW QC, sample -001, which was not associated with any field samples. No sample results will be qualified.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD 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.

Three TBs were submitted, one for each ARCO. FBs were submitted with ARCOs 616956 and 616957 and were associated with the respective field samples in the ARCOs. The DIW QC submitted with ARCO 616955 had no associated field samples. An EB was submitted with ARCO 616955 and was applied to the samples in ARCO 616956. A field duplicate pair was submitted with ARCO 616956. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Linda Thal **Level I** **Date:** 06/01/2016

Memorandum

Date: May 25, 2016
To: File
From: Mary Donovan
Subject: Inorganic Data Review and Validation – SNL
Site: MWL GWM
AR/COC: 616955, 616956 and 616957
SDG: 395664
Laboratory: GEL
Project/Task: 195122.10.11.08
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

Summary

Four 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. Cr was detected at a concentration < the PQL in EB1, sample 395644003 which was associated with samples -011 and -017. The associated sample results were non-detect and will not be qualified.

U was detected at concentrations < the PQL in the ICB and bracketing CCBs. The associated result for sample -003 was non-detect and the remaining associated sample results were detects > 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 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 < that in the ICS solution.

ICP Serial Dilution

The serial dilutions met all QC acceptance criteria.

Other QC

An EB was submitted with ARCO 616955 and was applied to the samples in ARCO 616956. A field duplicate pair was submitted with ARCO 616956. There are no “required” review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Linda Thal

Level I

Date: 06/01/2016

Memorandum

Date: May 27, 2016
To: File
From: Mary Donovan
Subject: Radiochemical Data Review and Validation – SNL
Site: MWL GWM
AR/COC: 616955, 616956 and 616957
SDG: 395664
Laboratory: GEL
Project/Task: 195122.10.11.08
Analysis: RAD

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

Summary

Four 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.

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**.

Radon-222:

1. The result for sample 395664029 was > 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.

It should be noted that an LCS/LCSD was analyzed and assessed for accuracy in lieu of an MS for the Rn-222 batch associated with the EB, sample 395666007. Because the EB was the only sample prepared in the batch, the result will not be qualified based on professional judgment.

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

It should be noted that an LCS/LCSD was analyzed and assessed for precision in lieu of a replicate for the Rn-222 batch associated with the EB, sample -007. Because the EB was the only sample prepared in the batch, the result will not be qualified based on professional judgment.

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 ARCOG 616955 and was applied to the samples in ARCOG 616956. A field duplicate pair was also submitted with ARCOG 616956. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Linda Thal

Level I

Date: 06/01/2016



Sample Findings Summary



AR/COC: 616955, 616956, 616957

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	099405-004/MWL-EB1	ALPHA (12587-46-1)	BD, FR3
	099405-004/MWL-EB1	BETA (12587-47-2)	BD, FR3
EPA 901.1			
	099405-003/MWL-EB1	Americium-241 (14596-10-2)	BD, FR3
	099405-003/MWL-EB1	Cesium-137 (10045-97-3)	BD, FR3
	099405-003/MWL-EB1	Cobalt-60 (10198-40-0)	BD, FR3
	099405-003/MWL-EB1	Potassium-40 (13966-00-2)	BD, FR3
	099408-003/MWL-BW2	Americium-241 (14596-10-2)	BD, FR3
	099408-003/MWL-BW2	Cesium-137 (10045-97-3)	BD, FR3
	099408-003/MWL-BW2	Cobalt-60 (10198-40-0)	BD, FR3
	099408-003/MWL-BW2	Potassium-40 (13966-00-2)	BD, FR3
	099409-003/MWL-BW2	Americium-241 (14596-10-2)	BD, FR3
	099409-003/MWL-BW2	Cesium-137 (10045-97-3)	BD, FR3
	099409-003/MWL-BW2	Cobalt-60 (10198-40-0)	BD, FR3
	099409-003/MWL-BW2	Potassium-40 (13966-00-2)	BD, FR3
	099412-003/MWL-MW7	Americium-241 (14596-10-2)	BD, FR3
	099412-003/MWL-MW7	Cesium-137 (10045-97-3)	BD, FR3
	099412-003/MWL-MW7	Cobalt-60 (10198-40-0)	BD, FR3
	099412-003/MWL-MW7	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	099405-005/MWL-EB1	Tritium (10028-17-8)	BD, FR3
	099408-005/MWL-BW2	Tritium (10028-17-8)	BD, FR3
	099409-005/MWL-BW2	Tritium (10028-17-8)	BD, FR3
	099412-005/MWL-MW7	Tritium (10028-17-8)	BD, FR3
SM 7500 Rn B			

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
	099405-006/MWL-EB1	Radon-222 (14859-67-7)	BD, FR3
	099412-006/MWL-MW7	Radon-222 (14859-67-7)	J, FR7

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

Sandia Data Validation Summary Worksheet

ARCOG#: 616955, 616956 and 616957	Site/Project: MWL GWM	Validation Date: 05/25/16
SDG #: 395664	Laboratory: GEL Laboratories, Inc.	Validator: Mary Donovan
Matrix: Aqueous	# of Samples: 30	CVR present: Yes
ARCOG(s) present: Yes	Sample Container Integrity: OK	
Analysis Type: <input checked="" type="checkbox"/> Organic <input checked="" type="checkbox"/> Metals <input type="checkbox"/> Genchem <input checked="" type="checkbox"/> Rad		

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

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

Comments: Collected: 04/19 through 21/2016

Validated by:

Mary A. Donovan

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #:616955, 616956 and 616957	SDG: 395664	Matrix: Aqueous
Laboratory Sample IDs: 395664001, -002, -008, -009, -010, -016, -022, -023, -024 and -030		
Method/Batch #s: 8260B /1563230	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	TB1 -008 TB2 -022 TB3 -030	EB1 -002	FB2 -009 ^A FB3 -023 ^B	DIW/ QC -001
	Int.	RF/ Slope	RSD/ r ²	(ICV)/ CCV %D										
bromodichloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	3.50	3.30 ^A 3.27 ^B	3.67
chloroform	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	2.84	2.60 ^A 2.53 ^B	2.84
dibromochloromethane	NA	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	2.20	2.19 ^A 2.13 ^B	2.21
1,1,2,2-tetrachloroethane	NA	✓	✓	-22.4 ²	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
2-butanone	NA	✓	✓	-26.3 ²	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
2-hexanone	NA	✓	✓	-30.6 ²	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
4-methyl-2-pentanone	NA	✓	✓	-22.9 ¹ -29.9 ²	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
acetone	NA	✓	✓	-28.2 ²	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
chloroethane	NA	✓	✓	(23.0)	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
dichlorodifluoromethane	NA	✓	✓	(22.3) 30.6 ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓
methylene chloride	NA	✓	✓	-23.6 ¹	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓

Surrogate Recovery Outliers

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

IS Outliers

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

Comments: HTs OK. ICAL VOA1.I 04/06/16. Mass spectra validated. MS/MSD performed on sample -010

¹associated with samples -001, -002, -008, -009, -010, -016, -022, -023; ²associated with samples -024 and -030

Sandia Inorganic Metals Worksheet

ARCO #s: 616955, 616956 and 616957	SDG #(s): 395664	Matrix: Aqueous
Laboratory Sample IDs: 395664003, -011, -017 and -025		
Method/Batch #s: 3005A/6020 1561955/1561956		

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)	CRI %R	EB1 -003			
	Int. mg/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L													
Cr	NA	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	NA	✓	0.00236J			
U	NA	✓	✓	✓	0.192	0.182	✓	0.00096	✓	✓	✓	✓	✓	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 -011.

Sandia Radiochemistry Worksheet

ARCO# #s): 616955, 616956 and 616957	SDG #: 395664	Matrix: Aqueous
Laboratory Sample IDs:395664 – see below		
Method/Batch#s: EPA 901.1 (gamma spec)/1561959 Samples -004, -012, -018 and -026		
Method/Batch#s: EPA 900.0/SW846 9310 (gross A/B)/1565842 Samples -005, -013, -019 and -027		
Method/Batch#s: SM 7500 Rn B (radon-222)/1561247 Sample -007, 1561840 Samples -015, -021 and -029		
Method/Batch#s: EPA 906.0 Modified (tritium)/1565646 Samples -006, -014, -020 and -028		

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	LCS/ LCSD RER		
None													
Tracer/Carrier Recovery Outliers													
Sample ID	Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	Sample ID			Tracer/Carrier	%R	
NA													

Comments: HTs OK. All matrix QC on samples from this SDG

Gamma spec – sample -004 and DUP recounted due to negative results > 2X MDA, recounts reported

Gross A/B - LCS and MS recounted due to high recovery, recounts reported.

Gross A/B parent and dup sample 150ml; MS/MSD 50ml; 3X dilution – data not qualified

Rn-222 – LCS/LCSD analyzed instead of DUP/MS with batch containing EB (-007)

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

20160443150

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Internal Lab

Batch No. <i>11</i>		SMO Use <i>395664</i>		AR/COC <i>616955</i>								
Project Name: MWL GWM / SVM		Date Samples Shipped: <i>4/19/16</i>		SMO Authorization: <i>edg</i>								
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>247508</i>		SMO Contact Phone: <i>SMO</i>								
Project/Task Number: 195122.10.11.08		Lab Contact: Edie Kent/843-769-7385		Wendy Palencia/505-844-3132								
Service Order: CF01-16		Lab Destination: GEL		Send Report to SMO: <input checked="" type="checkbox"/> 4° Celsius								
		Contract No.: 1303873		Stephanie Montaño/505.284.2553								
Tech Area:		Bill to: Sandia National Laboratories (Accounts Payable),										
Building:		P.O. Box 5800, MS-0154										
Room:		Albuquerque, NM 87185-0154 <i>395664</i>										
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
099404	001	MWL DIW/QC	NA	4/19/16 09:45	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMP (SW846-8260B)	<i>001</i>
099405	001	MWL-EB1	NA	4/19/16 09:45	DIW	G	3x40 ml	HCl	G	EB	VOC-LTMMP (SW846-8260B)	<i>002</i>
099405	002	MWL-EB1	NA	4/19/16 09:46	DIW	P	500 ml	HNO3	G	EB	METALS (SW846-6020): Cd, Cr, Ni, U	<i>003</i>
099405	003	MWL-EB1	NA	4/19/16 09:47	DIW	P	1 L	HNO3	G	EB	GAMMA SPEC, SHORT LIST (EPA 901)	<i>004</i>
099405	004	MWL-EB1	NA	4/19/16 09:48	DIW	P	1 L	HNO3	G	EB	GROSS-ALPHA/BETA (EPA 900)	<i>005</i>
099405	005	MWL-EB1	NA	4/19/16 09:49	DIW	AG	250 ml	NONE	G	EB	TRITIUM (EPA 906)	<i>006</i>
099405	006	MWL-EB1	NA	4/19/16 09:50	DIW	G	2x40 ml	NONE	G	EB	RADON (SM7500 Rn B)	<i>007</i>
099406	001	MWL-TB1	NA	4/19/16 09:45	DIW	G	3x40 ml	HCl	G	TB	VOC-LTMMP (SW846-8260B)	<i>008</i>
Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD		<input checked="" type="checkbox"/> Yes						
Background: <input type="checkbox"/> Yes		Entered by:		Turnaround Time		<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day						
Confirmatory: <input type="checkbox"/> Yes		QC inits.:		Negotiated TAT		<input type="checkbox"/>						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal		<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Lab Use		
	William Gibson	<i>William Gibson</i>	<i>WG</i>	SNL/04141/505-239-7367/505-239-7367		Return Samples By:						
	Robert Lynch	<i>Robert Lynch</i>	<i>RL</i>	SNL/04141/505-844-4013/505-250-7090		Comments: Report specific VOCs (MWL LTMMP List). Report short list isotopes for gamma spectroscopy analysis.						
	Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/04141/505-284-6870/505-228-0710								
Relinquished by <i>William Gibson</i>		Org. <i>4141</i>	Date <i>4/19/16</i>	Time <i>1050</i>	Relinquished by		Org.	Date	Time			
Received by <i>Robert Lynch</i>		Org. <i>4131</i>	Date <i>4/19/16</i>	Time <i>1650</i>	Received by		Org.	Date	Time			
Relinquished by <i>Robert Lynch</i>		Org. <i>4131</i>	Date <i>4/19/16</i>	Time <i>1135</i>	Relinquished by		Org.	Date	Time			
Received by <i>P. Mont</i>		Org. <i>GEL</i>	Date <i>4-20-16</i>	Time <i>0900</i>	Received by		Org.	Date	Time			

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

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Batch No. <i>N/A</i>		SMO Use <i>395664</i>		AR/COC <i>616956</i>									
Project Name: MWL GWM / SVM		Date Samples Shipped: <i>4/20/16</i>		SMO Authorization: <i>[Signature]</i>									
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>247521</i>		SMO Contact Phone: <i>Wendy Palencia/505-844-3132</i>									
Project/Task Number: 195122.10.11.08		Lab Contact: Edie Kent/843-769-7385		Send Report to SMO: <i>Stephanie Montaño/505.284.2553</i>									
Service Order: CF01-16		Lab Destination: GEL		Contract No.: 1303873									
Tech Area:		Operational Site:		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius									
Building:		Room:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <i>395664</i>									
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID	
099407	001	MWL-FB2	NA	4/20/16 10:35	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMP (SW846-8260B)	<i>009</i>	
099408	001	MWL-BW2	496	4/20/16 10:35	GW	G	3x40 ml	HCl	G	SA	VOC-LTMMP (SW846-8260B)	<i>010</i>	
099408	002	MWL-BW2	496	4/20/16 10:36	GW	P	500 ml	HNO3	G	SA	METALS (SW846-6020): Cd, Cr, Ni, U	<i>011</i>	
099408	003	MWL-BW2	496	4/20/16 10:37	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	<i>012</i>	
099408	004	MWL-BW2	496	4/20/16 10:39	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900)	<i>013</i>	
099408	005	MWL-BW2	496	4/20/16 10:40	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	<i>014</i>	
099408	006	MWL-BW2	496	4/20/16 10:41	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	<i>015</i>	
099409	001	MWL-BW2	496	4/20/16 10:35	GW	G	3x40 ml	HCl	G	DU	VOC-LTMMP (SW846-8260B)	<i>016</i>	
099409	002	MWL-BW2	496	4/20/16 10:36	GW	P	500 ml	HNO3	G	DU	METALS (SW846-6020): Cd, Cr, Ni, U	<i>017</i>	
099409	003	MWL-BW2	496	4/20/16 10:37	GW	P	1 L	HNO3	G	DU	GAMMA SPEC, SHORT LIST (EPA 901)	<i>018</i>	
Last Chain: <input type="checkbox"/> Yes			Sample Tracking			SMO Use			Special Instructions/QC Requirements:			Conditions on Receipt	
Validation Req'd: <input checked="" type="checkbox"/> Yes			Date Entered:						EDD <input checked="" type="checkbox"/> Yes				
Background: <input type="checkbox"/> Yes			Entered by:						Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day				
Confirmatory: <input type="checkbox"/> Yes			QC inits.:						Negotiated TAT <input type="checkbox"/>				
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			Return Samples By:				
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/04141/505-239-7367/505-239-7367					Comments: Report specific VOCs (MWL LTMMP List). Report short list isotopes for gamma spectroscopy analysis.				
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/04141/505-844-4013/505-250-7090									
	Alfred Santillanes	<i>[Signature]</i>	<i>AS</i>	SNL/04141/505-284-6870/505-228-0710									
Relinquished by <i>[Signature]</i> Org. <i>4141</i> Date <i>4/20/16</i> Time <i>1109</i>			Received by <i>[Signature]</i> Org. <i>4131</i> Date <i>4/20/16</i> Time <i>1109</i>			Relinquished by <i>[Signature]</i> Org. <i>4131</i> Date <i>4/20/16</i> Time <i>1200</i>			Received by <i>[Signature]</i> Org. <i>4131</i> Date <i>4/20/16</i> Time <i>1200</i>			Lab Use	
Relinquished by <i>[Signature]</i> Org. <i>GEL</i> Date <i>4/21/16</i> Time <i>0800</i>			Received by <i>[Signature]</i> Org. <i>GEL</i> Date <i>4/21/16</i> Time <i>0800</i>			Relinquished by <i>[Signature]</i> Org. <i>GEL</i> Date <i>4/21/16</i> Time <i>0800</i>			Received by <i>[Signature]</i> Org. <i>GEL</i> Date <i>4/21/16</i> Time <i>0800</i>				

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

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Batch No. <u>N/A</u>		SMO Use		AR/COC 616957																																																																																																																								
Project Name: MWL GWM / SVM		Date Samples Shipped: <u>4/21/16</u>		SMO Authorization: <u>[Signature]</u>																																																																																																																								
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <u>247626</u>		SMO Contact Phone: <u>Wendy Palencia/505-844-3132</u>																																																																																																																								
Project/Task Number: 195122.10.11.08		Lab Contact: <u>Edie Kent/843-769-7385</u>		Send Report to SMO: <u>Stephanie Montaño/505.284.2553</u>																																																																																																																								
Service Order: CF01-16		Lab Destination: <u>GEL</u>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius																																																																																																																								
Contract No.: 1303873		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <u>395064</u>																																																																																																																										
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																																																																																																																
099411	001	MWL-FB3	NA	4/21/16 09:49	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMP (SW846-8260B)	<u>023</u>																																																																																																																
099412	001	MWL-MW7	496	4/21/16 09:49	GW	G	3x40 ml	HCl	G	SA	VOC-LTMMP (SW846-8260B)	<u>024</u>																																																																																																																
099412	002	MWL-MW7	496	4/21/16 10:02	GW	P	500 ml	HNO3	G	SA	METALS (SW846-6020): Cd, Cr, Ni, U	<u>025</u>																																																																																																																
099412	003	MWL-MW7	496	4/21/16 10:03	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	<u>026</u>																																																																																																																
099412	004	MWL-MW7	496	4/21/16 10:04	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900)	<u>027</u>																																																																																																																
099412	005	MWL-MW7	496	4/21/16 10:05	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	<u>028</u>																																																																																																																
099412	006	MWL-MW7	496	4/21/16 10:06	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	<u>029</u>																																																																																																																
099413	001	MWL-TB3	NA	4/21/16 09:49	DIW	G	3x40 ml	HCl	G	TB	VOC-LTMMP (SW846-8260B)	<u>030</u>																																																																																																																
<table border="1"> <tr> <td colspan="3">Last Chain: <input type="checkbox"/> Yes</td> <td colspan="3">Sample Tracking</td> <td colspan="3">SMO Use</td> <td colspan="3">Special Instructions/QC Requirements:</td> <td rowspan="4">Conditions on Receipt</td> </tr> <tr> <td colspan="3">Validation Req'd: <input checked="" type="checkbox"/> Yes</td> <td colspan="3">Date Entered:</td> <td colspan="3">EDD <input checked="" type="checkbox"/> Yes</td> <td colspan="3">Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day</td> </tr> <tr> <td colspan="3">Background: <input type="checkbox"/> Yes</td> <td colspan="3">Entered by:</td> <td colspan="3">Negotiated TAT <input type="checkbox"/></td> <td colspan="3">Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab</td> </tr> <tr> <td colspan="3">Confirmatory: <input type="checkbox"/> Yes</td> <td colspan="3">QC inits.:</td> <td colspan="3">Return Samples By:</td> <td colspan="3">Comments: Report specific VOCs (MWL LTMMP List). Report short list isotopes for gamma spectroscopy analysis.</td> </tr> <tr> <td rowspan="4">Sample Team Members</td> <td>Name</td> <td>Signature</td> <td>Init.</td> <td colspan="3">Company/Organization/Phone/Cell</td> <td colspan="6">Lab Use</td> </tr> <tr> <td>William Gibson</td> <td><u>[Signature]</u></td> <td><u>WG</u></td> <td colspan="3">SNL/04141/505-239-7367/505-239-7367</td> <td colspan="6"></td> </tr> <tr> <td>Robert Lynch</td> <td><u>[Signature]</u></td> <td><u>RL</u></td> <td colspan="3">SNL/04141/505-844-4013/505-250-7090</td> <td colspan="6"></td> </tr> <tr> <td>Alfred Santillanes</td> <td><u>[Signature]</u></td> <td><u>AS</u></td> <td colspan="3">SNL/04141/505-284-6870/505-228-0710</td> <td colspan="6"></td> </tr> <tr> <td colspan="3">Relinquished by <u>[Signature]</u> Org. <u>4141</u> Date <u>4/21/16</u> Time <u>1020</u></td> <td colspan="3">Received by <u>[Signature]</u> Org. <u>4131</u> Date <u>4/21/16</u> Time <u>1020</u></td> <td colspan="3">Relinquished by <u>[Signature]</u> Org. <u>4131</u> Date <u>4/21/16</u> Time <u>1120</u></td> <td colspan="3">Received by <u>[Signature]</u> Org. <u>662</u> Date <u>4/22/16</u> Time <u>0850</u></td> <td colspan="2"></td> </tr> </table>													Last Chain: <input type="checkbox"/> Yes			Sample Tracking			SMO Use			Special Instructions/QC Requirements:			Conditions on Receipt	Validation Req'd: <input checked="" type="checkbox"/> Yes			Date Entered:			EDD <input checked="" type="checkbox"/> Yes			Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day			Background: <input type="checkbox"/> Yes			Entered by:			Negotiated TAT <input type="checkbox"/>			Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab			Confirmatory: <input type="checkbox"/> Yes			QC inits.:			Return Samples By:			Comments: Report specific VOCs (MWL LTMMP List). Report short list isotopes for gamma spectroscopy analysis.			Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell			Lab Use						William Gibson	<u>[Signature]</u>	<u>WG</u>	SNL/04141/505-239-7367/505-239-7367									Robert Lynch	<u>[Signature]</u>	<u>RL</u>	SNL/04141/505-844-4013/505-250-7090									Alfred Santillanes	<u>[Signature]</u>	<u>AS</u>	SNL/04141/505-284-6870/505-228-0710									Relinquished by <u>[Signature]</u> Org. <u>4141</u> Date <u>4/21/16</u> Time <u>1020</u>			Received by <u>[Signature]</u> Org. <u>4131</u> Date <u>4/21/16</u> Time <u>1020</u>			Relinquished by <u>[Signature]</u> Org. <u>4131</u> Date <u>4/21/16</u> Time <u>1120</u>			Received by <u>[Signature]</u> Org. <u>662</u> Date <u>4/22/16</u> Time <u>0850</u>				
Last Chain: <input type="checkbox"/> Yes			Sample Tracking			SMO Use			Special Instructions/QC Requirements:			Conditions on Receipt																																																																																																																
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Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell			Lab Use																																																																																																																					
	William Gibson	<u>[Signature]</u>	<u>WG</u>	SNL/04141/505-239-7367/505-239-7367																																																																																																																								
	Robert Lynch	<u>[Signature]</u>	<u>RL</u>	SNL/04141/505-844-4013/505-250-7090																																																																																																																								
	Alfred Santillanes	<u>[Signature]</u>	<u>AS</u>	SNL/04141/505-284-6870/505-228-0710																																																																																																																								
Relinquished by <u>[Signature]</u> Org. <u>4141</u> Date <u>4/21/16</u> Time <u>1020</u>			Received by <u>[Signature]</u> Org. <u>4131</u> Date <u>4/21/16</u> Time <u>1020</u>			Relinquished by <u>[Signature]</u> Org. <u>4131</u> Date <u>4/21/16</u> Time <u>1120</u>			Received by <u>[Signature]</u> Org. <u>662</u> Date <u>4/22/16</u> Time <u>0850</u>																																																																																																																			

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

AR/COC NUMBERS 616958, 616959

Memorandum

Date: June 1, 2016
To: File
From: Mary Donovan
Subject: GC/MS Organic Data Review and Validation – SNL
Site: MWL GWM
AR/COC: 616958 and 616959
SDG: 396016
Laboratory: GEL
Project/Task: 195122.10.11.08
Analysis: VOCs

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

Summary

Six 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 $\leq 40\%$ for bromoform. The associated result for sample 396016009 was a detect and will be **qualified J,I3**.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows. The ICAL %RSD was $>15\%$ but $\leq 40\%$ for bromoform. The results for all associated samples *except* sample -009 were non-detect and since no other calibration infraction occurred will not be qualified.

The ICV %D was >20% but \leq 40% with negative bias for dichlorodifluoromethane. The associated sample results were non-detect and since no other calibration infraction occurred will not be qualified.

The CCV %D was >20% with positive bias for 2-butanone. The associated sample results were non-detect 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 PQL in FB4, sample -001, associated with sample -002; and FB5, sample -009, associated with sample -010. Bromoform was detected at a concentration < the PQL in FB5, sample -009, associated with sample -010. 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.

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

No other specific issues that affect data quality were identified.

Reviewed by: Linda Thal

Level I

Date: 06/02/2016

Memorandum

Date: June 1, 2016
To: File
From: Mary Donovan
Subject: Inorganic Data Review and Validation – SNL
Site: MWL GWM
AR/COC: 616958 and 616959
SDG: 396016
Laboratory: GEL
Project/Task: 195122.10.11.08
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

Summary

Two 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 were 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 associated sample results were detects > 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 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 < that in the ICS solution.

ICP Serial Dilution

The serial dilutions met all QC acceptance criteria.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Linda Thal **Level I** **Date:** 06/02/2016

Memorandum

Date: June 2, 2016
To: File
From: Mary Donovan
Subject: Radiochemical Data Review and Validation – SNL
Site: MWL GWM
AR/COC: 616958 and 616959
SDG: 396016
Laboratory: GEL
Project/Task: 195122.10.11.08
Analysis: RAD

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

Summary

Two 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.

Gamma spec and Tritium:

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

Radon-222:

1. Sample 396016007 was analyzed beyond the method specified holding time but <2X the holding time. The associated result was a detect and will be **qualified J,H1**.
2. The result for sample 396016015 was > the MDA but ≤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

Tracer/carriers were not required.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD met all QC acceptance criteria.

It should be noted that the MS and/or MSD for gross alpha/beta and tritium were performed on SNL samples of similar matrix from another SDG. Data will not be qualified.

Laboratory Replicate

All replicate error ratio acceptance criteria were met.

It should be noted that the replicate analyses for gross alpha/beta and tritium were performed on SNL samples of similar matrix from another SDG. Data will not be qualified.

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

No other specific issues that affect data quality were identified.

Reviewed by: Linda Thal **Level I** **Date:** 06/02/2016



Sample Findings Summary



AR/COC: 616958, 616959

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 901.1			
	099415-003/MWL-MW9	Americium-241 (14596-10-2)	BD, FR3
	099415-003/MWL-MW9	Cesium-137 (10045-97-3)	BD, FR3
	099415-003/MWL-MW9	Cobalt-60 (10198-40-0)	BD, FR3
	099415-003/MWL-MW9	Potassium-40 (13966-00-2)	BD, FR3
	099418-003/MWL-MW8	Americium-241 (14596-10-2)	BD, FR3
	099418-003/MWL-MW8	Cesium-137 (10045-97-3)	BD, FR3
	099418-003/MWL-MW8	Cobalt-60 (10198-40-0)	BD, FR3
	099418-003/MWL-MW8	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	099415-005/MWL-MW9	Tritium (10028-17-8)	BD, FR3
	099418-005/MWL-MW8	Tritium (10028-17-8)	BD, FR3
SM 7500 Rn B			
	099415-006/MWL-MW9	Radon-222 (14859-67-7)	J, H1
	099418-006/MWL-MW8	Radon-222 (14859-67-7)	J, FR7
SW846 8260B DOE-AL			
	099417-001/MWL-FB5	Bromoform (75-25-2)	J, I3

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

Sandia Data Validation Summary Worksheet

ARCOG#: 616958 and 616959	Site/Project: MWL GWM	Validation Date: 06/01/16
SDG #: 396016	Laboratory: GEL Laboratories, Inc.	Validator: Mary Donovan
Matrix: Aqueous	# of Samples: 16	CVR present: Yes
ARCOG(s) present: Yes	Sample Container Integrity: OK	
Analysis Type: <input checked="" type="checkbox"/> Organic <input checked="" type="checkbox"/> Metals <input type="checkbox"/> Genchem <input checked="" type="checkbox"/> Rad		

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

Hold Time/Preservation Outliers								
Client Sample ID	Lab Sample ID	Analysis	Pres.	Collection Date	Preparation Date	Analysis Date	Analysis <2X HT	Analysis ≥2X HT
099415-006	396016007	SM 7500Rn B Radon-222	✓	04/25/16 09:54	04/29/16	04/30/16 07:57	yes	no

Comments: Collected: 04/25 and 26/2016

Validated by:

Mary A. Donovan

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #:616958 and 616959	SDG: 396016	Matrix: Aqueous
Laboratory Sample IDs: 396016001, -002, -008, -009, -010 and -016		
Method/Batch #s: 8260B /1564376	Tuning (pass/fail):pass	TICs Required? (yes/no):no

[illegible][illegible][illegible]

Comments: HTs OK. ICAL VOA9.I 04/22/16. Mass spectra validated. MS/MSD performed on sample -010.

Sandia Inorganic Metals Worksheet

ARCOG #(s): 616958 and 616959	SDG #(s): 396016	Matrix: Aqueous
Laboratory Sample IDs: 396016003 and -011		
Method/Batch #s: 3005A/6020 1563001/1563002		

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)	CRI %R				
	Int. mg/L	R²	ICV	CCV	ICB ug/L	CCB ug/L													
U	NA	✓	✓	✓	0.184	0.185	✓	0.00093	✓	✓	✓	✓	✓	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.

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. <i>W/A</i>		SMO Use		AR/COC		616958						
Project Name: MWL GWM / SVM		Date Samples Shipped: <i>4/25/16</i>		SMO Authorization: <i>[Signature]</i>		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius						
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>247633</i>		SMO Contact Phone: <i>[Signature]</i>		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154 <i>396016</i>						
Project/Task Number: 195122.10.11.08		Lab Contact: Edie Kent/843-769-7385		Wendy Palencia/505-844-3132								
Service Order: CF01-16		Lab Destination: GEL		Send Report to SMO:								
		Contract No.: 1303873		Stephanie Montaño/505.284.2553								
Tech Area:												
Building:		Room:		Operational Site:								
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
099414	001	MWL-FB4	NA	4/25/16 09:46	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMP (SW846-8260B)	001
099415	001	MWL-MW9	497	4/25/16 09:46	GW	G	3x40 ml	HCl	G	SA	VOC-LTMMP (SW846-8260B)	002
099415	002	MWL-MW9	497	4/25/16 09:47	GW	P	500 ml	HNO3	G	SA	METALS (SW846-6020): Cd, Cr, Ni, U	003
099415	003	MWL-MW9	497	4/25/16 09:48	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	004
099415	004	MWL-MW9	497	4/25/16 09:49	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900)	005
099415	005	MWL-MW9	497	4/25/16 09:50	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	006
099415	006	MWL-MW9	497	4/25/16 09:51	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	007
099416	001	MWL-TB4	NA	4/25/16 09:46	DIW	G	3x40 ml	HCl	G	TB	VOC-LTMMP (SW846-8260B)	008
Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:		EDD		<input checked="" type="checkbox"/> Yes						
Background: <input type="checkbox"/> Yes		Entered by:		Turnaround Time		<input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day						
Confirmatory: <input type="checkbox"/> Yes		QC inits.:		Negotiated TAT		<input type="checkbox"/>						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal		Return to Client		<input checked="" type="checkbox"/> Disposal by Lab		
						Return Samples By:						
						Comments: Report specific VOCs (MWL LTMMP List). Report short list isotopes for gamma spectroscopy analysis.						
William Gibson		<i>[Signature]</i>		SNL/04141/505-239-7367/505-239-7367								
Robert Lynch		<i>[Signature]</i>		SNL/04141/505-844-4013/505-250-7090								
Alfred Santillanes		<i>[Signature]</i>		SNL/04141/505-284-6870/505-228-0710								
Relinquished by <i>[Signature]</i>		Org. 4141	Date 4/25/16	Time 1019		Relinquished by		Org.	Date	Time		
Received by <i>[Signature]</i>		Org. 4131	Date 4/25/16	Time 1019		Received by		Org.	Date	Time		
Relinquished by <i>[Signature]</i>		Org. 4131	Date 4/25/16	Time 1120		Relinquished by		Org.	Date	Time		
Received by <i>[Signature]</i>		Org.	Date 4-26-16	Time 0725		Received by		Org.	Date	Time		

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. <u>11A</u>		SMO Use		AR/COC 616959																																																																																																					
Project Name: <u>MWL GWM / SVM</u>		Date Samples Shipped: <u>4/26/16</u>		SMO Authorization: <u>[Signature]</u>																																																																																																					
Project/Task Manager: <u>Timmie Jackson</u>		Carrier/Waybill No. <u>247/48</u>		SMO Contact Phone: <u>[Signature]</u>																																																																																																					
Project/Task Number: <u>195122.10.11.08</u>		Lab Contact: <u>Edie Kent/843-769-7385</u>		Wendy Palencia/505-844-3132																																																																																																					
Service Order: <u>CF01-16</u>		Lab Destination: <u>GEL</u>		Send Report to SMO:																																																																																																					
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099417	001	MWL-FB5	NA	4/26/16 09:48	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMP (SW846-8260B)	<u>009</u>																																																																																													
099418	001	MWL-MW8	497	4/26/16 09:48	GW	G	3x40 ml	HCl	G	SA	VOC-LTMMP (SW846-8260B)	<u>010</u>																																																																																													
099418	002	MWL-MW8	497	4/26/16 09:50	GW	P	500 ml	HNO3	G	SA	METALS (SW846-6020): Cd, Cr, Ni, U	<u>011</u>																																																																																													
099418	003	MWL-MW8	497	4/26/16 09:51	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	<u>012</u>																																																																																													
099418	004	MWL-MW8	497	4/26/16 09:52	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900)	<u>013</u>																																																																																													
099418	005	MWL-MW8	497	4/26/16 09:53	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	<u>014</u>																																																																																													
099418	006	MWL-MW8	497	4/26/16 09:54	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	<u>015</u>																																																																																													
099419	001	MWL-TB5	NA	4/26/16 09:48	DIW	G	3x40 ml	HCl	G	TB	VOC-LTMMP (SW846-8260B)	<u>016</u>																																																																																													
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="3">Last Chain: <input checked="" type="checkbox"/> Yes</td> <td colspan="3">Sample Tracking SMO Use</td> <td colspan="3">Special Instructions/QC Requirements:</td> <td colspan="4" rowspan="4">Conditions on Receipt</td> </tr> <tr> <td colspan="3">Validation Req'd: <input checked="" type="checkbox"/> Yes</td> <td colspan="3">Date Entered:</td> <td colspan="3">EDD <input checked="" type="checkbox"/> Yes</td> </tr> <tr> <td colspan="3">Background: <input type="checkbox"/> Yes</td> <td colspan="3">Entered by:</td> <td colspan="3">Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day</td> </tr> <tr> <td colspan="3">Confirmatory: <input type="checkbox"/> Yes</td> <td colspan="3">QC initials:</td> <td colspan="3">Negotiated TAT <input type="checkbox"/></td> </tr> <tr> <td rowspan="4">Sample Team Members</td> <td colspan="2">Name</td> <td colspan="2">Signature</td> <td>Init.</td> <td colspan="2">Company/Organization/Phone/Cell</td> <td colspan="2">Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab</td> <td colspan="3" rowspan="4">Return Samples By: Comments: Report specific VOCs (MWL LTMMP List). Report short list isotopes for gamma spectroscopy analysis.</td> </tr> <tr> <td colspan="2"></td> <td colspan="2"></td> <td></td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <td colspan="2">William Gibson</td> <td colspan="2"><u>[Signature]</u></td> <td><u>WJG</u></td> <td colspan="2">SNL/04141/505-239-7367/505-239-7367</td> <td colspan="2"></td> </tr> <tr> <td colspan="2">Robert Lynch</td> <td colspan="2"><u>[Signature]</u></td> <td><u>RL</u></td> <td colspan="2">SNL/04141/505-844-4013/505-250-7090</td> <td colspan="2"></td> </tr> <tr> <td></td> <td colspan="2">Alfred Santillanes</td> <td colspan="2"><u>[Signature]</u></td> <td><u>AS</u></td> <td colspan="2">SNL/04141/505-284-6870/505-228-0710</td> <td colspan="2"></td> <td colspan="3"></td> </tr> </table>													Last Chain: <input checked="" type="checkbox"/> Yes			Sample Tracking SMO Use			Special Instructions/QC Requirements:			Conditions on Receipt				Validation Req'd: <input checked="" type="checkbox"/> Yes			Date Entered:			EDD <input checked="" type="checkbox"/> Yes			Background: <input type="checkbox"/> Yes			Entered by:			Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day			Confirmatory: <input type="checkbox"/> Yes			QC initials:			Negotiated TAT <input type="checkbox"/>			Sample Team Members	Name		Signature		Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Return Samples By: Comments: Report specific VOCs (MWL LTMMP List). Report short list isotopes for gamma spectroscopy analysis.												William Gibson		<u>[Signature]</u>		<u>WJG</u>	SNL/04141/505-239-7367/505-239-7367				Robert Lynch		<u>[Signature]</u>		<u>RL</u>	SNL/04141/505-844-4013/505-250-7090					Alfred Santillanes		<u>[Signature]</u>		<u>AS</u>	SNL/04141/505-284-6870/505-228-0710						
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Relinquished by <u>[Signature]</u> Org. <u>4131</u> Date <u>4/26/16</u> Time <u>11:00</u>						Relinquished by _____ Org. _____ Date _____ Time _____																																																																																																			
Received by <u>[Signature]</u> Org. <u>GEL</u> Date <u>4/27/16</u> Time <u>0840</u>						Received by _____ Org. _____ Date _____ Time _____																																																																																																			

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

CONTRACT VERIFICATION REVIEW FORMS
GROUNDWATER MONITORING
APRIL 2016

AR/COC Number	Sample Type
616955	Environmental*
616956	Environmental*
616957	Environmental*
616958	Environmental*
616959	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. 195122_10.11.08

ARCOC No. 616955, 616956 & 616957

Analytical Lab GEL

SDG No. 395664

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		

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		Bromodichloromethane, chloroform and dibromochloromethane detected in MWL DIW/QC, MWL-EB, MWL-FB2 and MWL-FB3. Chromium detected in MWL-EB1.
3.6	Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits	X		
3.7	Narrative addresses planchet flaming for gross alpha/beta	X		
3.8	Narrative included, correct, and complete	X		
3.9	Second column confirmation data provided for methods 8330 (high explosives), pesticides/PCBs 8081 and 8082 and herbicides 8151.	N/A		

4.0 Calibration and Validation Documentation

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

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

Line No.	Item	Yes	No	Comments
	b) Continuing calibration provided	N/A		
	c) CRI provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	X		
	a) Initial calibration provided			
	b) Continuing calibration provided	X		
	c) ICP interference check sample data provided	X		The ICSA contained nickel concentrations greater than two times the MDL
	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		

Line No.	Item	Yes	No	If no, explain
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: 05-23-2016 13:29:00

Closed by: Wendy Palencia Date: 05-23-2016 13:29:00

Contract Verification Form (CVR)

Project Leader Jackson

Project Name MWL GWM

Project/Task No. 195122_10.11.08

ARCOC No. 616858 & 616959

Analytical Lab GEL

SDG No. 396016

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	Sample 099415-006 analyzed past holding time for Radon-222
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		

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	Bromodichloromethane, chloroform and dibromochloromethane detected in MWL-FB4. Bromodichloromethane, bromoform, chloroform and dibromochloromethane detected in MWL-FB5.
3.6	Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic and inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time; "h" - analysis done beyond the extraction/preparation holding time; "N" - result associated with spike analysis outside control limits	X		
3.7	Narrative addresses planchet flaming for gross alpha/beta	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)	N/A		
	a) Initial calibration provided			
	b) Continuing calibration provided	N/A		
	c) Instrument run logs provided	N/A		
4.3	HRGC/HRMS (1668)	N/A		
	a) 12-hour tune check provided			
	b) Initial calibration provided	N/A		
	c) Continuing calibration provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Labeled compound recovery data provided	N/A		
	f) RRTs for samples and standards provided	N/A		
	g) Ion abundance ratios for samples and standards provided	N/A		
	h) Instrument run logs provided	N/A		
4.4	LC/MS/MS (6850)	N/A		
	a) Initial calibration provided			

Line No.	Item	Yes	No	Comments
	b) Continuing calibration provided	N/A		
	c) CRI provided	N/A		
	d) Internal standard performance data provided	N/A		
	e) Chlorine isotope ratios provided (perchlorate only)	N/A		
	f) ICS provided (perchlorate only)	N/A		
4.5	Inorganics (metals)	X		
	a) Initial calibration provided			
	b) Continuing calibration provided	X		
	c) ICP interference check sample data provided	X		ICSA contained nickel concentrations greater than two times the MDL
	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: 06-01-2016 11:21:00

Closed by: Wendy Palencia Date: 06-01-2016 11:21:00

FIELD SAMPLING FORMS
OCTOBER 2016 GROUNDWATER MONITORING

TAILGATE SAFETY MEETING FORM

Dept: 4141 Well Location: MWL-BW2 Date: 10-25-16 Time: 0816

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: 53 °F Wind Speed: 8-10 MPH Humidity: 71 %

Chemicals Used: Preservatives in sample bottles

Other: Be aware of possible UXO's

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

William Gibson
Printed Name

Robert Lynch
Printed Name

ALFRED SANTILLANES
Printed Name

GILBERT L. Quintana
Printed Name

Printed Name

William Gibson
Signature

Robert Lynch
Signature

Alfred Santillanes
Signature

Gilbert L. Quintana
Signature

Signature

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BT

TAILGATE SAFETY MEETING FORM

Dept: 4141 Well Location: MWL-MW 7 Date: 10/26/16 Time: 0825Activities: 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: 60 °F Wind Speed: 0-5 MPH Humidity: 50 %Chemicals Used: Preservatives in sample bottlesOther: Be aware of possible UXO's

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

Robert Lynch
Signature

William Gibson
Printed Name

William Gibson
Signature

ALFRED SANTILLANES
Printed Name

Alfred Santillanes
Signature

ELBERT L. Quintana
Printed Name

Elbert L. Quintana
Signature

Printed Name

Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4141 Well Location: MWL-MW9 Date: 10-27-16 Time: 0813Activities: 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: 50 °F Wind Speed: 5-7 MPH Humidity: 51 %Chemicals Used: Preservatives in sample bottlesOther: Be aware of possible UXO's

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

William Gibson
Printed NameWilliam Gibson
SignatureRobert L. Quintana
Printed NameRobert L. Quintana
SignatureALFRED SANTILLANES
Printed NameAlfred Santillanes
Signature_____
Printed Name_____
Signature_____
Printed Name_____
Signature

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TAILGATE SAFETY MEETING FORM

Dept: 4141 Well Location: MWL - MW8 Date: 10-28-16 Time: 0820Activities: 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: 53 °F Wind Speed: 1 MPH Humidity: 45 %Chemicals Used: Preservatives in sample bottlesOther: Be aware of possible UXO's

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

ALFRED SANTILLANES
Printed Name

William Gibson
Printed Name

Robert Lynch
Printed Name

Printed Name

Printed Name

Alfred Santillanes
Signature

William Gibson
Signature

Robert Lynch
Signature

Signature

Signature

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FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: MWL	
Well I.D.: MWL-MW 7	Date: 10/26/16
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 0851

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: <u>MWL</u>	
Well I.D.: <u>MWL-MW9</u>	Date: <u>10-27-16</u>
Method: Portable pump <u>X</u> Dedicated pump _____ Pump depth: <u>497</u>	

PURGE MEASUREMENTS

[illegible]

Comments: 1.5 gal. purge
ozuq

MWL- FB

Bldg 1090 DIW

~~10-28-16~~ wja
10-26-16

GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: MWL						
Calibrations done by: R Lynch				Date: 10/25/16		
Make & Model: EXO 1						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 14H101486						
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:	0622	4.01	20.4	7.00	20.4	10.01
2. Time:	1313	4.02	20.5	7.00	20.6	10.02
3. Time:						
4. Time:						
Standard lot no.:		6GH909		6GG018		6GF797
Expiration date:		AUG/18		JUL/18		JUN/18
SC Calibration/Check						
Reference Value: 1413 uS				Standard Lot No.: 6GH952		
	Value	Temp	Expiration Date: AUG/17			
1. Time:	0621	1412.8	20.4			
2. Time:	1312	1413.3	20.5			
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV				Standard Lot No. 6GH792		
	Value	Temp	Expiration Date: MAY/17			
1. Time:	0624	219.7	20.4			
2. Time:	1315	220.1	20.6			
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value:		81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg		
1. Time:	0620	82.3	24.87			
2. Time:	1311	82.2	24.89			
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: 10/25/16	
TURBIDIMETER				
Make & Model: 2100Q			Serial No. S/N 16040C049087	
Reference Value	10	20	100	800
Standard Lot No.	A6055	A6056	A6064	A6104
1. Time 0826	10.1	19.8	104	806
2. Time 1115	10.4	20.3	106	804
3. Time				
4. Time				
Comments:				

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: MWL						
Calibrations done by: R Lynch				Date: 10/26/16		
Make & Model: EXO 1						
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 14H101486						
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: 0627	4.02	20.8	7.01	20.8	10.00	20.8
2. Time: 1135	4.01	20.8	7.02	20.8	10.01	20.8
3. Time:						
4. Time:						
Standard lot no.:	6GH909		6GG018		6GF797	
Expiration date:	AUG/18		JUL/18		JUN/18	
SC Calibration/Check						
Reference Value: 1413 uS			Standard Lot No.: 6GH952			
	Value	Temp	Expiration Date: AUG/17			
1. Time: 0626	1414.2	20.8				
2. Time: 1134	1413.3	20.8				
3. Time:						
4. Time:						
ORP Calibration/Check						
Reference Value: 220 mV			Standard Lot No. 6GH792			
	Value	Temp	Expiration Date: MAY/17			
1. Time: 0629	220.1	20.8				
2. Time: 1137	219.7	20.8				
3. Time:						
4. Time:						
DO Calibration/Check						
Calibration Value:	81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time: 0625	81.9	24.77				
2. Time: 1133	82.2	24.81				
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: 10/26/16	
TURBIDIMETER				
Make & Model: 2100Q			Serial No. S/N 16040C049087	
Reference Value	10	20	100	800
Standard Lot No.	A6055	A6056	A6064	A6104
1. Time 0629	10.3	19.9	104	807
2. Time 1025	10.1	20.4	102	805
3. Time				
4. Time				
Comments:				

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: MWL <i>WJA 10-27-16</i>							
Calibrations done by: R. Lynch B: Gibson				Date: 10-27-16			
Make & Model: EXO 1							
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 14H101486							
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:	0744	4.01	20.4	7.00	20.4	9.96	20.4
2. Time:	1209	4.01	20.5	7.01	20.5	9.97	20.5
3. Time:							
4. Time:							
Standard lot no.:		6GH909		6GG018		6GF797	
Expiration date:		AUG/18		JUL/18		JUN/18	
SC Calibration/Check							
Reference Value: 1413 uS			Standard Lot No.: 6GH952				
	Value	Temp	Expiration Date: AUG/17				
1. Time:	0746	1413	20.4				
2. Time:	1211	1413	20.5				
3. Time:							
4. Time:							
ORP Calibration/Check							
Reference Value: 220 mV			Standard Lot No.: 6GH792				
	Value	Temp	Expiration Date: MAY/17				
1. Time:	0741	219.9	20.4				
2. Time:	1207	219.9	20.5				
3. Time:							
4. Time:							
DO Calibration/Check							
Calibration Value:		81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0817	82.5	24.94				
2. Time:	1204	82.3	24.74				
3. Time:							
4. Time:							

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

SNL/NM Project Name: BSG MWL				
Calibration done by: W Gibson			Date: 10-27-16	
TURBIDIMETER				
Make & Model: HACH 2100Q			Serial No. S/N 16040C049268	
Reference Value	10	20	100	800
Standard Lot No.	A6056	A6056	A6064	A6056
1. Time 0832	.11	19.4	97.7	796
2. Time 11:31	.10	19.6	98.9	798
3. Time				
4. Time				
Comments:				

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GROUNDWATER SAMPLE COLLECTION FIELD EQUIPMENT CHECK LOG

Page 1 of 2

SNL/NM Project Name: MWL							
Calibrations done by: R Lynch				Date: 10-28-16			
Make & Model: EXO 1							
Sonde (S/N) with DO, Ec, pH, ORP, and temperature probes: 14H101486							
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:	0739	3.99	20.4	6.97	20.4	9.96	20.4
2. Time:	1254	4.01	20.8	7.01	20.8	9.97	20.8
3. Time:							
4. Time:							
Standard lot no.:		6GH909		6GG018		6GF797	
Expiration date:		AUG/18		JUL/18		JUN/18	
SC Calibration/Check							
Reference Value: 1413 uS				Standard Lot No.: 6GH952			
	Value	Temp	Expiration Date: AUG/17				
1. Time:	0741	1412.9	20.4				
2. Time:	1257	1413	20.8				
3. Time:							
4. Time:							
ORP Calibration/Check							
Reference Value: 220 mV				Standard Lot No. 6GH792			
	Value	Temp	Expiration Date: MAY/17				
1. Time:	0735	219.8	20.4				
2. Time:	1251	219.9	20.8				
3. Time:							
4. Time:							
DO Calibration/Check							
Calibration Value:		81% air saturation @ 5200 ft.		Atmospheric Pressure in Hg			
1. Time:	0829	82.7	24.83				
2. Time:	1247	82.0	24.52				
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: 10-28-16	
TURBIDIMETER 268				
Make & Model: 2100Q			Serial No. S/N 16040C049087 <i>268 10-28-16</i>	
Reference Value	10	20	100	800
Standard Lot No.	A6055	A6056	A6064	A6104
1. Time 0840	.10	20.1	101	802
2. Time 1231	.11	20.2	99.9	796
3. Time				
4. Time				
Comments:				

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Portable Pump and Tubing / Water Level Indicator
Decontamination Log Form

Project Name: <u>MWL-GWM</u>	Monitoring Well ID #: <u>N/A</u>	Date: ¹⁰ <u>08/24/16</u> <u>11/10/16</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>N/A</u>	
<u>Personnel Performing Decontamination:</u> Alfred Santillanes Print Name: _____ Initial: <u>AS</u> Robert Lynch Print Name: _____ Initial: <u>RL</u>		
Condition of Equipment Pump: <u>Excellent</u> Tubing Bundle: <u>Excellent</u> Water Level Indicator: <u>N/A</u>		
List of Decontamination Materials		
Deionized Water Source: <u>BLDG. 1090</u> Lot Number: <u>10-14-16</u>	HNO_3 Grade: <u>Reagent</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-GWM</u>	Monitoring Well ID #: <u>MWL-BW-2</u>	Date: <u>08/25/16</u> <u>TG 10/31/16</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>210272</u>	
Personnel Performing Decontamination:		
William Gibson	<u>WJG</u>	Initial:
Print Name:		
Robert Lynch	<u>RL</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 ₃	
Source: <u>BLDG. 1090</u>	Grade: <u>Reagent</u>	
Lot Number: <u>10-14-16</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-GWM</u>	Monitoring Well ID #: <u>MWL-MW7</u>	Date: ¹⁰ <u>08/26/16</u> <u>7/10/31/16</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>280208</u>	
<u>Personnel Performing Decontamination:</u> William Gibson Print Name: _____ Robert Lynch Print Name: _____ <div style="text-align: right;">Initial: <u>WJG</u> Initial: <u>RL</u></div>		
Condition of Equipment Pump: <u>Excellent</u> Tubing Bundle: <u>Excellent</u> Water Level Indicator: <u>Good</u>		
List of Decontamination Materials		
Deionized Water Source: <u>BLDG. 1090</u> Lot Number: <u>10-14-16</u>	HNO₃ Grade: <u>Reagent</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-GWM</u>	Monitoring Well ID #: <u>MWL-MW9</u>	Date: ¹⁰ <u>08/27/16</u> <u>19 10/31/16</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>280208</u>	
<u>Personnel Performing Decontamination:</u> Gilbert Quintana Print Name: _____ Initial: <u>GJ</u> Alfred Santillanes Print Name: _____ Initial: <u>AS</u>		
Condition of Equipment Pump: <u>Excellent</u> Tubing Bundle: <u>Excellent</u> Water Level Indicator: <u>Good</u>		
List of Decontamination Materials		
Deionized Water Source: <u>BLDG. 1090</u> Lot Number: <u>10-14-16</u>	HNO_3 Grade: <u>Reagent</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-GWM</u>	Monitoring Well ID #: <u>MWL-MW8</u>	Date: <u>08/28/16</u> <u>11/10/31/16</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>280208</u>	
<u>Personnel Performing Decontamination:</u>		
Robert Lynch	<u>RL</u>	Initial:
Print Name:		
William Gibson	<u>WG</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 ₃	
Source: <u>BLDG. 1090</u>	Grade: <u>Reagent</u>	
Lot Number: <u>10-14-16</u>	UN #: <u>2031</u>	
	Manufacturer: <u>ACROS</u>	
	Lot Number: <u>A0316863</u>	

**SUMMARY SHEET FOR
OCTOBER 2016 GROUNDWATER SAMPLES**

Sample Summary for October 2016 MWL Groundwater Monitoring

<i>Well ID</i>	<i>Sample 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>
GEL Analytical Data: Project Task # 195122.10.11.08, Service Order # CF01-17									
MWL-BW2	MWL-SA1	25-Oct-16	617416	100762	Environmental	n/a	617416 / 100763	617416 / 100761	
MWL-MW7	MWL-SA2	26-Oct-16	617418	100768	Environmental	617417 / 100765	617418 / 100770	617418 / 100767	
MWL-MW7	MWL-SA3	26-Oct-16	617418	100769	Duplicate	617417 / 100765	617418 / 100770	617418 / 100767	
MWL-MW8	MWL-SA4	28-Oct-16	617420	100775	Environmental	n/a	617420 / 100776	617420 / 100774	
MWL-MW9	MWL-SA5	27-Oct-16	617419	100772	Environmental	n/a	617419 / 100773	617419 / 100771	
MWL-EB1	MWL-SA6	25-Oct-16	617417	100765	Equipment Blank	n/a	617417 / 100766	n/a	Equipment blank sample prior to MWL-MW7.
MWL DIW/QC	MWL-SA11	25-Oct-16	617417	100764	DIW QC	n/a	617417 / 100764	n/a	DIW - source water for EB1 (VOCs only)
MWL-FB1	MWL-SA7	25-Oct-16	617416	100761	Field Blank	n/a	617416 / 100763	n/a	at MWL-BW2
MWL-FB2	MWL-SA8	26-Oct-16	617418	100767	Field Blank	n/a	617418 / 100770	n/a	at MWL-MW7
MWL-FB3	MWL-SA10	27-Oct-16	617419	100771	Field Blank	n/a	617419 / 100773	n/a	at MWL-MW9
MWL-FB4	MWL-SA9	28-Oct-16	617420	100774	Field Blank	n/a	617420 / 100776	n/a	at MWL-MW8

DATA VALIDATION REPORTS FOR ENVIRONMENTAL SAMPLES
GROUNDWATER MONITORING
OCTOBER 2016

AR/COC NUMBERS 617416, 617417, 617418



Memorandum

Date: December 7, 2016
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: MWL GWM
ARCOC: 617416, 617417 and 617418
SDG: 409076
Laboratory: GEL
Project/Task: 195122.10.11.08
Analysis: VOCs

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

Summary

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

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as follows. The CCV %Ds were >20% but ≤40% with negative bias for carbon disulfide. The associated sample results were non-detect and since no other calibration infractions occurred, will not be qualified.

Blanks

No target analytes were detected in any of the blanks except as follows. Acetone was detected at < the PQL in FB1, sample 409076001, associated with sample -002 and FB3, sample -015, associated with samples -016 and -021. 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 acceptability was verified during data validation and met QC acceptance criteria.

Three TBs were submitted, one for each ARCO. Three FBs were submitted, one for each ARCO. The FB on ARCO 617417 was QC DI water and was not associated with any field samples. An EB was submitted on ARCO 617417 and was associated with the field samples on ARCO 617418. A field duplicate pair was submitted on ARCO 617418. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 12/08/16



Memorandum

Date: December 7, 2016
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: MWL GWM
ARCOG: 617416, 617417 and 617418
SDG: 409084
Laboratory: GEL
Project/Task: 195122.10.11.08
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

Summary

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

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tune met QC acceptance criteria.

Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

Reporting Limit Verification

All 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 any of the blanks.

ICP-MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria.

Laboratory Replicate

The replicate met all QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

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

ICP Interference Check Sample (ICS A and AB)

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

ICP Serial Dilution

The serial dilution met all QC acceptance criteria.

Other QC

An EB was submitted on ARCOG 617417 and was associated with the field samples on ARCOG 617418. A field duplicate pair was submitted on ARCOG 617418. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 12/08/16



Memorandum

Date: December 7, 2016
To: File
From: Linda Thal
Subject: Radiochemical Data Review and Validation – SNL
Site: MWL GWM
ARCOC: 617416, 617417 and 617418
SDG: 409076
Laboratory: GEL
Project/Task: 195122.10.11.08
Analysis: RAD

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

Summary

Four 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 modified (tritium). Problems were identified with the data package that resulted in the qualification of data.

All analyses:

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

Gross Alpha/Beta:

1. The sample results which were > the MDA but $\leq 3X$ the MDA will be **qualified J,FR7**.

Gamma Spec:

1. The K-40 result for samples 409076003 and -010 were rejected by the laboratory due to the peak not meeting identification criteria and will be **qualified R,Z2**.

Holding Times and Preservation

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

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.

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 on ARCOG 617417 and was associated with the field samples on ARCOG 617418. A field duplicate pair was submitted on ARCOG 617418. There are no "required" review criteria for field duplicate analyses comparability; no data will be qualified as a result.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 12/08/16



Sample Findings Summary

AR/COC: 617416, 617417, 617418

Page 1 of 2

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 900.0/SW846 9310			
	100762-004/MWL-SA1	ALPHA (12587-46-1)	J, FR7
	100765-004/MWL-SA6	ALPHA (12587-46-1)	BD, FR3
	100765-004/MWL-SA6	BETA (12587-47-2)	BD, FR3
	100769-004/MWL-SA3	ALPHA (12587-46-1)	J, FR7
EPA 901.1			
	100762-003/MWL-SA1	Americium-241 (14596-10-2)	BD, FR3
	100762-003/MWL-SA1	Cesium-137 (10045-97-3)	BD, FR3
	100762-003/MWL-SA1	Cobalt-60 (10198-40-0)	BD, FR3
	100762-003/MWL-SA1	Potassium-40 (13966-00-2)	R, Z2
	100765-003/MWL-SA6	Americium-241 (14596-10-2)	BD, FR3
	100765-003/MWL-SA6	Cesium-137 (10045-97-3)	BD, FR3
	100765-003/MWL-SA6	Cobalt-60 (10198-40-0)	BD, FR3
	100765-003/MWL-SA6	Potassium-40 (13966-00-2)	R, Z2
	100768-003/MWL-SA2	Americium-241 (14596-10-2)	BD, FR3
	100768-003/MWL-SA2	Cesium-137 (10045-97-3)	BD, FR3
	100768-003/MWL-SA2	Cobalt-60 (10198-40-0)	BD, FR3
	100768-003/MWL-SA2	Potassium-40 (13966-00-2)	BD, FR3
	100769-003/MWL-SA3	Americium-241 (14596-10-2)	BD, FR3
	100769-003/MWL-SA3	Cesium-137 (10045-97-3)	BD, FR3
	100769-003/MWL-SA3	Cobalt-60 (10198-40-0)	BD, FR3
	100769-003/MWL-SA3	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	100762-005/MWL-SA1	Tritium (10028-17-8)	BD, FR3
	100765-005/MWL-SA6	Tritium (10028-17-8)	BD, FR3
	100768-005/MWL-SA2	Tritium (10028-17-8)	BD, FR3

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
SM 7500 Rn B	100769-005/MWL-SA3	Tritium (10028-17-8)	BD, FR3
	100765-006/MWL-SA6	Radon-222 (14859-67-7)	BD, FR3

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

Sandia Data Validation Summary Worksheet

ARCOG#(s): 617416, 617417 and 617418	Site/Project: MWL GWM	Validation Date: 12/07/2016
SDG: 409076 and 409084	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 30	CVR present: Yes
ARCOG(s) present: Yes	Sample Container Integrity: OK	
Analysis Type: <input checked="" type="checkbox"/> Organic <input checked="" type="checkbox"/> Metals <input type="checkbox"/> Genchem <input checked="" type="checkbox"/> Rad		

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

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

Comments: Collected: 10/25 and 10/26/2016

ARCOG 617417 has an EB associated with samples on ARCOG 617418

Validated by:

L. Thal

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #(s):617416, 617417 and 617418	SDG: 409076	Matrix: Aqueous
Laboratory Sample IDs: 409076001, -002, -007, -008, -009, -014, -015, -016, -021, -026		
Method/Batch #s: 8260B /1613347	Tuning (pass/fail):pass	TICs Required? (yes/no):no

[illegible]

Comments: HTs OK. MS/MSD -016. ICAL VOA4.1 10/31/2016. All average RF

Mass spectra OK

¹409076001, -002, -007, -008, -009, -014 ²-015, -016, -021, -026

Sandia Inorganic Metals Worksheet

ARCOG #(s): 617416, 617417 and 617418	SDG #(s): 409084	Matrix: Aqueous
Laboratory Sample IDs: 4090840001 through -004 (Cd, Cr, Ni, U)		
Method/Batch #s: 3005A/6020 /1612098/1612099		

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	DUP RPD	Serial Dil. %D	ICS AB %R	ICS A ±MDL ug/L (x50)	CRI %R	EB1 -002			
	Int. mg/L	R ²	ICV	CCV	ICB ug/L	CCB ug/L													
None																			

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

Comments: HTs OK. MS. DUP. SD performed on sample -001
Ca. Mg. Fe. Al < ICS A.

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. <i>N/A</i>		SMO Use		AR/COC 617416								
Project Name: MWL GWM / SVM		Date Samples Shipped: <i>10/25/16</i>		SMO Authorization: <i>[Signature]</i>								
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>26334</i>		SMO Contact Phone: <i>5MO</i>								
Project/Task Number: 195122.10.11.08		Lab Contact: Edie Kent/843-769-7385		Wendy Palencia/505-844-3132								
Service Order: CF01-17		Lab Destination: GEL		Send Report to SMO:								
		Contract No.: 1303873		Stephanie Montaño/505.284.2553								
Tech Area:		Operational Site:		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius								
Building:		Room:		Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154								
Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
100761	001	MWL-SA7	NA	10/25/16 10:57	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMP (SW846-8260B)	<i>409016 001</i>
100762	001	MWL-SA1	496	10/25/16 10:57	GW	G	3x40 ml	HCl	G	SA	VOC-LTMMP (SW846-8260B)	<i>002</i>
100762	002	MWL-SA1	496	10/25/16 10:59	GW	P	500 ml	HNO3	G	SA	METALS, TAL (SW846-8020/7470): Cd, Cr, Ni, U	<i>409084 001</i>
100762	003	MWL-SA1	496	10/25/16 11:00	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	<i>409016 003</i>
100762	004	MWL-SA1	496	10/25/16 11:03	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900)	<i>004</i>
100762	005	MWL-SA1	496	10/25/16 11:05	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	<i>005</i>
100762	006	MWL-SA1	496	10/25/16 11:06	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	<i>000</i>
100763	001	MWL-TB1	NA	10/25/16 10:57	DIW	G	3x40 ml	HCl	G	TB	VOC-LTMMP (SW846-8260B)	<i>007</i>
Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes						
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day						
Confirmatory: <input type="checkbox"/> Yes		QC inits.:				Negotiated TAT <input type="checkbox"/>						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab				Lab Use		
	William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/04141/505-284-3307/505-239-7367		Return Samples By:						
	Robert Lynch	<i>[Signature]</i>	<i>RL</i>	SNL/04141/505-844-4013/505-250-7090		Comments: Report specific list of VOCs (LTMMP list provided by SNL/NM SMO). If MeCl, acetone, toluene, or MEK detected > MDL, then request reanalysis.						
	Alfred Santillanes	<i>[Signature]</i>	<i>AS</i>	SNL/04141/505-284-6870/505-228-0710								
	Gilbert Quintana	<i>[Signature]</i>	<i>GQ</i>	SNL/04141/505-844-2507/505-228-2606								
Relinquished by <i>[Signature]</i>		Org. <i>4141</i>	Date <i>10/25/16</i>	Time <i>11:40</i>	Relinquished by		Org.	Date	Time			
Received by <i>[Signature]</i>		Org. <i>4131</i>	Date <i>10/25/16</i>	Time <i>11:40</i>	Received by		Org.	Date	Time			
Relinquished by <i>[Signature]</i>		Org. <i>4131</i>	Date <i>10/25/16</i>	Time <i>12:10</i>	Relinquished by		Org.	Date	Time			
Received by <i>[Signature]</i>		Org.	Date <i>10/26/16</i>	Time <i>7:35</i>	Received by		Org.	Date	Time			

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. <i>NA</i>		SMO Use		AR/COC 617417								
Project Name: MWL GWM / SVM		Date Samples Shipped: <i>10-26-16</i>		SMO Authorization: <i>Timmie Jackson SMO</i>								
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>256385</i>		SMO Contact Phone: Wendy Palencia/505-844-3132								
Project/Task Number: 195122.10.11.08		Lab Contact: Edie Kent/843-769-7385		Send Report to SMO: Stephanie Montaño/505.284.2553								
Service Order: CF01-17		Lab Destination: GEL		<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius								
Contract No.: 1303873				Bill to: Sandia National Laboratories (Accounts Payable), P.O. Box 5800, MS-0154 Albuquerque, NM 87185-0154								
Tech Area:		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
100764	001	MWL-SA11	NA	10/25/16 13:50	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMP (SW846-8260B)	<i>409076</i>
100765	001	MWL-SA6	NA	10/25/16 13:50	DIW	G	3x40 ml	HCl	G	EB	VOC-LTMMP (SW846-8260B)	<i>409076</i>
100765	002	MWL-SA6	NA	10/25/16 13:52	DIW	P	500 ml	HNO3	G	EB	METALS, TAL (SW846-6020/7470): Cd, Cr, Ni, U	<i>409076</i>
100765	003	MWL-SA6	NA	10/25/16 13:53	DIW	P	1 L	HNO3	G	EB	GAMMA SPEC, SHORT LIST (EPA 901)	<i>409076</i>
100765	004	MWL-SA6	NA	10/25/16 13:55	DIW	P	1 L	HNO3	G	EB	GROSS-ALPHA/BETA (EPA 900)	<i>409076</i>
100765	005	MWL-SA6	NA	10/25/16 13:57	DIW	AG	250 ml	NONE	G	EB	TRITIUM (EPA 906)	<i>409076</i>
100765	006	MWL-SA6	NA	10/25/16 13:58	DIW	G	2x40 ml	NONE	G	EB	RADON (SM7500 Rn B)	<i>409076</i>
100766	001	MWL-TB2	NA	10/25/16 13:59	DIW	G	3x40 ml	HCl	G	TB	VOC-LTMMP (SW846-8260B)	<i>409076</i>
Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt		
Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes						
Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day						
Confirmatory: <input type="checkbox"/> Yes		QC initials:				Negotiated TAT <input type="checkbox"/>						
Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab				Lab Use		
	William Gibson	<i>William Gibson</i>	<i>WG</i>	SNL/04141/505-284-3307/505-239-7367		Return Samples By:						
	Robert Lynch	<i>Robert Lynch</i>	<i>RL</i>	SNL/04141/505-844-4013/505-250-7090		Comments: Report specific list of VOCs (LTMMP list provided by SNL/NM SMO). If MeCl, acetone, toluene, or MEK detected > MDL, then request reanalysis.						
	Alfred Santillanes	<i>Alfred Santillanes</i>	<i>AS</i>	SNL/04141/505-284-6870/505-228-0710								
	Gilbert Quintana	<i>Gilbert Quintana</i>	<i>GQ</i>	SNL/04141/505-844-2507/505-228-2606								
Relinquished by <i>Alfred Santillanes</i>		Org. <i>4141</i>	Date <i>10/25/16</i>	Time <i>1425</i>	Relinquished by		Org.	Date	Time			
Received by <i>Timmie Jackson</i>		Org. <i>4131</i>	Date <i>10/25/16</i>	Time <i>1425</i>	Received by		Org.	Date	Time			
Relinquished by <i>Timmie Jackson</i>		Org. <i>4131</i>	Date <i>10/26/16</i>	Time <i>0845</i>	Relinquished by		Org.	Date	Time			
Received by <i>Timmie Jackson</i>		Org.	Date <i>10/26/16</i>	Time <i>7:30</i>	Received by		Org.	Date	Time			

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

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

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Internal Lab

Batch No. *N/A*

SMO Use

AR/COC 617418

Project Name:	MWL GWM / SVM	Date Samples Shipped:	10/26/16	SMO Authorization:	Tommy Goodman	<input type="checkbox"/> Waste Characterization
Project/Task Manager:	Timmie Jackson	Carrier/Waybill No.:	255948	SMO Contact Phone:	910	<input type="checkbox"/> RMA
Project/Task Number:	195122.10.11.08	Lab Contact:	Edie Kent/843-769-7385	Wendy Palencia/505-844-3132		<input type="checkbox"/> Released by COC No.
Service Order:	CF01-16	Lab Destination:	GEL	Send Report to SMO:		<input checked="" type="checkbox"/> 4° Celsius
		Contract No.:	1303873	Stephanie Montaño/505.284.2553		

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

Sample No.	Fraction	Sample Location Detail	Depth (ft)	Date/Time Collected	Sample Matrix	Container Type	Volume	Preservative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
100767	001	MWL-SA8	N/A	10/26/16 10:05	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMP (SW846-8260B)	409076
100768	001	MWL-SA2	496	10/26/16 10:05	GW	G	3x40 ml	HCl	G	SA	VOC-LTMMP (SW846-8260B)	409076
100768	002	MWL-SA2	496	10/26/16 10:07	GW	P	500 ml	HNO3	G	SA	METALS, TAL (SW846-8020/7470): Cd, Cr, Ni, U	409076
100768	003	MWL-SA2	496	10/26/16 10:09	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	409076
100768	004	MWL-SA2	496	10/26/16 10:12	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900)	409076
100768	005	MWL-SA2	496	10/26/16 10:15	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	409076
100768	006	MWL-SA2	496	10/26/16 10:16	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	409076
100769	001	MWL-SA3	496	10/26/16 10:05	GW	G	3x40 ml	HCl	G	DU	VOC-LTMMP (SW846-8260B)	409076
100769	002	MWL-SA3	496	10/26/16 10:07	GW	P	500 ml	HNO3	G	DU	METALS, TAL (SW846-8020/7470): Cd, Cr, Ni, U	409076
100769	003	MWL-SA3	496	10/26/16 10:09	GW	P	1 L	HNO3	G	DU	GAMMA SPEC, SHORT LIST (EPA 901)	409076

Last Chain:	<input type="checkbox"/> Yes	Sample Tracking	SMO Use	Special Instructions/QC Requirements:	Conditions on Receipt
Validation Req'd:	<input checked="" type="checkbox"/> Yes	Date Entered:		EDD <input checked="" type="checkbox"/> Yes	
Background:	<input type="checkbox"/> Yes	Entered by:		Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day	
Confirmatory:	<input type="checkbox"/> Yes	QC inits.:		Negotiated TAT <input type="checkbox"/>	
Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cell	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab
	William Gibson	<i>William Gibson</i>	WG	SNL/04141/505-284-3307/505-239-7367	Return Samples By: Comments: Report specific list of VOCs (LTMMP list provided by SNL/NM SMO). If MeCl, acetone, toluene, or MEK detected > MDL, then request reanalysis.
	Robert Lynch	<i>Robert Lynch</i>	RL	SNL/04141/505-844-4013/505-250-7090	
	Alfred Santillanes	<i>Alfred Santillanes</i>	AS	SNL/04141/505-284-6870/505-228-0710	
Gilbert Quintana	<i>Gilbert Quintana</i>	GQ	SNL/04141/505-844-2507/505-228-2606		
					Lab Use

Relinquished by	<i>William Gibson</i>	Org. HGT	Date 10-26-16	Time 1052	Relinquished by	Org.	Date	Time
Received by	<i>Robert Lynch</i>	Org. 4131	Date 10-26-16	Time 1052	Received by	Org.	Date	Time
Relinquished by	<i>Alfred Santillanes</i>	Org. 4131	Date 10-26-16	Time 1148	Relinquished by	Org.	Date	Time
Received by	<i>Gilbert Quintana</i>	Org.	Date 10/27/16	Time 7:30	Received by	Org.	Date	Time

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

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617418

[illegible]

AR/COC NUMBERS 617419, 617420

Memorandum

Date: December 8, 2016
To: File
From: Linda Thal
Subject: GC/MS Organic Data Review and Validation – SNL
Site: MWL GWM
ARCOC: 617419 and 617420
SDG: 409364
Laboratory: GEL
Project/Task: 195122.10.11.08
Analysis: VOCs

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

Summary

Six 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. For instrument VOA9.1, the ICAL %RSD was >15% but ≤40% and the CCV %D was >20% but ≤40% with negative bias for carbon disulfide. The associated results for samples 409364008, -009 and -014 were non-detect and will be **qualified UJ, I3,C3**.

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

Holding Times

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

Instrument Tune

All instrument tune requirements were met.

Calibration

The initial calibration and continuing calibration data met QC acceptance criteria except as noted above in the Summary section and as follows. For instrument VOA9.1, the ICAL %RSD was >15% but ≤40% for

bromoform. The associated sample results were non-detect and since no other calibration infractions occurred, will not be qualified.

For instrument VOA1.1, the ICAL intercepts were > the MDL and positive for trans-1,3-dichloropropylene and bromoform. The associated sample results were non-detect and will not be qualified.

For instrument VOA1.1, the CCV %D was >20% but ≤40% with negative bias for carbon disulfide. The associated sample results were non-detect and since no other calibration infractions occurred, will not be qualified.

For instrument VOA1.1, the CCV %D was >20% with positive bias for dichlorodifluoromethane. The associated sample results were non-detect and will not be qualified.

Blanks

No target analytes were detected in any of the blanks.

Surrogates

All surrogate recoveries met QC acceptance criteria.

Internal Standards

All internal standards met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS/MSD acceptance criteria were met.

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

All associated sample results were non-detect and, therefore, mass spectra acceptability was not verified during data validation.

Two TBs and two FBs were submitted and were associated with the samples on the same ARCOG.

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 12/08/16



Memorandum

Date: December 8, 2016
To: File
From: Linda Thal
Subject: Inorganic Data Review and Validation – SNL
Site: MWL GWM
ARCO: 617419 and 617420
SDG: 409366
Laboratory: GEL
Project/Task: 195122.10.11.08
Analysis: Metals

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

Summary

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

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

Holding Times and Preservation

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

ICP-MS Instrument Tune

The ICP-MS tune met QC acceptance criteria.

Calibration

All initial and continuing calibration criteria met QC acceptance criteria.

Reporting Limit Verification

All 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 any of the blanks.

ICP -MS Internal Standards

The ICP-MS internal standards met QC acceptance criteria.

Matrix Spike (MS)

The MS met all QC acceptance criteria.

Laboratory Replicate

The replicate met all QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met all QC acceptance criteria.

Detection Limits/Dilutions

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

ICP Interference Check Sample (ICS A and AB)

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

ICP Serial Dilution

The serial dilution met all QC acceptance criteria.

Other QC

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 12/08/16



Memorandum

Date: December 8, 2016
To: File
From: Linda Thal
Subject: Radiochemical Data Review and Validation – SNL
Site: MWL GWM
ARCOC: 617419 and 617420
SDG: 409364
Laboratory: GEL
Project/Task: 195122.10.11.08
Analysis: RAD

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03 Rev 4.

Summary

Two 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 modified (tritium). Problems were identified with the data package that resulted in the qualification of data.

Gamma Spec and Tritium:

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

Gamma Spec:

1. The K-40 result for sample 409364003 was rejected by the laboratory due to the peak not meeting identification criteria and will be **qualified R,Z2**.

Holding Times and Preservation

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

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. It should be noted that the MS and/or MSD were performed on SNL samples of similar matrix from another SDG. No data will be qualified.

Laboratory Replicate

All replicate error ratio acceptance criteria were met. It should be noted that the replicate analyses for all target analytes *except* Radon-222 were performed on SNL samples of similar matrix from another SDG. No data will be qualified.

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

No other specific issues that affect data quality were identified.

Reviewed by: Mary Donovan

Level: I

Date: 12/08/16



Sample Findings Summary

AR/COC: 617419, 617420

Page 1 of 1

Analytical Method	Sample ID	Analyte Name (CAS#)	Qualifier, RC
EPA 901.1			
	100772-003/MWL-SA5	Americium-241 (14596-10-2)	BD, FR3
	100772-003/MWL-SA5	Cesium-137 (10045-97-3)	BD, FR3
	100772-003/MWL-SA5	Cobalt-60 (10198-40-0)	BD, FR3
	100772-003/MWL-SA5	Potassium-40 (13966-00-2)	R, Z2
	100775-003/MWL-SA4	Americium-241 (14596-10-2)	BD, FR3
	100775-003/MWL-SA4	Cesium-137 (10045-97-3)	BD, FR3
	100775-003/MWL-SA4	Cobalt-60 (10198-40-0)	BD, FR3
	100775-003/MWL-SA4	Potassium-40 (13966-00-2)	BD, FR3
EPA 906.0 Modified			
	100772-005/MWL-SA5	Tritium (10028-17-8)	BD, FR3
	100775-005/MWL-SA4	Tritium (10028-17-8)	BD, FR3
SW846 8260B DOE-AL			
	100774-001/MWL-SA9	Carbon disulfide (75-15-0)	UJ, I3,C3
	100775-001/MWL-SA4	Carbon disulfide (75-15-0)	UJ, I3,C3
	100776-001/MWL-TB5	Carbon disulfide (75-15-0)	UJ, I3,C3

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

Sandia Data Validation Summary Worksheet

ARCOC#(s): 617419 and 617420	Site/Project: MWL GWM	Validation Date: 12/08/2016
SDG: 409364 and 409366	Laboratory: GEL Laboratories, LLC	Validator: Linda Thal
Matrix: Aqueous	# of Samples: 16	CVR present: Yes
ARCOC(s) present: Yes	Sample Container Integrity: OK	
Analysis Type: <input checked="" type="checkbox"/> Organic <input checked="" type="checkbox"/> Metals <input type="checkbox"/> Genchem <input checked="" type="checkbox"/> Rad		

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

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

Comments: Collected: 10/27 and 10/28/2016

Validated by:

L Thal

Sandia Organic Worksheet (GC/MS VOC)

ARCOC #(s):617419 and 617420	SDG: 409364	Matrix: Aqueous
Laboratory Sample IDs: 409364001, -002, -007, -008, -009, -014		
Method/Batch #s:8260B/1614433	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	FB3 -001	TB4 -007	FB4 -008	TB5 -014
	Int.	RF/ Slope	RSD/ r ²	(ICV)/CCV %D										
VOA9.1 Samples -008, -009, -014														
Carbon disulfide	NA	✓	17	-24	✓	NA	✓	✓	✓	✓			✓	✓
Bromoform	NA	✓	17	✓	✓	NA	✓	✓	✓	✓			✓	✓
VOA1.1 Samples -001, -002, -007														
trans-1,3-Dichloropropylene	+48	✓	✓	✓	✓	NA	✓	NA	NA	NA	✓	✓		
Bromoform	+50	✓	✓	✓	✓	NA	✓	NA	NA	NA	✓	✓		
Dichlorodifluoromethane	NA	✓	✓	+29	✓	NA	✓	NA	NA	NA	✓	✓		
Carbon disulfide	NA	✓	✓	-25	✓	NA	✓	NA	NA	NA	✓	✓		
Surrogate Recovery Outliers														
Sample ID	1,2-DCA-d4 %R		Toluene-d8 %R		BFB %R		Sample ID	1,2-DCA-d4 %R		Toluene-d8 %R		BFB %R		
None														
IS Outliers														
	FBZ		ChI-d5		1,4-DCB-d4									
Sample ID	Area	RT	Area	RT	Area	RT								
None														

Comments: HTs OK. MS/MSD -009.

ICAL VOA1.1 11/01/2016. Linear: Methylene chloride, trans-1,3-dichloropropylene, bromoform. Samples -001, -002, -007

ICAL VOA9.1 11/10/2016. All avg RF Samples -008, -009, -014

Mass spectra NA-all sample results ND

One vial for sample -007 received with headspace

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

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

Revised 7/2015

ARCOC #(s): 617419 and 617420	SDG #:409364	Matrix: Aqueous
Laboratory Sample IDs:409364 – see below		
Method/Batch#s: EPA 901.1 (gammascpec)/1611056 Samples -003, -010		
Method/Batch#s: EPA 900.0/SW846 9310 (gross A/B)/1616109 Samples -004, -011		
Method/Batch#s: SM 7500 Rn B (Rn-222)/1611895 Samples -006, -013		
Method/Batch#s: EPA 906.0 Modified (tritium)/1615891 Samples -005, -012		

[illegible]

Comments: HTs OK. Count time for sample -006 slightly > 96 hours; no data qualified
Matrix QC on SNL sample from another SDG for all except Rn-222. DUP -013 and LCS/LCSD.
GS: K-40 rejected in sample -003 due to peak not meeting identification criteria.
Gross A/B: Parent and dup sample 100ml; MS/MSD 25ml; 4X dilution – no data qualified.

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

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Batch No. <i>MA</i>		SMO Use		AR/COC 617419																																																																																									
Project Name: MWL GWM / SVM		Date Samples Shipped: <i>10/27/16</i>		SMO Authorization: <i>[Signature]</i>																																																																																									
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>256483</i>		SMO Contact Phone: <i>510</i>																																																																																									
Project/Task Number: 195122.10.11.08		Lab Contact: Edie Kent/843-769-7385		Wendy Palencia/505-844-3132																																																																																									
Service Order: CF01-17		Lab Destination: GEL		Send Report to SMO: Stephanie Montaño/505.284.2553																																																																																									
Contract No.: 1303873																																																																																													
Tech Area:				<input type="checkbox"/> Waste Characterization <input type="checkbox"/> RMA <input type="checkbox"/> Released by COC No. <input checked="" type="checkbox"/> 4° Celsius																																																																																									
Building:		Room:		Operational Site:																																																																																									
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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																																																																																	
100771	001	MWL-SA10	N/A	10/27/16 10:54	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMP (SW846-8260B)	<i>409304 001</i>																																																																																	
100772	001	MWL-SA5	497	10/27/16 10:54	GW	G	3x40 ml	HCl	G	SA	VOC-LTMMP (SW846-8260B)	<i>002</i>																																																																																	
100772	002	MWL-SA5	497	10/27/16 10:55	GW	P	500 ml	HNO3	G	SA	METALS, TAL (SW846-6020/7470): Cd, Cr, Ni, U	<i>409306 001</i>																																																																																	
100772	003	MWL-SA5	497	10/27/16 10:59	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	<i>409369 003</i>																																																																																	
100772	004	MWL-SA5	497	10/27/16 11:02	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900)	<i>004</i>																																																																																	
100772	005	MWL-SA5	497	10/27/16 11:04	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	<i>005</i>																																																																																	
100772	006	MWL-SA5	497	10/27/16 11:06	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	<i>006</i>																																																																																	
100773	001	MWL-TB4	N/A	10/27/16 10:54	DIW	G	3x40 ml	HCl	G	TB	VOC-LTMMP (SW846-8260B)	<i>007</i>																																																																																	
<table border="1"> <tr> <td colspan="2">Last Chain: <input type="checkbox"/> Yes</td> <td colspan="2">Sample Tracking</td> <td colspan="2">SMO Use</td> <td colspan="4">Special Instructions/QC Requirements:</td> <td colspan="2" rowspan="4">Conditions on Receipt</td> </tr> <tr> <td colspan="2">Validation Req'd: <input checked="" type="checkbox"/> Yes</td> <td colspan="2">Date Entered:</td> <td colspan="2"></td> <td colspan="4">EDD <input checked="" type="checkbox"/> Yes</td> </tr> <tr> <td colspan="2">Background: <input type="checkbox"/> Yes</td> <td colspan="2">Entered by:</td> <td colspan="2"></td> <td colspan="4">Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day</td> </tr> <tr> <td colspan="2">Confirmatory: <input type="checkbox"/> Yes</td> <td colspan="2">QC inits.:</td> <td colspan="2"></td> <td colspan="4">Negotiated TAT <input type="checkbox"/></td> </tr> <tr> <td rowspan="4">Sample Team Members</td> <td>Name</td> <td>Signature</td> <td>Init.</td> <td colspan="2">Company/Organization/Phone/Cell</td> <td colspan="4">Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab</td> <td colspan="2" rowspan="4">Lab Use</td> </tr> <tr> <td>William Gibson</td> <td><i>[Signature]</i></td> <td><i>WG</i></td> <td colspan="2">SNL/04141/505-284-3307/505-239-7367</td> <td colspan="4">Return Samples By:</td> </tr> <tr> <td>Gilbert Quintana</td> <td><i>[Signature]</i></td> <td><i>GQ</i></td> <td colspan="2">SNL/04141/505-844-2507/505-228-2606</td> <td colspan="4">Comments: Report specific list of VOCs (LTMMP list provided by SNL/NM SMO). If MeCl, acetone, toluene, or MEK detected > MDL, then request reanalysis.</td> </tr> <tr> <td>Alfred Santillanes</td> <td><i>[Signature]</i></td> <td><i>AS</i></td> <td colspan="2">SNL/04141/505-284-6870/505-228-0710</td> <td colspan="4"></td> </tr> </table>													Last Chain: <input type="checkbox"/> Yes		Sample Tracking		SMO Use		Special Instructions/QC Requirements:				Conditions on Receipt		Validation Req'd: <input checked="" type="checkbox"/> Yes		Date Entered:				EDD <input checked="" type="checkbox"/> Yes				Background: <input type="checkbox"/> Yes		Entered by:				Turnaround Time <input type="checkbox"/> 7-Day* <input type="checkbox"/> 15-Day* <input checked="" type="checkbox"/> 30-Day				Confirmatory: <input type="checkbox"/> Yes		QC inits.:				Negotiated TAT <input type="checkbox"/>				Sample Team Members	Name	Signature	Init.	Company/Organization/Phone/Cell		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab				Lab Use		William Gibson	<i>[Signature]</i>	<i>WG</i>	SNL/04141/505-284-3307/505-239-7367		Return Samples By:				Gilbert Quintana	<i>[Signature]</i>	<i>GQ</i>	SNL/04141/505-844-2507/505-228-2606		Comments: Report specific list of VOCs (LTMMP list provided by SNL/NM SMO). If MeCl, acetone, toluene, or MEK detected > MDL, then request reanalysis.				Alfred Santillanes	<i>[Signature]</i>	<i>AS</i>	SNL/04141/505-284-6870/505-228-0710					
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Relinquished by <i>[Signature]</i>		Org. <i>4141</i>	Date <i>10/27/16</i>	Time <i>12:05</i>	Relinquished by <i>[Signature]</i>		Org. <i>4131</i>	Date <i>10/27/16</i>	Time <i>12:55</i>																																																																																				
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Relinquished by <i>[Signature]</i>		Org. <i>4131</i>	Date <i>10/27/16</i>	Time <i>12:20</i>	Relinquished by <i>[Signature]</i>		Org. <i>4131</i>	Date <i>10/27/16</i>	Time <i>12:20</i>																																																																																				
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*Prior confirmation with SMO required for 7 and 15 day TAT

CONTRACT LABORATORY ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. <i>NA</i>		SMO Use		AR/COC 617420																																																																																																																																																				
Project Name: MWL GWM / SVM		Date Samples Shipped: <i>10/28/16</i>		SMO Authorization: <i>Tommy Goodman</i>																																																																																																																																																				
Project/Task Manager: Timmie Jackson		Carrier/Waybill No. <i>256523</i>		SMO Contact Phone: Wendy Palencia/505-844-3132																																																																																																																																																				
Project/Task Number: 195122.10.11.08		Lab Contact: Edie Kent/843-769-7385		Send Report to SMO: Stephanie Montaño/505.284.2553																																																																																																																																																				
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X 100774	001	MWL-SA9	N/A	10/28/16 10:22	DIW	G	3x40 ml	HCl	G	FB	VOC-LTMMP (SW846-8260B)	<i>409364 008</i>																																																																																																																																												
X 100775	001	MWL-SA4	497	10/28/16 10:22	GW	G	3x40 ml	HCl	G	SA	VOC-LTMMP (SW846-8260B)	<i>009</i>																																																																																																																																												
X 100775	002	MWL-SA4	497	10/28/16 10:24	GW	P	500 ml	HNO3	G	SA	METALS (SW846-6020/7470): Cd, Cr, Ni, U	<i>409364 010</i>																																																																																																																																												
X 100775	003	MWL-SA4	497	10/28/16 10:27	GW	P	1 L	HNO3	G	SA	GAMMA SPEC, SHORT LIST (EPA 901)	<i>011</i>																																																																																																																																												
X 100775	004	MWL-SA4	497	10/28/16 10:30	GW	P	1 L	HNO3	G	SA	GROSS-ALPHA/BETA (EPA 900)	<i>012</i>																																																																																																																																												
X 100775	005	MWL-SA4	497	10/28/16 10:31	GW	AG	250 ml	NONE	G	SA	TRITIUM (EPA 906)	<i>013</i>																																																																																																																																												
X 100775	006	MWL-SA4	497	10/28/16 10:33	GW	G	2x40 ml	NONE	G	SA	RADON (SM7500 Rn B)	<i>014</i>																																																																																																																																												
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Company/Organization/Phone/Cell			Return Samples By:			Lab Use	William Gibson		<i>William Gibson</i>		<i>WG</i>	SNL/04141/505-284-3307/505-239-7367			Comments: Report specific list of VOCs (LTMMP list provided by SNL/NM SMO). If MeCl, acetone, toluene, or MEK detected > MDL, then request reanalysis.			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Received by <i>Tommy Goodman</i>	Org. <i>4131</i>	Date <i>10/28/16</i>	Time <i>11:03</i>	Received by	Org.	Date	Time																																																																																																																																																	
Relinquished by <i>Robert Lynch</i>	Org. <i>4131</i>	Date <i>10/28/16</i>	Time <i>11:55</i>	Relinquished by	Org.	Date	Time																																																																																																																																																	
Received by <i>Maya Hernandez</i>	Org.	Date <i>10/29/16</i>	Time <i>9:00</i>	Received by	Org.	Date	Time																																																																																																																																																	

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

CONTRACT VERIFICATION REVIEW FORMS
GROUNDWATER MONITORING
OCTOBER 2016

AR/COC Number	Sample Type
617416	Environmental*
617417	Environmental*
617418	Environmental*
617419	Environmental*
617420	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. 195122_10.11.08

ARCOC No. 617416, 617417 & 617418

Analytical Lab GEL

SDG No. 409076

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 matrix spike (QC1203657250) analyzed past holding time
2.13	Contractual qualifiers provided	X		
2.14	All requested result and TIC (if requested) data provided	X		

3.0 Data Quality Evaluation

Line No.	Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1	Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2	Quantitation limit met for all samples	X		
3.3	Accuracy a) Laboratory control sample accuracy reported and met for all samples	X		
	b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
	c) Matrix spike recovery data reported and met	X		
3.4	Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	X		
	b) Matrix spike duplicate RPD data reported and met for all organic samples	X		
3.5	Blank data a) Method or reagent blank data reported and met for all samples	X		
	b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	Acetone detected in samples 100761-001/MWL-SA7(FB) and 100767-001/MWL-SA8(FB)

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	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)	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) a) Initial calibration provided	X		
	b) Continuing calibration provided	N/A		
	c) ICP interference check sample data provided	X		ICSA contained cadmium concentrations greater than two times the MDL
	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
All	Gross alpha	Narrative incorrectly states that the RPD for alpha MS/MSD outside acceptance range (QC1203669959/60)

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: 12-01-2016

Reviewed by: Wendy Palencia Date: 12-01-2016 10:20:00

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

Closed by: Wendy Palencia Date: 12-05-2016 14:03:00

Contract Verification Form (CVR)

Project Leader Jackson

Project Name MWL GWM

Project/Task No. 195122_10.11.08

ARCOC No. 617419 & 617420

Analytical Lab GEL

SDG No. 409364

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		One vial for sample 100773-001 received with headspace

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		
	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	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		
	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)	X		
	a) Initial calibration provided			
	b) Continuing calibration provided	X		
	c) ICP interference check sample data provided	X		ICSA contained nickel concentrations greater than two times the MDL
	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
All	Gross Alpha	Narrative incorrectly states that RPD for gross alpha ms/msd is outside acceptance range
.	.	.

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: 12-02-2016

Reviewed by: Wendy Palencia Date: 12-02-2016 07:49:00

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

Closed by: Wendy Palencia Date: 12-05-2016 14:08:00

ANNEX F

Mixed Waste Landfill Inspection Forms

April 2016-March 2017

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 04/27/16
 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.

I. SOIL-VAPOR MONITORING LOCATIONS [Semiannually or Annually]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	YES	NO	
B. Well cover caps in need of repair/maintenance.	YES	NO	
C. Well casing or sampling ports in need of repair/maintenance.	YES	NO	
D. Monitoring location and sampling ports properly labeled.	YES	NO	
E. Locks in need of cleaning or replacement.	YES	NO	
II. SAMPLING EQUIPMENT [Semiannually or Annually]			
<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	
III. PREVIOUS DEFICIENCIES			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	

**Mixed Waste Landfill
Soil-Vapor Monitoring Network Checklist/Form (Continued)**

NOTES

Note Number	Description

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

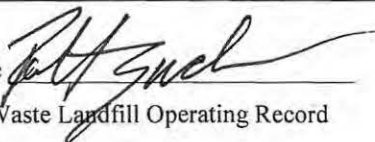
Action (Note Number) _____ assigned to _____ Date action completed _____

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

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

Additional Comments:

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 10/13/16
2. Time of Inspection 0815
3. Name of Inspector Robert J Lynch

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required.

I. SOIL-VAPOR MONITORING LOCATIONS [Semiannually or Annually]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	YES	NO	
B. Well cover caps in need of repair/maintenance.	YES	NO	
C. Well casing or sampling ports in need of repair/maintenance.	YES	NO	
D. Monitoring location and sampling ports properly labeled.	YES	NO	
E. Locks in need of cleaning or replacement.	YES	NO	
II. SAMPLING EQUIPMENT [Semiannually or Annually]			
<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	
III. PREVIOUS DEFICIENCIES			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	

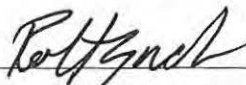
**Mixed Waste Landfill
Soil-Vapor Monitoring Network Checklist/Form (Continued)**

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:

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 4/7/2016
 2. Time of Inspection 0945
 3. Name of Inspector Robert Ziack

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required.

I. SOIL-MOSITURE MONITORING LOCATIONS [Semiannually or Annually]			
<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	
II. SAMPLING EQUIPMENT [Semiannually or Annually]			
<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	
III. PREVIOUS DEFICIENCIES			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	

**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:

Inspector's Signature 

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center

**Mixed Waste Landfill
Groundwater Monitoring Network Checklist/Form**

1. Date of Inspection 04/20/16
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.

I. GROUNDWATER MONITORING LOCATIONS [Semiannually]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	YES	NO	
B. Well cover caps in need of repair/maintenance.	YES	NO	1
C. Well casing in need of repair/maintenance.	YES	NO	
D. Monitoring well properly labeled.	YES	NO	
E. Locks in need of cleaning or replacement.	YES	NO	
II. GROUNDWATER SAMPLING EQUIPMENT [Semiannually]			
<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	
III. PREVIOUS DEFICIENCIES			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	

**Mixed Waste Landfill
Groundwater Monitoring Network Checklist/Form (Continued)**

NOTES

Note Number	Description
1	baroball assembly installed on all wells

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

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

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

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

Additional Comments:

Inspector's Signature 

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center

**Mixed Waste Landfill
Groundwater Monitoring Network Checklist/Form**

1. Date of Inspection 10-25-16
2. Time of Inspection 0845
3. Name of Inspector Robert Lynch

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required.

I. GROUNDWATER MONITORING LOCATIONS [Semiannually]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Concrete pads, bollards, and protective casings in need of repair/maintenance.	YES	NO	
B. Well cover caps in need of repair/maintenance.	YES	NO	1
C. Well casing in need of repair/maintenance.	YES	NO	
D. Monitoring well properly labeled.	YES	NO	
E. Locks in need of cleaning or replacement.	YES	NO	
II. GROUNDWATER SAMPLING EQUIPMENT [Semiannually]			
<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	
III. PREVIOUS DEFICIENCIES			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	

**Mixed Waste Landfill
Groundwater Monitoring Network Checklist/Form (Continued)**

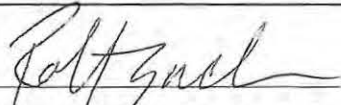
NOTES

Note Number	Description
1	Baroball assembly 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:

Inspector's Signature



Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center

**Mixed Waste Landfill
Cover Inspection Checklist/Form**

1. Date of Inspection June 3, 2016
2. Time of Inspection 0945
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.

I. COVER SYSTEM [Quarterly]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Visible settlement of the soil cover in excess of 6 inches.	yes	NO	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	NO	
E. Contiguous areas of no vegetation greater than 200 ft ² . Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	NO	
F. Potentially deep-rooted plants present. Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	NO	↓
II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Channel or sidewall erosion in excess of 6 inches deep.	yes	NO	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)**

III. SECURITY FENCE [Quarterly]			
<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	
IV. PREVIOUS DEFICIENCIES			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	yes	NO	NA

**Mixed Waste Landfill
Cover Inspection Checklist/Form (continued)**

NOTES

Note Number	Description
NA	The Russian thistles need to be removed as a "Best Management Practice" to reduce the seed bank of Russian thistles in the immediate area surrounding the ET cover.
NA	The project biologist was present providing additional support during the Quarterly inspection. There were no animal burrows identified on the ET cover or side slopes. The perimeter area outside the security fence was also inspected. The staff biologist's observations are documented in a supplemental report attached to this inspection form.

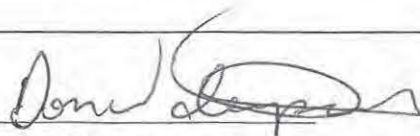
**Mixed Waste Landfill
Cover Inspection Checklist/Form (continued)**

Action (Note Number) <u>NA</u>	assigned to <u>NA</u>	Date action completed <u>NA</u>
Action (Note Number) <u>↓</u>	assigned to <u>↓</u>	Date action completed <u>↓</u>
Action (Note Number) <u>↓</u>	assigned to <u>↓</u>	Date action completed <u>↓</u>
Action (Note Number) <u>↓</u>	assigned to <u>↓</u>	Date action completed <u>↓</u>
Action (Note Number) <u>↓</u>	assigned to <u>↓</u>	Date action completed <u>↓</u>

Additional Comments:

No Actions Assigned

Inspector's Signature



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Mixed Waste Landfill – Long-Term Monitoring and Maintenance
June 2, 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 June 2, 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 June 2, 2016 quarterly ET Cover/Surface Inspection performed by an SNL field technician. This information supplements the June 2, 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 with healthy native bunchgrasses distributed evenly across the cover at a density similar to the surrounding native grass communities. The bunchgrasses display a mixture of new green foliage and old blades from previous seasons. Very few broad-leaf winter annuals were observed on the cover. Native forbs are also present on the cover, mirroring the local areas mixture of native vegetation communities. **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
June 2, 2016 Quarterly ET Cover/Surface Inspection
Documentation for Staff Biologist Support

Burrows - Inside the MWL Fenceline

No burrows were observed on the ET Cover. Active ant hills were observed on 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

An 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 abandoned kangaroo rat mound, located north of the 2nd T-post from the NW fence corner. Located further to the east (north of ER Site #76 sign) is an active kangaroo rat mound. Another active kangaroo rat mound is located on the east side of the north access gate. These burrows represent 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 at 35, 30 and 16 feet east of the ET Cover and fence there are three larger (approximately 8 to 10-inches in diameter) abandoned diggings. These are likely old badger diggings and do not show signs of recent activity. There was no sign of an animal present during the inspection.

An active kangaroo rat colony is present to the south, west, and north of the MWLVZ3 well pad. All of the burrow entrances are less than 4-inches in diameter and none are located directly at the well pad. These burrows represent normal activity and no follow-up action is recommended other than continued monitoring during routine inspections.

West of the MWL Fenceline

A kangaroo rat mound is located north of MWL-MW3 at the base of a shrub. This is not near the well pad. Kangaroo rat burrow entrances are also located to the N-NW of the Storm Water Sampling Point 45 sign. Another kangaroo rat mound is located at the NW corner post of the fenceline. These burrows represent normal activity and no follow-up action is recommended other than continued monitoring during routine inspections.

Conclusion

No animal burrows were observed on the ET Cover (including side slopes), only ant mounds. 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. 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.

**Mixed Waste Landfill
Cover Inspection Checklist/Form**

1. Date of Inspection 9/22/2016
2. Time of Inspection 0930 - 1020
3. Name of Inspector Robert Zock

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required in notes section at the end of this form.

I. COVER SYSTEM [Quarterly]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Visible settlement of the soil cover in excess of 6 inches.	yes	No	
B. Erosion of the soil cover in excess of 6 inches deep.	yes	No	
C. Evidence of water ponding on the MWL cover surface in excess of 100 square feet.	yes	No	
D. Animal intrusion burrows in excess of 4 inches in diameter. Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
E. Contiguous areas of no vegetation greater than 200 ft ² . Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
F. Potentially deep-rooted plants present. Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Channel or sidewall erosion in excess of 6 inches deep.	yes	No	
B. Channel sediment accumulation in excess of 6 inches deep.	yes	No	
C. Debris that blocks more than 1/3 of the channel width.	yes	No	

**Mixed Waste Landfill
Cover Inspection Checklist/Form (continued)**

III. SECURITY FENCE [Quarterly]			
<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	No	
F. Survey monuments in vicinity of MWL visible.	yes	No	
IV. PREVIOUS DEFICIENCIES			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	

**Mixed Waste Landfill
Cover Inspection Checklist/Form (continued)**

NOTES

Note Number	Description

**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:

*The staff biologist performed the annual
biology inspection of the cover on
September 1, 2016; therefore, no supplemental biology
documentation is provided with this inspection,
Rly 9/22/16*

Inspector's Signature *[Signature]*
Original to: Mixed Waste Landfill Operating Record
Copy to: SNL/NM Records Center

**Mixed Waste Landfill
Cover Inspection Checklist/Form**

1. Date of Inspection 12/2/2016
2. Time of Inspection 0827-0907
3. Name of Inspector Robert Zick, Bruce Reavis

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required in notes section at the end of this form.

I. COVER SYSTEM [Quarterly]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Visible settlement of the soil cover in excess of 6 inches.	yes	No	
B. Erosion of the soil cover in excess of 6 inches deep.	yes	No	
C. Evidence of water ponding on the MWL cover surface in excess of 100 square feet.	yes	No	
D. Animal intrusion burrows in excess of 4 inches in diameter. Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
E. Contiguous areas of no vegetation greater than 200 ft ² . Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
F. Potentially deep-rooted plants present. Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Channel or sidewall erosion in excess of 6 inches deep.	yes	No	
B. Channel sediment accumulation in excess of 6 inches deep.	yes	No	
C. Debris that blocks more than 1/3 of the channel width.	yes	No	

**Mixed Waste Landfill
Cover Inspection Checklist/Form (continued)**

III. SECURITY FENCE [Quarterly]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Accumulation of wind-blown plants and debris.	yes	yes	1
B. Fence wires and posts in need of repair/maintenance.	yes	No	
C. Gates in need of oiling/repair/maintenance.	yes	No	
D. Locks in need of cleaning or replacement.	yes	No	
E. Warning signs in need of repair or replacement.	yes	No	
F. Survey monuments in vicinity of MWL visible.	yes	No	
IV. PREVIOUS DEFICIENCIES			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	NA	NA	

NOTES

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**Mixed Waste Landfill
Cover Inspection Checklist/Form (continued)**

Action (Note Number) 1. assigned to Don Schofield Date action completed 12/21/2016

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

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

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

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

Additional Comments:

1. Windblown plant debris on the perimeter fence was removed by the cover system landscaping/maintenance contractor ~~from~~ ^{At 12/22/16} ~~on~~ on December 21, 2016.

Note: On December 13, 2016 the staff biologist performed an inspection of the ET Cover biological parameters to supplement this inspection. There were no issues identified. A summary of the biology inspection is attached to this inspection form. Rly 12/22/16

Inspector's Signature Bruce Leavis
Original to: Mixed Waste Landfill Operating Record
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Mixed Waste Landfill – Long-Term Monitoring and Maintenance
December 13, 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 December 13, 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 December 2, 2016 quarterly ET Cover/Surface Inspection performed by an SNL field technician. This information supplements the December 2, 2016 *Cover Inspection Checklist/Form* and is specific to ET Cover vegetation and animal burrows. The annual Biology Inspection performed on September 1, 2016 is documented on a separate *Biology Inspection Checklist/Form*.

Vegetation

The vegetation on the MWL ET Cover appears to be in very good condition with healthy native bunchgrasses distributed evenly across the cover at a density similar to the surrounding native grass communities. The bunchgrasses are currently dry, as is normal during the dormant cold season. Some basal rosettes of thistle plants are observed to be green and healthy to the north of the ET Cover, within the fence line. The ET Cover has a very low level of tumbleweeds on it and along the fence lines.

Erosion control work has recently been conducted on the west and east sides of the cover (side slopes and perimeter areas) in the vicinity of the monitoring wells. This work was carefully planned and executed to minimize impact to the native vegetation near the monitoring wells.

Mixed Waste Landfill – Long-Term Monitoring and Maintenance
December 13, 2016 Quarterly ET Cover/Surface Inspection
Documentation for Staff Biologist Support

However, some disturbance to the vegetation was unavoidable. The overall impact of this work is not able to be determined at the time of this inspection during the dormant season. These areas will continue to be monitored in future quarterly and annual inspections, and recommendations will be made as appropriate to ensure the vegetation recovers and remains health in these areas.

No barren areas greater than 200 square feet were observed.

Observations of the ET Cover vegetation are consistent with the September 2016 Biology Inspection. No follow-up actions are recommended.

Inside the MWL Fence

No burrows were observed on the ET Cover and side slopes. Active ant hills were observed on the cover. In the perimeter area between the ET Cover toe and fence (north and south ends), a few, small-diameter burrow entrances (less than 1.5 inches) were observed near the northeast corner.

Outside the MWL Fence – Perimeter Area

Very few 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 Fence

Approximately eight small diameter burrows (less than 2-inches) were observed throughout the area north of the MWL fenceline, between the fenceline and the perimeter road. This represents normal burrow density in native grasslands.

East of the MWL Fence

One larger (approximately 8 to 10-inches in diameter) abandoned digging that has been previously observed was again observed. It is located approximately 150 feet south of the northeast fence corner and approximately 30 feet east of the ET Cover. This is likely an old badger digging. There was no sign of an animal present during the inspection.

A small kangaroo rat colony is present to the southwest of the MWL-SV05 well pad, with a kangaroo rat burrow entrance at the base of the fence T-post and radon monitoring station MWL-RM5. All of the burrow entrances are less than 4-inches in diameter and none are located directly at the well pad. These burrows represent normal activity and no follow-up action is recommended other than continued monitoring during routine inspections.

South of the MWL Fence

No burrows were observed within the approximate 50-foot perimeter of the fenceline.

West of the MWL Fenceline

One small diameter burrow (less than 2-inches) were observed throughout the area west of the MWL fenceline, between the fenceline and the perimeter road. As a result of

**Mixed Waste Landfill – Long-Term Monitoring and Maintenance
December 13, 2016 Quarterly ET Cover/Surface Inspection
Documentation for Staff Biologist Support**

recent construction activity in this area, the burrow density may currently be lower than normal for a grassland area of this size.

Conclusion

No animal burrows were observed on the ET Cover (including side slopes), only ant mounds. Burrows observed in the ET Cover perimeter area, both inside and outside the perimeter fence, represent normal ant and animal activity. The types and locations of the burrows do not represent an issue relative to ET Cover performance.

Recommendations

1. Continue to monitor the vegetation impacts associated with the erosion control work in the eastern and western perimeter areas as part of the routine quarterly and annual inspections.
2. Continue to monitor burrowing activity around the perimeter of the ET Cover during routine quarterly and annual inspections as a best management practice.

Mixed Waste Landfill Cover Inspection Checklist/Form

1. Date of Inspection 3/22/17
2. Time of Inspection 1009-1050
3. Name of Inspector Robert Zick, Bruce Reavis

Provide explanatory notes for each parameter not inspected or each action required. Include any maintenance or repair required in notes section at the end of this form.

I. COVER SYSTEM [Quarterly]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Visible settlement of the soil cover in excess of 6 inches.	yes	No	
B. Erosion of the soil cover in excess of 6 inches deep.	yes	No	
C. Evidence of water ponding on the MWL cover surface in excess of 100 square feet.	yes	No	
D. Animal intrusion burrows in excess of 4 inches in diameter. Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
E. Contiguous areas of no vegetation greater than 200 ft ² . Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
F. Potentially deep-rooted plants present. Note: During period when the Biology Inspection is occurring quarterly, this inspection requirement will be covered on the Biology Inspection Checklist/Form.	yes	No	
II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Channel or sidewall erosion in excess of 6 inches deep.	yes	No	
B. Channel sediment accumulation in excess of 6 inches deep.	yes	No	
C. Debris that blocks more than 1/3 of the channel width.	yes	No	

**Mixed Waste Landfill
Cover Inspection Checklist/Form (continued)**

III. SECURITY FENCE [Quarterly]			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
A. Accumulation of wind-blown plants and debris.	yes	yes	1
B. Fence wires and posts in need of repair/maintenance.	yes	No	
C. Gates in need of oiling/repair/maintenance.	yes	No	
D. Locks in need of cleaning or replacement.	yes	No	
E. Warning signs in need of repair or replacement.	yes	yes	2
F. Survey monuments in vicinity of MWL visible.	yes	No	
IV. PREVIOUS DEFICIENCIES			
<i>Inspection Parameter</i>	<i>Parameter Inspected (Yes or No)</i>	<i>Action Required (Yes or No)</i>	<i>Note Number</i>
Uncorrected/undocumented previous deficiencies.	N/A	N/A	

**Mixed Waste Landfill
Cover Inspection Checklist/Form (continued)**

NOTES

Note Number	Description
1	There is accumulation of windblown
	plant debris on the security fence.
2	A warning sign on the southern
	security fence dangling upside down.
	The sign was reattached at time
	of the inspection.

**Mixed Waste Landfill
Cover Inspection Checklist/Form (continued)**

Action (Note Number) 1 assigned to Don Schofield Date action completed 5/8/17 *Ry*

Action (Note Number) 2 assigned to Robert Zock Date action completed 3/22/17 *4/5/2017*

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:

2. Two broom snakeweed shrubs identified by the
biologist on March 30, 2017, were removed
by Robert Zock on April 5, 2017. Ry

1. Windblown plant debris on the perimeter fence
was removed by the cover system
landscaping/maintenance contractor on May 8, 2017. *Ry*

Inspector's Signature

Robert Zock, Bruce Reavis

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center



Sandia National Laboratories

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

Albuquerque, New Mexico 87185-1089

date: March 30, 2017

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

from: Jennifer Payne MS:0729 (04143)

subject: MWL: March 2017 Vegetation Monitoring Observations and Recommendations

Observations:

The MWL was assessed on March 30th for native vegetation health. The native vegetation on the MWL ET Cover appears to be very healthy. A low quantity of annual spring weeds were observed to be scattered across the MWL. The amount of weedy annual vegetation on the MWL is consistent with the weed presence in the native vegetation surrounding the ET Cover.

Two broom snakeweed shrubs (*Gutierrezia sarothrae*) were observed on the cover, just north of the MWL RN-13 t-post location. These individuals are both small with shallow root systems.

Over the past few years a small shrub new to the area near the MWL has been increasing in numbers relatively close to the fence line. It may be a type wolfberry, but a positive identification has not yet been made. It has thorns that are variable in length and occur intermittently along the stems. The leaves are narrow and moderate green in color that emerge in clusters along the stems. The shrub occurs frequently to the west of the fence line, near the groundwater monitoring wells. It also occurs to the south of the fence line, though it is less common. See shrub image below the Recommendations section.

Recommendations:

1. The two small broom snakeweed shrubs should be removed soon while they are still young as a best management practice.
2. The shrub species observed to be growing within approximately 50 feet of the fence line as described in the final observation paragraph above and pictured below, should be removed as a best management practice.



Shrub species occurring outside of the MWL fenceline that should be removed as a best management practice.

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

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

Mixed Waste Landfill Biology Inspection Checklist/Form for the MWL Cover

Approximate vegetative coverage (actively photosynthesizing*): 51 %

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 Cover¹</u>
<u>Pleuraphis jamesii</u>	<u>Galleta grass</u>	<u>42 %</u>
<u>Bouteloua gracilis</u>	<u>Blue grama</u>	<u>2 %</u>
<u>Sporobolus flexuosus</u>	<u>Mesa dropseed</u>	<u>3 %</u>
<u>Bouteloua eriopoda</u>	<u>Black grama</u>	<u>2 %</u>
<u>Sporobolus cryptandrus</u>	<u>Sand dropseed</u>	<u>2 %</u>
<u>Xanthisma spinulosum</u>	<u>Spiny goldenweed</u>	<u>< 0.5%</u>
<u>Salsola tragus</u>	<u>Russian thistle</u>	<u>< 0.5%</u>
<u>Sporobolus contractus</u>	<u>Spike dropseed</u>	<u>< 0.5%</u>
<u>Gutierrezia sarothrae</u>	<u>Snakeweed</u>	<u>< 0.5%</u>
<u>Sphaeralcea hastulata</u>	<u>Wrinkled globemallow</u>	<u>< 0.5%</u>
<u>Kallstroemia parviflora</u>	<u>Warty carpetweed</u>	<u>< 0.5%</u>
<u>Solanum elaeagnifolium</u>	<u>Silverleaf nightshade</u>	<u>< 0.5%</u>
<u>Achnatherum hymenoides</u>	<u>Indian ricegrass</u>	<u>< 0.5%</u>

Notes:

* Living plants per Section 4.1 of the MWL LTMMP.

¹ Percentage of total MWL Cover populated by living plants of these species. All species observed to be present at less than 0.5% are not calculated into the total vegetative coverage.

**Mixed Waste Landfill
Biology Inspection Checklist/Form for the MWL Cover
(continued)**

Are there any contiguous areas of no vegetation greater than 200 square feet? (approximately 14 x 14 ft)? No

If "Yes," mark such areas on a map and attach to this checklist. Address actions and schedule to improve such area(s) in the notes section below.

Are there any very deeply rooted (roots greater than 8 feet deep at maturity) plant species present on the cover? No

If "Yes," describe the plant(s) and their general distribution. Address actions and schedule to remove plant(s) from the cover in the notes section below.

Notes: _____

Inspection for Animal and Insect Intrusion into MWL Cover

Are any burrows present on the cover? No

Do any of the burrows appear to be active? N/A

Any ant hills/nests? Yes

Describe below observations regarding animal and insect features. If burrows with an entrance diameter of 4 inches or greater are present or appear to be that of a species that is able to burrow 6 feet deep or greater, indicate the location(s) on a map and attach to this checklist. Address actions and schedule to repair cover damage that exceeds prescribed limits. As appropriate, identify animal and insect features and have them surveyed and marked for biota sampling.

Notes: 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 2016.

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):

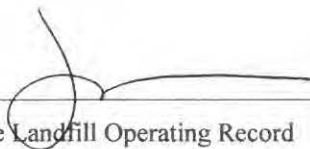
General Observations:

- Very few weeds present on the MWL cover. The limited number of Russian thistle were all observed to be small in size.
- A few 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 MWL ET area has received almost exactly the historical average growing season precipitation. Overall 2016 precipitation has been below average, receiving 4.87 inches January-August 2016, approximately one inch below the historical average for the period.
- An old, shallow animal digging that is approximately 8" diameter was observed to the north of the MWL ET Cover, within the fenceline. This old digging is caving in and is becoming overgrown with native grasses. It is over 20 feet north of the toe of the north side-slope, and not a concern relative to the cover.

Biological Aspects Map -- [note: sketch map to locate specific features described above will be attached as appropriate]

See attached map.

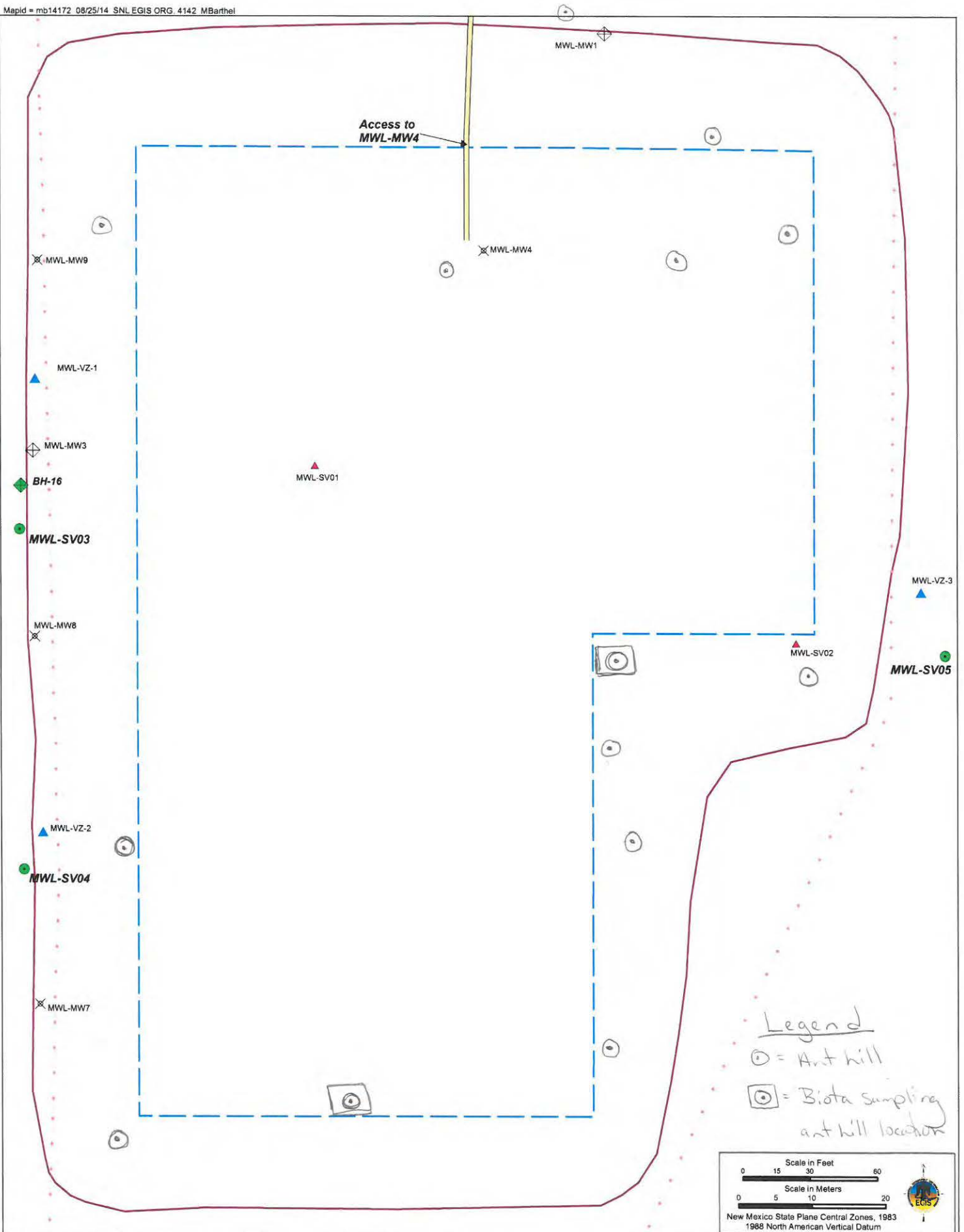
Inspector's Signature: _____



Date: Sept. 1, 2016

Original to: Mixed Waste Landfill Operating Record

Copy to: SNL/NM Records Center



MWL Biological Inspection map - September 1, 2016

ANNEX G

Mixed Waste Landfill Biology Report

April 2016-March 2017

2016-2017 Mixed Waste Landfill Biology Report

1.0 Introduction

As required by the Mixed Waste Landfill (MWL) Long-Term Monitoring and Maintenance Plan (LTMMMP) (SNL/NM March 2012, Section 4.2.1), this summary report for the annual reporting period (April 1, 2016-March 31, 2017) 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 2016 growing season and reporting period, expand on the inspection results, if appropriate, and provide recommendations for future ET Cover vegetation monitoring and maintenance. The annual Biology Inspection of the ET Cover was conducted on September 1, 2016. The inspection observations are documented on the *Biology Inspection Checklist/Form for the MWL Cover* and included in Annex F of this MWL Annual Long-Term Monitoring and Maintenance (LTMM) Report. The staff biologist also provided support during the other quarterly ET Cover Inspections (June and December 2016, and March 2017) as a best management practice.

A self-sustaining plant community is an important component of overall ET Cover performance. Vegetation minimizes erosion by stabilizing the ET Cover surface and moves soil moisture from the ET Cover Topsoil and Native Soil Layers to the atmosphere through transpiration. 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 withstand drought conditions, provide soil stabilization, and remove moisture from deeper within the Native Soil Layer relative to non-native or annual species.

2.0 Background Information

To meet the revegetation criteria as required in the MWL LTMMMP, Section 4.1, the MWL was seeded in August 2009 after cover construction was completed. The native seed mix was drill-seeded and hand-broadcast uniformly across the cover. To facilitate seed germination and seedling growth, supplemental watering was performed as approved by NMED (Bearzi December 2008). Specific conditions and limits for supplemental watering are addressed in Section 4.2.3 of the LTMMMP (SNL/NM March 2012). The MWL LTMMMP 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 LTMM Reports.

ET Cover Biology Inspections were initiated in May 2013 prior to LTMMMP approval, which occurred on January 8, 2014. The ET Cover has met the LTMMMP criteria for successful revegetation as documented in all quarterly inspections. In accordance with the LTMMMP, the frequency of Biology Inspections transitioned to an annual frequency after the August

2016-2017 Mixed Waste Landfill Biology Report

2014 growing season inspection, which provided confirmation that all successful revegetation criteria had been met (SNL/NM June 2015).

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 2016 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.

October through December 2015 assisted the 2016 growing season with above average precipitation, providing good soil moisture and aiding vegetative root health. The remaining winter and spring months preceding the 2016 growing season experienced a few months with near-normal precipitation. Three of these months (February, March, and May 2016) received minimal precipitation, initiating the growing season with lower than normal soil moisture.

Table 1 provides meteorological data for CY 2016. Table 2 provides meteorological data for the first 3-month period of CY 2017.

Precipitation, Relative Humidity and Winds

Drought has been the dominant meteorological trend in the MWL area since 2008. Total annual precipitation for 2016 was 8.42, slightly below the 20-year annual precipitation mean of 8.72 inches. In 2015 the total annual precipitation was 11.17 inches, which exceeded the 20-year annual precipitation average by 2.45 inches and brought the area out of drought status. As of April 6, 2017, the area was categorized as "Abnormally Dry" according to the U.S. Drought Monitor (U.S. Drought Monitor April 2017).

2016-2017 Mixed Waste Landfill Biology Report

Table 1
Summary of 2016 Meteorological Data at the Mixed Waste Landfill^a

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Temperature (°F)													Annual ^b
Monthly Mean	35.5	44.5	51.1	54.5	62.8	77.4	80.1	71.4	69.1	63.0	47.7	38.7	58.0
20-year Temp Means	37	41.7	48.8	55.8	66.1	75.4	76.7	74.8	68.9	57.9	46.4	37.0	57.3
Precipitation (Inches)													Annual ^c
Monthly Total	0.45	0.06	0.01	0.48	0.11	0.95	0.95	1.86	0.69	1.23	0.98	0.65	8.42
20-year Precip Means	0.34	0.45	0.56	0.50	0.26	0.49	1.64	1.57	1.00	0.93	0.41	0.57	8.72
Relative Humidity (%)													Annual ^b
Monthly Mean	56.7	37.2	25.7	38.3	29.3	27.0	29.2	48.0	41.8	35.6	51.4	55.9	39.7
20-year RH Means	49.9	44.9	36.4	30.3	26.3	24.9	40.9	44.6	45.6	46.6	47.6	48.6	40.6
Wind (Miles/hour)													Annual ^b
Monthly Mean	6.6	7.3	9.7	9.6	10.5	9.2	8.5	8.0	8.5	7.4	8.0	7.0	8.4
20-year Wind Means	6.94	8.13	9.10	10.47	9.96	9.76	8.42	7.91	7.99	7.81	7.08	6.77	8.36

^aInformation Source: SNL/NM Meteorological Monitoring Network.

^bValues provided are averages of the monthly data.

^cValues provided are totals of the monthly data.

2016-2017 Mixed Waste Landfill Biology Report

Table 2
Summary of January-March 2017 Meteorological Data at the Mixed Waste Landfill^a

Month	January	February	March
Temperature (°F)			
Monthly Mean	38.4	46.1	54.3
20-year Temp Means	37.7	41.7	48.8
Precipitation (Inches)			
Monthly Total	1.18	0.14	0.10
20-year Precip Means	0.34	0.45	0.56
Relative Humidity (%)			
Monthly Mean	57.4	45.7	28.7
20-year RH Means	49.9	44.9	36.4
Wind (Miles/hour)			
Monthly Mean	6.6	7.3	9.7
20-year Wind Means	6.9	8.1	9.1

^aInformation Source: SNL/NM Meteorological Monitoring Network.

2016 Chemical Waste Landfill Biology Report

The soil moisture received during the months of October through December 2015 benefitted the vegetation during the very dry months of February and March 2016, which barely received any measurable precipitation. June through August 2016 received 3.76 inches of precipitation, nearly the exact growing season historical mean of 3.70 inches.

Relative humidity was near normal for the year at 39.7%, slightly below the 20-year annual mean of 40.6%.

Winds were very close to average for the same period. All months recorded average wind speeds that were within 1.0 mile per hour of the respective historical monthly mean.

Temperature

In 2016 the MWL experienced 94 degrees of temperature variability, with a low of 7.9°F in February and a high of 102.2°F in June. The average temperature for the year was 58°F, slightly above the mean of 57.3°F.

4.0 September 2016 Inspection Results

The September 1, 2016 MWL ET Cover Biology Inspection occurred during the New Mexico growing season, 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.

The September 2016 MWL ET Cover Biology Inspection results confirmed the ET Cover continues to meet the successful revegetation criteria defined in the MWL LTMMP, Section 4.1 (SNL/NM March 2012). The approximate foliar coverage of living plants was 51%, 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, with native species spaced evenly across the cover. The overall appearance of the mature native grass community was very similar the surrounding vegetation. The native bunch grasses in 2016 were green, with actively-photosynthesizing blades of grass mixed with brown blades of grass from previous years. Very few weeds were present on the MWL ET Cover, mostly a limited number of small Russian thistle seedlings.

No burrows were observed on the MWL ET Cover during the September 2016 Biology 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. Fourteen ant hills were observed, primarily occurring on the side-slopes of the cover.

2016 Chemical Waste Landfill Biology Report

Biota sampling locations were identified for anthills during the September 2016 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 obtain samples from different areas of the ET Cover. No burrows or potentially deep-rooted plants were observed in 2016. Biota sampling activities and results are presented in Chapter 8 of this MWL Annual LTMM Report.

5.0 Cover Maintenance

Maintenance activities performed on the MWL ET Cover during the 2016 – 2017 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. A thorny shrub (Pale Wolfberry [*Lycium pallidum*]) was observed on the western perimeter (outside the fence) during the March 2017 quarterly inspection and was removed as a best management practice.

6.0 Recommendations

The MWL ET Cover Biology Inspections will continue on an annual frequency and be conducted in August or September. As a best management practice, the SNL staff biologist will document growing season observations and provide recommendations as needed to maintain or improve the ecological health and integrity of the ET Cover.

Weed removal events will likely be needed during the 2017 – 2018 reporting period to clear the perimeter fence and remove windblown tumbleweeds from the ET Cover and perimeter drainage based on LTMMMP inspection requirements. Pre- and/or 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. Four-wing saltbush and any other potentially deep-rooted plants will be pulled by hand, clipped at the ground surface, or removed for biota sampling.

7.0 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 (April 2017)

Accessed April 2017.

<http://droughtmonitor.unl.edu/>

2016 Chemical 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 September 1, 2016 MWL ET Cover Photographs – Main Cover Surface

2016 Chemical Waste Landfill Biology Report



North Slope: facing west from the eastern end



West Slope: facing south from northern end



South Slope: facing east from the western end



East Slope: facing north from north of the dogleg bend

Figure 2 September 1, 2016 MWL ET Cover Photographs – Cover Side Slopes

ANNEX H

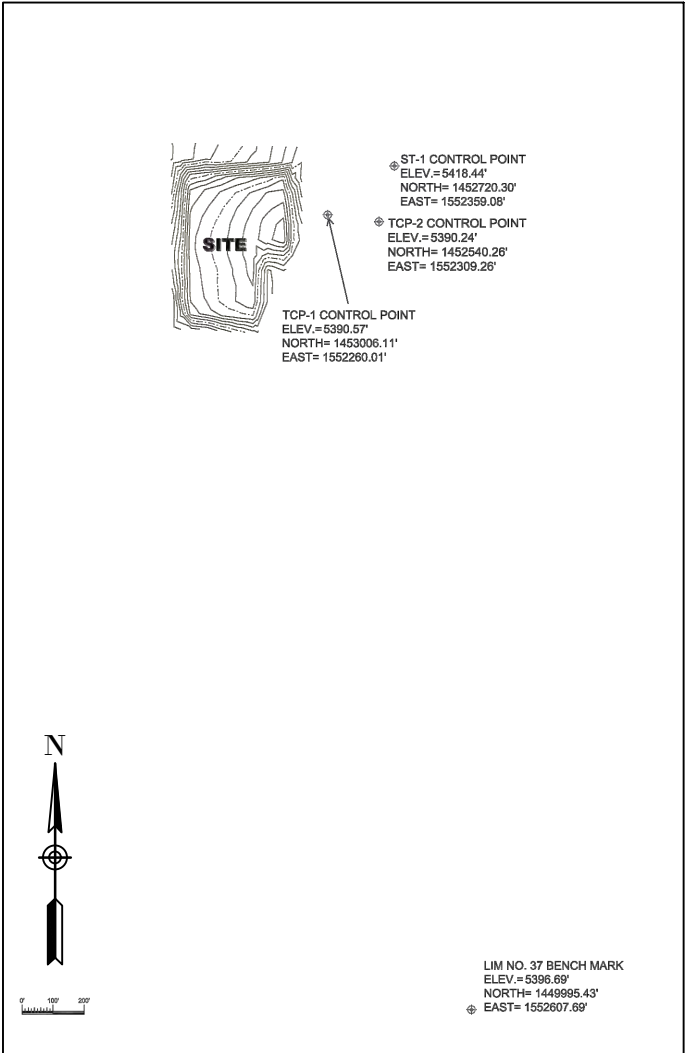
As-Built Drawings – Mixed Waste Landfill Evapotranspirative Cover with Erosion Control

Revised January 2017

EVAPOTRANSPIRATIVE COVER WITH EROSION CONTROL AND MONITORING WELL PROTECTION
AT THE MIXED WASTE LANDFILL (MWL), SANDIA NATIONAL LABORATORIES
ALBUQUERQUE, NEW MEXICO
JANUARY 2017

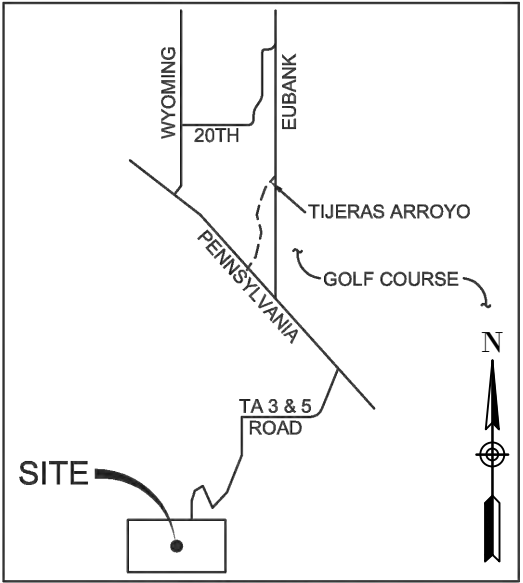


VICINITY MAP
NTS



BENCHMARK MAP

NOTE:
SURVEY DATA HAS BEEN ADJUSTED
WITH NEW CONTROL POINT
INFORMATION



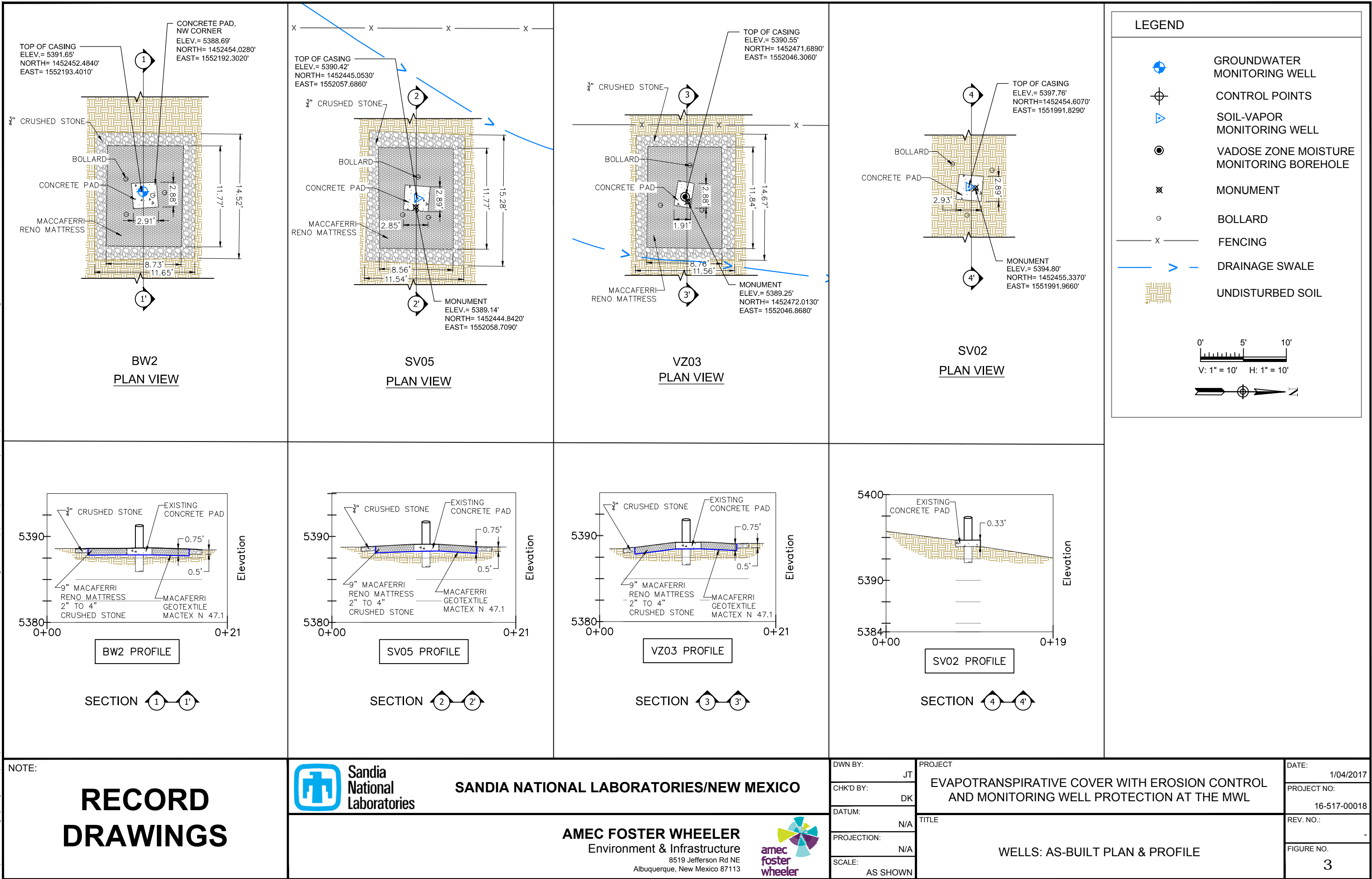
LOCATION MAP
NTS

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TITLE SHEET.....	1	
SITE PLAN.....	2	
WELLS: AS-BUILT PLAN & PROFILE.....	3	
WELLS: AS-BUILT PLAN & PROFILE.....	4	
WELLS: AS-BUILT PLAN & PROFILE.....	5	
WELLS: AS-BUILT PLAN & PROFILE.....	6	
SECTIONS.....	7	
DETAILS.....	8	

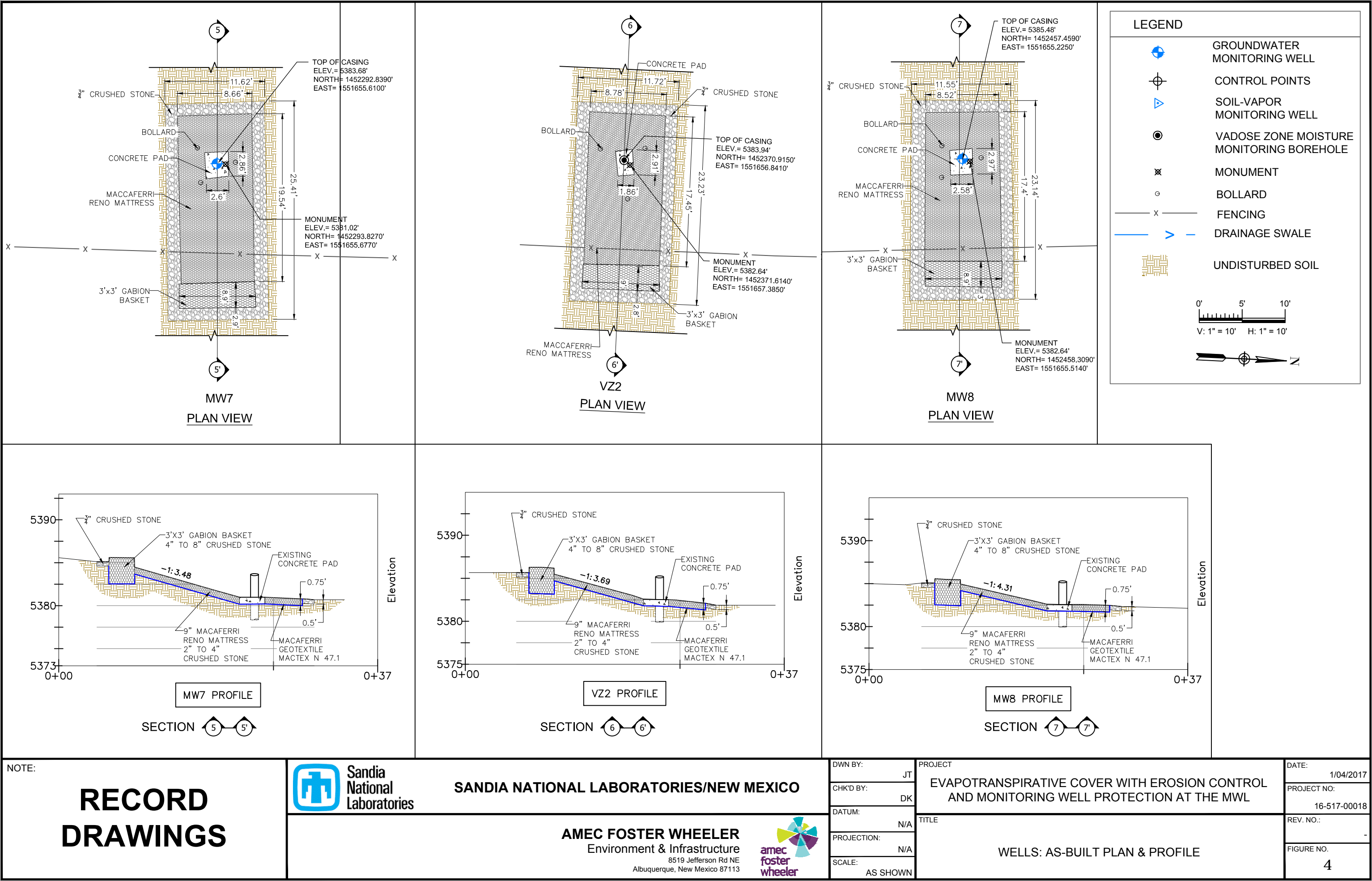
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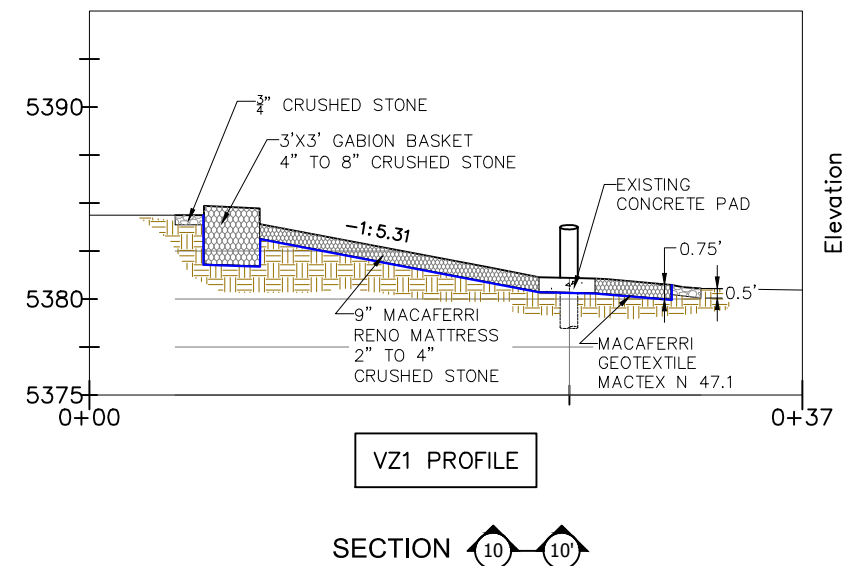
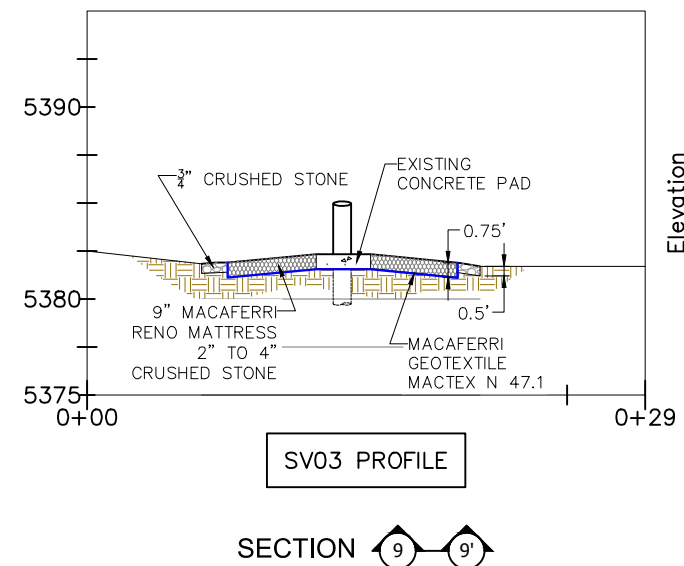
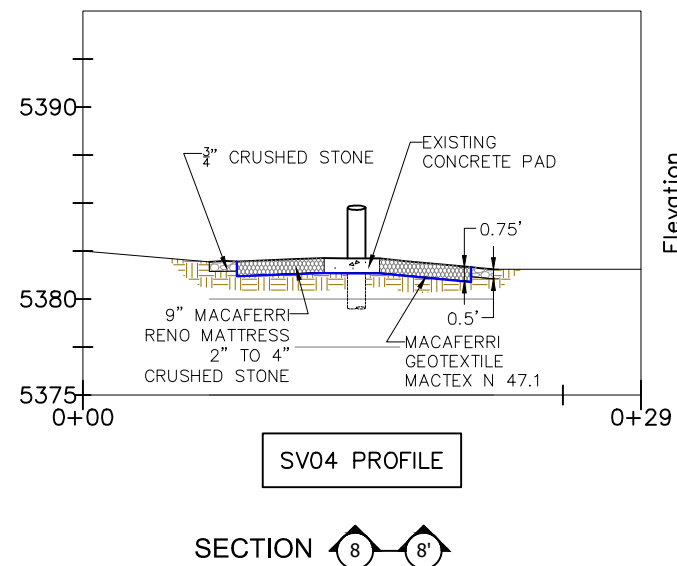
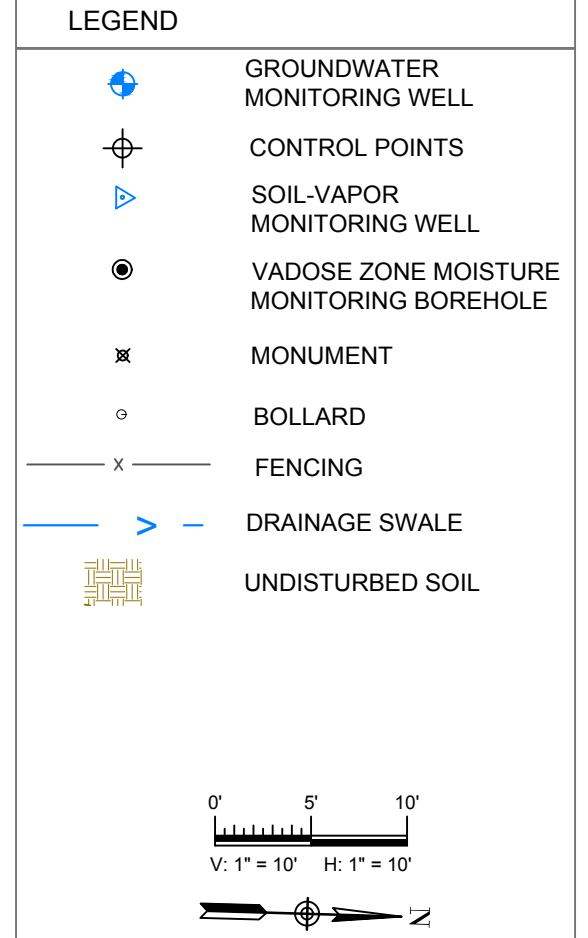
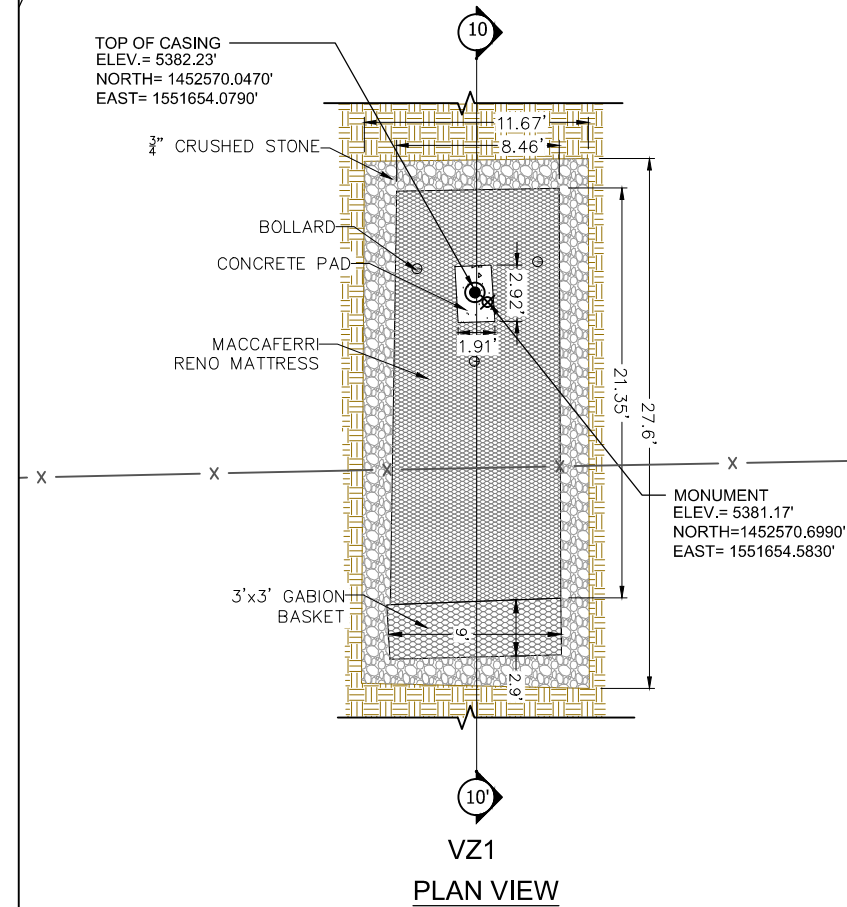
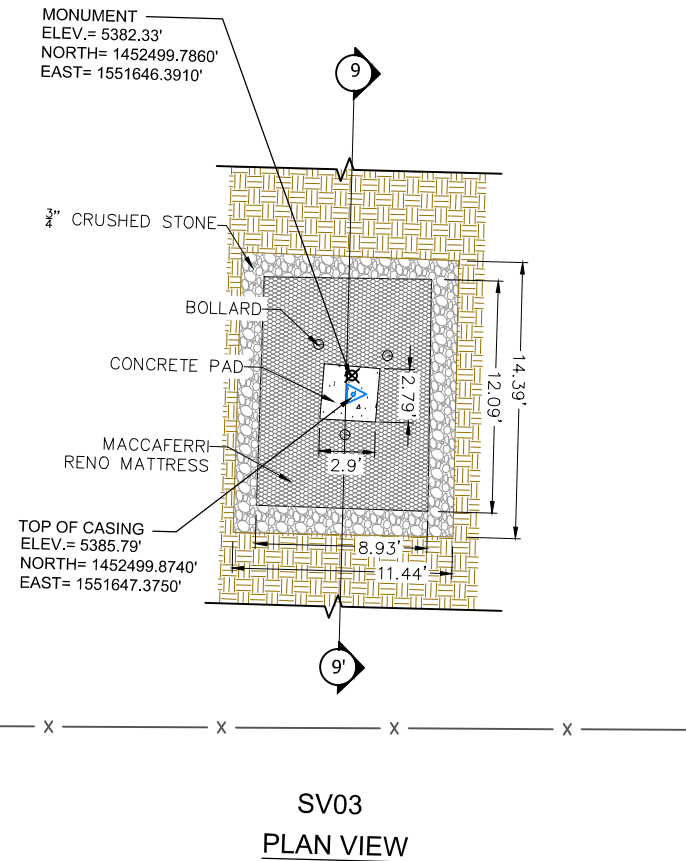
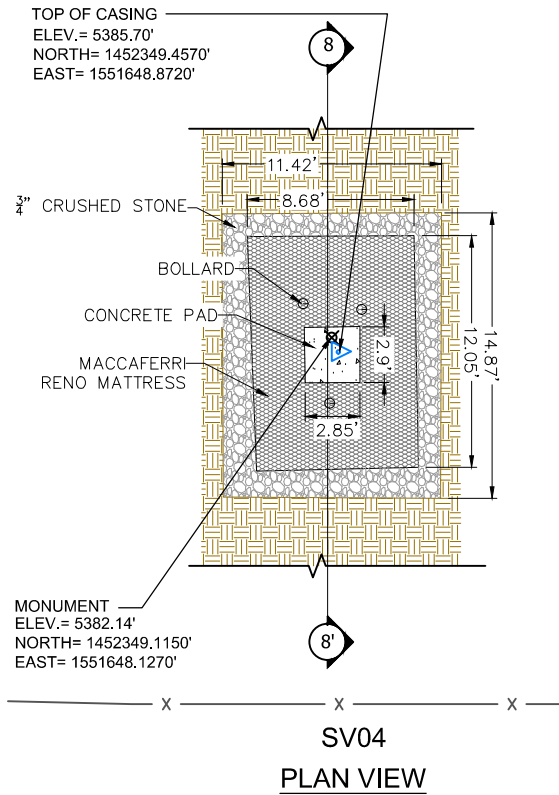
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NOTE:

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Environment & Infrastructure
8519 Jefferson Rd NE
Albuquerque, New Mexico 87113



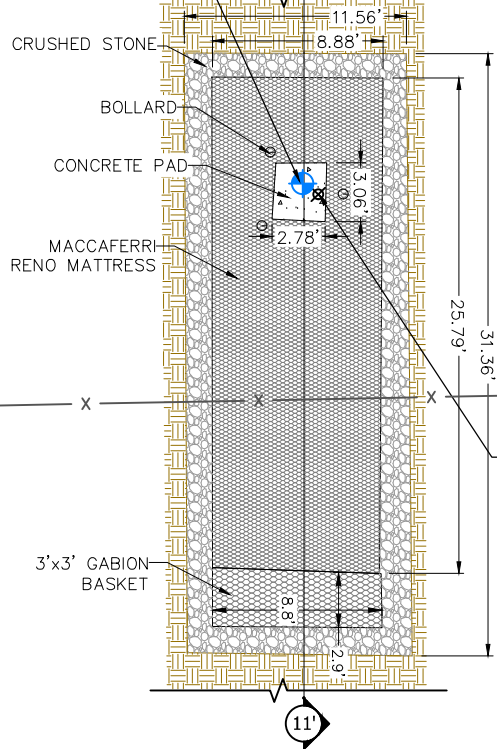
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CHK'D BY: DK
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PROJECTION: N/A
SCALE: AS SHOWN

PROJECT
EVAPOTRANSPIRATIVE COVER WITH EROSION CONTROL
AND MONITORING WELL PROTECTION AT THE MWL
TITLE
WELLS: AS-BUILT PLAN & PROFILE

DATE: 1/04/2017
PROJECT NO: 16-517-00018
REV. NO.: -
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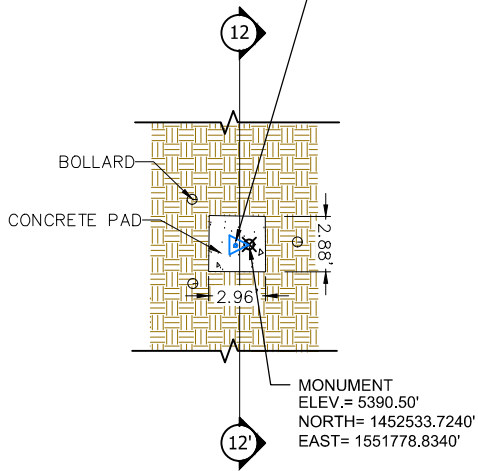
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TOP OF CASING
ELEV.= 5382.58'
NORTH= 1452621.7440'
EAST= 1551650.9800'



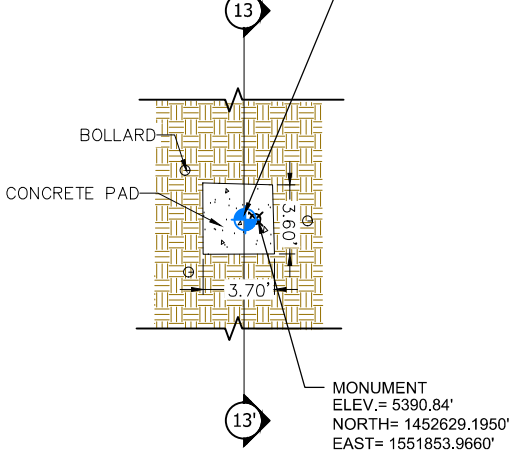
MW9
PLAN VIEW

TOP OF CASING
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NORTH= 1452533.0250'
EAST= 1551778.8930'



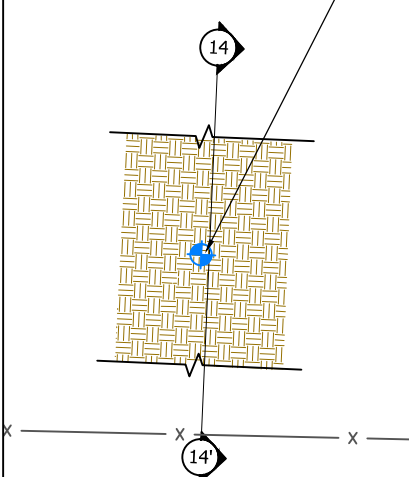
SV01
PLAN VIEW

TOP OF CASING
ELEV.= 5392.80'
NORTH= 1452628.6580'
EAST= 1551854.0000'



MW4
PLAN VIEW

TOP OF CASING
ELEV.= 5381.76'
NORTH= 1452539.1650'
EAST= 1551654.5130'



MW3
PLAN VIEW

LEGEND



GROUNDWATER
MONITORING WELL



CONTROL POINTS



SOIL-VAPOR
MONITORING WELL



VADOSE ZONE MOISTURE
MONITORING BOREHOLE



MONUMENT



BOLLARD



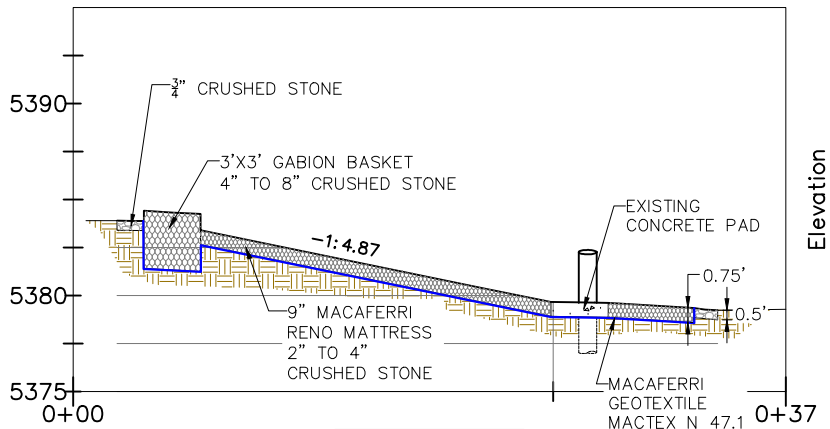
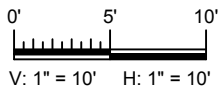
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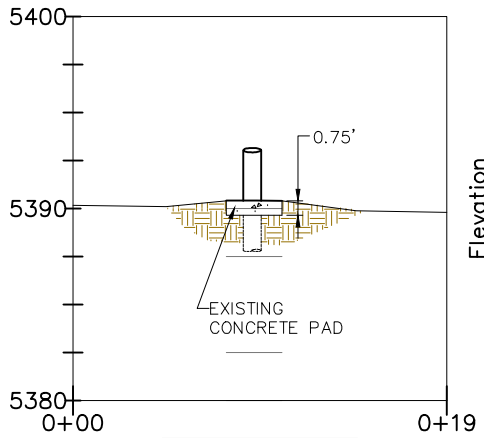
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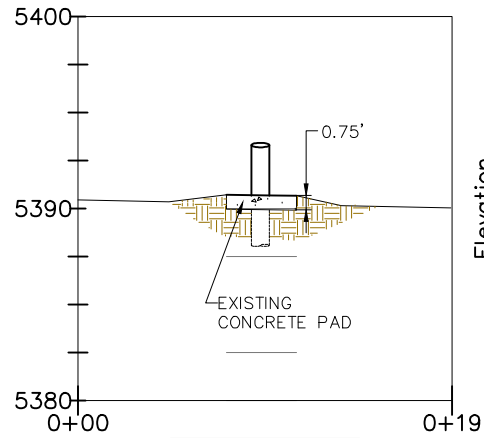
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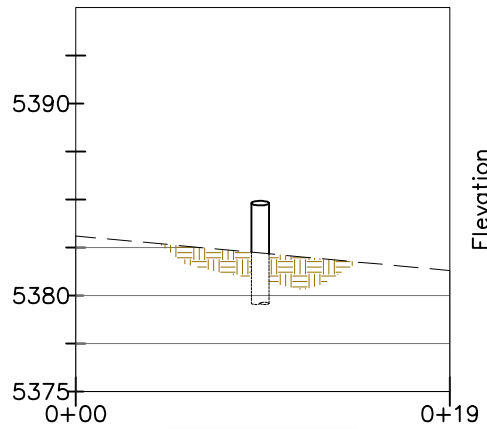
MW9 PROFILE
SECTION 11' 11'



SV01 PROFILE
SECTION 12' 12'



MW4 PROFILE
SECTION 13' 13'



MW3 PROFILE
SECTION 14' 14'

NOTE:

RECORD
DRAWINGS



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Environment & Infrastructure
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Albuquerque, New Mexico 87113



DWN BY:

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CHK'D BY:

DK

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N/A

PROJECTION:

N/A

SCALE:

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PROJECT

EVAPOTRANSPIRATIVE COVER WITH EROSION CONTROL
AND MONITORING WELL PROTECTION AT THE MWL

TITLE

WELLS: AS-BUILT PLAN & PROFILE

DATE:

1/04/2017

PROJECT NO.:

16-517-00018

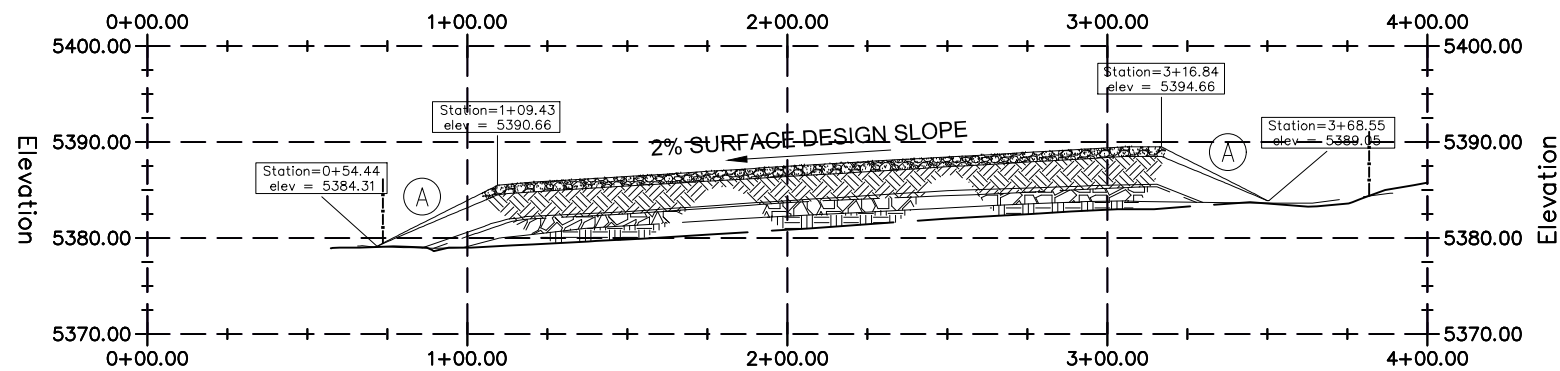
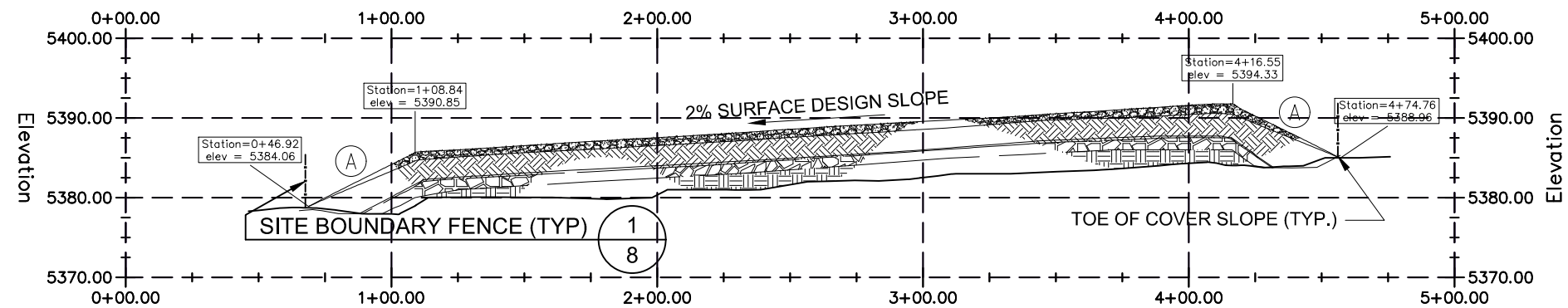
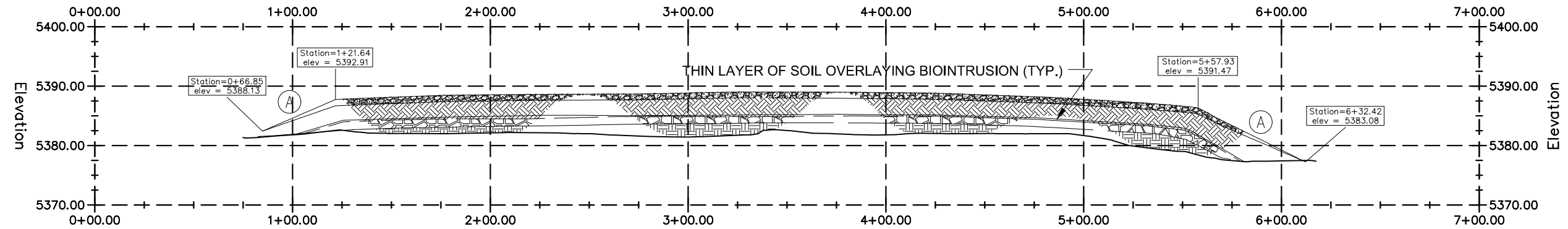
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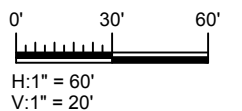
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LEGEND

- TOPSOIL
- NATIVE SOIL
- BIOINTRUSION
- SUBGRADE
- EXISTING SURFACE
- ALL SIDE SLOPES AT 6:1 OR FLATTER (TYP.)
- SECTION LETTER
- SHEET NUMBER WHERE REFERENCED FROM



NOTE:

RECORD DRAWINGS



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Albuquerque, New Mexico 87113



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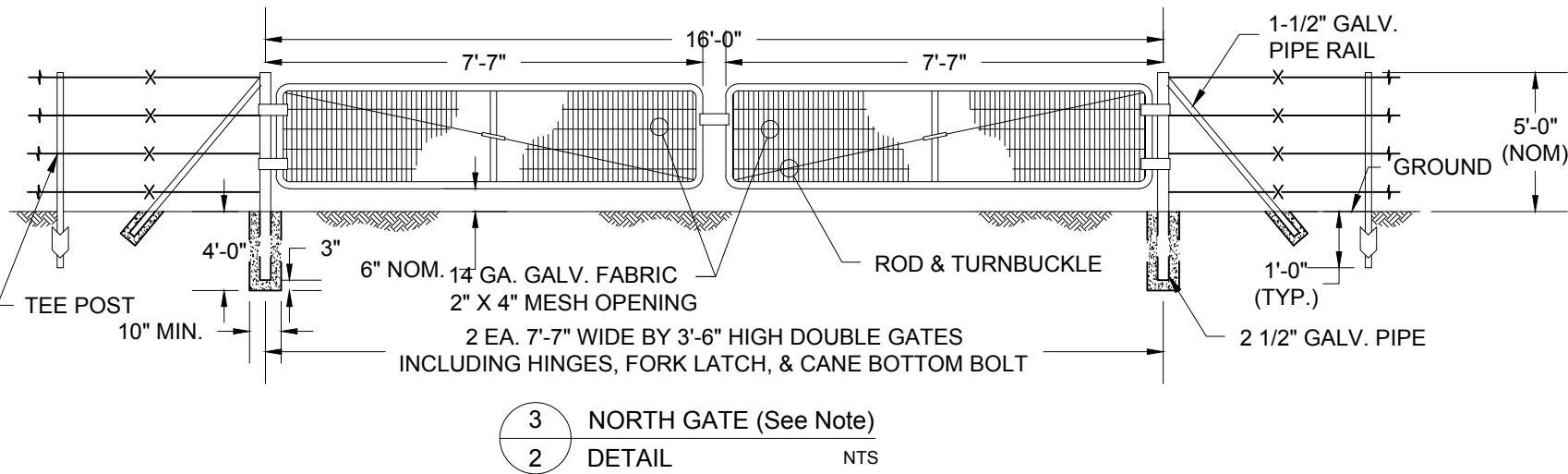
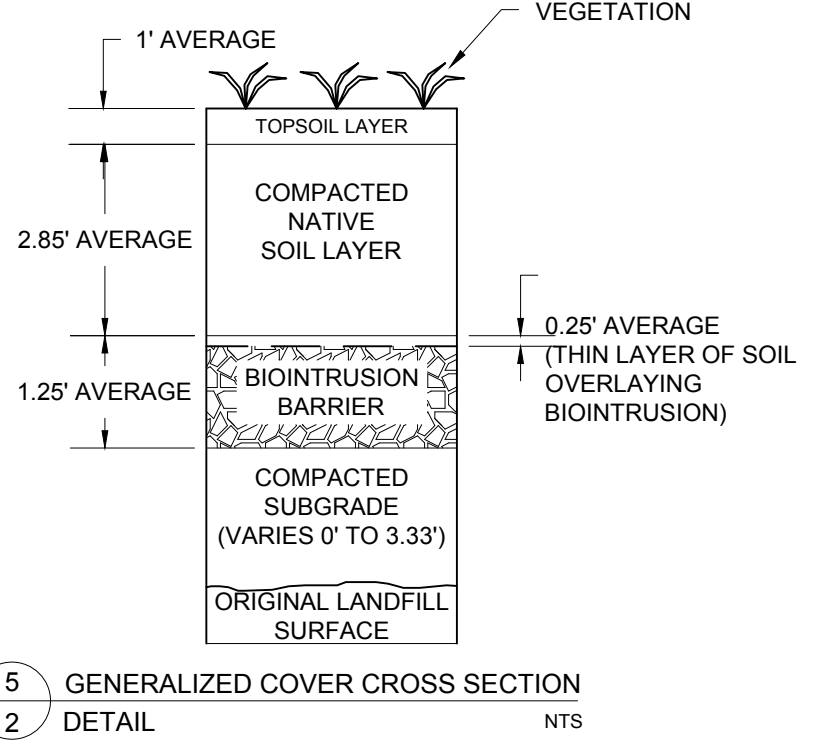
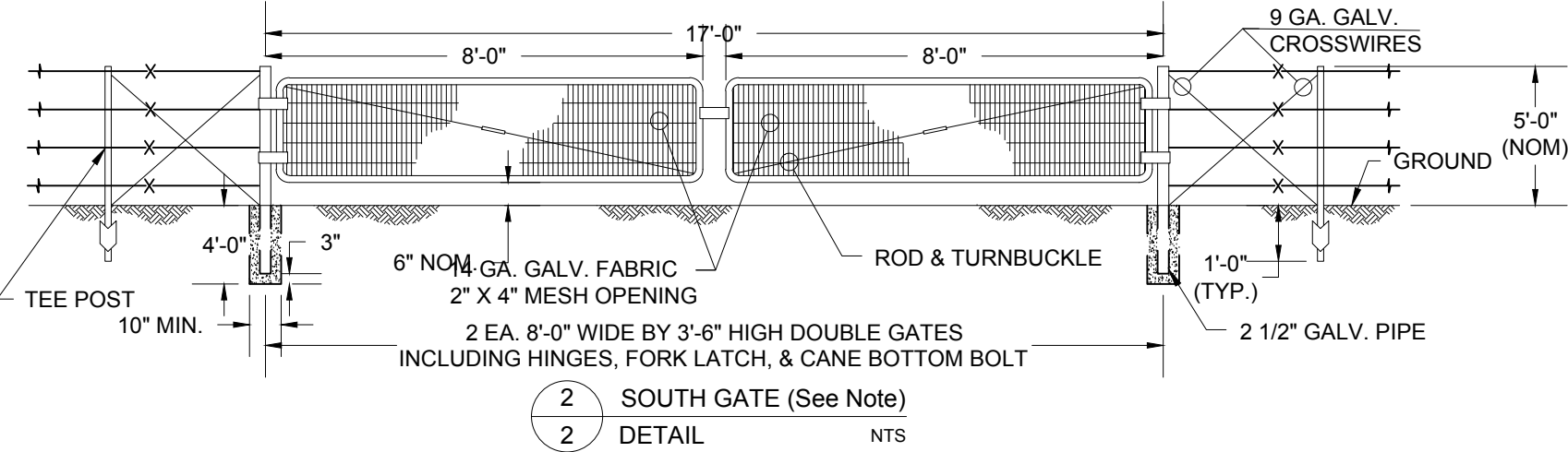
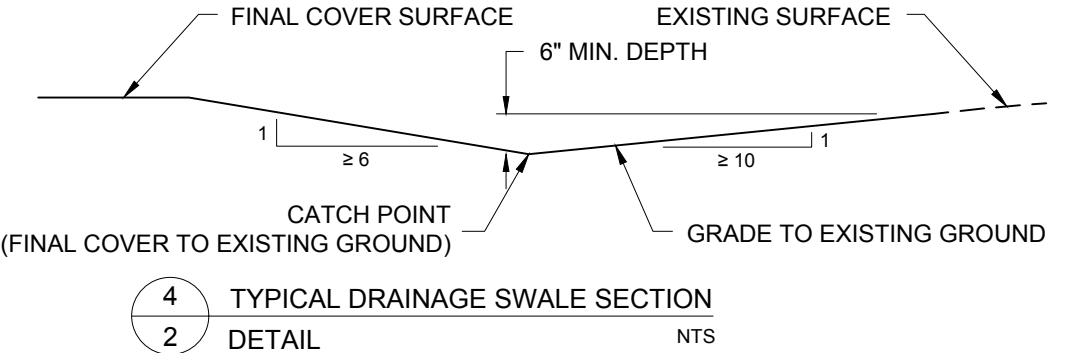
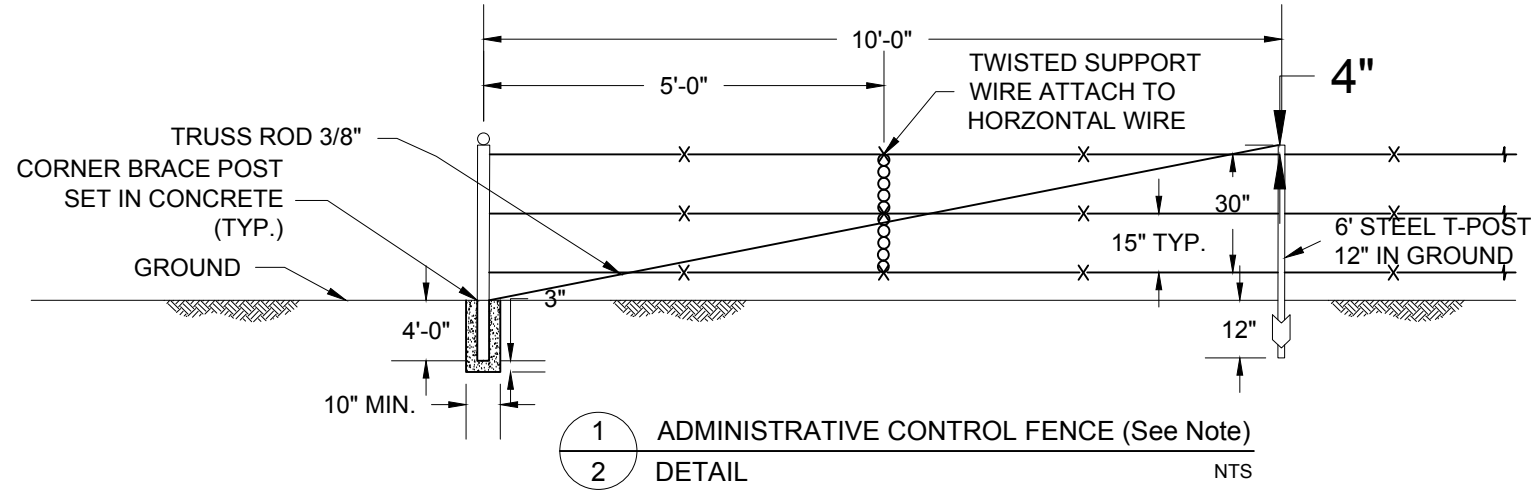
PROJECT
EVAPOTRANSPIRATIVE COVER WITH EROSION CONTROL
AND MONITORING WELL PROTECTION AT THE MWL

TITLE

SECTIONS

DATE: 1/04/2017
PROJECT NO: 16-517-00018
REV. NO.: -
FIGURE NO: 7

P:\consulting\projects\16\16-517-00018.SNL Environmental Program Support\As-Built\1651700018 AS-BUILT.dwg



LEGEND	
1	DETAIL NUMBER
2	SHEET NUMBER WHERE REFERENCED FROM

NOTE:

RECORD
DRAWINGS



SANDIA NATIONAL LABORATORIES/NEW MEXICO

AMEC FOSTER WHEELER
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8519 Jefferson Rd NE
Albuquerque, New Mexico 87113



DWN BY:	JT
CHK'D BY:	DK
DATUM:	N/A
PROJECTION:	N/A
SCALE:	AS SHOWN

PROJECT	TITLE
EVAPOTRANSPIRATIVE COVER WITH EROSION CONTROL AND MONITORING WELL PROTECTION AT THE MWL	DETAILS

DATE:	1/04/2017
PROJECT NO:	16-517-00018
REV. NO.:	-
FIGURE NO.	8